ALUMINUM ELECTROLYTIC CAPACITORS

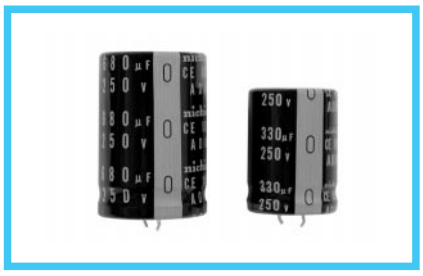
nichicon

AD series

Snap-in Terminal Type, Withstanding Overvoltage series

- Withstanding 3000 hours application of ripple current at 105°C.
- Suited for 100V/200V switch-over use in switching power supplies.
- Withstanding overvoltage and suited for IEC-60950 application.

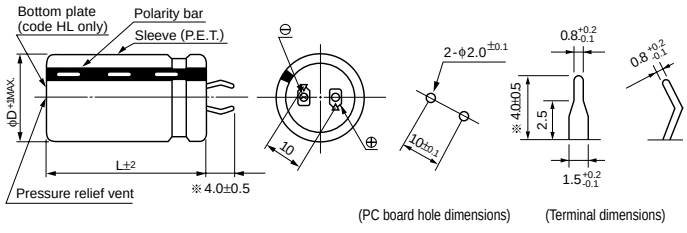
AD ← Withstand overvoltage GU



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C
Rated Voltage Range	250V
Rated Capacitance Range	82 ~ 1200μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C:Rated Capacitance (μF), V:Voltage (V)]
tan δ	Rated voltage(V): 250; tan δ (MAX.): 0.15 — Measurement frequency:120Hz, Temperature:20°C
Stability at Low Temperature	Rated voltage(V): 250; Impedance ratio ZT/Z20 (MAX.): Z—25°C/Z+20°C: 3; Z—40°C/Z+20°C: 12 — Measurement frequency:120Hz
Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current)for 3000 hours at 105°C, capacitors meet the characteristic requirements listed at right. — Capacitance change: Within ±20% of intial value; tan δ: 200% or less of intial spesified value; Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right. — Capacitance change: Within ±15% of intial value; tan δ: 150% or less of intial spesified value; Leakage current: Initial specified value or less
Withstand excess voltage	Not defective after 7 hours continuous charges of 360VDC at 70°C atmosphere.
Marking	Printed with white color letter on black sleeve.

■Drawing



※ The other terminal is also available upon request.
Please refer page 197 for schematic of dimensions.

Type numbering system (Example : 250V 560μF)

1 2 3 4 5 6 7 8 9 10 11 12
L A D 2 E 5 6 1 M E L A

- Case dia. code
- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (560μF)
- Rated voltage (250V)
- Series name
- Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(μF)	Code (V(Code), φD)	250V (2E) 20		22		25		30		35	
82	820	20 × 20	0.42								
100	101	20 × 25	0.53	22 × 20	0.53						
120	121	20 × 25	0.65	22 × 25	0.65	25 × 20	0.65				
150	151	20 × 30	0.79	22 × 25	0.79	25 × 25	0.79				
180	181	20 × 35	0.90	22 × 25	0.90	25 × 25	0.90	30 × 20	0.90		
220	221	20 × 40	1.00	22 × 30	1.00	25 × 25	1.00	30 × 25	1.00		
270	271	20 × 45	1.15	22 × 35	1.15	25 × 30	1.15	30 × 25	1.15	35 × 20	1.15
330	331	20 × 50	1.30	22 × 40	1.30	25 × 35	1.30	30 × 25	1.30	35 × 25	1.30
390	391			22 × 45	1.49	25 × 40	1.49	30 × 30	1.49	35 × 25	1.49
470	471					25 × 45	1.65	30 × 35	1.65	35 × 25	1.65
560	561					25 × 50	1.80	30 × 40	1.80	35 × 30	1.80
680	681							30 × 45	2.00	35 × 35	2.00
820	821							30 × 50	2.30	35 × 40	2.30
1000	102									35 × 45	2.47
1200	122									35 × 50	2.60
										Case size	Rated ripple

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)	50	60	120	300	1k	10k	50k~
Coefficient	0.81	0.85	1.00	1.17	1.32	1.45	1.50

Minimum order quantity : 50pcs.

PLASTIC FILM CAPACITORS

nichicon

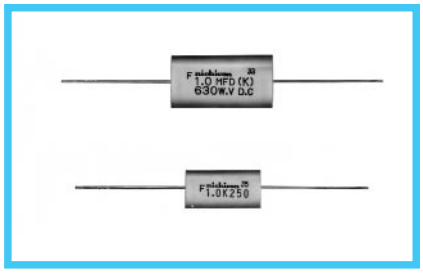
AF

Metallized Polypropylene Film Capacitor

series (Tape-wrapped Axial Type for High Frequency Applications)

For High Frequency

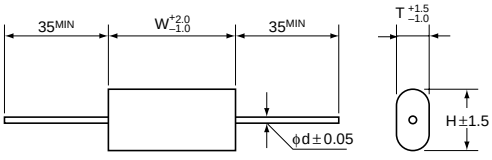
- Non-inductive construction, with axial lead wires.
- Superior performance in high frequency circuit and charging / discharging circuit due to excellent characteristics of metallized polypropylene film dielectric.
- Highly reliable with self-healing property.
- Tape-wrapped and epoxy endfilled at both leads for superior mechanical strength and humidity resistance.
- Some A.C. applications may cause capacitor failure, over heating of the capacitors and / or discharge may be the result. Please contact us about details for A.C. application.



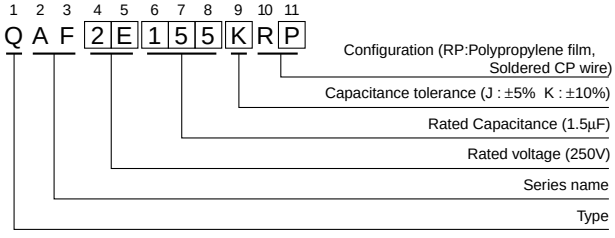
Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage	250, 400, 630V.D.C.
Rated Capacitance Range	0.15 ~ 10μF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.1% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.33μF : 30000 MΩ or more C > 0.33μF : 10000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Adhesive polyester film, resin

Drawing



Type numbering system (Example : 250V 1.5μF)



Dimensions

Unit : mm

Cap.(μF)	Code \ Size \ V(Code)	250VDC (2E)				400VDC (2G)				630VDC (2J)			
		T	W	H	d	T	W	H	d	T	W	H	d
0.15	154									4.8	28.0	11.4	0.8
0.22	224									5.6	28.0	13.8	0.8
0.33	334					6.1	28.0	12.7	0.8	7.4	28.0	15.6	0.8
0.47	474	4.3	28.0	10.9	0.8	7.7	28.0	14.2	0.8	7.8	33.0	15.9	0.8
0.68	684	5.0	28.0	13.2	0.8	9.0	28.0	17.2	0.8	9.9	33.0	18.1	0.8
1.0	105	6.5	28.0	14.7	0.8	9.7	33.0	17.9	0.8	10.4	38.0	20.1	1.0
1.5	155	8.6	28.0	16.7	0.8	11.9	33.0	21.6	0.8	12.0	44.0	21.7	1.0
2.2	225	9.3	33.0	17.5	0.8	13.3	38.0	22.7	1.0	15.3	44.0	25.0	1.0
3.3	335	11.4	33.0	21.1	0.8	15.4	44.0	25.1	1.0	17.9	50.0	27.6	1.0
4.7	475	12.6	38.0	22.3	1.0	17.5	50.0	27.2	1.0				
6.8	685	14.3	44.0	24.0	1.0								
10.0	106	16.6	50.0	26.3	1.0								

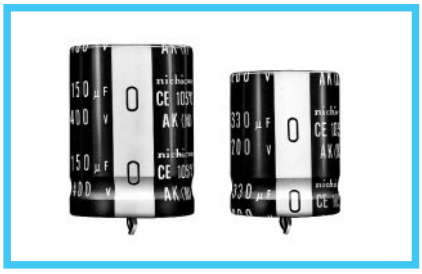
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

AK

Snap-in Terminal Type, Permissible Abnormal Voltage, Wide Temperature Range
series

- Withstanding 2000 hours application of ripple current at 105°C.
- Extended voltage range at 200V, 400V and 420V.
- Improved safety features for abnormally excessive voltage.
- Ideally suited for the equipment used at voltage fluctuating area.



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 25 ~ +105°C
Rated Voltage Range	200・400・420V
Rated Capacitance Range	33 ~ 1200μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	I ≦ $3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF),V : Voltage(V)]
tan δ	0.20MAX. 120Hz 20°C

Stability at Low Temperature

Rated voltage(V)		200	400・420	Measurement frequency : 120Hz
Impedance ratio	Z—25°C/Z+20°C	8	8	

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Safety Performance

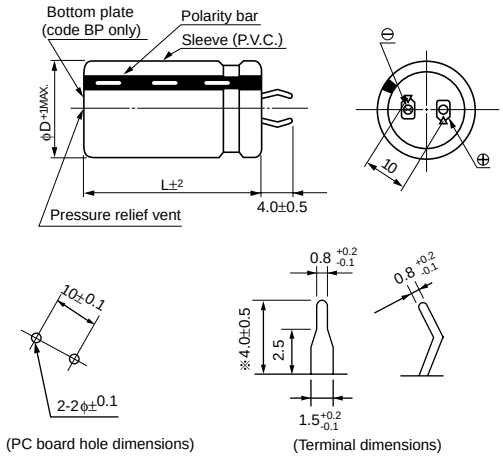
The pressure relief vent will operate in normal conditions, with no dangerous conditions such as flames, ignitions or dispersion of pieces of the capacitor and/or case.

rating		test conditions	
Voltage (V)	Capacitance (μF)	Limited DC current	Test voltage
200	C < 330	4 A	300VDC and 375VDC
	330 ≦ C < 470	5 A	
	470 ≦ C	7 A	
400	C < 100	2 A	500VDC and 600VDC
	100 ≦ C < 220	4 A	
	220 ≦ C	7 A	
420	C < 100	2 A	520VDC and 630VDC
	100 ≦ C < 220	4 A	
	220 ≦ C	7 A	

Marking

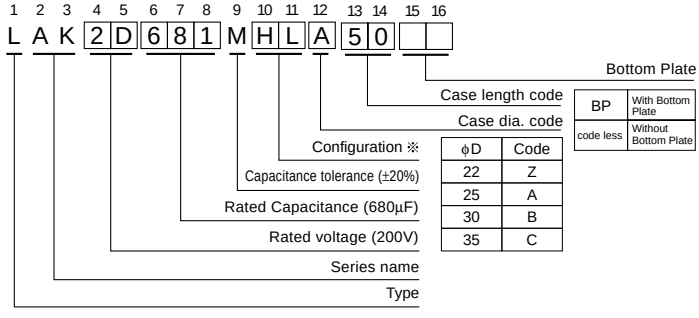
Printed with white color letter on dark blue sleeve

■Drawing



(PC board hole dimensions) (Terminal dimensions)

Type numbering system (Example : 200V 680μF)



※Please contact to us if Eco-Products are required.

Minimum order quantity : 50pcs.

● Dimension table in next page.

AK series

■Dimensions

D × L (mm)

Cap.(μF)	Code	V(Code) / φD	200V (2D)				400V (2G)				420V (W6)			
			22	25	30	35	22	25	30	35	22	25	30	35
33	330						22×20 0.22				22×25 0.25			
39	390						22×20 0.30							
47	470		22×20 0.35				22×25 0.35	25×20 0.35	30×20 0.40		22×25 0.35			
56	560						22×25 0.38	25×20 0.38			22×25 0.38			
68	680						22×25 0.40	25×25 0.45	30×20 0.50		22×30 0.45	25×25 0.45		
82	820						22×30 0.50	25×25 0.50	30×20 0.50		22×35 0.64	25×30 0.64		
100	101		22×20 0.50				22×35 0.55	25×30 0.53	30×25 0.53	35×20 0.55	22×40 0.69	25×30 0.69	30×25 0.69	
120	121						22×40 0.60	25×30 0.60	30×25 0.60		22×45 0.75	25×35 0.75	30×30 0.75	35×25 0.75
150	151			25×20 0.65			22×45 0.70	25×35 0.70	30×30 0.70	35×25 0.70		25×40 0.82	30×30 0.82	35×25 0.82
180	181		22×25 0.70		30×20 0.70		22×50 0.80	25×40 0.80	30×30 0.80	35×25 0.80		25×45 0.90	30×35 0.90	35×30 0.90
220	221		22×25 0.74					25×45 0.90	30×35 0.90	35×30 0.90			30×40 1.00	35×35 1.00
270	271		22×30 0.90	25×25 0.85		35×20 1.10			30×40 0.98	35×35 0.96			30×45 1.10	35×40 1.10
330	331		22×30 1.05	25×30 1.05	30×25 1.05				30×50 1.21	35×40 1.21				35×45 1.20
390	391		22×35 1.20	25×30 1.20	30×25 1.20					35×45 1.32				
470	471		22×40 1.30	25×35 1.30	30×25 1.35					35×50 1.45				
560	561		22×45 1.50	25×40 1.50	30×35 1.55	35×25 1.55								
680	681			25×50 1.70	30×40 1.70	35×30 1.70								
820	821				30×45 1.99	35×35 1.99								
1000	102				30×50 2.10	35×40 2.10								
1200	122					35×50 2.30								Case size Rated ripple

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	1k	10k~
Coefficient	200V	0.85	0.88	1.00	1.15	1.20
	400•420V	0.88	0.90	1.00	1.10	1.15

Eco-Products “GeoCap”

Nichicon promotes environmentally conscious practices.

Nichicon offers “GeoCap”,which has completely lead free terminals and contains no polyvinyl chloride in the sleeve.

Marking “PET” or “P” is indicated for the products which use polyethylene terephthalate for sleeve materials.

■ Aluminum Electrolytic Capacitors

Type・Classification		Series	Lead-Free Compliance	Anti Polyvinyl Chloride Compliance
Surface Mount type		ZD, ZR, ZE, ZG, ZS, ZP, ZT WX, WP, WT, WF, WG, UP, UT UV, UA, UU, UD, UB, UR, UX, UK UG, UJ, UN, UH	Available upon request	No polyvinyl chloride contained
Radiallead type	Ultra-Miniature type	MA, ML, MP, MT, MF, MV, MJ SA, SR, SL, SP, ST, SV, SF		Available upon request
	Standard type	VK, VR, VY, VZ, RS, RZ, RU, RY, VP, ET, EP		
	High Reliability type	PM, PW, HV, HD, HC, HE, HM, HN, HZ PJ, PS, PV, PT, PZ, PB, CA, CS, PX, BT, BX		
	For special Circuits	KL, TM, SH, HA, JB, AQ		
	For Audio Equipment	KZ, FG, FX, FW, SK, SW MC, ES, DB, GB		
Snap-in Terminal type	Standard type	LU, LS, LN, DM		
	High Reliability type	GU, GN, GJ, GJ (15) DQ, GK-HH, GY		
	For special Circuits	AD, AK, AQ		
Screw Terminnal type		NR, NX, NT	No Polyvinyl chloride contained	
For Audio Equipment		KG	Available upon request	

APPLICATION GUIDELINES FOR ALUMINUM ELECTROLYTIC CAPACITORS

1. Circuit Design

(1) Please make sure the environmental and mounting conditions to which the capacitor will be exposed to are within the conditions specified in Nichicon's catalog (or alternate Nichicon specifications, such as series drawings).

(2) Operating temperature and applied ripple current must be within Nichicon specification.
①The capacitor must not be used in an ambient temperature which exceeds the operating temperature specified in the Nichicon catalog.
② Do not apply excessive current which exceeds the rated ripple current.

(3) Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.

(4) Aluminum electrolytic capacitors are polarized. Do not apply reverse voltage or AC voltage. Please use bi–polarized capacitors for a circuit that can possibly see reversed polarity.
Note: Even bi–polarized capacitors can not be used for AC voltage application.

(5) It is necessary to use a properly designed aluminum electrolytic capacitor for applications that capacitors are rapidly charged/discharged. The following are given as “rapid charge/discharge” applications. Welding machine, photo flash and servo motor control unit. Please contact us when capacitors are to be used in such a circuit.

(6) Do not apply excess voltage.
① Please pay attention so that the peak voltage, which is DC voltage overlapped by ripple current, will not exceed the rated voltage.
② In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage be will applied to each capacitor equally using a balancing resistor in parallel with the capacitor.

(7) Aluminum electrolytic capacitors must be electrically isolated as follows, since the aluminum case of aluminum electrolytic capacitors is electrically connected to cathode foil through unstable resistance contained on naturally formed oxide layer of the aluminum case and electrolytes’ resistance.
①(a) Case and negative terminal (except axial leaded part such as JIS configuration 02 type)
(b) Case and positive terminal
(c) Case and circuit pattern
②(a) Blank terminal of can type such as JIS configuration 693, 694 or 695 and negative and positive terminal, including the circuit pattern.

(8) Outer sleeve of the capacitor is not guaranteed as an electrical insulator. Do not use a standard sleeve on a capacitor in applications that require the electrical insulation. When the application requires special insulation, please contact our sales office for details.

(9) Capacitors must not be used under the following conditions:
①(a) Capacitors must not be exposed to water (including condensation), brine or oil.
(b) Ambient conditions that include toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc..
(c) Ambient conditions that expose the capacitor to ozone, ultraviolet ray and radiation.
②Severe vibration and physical shock conditions that exceed Nichicon specifications.
Vibration:
Test condition
- vibration frequency range : 10 ~ 55 ~ 10Hz
- sweep rate : 10 ~ 55 ~ 10Hz / minute
- sweep method : logarithmic
- amplitude or acceleration : 1.5mm (max.acceleration is 10G)
- direction of vibration : X, Y, Z direction
- testing time : 2 hours per each direction

Shock is not applicable normally.
If a particular condition is required, Please contact to our sales office.

(10) When designing a circuit board, Please pay attention to following:
①Make the hole spacing on the P.C. board match the lead space of the capacitor.
②There should not be any circuit pattern or circuit wire above the capacitor pressure relief vent.
③Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Gap Required
φ6.3 ~ 16	2mm or more
φ18 ~ 35	3mm or more
φ40 or more	5mm or more

④ In case the vent side is placed toward P.C. board
(such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated. The hole should be made to match the capacitor vent position.
⑤ Do not install screw terminal capacitor with end seal side down. When you install a screw terminal capacitor in a horizontal mount, the positive terminal must be in the upper position.

(11) The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive. When it comes in contact with the P.C. board, there is a possibility of pattern corrosion or short circuit between the circuit pattern which could in result smoking or catching fire.
Do not locate any circuit pattern beneath the capacitor end seal.

(12) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reverse side of P.C. board (under the capacitor).

(13) Please refer to the pad size layout recommendations in our catalog when designing in surface mount capacitors.

(14) Electrical characteristics may vary depending on changes in temperature and frequency. Please consider this variation when you design circuits.

(15) When you are designing capacitors for use on double-sides P.C. boards, avoid circuit patterns or through holes (such to connect both sides), that are placed under the capacitor.

(16) The torque for terminal screw or brackets screws must be within the specified value on Nichicon's drawings.

(17) When you install more than 2 capacitors in parallel, consider the balance of current flowing into the capacitors.
Care must be taken if you use solid conductive polymer aluminum electrolytic capacitors in parallel with standard aluminum electrolytic capacitors.

(18) If more than 2 aluminum electrolytic capacitors are used in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each capacitor equally using a balancing resistor in parallel with the capacitor.

2. Mounting

(1) Once a capacitor has been assembled in the set and power applied, do not attempt to re-use the capacitor in other circuits or application.

(2) Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using a 1kΩ resistor.

(3) Leakage current of the parts that have been stored for more than 2 years may increase. When leakage current has increased, please perform a voltage treatment using 1kΩ resistor.

(4) Please confirm ratings before installing capacitors on the P.C. board.

(5) Please confirm polarity before in stalling capacitors on the P.C. board.

(6) Do not drop capacitors on the floor, nor use a capacitor that was dropped.

(7) Be careful not to deform the capacitor during installation.

(8) Please confirm that the lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation.

(9) Snap-in can type capacitor such as JIS configuration 692, 693, 694 and 695 type should be installed tightly to the P.C. board (allow no gap between the P.C. board an bottom of the capacitor).

(10) Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.

(11) Please pay attention to that the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounter, or by product checker,or by centering mechanism.

(12) Hand soldering.
①Soldering condition must be confirmed to be within Nichicon specification.
Bit temperature: 350±10°C
Application time of soldering iron: $3\pm^{1}_{0}$ second
② If it is necessary that the leads must be formed due to a mismatch of the lead space to hole space on the board, bend the lead prior to soldering without applying too much stress to the capacitor.
③ If you need to remove parts which were soldered, please melt the solder enough so that stress is not applied to lead.
④Please pay attention so that solder iron does not touch any portion of capacitor body.

(13) Flow soldering (Wave solder)
①Aluminum capacitor body must not be submerged into the solder bath. Aluminum capacitors must be mounted on the "top side" of the P.C. board and only allow the bottom side of the P.C. board to come in contact with the solder.

②Soldering condition must be confirmed to be within Nichicon specification.
Solder temperature: 260±5°C Immersing lead time:10±1 second Thickness of P.C. board : 1.6mm
③Please avoid having flux adhere to any portion except the terminal.
④Please avoid contact between other components and the aluminum capacitor.

(14) Reflow soldering (SMD only)
①Soldering condition must be confirmed to be within Nichicon specification.
Pre-heationg : Less than 150°C, 90 seconds max.
Max. temperature at capacitor top during reflow : 230°C
The duration for over 200°C temperature at capacitor
top: 20 seconds max.
The duration from the pre-heat temperature to peak temperature of reflow varies due to changes of the peak temperature. Refer to page 17 for details.
②When an infrared heater is used, please pay attention to the extent of heating since the absorption rate of infrared, will vary due to difference in the color of the capacitor body, material of the sleeve and capacitor size.
③The number of reflow time for SMD aluminum electrolytic capacitors shall be one time. If this type of capacitor has to be inevitably subjected to the reflow twice, enough cooling time between the first and second reflow (at least more than 30 minutes) shall be taken to avoid consecutive reflow. Please contact our sales office if you have questions.

(15)Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the P.C. board.

(16)Do not carry the P.C. board by grasping the soldered capacitor.

(17)Please do not allow anything to touch the capacitor after soldering. If P.C. board are stored in stack, please make sure P.C. board or the other components do not touch the capacitor.
The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering.

(18) Cleaning
①Do not clean capacitors with halogenated cleaning agent. However, if it is necessary to clean with halogenated cleaning agent, use cleaning proof capacitors but within the range specified in the specification.
②Recommeded cleaning method

Applicable	: Any type, any ratings
Cleaning agents	: Pine Alpha ST–100S, Clean Through 750H/750L/710M, Sanelek B–12, Aqua Cleaner 210SEP,Techno Care FRW14 ~ 17, Iso-propyl Alcohol
Cleaning conditions	: Total cleaning time shall be within 5 minutes by immersion,ultrasonic or other method. (Temperature of the cleaning agent shall be 60°C or lower.)After cleaning, capacitors should be dried using hot air for minimum of 10 minutes along with the PC board. Hot air temperature should be below the maximum operating temperature of the capacitor. Insufficient dries dry after water rinse may cause appearance problems, sleeve shrink, bottom-plate bulge and such.It is recommended to monitor conductivity, pH,and concentration of the agent.Please do NOT keep a product after cleaning in condition that cleaning agents exists as steam,or in non ventilated containers.

③CFC substitute
The capacitors can be cleaned using AK-225AES as shown in table below. Please monitor contamination of solution by measuring conductivity, pH, specific gravity, water content and such. Do not store capacitors in a cleaning agent atomosphere or sealed container after cleaning.

Cleaning Agent	AK-225AES		
Applicable Series	Miniature Type	Chip (SMD) Type	ZD, ZR, ZE, ZG, ZS, ZP, WX, WP, WT, WF, WG, UP, UT, UA, UU, UD, UR, UX, UK, UN, UH UG (Less than 100V) UJ (Less than 100V)
		Ultra-Miniature Type	MA, MP, ML, MT, MF, MJ, SA, SR, SL, SP, ST, SF
		Standard Products	VK (Less than 100V) VR (Less than 100V) VY (Less than 100V) VZ (Less than 100V) RS (Less than 100V) RZ (Less than 100V) RU(Less than 100V) RY (Less than 100V), VP, ET, EP
		High-Reliability Type	PM (Less than 100V) PW (Less than 100V) HV, HD, HC, HE, HM, HN, HZ PJ (Less than 100V) PS (Less than 100V) PV,PX PB (Less than 100V), BT (Less than 100V), BX
		For Special Circuit	KL, TM, SH, HA, JB VX 02 type (Less than 100V)
		For Audio Use	KZ, FG, FX, FW, SK, SW, MC, ES, DB, GB
	Large Can Type	Standard Products	LS (Less than 100V)
		High-Reliability Type	GU (Less than 100V) GK-HH (Less than 100V)
Cleaning Conditions	Within 5 minutes, total cleaning time by immersion, vapor spray, or ultrasonic and such. For SMD and ultra-miniature type, within 2 minutes total cleaning time. (Temp. of agent: 40°C or below)		

④Avoid using ozone depleting substances for cleaning agents to concern about global environment.
⑤Please consult us when using Cleaning Agents and /or cleaning conditions except aforementioned.

(19) Fixing materials and coating materials
①Do not use any ingredients which contain halogen.
②Please pay attention to remove flux and any contamination which remains in the gap between the end seal and P.C. board and dry that portion well before coating.
③Please do not apply any material all around the capacitor body but apply it partially.
④Please contact our sales office to make sure whether the curing condition of coating material would cause any problems.

(20) Regarding repellent process
Be aware that halogen compound such as methyl bromide may be contained in repellent chemicals used during insects proofing process. The following cases can cause corrosive reaction to aluminum electrolytic capacitors if halogens are contained in the chemical. (1)A completed unit or individual capacitors are directly steamed with the chemical.(2)Lumber that has been treated with the chemical is used in the packaging process.

(21) Notification on Disinfection due to SARS
①Influence caused by harmful ingredients/substances of disinfectants :
Some disinfectants contain halongenide such as fluorine, Chlorine, bromine, iodine etc. , and acid or alkali solutions. Please do not use the disinfectants which contain any substances as above-mentioned in a location where capacitors may be subjected to them.
Halogens contained in the disinfectants can particularly cause corrosive reactions to aluminum electrolytic capacitors, such as reduction of capacitance, open circuit and so on as time goes by. Therefore, if the disinfectants containing the above-mentioned substances are used at the place where capacitors are exposed and may become with them, Please be sure to dry the solution completely from capacitors.
②In case you have already used some disinfectants containing halogenide, acid or alkai solution in the work place :
If you have already used some disinfectants containing halogenide, acid or alkai solution, Please Inform us what kind of disinfectants and under what conditions you used. Upon request, we will advise you of the possible effect the soltion will have on the capacitors.

Please note that even when disinfectants do not touch capacitors directly, vaporized ingredients and substances contained in them can potentially adhere to and exert a harmful influence upon capacitors.

An influence may vary from differing conditions as to how much disinfectant is adhering or spreading over capacitors.
As long as the capacitors cannot be completely sealed or isolated but has a chance to come in contact with trace amounts of these disinfectants, please evaluate and check the capacitors for confirmation.

3. In the equipment

(1) Do not directly touch terminal by hand.

(2) Do not short between terminals by conductor, nor spill conductible liquid such as alkaline or acidic solution on or near the capacitor.

(3) Please make sure that the ambient conditions where the set is installed will be free from spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gases, vibration or mechanical shock.

4. Maintenance and Inspection

(1) Please periodically inspect the aluminum capacitors that are installed in industrial equipment. The following items should be checked:
①Appearance : Remarkable abnormality such as vent operation, leaking electrolyte etc.
②Electrical characteristic: Capacitance, dielectric loss tangent, leakage current etc., which are specified in the drawing exchanged between Nichicon and our customers or the Nichicon catalog.

5. In an Emergency

(1) If you see smoke due to operation of safety vent, turn off the main switch or pull out the plug from the outlet.

(2) Do not draw your face the safety vent since gas which in over 100°C will be emitted when the safety vent operates.
If the gas has entered your eyes, please flush your eyes immediately in pure water.
If you breathed the gas, immediately wash out your mouth and throat with water.
Do not ingest electrolyte. If your skin is exposed to electrolyte, please wash it away using soap and water.

6. Storage

(1) Do not keep capacitor in high temperature and high humidity.
Storage ambient should be:
Temperature : 5°C ~ 35°C, Humidity : lower than 75%.
Place: Indoor

(2) Avoid ambient conditions: where capacitors can be covered with water, brine or oil.

(3) Avoid ambient conditions: where capacitors are exposed poisonous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium etc.

(4) Do not keep capacitor in conditions, that expose the capacitor to ozone, ultraviolet ray or radiation

7. Disposal

(1) Please dispose capacitors in either of the following ways :
① Incinerate capacitors after crushing parts of making a hole on the capacitor body.
② Bury capacitors in the ground. Please have a disposal specialist do it.

The above mentioned material is according to EIAJ
RCR–2367B (issued in March, 2002), titled “Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment”.
Please refer to the book for details.

Type numbering system

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type	Series name		Rated voltage		Capacitance			Capacitance tolerance	Configuration		Size code		

Series name: See pages 6 ~ 8.

Configuration: See pages 24 ~ 208

Size code: See pages 24 ~ 208

Chip type Radial lead type (CE32)	U
Axial lead type (CE02)	T
Can type (CE621,622,692, 694,695,331)	L

Rated voltage (V)	Surge voltage (V)	Code
4	5	0G
5.5	6.3	0L
6.3	8	0J
10	13	1A
16	20	1C
25	32	1E
35	44	1V
50	63	1H
63	79	1J
80	100	1K
100	125	2A
110	※	2Q

※ A.C. rated voltage only.

Rated voltage (V)	Surge voltage (V)	Code
125	※	2B
160	200	2C
180	225	2Z
200	250	2D
220	270	2P
250	300	2E
315	365	2F
350	400	2V
400	450	2G
420	470	W6
450	500	2W
500	550	2H
550	600	2L

Capacitance (μF)	Code
0.1	0R1
0.47	R47
1	010
2.2	2R2
22	220
220	221
2200	222
22000	223

Cap. Tol. (%)	Code
±10	K
±20	M
–10 ~ +30	Q
–10 ~ +50	T
Special	A

Miniature Type: Taped, lead cut / formed See pages 19 ~ 21

Large Can Type: Specification code

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

AQ

Wide Temperature Range, Miniature Type Permissible Abnormal Voltage
(Radial Lead Type) series

- Improved safety feature for abnormally excessive voltage.
- High ripple current product.

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C
Rated Voltage Range	200 · 400V
Rated Capacitance Range	10 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is 0.04CV+100 (µA) or less.
tan δ	Rated voltage (V): 200 / 400; tan δ (MAX.): 0.15 / 0.15 — Measurement frequency:120Hz, Temperature:20°C
Stability at Low Temperature	Rated voltage (V): 200 / 400; Impedance ratio ZT / Z20 (MAX.): Z–25°C / Z+20°C: 3 / 8; Z–40°C / Z+20°C: 6 / 10 — Measurement frequency : 120Hz
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Safety Performance	The pressure relief vent will operate in normal conditions, with no dangerous conditons such as flames, ignitions or dispersion of pieces of the capacitor and / or case.
Marking	Printed with white color letter on dark brown sleeve.

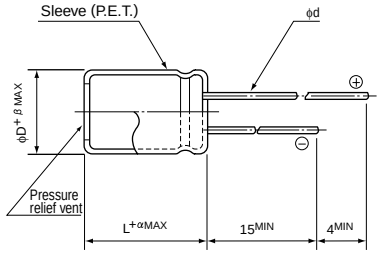
Endurance:

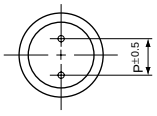
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Safety Performance:

voltage (V)	Test conditions: Limited DC current	Test conditions: Test Voltage
200	4A	300VDC and 375VDC
400	2A	500VDC and 600VDC

■Radial Lead Type





φD	10	12.5	16	18	22
β	0.5	0.5	0.5	0.5	1.0
P	5.0	5.0	7.5	7.5	10
φd	0.6	0.6※	0.8	0.8	1.0

α	
	(φD≦18) 2.0
	(φD >18) 3.0

※In case L>25 for φ12.5 (D) case sizes, lead diameter φ0.8 (d) will be applied.

Type numbering system (Example : 200V 100µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	A	Q	2	D	1	0	1	M	H	D	

- Case size
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (100µF)
- Rated voltage (200V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
10	PD	PH
12.5 ~ 18	HD	HH
22	RD	RH

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(µF)	Code \ V(Code) φD	200 (2D) 10	200 (2D) 12.5	200 (2D) 16	200 (2D) 18	200 (2D) 22	400 (2G) 12.5	400 (2G) 16	400 (2G) 18	400 (2G) 22
10	100						12.5 × 20 / 100			
22	220	10 × 20 / 120					12.5 × 31.5 / 145	○16 × 20 / 145		
33	330	10 × 25 / 160	○12.5 × 20 / 160				12.5 × 40 / 195	○16 × 25 / 195	※18 × 20 / 195	
47	470	10 × 31.5 / 195	○12.5 × 20 / 195					16 × 35.5 / 280	○18 × 25 / 280	
56	560		12.5 × 25 / 210					16 × 35.5 / 320	○18 × 31.5 / 320	※22 × 20 / 280
68	680		12.5 × 25 / 250					16 × 40 / 350	○18 × 35.5 / 350	※22 × 25 / 320
82	820		12.5 × 31.5 / 285	○16 × 20 / 285					18 × 40 / 420	
100	101		12.5 × 35.5 / 335	○16 × 25 / 335	※18 × 20 / 335					
150	151			16 × 31.5 / 435	○18 × 25 / 435	※22 × 20 / 435				
180	181			16 × 35.5 / 495	○18 × 31.5 / 495	※22 × 25 / 495				
220	221				18 × 35.5 / 575					Case size / Rated ripple

Rated Ripple (mA rms) at 105°C 120Hz

○ : In case of low profile type, 6 will be put at 12th digit of type numbering system.

※ : For further low profile product, 3 will be put at 12th digit.

- Frequency coefficient of rated ripple current

Frequency	50, 60Hz	120Hz	300Hz	1kHz	10kHz ~
Coefficient	0.80	1.00	1.25	1.40	1.60

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

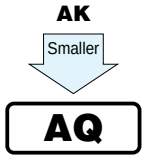
nichicon

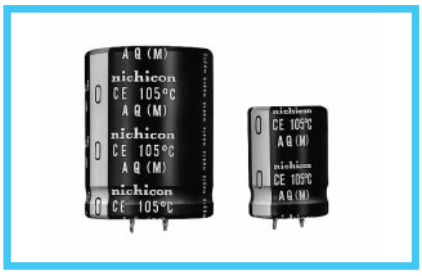
AQ

Snap-in Terminal Type, Permissible Abnormal Voltage, Smaller-sized, Wide Temperature Range
(692 type) series

Smaller

- Withstanding 2000 hours application of ripple current of 105°C.
- Extended voltage range at 200V, 220V and 400V.
- Smaller case sizes and higher ripple current than AK series.
- Improved safety features for abnormally excessive voltage.
- Ideally suited for the equipment used at voltage fluctuating area.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–25 ~ +105°C
Rated Voltage Range	200・220V・400V
Rated Capacitance Range	33 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF),V : Voltage(V)]
tan δ	0.20MAX. 120Hz, 20°C

Stability at Low Temperature

Rated voltage(V)		200・220	400	Measurement frequency : 120Hz
Impedance ratio	Z—25°C/Z+20°C	8	8	

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Safety Performance

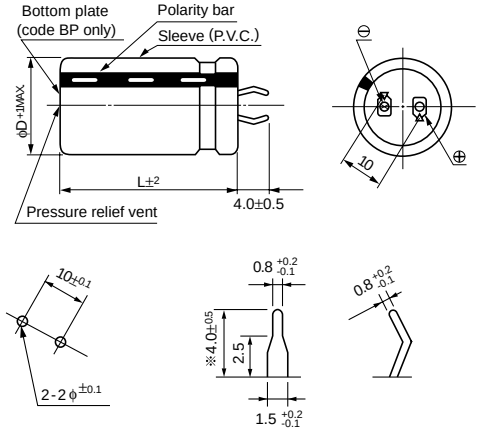
The pressure relief vent will operate in normal conditions, with no dangerous conditions such as flames, ignitions or dispersion of pieces of the capacitor and / or case.

Rating		Test conditions	
Voltage (V)	Rated Capacitance (μF)	Limited DC current	Test voltage
200	C < 330	4 A	300VDC and 375VDC
	330 ≦ C < 470	5 A	
	470 ≦ C	7 A	
220	C < 330	4 A	320VDC and 405VDC
	330 ≦ C < 470	5 A	
	470 ≦ C	7 A	
400	C < 100	2 A	500VDC and 600VDC
	100 ≦ C < 220	4 A	
	220 ≦ C	7 A	

Marking

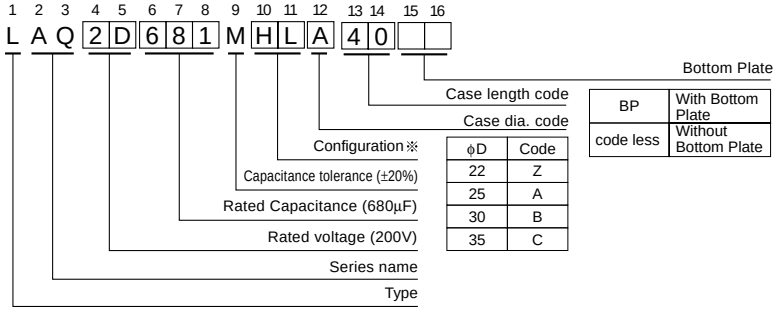
Printed with white color letter on dark blue sleeve

■Drawing



(PC board hole dimensions) (Terminal dimensions)

Type numbering system (Example : 200V 680μF)



※Please contact to us if Eco-Products are required.

Minimum order quantity : 50pcs.

● Dimension table in next page.

AQ series

■Dimensions

D × L (mm)

Cap.(μF)	Code \ V(Code) / φD	200V (2D)				220V (2P)				400V (2G)			
		22	25	30	35	22	25	30	35	22	25	30	35
33	330									22×25 0.25			
39	390									22×25 0.30			
47	470									22×25 0.35			
56	560									22×25 0.45			
68	680									22×25 0.51			
82	820									22×30 0.58	25×25 0.58		
100	101					22×20 0.50				22×30 0.66	25×25 0.66		
120	121					22×25 0.60				22×35 0.76	25×30 0.76	30×25 0.76	
150	151					22×25 0.65	25×20 0.65			22×40 0.85	25×35 0.85	30×25 0.85	
180	181	22×25 0.70	25×20 0.70			22×25 0.70	25×25 0.70				25×40 0.95	30×30 0.95	35×25 0.95
220	221	22×25 0.90				22×30 0.90	25×25 0.90	30×20 0.90			25×45 1.24	30×35 1.24	35×30 1.24
270	271	22×25 1.00				22×35 1.00	25×30 1.00	30×25 1.00	35×20 1.00			30×40 1.30	35×35 1.30
330	331	22×30 1.20	25×25 1.20			22×40 1.20	25×30 1.20	30×25 1.20	35×25 1.20			30×45 1.47	35×35 1.47
390	391	22×35 1.35	25×30 1.35			22×45 1.35	25×35 1.35	30×30 1.35	35×25 1.35				35×40 1.59
470	471	22×40 1.45	25×30 1.45	30×25 1.45			25×40 1.45	30×30 1.45	35×25 1.45				35×45 1.87
560	561	22×45 1.60	25×35 1.60	30×30 1.60			25×45 1.60	30×35 1.60	35×30 1.60				
680	681	22×50 1.75	25×40 1.75	30×30 1.75	35×25 1.75			30×40 1.75	35×35 1.75				
820	821		25×50 2.11	30×35 2.11	35×30 2.11			30×45 2.11	35×40 2.11				
1000	102			30×45 2.40	35×35 2.40				35×45 2.40				
1200	122			30×50 2.65	35×40 2.65								
1500	152				35×45 3.08								Case size Rated ripple

Rated Ripple (A rms) at 105°C 120 Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	1k	10k~
Coefficient	200•220V	0.85	0.88	1.00	1.15	1.20
	400V	0.88	0.90	1.00	1.10	1.15

PLASTIC FILM CAPACITORS

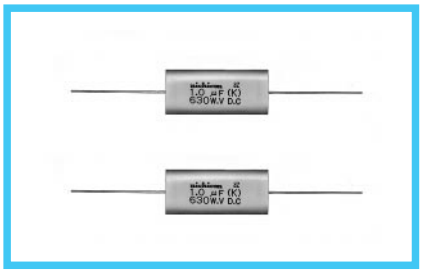
nichicon

AS

Metallized Polyester Film Capacitor

series (Tape-wrapped Axial Compact Type)

- Non-inductive construction, compact size, metallized film capacitor with axial lead wires.
- Highly reliable with self-healing property.
- Minimum loss at high frequency.
- Tape-wrapped and epoxy endfilled at both leads for superior mechanical strength and humidity resistance.
- High capacitance value, offering a wide variety of applications.



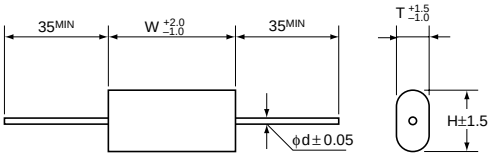
Applications

- Filtering DC-blocking, coupling and so on of general communications equipment and use in AC circuits for motor starting, charging / discharging, lighting, etc.
  Some A.C. applications may cause capacitor failure, over heating of the capacitors and/or discharge may be the result. Please contact us about details for A.C. application.

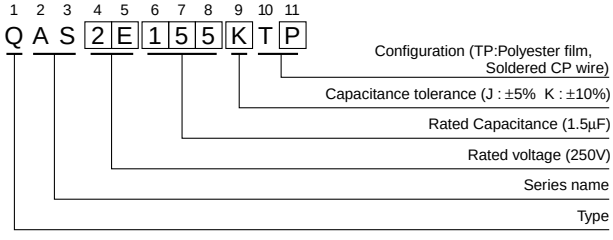
Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage	250, 400, 630V.D.C.
Rated Capacitance Range	0.1 ~ 10μF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	1.0% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.33μF : 9000 MΩ or more C > 0.33μF : 3000 ΩF or more
Withstand Voltage	Between Terminals Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals and Coverage Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Adhesive polyester film, epoxy resin

Drawing



Type numbering system (Example : 250V 1.5μF)



Dimensions

Unit : mm

Cap.(μF)	Code \ V(Code) Size	250VDC (2E)				400VDC (2G)				630VDC (2J)			
		T	W	H	d	T	W	H	d	T	W	H	d
0.1	104									4.5	28.0	11.0	0.8
0.15	154									6.0	28.0	12.5	0.8
0.22	224									7.0	28.0	15.0	0.8
0.33	334					6.0	23.0	14.0	0.8	9.0	28.0	17.0	0.8
0.47	474	4.0	23.0	10.5	0.8	7.5	23.0	15.5	0.8	9.5	33.0	17.5	0.8
0.68	684	5.5	23.0	11.5	0.8	7.5	28.0	15.5	0.8	10.0	38.0	19.5	1.0
1.0	105	6.0	23.0	14.0	0.8	9.5	28.0	17.5	0.8	11.0	44.0	20.5	1.0
1.5	155	6.5	28.0	14.5	0.8	11.5	28.0	21.0	0.8	14.5	44.0	23.5	1.0
2.2	225	8.0	28.0	16.0	0.8	12.0	33.0	21.5	0.8	16.5	50.0	26.0	1.0
3.3	335	8.0	33.0	18.0	0.8	15.5	33.0	25.0	0.8	21.0	50.0	30.0	1.0
4.7	475	10.5	33.0	20.0	0.8	17.0	39.0	26.5	1.0				
6.8	685	12.0	38.0	21.0	1.0								
10.0	106	15.0	38.0	24.0	1.0								

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

BT

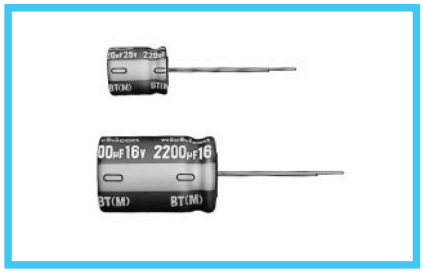
High Temperature Range, For +125°C Use

series

Long Life

Anti-Solvent Feature (Through 100V only)

- Highly dependable reliability withstanding load life of 2,000 to 10,000 hours at +125°C.
- Suited for automobile electronics where heavy duty services are indispensable.



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +125°C (10 ~ 250V), −25 ~ +125°C (350 ~ 450V)
Rated Voltage Range	10 ~ 450V
Rated Capacitance Range	1 ~ 4700μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated Voltage (V)	10 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	CV ≦ 1000 : I = 0.1CV+40 (μA) max. (1 minute's) CV > 1000 : I = 0.04CV+100 (μA) max. (1 minute's)

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	10	16	25	35	50	63	80	100	160 ~ 250	350 ~ 450
tan δ (MAX.)	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.20	0.24

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		10	16	25	35	50	63	80	100	160 ~ 250	350 ~ 450
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	3	2	2	2	2	2	2	2	3	6
	Z−40°C / Z+20°C	4	4	4	4	4	4	4	4	6	–

Endurance

After an application of D.C. bias voltage plus the rated ripple current for less than 50V (φD = 8 : 2000 hours, φD = 10 : 5000 hours, φD ≧ 12.5 : 10000 hours), 63~100V (φD = 8 : 2000 hours, φD = 10 : 3000 hours, φD ≧ 12.5 : 5000 hours), more than 160V (2000 hours) at 125°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristics requirements listed at right.

Capacitance change	Within ±30% of initial value (10 ~ 100V) Within ±20% of initial value (160 ~ 450V)
Dissipation Factor	300% or less of initial specified value (10 ~ 100V) 200% or less of initial specified value (160 ~ 450V)
Leakage current	Initial specified value or less

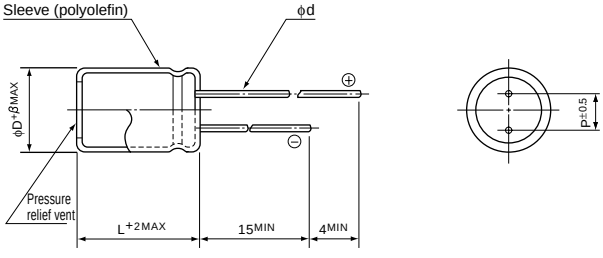
Shelf Life

After leaving capacitors under no load at 125°C for 1000 hours, they meet the requirements for endurance characteristics listed above.

Marking

Printed with white color letter on blue sleeve.

■Radial Lead Type



φD	8	10	12.5	16	18
β	0.8	0.8	1.0	1.0	1.0
P	3.5	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.6※	0.8	0.8

※ In case L > 25 for the φ12.5 dia. unit, lead dia. φ d = 0.8mm.

Type numbering system (Example : 10V 220μF)

1	2	3	4	5	6	7	8	9	10	11
U	B	T	1	A	2	2	1	M	P	D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (220μF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free Polyolefin sleeve
8・10	PD
12.5・18	HD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

BT series

■Dimensions

D × L (mm)

Cap. (μF)	Code	10 (1A) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	16 (1C) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	25 (1E) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	35 (1V) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	50 (1H) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)
1	010													8 × 11.5	2.00	35
2.2	2R2													8 × 11.5	1.80	50
3.3	3R3													8 × 11.5	1.50	60
4.7	4R7													8 × 11.5	1.15	85
10	100													8 × 11.5	0.75	180
22	220													8 × 11.5	0.50	250
33	330													8 × 11.5	0.45	300
47	470													8 × 11.5	0.35	440
100	101				8 × 11.5	0.32	340	8 × 11.5	0.13	500	10 × 12.5	0.15	620	10 × 12.5	0.18	555
220	221	8 × 11.5	0.26	340	10 × 12.5	0.15	620	10 × 12.5	0.10	680	10 × 16	0.094	790	10 × 20	0.098	930
330	331	10 × 12.5	0.15	620	10 × 12.5	0.10	680	10 × 16	0.075	945	10 × 20	0.075	950	12.5 × 20	0.070	1330
470	471	10 × 12.5	0.10	680	10 × 16	0.075	945	10 × 20	0.057	1100	12.5 × 20	0.058	1330	12.5 × 25	0.055	1650
1000	102	10 × 20	0.057	1100	12.5 × 20	0.042	1490	12.5 × 25	0.033	1750	16 × 25	0.031	2010	16 × 31.5	0.031	2430
2200	222	12.5 × 25	0.033	1750	16 × 25	0.024	2300	16 × 31.5	0.020	2710	18 × 35.5	0.025	2790			
3300	332	16 × 25	0.024	2300	16 × 31.5	0.020	2710	18 × 31.5	0.017	3310						
4700	472	16 × 31.5	0.020	2710	18 × 31.5	0.018	3270									

Cap. (μF)	Code	63 (1J) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	80 (1K) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)	100 (2A) Case size φD × L (mm)	Impedance (Ω) MAX.	Rated ripple (mA rms)
4.7	4R7							8 × 11.5	2.00	130
10	100							8 × 11.5	1.50	150
22	220	8 × 11.5	2.00	130	8 × 11.5	1.50	150	10 × 12.5	0.80	480
33	330	8 × 11.5	1.50	150	10 × 12.5	0.80	480	10 × 12.5	0.80	480
47	470	10 × 12.5	0.59	530	10 × 12.5	0.80	480	10 × 16	0.55	630
100	101	10 × 16	0.41	690	10 × 20	0.39	790	12.5 × 20	0.25	990
220	221	12.5 × 20	0.16	1050	12.5 × 25	0.18	1240	16 × 25	0.11	1500
330	331	12.5 × 25	0.12	1290	12.5 × 31.5	0.16	1390	16 × 31.5	0.079	1790
470	471	12.5 × 31.5	0.097	1460	16 × 25	0.11	1500			

Rated Ripple (mA rms) at 125°C 10kHz ~ 100kHz
Impedance (Ω MAX.) at 20°C 100kHz

●Frequency coefficient of rated ripple current

Cap. (μF) \ Frequency	120Hz	300Hz	1kHz	10kHz ~
1000 > CV	0.50	0.64	0.83	1.00
1000 ≦ CV	0.67	0.79	0.91	1.00

D × L (mm)

Cap.	Code	160 (2C) Case size φD × L (mm)	Rated ripple (mA rms)	200 (2D) Case size φD × L (mm)	Rated ripple (mA rms)	250 (2E) Case size φD × L (mm)	Rated ripple (mA rms)	350 (2V) Case size φD × L (mm)	Rated ripple (mA rms)	400 (2G) Case size φD × L (mm)	Rated ripple (mA rms)	450 (2W) Case size φD × L (mm)	Rated ripple (mA rms)
4.7	4R7							10 × 20	53	10 × 20	53	10 × 25	58
10	100			10 × 20	78	10 × 20	78	10 × 25	85	10 × 25	86	12.5 × 20	86
22	220	10 × 20	115	10 × 25	126	12.5 × 20	128	12.5 × 25	139	12.5 × 31.5	142	16 × 25	154
33	330	10 × 25	154	12.5 × 20	157	12.5 × 25	171	16 × 25	189	16 × 25	189	16 × 31.5	203
47	470	12.5 × 20	187	12.5 × 25	204	16 × 25	225	16 × 31.5	243	16 × 31.5	243		
68	680	12.5 × 25	245	16 × 20	250	16 × 31.5	292						
100	101	16 × 25	329	16 × 25	329								
150	151	16 × 31.5	434										

Rated Ripple (mA rms) at 125°C 120Hz

●Frequency coefficient of rated ripple current

Cap. (μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz	100kHz
4.7 ~ 33	0.75	1.00	1.25	1.50	1.75	1.80
47 ~ 150	0.80	1.00	1.15	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

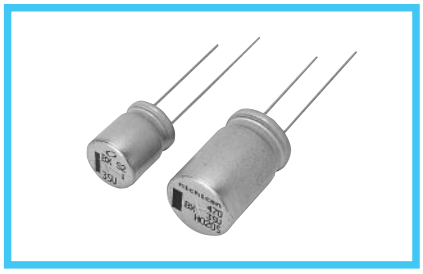
nichicon

BX series

High Temperature Range, For +150°C Use

Long Life | Anti-Solvent Feature

- Laminated cace series.
- Suited for automobile electronics where heavy duty services are indispensable.

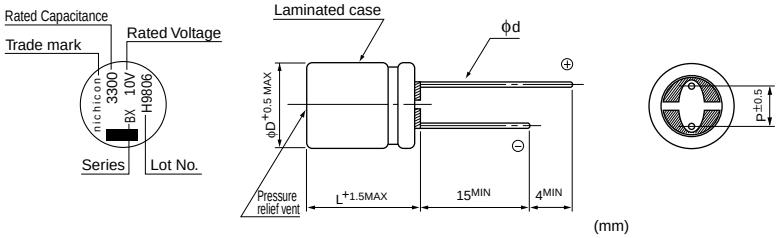


BX ← High Reliability BT

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +150°C
Rated Voltage Range	10 ~ 35V
Rated Capacitance Range	1 ~ 4700µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Rated voltage (V): 10 / 16 / 25 / 35 tan δ (MAX.): 0.20 / 0.16 / 0.14 / 0.12 Measurement frequency : 120Hz Temperature : 20°C
Stability at Low Temperature	Rated voltage (V): 10 / 16 / 25 / 35 Impedance ratio ZT / Z20 (MAX.) Z–25°C / Z+20°C: 3 / 2 / 2 / 2 Z–40°C / Z+20°C: 4 / 4 / 4 / 4 Measurement frequency : 120Hz
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours (1000 hours for φD =10 and 12.5) at 150°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristics requirements listed at right. Capacitance change: Within ±30% of initial value Dissipation Factor: 300% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 150°C for 1000 hours, they meet the requirements for endurance characteristics listed above.
Marking	Black print on the case top.

■Radial Lead Type



(mm)

φD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.8	0.8

Type numbering system (Example : 10V 3300µF)

1	2	3	4	5	6	7	8	9	10	11
U	B	X	1	A	3	3	2	M	H	R

φD	Code
10	PR
12.5 ~ 18	HR

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (3300µF)
- Rated voltage (10V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

D × L (mm)

Cap. (µF)	Code	10 (1A)		16 (1C)		25 (1E)		35 (1V)	
1	010							10×12.5	35
2.2	2R2							10×12.5	50
3.3	3R3							10×12.5	60
4.7	4R7							10×12.5	85
10	100							10×12.5	175
22	220							10×12.5	200
33	330							10×12.5	225
47	470							10×12.5	250
100	101					10×12.5	250	10×20	400
220	221			10×16	300	12.5×20	500	12.5×25	600
330	331	10×16	300	10×20	400	12.5×25	600	16×25	800
470	471	10×20	400	12.5×20	600	16×25	800	16×31.5	1000
1000	102	12.5×25	600	16×25	800	16×31.5	1000	18×40	1300
2200	222	16×31.5	1000	18×35.5	1200				
3300	332	18×35.5	1200	18×40	1300				Rated Ripple
4700	472	18×40	1300					Cace Size	

Rated Ripple (mA rms) at 150°C 100kHz

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

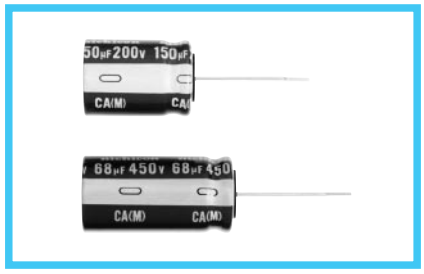
CA series

Miniature Sized, High Ripple Current, Long Life

Smaller | Long Life | High Ripple Current

- High ripple current and Long Life product withstanding load life of 10000 hours at +105°C.
- Suited for ballast application.

PB Long Life CA



■Specifications

Item	Performance Characteristics
Category Temperature Range	–25 ~ +105°C
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	6.8 ~ 220μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minutes' application of rated voltage, leakage current is not more than 0.04CV+100 (μA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	160	200	250	350	400	450
tan δ (MAX.)	0.15	0.15	0.15	0.20	0.20	0.20

Stability at Low Temperature — Measurement frequency : 120Hz

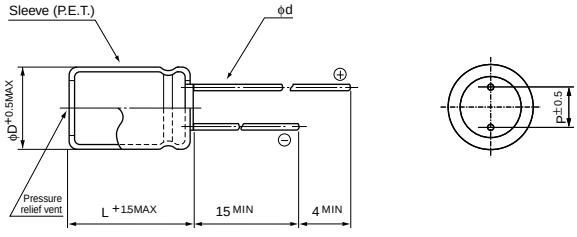
Rated voltage (V)		160	200	250	350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	3	3	3	6	6	6

Endurance — After an application of D.C. bias voltage plus the rated ripple current for 10000 hours (8000 hours for D =10) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed above.
Marking	Printed with white color letter on dark brown sleeve.

■Radial Lead Type



φD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.8	0.8

Type numbering system (Example : 250V 100μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	C	A	2	E	1	0	1	M	H	D	

- Case Size Code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (100μF)
- Rated voltage (250V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve
10	PD
12.5 ~ 18	HD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

CA series

■Dimensions

D × L (mm)

Cap	Code \ V	160		200		250		350		400		450	
		2C		2D		2E		2V		2G		2W	
6.8	6R8							10 × 16	220	10 × 16	220	10 × 20	150
10	100	10 × 16	250	10 × 16	250	10 × 20	280	10 × 20	280	10 × 20	280	12.5 × 20	320
22	220	10 × 20	500	10 × 20	500	12.5 × 20	600	12.5 × 20	350	12.5 × 20 ▲16 × 20	430 430	16 × 25 ▲18 × 20	560 560
33	330	10 × 20	500	12.5 × 20	600	12.5 × 20	600	16 × 20	500	16 × 25 ▲18 × 20	640 640	16 × 31.5 ▲18 × 25	700 700
47	470	12.5 × 20	660	12.5 × 20	660	12.5 × 25 ▲16 × 20	720 720	16 × 25 ▲18 × 20	660 660	16 × 31.5 ▲18 × 25	840 840	18 × 31.5	880
68	680	12.5 × 25 ▲16 × 20	760 760	12.5 × 25 ▲16 × 20	760 760	16 × 25 ▲18 × 20	920 920	16 × 31.5 ▲18 × 25	850 850	18 × 31.5	1000		
100	101	16 × 25 ▲18 × 20	1120 1120	16 × 25 ▲18 × 20	1120 1120	16 × 31.5 ▲18 × 25	1200 1200						
150	151	16 × 31.5 ▲18 × 25	1360 1360	16 × 31.5 ▲18 × 25	1360 1360	18 × 31.5	1500						
220	221	16 × 31.5 ▲18 × 25	1400 1400	18 × 31.5	1700							Case size	※

※: Rated Ripple (Arms) at 105°C 100kHz
▲: In this case, 6 will be put at 12th digit of type numbering system.

• Frequency coefficient of rated ripple current

Frequency	120Hz	1kHz	10kHz	100kHz ~
Coefficient	0.50	0.80	0.90	1.00

Taping Specifications for Chip Type Capacitors

● Carrier tape

Fig.1 For ϕ3 ~ ϕ10

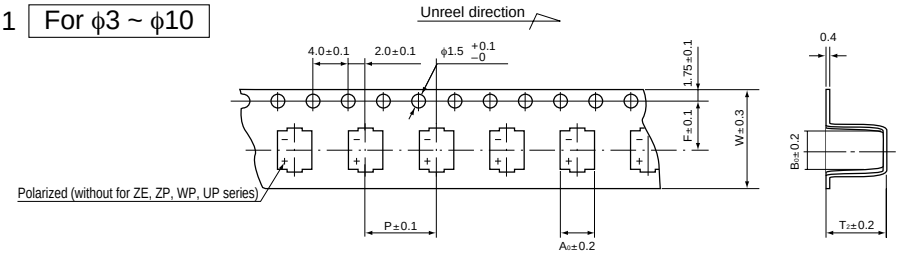
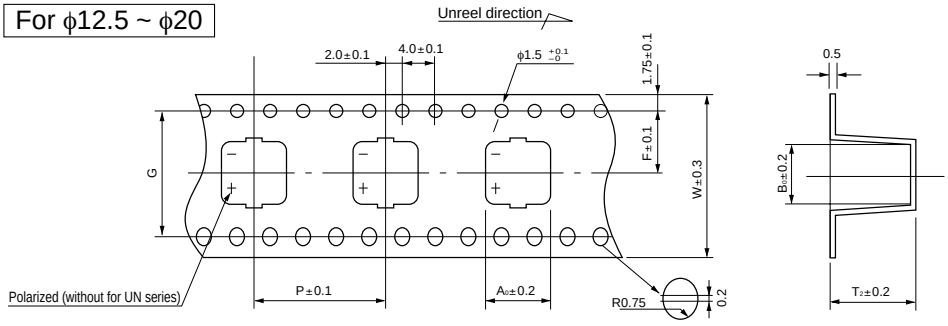
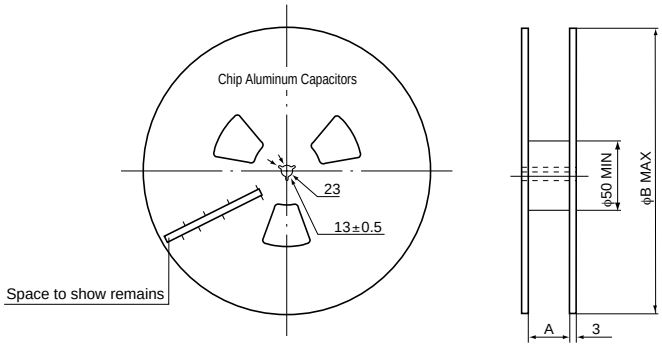


Fig.2 For ϕ12.5 ~ ϕ20



Size	Item							fig.	Series
	W	P	F	A_0	B_0	T_2	G		
ϕ4 × 3.0 L	12.0	8.0	5.5	5.0	5.0	3.2	—	1	ZD
ϕ5 × 3.0 L	12.0	12.0	5.5	6.0	6.0	3.2			
ϕ6.3 × 3.0 L	16.0	12.0	7.5	7.0	7.0	3.2			
ϕ4 × 3.9 L	12.0	8.0	5.5	5.0	5.0	4.3	—	1	ZR, ZE, ZG
ϕ5 × 3.9 L	12.0	12.0	5.5	6.0	6.0	4.3			
ϕ6.3 × 3.9 L	16.0	12.0	7.5	7.0	7.0	4.4			
ϕ4 × 4.5 L	12.0	8.0	5.5	5.0	5.0	4.9	—	1	ZS, ZP, ZT
ϕ5 × 4.5 L	12.0	12.0	5.5	6.0	6.0	4.9			
ϕ6.3 × 4.5 L	16.0	12.0	7.5	7.0	7.0	5.0			
ϕ3 × 5.4 L	12.0	8.0	5.5	3.5	3.6	5.8	—	1	WX, WP, WT, WF, WG
ϕ4 × 5.4 L	12.0	8.0	5.5	5.0	5.0	5.8			
ϕ5 × 5.4 L	12.0	12.0	5.5	6.0	6.0	5.8			
ϕ6.3 × 5.4 L	16.0	12.0	7.5	7.0	7.0	5.8			
ϕ8 × 5.4 L	16.0	12.0	7.5	8.7	8.7	5.8			
ϕ4 × 5.8 L	12.0	8.0	5.5	5.0	5.0	6.3	—	1	WT, UT, UP, UV, UD, UR, UK, UA
ϕ5 × 5.8 L	12.0	12.0	5.5	6.0	6.0	6.3			
ϕ6.3 × 5.8 L	16.0	12.0	7.5	7.0	7.0	6.3			
ϕ6.3 × 6.2 L	16.0	12.0	7.5	7.0	7.0	6.3	—	1	WT, WF, UR, UX, UD, UB, WG, UA
ϕ8 × 6.2 L	16.0	12.0	7.5	8.7	8.7	6.8			
ϕ6.3 × 7.7 L	16.0	12.0	7.5	7.0	7.0	8.0			
ϕ8 × 10 L	24.0	16.0	11.5	8.7	8.7	11.0			
ϕ10 × 10 L	24.0	16.0	11.5	10.7	10.7	11.0			
ϕ4 × 6.8 L	12.0	8.0	5.5	5.0	5.0	7.3	—	1	UU
ϕ5 × 6.8 L	12.0	12.0	5.5	6.0	6.0	7.3			
ϕ6.3 × 6.8 L	16.0	12.0	7.5	7.0	7.0	7.3			
ϕ8 × 12 L	24.0	16.0	11.5	8.7	8.7	13.0			
ϕ12.5 × 13.5 L	32.0	24.0	14.2	14.0	14.0	14.0	28.4	2	UG, UJ, UN, UH
ϕ12.5 × 16 L	32.0	24.0	14.2	14.0	14.0	16.3	28.4		
ϕ12.5 × 21 L	32.0	24.0	14.2	14.0	14.0	21.3	28.4		
ϕ16 × 16.5 L	44.0	28.0	20.2	17.5	17.5	16.8	40.4		
ϕ16 × 21.5 L	44.0	28.0	20.2	17.5	17.5	21.8	40.4		
ϕ18 × 16.5 L	44.0	32.0	20.2	19.5	19.5	16.8	40.4		
ϕ18 × 21.5 L	44.0	32.0	20.2	19.5	19.5	21.8	40.4		
ϕ20 × 16.5 L	44.0	36.0	20.2	21.5	21.5	17.0	40.4		
ϕ20 × 21.5 L	44.0	36.0	20.2	21.5	21.5	22.0	40.4		

● Reel

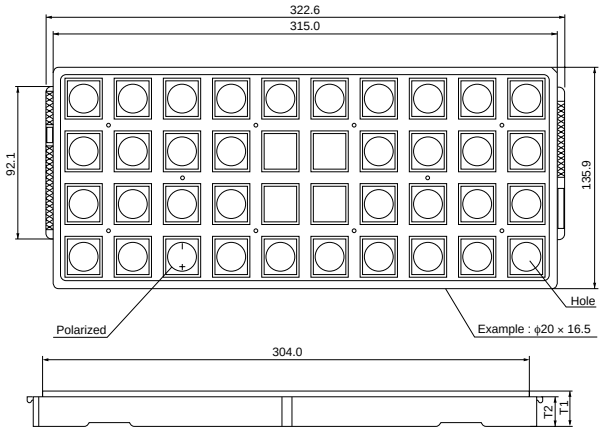


ϕD	3, 4	5	6.3	8×5.4, 8×6.2, 8×7	8×10, 10×8, 10×10	12.5	16, 18, 20
A	14	14	18	18	26	34	46
B	382	382	382	382	382	332	332

Package quantity

ϕD	Q'ty / reel
3, 4	2000pcs.
5, 6.3	1000pcs.
6.3 × 7.7	900pcs.
8 × 5.4, 8 × 6.2, 8 × 7	1000pcs.
8 × 10, 10 × 8, 10 × 10	500pcs.
12.5 × 13.5	200pcs.
12.5 × 16	150pcs.
12.5 × 21, 16 × 16.5, 18 × 16.5	125pcs.
20 × 16.5	100pcs.
16 × 21.5, 18 × 21.5	75pcs.
20 × 21.5	50pcs.

Chip tray (for UG, UJ, UN & UH series)

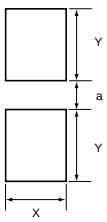


Size	T_1	T_2
12.5 × 13.5, 12.5 × 16	22	18
16 × 16.5, 18 × 16.5, 20 × 16.5	22.5	18.5
12.5 × 21	28	23
16 × 21.5, 18 × 21.5, 20 × 21.5	28.5	23.5

Package quantity

ϕD	Q'ty / tray
12.5	70pcs.
16	60pcs.
18, 20	40pcs.

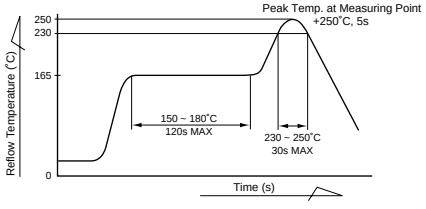
Recommended Land Size



Size	X	Y	a
ϕ3	1.6	2.2	0.8
ϕ4	1.6	2.6	1.0
ϕ5	1.6	3.0	1.4
ϕ6.3	1.6	3.5	2.1
ϕ8×5.5L, ϕ8×6.2L, ϕ8×7L	2.5	4.0	2.1
ϕ8 × 10L	2.5	3.5	3.0
ϕ10 × 8L, ϕ10 × 10L	2.5	4.0	4.0
ϕ12.5	4.0	7.5	7.0
ϕ16	6.0	8.5	9.5
ϕ18	6.0	9.5	10.5
ϕ20	6.0	9.5	12.5

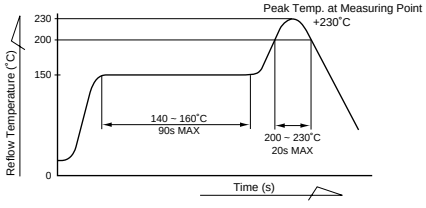
Soldering by Reflow

● Chip Type Aluminum Electrolytic Capacitors (Lead-Free prduct)



- Pre - heating shall be done at +150˚C ~ 180˚C and for 120 second.
- The temperature at capacitor top shall not exceed +250˚C.
- The duration for over +230˚C temperature at capacitor top shall not exceed 30 seconds.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Please contact us for the applicable product series.
- Please contact us for the UU series.

● Chip Type Aluminum Electrolytic Capacitors (Conventional product)



- Pre - heating shall be done at +140˚C ~ 160˚C and for 90 second. (less than 120 seconds for ϕ12.5 or larger chips.)
- The temperature at capacitor top shall not exceed +230˚C.
- The duration for over +200˚C temperature at capacitor top shall not exceed 20 seconds.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.

Taping Specifications for Chip Type Capacitors

● Carrier tape

Fig.1 For ϕ3 ~ ϕ10

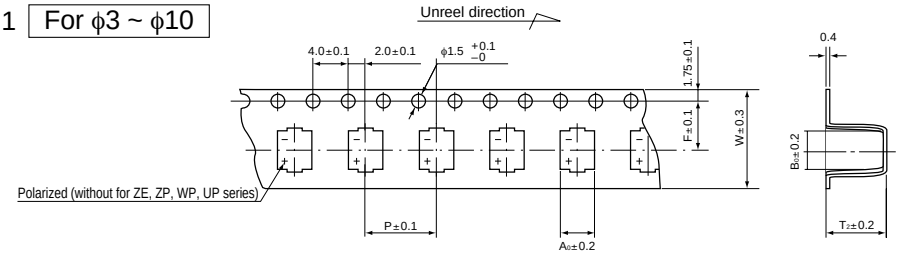
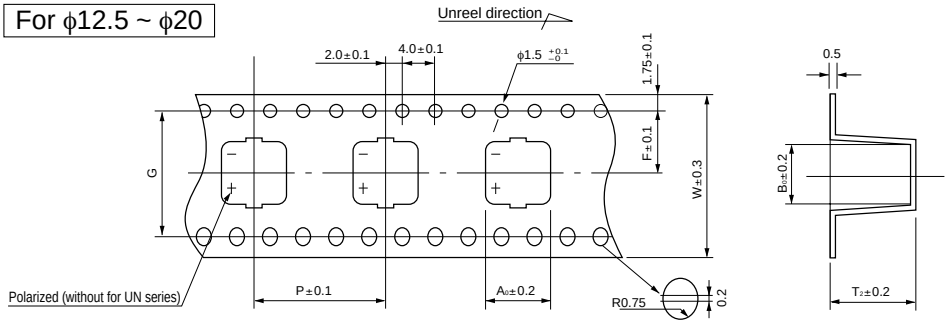
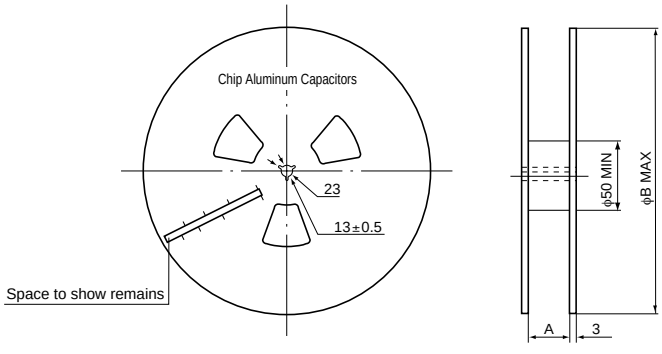


Fig.2 For ϕ12.5 ~ ϕ20



Size	Item							fig.	Series
	W	P	F	A_0	B_0	T_2	G		
ϕ4 × 3.0 L	12.0	8.0	5.5	5.0	5.0	3.2	—	1	ZD
ϕ5 × 3.0 L	12.0	12.0	5.5	6.0	6.0	3.2			
ϕ6.3 × 3.0 L	16.0	12.0	7.5	7.0	7.0	3.2			
ϕ4 × 3.9 L	12.0	8.0	5.5	5.0	5.0	4.3	—	1	ZR, ZE, ZG
ϕ5 × 3.9 L	12.0	12.0	5.5	6.0	6.0	4.3			
ϕ6.3 × 3.9 L	16.0	12.0	7.5	7.0	7.0	4.4			
ϕ4 × 4.5 L	12.0	8.0	5.5	5.0	5.0	4.9	—	1	ZS, ZP, ZT
ϕ5 × 4.5 L	12.0	12.0	5.5	6.0	6.0	4.9			
ϕ6.3 × 4.5 L	16.0	12.0	7.5	7.0	7.0	5.0			
ϕ3 × 5.4 L	12.0	8.0	5.5	3.5	3.6	5.8	—	1	WX, WP, WT, WF, WG
ϕ4 × 5.4 L	12.0	8.0	5.5	5.0	5.0	5.8			
ϕ5 × 5.4 L	12.0	12.0	5.5	6.0	6.0	5.8			
ϕ6.3 × 5.4 L	16.0	12.0	7.5	7.0	7.0	5.8			
ϕ8 × 5.4 L	16.0	12.0	7.5	8.7	8.7	5.8			
ϕ4 × 5.8 L	12.0	8.0	5.5	5.0	5.0	6.3	—	1	WT, UT, UP, UV, UD, UR, UK, UA
ϕ5 × 5.8 L	12.0	12.0	5.5	6.0	6.0	6.3			
ϕ6.3 × 5.8 L	16.0	12.0	7.5	7.0	7.0	6.3			
ϕ6.3 × 6.2 L	16.0	12.0	7.5	7.0	7.0	6.3	—	1	WT, WF, UR, UX, UD, UB, WG, UA
ϕ8 × 6.2 L	16.0	12.0	7.5	8.7	8.7	6.8			
ϕ6.3 × 7.7 L	16.0	12.0	7.5	7.0	7.0	8.0			
ϕ8 × 10 L	24.0	16.0	11.5	8.7	8.7	11.0			
ϕ10 × 10 L	24.0	16.0	11.5	10.7	10.7	11.0			
ϕ4 × 6.8 L	12.0	8.0	5.5	5.0	5.0	7.3	—	1	UU
ϕ5 × 6.8 L	12.0	12.0	5.5	6.0	6.0	7.3			
ϕ6.3 × 6.8 L	16.0	12.0	7.5	7.0	7.0	7.3			
ϕ8 × 12 L	24.0	16.0	11.5	8.7	8.7	13.0			
ϕ12.5 × 13.5 L	32.0	24.0	14.2	14.0	14.0	14.0	28.4	2	UG, UJ, UN, UH
ϕ12.5 × 16 L	32.0	24.0	14.2	14.0	14.0	16.3	28.4		
ϕ12.5 × 21 L	32.0	24.0	14.2	14.0	14.0	21.3	28.4		
ϕ16 × 16.5 L	44.0	28.0	20.2	17.5	17.5	16.8	40.4		
ϕ16 × 21.5 L	44.0	28.0	20.2	17.5	17.5	21.8	40.4		
ϕ18 × 16.5 L	44.0	32.0	20.2	19.5	19.5	16.8	40.4		
ϕ18 × 21.5 L	44.0	32.0	20.2	19.5	19.5	21.8	40.4		
ϕ20 × 16.5 L	44.0	36.0	20.2	21.5	21.5	17.0	40.4		
ϕ20 × 21.5 L	44.0	36.0	20.2	21.5	21.5	22.0	40.4		

● Reel

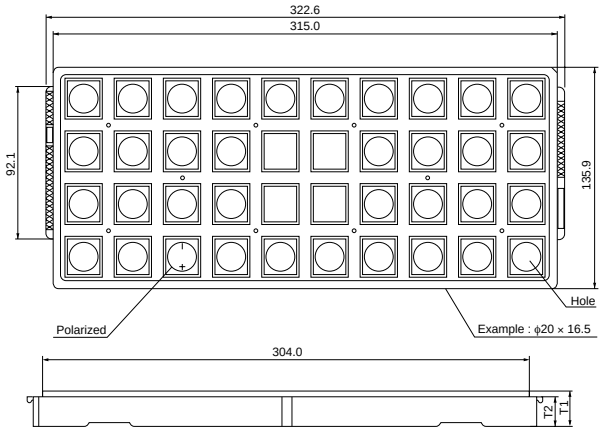


ϕD	3, 4	5	6.3	8×5.4, 8×6.2, 8×7	8×10, 10×8, 10×10	12.5	16, 18, 20
A	14	14	18	18	26	34	46
B	382	382	382	382	382	332	332

Package quantity

ϕD	Q'ty / reel
3, 4	2000pcs.
5, 6.3	1000pcs.
6.3 × 7.7	900pcs.
8 × 5.4, 8 × 6.2, 8 × 7	1000pcs.
8 × 10, 10 × 8, 10 × 10	500pcs.
12.5 × 13.5	200pcs.
12.5 × 16	150pcs.
12.5 × 21, 16 × 16.5, 18 × 16.5	125pcs.
20 × 16.5	100pcs.
16 × 21.5, 18 × 21.5	75pcs.
20 × 21.5	50pcs.

Chip tray (for UG, UJ, UN & UH series)

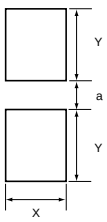


Size	T_1	T_2
12.5 × 13.5, 12.5 × 16	22	18
16 × 16.5, 18 × 16.5, 20 × 16.5	22.5	18.5
12.5 × 21	28	23
16 × 21.5, 18 × 21.5, 20 × 21.5	28.5	23.5

Package quantity

ϕD	Q'ty / tray
12.5	70pcs.
16	60pcs.
18, 20	40pcs.

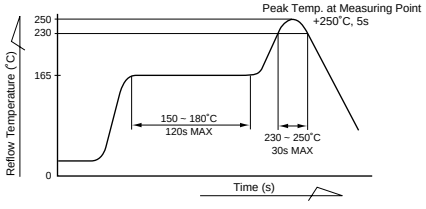
Recommended Land Size



Size	X	Y	a
ϕ3	1.6	2.2	0.8
ϕ4	1.6	2.6	1.0
ϕ5	1.6	3.0	1.4
ϕ6.3	1.6	3.5	2.1
ϕ8×5.5L, ϕ8×6.2L, ϕ8×7L	2.5	4.0	2.1
ϕ8 × 10L	2.5	3.5	3.0
ϕ10 × 8L, ϕ10 × 10L	2.5	4.0	4.0
ϕ12.5	4.0	7.5	7.0
ϕ16	6.0	8.5	9.5
ϕ18	6.0	9.5	10.5
ϕ20	6.0	9.5	12.5

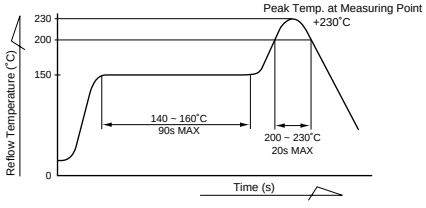
Soldering by Reflow

● Chip Type Aluminum Electrolytic Capacitors (Lead-Free prduct)



- Pre - heating shall be done at +150˚C ~ 180˚C and for 120 second.
- The temperature at capacitor top shall not exceed +250˚C.
- The duration for over +230˚C temperature at capacitor top shall not exceed 30 seconds.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Please contact us for the applicable product series.
- Please contact us for the UU series.

● Chip Type Aluminum Electrolytic Capacitors (Conventional product)



- Pre - heating shall be done at +140˚C ~ 160˚C and for 90 second. (less than 120 seconds for ϕ12.5 or larger chips.)
- The temperature at capacitor top shall not exceed +230˚C.
- The duration for over +200˚C temperature at capacitor top shall not exceed 20 seconds.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.

Taping Specifications for Chip Type Capacitors

● Carrier tape

Fig.1 For ϕ3 ~ ϕ10

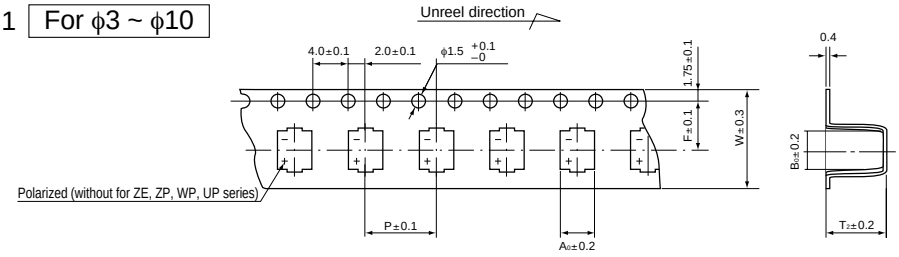
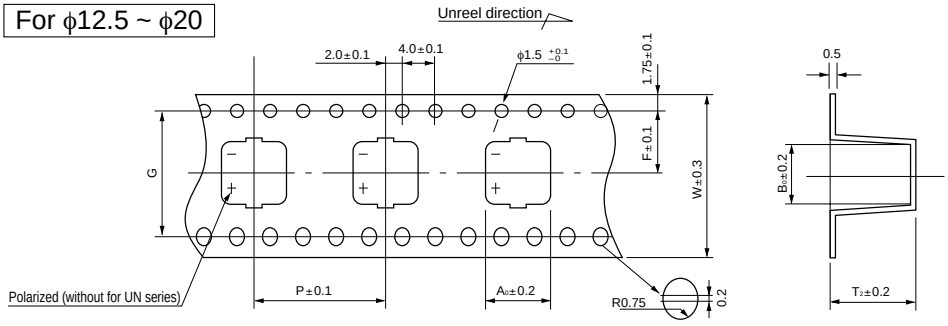
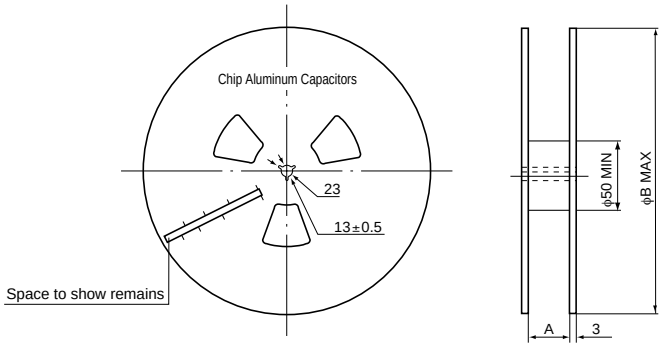


Fig.2 For ϕ12.5 ~ ϕ20



Size	Item							fig.	Series
	W	P	F	A_0	B_0	T_2	G		
ϕ4 × 3.0 L	12.0	8.0	5.5	5.0	5.0	3.2	—	1	ZD
ϕ5 × 3.0 L	12.0	12.0	5.5	6.0	6.0	3.2			
ϕ6.3 × 3.0 L	16.0	12.0	7.5	7.0	7.0	3.2			
ϕ4 × 3.9 L	12.0	8.0	5.5	5.0	5.0	4.3	—	1	ZR, ZE, ZG
ϕ5 × 3.9 L	12.0	12.0	5.5	6.0	6.0	4.3			
ϕ6.3 × 3.9 L	16.0	12.0	7.5	7.0	7.0	4.4			
ϕ4 × 4.5 L	12.0	8.0	5.5	5.0	5.0	4.9	—	1	ZS, ZP, ZT
ϕ5 × 4.5 L	12.0	12.0	5.5	6.0	6.0	4.9			
ϕ6.3 × 4.5 L	16.0	12.0	7.5	7.0	7.0	5.0			
ϕ3 × 5.4 L	12.0	8.0	5.5	3.5	3.6	5.8	—	1	WX, WP, WT, WF, WG
ϕ4 × 5.4 L	12.0	8.0	5.5	5.0	5.0	5.8			
ϕ5 × 5.4 L	12.0	12.0	5.5	6.0	6.0	5.8			
ϕ6.3 × 5.4 L	16.0	12.0	7.5	7.0	7.0	5.8			
ϕ8 × 5.4 L	16.0	12.0	7.5	8.7	8.7	5.8			
ϕ4 × 5.8 L	12.0	8.0	5.5	5.0	5.0	6.3	—	1	WT, UT, UP, UV, UD, UR, UK, UA
ϕ5 × 5.8 L	12.0	12.0	5.5	6.0	6.0	6.3			
ϕ6.3 × 5.8 L	16.0	12.0	7.5	7.0	7.0	6.3			
ϕ6.3 × 6.2 L	16.0	12.0	7.5	7.0	7.0	6.3	—	1	WT, WF, UR, UX, UD, UB, WG, UA
ϕ8 × 6.2 L	16.0	12.0	7.5	8.7	8.7	6.8			
ϕ6.3 × 7.7 L	16.0	12.0	7.5	7.0	7.0	8.0			
ϕ8 × 10 L	24.0	16.0	11.5	8.7	8.7	11.0			
ϕ10 × 10 L	24.0	16.0	11.5	10.7	10.7	11.0			
ϕ4 × 6.8 L	12.0	8.0	5.5	5.0	5.0	7.3	—	1	UU
ϕ5 × 6.8 L	12.0	12.0	5.5	6.0	6.0	7.3			
ϕ6.3 × 6.8 L	16.0	12.0	7.5	7.0	7.0	7.3			
ϕ8 × 12 L	24.0	16.0	11.5	8.7	8.7	13.0			
ϕ12.5 × 13.5 L	32.0	24.0	14.2	14.0	14.0	14.0	28.4	2	UG, UJ, UN, UH
ϕ12.5 × 16 L	32.0	24.0	14.2	14.0	14.0	16.3	28.4		
ϕ12.5 × 21 L	32.0	24.0	14.2	14.0	14.0	21.3	28.4		
ϕ16 × 16.5 L	44.0	28.0	20.2	17.5	17.5	16.8	40.4		
ϕ16 × 21.5 L	44.0	28.0	20.2	17.5	17.5	21.8	40.4		
ϕ18 × 16.5 L	44.0	32.0	20.2	19.5	19.5	16.8	40.4		
ϕ18 × 21.5 L	44.0	32.0	20.2	19.5	19.5	21.8	40.4		
ϕ20 × 16.5 L	44.0	36.0	20.2	21.5	21.5	17.0	40.4		
ϕ20 × 21.5 L	44.0	36.0	20.2	21.5	21.5	22.0	40.4		

● Reel

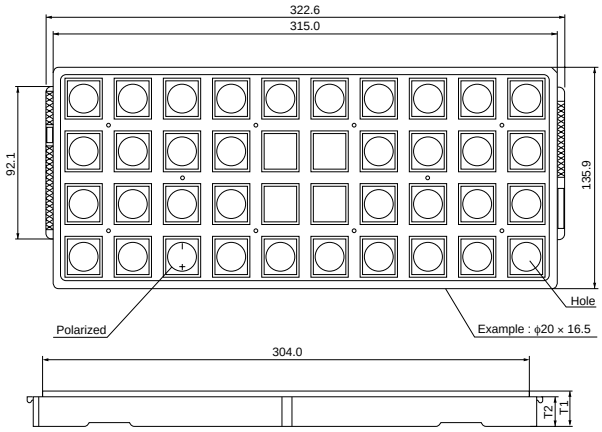


ϕD	3, 4	5	6.3	8×5.4, 8×6.2, 8×7	8×10, 10×8, 10×10	12.5	16, 18, 20
A	14	14	18	18	26	34	46
B	382	382	382	382	382	332	332

Package quantity

ϕD	Q'ty / reel
3, 4	2000pcs.
5, 6.3	1000pcs.
6.3 × 7.7	900pcs.
8 × 5.4, 8 × 6.2, 8 × 7	1000pcs.
8 × 10, 10 × 8, 10 × 10	500pcs.
12.5 × 13.5	200pcs.
12.5 × 16	150pcs.
12.5 × 21, 16 × 16.5, 18 × 16.5	125pcs.
20 × 16.5	100pcs.
16 × 21.5, 18 × 21.5	75pcs.
20 × 21.5	50pcs.

Chip tray (for UG, UJ, UN & UH series)

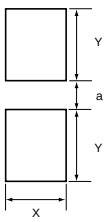


Size	T_1	T_2
12.5 × 13.5, 12.5 × 16	22	18
16 × 16.5, 18 × 16.5, 20 × 16.5	22.5	18.5
12.5 × 21	28	23
16 × 21.5, 18 × 21.5, 20 × 21.5	28.5	23.5

Package quantity

ϕD	Q'ty / tray
12.5	70pcs.
16	60pcs.
18, 20	40pcs.

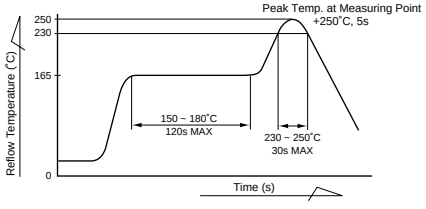
Recommended Land Size



Size	X	Y	a
ϕ3	1.6	2.2	0.8
ϕ4	1.6	2.6	1.0
ϕ5	1.6	3.0	1.4
ϕ6.3	1.6	3.5	2.1
ϕ8×5.5L, ϕ8×6.2L, ϕ8×7L	2.5	4.0	2.1
ϕ8 × 10L	2.5	3.5	3.0
ϕ10 × 8L, ϕ10 × 10L	2.5	4.0	4.0
ϕ12.5	4.0	7.5	7.0
ϕ16	6.0	8.5	9.5
ϕ18	6.0	9.5	10.5
ϕ20	6.0	9.5	12.5

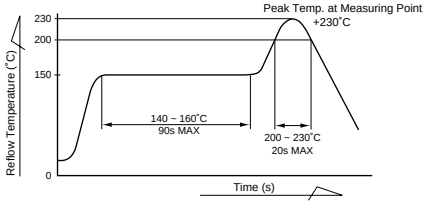
Soldering by Reflow

● Chip Type Aluminum Electrolytic Capacitors (Lead-Free prduct)



- Pre - heating shall be done at +150˚C ~ 180˚C and for 120 second.
- The temperature at capacitor top shall not exceed +250˚C.
- The duration for over +230˚C temperature at capacitor top shall not exceed 30 seconds.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Please contact us for the applicable product series.
- Please contact us for the UU series.

● Chip Type Aluminum Electrolytic Capacitors (Conventional product)



- Pre - heating shall be done at +140˚C ~ 160˚C and for 90 second. (less than 120 seconds for ϕ12.5 or larger chips.)
- The temperature at capacitor top shall not exceed +230˚C.
- The duration for over +200˚C temperature at capacitor top shall not exceed 20 seconds.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

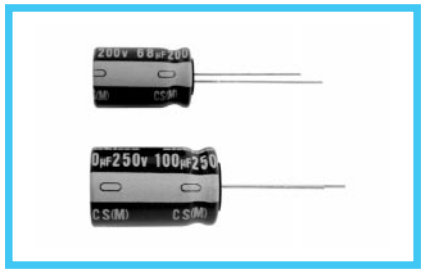
CS series

Miniature Sized, High Ripple Current, Long Life

Smaller | Long Life | High Ripple Current

- High ripple current and Long Life product withstanding load life of 8000 to 10000 hours at +105°C.
- Suited for ballast application.

CA → Smaller → **CS**



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C (160 ~ 400V) , –25 ~ +105°C (450V)
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	6.8 ~ 330µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minutes' application of rated voltage, leakage current is not more than 0.04CV+100 (µA) , whichever is greater.

tan δ

Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	160	200	250	350	400	450
tan δ (MAX.)	0.20	0.20	0.20	0.24	0.24	0.24

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		160	200	250	350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	3	3	3	5	5	6
	Z–40°C / Z+20°C	6	6	6	6	6	6

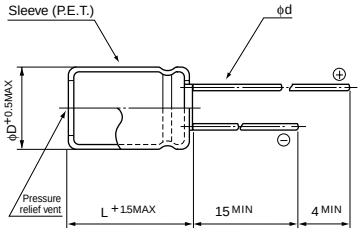
Endurance

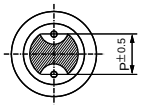
After an application of D.C. bias voltage plus the rated ripple current for 10000 hours (8000 hours for D =10) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed above.
Marking	Printed with white color letter on dark brown sleeve.

■Radial Lead Type





ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6	0.6	0.8	0.8

Type numbering system (Example : 250V 100µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	C	S	2	E	1	0	1	M	H	D	

- Case Size Code
- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (100µF)
- Rated voltage (250V)
- Series name
- Type

※Configuration

ϕ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

CS series

■Dimensions

D × L (mm)

Cap	Code \ V	160		200		250		350		400		450	
		2C		2D		2E		2V		2G		2W	
6.8	6R8							10 × 16	275	10 × 16	275	10 × 20	275
10	100	10 × 16	315	10 × 16	315	10 × 20	350	10 × 20	350	10 × 20	350	12.5 × 20	450
15	150									12.5 × 20	550	12.5 × 25	600
22	220	10 × 20	500	10 × 20	500	10 × 20	500	12.5 × 20	650	12.5 × 20	650	16 × 20	725
33	330	10 × 20	625	10× 20	650	12.5 × 20	800	16 × 20	900	16 × 20	900	16 × 25 ▲18 × 20	975 950
47	470	10 × 20	750	12.5 × 20	975	12.5 × 20	975	16 × 20	1075	16 × 25 ▲18 × 20	1175 1125	18 × 25	1200
68	680	12.5 × 25	1175	12.5 × 20	1175	16 × 20	1300	16 × 25 ▲18 × 20	1400 1375	18 × 25	1465	18 × 31.5	1575
82	820	12.5 × 20	1275	16 × 20	1375	16 × 20	1375	18 × 25	1525	18 × 25	1525		
100	101	12.5 × 25 ▲16 × 20	1395 1420	16 × 20	1420	16 × 25	1530	18 × 25	1575				
150	151	16 × 20	1735	16 × 25	1890	18 × 25	1935						
220	221	16 × 25	2295	18 × 25	2365	18 × 31.5	3130					Case size	※
330	331	18 × 31.5	3130	18 × 35.5	3220								

※: Rated Ripple (Arms) at 105°C 100kHz

▲: In this case, 6 will be put at 12th digit of type numbering system.

• Frequency coefficient of rated ripple current

Frequency	120Hz	1kHz	10kHz	100kHz ~
Coefficient	0.50	0.80	0.90	1.00

nichicon

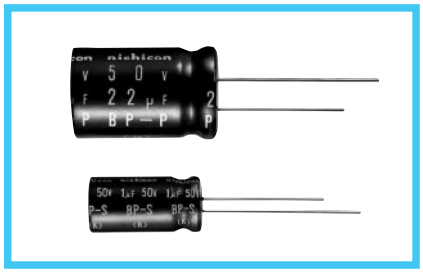
DB.GB

Bi-Polarized, For Speaker Network

series

For Audio Use | Bi-polarized | Anti-Solvent Feature

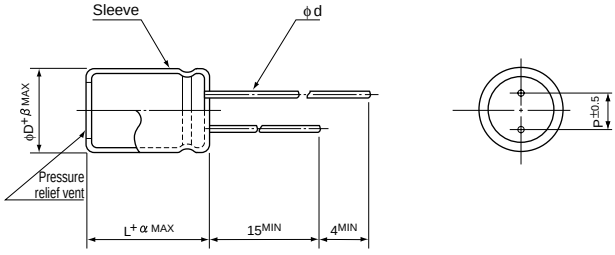
- Bi-polarized series.
- Designed specifically for crossover networks in Hi-Fi sound systems.



■Specifications

Performance Characteristics	DB series	GB series
Category Temperature Range	−40 ~ +85°C	−40 ~ +85°C
Rated Voltage Range	50V	50V
Rated Capacitance Tolerance	±20% at 1kHz	±10% at 1kHz
Leakage Current (After 5 minutes' application of rated voltage)	Leakage current is not more than 0.03CV or 3 (μA), whichever is greater.	
tan δ (MAX.) (1 kHz) (5 kHz)	0.10 or less 0.15 or less	0.05 or less 0.05 or less
Allowable Continuous Current (8Ω - fc)	Value in table or less	Value in table or less
Marking	Printed with white color letter on dark green sleeve.	

■Radial Lead Type



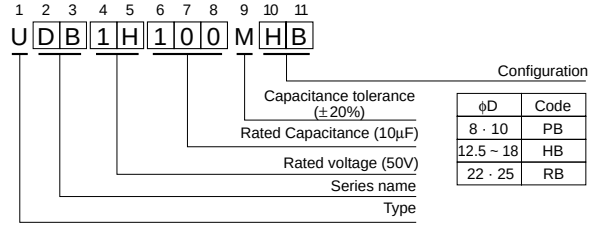
φD	8	10	12.5	16	18	22	25
P	3.5	5.0	5.0	7.5	7.5	10.0	12.5
φd	0.8	0.8	0.8	0.8	0.8	1.0	1.0
α	1	1	1	1	1	2	2
β	0.5	0.5	0.5	0.5	0.5	1	1

■Dimensions

D × L (mm)

Cap. (μF)	Code	DB	GB	Rated ripple (mA rms)		
		1H (50V)		Frequency (Hz)	DB	GB
1	010	8×11.5	10×20	20k	205	760
1.5	1R5	8×11.5	12.5×20	13k	245	800
2.2	2R2	10×12.5	12.5×20	9k	320	820
3.3	3R3	10×16	16×25	6k	400	850
4.7	4R7	10×20	16×25	4.2k	480	890
6.8	6R8	12.5×20	16×31.5	2.9k	540	920
10	100	12.5×25	18×35.5	2k	600	970
15	150	12.5×25	22×40	1.3k	660	1040
22	220	16×25	22×40	900	740	1060
33	330	16×31.5	25×40	600	800	1120
47	470	18×35.5	——	420	1020	——
68	680	22×40	——	290	1200	——

Type numbering system (Example : DB series 50V 10μF)



φD	Code
8 · 10	PB
12.5 ~ 18	HB
22 · 25	RB

※ Please contact to us if Eco-Products are required.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

DM

Horizontal Mounting Type

series

Smaller

- For ϕ20, ϕ22 and ϕ25, but suited for horizontal mounting toassure flat and low-profile design.

DQ

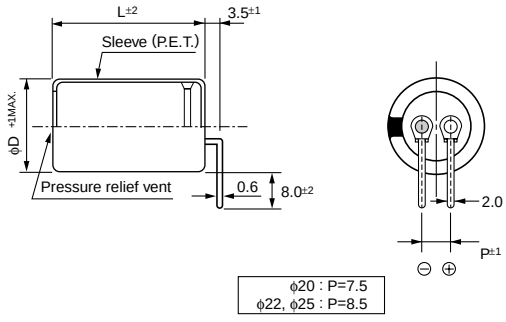
High Temperature

DM

■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ + 85°C (200V), – 25 ~ + 85°C (400V)
Rated Voltage Range	200 ·400V
Rated Capacitance Range	82 ~ 1200μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leq 3\sqrt{CV}$(μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF), V : Voltage(V)]
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 200 / 400 tan δ (MAX.): 0.15 / 0.15
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 200 / 400 Impedance ratio ZT/Z20(MAX.): Z—25°C/Z+20°C: 3 / 8; Z—40°C/Z+20°C: 12 / —
Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 85°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the characteristic requirements at right. Capacitance change: Within ±15% of initial value tan δ: 150% or less of initial specified value Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.

■Drawing



Type numbering system (Example : 200V 470μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

L D M 2 D 4 7 1 M E R Z G A

- Lead wire configuration (GA: ⊖ Left side from the front; HA: ⊖ Right side from the front)
- Case dia. code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (470μF)
- Rated voltage (200V)
- Series name
- Type

ϕD	Code
20	Y
22	Z
25	A

※ Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
ER	LR

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(μF)	Code	200V (2D) ϕD 20		22		25		400V (2G) ϕD 20		22		25	
82	820							20 × 30	0.78				
100	101							20 × 30	0.90				
120	121							20 × 35	1.02				
150	151							20 × 40	1.17	22 × 35	1.20		
180	181							20 × 50	1.30	22 × 40	1.38	25 × 35	1.25
220	221									22 × 45	1.55	25 × 40	1.56
270	271	20 × 30	1.32							22 × 60	1.70	25 × 45	1.70
330	331	20 × 30	1.49									25 × 50	1.90
390	391	20 × 35	1.66									25 × 60	2.15
470	471	20 × 40	1.93	22 × 35	1.88								
560	561	20 × 45	2.00	22 × 40	1.96								
680	681	20 × 50	2.30	22 × 45	2.43	25 × 35	2.68						
820	821			22 × 50	2.80	25 × 40	2.80						
1000	102			22 × 60	3.00	25 × 45	3.12					Case size	Rated ripple
1200	122					25 × 60	3.44						

※ Other ratings also available on request.

Rated Ripple (A rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
Coeff.	200V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	400V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

DQ series

Horizontal Mounting Type, Wide Temperature Range

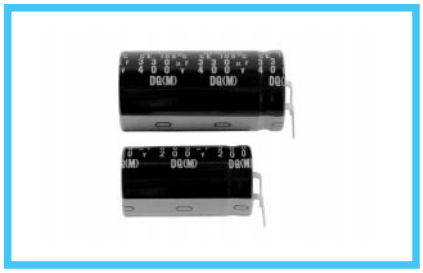
Smaller

- Horizontal mounting version for ϕ20 ,ϕ22 and ϕ25.
- Suited for use in flat electronic devices where height space is limited.

DQ

High Temperature

DM



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (200V) , – 25~+105°C (400V)
Rated Voltage Range	200 ·400V
Rated Capacitance Range	68 ~ 1200μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	I ≦ $3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF) V : Voltage(V)]
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	200	400
tan δ (MAX.)	0.15	0.15

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		200	400
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C	3	8
	Z—40°C/Z+20°C	12	—

Endurance — After an application of DC voltage(in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

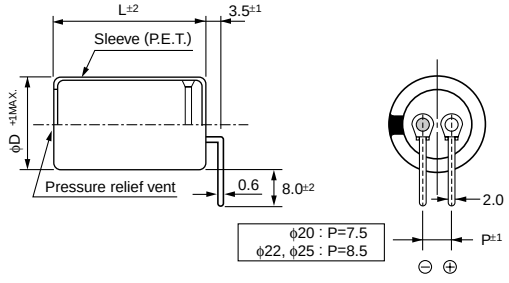
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking — Printed with white color letter on black sleeve.

■Drawing



Type numbering system (Example : 200V 470μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
L	D	Q	2	D	4	7	1	M	E	R	Z	G	A

- Lead wire configurationt (GA : ⊖ Left side from the front / HA : ⊖ Right side from the front)
- Case dia.code

ϕD	Code
20	Y
22	Z
25	A

- Configuration※
- Capacitance tolerance(±20%)
- Rated Capacitance(470μF)
- Rated voltage(200V)
- Series name
- Type

※Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
ER	LR

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(μF)	Code \ V(Code) / ϕD	200V (2D) 20		22		25		400V (2G) 20		22		25	
68	680							20×30	0.56				
82	820							20×30	0.64				
100	101							20×35	0.70				
120	121							20×40	0.75	22×35	0.75		
150	151							20×45	0.83	22×40	0.88		
180	181							20×50	0.95	22×45	0.95	25×35	0.95
220	221									22×50	1.10	25×40	1.10
270	271	20×30	1.10							22×60	1.22	25×45	1.22
330	331	20×35	1.20									25×50	1.44
390	391	20×40	1.31										
470	471	20×45	1.45	22×35	1.45								
560	561	20×50	1.58	22×40	1.60	25×35	1.60						
680	681			22×45	1.78	25×40	1.78						
820	821			22×60	2.04	25×45	2.04						
1000	102					25×50	2.30					Case size	Rated
1200	122					25×60	2.65						

※ Other rating also available on request.

Rated Ripple (A rms) at 105°C, 120Hz

●Frequency coefficient of rated ripple current

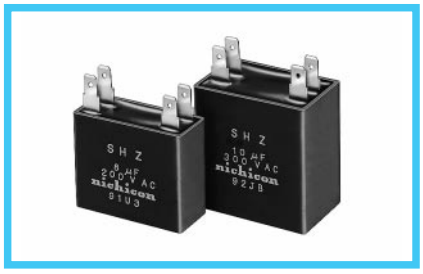
Frequency (Hz)		50	60	120	300	1k	10k	50k~
Coeff.	200V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	400V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

nichicon

EH series

Metallized Polypropylene Film AC Power Capacitor



Specifications

Item	Performance Characteristics
Maximum permissible temperature	+85˚C (Z)
Minimum ambient temperature	–25˚C (B)
Rated Voltage Range	200 ~ 460VAC
Rated Capacitance Range	1.0 ~ 30μF
Capacitance Tolerance	+10 ~ –5%
Dielectric Loss Tangent	0.12% or less (at 20˚C, 50 / 60Hz 200VAC)
Withstand Voltage	Between Terminals : Rated Voltage (VAC) × 175% 10secs. Between Terminals connected together and case : 2000VAC 60secs.
Insulation Resistance	Between Terminals connected together and case : 1000 MΩ or more (at 500VDC)
Encapsulation	Flame-retardant epoxy cased, Resin filled
Current duration class	40D (40,000h)
Safety Mechanism	Non-included

Drawing

Please refer to page 249.

Dimensions

Unit : mm

(μF) Cap.	Code \ Size \ V (Code)	200VAC (2D)				250VAC (2E)				400VAC (2G)				460VAC (W7)			
		A	B	C	Fig.	A	B	C	Fig.	A	B	C	Fig.	A	B	C	Fig.
1.0	105	–	–	–	①④⑦	–	–	–	①④⑦	37.0	11.5	25.0	①④⑦	37.0	11.5	25.0	①④⑦
1.5	155	–	–	–		–	–	–		37.0	11.5	25.0		37.0	13.5	27.0	
2.0	205	37.0	11.5	25.0		37.0	11.5	25.0		37.0	13.5	27.0		37.0	15.5	29.0	
2.5	255	37.0	11.5	25.0		37.0	11.5	25.0		37.0	15.5	29.0		37.0	17.5	31.0	
3.0	305	37.0	11.5	25.0		37.0	11.5	25.0		37.0	15.5	29.0		37.0	19.5	33.0	
3.5	355	37.0	11.5	25.0		37.0	11.5	25.0		37.0	17.5	31.0		37.0	21.5	35.0	
4.0	405	37.0	11.5	25.0		37.0	11.5	25.0		37.0	19.5	33.0		37.0	21.5	35.0	
4.5	455	37.0	13.5	27.0		37.0	13.5	27.0		37.0	19.5	33.0		37.0	24.0	37.0	
5.0	505	37.0	13.5	27.0		37.0	13.5	27.0		37.0	21.5	35.0		37.0	24.0	37.0	
6.0	605	37.0	13.5	27.0		37.0	13.5	27.0		37.0	24.0	37.0		48.0	24.0	38.0	②⑤
7.0	705	37.0	15.5	29.0		37.0	15.5	29.0		37.0	24.0	37.0		58.0	26.0	40.0	③⑥
8.0	805	37.0	15.5	29.0		37.0	15.5	29.0		48.0	24.0	38.0	②⑤	58.0	26.0	40.0	
10.0	106	37.0	17.5	31.0		37.0	17.5	31.0		58.0	26.0	40.0	③⑥	58.0	30.0	44.0	
12.0	126	37.0	21.5	35.0		37.0	21.5	35.0		58.0	26.0	40.0		58.0	30.0	44.0	
14.0	146	37.0	24.0	37.0		37.0	24.0	37.0		58.0	30.0	44.0		58.0	34.0	49.0	
15.0	156	37.0	24.0	37.0		37.0	24.0	37.0		58.0	30.0	44.0		58.0	34.0	49.0	
16.0	166	37.0	24.0	37.0		37.0	24.0	37.0									
18.0	186	48.0	21.5	35.0	②⑤	48.0	21.5	35.0	②⑤								
20.0	206	48.0	24.0	38.0		48.0	24.0	38.0									
22.0	226	58.0	26.0	40.0	③⑥	58.0	26.0	40.0	③⑥								
25.0	256	58.0	26.0	40.0		58.0	26.0	40.0									
30.0	306	58.0	26.0	40.0		58.0	26.0	40.0									

EH,EN series

Drawing

● Tab terminal 2 (Terminal shape : Q)

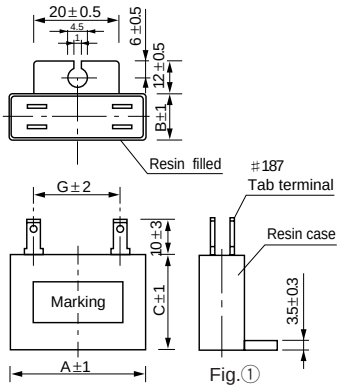


Fig.①

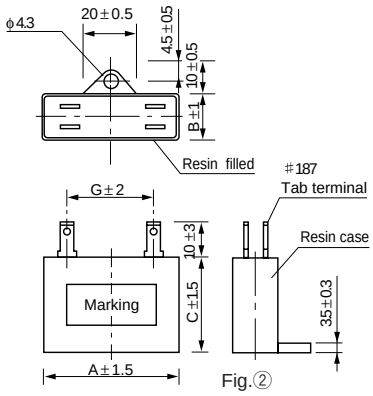


Fig.②

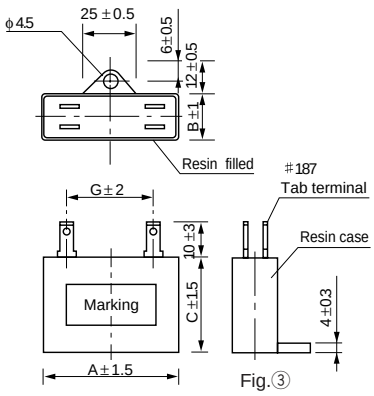


Fig.③

● Tab terminal 1 (Terminal shape : Z)

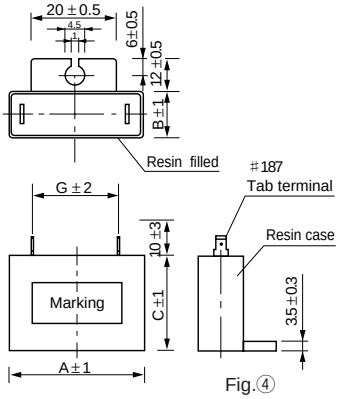


Fig.④

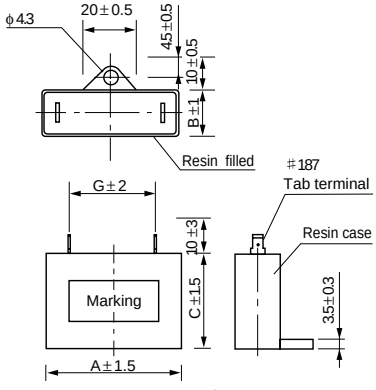


Fig.⑤

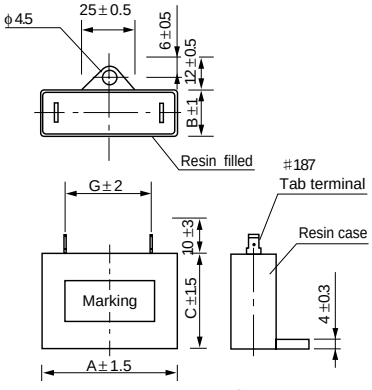


Fig.⑥

● Pin terminal (Terminal shape : W)

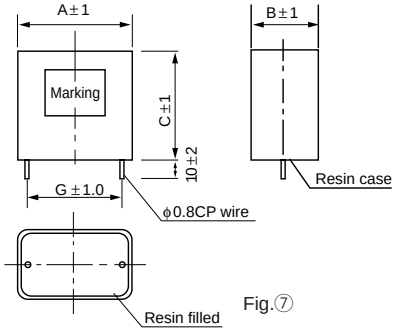
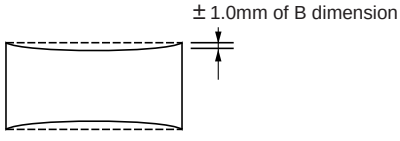


Fig.⑦

Remarks : 1) Tab terminal product has bracket as standard. It is also available without bracket.
2) Dimension of case bottom is expressed by A and B.
3) Dimension B of case top shall be ±1.0mm as shown below.



4) In case of pin terminal product, cased dimension A is only 37mm.

Dimensions

Case size (mm)			Case size code ( ) for Pin terminal	Lead pitch G (mm)					
				Terminal Shape Q		Terminal Shape Z		Terminal Shape W	
A	B	C		Terminal 2	Fig	Terminal 1	Fig	Pin terminal	Fig
37.0	11.5	25.0	01	27.0	①	30.0	④	34.2	⑦
37.0	13.5	27.0※	02 (09)※						
37.0	15.5	29.0	03 (27)※※						
37.0	17.5	31.0	04 (11)※※※						
37.0	19.5	33.0	05						
37.0	21.5	35.0	06						
37.0	24.0	37.0	07						
48.0	21.5	35.0	13	37.0	②	40.0	⑤	—	—
48.0	24.0	38.0	14						
58.0	26.0	40.0	15	47.0	③	50.0	⑥		
58.0	30.0	44.0	16						
58.0	34.0	49.0	31						

※ In case of pin terminal product, dimension will be 37.0×13.5×28.0mm. (Code : 09)
※※ In case of pin terminal product, dimension will be 37.0×15.5×29.0mm. (Code : 27)
※※※ In case of pin terminal product, dimension will be 37.0×17.5×31.0mm. (Code : 11)

EN series

Metallized Polypropylene Film AC Power Capacitor
Safety Mechanism,UL810 approved (Failure current 5,000A)

Specifications

Item	Performance Characteristics
UL Approved No.	UL810 FILE No. E86988
Maximum permissible temperature	+70˚C (M)
Minimum ambient temperature	–25˚C (B)
Rated Voltage Range	200 ~ 440VAC
Rated Capacitance Range	1.0 ~ 30μF
Capacitance Tolerance	+10 ~ –5%
Dielectric Loss Tangent	0.12% or less (at 20˚C, 50/60Hz 200VAC)
Withstand Voltage	Between Terminals : Rated Voltage (VAC) × 175% 10secs. Between Terminals connected together and case : 2000VAC 60secs.
Insulation Resistance	Between Terminals connected together and case : 1000 MΩ or more (at 500VDC)
Encapsulation	Flame-retardant epoxy cased, Resin filled
Current duration class	40D (40,000h)
Safety Mechanism	Included

Please indicate as "EEN" series when applying to UL.

Drawing

Please refer to page 249.

Dimensions

Unit : mm

(μF) Cap	V(Code) / Code / Size	200VAC (2D) A	B	C	Fig.	250VAC (2E) A	B	C	Fig.	400VAC (2G) A	B	C	Fig.	440VAC (Y5) A	B	C	Fig.
1.0	105	37.0	11.5	25.0	① ④ ⑦	37.0	11.5	25.0	① ④ ⑦	37.0	13.5	27.0	① ④ ⑦	37.0	13.5	27.0	① ④ ⑦
1.5	155	37.0	11.5	25.0		37.0	11.5	25.0		37.0	15.5	29.0		37.0	17.5	31.0	
2.0	205	37.0	11.5	25.0		37.0	11.5	25.0		37.0	17.5	31.0		37.0	19.5	33.0	
2.5	255	37.0	11.5	25.0		37.0	11.5	25.0		37.0	19.5	33.0		37.0	24.0	37.0	
3.0	305	37.0	11.5	25.0		37.0	13.5	27.0		37.0	21.5	35.0		37.0	24.0	37.0	
3.5	355	37.0	13.5	27.0		37.0	13.5	27.0		37.0	24.0	37.0		48.0	24.0	38.0	② ⑤
4.0	405	37.0	13.5	27.0		37.0	15.5	29.0		48.0	21.5	35.0	② ⑤	48.0	24.0	38.0	
4.5	455	37.0	15.5	29.0		37.0	15.5	29.0		48.0	24.0	38.0		58.0	26.0	40.0	③ ⑥
5.0	505	37.0	15.5	29.0		37.0	17.5	31.0		48.0	24.0	38.0		58.0	26.0	40.0	
6.0	605	37.0	17.5	31.0		37.0	19.5	33.0		58.0	26.0	40.0	③ ⑥	58.0	26.0	40.0	
7.0	705	37.0	17.5	31.0		37.0	21.5	35.0		58.0	26.0	40.0		58.0	30.0	44.0	
8.0	805	37.0	19.5	33.0		37.0	21.5	35.0		58.0	26.0	40.0		58.0	30.0	44.0	
10.0	106	37.0	21.5	35.0		37.0	24.0	37.0		58.0	30.0	44.0					
12.0	126	37.0	24.0	37.0		48.0	24.0	38.0	② ⑤								
14.0	146	48.0	21.5	35.0	② ⑤	48.0	24.0	38.0									
15.0	156	48.0	24.0	38.0		58.0	26.0	40.0	③ ⑥								
16.0	166	48.0	24.0	38.0		58.0	26.0	40.0									
18.0	186	58.0	26.0	40.0	③ ⑥	58.0	26.0	40.0									
20.0	206	58.0	26.0	40.0		58.0	26.0	40.0									
22.0	226	58.0	26.0	40.0		58.0	30.0	44.0									
25.0	256	58.0	26.0	40.0		58.0	30.0	44.0									
30.0	306	58.0	30.0	44.0													

EH,EN series

Drawing

● Tab terminal 2 (Terminal shape : Q)

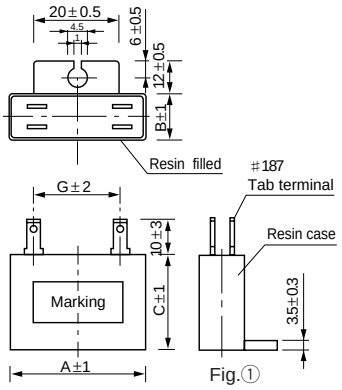


Fig.①

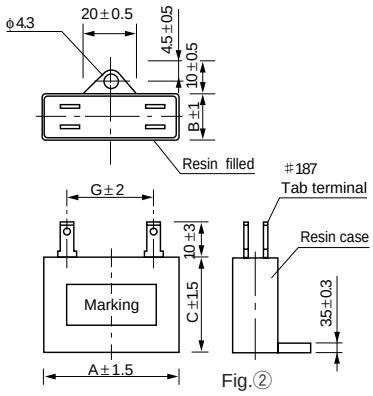


Fig.②

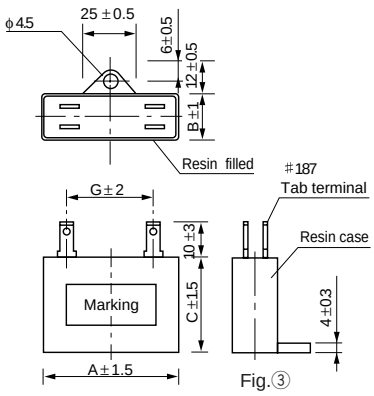


Fig.③

● Tab terminal 1 (Terminal shape : Z)

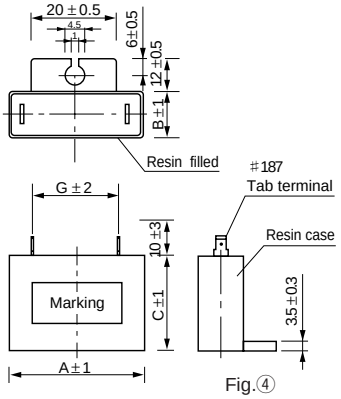


Fig.④

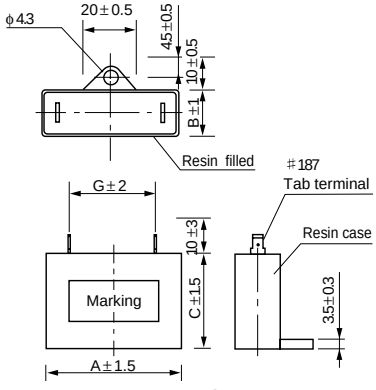


Fig.⑤

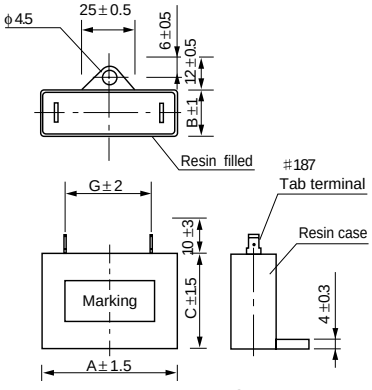


Fig.⑥

● Pin terminal (Terminal shape : W)

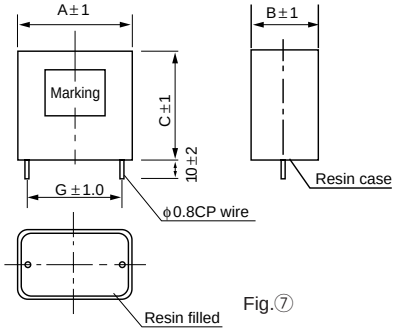
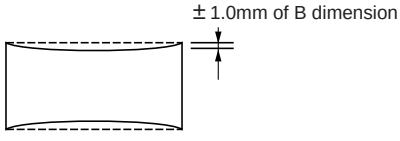


Fig.⑦

Remarks : 1) Tab terminal product has bracket as standard. It is also available without bracket.
2) Dimension of case bottom is expressed by A and B.
3) Dimension B of case top shall be ±1.0mm as shown below.



4) In case of pin terminal product, cased dimension A is only 37mm.

Dimensions

Case size (mm)			Case size code ( ) for Pin terminal	Lead pitch G (mm)					
				Terminal Shape Q		Terminal Shape Z		Terminal Shape W	
A	B	C		Terminal 2	Fig	Terminal 1	Fig	Pin terminal	Fig
37.0	11.5	25.0	01	27.0	①	30.0	④	34.2	⑦
37.0	13.5	27.0※	02 (09)※						
37.0	15.5	29.0	03 (27)※※						
37.0	17.5	31.0	04 (11)※※※						
37.0	19.5	33.0	05						
37.0	21.5	35.0	06						
37.0	24.0	37.0	07						
48.0	21.5	35.0	13	37.0	②	40.0	⑤	—	—
48.0	24.0	38.0	14						
58.0	26.0	40.0	15	47.0	③	50.0	⑥		
58.0	30.0	44.0	16						
58.0	34.0	49.0	31						

※ In case of pin terminal product, dimension will be 37.0×13.5×28.0mm. (Code : 09)
※※ In case of pin terminal product, dimension will be 37.0×15.5×29.0mm. (Code : 27)
※※※ In case of pin terminal product, dimension will be 37.0×17.5×31.0mm. (Code : 11)

ALUMINUM ELECTROLYTIC CAPACITORS

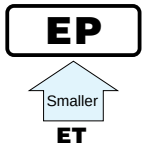
nichicon

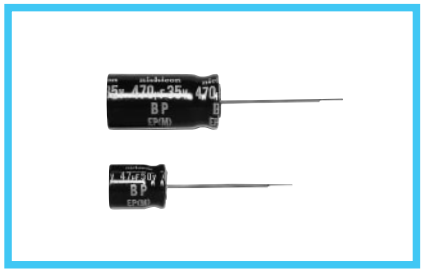
EP series

Bi-Polarized, Wide Temperature Range

Smaller | Bi-polarized | Anti-Solvent Feature

● 1 ~ 2 ranks smaller than ET series.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.47 ~ 6800μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than 0.03CV or 3 (μA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.24	0.24	0.20	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

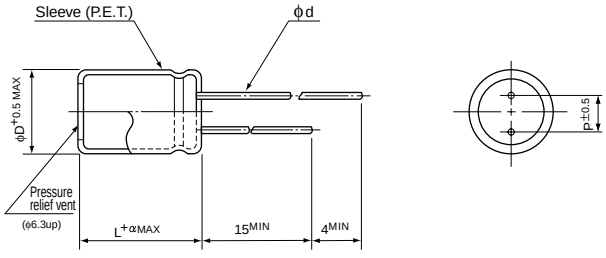
Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX)	Z–25°C / Z+20°C	4	3	2	2	2	2	2	2
	Z–40°C / Z+20°C	10	8	6	4	3	3	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value (6.3~16V) Within ±20% of initial value (25~100V)
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8

Type numbering system (Example : 10V 47μF)

1 2 3 4 5 6 7 8 9 10 11

U E P 1 A 4 7 0 M D D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (47μF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap. (μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.47	R47											5×11	7			5×11	8
1	010											5×11	10			5×11	12
2.2	2R2											5×11	15			6.3×11	20
3.3	3R3											5×11	18	5×11	20	6.3×11	25
4.7	4R7									5×11	21	5×11	22	6.3×11	24	6.3×11	30
10	100					5×11	27	5×11	27	5×11	30	6.3×11	37	6.3×11	40	8×11.5	50
22	220			5×11	37	5×11	40	6.3×11	46	6.3×11	51	8×11.5	63	8×11.5	68	10×16	97
33	330	5×11	45	5×11	45	5×11	49	6.3×11	56	8×11.5	72	8×11.5	77	10×12.5	98	12.5×20	140
47	470	5×11	54	5×11	54	6.3×11	67	6.3×11	67	8×11.5	86	10×12.5	105	10×16	130	12.5×20	170
100	101	6.3×11	90	6.3×11	90	8×11.5	110	8×11.5	110	10×16	160	10×20	190	12.5×20	225	16×25	300
220	221	8×11.5	150	8×11.5	150	10×12.5	195	10×16	215	12.5×20	290	12.5×25	340	16×25	405	18×35.5	510
330	331	8×11.5	185	10×16	240	10×16	265	12.5×20	320	12.5×20	350	16×25	460	16×31.5	535		
470	471	10×12.5	260	10×16	290	10×20	345	12.5×20	380	12.5×25	465	16×31.5	590	18×35.5	680		
1000	102	10×20	460	12.5×20	510	12.5×25	605	16×25	670	16×31.5	805						
2200	222	12.5×25	820	16×25	910	16×31.5	1070	18×35.5	1140								
3300	332	16×25	1110	16×31.5	1200	18×35.5	1400										
4700	472	16×31.5	1430	18×35.5	1520												Rated ripple
6800	682	18×35.5	1830													Case size	

Rated Ripple (mA rms) at 105°C 120Hz

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

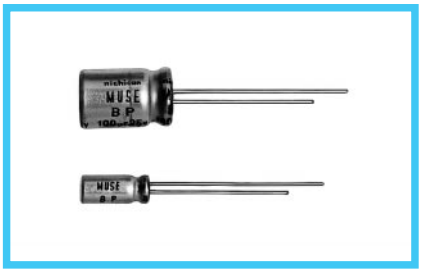
nichicon

nichicon MUSE **ES** series

Bi-Polarized, For Audio Equipment

For Audio Use | Bi-polarized | Anti-Solvent Feature

- Bi-polarized "nichicon MUSE" acoustic series.
- Suited for audio signal circuits.



ES ← Bi-polarized **FG**

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.47 ~ 1000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 3 (μA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.16	0.16	0.14	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	4	4

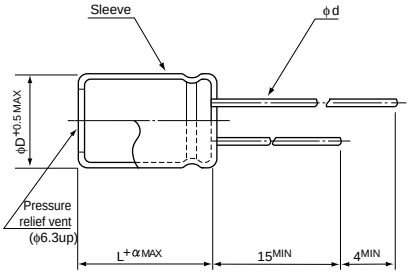
Endurance — After 1000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours, capacitors meet the characteristics requirement listed at right.

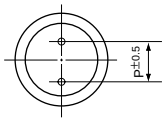
Capacitance change	Within ±20% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with black color letter on clear green sleeve.

■Radial Lead Type





φD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.6	0.6	0.6	0.6	0.8	0.8

α	
	(φD < 10) 1.0
	(φD ≧ 10) 1.5

Type numbering system (Example : 10V 47μF)

1	2	3	4	5	6	7	8	9	10	11
U	E	S	1	A	4	7	0	M	E	J

- 11: Configuration
- 9: Capacitance tolerance (±20%)
- 8: Rated Capacitance (47μF)
- 5: Rated voltage (10V)
- 3: Series name
- 1: Type

φD	Code
5	DJ
6.3	EJ
8 · 10	PJ
12.5 · 16	HJ

※ Please contact to us if Eco-Products are required.

■Dimensions

D × L (mm)

Cap.(μF)	Code \ V	6.3	10	16	25	35	50
		0J	1A	1C	1E	1V	1H
0.47	R47						5×11
1	010						5×11
2.2	2R2						5×11
3.3	3R3						5×11
4.7	4R7				5×11	5×11	6.3×11
10	100			5×11	5×11	6.3×11	8×11.5
22	220		5×11	6.3×11	6.3×11	8×11.5	10×12.5
33	330	5×11	6.3×11	6.3×11	8×11.5	10×12.5	10×16
47	470	6.3×11	6.3×11	8×11.5	10×12.5	10×12.5	10×20
100	101	8×11.5	10×12.5	10×12.5	10×16	10×20	12.5×25
220	221	10×12.5	10×16	10×20	12.5×25	12.5×25	16×25
330	331	10×16	10×20	12.5×20	12.5×25	16×25	16×31.5
470	471	10×20	12.5×20	12.5×25	16×25	16×25	
1000	102	12.5×25	16×25	16×25	16×31.5		

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

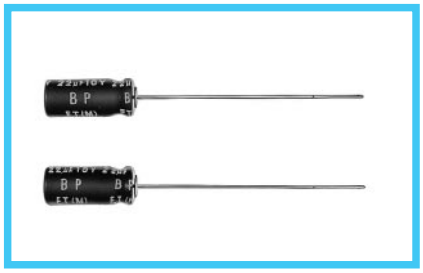
nichicon

ET Bi-Polarized, Wide Temperature Range series

BP Bi-polarized | Anti-Solvent Feature

● Bi-polarized series for operations over wide temperature range of –55 ~ +105°C.

ET
High Temperature
VP



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.47 ~ 1000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than 0.03CV or 3 (µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.24	0.20	0.16	0.16	0.14	0.12	0.10	0.09

Stability at Low Temperature — Measurement frequency : 120Hz

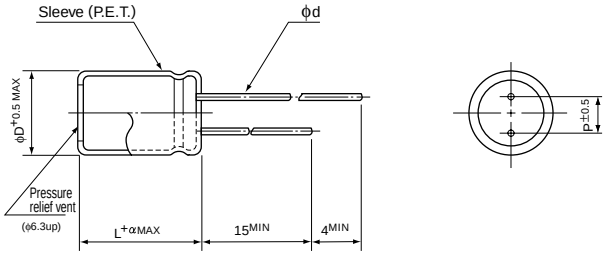
Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX)	Z–25°C / Z+20°C	4	3	2	2	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	3	3	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirement listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

φD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8

Type numbering system (Example : 10V 47µF)

1	2	3	4	5	6	7	8	9	10	11
U	E	T	1	A	4	7	0	M	E	D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (47µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 · 16	HD	HH

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap. (µF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.47	R47											5×11	8			5×11	10
1	010											5×11	12			5×11	15
2.2	2R2											5×11	18			6.3×11	22
3.3	3R3											5×11	22	6.3×11	26	8×11.5	32
4.7	4R7							5×11	23	5×11	25	6.3×11	29	6.3×11	31	8×11.5	39
10	100					5×11	30	5×11	34	6.3×11	40	8×11.5	51	8×11.5	53	10×12.5	64
22	220			5×11	42	6.3×11	51	6.3×11	55	8×11.5	68	10×12.5	82	10×16	96	10×20	114
33	330	5×11	46	6.3×11	57	6.3×11	63	8×11.5	79	10×12.5	89	10×16	107	10×20	129	12.5×20	164
47	470	6.3×11	61	6.3×11	67	8×11.5	89	10×12.5	100	10×12.5	111	10×20	146	10×20	157	12.5×25	200
100	101	8×11.5	104	10×12.5	125	10×12.5	139	10×16	164	10×20	196	12.5×25	264	12.5×25	275	16×25	304
220	221	10×12.5	168	10×16	204	10×20	279	12.5×25	336	12.5×25	364	16×25	443	16×31.5	486		
330	331	10×16	229	10×20	275	12.5×20	346	12.5×25	414	16×25	493	16×31.5	593				
470	471	10×20	300	12.5×20	371	12.5×25	460	16×25	543	16×25	586						
1000	102	12.5×25	550	16×25	668	16×25	746	16×31.5	871							Case size	Rated ripple

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(µF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000	0.85	1.00	1.10	1.13	1.15

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

SOLID TANTALUM ELECTROLYTIC CAPACITORS

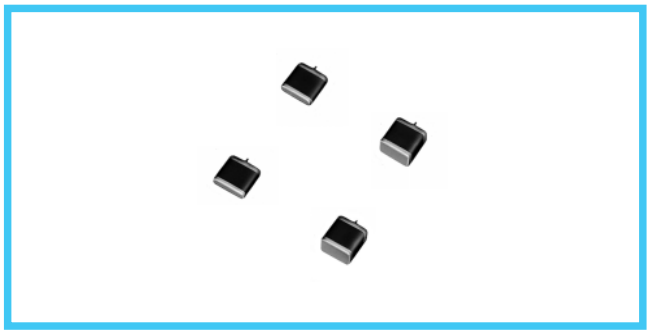
nichicon

F72 Low Profile Conformal coated Chip

F75 Maximum CV Conformal coated Chip

FRAMELESS™

For SMD | Smaller | For High Frequency | Eco-Products



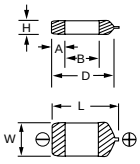
F72

Type numbering system (Example : 10V 100µF)

1	2	3	4	5	6	7	8	9	10	11
F	7	2	1	A	1	0	7	M	R	

- 11: Taping code (Refer to page 213 for details)
- 10: Case code
- 9: Capacitance tolerance
- 8–6: Rated Capacitance
- 5–4: Rated voltage
- 3–1: Series

Drawing



Dimensions

(mm)

Case code	L	W	H	A	B	(D)
R	7.2 ± 0.3	6.0 ± 0.3	1.2 ± 0.3	1.3 ± 0.4	3.8 ± 0.6	(6.2)

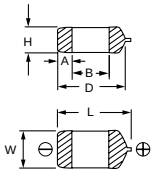
D dimension only for reference

F75

1	2	3	4	5	6	7	8	9	10	11
F	7	5	1	C	1	5	7	M	D	

- 11: Taping code (Refer to page 213 for details)
- 10: Case code
- 9: Capacitance tolerance
- 8–6: Rated Capacitance
- 5–4: Rated voltage
- 3–1: Series

Drawing



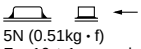
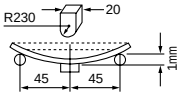
Dimensions

(mm)

Case code	L	W	H	A	B	(D)
C	7.1 ± 0.3	3.2 ± 0.3	2.5 ± 0.3	1.3 ± 0.3	3.6 ± 0.6	(6.0)
D	7.3 ± 0.3	4.3 ± 0.3	2.8 ± 0.3	1.3 ± 0.4	3.9 ± 0.6	(6.4)
R	7.2 ± 0.3	6.0 ± 0.3	3.5 ± 0.3	1.3 ± 0.4	3.8 ± 0.6	(6.2)

D dimension only for reference

Specifications

Item	Performance Characteristics	
Category Temperature Range	−55 ~ +125˚C (Rated temperature : +85˚C)	
Capacitance Tolerance	±20%, ±10% (at 120Hz)	
Dissipation Factor (120Hz)	F72 33~68µF 6%Max. 100µF~ 8%Max. 150µF 10%Max. 220µF~330µF 12%Max.	F75 68~330µF 10%Max. 470µF 14%Max. 680µF 18%Max. 1000µF 24%Max. 1500µF 30%Max. 2200µF 45%Max.
E.S.R (100kHz)	33µF 0.90Ω 47µF 0.80Ω 68µF 0.75Ω 100µF~ 0.70Ω	~150µF 0.22Ω 220µF 0.20Ω 330µF 0.15Ω 470~1500µF 0.12Ω 2200µF 0.07Ω
Leakage Current	• After 1 minute's application of rated voltage, leakage current at 20˚C is not more than 0.01CV or 0.5µA, whichever is greater. • After 1 minute's application of rated voltage, leakage current at 85˚C is not more than 0.1CV or 5µA, whichever is greater. • After 1 minute's application of derated voltage, leakage current at 125˚C is not more than 0.125CV or 6.3µA, whichever is greater.	
Capacitance Change by Temperature	+15% Max. (at +125˚C) +10% Max. (at +85˚C) −10% Max. (at −55˚C)	
Damp Heat	At 40˚C, 90~95% R.H., For 500 hours (No voltage applied) Capacitance Change ····· Within ±10% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less	
Temperature Cycles	At −55˚C / +125˚C, 30 minutes each, For 5 cycles, Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Currentv ····· Initial specified value or less	
Resistance to Soldering Heat	Dipping Flow at 260˚C for 10 seconds,Reflow at 260˚C for 10 seconds Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less	
Surge*	After application of surge in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85˚C, capacitors meet the characteristics requirements listed below. Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less	
Endurance*	After 2000 hours' application of rated voltage at 85˚C, or derated voltage at 125˚C, capacitors meet the characteristic requirements listed below. Capacitance Change ····· Within ±10% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less	
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, there shall be found neither exfoliation nor its sign at the terminal electrode.	 5N (0.51kg · f) For 10 ± 1 seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.	

* As for the surge and derated voltage at 125˚C, refer to page 212 for details.

Standard ratings

F72

Cap.(µF) \ Code \ V		4	6.3	10	16
		0G	0J	1A	1C
33	336				R
47	476			R	R
68	686		R	R	R
100	107	R	R	R	
150	157	R	R	R	
220	227	R	R		
330	337	R			

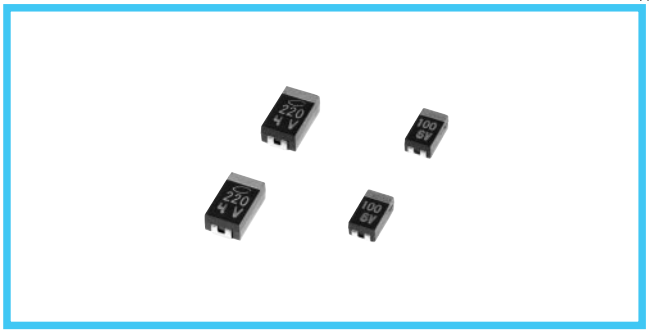
F75

Cap. (µF) \ Code \ V		4	6.3	10	16
		0G	0J	1A	1C
68	686				C
100	107				C
150	157			C	D
220	227		C	C・D	R
330	337	C	C・D	D	
470	477	C・D	D	R	
680	687	D	D・R		
1000	108	D・R	R		
1500	158	R			
2200	228	R			

F91

LOW ESR
Resin-molded Chip,

For SMD | For High Frequency | Eco-Products



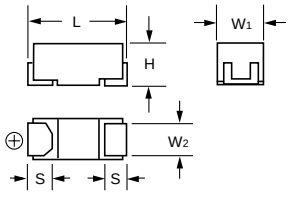
Type numbering system (Example : 10V 100µF)

1	2	3	4	5	6	7	8	9	10	11
F	9	1	1	A	1	0	7	M	C	

- 11: Taping code (Refer to page 213 for details)
- 10: Case code
- 9: Capacitance tolerance
- 8–6: Rated Capacitance
- 5: Rated voltage
- 4: Series

Drawing

C・N Case

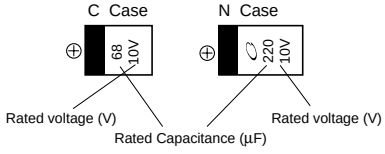


Dimensions

(mm)

Case Code	L	W1	W2	H	S
C	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
N	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

Marking



Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +125˚C (Rated temperature : 85˚C)
Capacitance Tolerance	±20%, ±10% (at 120Hz)
Dissipation Factor (120Hz)	Refer to the list below.
E.S.R. (100kHz)	Refer to the list below.
Leakage Current	• After 1 minute's application of rated voltage, leakage current at 20˚C is not more than 0.01CV or 0.5mA, whichever is greater. • After 1 minute's application of rated voltage, leakage current at 85˚C is not more than 0.1CV or 5mA, whichever is greater. • After 1 minute's application of derated voltage, leakage current at 125˚C is not more than 0.125CV or 6.3mA, whichever is greater.
Capacitance Change by Temperature	+15% Max. (at +125˚C) +10% Max. (at +85˚C) −10% Max. (at −55˚C)
Damp Heat (No voltage applied)	At 40˚C 90 ~ 95% R.H. 500 hours Capacitance Change Within ±10% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Temperature Cycles	−55˚C / +125˚C 30 minutes each 5 cycles Capacitance Change Within ±5% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Resistance to Soldering Heat	Test condition: 10 seconds reflow at 260˚C Capacitance Change Within ±3% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Surge*	After application of surge in series with a 33Ω resistor at the rate of 30 seconds ON, seconds OFF, for 1000 sucessive test cycles at 85˚C, capacitors meet the characteristic requirements listed below. Capacitance Change····Within ±5% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Endurance*	After 2000 hours' application of rated voltage in series with a 3Ω resistor at 85˚C, or derated voltage in series with a 3Ω resistor at 125˚C, capacitors meet the characteristics requirements listed below. Capacitance Change·····Within ±10% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, neither exfoliation not its sign shall be found at the terminal electrode. 5N (0.51kg・f) For 10±1seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure load is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. R230 20 1mm 45 45

* As for the surge and derated voltage at 125˚C, refer to page 212 for details.

Standard ratings

Cap. (µF) \ V	Code	2.5	4	6.3	10
		0E	0G	0J	1A
68	686				C
100	107			C	C
150	157		C	C	N
220	227	C	C	C・N	N
330	337		N	N	N
470	477	N	N	N	
680	687		N		

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R. (mΩ@100kHz)
2.5V	220	C	F910E227MCC	5.5	12	250
	470	N	F910E477MNC	11.8	12	100
4V	150	C	F910G157MCC	6.0	12	250
	220	C	F910G227MCC	8.8	12	250
	330	N	F910G337MNC	13.2	10	100
	470	N	F910G477MNC	18.8	16	100
	680	N	F910G687MNC	27.2	18	100
6.3V	100	C	F910J107MCC	6.3	10	250
	150	C	F910J157MCC	9.5	12	250
	220	C	F910J227MCC	13.9	14	250
	220	N	F910J227MNC	13.9	10	100
	330	N	F910J337MNC	20.8	14	100
	470	N	F910J477MNC	29.6	16	100
10V	68	C	F911A686MCC	6.8	8	300
	100	C	F911A107MCC	10.0	10	250
	150	N	F911A157MNC	15.0	10	100
	220	N	F911A227MNC	22.0	12	100
	330	N	F911A337MNC	33.0	18	100

※ In case of capacitance tolerance ± 10% type, K will be put at 9th digit of type numbering system.

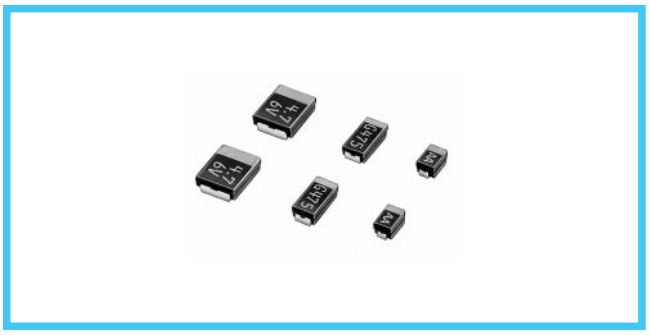
SOLID TANTALUM ELECTROLYTIC CAPACITORS

nichicon

F92

Resin-molded Chip, Compact Series

For SMD | Smaller | Eco-Products

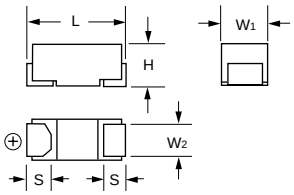


■ Type numbering system (Example: 6.3V 10µF)

1	2	3	4	5	6	7	8	9	10	11
F	9	2	0	J	1	0	6	M	P	

- Taping code (Refer to page 213 for details)
- Case code
- Capacitance tolerance
- Rated Capacitance
- Rated voltage
- Series

■ Drawing

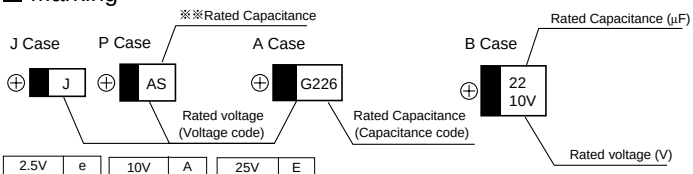


■ Dimensions

(mm)

Case code	L	W_1	W_2	H	S
J	1.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.8 ± 0.1	0.4 ± 0.1
P	2.0 ± 0.2	1.25 ± 0.1	0.9 ± 0.1	1.1 ± 0.1	0.5 ± 0.2
A	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
B	3.4 ± 0.2	2.8 ± 0.2	2.3 ± 0.1	1.1 ± 0.1	0.8 ± 0.2

■ Marking



2.5V	e	10V	A	25V	E
4V	G	16V	C	35V	V
6.3V	J	20V	D		

※ ※ Capacitance code of "P" case products are as shown below.

■ Specifications

Item	Performance Characteristics	
	J・P Case	A・B Case
Category Temperature Range	−55 ~ +125°C (Rated temperature : 85°C)	
Capacitance Tolerance	±20% (at 120Hz)	
Dissipation Factor (120Hz)	refer to P.216	
E.S.R. (100kHz)	refer to P.216	
Leakage Current	• After 1 minute's application of rated voltage, leakage current at 20°C is not more than 0.01CV or 0.5µA, whichever is greater. • After 1 minute's application of rated voltage, leakage current at 85°C is not more than 0.1CV or 5µA, whichever is greater. • After 1 minute's application of derated voltage, leakage current at 125°C is not more than 0.125CV or 6.3µA, whichever is greater.	
Capacitance Change by Temperature	+20% Max. (at +125°C) +15% Max. (at +85°C) −15% Max. (at −55°C)	+15% Max. (at +125°C) +10% Max. (at +85°C) −10% Max. (at −55°C)
Damp Heat (No voltage applied)	At 40°C 90 ~ 95% R.H. 240 hours	At 40°C 90 ~ 95% R.H. 500 hours
	Capacitance Change··· Within ±20% of initial value Dissipation Factor···150% or less of initial specified value Leakage Current··· Initial specified value or less	Within ±10% of initial value Initial specified value or less Initial specified value or less
Temperature Cycles	−55°C / +125°C 30 minutes each 5 cycles	
	Capacitance Change··· Within ±10% of initial value (J case Within ±20%) Dissipation Factor···150% of less of initial specified value *1 Leakage Current··· Initial specified value or less	Within ±5% of initial value Initial specified value or less Initial specified value or less

Resistance to Soldering Heat	5 seconds immension at 260°C,10 seconds reflow at 260°C	
	Capacitance Change··· Within ±10% of initial value (J case within ±20%) Dissipation Factor···150% of less of initial specified value*1 Leakage Current··· Initial specified value or less	Within ±5% of initial value Initial specified value or less Initial specified value or less
Surge*	After application of surge voltage in series with a 33Ω (For "J" "P" case: 1kΩ) resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C, capacitors meet the characteristics requirements listed below.	
	Capacitance Change··· Within ±10% of initial value (J case within ±20%) Dissipation Factor···150% or less of initial specified value*1 Leakage Current··· Initial specified value or less	Within ±5% of initial value Initial specified value or less Initial specified value or less
Endurance*	After 1000hours' application of rated voltage in series with a 3Ω resistor at 85°C, or derated voltage in series with a 3Ω resistor at 125°C, capacitors meet the characteristic requirements listed below. Capacitance Change··· Within ±10°C of initial value (J case within ±20%) Dissipation Factor···150% or less of initial specified value*1 Leakage Current··· Initial specified value or less (J case 2 times value or less)	After 2000hours' application of rated voltage in series with a 3Ω resistor at 85°C, or derated voltage in series with a 3Ω resistor at 125°C, capacitors meet the characteristic requirements listed below. Capacitance Change··· Within ±10°C of initial value Dissipation Factor··· Initial specified value or less Leakage Current··· Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, there shall be found neither exfoliation nor its sign at the terminal electrode.	5N (0.51kg・f) For 10 ± 1seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.	R230 20 45 45 1mm

* As for the surge and derated voltage at 125°C, refer to page 212 for details.

■ Standard ratings

Cap.(µF) \ V	Code	2.5	4	6.3	10	16	20	25	35	※※ Capacitance code
		0E	0G	0J	1A	1C	1D	1E	1V	
0.1	104								A	
0.15	154								A	
0.22	224						P・A	A	A	J
0.33	334						P・A	A	A	N
0.47	474					P	P・A	A	B	S
0.68	684					P	A	B	B	W
1	105			P	P	J・P・A	P・A	P・A・B	(A)	A
1.5	155			P	P・A	P・A	A・B			E
2.2	225		P	J・P・A	J・P・A	P・A・B	A・B	(B)	(B)	J
3.3	335		P・A	P・A	P・A	A・B	B			N
4.7	475	P	J・P・A	J・P・A	P・A	A・B	B			S
6.8	685	P	J・P・A	P・A	P・A	B				w
10	106	J・P・A	J・P・A	J・P・A	P・A・B	(A)・B				a
15	156	P・A	P・A	P・A	A・B					e
22	226	P・A	P・A	P・A・B	(A)・B	(B)				j
33	336	P・A	(P)・A・B	(A)・B	B					n
47	476	B	(A)・B	B						
68	686	B	B							
100	107	B	B	(B)						

( ) The series in parentheses are being developed.
Please contact to your local Nichicon sales office when these series are being designed in your application.

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■ Standard ratings

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R. (Ω@100kHz)
2.5V	4.7	P	F920E475MPA	0.5	8	6.0
	6.8	P	F920E685MPA	0.5	10	6.0
	10	J	F920E106MJA	0.5	20	6.5
	10	P	F920E106MPA	0.5	10	6.0
	10	A	F920E106MAA	0.5	8	4.0
	15	P	F920E156MPA	0.5	10	5.0
	15	A	F920E156MAA	0.5	8	4.0
	22	P	F920E226MPA	0.6	20	4.0
	22	A	F920E226MAA	0.6	12	2.8
	33	P	F920E336MPA	0.8	20	4.0
	33	A	F920E336MAA	0.8	12	2.8
	47	B	F920E476MBA	1.2	12	1.7
	68	B	F920E686MBA	1.7	12	1.5
	100	B	F920E107MBA	2.5	18	1.3
4V	2.2	P	F920G225MPA	0.5	8	12.0
	3.3	P	F920G335MPA	0.5	8	12.0
	3.3	A	F920G335MAA	0.5	6	7.0
	4.7	J	F920G475MJA	0.5	20	8.5
	4.7	P	F920G475MPA	0.5	8	6.0
	4.7	A	F920G475MAA	0.5	6	4.0
	6.8	J	F920G685MJA	0.5	20	7.5
	6.8	P	F920G685MPA	0.5	10	6.0
	6.8	A	F920G685MAA	0.5	6	4.0
	10	J	F920G106MJA	0.5	20	6.5
	10	P	F920G106MPA	0.5	10	6.0
	10	A	F920G106MAA	0.5	8	4.0
	15	P	F920G156MPA	0.6	10	5.0
	15	A	F920G156MAA	0.6	8	4.0
	22	P	F920G226MPA	0.9	20	5.0
	22	A	F920G226MAA	0.9	12	2.8
	33	A	F920G336MAA	1.3	12	2.8
	33	B	F920G336MBA	1.3	12	1.7
	47	B	F920G476MBA	1.9	12	1.7
	68	B	F920G686MBA	2.7	18	1.5
	100	B	F920G107MBA	4.0	18	1.3
6.3V	1	P	F920J105MPA	0.5	8	12.0
	1.5	P	F920J155MPA	0.5	8	12.0
	2.2	J	F920J225MJA	0.5	20	17.5
	2.2	P	F920J225MPA	0.5	8	12.0
	2.2	A	F920J225MAA	0.5	6	7.0
	3.3	P	F920J335MPA	0.5	8	12.0
	3.3	A	F920J335MAA	0.5	6	7.0
	4.7	J	F920J475MJA	0.5	20	8.5
	4.7	P	F920J475MPA	0.5	8	6.0
	4.7	A	F920J475MAA	0.5	6	4.0
	6.8	P	F920J685MPA	0.5	10	6.0
	6.8	A	F920J685MAA	0.5	6	4.0
	10	J	F920J106MJA	0.6	20	8.5
	10	P	F920J106MPA	0.6	10	6.0
	10	A	F920J106MAA	0.6	8	4.0
	15	P	F920J156MPA	0.9	10	6.0
	15	A	F920J156MAA	0.9	8	4.0
	22	P	F920J226MPA	1.4	20	5.0
	22	A	F920J226MAA	1.4	12	2.8
	22	B	F920J226MBA	1.4	8	1.9
	33	B	F920J336MBA	2.1	12	1.7
	47	B	F920J476MBA	3.0	12	1.7

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R. (Ω@100kHz)
10V	1	P	F921A105MPA	0.5	8	12.0
	1.5	P	F921A155MPA	0.5	8	12.0
	1.5	A	F921A155MAA	0.5	6	7.4
	2.2	J	F921A225MJA	0.5	20	17.5
	2.2	P	F921A225MPA	0.5	8	12.0
	2.2	A	F921A225MAA	0.5	6	7.0
	3.3	P	F921A335MPA	0.5	8	12.0
	3.3	A	F921A335MAA	0.5	6	7.0
	4.7	P	F921A475MPA	0.5	8	6.0
	4.7	A	F921A475MAA	0.5	6	4.0
	6.8	P	F921A685MPA	0.7	8	6.0
	6.8	A	F921A685MAA	0.7	6	4.0
	10	P	F921A106MPA	1.0	14	6.0
	10	A	F921A106MAA	1.0	8	4.0
	10	B	F921A106MBA	1.0	6	2.0
	15	A	F921A156MAA	1.5	8	4.0
	15	B	F921A156MBA	1.5	6	2.0
	22	B	F921A226MBA	2.2	8	1.9
	33	B	F921A336MBA	3.3	12	1.9
16V	0.47	P	F921C474MPA	0.5	8	20.0
	0.68	P	F921C684MPA	0.5	8	12.0
	1	J	F921C105MJA	0.5	20	25.5
	1	P	F921C105MPA	0.5	8	12.0
	1	A	F921C105MAA	0.5	4	10.0
	1.5	P	F921C155MPA	0.5	8	12.0
	1.5	A	F921C155MAA	0.5	6	7.4
	2.2	P	F921C225MPA	0.5	8	12.0
	2.2	A	F921C225MAA	0.5	6	7.0
	2.2	B	F921C225MBA	0.5	6	3.0
	3.3	A	F921C335MAA	0.5	6	7.0
	3.3	B	F921C335MBA	0.5	6	3.0
	4.7	A	F921C475MAA	0.8	6	7.0
	4.7	B	F921C475MBA	0.8	6	3.0
	6.8	B	F921C685MBA	1.1	6	3.0
	10	B	F921C106MBA	1.6	6	2.0
20V	0.22	P	F921D224MPA	0.5	8	20.0
	0.22	A	F921D224MAA	0.5	4	10.0
	0.33	P	F921D334MPA	0.5	8	20.0
	0.33	A	F921D334MAA	0.5	4	10.0
	0.47	P	F921D474MPA	0.5	8	20.0
	0.47	A	F921D474MAA	0.5	4	10.0
	0.68	A	F921D684MAA	0.5	4	10.0
	1	P	F921D105MPA	0.5	8	20.0
	1	A	F921D105MAA	0.5	4	10.0
	1.5	A	F921D155MAA	0.5	6	7.4
	1.5	B	F921D155MBA	0.5	6	4.0
	2.2	A	F921D225MAA	0.5	6	7.0
	2.2	B	F921D225MBA	0.5	6	3.0
	3.3	B	F921D335MBA	0.7	6	3.0
	4.7	B	F921D475MBA	0.9	6	3.0
25V	0.22	A	F921E224MAA	0.5	4	10.0
	0.33	A	F921E334MAA	0.5	4	10.0
	0.47	A	F921E474MAA	0.5	4	10.0
	0.68	B	F921E684MBA	0.5	4	4.0
	1	P	F921E105MPA	0.5	8	20.0
	1	A	F921E105MAA	0.5	6	10.0
	1	B	F921E105MBA	0.5	4	4.0
35V	0.1	A	F921V104MAA	0.5	4	10.0
	0.15	A	F921V154MAA	0.5	4	10.0
	0.22	A	F921V224MAA	0.5	4	10.0
	0.33	A	F921V334MAA	0.5	4	10.0
	0.47	B	F921V474MBA	0.5	4	4.0
	0.68	B	F921V684MBA	0.5	4	4.0

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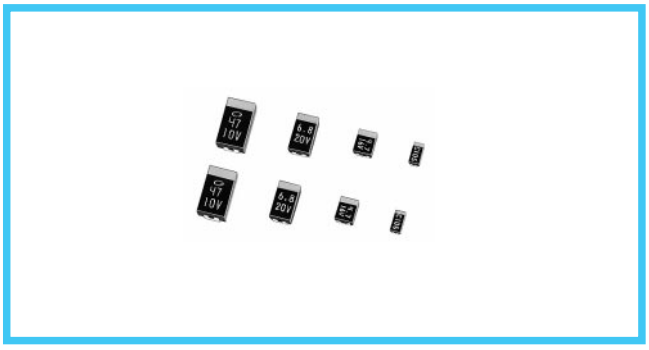
Resin-molded Chip, Standard Series

For SMD Eco-Products

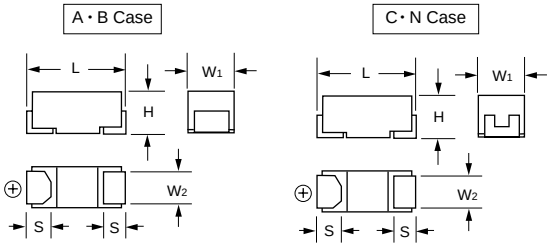


Type numbering system (Example: 10V 10µF)

1	2	3	4	5	6	7	8	9	10	11
F	9	3	1	A	1	0	6	M	A	

- Taping code (Refer to page 213 for details)
- Case code
- Capacitance tolerance
- Rated Capacitance
- Rated voltage
- Series

Drawing

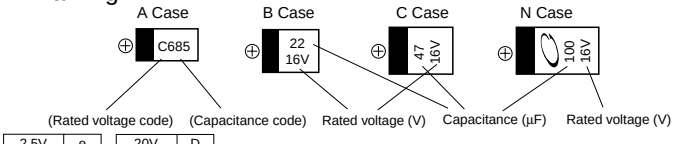


Dimensions

(mm)

Case code	L	W_1	W_2	H	S
A	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
B	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
N	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

Marking



2.5V	e
4V	G
6.3V	J
10V	A
16V	C

20V	D
25V	E
35V	V

Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +125˚C (Rated temperature : 85˚C)
Capacitance Tolerance	±20%, ±10% (at 120Hz)
Dissipation Factor (120Hz)	Refer to P.218
E.S.R. (100kHz)	Refer to P.218
Leakage Current	• After 1 minute's application of rated voltage, leakage current at 20˚C is not more than 0.01CV or 0.5µA, whichever is greater. • After 1 minute's application of rated voltage, leakage current at 85˚C is not more than 0.1CV or 5µA, whichever is greater. • After 1 minute's application of derated voltage, leakage current at 125˚C is not more than 0.125CV or 6.3µA, whichever is greater.
Capacitance Change by Temperature	+15% Max. (at +125˚C) +10% Max. (at +85˚C) −10% Max. (at −55˚C)
Damp Heat (No voltage applied)	At 40˚C 90 ~ 95% R.H. 500 hours Capacitance Change Within ±10% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Temperature Cycles	−55˚C / +125˚C 30 minutes each 5 cycles Capacitance Change Within ±5% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Resistance to Soldering Heat	Test condition: 5 seconds immersion at 260˚C,10 seconds reflow at 260˚C Capacitance Change Within ±5% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Surge*	After application of surge voltage in series with a 33Ω resistor at the rate of 30 seconds ON, seconds OFF, for 1000 sucessive test cycles at 85˚C, capacitors meet the characteristics requirements listed below. Capacitance Change····Within ±5% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Endurance*	After 2000 hours' application of rated voltage in series with a 3Ω resistor at 85˚C, or derated voltage in series with a 3Ω resistor at 125˚C, capacitors meet the characteristic requirements listed below. Capacitance Change·····Within ±10% of initial value Dissipation Factor·····Initial specified value or less Leakage Current·····Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, neigher exfoliation not its sign shall be found at the terminal electrode. 5N (0.51kg・f) For 10±1seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure load is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. R230 20 45 45 1mm

* As for the surge and derated voltage at 125˚C, refer to page 212 for details.

Standard ratings

Cap. (µF) \ V	Code	2.5	4	6.3	10	16	20	25	35
		0E	0G	0J	1A	1C	1D	1E	1V
0.47	474								A
0.68	684							A	A
1	105					A	A	A	A
1.5	155					A	A	A	A
2.2	225			A	A	A	A	A	B
3.3	335			A	A	A	A	A・B	B
4.7	475		A	A	A	A	A・B	B	C
6.8	685		A	A	A	A・B	A・B	C	C
10	106		A	A	A・B	A・B	(A)・B	C	C
15	156		A	A・B	A・B	A・B	C	C	N
22	226	A	A・B	A・B	A・B	(A)・B・C	C	N	N
33	336	A	A・B	A・B	(A)・B・C	B・C	N	N	
47	476	A	A・B	A・B	B・C	C・N	N		
68	686	A・B	A・B	B・C	C・N	N			
100	107	B	A・B	B・C	C・N	(C)・N			
150	157	B	(A)・B・C	(B)・C・N	(C)・N				
220	227	B・C	B・C	C・N	N				
330	337	C	C・N	N	N				
470	477	C・N	N	N					
680	687		N						

( ) The series in parentheses are being developed.

Please contact to your local Nichicon sales office when these series are being designed in your application.

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■ Standard ratings

Rated Volt (V)	Rated Capacitance (μF)	Case size	Part Number	Leakage Current (μA)	Disspation Factor (%@120Hz)	E.S.R. (Ω@100kHz)
2.5V	22	A	F930E226MAA	0.6	6	2.5
	33	A	F930E336MAA	0.8	8	2.5
	47	A	F930E476MAA	1.2	12	2.5
	68	A	F930E686MAA	1.7	18	2.5
	68	B	F930E686MBA	1.7	8	1.0
	100	B	F930E107MBA	2.5	14	0.9
	150	B	F930E157MBA	3.8	14	0.7
	220	B	F930E227MBA	5.5	18	0.7
	220	C	F930E227MCC	5.5	12	0.7
	330	C	F930E337MCC	8.3	16	0.7
	470	C	F930E477MCC	11.8	18	0.7
	470	N	F930E477MNC	11.8	12	0.3
4V	4.7	A	F930G475MAA	0.5	6	4.0
	6.8	A	F930G685MAA	0.5	6	3.5
	10	A	F930G106MAA	0.5	6	3.0
	15	A	F930G156MAA	0.6	6	2.9
	22	A	F930G226MAA	0.9	8	2.5
	22	B	F930G226MBA	0.9	6	1.9
	33	A	F930G336MAA	1.3	8	2.5
	33	B	F930G336MBA	1.3	6	1.4
	47	A	F930G476MAA	1.9	18	2.5
	47	B	F930G476MBA	1.9	8	1.0
	68	A	F930G686MAA	2.7	24	2.5
	68	B	F930G686MBA	2.7	8	0.8
	100	A	F930G107MAA	4.0	30	2.0
	100	B	F930G107MBA	4.0	14	0.9
	150	B	F930G157MBA	6.0	16	0.7
	150	C	F930G157MCC	6.0	12	0.7
	220	B	F930G227MBA	8.8	18	0.7
	220	C	F930G227MCC	8.8	12	0.7
	330	C	F930G337MCC	13.2	14	0.7
	330	N	F930G337MNC	13.2	10	0.5
	470	N	F930G477MNC	18.8	16	0.3
	680	N	F930G687MNC	27.2	18	0.3
6.3V	2.2	A	F930J225MAA	0.5	6	5.0
	3.3	A	F930J335MAA	0.5	6	4.5
	4.7	A	F930J475MAA	0.5	6	4.0
	6.8	A	F930J685MAA	0.5	6	3.5
	10	A	F930J106MAA	0.6	6	3.0
	15	A	F930J156MAA	0.9	8	2.9
	15	B	F930J156MBA	0.9	6	2.0
	22	A	F930J226MAA	1.4	8	2.5
	22	B	F930J226MBA	1.4	6	1.9
	33	A	F930J336MAA	2.1	8	2.5
	33	B	F930J336MBA	2.1	8	1.4
	47	A	F930J476MAA	3.0	18	2.5
	47	B	F930J476MBA	3.0	8	1.0
	68	B	F930J686MBA	4.3	8	1.0
	68	C	F930J686MCC	4.3	8	0.8
	100	B	F930J107MBA	6.3	14	0.9
	100	C	F930J107MCC	6.3	10	0.7
	150	C	F930J157MCC	9.5	12	0.7
	150	N	F930J157MNC	9.5	10	0.6
	220	C	F930J227MCC	13.9	14	0.7
	220	N	F930J227MNC	13.9	10	0.5
	330	N	F930J337MNC	20.8	14	0.5
	470	N	F930J477MNC	29.6	16	0.3
10V	2.2	A	F931A225MAA	0.5	6	5.0
	3.3	A	F931A335MAA	0.5	6	4.5
	4.7	A	F931A475MAA	0.5	6	4.0
	6.8	A	F931A685MAA	0.7	6	3.5
	10	A	F931A106MAA	1.0	6	3.0
	10	B	F931A106MBA	1.0	6	2.1
	15	A	F931A156MAA	1.5	8	2.9
	15	B	F931A156MBA	1.5	6	2.0
	22	A	F931A226MAA	2.2	12	2.5
	22	B	F931A226MBA	2.2	8	1.9
	33	B	F931A336MBA	3.3	8	1.4
	33	C	F931A336MCC	3.3	6	1.1
	47	B	F931A476MBA	4.7	8	1.0
	47	C	F931A476MCC	4.7	8	0.9
10V	68	C	F931A686MCC	6.8	8	0.8
	68	N	F931A686MNC	6.8	6	0.6
	100	C	F931A107MCC	10.0	10	0.7
	100	N	F931A107MNC	10.0	10	0.6
	150	N	F931A157MNC	15.0	10	0.6
	220	N	F931A227MNC	22.0	12	0.5
	330	N	F931A337MNC	33.0	18	0.5
16V	1	A	F931C105MAA	0.5	4	7.5
	1.5	A	F931C155MAA	0.5	6	6.0
	2.2	A	F931C225MAA	0.5	6	5.0
	3.3	A	F931C335MAA	0.5	6	4.5
	4.7	A	F931C475MAA	0.8	6	4.0
	6.8	A	F931C685MAA	1.1	6	3.5
	6.8	B	F931C685MBA	1.1	6	2.5
	10	A	F931C106MAA	1.6	6	3.0
	10	B	F931C106MBA	1.6	6	2.0
	15	A	F931C156MAA	2.4	10	3.0
	15	B	F931C156MBA	2.4	8	2.0
	22	B	F931C226MBA	3.5	8	1.9
	22	C	F931C226MCC	3.5	6	1.1
	33	B	F931C336MBA	5.3	8	1.9
	33	C	F931C336MCC	5.3	8	1.1
	47	C	F931C476MCC	7.5	8	0.9
	47	N	F931C476MNC	7.5	6	0.7
	68	N	F931C686MNC	10.9	8	0.6
	100	N	F931C107MNC	16.0	10	0.6
20V	1	A	F931D105MAA	0.5	4	7.5
	1.5	A	F931D155MAA	0.5	6	6.3
	2.2	A	F931D225MAA	0.5	6	5.0
	3.3	A	F931D335MAA	0.7	6	4.5
	4.7	A	F931D475MAA	0.9	6	4.0
	4.7	B	F931D475MBA	0.9	6	2.8
	6.8	A	F931D685MAA	1.4	6	3.5
	6.8	B	F931D685MBA	1.4	6	2.5
	10	B	F931D106MBA	2.0	6	2.1
	15	C	F931D156MCC	3.0	6	1.2
	22	C	F931D226MCC	4.4	8	1.1
	33	N	F931D336MNC	6.6	6	0.7
	47	N	F931D476MNC	9.4	8	0.7
25V	0.68	A	F931E684MAA	0.5	4	7.6
	1	A	F931E105MAA	0.5	4	7.5
	1.5	A	F931E155MAA	0.5	6	6.7
	2.2	A	F931E225MAA	0.6	6	6.3
	3.3	A	F931E335MAA	0.8	6	6.0
	3.3	B	F931E335MBA	0.8	6	3.1
	4.7	B	F931E475MBA	1.2	6	2.8
	6.8	C	F931E685MCC	1.7	6	1.8
	10	C	F931E106MCC	2.5	6	1.5
	15	C	F931E156MCC	3.8	8	1.2
	22	N	F931E226MNC	5.5	6	0.7
	33	N	F931E336MNC	8.3	8	0.7
35V	0.47	A	F931V474MAA	0.5	4	10.0
	0.68	A	F931V684MAA	0.5	4	7.6
	1	A	F931V105MAA	0.5	4	7.5
	1.5	A	F931V155MAA	0.5	6	7.5
	2.2	B	F931V225MBA	0.8	6	3.8
	3.3	B	F931V335MBA	1.2	6	3.5
	4.7	C	F931V475MCC	1.6	6	1.8
	6.8	C	F931V685MCC	2.4	6	1.8
	10	C	F931V106MCC	3.5	6	1.6
	15	N	F931V156MNC	5.3	6	0.7
	22	N	F931V226MNC	7.7	8	0.7

※ In case of capacitance tolerance ±10% type, K will be put at 9th digit of type numbering system.

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Conformal coated Chip

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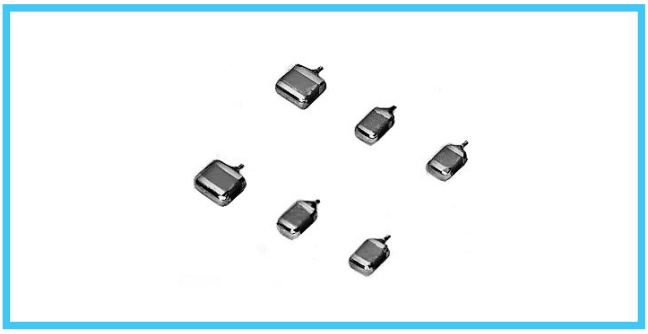
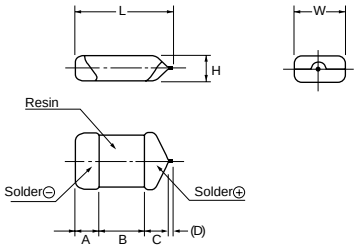


■Type numbering system (Example : 35V 1.5 µF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
F	9	5	1	V	1	5	5	M	A		A	Q	2

- Single face electrode
- Taping code (Refer to page 213 for details)
- Case code
- Capacitance tolerance
- Rated Capacitance
- Rated voltage
- Series

■Drawing



Single-side electrodes
(Both electrodes at bottom side only)

■ Dimensions

(mm)

Case Code	L	W	H	A	B	C	(D)
P	2.2 ± 0.3	1.25 ± 0.3	0.9 ± 0.3	0.6 ± 0.3	0.8 ± 0.3	0.8 ± 0.3	(0.2)
S	3.2 ± 0.3	1.6 ± 0.3	0.9 ± 0.3	0.8 ± 0.3	1.2 ± 0.3	0.8 ± 0.3	(0.2)
A	3.2 ± 0.3	1.7 ± 0.3	1.3 ± 0.3	0.8 ± 0.3	1.2 ± 0.3	0.8 ± 0.3	(0.2)
B	3.3 ± 0.3	2.7 ± 0.3	1.7 ± 0.3	0.8 ± 0.3	1.2 ± 0.3	1.1 ± 0.3	(0.2)

D dimension only for reference

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +125˚C (Rated temperature : 85˚C)
Capacitance Tolerance	±20%, ±10% (at 120Hz)
Dissipation Factor (at 120Hz)	Refer to P.221
E.S.R.(100kHz)	Refer to P.221
Leakage Current	• After 1 minute's application of rated voltage, leakage current at 20˚C is not more than 0.01CV or 0.5 µA, whichever is greater. • After 1 minute's application of rated voltage, leakage current at 85˚C is not more than 0.1CV or 5 µA, whichever is greater. • After 1 minute's application of derated voltage, leakage current at 125˚C is not more than 0.125CV or 6.3 µA, whichever is greater.
Capacitance Change by Temperature	+15% Max. (at +125˚C) +10% Max. (at +85˚C) −10% Max. (at −55˚C)
Damp Heat	At 40˚C, 90 ~ 95% R.H., For 500 hours (No voltage applied) Capacitance Change ..... Within ±10% of initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Temperature Cycles	At −55˚C / +125˚C, 30 minutes each, For 5 cycles, Capacitance Change ..... Within ±5% of initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Resistance to Soldering Heat	Dipping Flow at 260˚C for 10 seconds, reflow at 260˚C for 10 seconds Capacitance Change ..... Within ±5% of initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Surge*	After application of surge voltage in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85˚C, capacitors meet the characteristics requirements listed below. Capacitance Change ..... Within ±5% of initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Endurance*	After 2000 hours' application of rated voltage at 85˚C, or derated voltage at 125˚C, capacitors meet the characteristic requirements listed below. Capacitance Change ..... Within ±10% of initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, there shall be found neither exfoliation nor its sign at the terminal electrode. 5N (0.51kg・f) For 10 ± 1 seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. R230 20 45 45 1mm

* As for the surge and derated voltage at 125˚C, refer to page 212 for details.

■ Standard ratings

Cap. (µF) \ V		4	6.3	10	16	20	25	35
	Code	0G	0J	1A	1C	1D	1E	1V
1	105				P		P・S	S・A
1.5	155				P	S	S	A
2.2	225				P	P・S	S・A	A・B
3.3	335			P	P	A	A	(A)・B
4.7	475			P	P	A	(S)・A・B	B
6.8	685			P	S	A・B		
10	106		P	P	P・S・A	A・B	B	
15	156	P	P	P・S・A	(S)・A・B			
22	226	P	P・S	(P)・S・A	A・B	B		
33	336	P・S	P・S・A	S・A	B			
47	476	P・S・A	(P)・S・A	(S)・A・B	(B)			
68	686	S・A	S・A・B	B				
100	107	S・A・B	(S)・A・B	(B)				
150	157	B						
220	227	(A)・B	(B)					

( ) The series in parentheses are being developed.

Please contact to your local Nichicon sales office when these series are being designed in your application.

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■ Standard ratings

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R (Ω@100kHZ)
4V	15	P	F950G156MPAAQ2	0.6	10	1.8
	22	P	F950G226MPAAQ2	0.9	14	1.1
	33	P	F950G336MPAAQ2	1.3	14	1.1
	33	S	F950G336MSAAQ2	1.3	8	1.0
	47	P	F950G476MPAAQ2	1.9	14	1.1
	47	S	F950G476MSAAQ2	1.9	10	0.8
	47	A	F950G476MAAAQ2	1.9	8	0.6
	68	S	F950G686MSAAQ2	2.7	10	0.8
	68	A	F950G686MAAAQ2	2.7	10	0.5
	100	S	F950G107MSAAQ2	4.0	14	0.8
	100	A	F950G107MAAAQ2	4.0	12	0.5
	100	B	F950G107MBAAQ2	4.0	10	0.4
	150	B	F950G157MBAAQ2	6.0	14	0.4
6.3V	10	P	F950J106MPAAQ2	0.6	8	2.0
	15	P	F950J156MPAAQ2	0.9	10	1.8
	22	P	F950J226MPAAQ2	1.4	14	1.1
	22	S	F950J226MSAAQ2	1.4	10	1.0
	33	P	F950J336MPAAQ2	2.1	14	1.1
	33	S	F950J336MSAAQ2	2.1	10	1.0
	33	A	F950J336MAAAQ2	2.1	8	0.8
	47	S	F950J476MSAAQ2	3.0	10	0.9
	47	A	F950J476MAAAQ2	3.0	10	0.6
	68	S	F950J686MSAAQ2	4.3	14	0.9
	68	A	F950J686MAAAQ2	4.3	12	0.5
	68	B	F950J686MBAAQ2	4.3	8	0.4
	100	A	F950J107MAAAQ2	6.3	14	0.5
	100	B	F950J107MBAAQ2	6.3	14	0.4
	3.3	P	F951A335MPAAQ2	0.5	8	5.0
10V	4.7	P	F951A475MPAAQ2	0.5	8	4.0
	6.8	P	F951A685MPAAQ2	0.7	8	4.0
	10	P	F951A106MPAAQ2	1.0	8	3.0
	15	P	F951A156MPAAQ2	1.5	10	3.0
	15	S	F951A156MSAAQ2	1.5	8	1.2
	15	A	F951A156MAAAQ2	1.5	6	1.0
	22	S	F951A226MSAAQ2	2.2	10	1.1
	22	A	F951A226MAAAQ2	2.2	6	0.9
	33	S	F951A336MSAAQ2	3.3	10	1.1
	33	A	F951A336MAAAQ2	3.3	10	0.8
	47	A	F951A476MAAAQ2	4.7	10	0.8
	47	B	F951A476MBAAQ2	4.7	8	0.4
	68	B	F951A686MBAAQ2	6.8	12	0.4
16V	1	P	F951C105MPAAQ2	0.5	8	8.0
	1.5	P	F951C155MPAAQ2	0.5	8	8.0
	2.2	P	F951C225MPAAQ2	0.5	8	6.0
	3.3	P	F951C335MPAAQ2	0.5	8	6.0
	4.7	P	F951C475MPAAQ2	0.8	10	4.0
	6.8	S	F951C685MSAAQ2	1.1	6	2.5
	10	P	F951C106MPAAQ2	1.6	10	4.0
	10	S	F951C106MSAAQ2	1.6	8	2.0
	10	A	F951C106MAAAQ2	1.6	6	1.4
	15	A	F951C156MAAAQ2	2.4	8	1.4
	15	B	F951C156MBAAQ2	2.4	6	0.7
	22	A	F951C226MAAAQ2	3.5	8	1.4
	22	B	F951C226MBAAQ2	3.5	6	0.5
	33	B	F951C336MBAAQ2	5.3	8	0.5

※ In case of capacitance tolerance ±10% type, K will be put at 9th digit of type numbering system.

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R (Ω@100kHZ)
20V	1.5	S	F951D155MSAAQ2	0.5	6	6.0
	2.2	P	F951D225MPAAQ2	0.5	8	6.0
	2.2	S	F951D225MSAAQ2	0.5	6	5.0
	3.3	A	F951D335MAAAQ2	0.7	6	2.0
	4.7	A	F951D475MAAAQ2	0.9	6	1.5
	6.8	A	F951D685MAAAQ2	1.4	8	1.5
	6.8	B	F951D685MBAAQ2	1.4	6	0.9
	10	A	F951D106MAAAQ2	2.0	8	1.5
	10	B	F951D106MBAAQ2	2.0	6	0.8
	22	B	F951D226MBAAQ2	4.4	8	0.8
25V	1	P	F951E105MPAAQ2	0.5	6	8.0
	1	S	F951E105MSAAQ2	0.5	6	8.0
	1.5	S	F951E155MSAAQ2	0.5	6	7.0
	2.2	S	F951E225MSAAQ2	0.6	6	7.0
	2.2	A	F951E225MAAAQ2	0.6	6	3.2
	3.3	A	F951E335MAAAQ2	0.8	6	2.8
	4.7	A	F951E475MAAAQ2	1.2	8	2.0
	4.7	B	F951E475MBAAQ2	1.2	6	0.9
	10	B	F951E106MBAAQ2	2.5	6	0.9
35V	1	S	F951V105MSAAQ2	0.5	6	8.0
	1	A	F951V105MAAAQ2	0.5	4	4.4
	1.5	A	F951V155MAAAQ2	0.5	6	4.4
	2.2	A	F951V225MAAAQ2	0.8	6	4.4
	2.2	B	F951V225MBAAQ2	0.8	6	1.6
	3.3	B	F951V335MBAAQ2	1.2	6	1.6
	4.7	B	F951V475MBAAQ2	1.7	6	1.6

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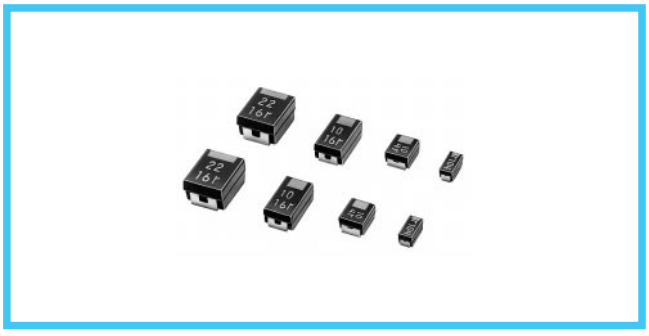
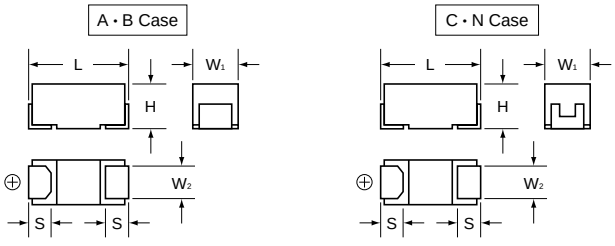


■ Type numbering system (Example : 16V 3.3 µF)

1	2	3	4	5	6	7	8	9	10	11
F	9	7	1	C	3	3	5	M	B	

- Taping code (Refer to page 213 for details)
- Case code
- Capacitance tolerance
- Rated Capacitance
- Rated voltage
- Series

■ Drawing

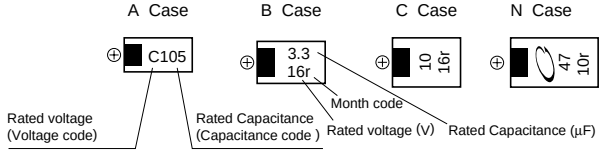


■ Dimensions

(mm)

Case code	L	W1	W2	H	S
A	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
B	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
N	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

■ Marking



■ Standard ratings

Cap. (µF) \ V	Code	4	6.3	10	16	20	25	35
		0G	0J	1A	1C	1D	1E	1V
0.1	104							A
0.15	154							A
0.22	234							A
0.33	334							A
0.47	474						A	B
0.68	684					A	A	B
1	105				A	A		B
1.5	155			A	A		B	C
2.2	225		A	A		B		C
3.3	335	A	A	A	B	B		C
4.7	475	A	A	B	B		C	N
6.8	685	A	B	B		C	C	N
10	106	B	B	B	C	C	N	N
15	156	B	B	C	C	N	N	
22	226	B	C	C	N	N		
33	336	C	C	C・N	N			
47	476	C	C・N	N				
68	686	C・N	N					
100	107	N	N					
150	157	N						

■ Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +125˚C (Rated temperature : 85˚C.)
Capacitance Tolerance	±20%, ±10% (at 120Hz)
Dissipation Factor	~15 µF 4% Max. 2.2 ~68 µF 6% Max. (at 120Hz) 100 µF~ 8% Max.
Leakage Current*	• After 1 minute' s application of rated voltage,leakage current at 20˚C is not more than 0.01CV or 0.5µA, whichever is greater. • After 1 minute' s application of rated voltage,leakage current at 85˚C is not more than 0.1CV or 5µA,whichever is greater. • After 1 minute' s application of derated voltage,leakage current at 125˚C is not more than 0.125CV or 6.3µA,whichever is greater.
Capacitance Change by Temperature	+15% Max. (at +125˚C) +10% Max. (at +85˚C) −10% Max. (at −55˚C)
Damp Heat	At 85˚C, 85% R.H.,For 1000 hours (No voltage applied) Capacitance Change ····· Within ±10% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· 125% or less of initial specified value
Load Humidity	After 500 hour' s application of rated voltage in series with a 33Ω resistor at 60˚C,90~95% R.H.,capacitors meet the characteristics requirements listed below. Capacitance Change ····· Within ±10% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· 125% or less of initial specified value
Temperature Cycles	At −55˚C / +125˚C,For 30 minutes each,1000 cycles Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less
Resistance to Soldering Heat	At 260˚C,reflowing capacitors for 10 seconds Max. Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less
Solderability	After immersing capacitors completely into a solder pot at 245˚C for 2~3 seconds,more than 3/4 of their electrode area shall remain covered with new solder.
Surge*	After application of surge in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF,for 1000 successive test cycles at 85˚C,capacitors meet the characteristics requirements listed below. Capacitance Change ····· Within ±5% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less
Endurance*	After 2000 hours' application of rated voltage in series with a 3Ω resistor at 85˚C,or derated voltage in series with a 3Ω resistor at 125˚C,capacitors meet the characteristic requirements listed below. Capacitance Change ····· Within ±10% of initial value Dissipation Factor ····· Initial specified value or less Leakage Current ····· Initial specified value or less
Shear Test	After Applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate,there shall be found neither exfoliation nor its sign at the terminal electrode. 5N (0.51kg・f) For 10 ± 1 seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then,there shall be found no remarkable abnormality on the capacitor terminals. R230 20 45 45 1mm

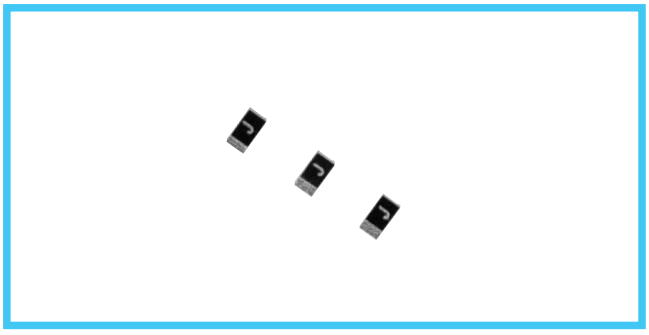
* As for the surge and derated voltage at 125˚C, refer to page 212 for details.

F98

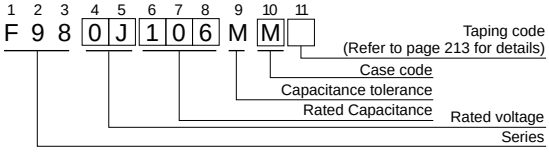
Resin-molded Chip,
High Capacitance Series

FRAMELESS™

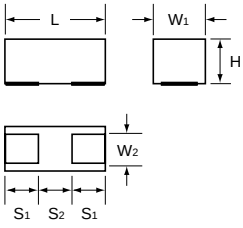
For SMD Smaller Eco-Products



■Type numbering system (Example : 6.3V 10 µF)



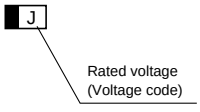
■Drawing



(mm)

Cace Code	L	W1	W2	H	S1	S2
M	1.6 ± 0.1	0.85 ± 0.1	0.65 ± 0.1	0.8 ± 0.1	0.5 ± 0.1	0.6 ± 0.1

■ Marking



■Specifications

Item	Performance Characteristics
Category Temperature Range	-55 ~ +125°C (Rated temperature : 85°C)
Capacitance Tolerance	±20% (at 120Hz)
Dissipation Factor(120Hz)	Refer to the list below.
E.S.R.(100kHz)	Refer to the list below.
Leakage Current	After 5 minute's application of rated voltage, leakage current at 20°C is not more than 0.1CV or 0.5µA, whichever is greater.
Damp Heat	At 40°C, 90 ~ 95% R.H., For 500hours (No voltage applied) Capacitance Change ··· Within ±30% of initial value Dissipation Factor ····· 150% or less of initial specified value Leakage Current ····· 200% or less of initial specified value
Temperature Cycles	At -55°C / +125°C, For 30 minutes each, 5 cycles Capacitance Change ··· Within ±30% of initial value Dissipation Factor ····· 150% or less of initial specified value Leakage Current ····· Initial specified value or less
Resistance to Soldening Heat	At 260°C, For 10 seconds, Reflow, Capacitance Change ··· Within ±30% of initial value Leakage Current ····· Initial specified value or less Leakage Current ····· Initial specified value or less
Surge*	After application of surge in series with a 1kΩ resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C, capacitors meet the characteristics requirements listed below. Capacitance Change ··· Within ±30% initial value Dissipation Factor ····· 150% or less of initial specified value Leakage Current ····· 200% or less of initial specified value
Endurance*	After 1000 hours' application of rated voltage in series with a 3Ω resistor at 85°C, capacitors meet the characteristic requirements listed below Capacitance Change ··· Within ±30% of initial value Dissipation Factor ····· 150% or less of initial specified value Leakage Current ····· 200% or less of initial specified value
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on an aluminum substrate, there shall be found neither exfoliation nor its sign at the terminal electrode. 5N (0.51kg · f) For 10 ± 1seconds
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. R230 20 1mm 45 45

* As for the surge and derated voltage at 125°C, refer to page 212 for details.

■Standard ratings

Cap.(µF) \ V	Code	2.5	4	6.3	10	16
		0E	0G	0J	1A	1C
1	105					M
2.2	225					M
4.7	475				M	
10	106			M	M	
22	226		M	M		
33	336		(M)			
47	476	(M)				

( )The series in parentheses are being developed.
Please contact to your local Nichicon sales office when these series are being designed in your application.

Rated Volt (V)	Rated Capacitance (µF)	Case size	Part Number	Leakage Current (µA)	Disspation Factor (%@120Hz)	E.S.R. (mΩ@100kHz)
4	22	M	F980G226MMA	0.9	15	8
6.3	10	M	F980J106MMA	0.6	8	8
	22	M	F980J226MMA	1.4	20	8
10	4.7	M	F981A475MMA	0.5	6	10
	10	M	F981A106MMA	1.0	20	8
16	1	M	F981C105MMA	0.5	6	20
	2.2	M	F981C225MMA	0.5	6	20

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

FG

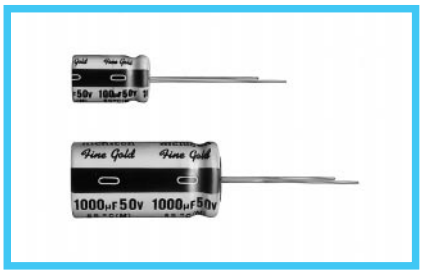
High Grade Type, For Audio Equipment

series

For Audio Use Anti-Solvent Feature

- "Fine Gold" MUSE acoustic series suited for high grade audio equipment, using state of the art etching techniques.
- Rich sound in the bass register and clearer high end, most suited for AV equipment like DVD, MD.

FG ← High Grade FW



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.1 ~ 10000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) , whichever is greater.
tan δ	For capacitance of more than 1000μF add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08

Stability at Low Temperature — Measurement frequency : 120Hz

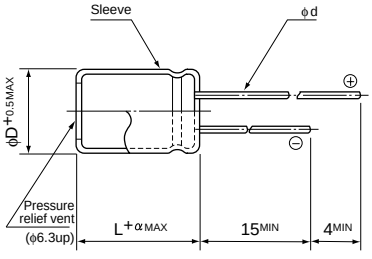
Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	3	3	3	3	3

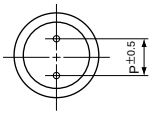
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of the initial measurement for units of not more than 16V or ϕ6.3 Within ±15% of the initial measurement for units of not less than 25V or above ϕ6.3
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with black color letter on gold sleeve.

■Radial Lead Type





ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.6	0.6	0.6	0.6	0.8	0.8	0.8

α	(L < 20) 1.5
	(L ≧ 20) 2.0

Type numbering system (Example : 10V 47μF)

1 2 3 4 5 6 7 8 9 10 11
U F G 1 A 4 7 0 M D J

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (47μF)
- Rated voltage (10V)
- Series name
- Type

ϕD	Code
5	DJ
6.3	EJ
8 · 10	PJ
12.5 ~ 18	HJ

※ Please contact to us if Eco-Products are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

FG series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											5×11	1.1
0.22	R22											5×11	2.4
0.33	R33											5×11	3.6
0.47	R47											5×11	5.0
1	010											5×11	9.0
2.2	2R2											5×11	18
3.3	3R3											5×11	22
4.7	4R7											5×11	27
10	100											5×11	39
22	220							5×11	50	6.3×11	60	6.3×11	65
33	330					5×11	57	6.3×11	70	6.3×11	75	8×11.5	93
47	470			5×11	60	6.3×11	74	6.3×11	85	8×11.5	101	8×11.5	111
100	101			6.3×11	99	8×11.5	128	8×11.5	140	10×12.5	176	10×16	215
220	221			8×11.5	170	10×12.5	226	10×16	260	10×20	320	12.5×20	390
330	331			10×12.5	247	10×16	309	10×20	351	12.5×20	446	12.5×20	488
470	471	10×12.5	270	10×16	330	10×20	406	12.5×20	476	12.5×25	590	16×25	650
1000	102	10×20	485	12.5×20	601	12.5×25	723	16×25	854	16×25	1060	16×31.5	1143
2200	222	12.5×25	867	16×25	1047	16×25	1290	16×35.5	1570	18×35.5	1840		
3300	332	16×25	1135	16×31.5	1520	16×35.5	1720	18×40	1794				
4700	472	16×31.5	1431	16×35.5	1840	18×35.5	2140						
6800	682	18×35.5	1810	18×40	2049								
10000	103	18×40	2100										

Cap.(μF) \ V	Code	63		80		100	
		1J		1K		2A	
0.1	0R1					5×11	2.3
0.22	R22					5×11	5.5
0.33	R33					5×11	8.0
0.47	R47					5×11	10
1	010					5×11	15
2.2	2R2					5×11	22
3.3	3R3					5×11	27
4.7	4R7					5×11	36
10	100	6.3×11	50	6.3×11	55	8×11.5	65
22	220	8×11.5	85	8×11.5	100	10×12.5	110
33	330	8×11.5	105	10×12.5	130	10×16	150
47	470	10×12.5	140	10×16	170	10×20	190
100	101	10×20	255	12.5×20	270	12.5×20	300
220	221	12.5×20	420	12.5×25	490	16×25	549
330	331	12.5×25	541	16×31.5	650	16×31.5	734
470	471	16×25	840	16×35.5	920	18×35.5	980
1000	102	18×35.5	1400			Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 10000	0.85	1.00	1.10	1.13	1.15

PLASTIC FILM CAPACITORS

Series	Capacitance (μF)		Bulk	Taping Ammo-pack
XJ	250VDC	0.047 ~ 0.1	※	1,000
		0.15 ~ 1.0		500
	400VDC	0.022 ~ 0.047	※	1,000
		0.068 ~ 0.22		500
		0.33		400
		0.47		300
	630VDC	0.01 ~ 0.015	※	1,000
		0.022 ~ 0.068		500
		0.1		400
XN	250VDC	0.01 ~ 0.33	※	1,000
		0.47 ~ 1.0		500
		1.5		400
	400VDC	0.01 ~ 0.1	※	1,000
		0.15 ~ 0.22		500
		0.33 ~ 0.47		400
	630VDC	0.01 ~ 0.047	※	1,000
		0.068 ~ 0.15		500
		0.22		300
XD	400, 630VDC	0.0068 ~ 0.1	※	—
XF	250VDC	0.047 ~ 0.068	※	1,000
		0.1 ~ 0.15		500
		0.22 ~ 0.33		400
		0.47 ~ 0.68		300
	400VDC	0.022 ~ 0.033	※	1,000
		0.047 ~ 0.068		500
		0.1 ~ 0.15		400
		0.22 ~ 0.33		300
	630VDC	0.01 ~ 0.015	※	1,000
		0.022 ~ 0.068		500
		0.1		400
		0.15		300
	800VDC	0.01	※	1,000
		0.015 ~ 0.033		500
		0.047 ~ 0.068		400
		0.1		300
XU	125, 250VAC	0.01 ~ 1.0	※	—
AS, AF	250, 400, 630VDC	0.47 ~ 3.3	※	—
YX	50VDC	0.001 ~ 0.027	1000	2,000
		0.033 ~ 0.22		1,000
	100VDC	0.001 ~ 0.027	1000	2,000
		0.033 ~ 0.1		1,000
YS	50VDC	0.001 ~ 0.015	1000	2,000
		0.022 ~ 0.22		1,000
		0.033 ~ 0.47		500
YP	50VDC	0.001 ~ 0.015	1000	2,000
		0.022 ~ 0.1		1,000
YR	100VDC	0.001 ~ 0.22	1000	—
YK	100VDC	0.001 ~ 0.47	1000	—
EH	Whole series		100	—
EN	Whole series		100	—

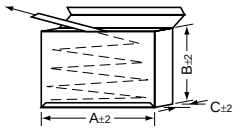
※Please refer to page 234

Order quantity (Taping)

(μF) Cap.	Code	XJ series 250VDC Style	XJ 250VDC Quantity	XJ 250VDC Case Code	XJ 400VDC Style	XJ 400VDC Quantity	XJ 400VDC Case Code	XJ 630VDC Style	XJ 630VDC Quantity	XJ 630VDC Case Code	XN series 250VDC Style	XN 250VDC Quantity	XN 250VDC Case Code	XN 400VDC Style	XN 400VDC Quantity	XN 400VDC Case Code	XN 600VDC Style	XN 600VDC Quantity	XN 600VDC Case Code	XU series 125VAC Style	XU 125VAC Quantity	XU 125VAC Case Code	XU 250VAC Style	XU 250VAC Quantity	XU 250VAC Case Code
0.01	103							R	1000	3	A	1000	1	A	1000	1	E	1000	1				E	1000	1
0.015	153																								
0.022	223				E	1000	2		500	1				E		2			2	E	1000	1			2
0.033	333																								
0.047	473	L	1000	2	R		3			4									4			2			3
0.068	683					500	1										R	500	3				R	500	
0.1	104								400										4			3			4
0.15	154	M	500				4						2	R	500	3									
0.22	224			3							L		3					300				4		300	3
0.33	334					400									400	4				R	500				
0.47	474			4		300					M	500	2								400				
0.68	684												4								300				
1.0	105																								
1.5	155											400													

(μF) Cap.	Code	XF series 250VDC Style	XF 250VDC Quantity	XF 250VDC Case Code	XF 400VDC Style	XF 400VDC Quantity	XF 400VDC Case Code	XF 630VDC Style	XF 630VDC Quantity	XF 630VDC Case Code	XF 800VDC Style	XF 800VDC Quantity	XF 800VDC Case Code
0.01	103							R	1000	3	R	1000	3
0.015	153											500	1
0.022	223				R	1000	3		500	1			
0.033	333												4
0.047	473	R	1000	3		500	1			4		400	
0.068	683												
0.1	104		500	1		400	4		400			300	
0.15	154								300				
0.22	224		400	4		300							
0.33	334												
0.47	474		300	4									
0.68	684												

■Packing Quantity (Ammo-Pack)



(mm)

Case code \ Size	A	B	C
NO.1	330	235	55
NO.2	330	300	55
NO.3	330	330	55
NO.4	350	360	62

Order quantity (Bulk)

(μF) Cap.	Code	XJ series 250VDC	XJ 400VDC	XJ 630VDC	XN series 250VDC	XN 400VDC	XN 630VDC	XD series 400VDC	XD 630VDC	XF series 250VDC	XF 400VDC	XF 630VDC	XF 800VDC	XU series 125VDC	XU 250VDC	AS series 250VDC	AS 400VDC	AS 630VDC	AF series 250VDC	AF 400VDC	AF 630VDC
0.0068	682								1000												
0.01	103			1000	1000	1000	1000	1000				1000	1000		1000						
0.015	153																				
0.022	223		1000								1000			1000							
0.033	333									1000											
0.047	473	1000							800												
0.068	683								500												
0.1	104							800										1000			
0.15	154												800								1000
0.22	224			800									600					800			800
0.33	334			600								800	500				1000	500		800	600
0.47	474			500			800				800	600	400		800	1000	800	400	1000	700	500
0.68	684		800				600				600	400					600	300		500	350
1.0	105		600			800	500			800	400						500	250	600	400	250
1.5	155		500			600	400			600	300					800	400	200	500	300	200
2.2	225	800				500	250			500						700	300	125	400	200	125
3.3	335	600			800					350						500	200	100	300	150	100
4.7	475				600											300	150		200	100	
6.8	685				400											250			150		
10.0	106				300											200			100		

ALUMINUM ELECTROLYTIC CAPACITORS

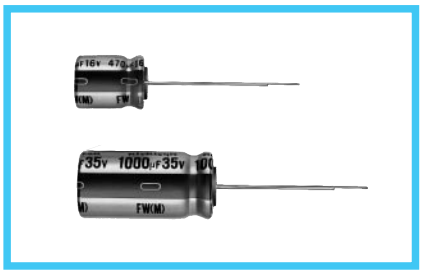
nichicon

FW series

Miniature Sized, For Audio Equipment

Smaller | For Audio Use | Anti-Solvent Feature

FG ← High Grade **FW**



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.1 ~ 33000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03 CV or 4 (µA) ,whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (µA) ,whichever is greater.
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08

Stability at Low Temperature — Measurement frequency : 120Hz

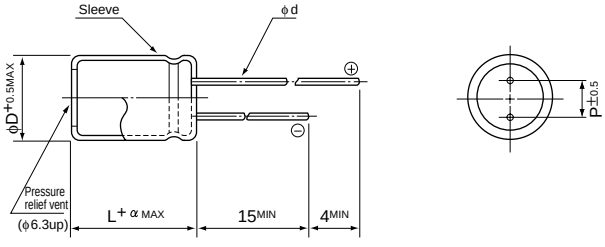
Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	5	4	3	2	2	2	2	2
	Z–40°C / Z+20°C	12	10	8	5	4	3	3	3

Endurance — After 2000 hours' application of voltage at 85°C, capacitors meet the characteristic requirements listed below.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with black color letter on Gold sleeve.

■Radial Lead Type



φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	10	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(φD < 20) 1.5
	(φD ≧ 20) 2.0

Type numbering system (Example : 10V 1000µF)

1 2 3 4 5 6 7 8 9 10 11

U F W 1 A 1 0 2 M P A

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (1000µF)
- Rated voltage (10V)
- Series name
- Type

φD	Code
5	DA
6.3	EA
8 ·10	PA
12.5 ~ 18	HA
20 ~ 25	RA

※ Please contact to us if Eco-Products are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

FW series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.1	0R1											5×11	1.1			5×11	2.1
0.22	R22											5×11	2.4			5×11	4.7
0.33	R33											5×11	3.5			5×11	7.0
0.47	R47											5×11	5.0			5×11	10
1	010											5×11	10			5×11	21
2.2	2R2											5×11	23			5×11	30
3.3	3R3											5×11	35			5×11	40
4.7	4R7											5×11	40			5×11	45
10	100											5×11	65	5×11	70	6.3×11	75
22	220											5×11	95	5×11	100	6.3×11	120
33	330									5×11	105	5×11	120	6.3×11	140	8×11.5	160
47	470							5×11	115	5×11	120	6.3×11	150	6.3×11	165	10×12.5	210
100	101			5×11	145	5×11	155	6.3×11	185	6.3×11	200	8×11.5	250	10×12.5	300	10×20	350
220	221			6.3×11	230	6.3×11	250	8×11.5	320	10×12.5	370	10×12.5	410	10×16	470	12.5×25	600
330	331	6.3×11	265	6.3×11	270	8×11.5	360	10×12.5	420	10×12.5	470	10×16	570	10×20	650	12.5×25	750
470	471	6.3×11	310	6.3×11	330	8×11.5	420	10×12.5	530	10×16	630	12.5×20	760	12.5×20	880	16×25	1000
1000	102	8×11.5	530	10×12.5	630	10×16	770	10×20	950	12.5×20	1100	12.5×25	1300	16×25	1300	18×40	1370
2200	222	10×20	980	10×20	1050	12.5×20	1250	12.5×25	1550	16×25	1800	16×35.5	2090	18×35.5	2200	22×50	2400
3300	332	10×20	1170	12.5×20	1420	12.5×25	1700	16×25	1950	16×35.5	2220	18×35.5	2360	20×40	2700	25×50	2900
4700	472	12.5×20	1350	12.5×25	1800	16×25	2100	16×31.5	2360	18×35.5	2490	20×40	2900	22×50	3400		
6800	682	12.5×25	1600	16×25	2150	16×35.5	2500	18×35.5	2590	20×40	3000	22×50	3500	25×50	3500		
10000	103	16×25	2000	16×35.5	2500	18×35.5	2640	20×40	3000	22×50	3700	25×50	4000				
15000	153	16×35.5	2550	18×35.5	2720	20×40	3400	22×50	3800	25×50	4300						
22000	223	18×40	3200	20×40	3700	22×50	4200	25×50	4500								
33000	333	22×50	3900	22×50	4500	25×50	4800									Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 33000	0.85	1.00	1.10	1.13	1.15

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

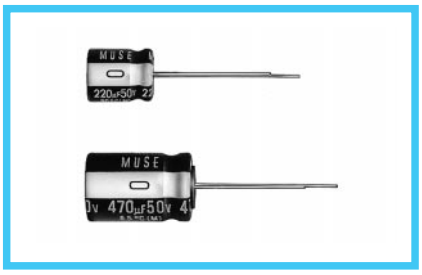
nichicon MUSE **FX** series

Miniature Sized, For Audio Equipment

Smaller | For Audio Use | Anti-Solvent Feature

- Miniature sized "nichicon MUSE" acoustic series.
- Suited for use in audio devices where lighter, thinner, shorter and smaller capacitors are required.

KZ ← High Grade **FX** → Smaller → SK, MC



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.1 ~ 22000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater. After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

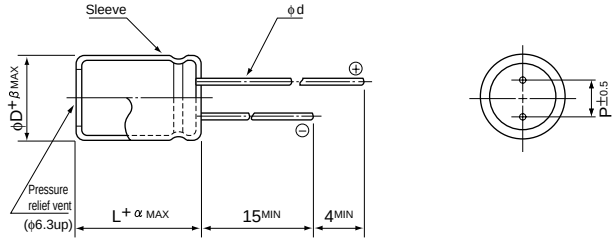
Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2	2	2
	Z–40°C / Z+20°C	10	8	6	4	3	3	3	3

Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with silver color letter on emerald green sleeve.

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

(mm)

φD	5	6.3	8	10	12.5	16	18	20
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
φd	0.6	0.6	0.6	0.6	0.8	0.8	0.8	1.0

Type numbering system (Example : 10V 330µF)

1	2	3	4	5	6	7	8	9	10	11
U	F	X	1	A	3	3	1	M	P	J

- 11: Configuration
- 9: Capacitance tolerance (±20%)
- 6–8: Rated Capacitance (330µF)
- 4–5: Rated voltage (10V)
- 3: Series name
- 1–2: Type

φD	Code
5	DJ
6.3	EJ
8 · 10	PJ
12.5 ~ 18	HJ
20	NJ

※ Please contact to us if Eco-Products are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

nichicon MUSE FX series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.1	0R1											5×11	1.1			5×11	2.1
0.22	R22											5×11	2.3			5×11	4.7
0.33	R33											5×11	3.5			5×11	7
0.47	R47											5×11	5			5×11	10
1	010											5×11	10			5×11	21
2.2	2R2											5×11	23			5×11	30
3.3	3R3											5×11	35			5×11	35
4.7	4R7							5×11	30	5×11	35	5×11	40	5×11	40	5×11	40
10	100					5×11	40	5×11	50	5×11	50	5×11	55	5×11	60	6.3×11	70
22	220	5×11	35	5×11	55	5×11	70	5×11	75	5×11	80	5×11	85	6.3×11	100	8×11.5	120
33	330	5×11	55	5×11	75	5×11	85	5×11	90	5×11	95	6.3×11	110	6.3×11	120	10×12.5	150
47	470	5×11	75	5×11	90	5×11	100	5×11	110	6.3×11	120	6.3×11	140	8×11.5	170	10×16	190
100	101	5×11	120	5×11	130	6.3×11	160	6.3×11	170	8×11.5	210	8×11.5	230	10×12.5	270	12.5×20	330
220	221	6.3×11	200	6.3×11	220	8×11.5	280	8×11.5	300	10×12.5	340	10×16	380	10×20	440	16×25	520
330	331	6.3×11	250	8×11.5	310	8×11.5	340	10×12.5	390	10×16	430	10×20	490	12.5×20	600	16×25	630
470	471	8×11.5	340	8×11.5	370	10×12.5	440	10×16	480	10×20	540	12.5×20	660	12.5×25	740	16×31.5	780
1000	102	10×12.5	530	10×16	600	10×20	700	12.5×20	830	12.5×25	910	16×25	1000	16×31.5	1100	18×40	1200
2200	222	12.5×20	930	12.5×20	1000	12.5×25	1100	16×25	1200	16×31.5	1300	18×35.5	1450	18×40	1600		
3300	332	12.5×20	1050	12.5×25	1200	16×25	1350	16×31.5	1450	18×35.5	1600	20×40	1750				
4700	472	16×25	1300	16×25	1400	16×31.5	1550	18×35.5	1700	18×40	1850						
6800	682	16×25	1500	16×31.5	1650	18×35.5	1850	20×40	2000								
10000	103	16×31.5	1700	18×35.5	1850	18×40	2000										
15000	153	18×35.5	1950	18×40	2050												
22000	223	20×40	2200													Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 22000	0.85	1.00	1.10	1.13	1.15

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

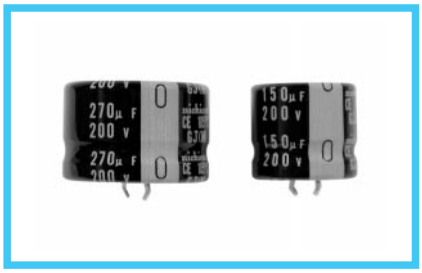
GJ

Snap-in Terminal Type, Low-Profile Sized, Wide Temperature Range
series

Smaller

- Withstanding 3000hours application of ripple current at 105°C.
- Ideally suited for flat design fo switching power supply.

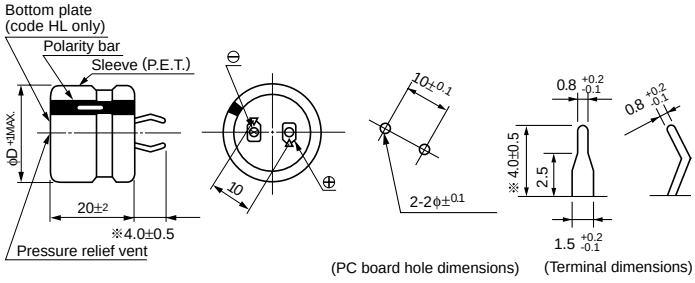
GU
Low Profile
GJ



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (160 ~ 250V) , – 25 ~ +105°C (315 ~ 400V)
Rated Voltage Range	160 ~ 400V
Rated Capacitance Range	39 ~ 680μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance(μF), V : Voltage(V)]
tan δ	0.15 MAX. 120Hz 20°C
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage(V): 160 ~ 250 / 315・400 Impedance ratio ZT/Z20(MAX.) Z—25°C/Z+20°C: 3 / 8 Impedance ratio ZT/Z20(MAX.) Z—40°C/Z+20°C: 12 /
Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 3000 hours at 105°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right. Capacitance change: Within ±15% of initial value tan δ: 150% or less of initial specified value Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.

■Drawing



※ The other terminal is also available upon request.
Please refer to page 197 for schematic of terminal dimensions.

Type numbering system (Example : 200V 330μF)

1	2	3	4	5	6	7	8	9	10	11	12
L	G	J	2	D	3	3	1	M	E	L	B

- 12: Case dia. code
- 11: Configuration※
- 10: Capacitance tolerance (±20%)
- 9: Rated Capacitance (330μF)
- 8: Rated voltage (200V)
- 7: Series name
- 1: Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(μF)	V(Code) / Code	160V (2C)		180V (2Z)		200V (2D)		250V (2E)		315V (2F)		400V (2G)	
39	390											20 × 20	0.32
47	470											22 × 20	0.37
56	560									20 × 20	0.38	25 × 20	0.40
68	680									22 × 20	0.45	25 × 20	0.46
82	820									22 × 20	0.47	30 × 20	0.55
100	101							20 × 20	0.51	25 × 20	0.56	30 × 20	0.60
120	121					20 × 20	0.56	22 × 20	0.60	30 × 20	0.65	35 × 20	0.75
150	151			20 × 20	0.62	22 × 20	0.73	25 × 20	0.74	30 × 20	0.70	35 × 20	0.80
180	181	20 × 20	0.68	22 × 20	0.80	22 × 20	0.80	25 × 20	0.75	35 × 20	0.85		
220	221	22 × 20	0.81	25 × 20	0.90	25 × 20	0.85	30 × 20	0.95	35 × 20	0.90		
270	271	25 × 20	0.98	25 × 20	0.95	30 × 20	1.05	30 × 20	1.00				
330	331	25 × 20	1.02	30 × 20	1.15	30 × 20	1.10	35 × 20	1.16				
390	391	30 × 20	1.25	30 × 20	1.20	35 × 20	1.30						
470	471	30 × 20	1.30	35 × 20	1.36	35 × 20	1.41						
560	561	35 × 20	1.46	35 × 20	1.43								Rated ripple
680	681	35 × 20	1.51									Case size	

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1 k	10k~	50k~
Coeff.	160 ~ 250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	315 · 400V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

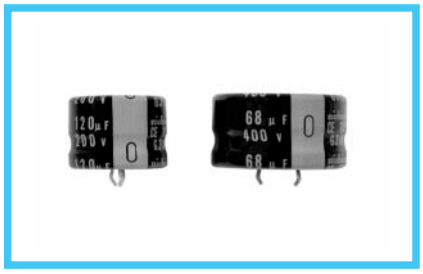
GJ(15) series

Snap-in Terminal Type, Low-Profile Sized, Wide Temperature Range.

Smaller

- Withstanding 2000 hours application of ripple current at 105°C.
- Smaller than low-profile GJ series.
- Ideally suited for flat design of switching power supply.

GU
Low Profile
GJ(15)



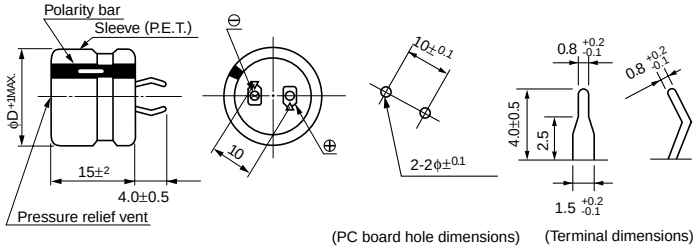
■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (160~250V) , – 25 ~ +105°C (315 ~ 400V)
Rated Voltage Range	160 ~ 400V
Rated Capacitance Range	39 ~ 390μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	I ≦ 3$\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance(μF), V : Voltage(V)]
tan δ	0.20 MAX. 120Hz 20°C
Stability at Low Temperature	Measurement frequency : 120Hz

Rated voltage(V)		160 ~ 250	315・400
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C	3	8
	Z—40°C/Z+20°C	12	—

Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right.	Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.	Capacitance change: Within ±15% of initial value tan δ: 150% or less of initial specified value Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.	

■Drawing



(PC board hole dimensions) (Terminal dimensions)

Type numbering system (Example : 200V 330μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
L	G	J	2	D	3	3	1	M	E	L	C	1	5

- Case length code
- Case dia. code
- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (330μF)
- Rated voltage (200V)
- Series name
- Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
EL	HL

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(μF)	Code	V(Code) 160V (2C)		180V (2Z)		200V (2D)		250V (2E)		315V (2F)		400V (2G)	
39	390											22 × 15	0.30
47	470											25 × 15	0.35
56	560									22 × 15	0.35	30 × 15	0.40
68	680									25 × 15	0.40	30 × 15	0.45
82	820									30 × 15	0.45	35 × 15	0.50
100	101					20 × 15	0.45	22 × 15	0.50	30 × 15	0.50	35 × 15	0.55
120	121			20 × 15	0.50	22 × 15	0.55	25 × 15	0.60	35 × 15	0.55		
150	151	20 × 15	0.55	22 × 15	0.60	25 × 15	0.65	30 × 15	0.70	35 × 15	0.60		
180	181	22 × 15	0.65	25 × 15	0.75	25 × 15	0.75	30 × 15	0.75				
220	221	25 × 15	0.80	30 × 15	0.85	30 × 15	0.90	35 × 15	0.90				
270	271	30 × 15	0.95	30 × 15	1.00	30 × 15	1.00	35 × 15	1.00				
330	331	30 × 15	1.00	35 × 15	1.10	35 × 15	1.10						Rated
390	391	35 × 15	1.20	35 × 15	1.20							Case size	ripple

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1 k	10k~	50k~
Coeff.	160 ~ 250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	315 · 400V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

GK HH series

PC Board Mounting Type

Anti-Solvent Feature (Through 100V only)

- Higher C/V products.
- Plentiful line-up from φ35 × 63 to φ40 × 100mm.
- Auxiliary terminals provided to assure anti-vibration performamance.

■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (16 ~ 250V) , – 25 ~ +105°C (400V)
Rated Voltage Range	16 ~ 400V
Rated Capacitance Range	560 ~ 68000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Capacitance(μF) , V : Voltage(V)]

tan δ

Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage(V)	16	25	35	50	63	80	100	160	200	250	400
tan δ (MAX.)	0.60	0.50	0.40	0.35	0.30	0.30	0.25	0.20	0.15	0.15	0.30

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage(V)		16 ~ 250	400
Impedance ratio ZT/Z20 (MAX.)	Z–25°C/Z+20°C	4	8
	Z–40°C/Z+20°C	15	—

Endurance

After an application of DC voltage(in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

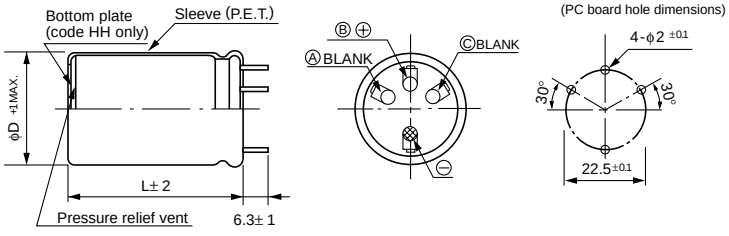
Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking

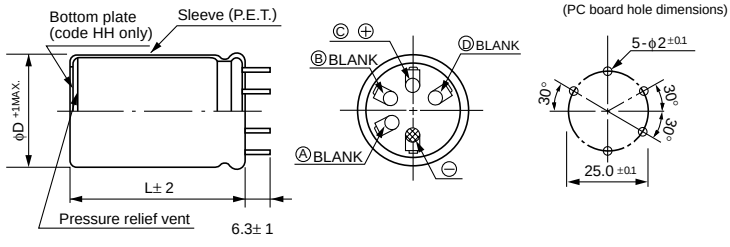
Printed with white color letter on black sleeve.

■Drawing

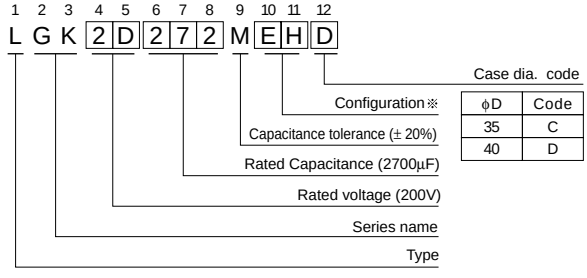
- For all of φ35mm products and for 63mmL or shorter with φ40mm.



- For 63mmL or longer with φ40mm.



Type numbering system (Example : 200V 2700μF)



φD	Code
35	C
40	D

※Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EH	HH

※ Please contact to us if other configurations are required.

Notes:
As blank terminals are not insulated from capacitor element, they shall be mounted on independent lands.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	1 k	10k~
Coeff.	16 ~ 100V	0.88	0.90	1.00	1.15	1.15
	160 ~ 250V	0.85	0.88	1.00	1.15	1.20
	400V	0.88	0.90	1.00	1.10	1.15

Minimum order quantity : 50pcs.

● Dimension table in next page.

GKHH series

■Dimensions

D × L (mm)

Cap.(μF)	Code \ V(Code) / φD	16V (1C)		25V (1E)		35V (1V)		50V (1H)	
		35	40	35	40	35	40	35	40
18000	183							35×68 5.55	40×63 5.80
22000	223					35×63 5.10	40×50 5.00	35×80 6.35	40×63 6.15
27000	273					35×68 5.50	40×63 5.80		
33000	333			35×63 5.60	40×50 5.50	35×80 6.25	40×63 6.05		
39000	393			35×68 6.00	40×63 6.30				
47000	473	35×63 5.90	40×50 5.75	35×80 6.80	40×63 6.60				
56000	563	35×68 6.20	40×63 6.45						
68000	683	35×80 6.90	40×63 6.70						

Cap.(μF)	Code \ V(Code) / φD	63V (1J)		80V (1K)		100V (2A)	
		35	40	35	40	35	40
5600	562					35×68 4.40	40×63 4.55
6800	682					35×80 4.80	40×63 4.65
8200	822			35×63 4.75	40×50 4.65		
10000	103			35×80 5.45	40×63 5.00		
12000	123	35×63 5.35	40×50 5.25				
15000	153	35×68 5.85	40×63 6.10				

Cap.(μF)	Code \ V(Code) / φD	160V (2C)		200V (2D)		250V (2E)		400V (2G)	
		35	40	35	40	35	40	35	40
560	561							35×63 1.75	40×50 1.70
680	681							35×80 2.05	40×63 2.00
820	821							35×80 2.20	
1000	102							35×100 2.65	40×80 2.60
1200	122					35×63 2.75	40×50 2.70		40×100 3.00
1500	152					35×68 3.20	40×63 3.35		
1800	182			35×63 3.30	40×50 3.20	35×100 4.05	40×80 3.95		
2200	222	35×63 3.50	40×50 3.45	35×80 3.90	40×63 3.80	35×100 4.35	40×80 4.20		
2700	272	35×68 3.90	40×63 4.10	35×100 4.65	40×80 4.50		40×100 5.00		
3300	332	35×80 4.55	40×63 4.40		40×80 4.90				
3900	392	35×100 5.30	40×80 5.20		40×100 5.70				
4700	472		40×100 6.15					Case size Rated ripple	

Rated Ripple (A rms) at 105°C 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS

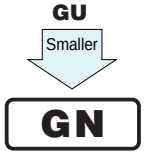
nichicon

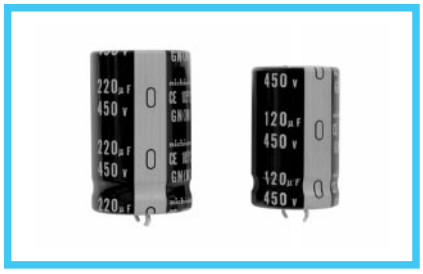
GN series

Snap-in Terminal Type, Smaller-Sized, Wide Temperature Range

Smaller

- Withstanding 2000 hours application of ripple current at 105°C.
- One rank smaller case sized than GU series.

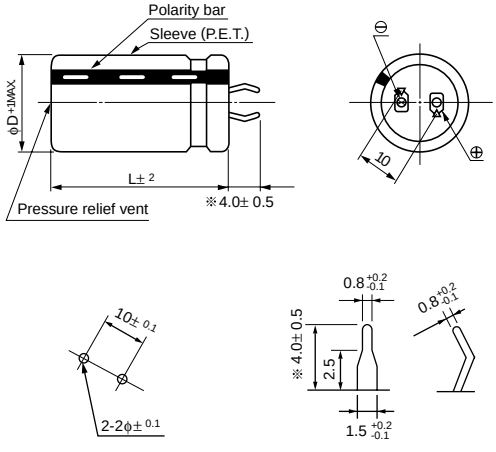




■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (160 ~ 250V) , – 25 ~ +105°C (350 ~ 450V)
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	56 ~ 3300μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$(μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance(μF), V : Voltage(V)]
tan δ	Rated voltage (V): 160 ~ 420 — 450 tan δ (MAX.): 0.15 — 0.20 Measurement frequency : 120Hz, Temperature : 20°C
Stability at Low Temperature	Rated voltage (V): 160 ~ 250 — 350 ~ 450 Impedance ratio ZT/Z20 (MAX.) Z—25°C/Z+20°C: 4 — 8 Measurement frequency : 120Hz
Endurance	After an application of DC voltage(in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 105°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.

■Drawing



(PC board hole dimensions)

(Terminal dimensions)

※ The other terminal is also available upon request.
Please refer page 197 for schematic of dimensions.

Type numbering system (Example : 400V 180μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

L G N 2 G 1 8 1 M E L A 3 0

- Case length code
- Case dia. code
- Configuration※
- Capacitance tolerance (± 20%)
- Rated Capacitance (180μF)
- Rated voltage (400V)
- Series name
- Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
EL	HL

※ Please contact to us if other configurations are required.

Minimum order quantity : 50pcs.

● Dimension table in next page.

GN series

■Dimensions

160V (2C)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
330	20×25	1170	0.15	0.68	LGN2C331MELY25
390	20×25	1280	0.15	0.74	LGN2C391MELY25
470	20×30	1400	0.15	0.82	LGN2C471MELY30
	22×25	1400	0.15	0.82	LGN2C471MELZ25
560	20×35	1500	0.15	0.89	LGN2C561MELY35
	22×30	1500	0.15	0.89	LGN2C561MELZ30
680	20×40	1700	0.15	0.98	LGN2C681MELY40
	22×35	1700	0.15	0.98	LGN2C681MELZ35
	25×25	1700	0.15	0.98	LGN2C681MELA25
820	22×35	2000	0.15	1.08	LGN2C821MELZ35
	25×30	2000	0.15	1.08	LGN2C821MELA30
	30×25	2000	0.15	1.08	LGN2C821MELB25
1000	22×45	2200	0.15	1.20	LGN2C102MELZ45
	25×35	2200	0.15	1.20	LGN2C102MELA35
	30×25	2200	0.15	1.20	LGN2C102MELB25
1200	25×40	2300	0.15	1.31	LGN2C122MELA40
	30×30	2300	0.15	1.31	LGN2C122MELB30
	35×25	2300	0.15	1.31	LGN2C122MELC25
1500	25×45	2500	0.15	1.46	LGN2C152MELA45
	30×35	2500	0.15	1.46	LGN2C152MELB35
	35×30	2500	0.15	1.46	LGN2C152MELC30
1800	30×40	2700	0.15	1.60	LGN2C182MELB40
	35×35	2700	0.15	1.60	LGN2C182MELC35
2200	30×45	2900	0.15	1.77	LGN2C222MELB45
	35×35	2900	0.15	1.77	LGN2C222MELC35
2700	35×45	3100	0.15	1.97	LGN2C272MELC45
3300	35×50	3300	0.15	2.17	LGN2C332MELC50

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

180V (2Z)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
330	20×25	1200	0.15	0.73	LGN2Z331MELY25
390	20×30	1280	0.15	0.79	LGN2Z391MELY30
	22×25	1280	0.15	0.79	LGN2Z391MELZ25
470	20×35	1380	0.15	0.87	LGN2Z471MELY35
	22×30	1380	0.15	0.87	LGN2Z471MELZ30
560	20×40	1500	0.15	0.95	LGN2Z561MELY40
	22×30	1500	0.15	0.95	LGN2Z561MELZ30
	25×25	1500	0.15	0.95	LGN2Z561MELA25
680	20×45	1700	0.15	1.04	LGN2Z681MELY45
	22×35	1700	0.15	1.04	LGN2Z681MELZ35
	25×30	1700	0.15	1.04	LGN2Z681MELA30
820	22×40	2000	0.15	1.15	LGN2Z821MELZ40
	25×35	2000	0.15	1.15	LGN2Z821MELA35
	30×25	2000	0.15	1.15	LGN2Z821MELB25
1000	25×40	2200	0.15	1.27	LGN2Z102MELA40
	30×30	2200	0.15	1.27	LGN2Z102MELB30
	35×25	2200	0.15	1.27	LGN2Z102MELC25
1200	25×45	2300	0.15	1.39	LGN2Z122MELA45
	30×35	2300	0.15	1.39	LGN2Z122MELB35
	35×30	2300	0.15	1.39	LGN2Z122MELC30
1500	25×50	2500	0.15	1.55	LGN2Z152MELA50
	30×40	2500	0.15	1.55	LGN2Z152MELB40
	35×30	2500	0.15	1.55	LGN2Z152MELC30
1800	30×45	2700	0.15	1.70	LGN2Z182MELB45
	35×35	2700	0.15	1.70	LGN2Z182MELC35
2200	30×50	2900	0.15	1.88	LGN2Z222MELB50
	35×40	2900	0.15	1.88	LGN2Z222MELC40
2700	35×50	3100	0.15	2.09	LGN2Z272MELC50

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

200V (2D)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
270	20×25	990	0.15	0.69	LGN2D271MELY25
330	20×30	1200	0.15	0.77	LGN2D331MELY30
	22×25	1200	0.15	0.77	LGN2D331MELZ25
390	20×30	1340	0.15	0.83	LGN2D391MELY30
	22×25	1310	0.15	0.83	LGN2D391MELZ25
470	20×35	1480	0.15	0.91	LGN2D471MELY35
	22×30	1480	0.15	0.91	LGN2D471MELZ30
	25×25	1480	0.15	0.91	LGN2D471MELA25
560	20×40	1600	0.15	1.00	LGN2D561MELY40
	22×35	1600	0.15	1.00	LGN2D561MELZ35
680	22×40	1750	0.15	1.10	LGN2D681MELZ40
	25×30	1750	0.15	1.10	LGN2D681MELA30
	30×25	1750	0.15	1.10	LGN2D681MELB25
820	22×45	2040	0.15	1.21	LGN2D821MELZ45
	25×35	2040	0.15	1.21	LGN2D821MELA35
1000	22×50	2300	0.15	1.34	LGN2D102MELZ50
	25×45	2300	0.15	1.34	LGN2D102MELA45
	30×30	2300	0.15	1.34	LGN2D102MELB30
	35×25	2300	0.15	1.34	LGN2D102MELC25
1200	25×50	2650	0.15	1.46	LGN2D122MELA50
	30×35	2650	0.15	1.46	LGN2D122MELB35
	35×30	2650	0.15	1.46	LGN2D122MELC30
1500	30×40	2800	0.15	1.64	LGN2D152MELB40
	35×35	2800	0.15	1.64	LGN2D152MELC35
1800	30×50	3080	0.15	1.80	LGN2D182MELB50
	35×40	3080	0.15	1.80	LGN2D182MELC40
2200	35×45	3480	0.15	1.98	LGN2D222MELC45

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

220V (2P)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20×25	980	0.15	0.66	LGN2P221MELY25
270	20×30	1080	0.15	0.73	LGN2P271MELY30
	22×25	1080	0.15	0.73	LGN2P271MELZ25
330	20×35	1260	0.15	0.80	LGN2P331MELY35
	22×25	1260	0.15	0.80	LGN2P331MELZ25
390	20×35	1340	0.15	0.87	LGN2P391MELY35
	22×30	1340	0.15	0.87	LGN2P391MELZ30
	25×25	1340	0.15	0.87	LGN2P391MELA25
470	20×45	1480	0.15	0.96	LGN2P471MELY45
	22×35	1480	0.15	0.96	LGN2P471MELZ35
560	22×40	1610	0.15	1.05	LGN2P561MELZ40
	25×35	1610	0.15	1.05	LGN2P561MELA35
	30×25	1610	0.15	1.05	LGN2P561MELB25
680	22×45	1780	0.15	1.16	LGN2P681MELZ45
	25×35	1780	0.15	1.16	LGN2P681MELA35
	30×30	1780	0.15	1.16	LGN2P681MELB30
820	22×50	1930	0.15	1.27	LGN2P821MELZ50
	25×40	1930	0.15	1.27	LGN2P821MELA40
	30×35	1930	0.15	1.27	LGN2P821MELB35
	35×25	1930	0.15	1.27	LGN2P821MELC25
1000	25×50	2330	0.15	1.40	LGN2P102MELA50
	30×35	2330	0.15	1.40	LGN2P102MELB35
	35×30	2330	0.15	1.40	LGN2P102MELC30
1200	30×40	2500	0.15	1.54	LGN2P122MELB40
	35×35	2500	0.15	1.54	LGN2P122MELC35
1500	30×50	2760	0.15	1.72	LGN2P152MELB50
	35×40	2760	0.15	1.72	LGN2P152MELC40
1800	35×50	3110	0.15	1.88	LGN2P182MELC50

Rated Ripple (mA rms) at 105°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

GN series

■Dimensions

250V (2E)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	22×25	1000	0.15	0.70	LGN2E221MELZ25
270	22×25	1100	0.15	0.77	LGN2E271MELZ25
330	20×35	1200	0.15	0.86	LGN2E331MELY35
	22×30	1200	0.15	0.86	LGN2E331MELZ30
	25×25	1200	0.15	0.86	LGN2E331MELA25
390	20×40	1300	0.15	0.93	LGN2E391MELY40
	22×35	1300	0.15	0.93	LGN2E391MELZ35
	25×30	1300	0.15	0.93	LGN2E391MELA30
470	22×40	1400	0.15	1.02	LGN2E471MELZ40
	25×35	1400	0.15	1.02	LGN2E471MELA35
	30×25	1400	0.15	1.02	LGN2E471MELB25
560	22×45	1500	0.15	1.12	LGN2E561MELZ45
	25×35	1500	0.15	1.12	LGN2E561MELA35
	30×30	1500	0.15	1.12	LGN2E561MELB30
680	22×50	1700	0.15	1.23	LGN2E681MELZ50
	25×40	1700	0.15	1.23	LGN2E681MELA40
	30×30	1700	0.15	1.23	LGN2E681MELB30
	35×25	1700	0.15	1.23	LGN2E681MELC25
820	25×45	2000	0.15	1.35	LGN2E821MELA45
	30×35	2000	0.15	1.35	LGN2E821MELB35
	35×30	2000	0.15	1.35	LGN2E821MELC30
1000	30×40	2200	0.15	1.50	LGN2E102MELB40
	35×35	2200	0.15	1.50	LGN2E102MELC35
1200	30×45	2300	0.15	1.64	LGN2E122MELB45
	35×40	2300	0.15	1.64	LGN2E122MELC40
1500	35×45	2500	0.15	1.83	LGN2E152MELC45
1800	35×50	2700	0.15	2.01	LGN2E182MELC50

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

350V (2V)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
120	22×25	750	0.15	0.61	LGN2V121MELZ25
150	22×30	820	0.15	0.68	LGN2V151MELZ30
180	22×30	900	0.15	0.75	LGN2V181MELZ30
	25×25	900	0.15	0.75	LGN2V181MELA25
220	22×35	1000	0.15	0.83	LGN2V221MELZ35
	25×30	1000	0.15	0.83	LGN2V221MELA30
270	22×40	1100	0.15	0.92	LGN2V271MELZ40
	25×35	1100	0.15	0.92	LGN2V271MELA35
	30×25	1100	0.15	0.92	LGN2V271MELB25
330	22×45	1200	0.15	1.01	LGN2V331MELZ45
	25×40	1200	0.15	1.01	LGN2V331MELA40
	30×30	1200	0.15	1.01	LGN2V331MELB30
390	25×45	1300	0.15	1.10	LGN2V391MELA45
	30×35	1300	0.15	1.10	LGN2V391MELB35
470	25×50	1400	0.15	1.21	LGN2V471MELA50
	30×40	1400	0.15	1.21	LGN2V471MELB40
	35×30	1400	0.15	1.21	LGN2V471MELC30
560	30×45	1500	0.15	1.32	LGN2V561MELB45
	35×35	1500	0.15	1.32	LGN2V561MELC35
680	30×50	1700	0.15	1.46	LGN2V681MELB50
	35×40	1700	0.15	1.46	LGN2V561MELC40
820	35×45	1900	0.15	1.60	LGN2V821MELC45

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

400V (2G)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
68	20×25	490	0.15	0.49	LGN2G680MELY25
82	20×30	640	0.15	0.54	LGN2G820MELY30
100	20×30	680	0.15	0.60	LGN2G101MELY30
	22×25	680	0.15	0.60	LGN2G101MELZ25
120	20×35	730	0.15	0.65	LGN2G121MELY35
	22×30	730	0.15	0.65	LGN2G121MELZ30
150	20×40	850	0.15	0.73	LGN2G151MELY40
	22×35	850	0.15	0.73	LGN2G151MELZ35
180	22×35	950	0.15	0.80	LGN2G181MELZ35
	25×30	950	0.15	0.80	LGN2G181MELA30
	30×25	950	0.15	0.80	LGN2G181MELB25
220	22×45	1100	0.15	0.88	LGN2G221MELZ45
	25×35	1100	0.15	0.88	LGN2G221MELA35
	30×25	1100	0.15	0.88	LGN2G221MELB25
270	22×50	1220	0.15	0.98	LGN2G271MELZ50
	25×40	1220	0.15	0.98	LGN2G271MELA40
	30×30	1220	0.15	0.98	LGN2G271MELB30
	35×25	1220	0.15	0.98	LGN2G271MELC25
330	25×45	1440	0.15	1.08	LGN2G331MELA45
	30×35	1440	0.15	1.08	LGN2G331MELB35
390	25×50	1550	0.15	1.18	LGN2G391MELA50
	30×40	1550	0.15	1.18	LGN2G391MELB40
	35×30	1550	0.15	1.18	LGN2G391MELC30
470	30×45	1680	0.15	1.30	LGN2G471MELB45
	35×35	1680	0.15	1.30	LGN2G471MELC35
560	30×50	1900	0.15	1.41	LGN2G561MELB50
	35×40	1900	0.15	1.41	LGN2G561MELC40
680	35×45	2120	0.15	1.56	LGN2G681MELC45

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

420V (W6)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
68	20×25	500	0.15	0.50	LGNW6680MELY25
82	20×25	640	0.15	0.55	LGNW6820MELY25
100	20×30	660	0.15	0.61	LGNW6101MELY30
	22×25	660	0.15	0.61	LGNW6101MELZ25
120	20×35	810	0.15	0.67	LGNW6121MELY35
	22×30	810	0.15	0.67	LGNW6121MELZ30
	25×25	810	0.15	0.67	LGNW6121MELA25
150	20×40	840	0.15	0.75	LGNW6151MELY40
	22×35	840	0.15	0.75	LGNW6151MELZ35
	25×30	840	0.15	0.75	LGNW6151MELA30
180	20×45	910	0.15	0.82	LGNW6181MELY45
	22×40	910	0.15	0.82	LGNW6181MELZ40
	25×30	910	0.15	0.82	LGNW6181MELA30
	30×25	910	0.15	0.82	LGNW6181MELB25
220	22×45	1050	0.15	0.91	LGNW6221MELZ45
	25×35	1050	0.15	0.91	LGNW6221MELA35
	30×30	1050	0.15	0.91	LGNW6221MELB30
270	25×40	1250	0.15	1.01	LGNW6271MELA40
	30×30	1250	0.15	1.01	LGNW6271MELB30
	35×25	1250	0.15	1.01	LGNW6271MELC25
330	25×50	1420	0.15	1.11	LGNW6331MELA50
	30×35	1420	0.15	1.11	LGNW6331MELB35
	35×30	1420	0.15	1.11	LGNW6331MELC30
390	30×40	1610	0.15	1.21	LGNW6391MELB40
	35×35	1610	0.15	1.21	LGNW6391MELC35
470	30×45	1860	0.15	1.33	LGNW6471MELB45
	35×40	1860	0.15	1.33	LGNW6471MELC40
560	35×45	2100	0.15	1.45	LGNW6561MELC45
680	35×50	2200	0.15	1.60	LGNW6681MELC50

Rated Ripple (mA rms) at 105°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

GN series

■Dimensions

450V (2W)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
56	20×25	440	0.20	0.47	LGN2W560MELY25
68	20×25	500	0.20	0.52	LGN2W680MELY25
82	20×30	640	0.20	0.57	LGN2W820MELY30
	22×25	640	0.20	0.57	LGN2W820MELZ25
100	20×35	690	0.20	0.63	LGN2W101MELY35
	22×30	690	0.20	0.63	LGN2W101MELZ30
	25×25	690	0.20	0.63	LGN2W101MELA25
120	22×35	720	0.20	0.69	LGN2W121MELZ35
	25×30	720	0.20	0.69	LGN2W121MELA30
150	20×45	790	0.20	0.77	LGN2W151MELY45
	22×40	790	0.20	0.77	LGN2W151MELZ40
	25×30	790	0.20	0.77	LGN2W151MELA30
	30×25	790	0.20	0.77	LGN2W151MELB25
180	22×45	870	0.20	0.85	LGN2W181MELZ45
	25×35	870	0.20	0.85	LGN2W181MELA35
	30×30	870	0.20	0.85	LGN2W181MELB30
220	25×40	1050	0.20	0.94	LGN2W221MELA40
	30×30	1050	0.20	0.94	LGN2W221MELB30
	35×25	1050	0.20	0.94	LGN2W221MELC25
270	25×50	1230	0.20	1.04	LGN2W271MELA50
	30×35	1230	0.20	1.04	LGN2W271MELB35
	35×30	1230	0.20	1.04	LGN2W271MELC30
330	30×40	1380	0.20	1.15	LGN2W331MELB40
	35×35	1380	0.20	1.15	LGN2W331MELC35
390	30×50	1610	0.20	1.25	LGN2W391MELB50
	35×40	1610	0.20	1.25	LGN2W391MELC40
470	35×45	1780	0.20	1.37	LGN2W471MELC45
560	35×50	1990	0.20	1.50	LGN2W561MELC50

Rated Ripple (mA rms) at 105°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
coeff	160~250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	350~450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

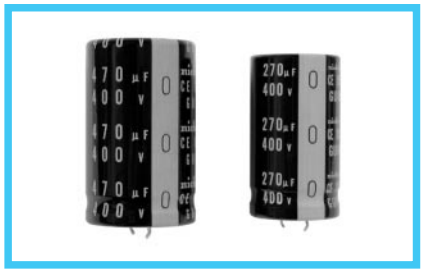
GU series

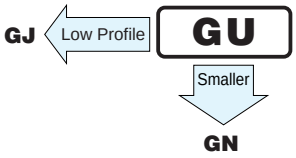
Snap-in Terminal Type, Wide Temperature Range

RCJ Approved (160V~) Anti-Solvent Feature (Through 100V only)

Approved by Reliability Center for Electronic Component, Japan-Certification No. RCJ-03-24D

● Withstanding 3000 hours application of ripple current at 105°C.





■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ + 105°C (16 ~ 250V) , – 25 ~ +105°C (315 ~ 450V)
Rated Voltage Range	16 ~ 450V
Rated Capacitance Range	47~ 47000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	I ≦ 3$\sqrt{CV}$(µA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (µF), V : Voltage (V)]
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage(V)	16	25	35	50	63	80 ·100	160~420	450
tan δ (MAX.)	0.50	0.40	0.35	0.30	0.25	0.20	0.15	0.20

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		16~100	160~250	315~450
Impedance ratio ZT/Z20 (MAX.)	Z—25°C/Z+20°C	4	3	8
	Z—40°C/Z+20°C	20	12	—

Endurance — After an application of DC voltage(in the range of rated DC voltage even after over-lapping the specified ripple current) for 3000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

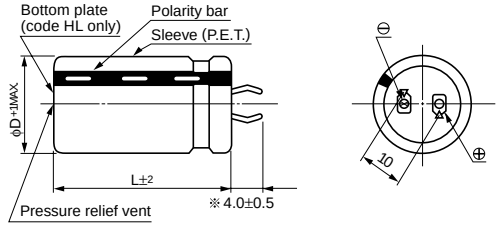
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

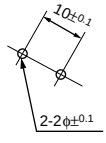
Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the characteristic requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

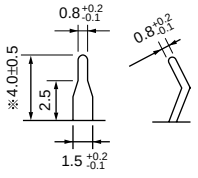
Marking — Printed with white color letter on black sleeve.

■Drawing





(PC board hole dimensions)



(Terminal dimensions)

※ The other terminal is also available upon request.
Please refer page 197 for schematic of dimensions.

Type numbering system (Example : 200V 680µF)

1	2	3	4	5	6	7	8	9	10	11	12
L	G	U	2	D	6	8	1	M	E	L	A

- 12: Case dia. code
- 10–11: Configuration※
- 9: Capacitance tolerance (±20%)
- 6–8: Rated Capacitance (680µF)
- 4–5: Rated voltage (200V)
- 3: Series name
- 1–2: Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
Coeff.	16~100V	0.88	0.90	1.00	1.07	1.15	1.15	1.15
	160~250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	315~450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

● Dimension table in next page.

GU series

■Dimensions

16V (1C)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
6800	22×25	1750	0.50	0.98	LGU1C682MELZ
8200	22×30	2000	0.50	1.08	LGU1C822MELZ
10000	22×30	2100	0.50	1.20	LGU1C103MELZ
	25×25	2050	0.50	1.20	LGU1C103MELA
12000	22×35	2310	0.50	1.31	LGU1C123MELZ
	25×30	2300	0.50	1.31	LGU1C123MELA
	30×25	2380	0.50	1.31	LGU1C123MELB
15000	22×40	2680	0.50	1.46	LGU1C153MELZ
	25×35	2680	0.50	1.46	LGU1C153MELA
	30×30	2570	0.50	1.46	LGU1C153MELB
18000	22×45	2980	0.50	1.60	LGU1C183MELZ
	25×40	3160	0.50	1.60	LGU1C183MELA
	30×30	3000	0.50	1.60	LGU1C183MELB
22000	25×45	3400	0.50	1.77	LGU1C223MELA
	30×35	3390	0.50	1.77	LGU1C223MELB
	35×30	3250	0.50	1.77	LGU1C223MELC
27000	25×50	3850	0.50	1.97	LGU1C273MELA
	30×40	3830	0.50	1.97	LGU1C273MELB
	35×30	3740	0.50	1.97	LGU1C273MELC
33000	30×45	4300	0.50	2.17	LGU1C333MELB
	35×35	4270	0.50	2.17	LGU1C333MELC
39000	30×50	4810	0.50	2.36	LGU1C393MELB
	35×40	4800	0.50	2.36	LGU1C393MELC
47000	35×45	5530	0.50	2.60	LGU1C473MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

25V (1E)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
4700	22×25	1610	0.40	1.02	LGU1E472MELZ
5600	22×30	1800	0.40	1.12	LGU1E562MELZ
6800	22×30	1910	0.40	1.23	LGU1E682MELZ
	25×25	1910	0.40	1.23	LGU1E682MELA
8200	22×35	2140	0.40	1.35	LGU1E822MELZ
	25×30	2340	0.40	1.35	LGU1E822MELA
	30×25	2250	0.40	1.35	LGU1E822MELB
10000	22×40	2650	0.40	1.50	LGU1E103MELZ
	25×35	2610	0.40	1.50	LGU1E103MELA
	30×30	2610	0.40	1.50	LGU1E103MELB
12000	22×45	2690	0.40	1.64	LGU1E123MELZ
	25×40	2810	0.40	1.64	LGU1E123MELA
	30×30	2740	0.40	1.64	LGU1E123MELB
15000	25×45	3270	0.40	1.83	LGU1E153MELA
	30×35	3130	0.40	1.83	LGU1E153MELB
	35×30	3260	0.40	1.83	LGU1E153MELC
18000	25×50	3540	0.40	2.01	LGU1E183MELA
	30×40	3560	0.40	2.01	LGU1E183MELB
	35×35	3840	0.40	2.01	LGU1E183MELC
22000	30×45	4240	0.40	2.22	LGU1E223MELB
	35×35	3960	0.40	2.22	LGU1E223MELC
27000	35×45	4750	0.40	2.46	LGU1E273MELC
33000	35×50	5500	0.40	2.72	LGU1E333MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

35V (1V)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
3300	22×25	1450	0.35	1.01	LGU1V332MELZ
3900	22×30	1690	0.35	1.10	LGU1V392MELZ
4700	22×35	2020	0.35	1.21	LGU1V472MELZ
	25×25	1780	0.35	1.21	LGU1V472MELA
5600	22×35	2130	0.35	1.32	LGU1V562MELZ
	25×30	2040	0.35	1.32	LGU1V562MELA
	30×25	2120	0.35	1.32	LGU1V562MELB
6800	22×40	2410	0.35	1.46	LGU1V682MELZ
	25×35	2310	0.35	1.46	LGU1V682MELA
	30×25	2310	0.35	1.46	LGU1V682MELB
8200	22×50	2850	0.35	1.60	LGU1V822MELZ
	25×40	2730	0.35	1.60	LGU1V822MELA
	30×30	2750	0.35	1.60	LGU1V822MELB
10000	25×45	3050	0.35	1.77	LGU1V103MELA
	30×35	3050	0.35	1.77	LGU1V103MELB
12000	25×50	3370	0.35	1.94	LGU1V123MELA
	30×40	3280	0.35	1.94	LGU1V123MELB
	35×30	3200	0.35	1.94	LGU1V123MELC
15000	30×45	3740	0.35	2.17	LGU1V153MELB
	35×35	3690	0.35	2.17	LGU1V153MELC
18000	35×40	4370	0.35	2.38	LGU1V183MELC
22000	35×50	4920	0.35	2.63	LGU1V223MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

50V (1H)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
1800	22×25	1340	0.30	0.90	LGU1H182MELZ
2700	22×30	1700	0.30	1.10	LGU1H272MELZ
	25×25	1700	0.30	1.10	LGU1H272MELA
3300	22×35	1980	0.30	1.21	LGU1H332MELZ
	25×30	2000	0.30	1.21	LGU1H332MELA
3900	22×40	2250	0.30	1.32	LGU1H392MELZ
	25×30	2280	0.30	1.32	LGU1H392MELA
	30×25	2220	0.30	1.32	LGU1H392MELB
4700	22×45	2560	0.30	1.45	LGU1H472MELZ
	25×35	2610	0.30	1.45	LGU1H472MELA
	30×30	2580	0.30	1.45	LGU1H472MELB
5600	22×50	2890	0.30	1.58	LGU1H562MELZ
	25×40	2810	0.30	1.58	LGU1H562MELA
	30×30	2950	0.30	1.58	LGU1H562MELB
6800	25×45	3370	0.30	1.74	LGU1H682MELA
	30×35	3390	0.30	1.74	LGU1H682MELB
	35×30	3310	0.30	1.74	LGU1H682MELC
8200	30×40	3710	0.30	1.92	LGU1H822MELB
	35×35	3660	0.30	1.92	LGU1H822MELC
10000	30×50	4090	0.30	2.12	LGU1H103MELB
	35×40	4070	0.30	2.12	LGU1H103MELC
12000	35×45	4560	0.30	2.32	LGU1H123MELC
15000	35×50	4770	0.30	2.59	LGU1H153MELC

Rated Ripple (mA rms) at 105°C 120Hz

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

GU series

■Dimensions

63V (1J)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
1200	22×25	1250	0.25	0.82	LGU1J122MELZ
1500	22×30	1470	0.25	0.92	LGU1J152MELZ
	25×25	1440	0.25	0.92	LGU1J152MELA
1800	22×30	1580	0.25	1.01	LGU1J182MELZ
	25×25	1520	0.25	1.01	LGU1J182MELA
2200	22×35	1820	0.25	1.11	LGU1J222MELZ
	25×30	1750	0.25	1.11	LGU1J222MELA
2700	22×40	2070	0.25	1.23	LGU1J272MELZ
	25×35	2110	0.25	1.23	LGU1J272MELA
	30×25	1930	0.25	1.23	LGU1J272MELB
3300	22×45	2330	0.25	1.36	LGU1J332MELZ
	25×35	2270	0.25	1.36	LGU1J332MELA
	30×30	2240	0.25	1.36	LGU1J332MELB
3900	25×40	2540	0.25	1.48	LGU1J392MELA
	30×35	2550	0.25	1.48	LGU1J392MELB
4700	25×50	2970	0.25	1.63	LGU1J472MELA
	30×40	2900	0.25	1.63	LGU1J472MELB
	35×30	2830	0.25	1.63	LGU1J472MELC
5600	30×40	3280	0.25	1.78	LGU1J562MELB
	35×35	3240	0.25	1.78	LGU1J562MELC
6800	30×50	3730	0.25	1.96	LGU1J682MELB
	35×40	3710	0.25	1.96	LGU1J682MELC
8200	35×45	4160	0.25	2.15	LGU1J822MELC
10000	35×50	4690	0.25	2.38	LGU1J103MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

80V (1K)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
820	22×25	1110	0.20	0.76	LGU1K821MELZ
1000	22×25	1290	0.20	0.84	LGU1K102MELZ
1200	22×30	1440	0.20	0.92	LGU1K122MELZ
	25×25	1390	0.20	0.92	LGU1K122MELA
1500	22×30	1610	0.20	1.03	LGU1K152MELZ
	25×25	1620	0.20	1.03	LGU1K152MELA
1800	22×35	1830	0.20	1.13	LGU1K182MELZ
	25×30	1860	0.20	1.13	LGU1K182MELA
	30×25	1810	0.20	1.13	LGU1K182MELB
2200	22×40	2090	0.20	1.25	LGU1K222MELZ
	25×35	2010	0.20	1.25	LGU1K222MELA
	30×25	2100	0.20	1.25	LGU1K222MELB
2700	25×40	2430	0.20	1.39	LGU1K272MELA
	30×30	2430	0.20	1.39	LGU1K272MELB
3300	25×45	2760	0.20	1.54	LGU1K332MELA
	30×35	2780	0.20	1.54	LGU1K332MELB
	35×30	2710	0.20	1.54	LGU1K332MELC
3900	25×50	2920	0.20	1.67	LGU1K392MELA
	30×40	3120	0.20	1.67	LGU1K392MELB
	35×30	3070	0.20	1.67	LGU1K392MELC
4700	30×45	3520	0.20	1.83	LGU1K472MELB
	35×35	3500	0.20	1.83	LGU1K472MELC
5600	30×50	3800	0.20	2.00	LGU1K562MELB
	35×40	3870	0.20	2.00	LGU1K562MELC
6800	35×45	4190	0.20	2.21	LGU1K682MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

100V (2A)					
Cap. (μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
560	22×25	1070	0.20	0.70	LGU2A561MELZ
820	22×30	1350	0.20	0.85	LGU2A821MELZ
	25×25	1350	0.20	0.85	LGU2A821MELA
1000	22×30	1540	0.20	0.94	LGU2A102MELZ
	25×30	1560	0.20	0.94	LGU2A102MELA
1200	22×40	1740	0.20	1.03	LGU2A122MELZ
	25×30	1760	0.20	1.03	LGU2A122MELA
	30×25	1710	0.20	1.03	LGU2A122MELB
1500	22×45	1990	0.20	1.16	LGU2A152MELZ
	25×35	2030	0.20	1.16	LGU2A152MELA
	30×30	2000	0.20	1.16	LGU2A152MELB
1800	25×40	2280	0.20	1.27	LGU2A182MELA
	30×35	2270	0.20	1.27	LGU2A182MELB
2200	25×50	2570	0.20	1.40	LGU2A222MELA
	30×35	2590	0.20	1.40	LGU2A222MELB
	35×30	2520	0.20	1.40	LGU2A222MELC
2700	30×45	2940	0.20	1.55	LGU2A272MELB
	35×35	2900	0.20	1.55	LGU2A272MELC
3300	30×50	3320	0.20	1.72	LGU2A332MELB
	35×40	3310	0.20	1.72	LGU2A332MELC
3900	35×45	3690	0.20	1.87	LGU2A392MELC
4700	35×50	4140	0.20	2.05	LGU2A472MELC

Rated Ripple(mA rms) at 105°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

160V (2C)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
270	20×25	1100	0.15	0.62	LGU2C271MELY
330	20×30	1200	0.15	0.68	LGU2C331MELY
390	20×30	1300	0.15	0.74	LGU2C391MELY
	22×25	1300	0.15	0.74	LGU2C391MELZ
470	20×35	1340	0.15	0.82	LGU2C471MELY
	22×30	1550	0.15	0.82	LGU2C471MELZ
	25×25	1550	0.15	0.82	LGU2C471MELA
560	20×40	1500	0.15	0.89	LGU2C561MELY
	22×35	1670	0.15	0.89	LGU2C561MELZ
	25×30	1670	0.15	0.89	LGU2C561MELA
	30×25	1670	0.15	0.89	LGU2C561MELB
680	20×45	1700	0.15	0.98	LGU2C681MELY
	22×40	1820	0.15	0.98	LGU2C681MELZ
	25×30	1820	0.15	0.98	LGU2C681MELA
	30×25	1820	0.15	0.98	LGU2C681MELB
820	22×45	2040	0.15	1.08	LGU2C821MELZ
	25×35	2040	0.15	1.08	LGU2C821MELA
	30×30	2040	0.15	1.08	LGU2C821MELB
	35×25	2040	0.15	1.08	LGU2C821MELC
1000	22×50	2250	0.15	1.20	LGU2C102MELZ
	25×40	2250	0.15	1.20	LGU2C102MELA
	30×30	2250	0.15	1.20	LGU2C102MELB
	35×25	2250	0.15	1.20	LGU2C102MELC
1200	25×45	2490	0.15	1.31	LGU2C122MELA
	30×35	2490	0.15	1.31	LGU2C122MELB
	35×30	2490	0.15	1.31	LGU2C122MELC
1500	30×40	2840	0.15	1.46	LGU2C152MELB
	35×30	2840	0.15	1.46	LGU2C152MELC
1800	30×45	3320	0.15	1.60	LGU2C182MELB
	35×35	3000	0.15	1.60	LGU2C182MELC
2200	35×45	3500	0.15	1.77	LGU2C222MELC
2700	35×50	4000	0.15	1.97	LGU2C272MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

GU series

■Dimensions

180V (2Z)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20×25	1000	0.15	0.59	LGU2Z221MELY
270	20×30	1100	0.15	0.66	LGU2Z271MELY
330	20×30	1200	0.15	0.73	LGU2Z331MELY
	22×25	1200	0.15	0.73	LGU2Z331MELZ
390	20×35	1300	0.15	0.79	LGU2Z391MELY
	22×30	1350	0.15	0.79	LGU2Z391MELZ
	25×25	1350	0.15	0.79	LGU2Z391MELA
470	20×40	1400	0.15	0.87	LGU2Z471MELY
	22×35	1500	0.15	0.87	LGU2Z471MELZ
	25×30	1500	0.15	0.87	LGU2Z471MELA
	30×25	1500	0.15	0.87	LGU2Z471MELB
560	20×45	1550	0.15	0.95	LGU2Z561MELY
	22×40	1670	0.15	0.95	LGU2Z561MELZ
	25×30	1670	0.15	0.95	LGU2Z561MELA
	30×25	1670	0.15	0.95	LGU2Z561MELB
680	22×45	1780	0.15	1.04	LGU2Z681MELZ
	25×35	1780	0.15	1.04	LGU2Z681MELA
	30×30	1780	0.15	1.04	LGU2Z681MELB
	35×25	1780	0.15	1.04	LGU2Z681MELC
820	22×50	2040	0.15	1.15	LGU2Z821MELZ
	25×40	2040	0.15	1.15	LGU2Z821MELA
	30×30	2040	0.15	1.15	LGU2Z821MELB
	35×25	2040	0.15	1.15	LGU2Z821MELC
1000	25×45	2300	0.15	1.27	LGU2Z102MELA
	30×35	2300	0.15	1.27	LGU2Z102MELB
	35×30	2300	0.15	1.27	LGU2Z102MELC
1200	25×50	2550	0.15	1.39	LGU2Z122MELA
	30×40	2550	0.15	1.39	LGU2Z122MELB
	35×30	2550	0.15	1.39	LGU2Z122MELC
1500	30×45	2900	0.15	1.55	LGU2Z152MELB
	35×35	2900	0.15	1.55	LGU2Z152MELC
1800	35×45	3300	0.15	1.70	LGU2Z182MELC
2200	35×50	3650	0.15	1.88	LGU2Z222MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

200V (2D)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20×25	1000	0.15	0.62	LGU2D221MELY
270	20×30	1100	0.15	0.69	LGU2D271MELY
	22×25	1100	0.15	0.69	LGU2D271MELZ
330	20×35	1200	0.15	0.77	LGU2D331MELY
	22×30	1250	0.15	0.77	LGU2D331MELZ
	25×25	1250	0.15	0.77	LGU2D331MELA
390	20×40	1310	0.15	0.83	LGU2D391MELY
	22×30	1350	0.15	0.83	LGU2D391MELZ
	25×25	1350	0.15	0.83	LGU2D391MELA
470	20×45	1450	0.15	0.91	LGU2D471MELY
	22×35	1500	0.15	0.91	LGU2D471MELZ
	25×30	1500	0.15	0.91	LGU2D471MELA
	30×25	1500	0.15	0.91	LGU2D471MELB
560	20×50	1580	0.15	1.00	LGU2D561MELY
	22×40	1670	0.15	1.00	LGU2D561MELZ
	25×30	1670	0.15	1.00	LGU2D561MELA
	30×25	1670	0.15	1.00	LGU2D561MELB
680	22×45	1780	0.15	1.10	LGU2D681MELZ
	25×35	1780	0.15	1.10	LGU2D681MELA
	30×30	1780	0.15	1.10	LGU2D681MELB
	35×25	1780	0.15	1.10	LGU2D681MELC
820	25×45	2040	0.15	1.21	LGU2D821MELA
	30×30	2040	0.15	1.21	LGU2D821MELB
	35×25	2040	0.15	1.21	LGU2D821MELC
1000	25×50	2300	0.15	1.34	LGU2D102MELA
	30×35	2300	0.15	1.34	LGU2D102MELB
	35×30	2300	0.15	1.34	LGU2D102MELC
1200	30×40	2650	0.15	1.46	LGU2D122MELB
	35×35	2650	0.15	1.46	LGU2D122MELC
1500	30×50	3080	0.15	1.64	LGU2D152MELB
	35×40	3080	0.15	1.64	LGU2D152MELC
1800	35×45	3480	0.15	1.80	LGU2D182MELC
2200	35×50	3780	0.15	1.98	LGU2D222MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

220V (2P)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
180	20×25	900	0.15	0.59	LGU2P181MELY
220	20×30	1000	0.15	0.66	LGU2P221MELY
	22×25	1000	0.15	0.66	LGU2P221MELZ
270	20×35	1150	0.15	0.73	LGU2P271MELY
	22×30	1150	0.15	0.73	LGU2P271MELZ
330	20×40	1250	0.15	0.80	LGU2P331MELY
	22×35	1250	0.15	0.80	LGU2P331MELZ
	25×25	1250	0.15	0.80	LGU2P331MELA
390	20×45	1400	0.15	0.87	LGU2P391MELY
	22×35	1400	0.15	0.87	LGU2P391MELZ
	25×30	1400	0.15	0.87	LGU2P391MELA
470	20×50	1450	0.15	0.96	LGU2P471MELY
	22×40	1450	0.15	0.96	LGU2P471MELZ
	25×35	1450	0.15	0.96	LGU2P471MELA
	30×25	1450	0.15	0.96	LGU2P471MELB
560	22×45	1700	0.15	1.05	LGU2P561MELZ
	25×40	1700	0.15	1.05	LGU2P561MELA
	30×30	1700	0.15	1.05	LGU2P561MELB
680	25×45	1780	0.15	1.16	LGU2P681MELA
	30×35	1780	0.15	1.16	LGU2P681MELB
	35×25	1780	0.15	1.16	LGU2P681MELC
820	25×50	2100	0.15	1.27	LGU2P821MELA
	30×40	2100	0.15	1.27	LGU2P821MELB
	35×30	2100	0.15	1.27	LGU2P821MELC
1000	30×45	2400	0.15	1.40	LGU2P102MELB
	35×35	2400	0.15	1.40	LGU2P102MELC
1200	30×50	2600	0.15	1.54	LGU2P122MELB
	35×40	2600	0.15	1.54	LGU2P122MELC
1500	35×45	3000	0.15	1.72	LGU2P152MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

250V (2E)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
150	20×25	790	0.15	0.58	LGU2E151MELY
180	20×30	900	0.15	0.63	LGU2E181MELY
220	20×30	1000	0.15	0.70	LGU2E221MELY
	22×25	1000	0.15	0.70	LGU2E221MELZ
270	20×35	1100	0.15	0.77	LGU2E271MELY
	22×35	1180	0.15	0.77	LGU2E271MELZ
	25×25	1180	0.15	0.77	LGU2E271MELA
330	20×40	1200	0.15	0.86	LGU2E331MELY
	22×40	1300	0.15	0.86	LGU2E331MELZ
	25×30	1300	0.15	0.86	LGU2E331MELA
	30×25	1300	0.15	0.86	LGU2E331MELB
390	20×50	1450	0.15	0.93	LGU2E391MELY
	22×45	1490	0.15	0.93	LGU2E391MELZ
	25×35	1490	0.15	0.93	LGU2E391MELA
	30×25	1490	0.15	0.93	LGU2E391MELB
470	22×50	1650	0.15	1.02	LGU2E471MELZ
	25×40	1650	0.15	1.02	LGU2E471MELA
	30×30	1650	0.15	1.02	LGU2E471MELB
	35×25	1650	0.15	1.02	LGU2E471MELC
560	25×45	1800	0.15	1.12	LGU2E561MELA
	30×35	1800	0.15	1.12	LGU2E561MELB
	35×25	1800	0.15	1.12	LGU2E561MELC
680	25×50	2000	0.15	1.23	LGU2E681MELA
	30×40	2000	0.15	1.23	LGU2E681MELB
	35×30	2000	0.15	1.23	LGU2E681MELC
820	30×45	2300	0.15	1.35	LGU2E821MELB
	35×35	2300	0.15	1.35	LGU2E821MELC
1000	30×50	2470	0.15	1.50	LGU2E102MELB
	35×40	2470	0.15	1.50	LGU2E102MELC
1200	35×45	2600	0.15	1.64	LGU2E122MELC
1500	35×50	3000	0.15	1.83	LGU2E152MELC

Rated Ripple (mA rms) at 105°C 120Hz

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

GU series

■Dimensions

315V (2F)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
82	20×25	640	0.15	0.48	LGU2F820MELY
100	20×30	690	0.15	0.53	LGU2F101MELY
120	20×30	750	0.15	0.58	LGU2F121MELY
	22×25	750	0.15	0.58	LGU2F121MELZ
150	20×35	820	0.15	0.65	LGU2F151MELY
	22×30	820	0.15	0.65	LGU2F151MELZ
	25×25	820	0.15	0.65	LGU2F151MELA
180	20×40	900	0.15	0.71	LGU2F181MELY
	22×35	920	0.15	0.71	LGU2F181MELZ
	25×25	920	0.15	0.71	LGU2F181MELA
220	20×50	1000	0.15	0.78	LGU2F221MELY
	22×40	1040	0.15	0.78	LGU2F221MELZ
	25×30	1040	0.15	0.78	LGU2F221MELA
	30×25	1040	0.15	0.78	LGU2F221MELB
270	22×45	1160	0.15	0.87	LGU2F271MELZ
	25×35	1160	0.15	0.87	LGU2F271MELA
	30×25	1160	0.15	0.87	LGU2F271MELB
330	22×50	1330	0.15	0.96	LGU2F331MELZ
	25×40	1330	0.15	0.96	LGU2F331MELA
	30×30	1330	0.15	0.96	LGU2F331MELB
	35×25	1330	0.15	0.96	LGU2F331MELC
390	25×45	1470	0.15	1.05	LGU2F391MELA
	30×35	1470	0.15	1.05	LGU2F391MELB
	35×30	1470	0.15	1.05	LGU2F391MELC
470	25×50	1700	0.15	1.15	LGU2F471MELA
	30×40	1700	0.15	1.15	LGU2F471MELB
	35×30	1700	0.15	1.15	LGU2F471MELC
560	30×45	2050	0.15	1.26	LGU2F561MELB
	35×35	2050	0.15	1.26	LGU2F561MELC
680	30×50	2170	0.15	1.38	LGU2F681MELB
	35×40	2170	0.15	1.38	LGU2F681MELC
820	35×45	2200	0.15	1.52	LGU2F821MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

400V (2G)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
56	20×25	510	0.15	0.44	LGU2G560MELY
68	20×30	560	0.15	0.49	LGU2G680MELY
82	20×30	640	0.15	0.54	LGU2G820MELY
	22×25	640	0.15	0.54	LGU2G820MELZ
100	20×35	700	0.15	0.60	LGU2G101MELY
	22×30	700	0.15	0.60	LGU2G101MELZ
	25×25	700	0.15	0.60	LGU2G101MELA
120	20×40	750	0.15	0.65	LGU2G121MELY
	22×35	750	0.15	0.65	LGU2G121MELZ
	25×25	750	0.15	0.65	LGU2G121MELA
150	20×45	830	0.15	0.73	LGU2G151MELY
	22×40	880	0.15	0.73	LGU2G151MELZ
	25×30	880	0.15	0.73	LGU2G151MELA
	30×25	880	0.15	0.73	LGU2G151MELB
180	22×45	980	0.15	0.80	LGU2G181MELZ
	25×35	980	0.15	0.80	LGU2G181MELA
	30×30	980	0.15	0.80	LGU2G181MELB
	35×25	980	0.15	0.80	LGU2G181MELC
220	22×50	1100	0.15	0.88	LGU2G221MELZ
	25×40	1100	0.15	0.88	LGU2G221MELA
	30×30	1100	0.15	0.88	LGU2G221MELB
	35×25	1100	0.15	0.88	LGU2G221MELC
270	25×45	1220	0.15	0.98	LGU2G271MELA
	30×35	1220	0.15	0.98	LGU2G271MELB
	35×30	1220	0.15	0.98	LGU2G271MELC
330	25×50	1440	0.15	1.08	LGU2G331MELA
	30×40	1440	0.15	1.08	LGU2G331MELB
	35×30	1440	0.15	1.08	LGU2G331MELC
390	30×45	1600	0.15	1.18	LGU2G391MELB
	35×35	1600	0.15	1.18	LGU2G391MELC
470	30×50	1900	0.15	1.30	LGU2G471MELB
	35×40	1900	0.15	1.30	LGU2G471MELC
560	35×45	2120	0.15	1.41	LGU2G561MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

420V (W6)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
56	20×25	510	0.15	0.46	LGUW6560MELY
68	20×30	560	0.15	0.50	LGUW6680MELY
82	20×35	640	0.15	0.55	LGUW6820MELY
	22×25	640	0.15	0.55	LGUW6820MELZ
100	20×35	700	0.15	0.61	LGUW6101MELY
	22×30	700	0.15	0.61	LGUW6101MELZ
	25×25	700	0.15	0.61	LGUW6101MELA
120	20×40	750	0.15	0.67	LGUW6121MELY
	22×35	750	0.15	0.67	LGUW6121MELZ
	25×30	750	0.15	0.67	LGUW6121MELA
150	20×50	880	0.15	0.75	LGUW6151MELY
	22×40	880	0.15	0.75	LGUW6151MELZ
	25×35	880	0.15	0.75	LGUW6151MELA
	30×25	880	0.15	0.75	LGUW6151MELB
180	22×45	950	0.15	0.82	LGUW6181MELZ
	25×35	950	0.15	0.82	LGUW6181MELA
	30×30	950	0.15	0.82	LGUW6181MELB
220	22×50	1100	0.15	0.91	LGUW6221MELZ
	25×45	1100	0.15	0.91	LGUW6221MELA
	30×35	1100	0.15	0.91	LGUW6221MELB
	35×25	1100	0.15	0.91	LGUW6221MELC
270	25×50	1220	0.15	1.01	LGUW6271MELA
	30×40	1220	0.15	1.01	LGUW6271MELB
	35×30	1220	0.15	1.01	LGUW6271MELC
330	30×45	1450	0.15	1.11	LGUW6331MELB
	35×35	1450	0.15	1.11	LGUW6331MELC
390	30×50	1550	0.15	1.21	LGUW6391MELB
	35×40	1550	0.15	1.21	LGUW6391MELC
470	35×45	1900	0.15	1.33	LGUW6471MELC
560	35×50	2150	0.15	1.45	LGUW6561MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

450V (2W)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
47	20×25	390	0.20	0.43	LGU2W470MELY
56	20×30	510	0.20	0.47	LGU2W560MELY
68	20×35	560	0.20	0.52	LGU2W680MELY
82	20×35	640	0.20	0.57	LGU2W820MELY
	22×30	640	0.20	0.57	LGU2W820MELZ
	25×25	640	0.20	0.57	LGU2W820MELA
100	20×45	690	0.20	0.63	LGU2W101MELY
	22×35	690	0.20	0.63	LGU2W101MELZ
	25×30	690	0.20	0.63	LGU2W101MELA
120	20×50	750	0.20	0.69	LGU2W121MELY
	22×40	800	0.20	0.69	LGU2W121MELZ
	25×30	800	0.20	0.69	LGU2W121MELA
	30×25	800	0.20	0.69	LGU2W121MELB
150	22×45	880	0.20	0.77	LGU2W151MELZ
	25×35	880	0.20	0.77	LGU2W151MELA
	30×30	880	0.20	0.77	LGU2W151MELB
180	22×50	1000	0.20	0.85	LGU2W181MELZ
	25×40	1000	0.20	0.85	LGU2W181MELA
	30×30	1000	0.20	0.85	LGU2W181MELB
220	25×45	1120	0.20	0.94	LGU2W221MELA
	30×35	1120	0.20	0.94	LGU2W221MELB
	35×30	1120	0.20	0.94	LGU2W221MELC
270	30×40	1280	0.20	1.04	LGU2W271MELB
	35×35	1280	0.20	1.04	LGU2W271MELC
330	30×50	1450	0.20	1.15	LGU2W331MELB
	35×40	1450	0.20	1.15	LGU2W331MELC
390	35×40	1500	0.20	1.25	LGU2W391MELC
470	35×50	1850	0.20	1.37	LGU2W471MELC

Rated Ripple (mA rms) at 105°C 120Hz

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

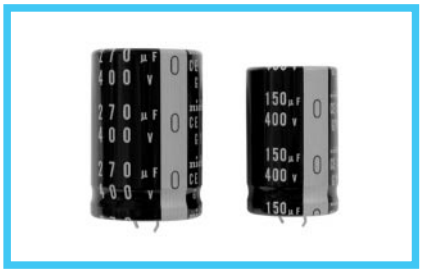
GY series

Snap-in Terminal Type, Long Life, Wide Temperature Range

Long Life

- Long life assurance series withstanding 7000 hours application of ripple current at 105°C.
- Suited for use in industrial power supplies applications where high reliability and dependable performance are the most important.
- Suited for ballast application.

GU → Long Life → GY



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (160~250V) , – 25 ~ +105°C (315 ~ 450V)
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	39 ~ 2200μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF), V : Voltage(V)]

tan δ

Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage(V)	160	180	200	250	315	350	400	450
tan δ (MAX.)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.20

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage(V)		160 ~ 250	315 ~ 450
Impedance ratio ZT/Z20 (MAX.)	Z—25°C/Z+20°C	3	8
	Z—40°C/Z+20°C	12	—

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 7000 hours at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value
tan δ	250% or less of initial specified value
Leakage current	Initial specified value or less

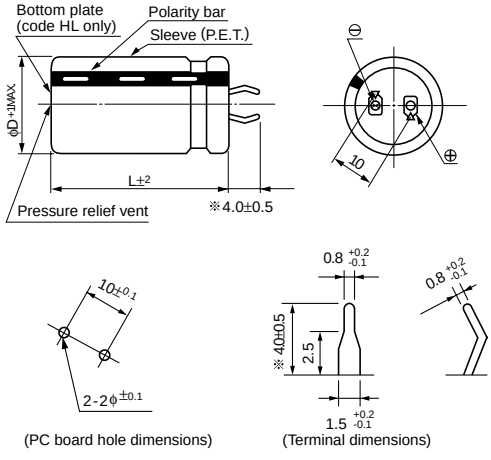
Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking: Printed with white color letter on black sleeve.

■Drawing



(PC board hole dimensions) (Terminal dimensions)

※ The other terminal is also available upon request.
Please refer page 197 for schematic of dimensions.

Type numbering system (Example : 200V 680μF)

1	2	3	4	5	6	7	8	9	10	11	12
L	G	Y	2	D	6	8	1	M	E	L	A

- 12: Case dia. code
- 10–11: Configuration ※1
- 9: Capacitance tolerance (±20%)
- 6–8: Rated Capacitance (680μF)
- 4–5: Rated voltage (200V)
- 2–3: Series name
- 1: Type

φD	Code
22	Z
25	A
30	B
35	C

※1 Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※ Please contact to us if other configurations are required.

Minimum order quantity : 50pcs.

● Dimension table in next page.

GY series

■Dimensions

D × L (mm)

Cap.(μF)	Code	160V (2C)				180V (2Z)				200V (2D)				250V (2E)			
	φD	22	25	30	35	22	25	30	35	22	25	30	a35	22	25	30	35
180	181													22×30 0.90	25×25 0.90		
220	221					22×25 1.00				22×25 1.00				22×30 1.00	25×25 1.00		
270	271	22×25 1.10				22×25 1.10				22×30 1.10	25×25 1.10			22×35 1.10	25×30 1.10	30×25 1.10	
330	331	22×30 1.20				22×30 1.20	25×25 1.20			22×30 1.20	25×25 1.20			22×40 1.20	25×35 1.20	30×25 1.20	
390	391	22×30 1.30	25×25 1.30			22×30 1.30	25×25 1.30			22×35 1.30	25×30 1.30	30×25 1.30		22×45 1.30	25×35 1.30	30×30 1.30	
470	471	22×35 1.40	25×30 1.40			22×35 1.40	25×30 1.40	30×25 1.40		22×40 1.40	25×35 1.40	30×30 1.40			25×45 1.40	30×35 1.40	35×30 1.40
560	561	22×40 1.50	25×30 1.50	30×25 1.50		22×40 1.50	25×35 1.50	30×25 1.50		22×45 1.50	25×35 1.50	30×30 1.50			25×50 1.50	30×35 1.50	35×30 1.50
680	681	22×45 1.70	25×35 1.70	30×30 1.70		22×50 1.70	25×40 1.70	30×30 1.70			25×40 1.70	30×35 1.70				30×45 1.70	35×35 1.70
820	821		25×40 2.00	30×30 2.00			25×45 2.00	30×35 2.00	35×30 2.00		25×50 2.00	30×40 2.00	35×30 2.00			30×50 2.00	35×40 2.00
1000	102		25×45 2.20	30×35 2.20				30×40 2.20	35×30 2.20			30×45 2.20	35×35 2.20				35×45 2.20
1200	122		25×50 2.30	30×40 2.30	35×35 2.30			30×45 2.30	35×35 2.30			30×50 2.30	35×40 2.30				35×50 2.30
1500	152			30×45 2.50	35×35 2.50			30×50 2.50	35×40 2.50				35×50 2.50				
1800	182			30×50 2.70	35×40 2.70				35×45 2.70								
2200	222				35×50 2.90				35×50 2.90							Case size Rated ripple	

Cap.(μF)	Code	315V (2F)				350V (2V)				400V (2G)				450V (2W)			
	φD	22	25	30	35	22	a25	30	a35	22	25	30	35	a22	a25	30	a35
39	390													22×25 0.37			
47	470													22×30 0.40			
56	560									22×25 0.51				22×35 0.47	25×25 0.47		
68	680									22×30 0.56	25×25 0.56			22×40 0.53	25×30 0.53		
82	820	22×25 0.64				22×25 0.64				22×35 0.64	25×25 0.64			22×45 0.56	25×35 0.56	30×25 0.56	
100	101	22×30 0.69				22×30 0.69	25×25 0.69			22×35 0.69	25×30 0.69			22×50 0.64	25×40 0.64	30×30 0.64	
120	121	22×30 0.75	25×25 0.75			22×35 0.75	25×30 0.75			22×40 0.75	25×35 0.75	30×25 0.75			25×45 0.72	30×30 0.72	
150	151	22×35 0.82	25×30 0.82	30×25 0.82		22×40 0.82	25×30 0.82	30×25 0.82		22×50 0.82	25×40 0.82	30×30 0.82			25×50 0.79	30×40 0.79	35×30 0.79
180	181	22×40 0.90	25×35 0.90	30×25 0.90		22×45 0.90	25×35 0.90	30×30 0.90			25×45 0.90	30×35 0.90	35×25 0.90			30×45 0.87	35×35 0.87
220	221	22×45 1.00	25×40 1.00	30×30 1.00		22×50 1.00	25×40 1.00	30×30 1.00			25×50 1.00	30×40 1.00	35×30 1.00			30×50 1.00	35×40 1.00
270	271		25×45 1.10	30×35 1.10	35×30 1.10		25×50 1.10	30×35 1.10	35×30 1.10			30×45 1.10	35×35 1.10				35×45 1.19
330	331		25×50 1.20	30×40 1.20	35×30 1.20			30×45 1.20	35×35 1.20			30×50 1.20	35×40 1.20				35×50 1.38
390	391			30×45 1.30	35×35 1.30			30×50 1.30	35×40 1.30				35×45 1.30				
470	471			30×50 1.40	35×40 1.40				35×40 1.40				35×50 1.40				
560	561				35×45 1.50				35×50 1.50								
680	681				35×50 1.70											Case size Rated ripple	

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
Coeff.	160~250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	315~450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

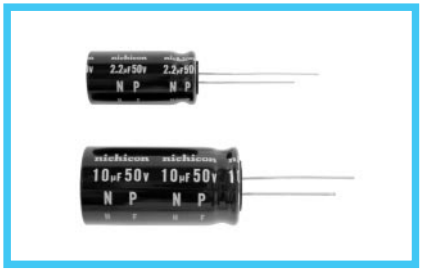
HA series

Horizontal Deflection Current Correction Use

Bi-polarized

Anti-Solvent Feature

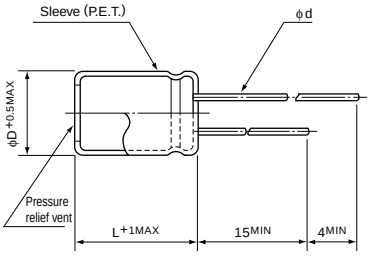
- Designed specifically for horizontal deflection current correction of TV's where high frequencies and high ripple currents are applied.

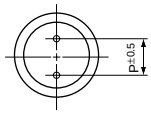


■Specifications

Item	Performance Characteristics
Category Temperature Range	–25 ~ +85°C
Rated Voltage Range	25 · 50V
Rated Capacitance Range	2.2 ~ 10µF
Capacitance Tolerance	±10% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is 100 (µA) or less.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 25, 50 tan δ (MAX.): 0.05
Endurance	After 1000 hours' application of DC 12V on which the specified allowable ripple current is superimposed at 70°C, capacitors meet the characterstic requirements listed at right. Capacitance change: Within ±15% of initial value tan δ: 200% or less of initial specified value Leakage Current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 500 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve. (PVC sleeve product : Printed with blue color letter on light blue sleeve.)

■Radial Lead Type





φD	12.5	16	18
P	5.0	7.5	7.5
φd	0.6	0.8	0.8

Type numbering system (Example : 25V 3.3µF)

1 2 3 4 5 6 7 8 9 10 11

U H A 1 E 3 R 3 K H D

- Configuration※
- Capacitance tolerance (±10%)
- Rated Capacitance (3.3µF)
- Rated voltage (25V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
12.5 ~ 18	HD	HA

※ Please contact to us if other configurations are required.

■Dimensions

Cap.(µF) \ V	Code	25, 50 (1E, 1H) Case size (mm)	Rated ripple Ripple (Ap-p) at 70°C 15.75kHz
2.2	2R2	12.5 × 25	5
3.3	3R3	16 × 25	6
4.7	4R7	16 × 31.5	7
5.6	5R6	16 × 31.5	7.5
6.8	6R8	16 × 35.5	8
10	100	18 × 35.5	10

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

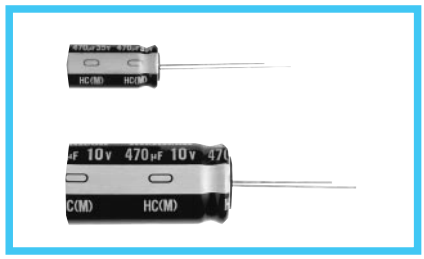
nichicon

HC Low Impedance series

Smaller | Low Impedance | Anti-Solvent Feature

● Lower impedance than HD series.

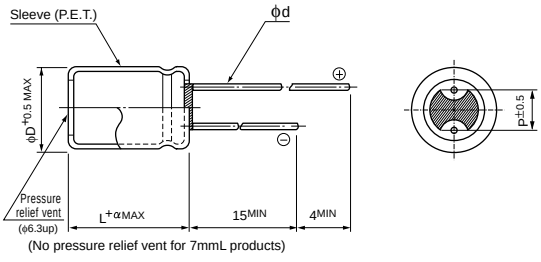
HC ← Low Impedance — HD



■Specifications

Item	Performance Characteristics							
Category Temperature Range	–40 ~ +105˚C							
Rated Voltage Range	6.3 ~ 35V							
Rated Capacitance Range	4.7 ~ 1000µF							
Capacitance Tolerance	±20% at 120Hz, 20˚C							
Leakage Current	After 2 minutes' application of rated voltage, leakage current is less than 0.01CV or 3 (µA), whichever is greater.							
tan δ	Rated voltage (V)		6.3	10	16	25	35	120Hz 20˚C
	tan δ (MAX.)		0.15	0.13	0.12	0.10	0.10	
Stability at Low Temperature	Rated voltage (V)		6.3	10	16	25	35	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–40˚C / Z+20˚C	2	2	2	2	2	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours (φD ≦ 6.3 : 1000 hours) at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.							
	Capacitance change	Within ± 20% of initial value						
	tan δ	200% or less of initial specified value						
	Leakage current	Initial specified value or less						
Marking	Printed with white color letter on black sleeve.							

■Radial Lead Type



(No pressure relief vent for 7mmL products)

α	
	(L = 7) 1.0
	(L ≧11) 1.5

(mm)

φD	4	5	6.3	8	10
P	1.5	2.0	2.5	3.5	5.0
φd	0.45	0.45	0.5 (0.45)	0.6	0.6

( ) : Applied to 7mmL products

Type numbering system (Example : 10V 470µF)

1	2	3	4	5	6	7	8	9	10	11
U	H	C	1	A	4	7	1	M	P	D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (470µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
φ4 × 7L φ5 × 7L φ6.3 × 7L	DD	DH
6.3	ED	EH
8 · 10	PD	PH

※ Please contact to us if other configurations are required.

The laminated case is also available upon request.
Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

HC series

■Standard ratings

Cap.(μF)	Code	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (Ω MAX.) 20˚C / 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (Ω MAX.) 20˚C / 100kHz	10 (1A) Rated ripple (mA rms) 105˚C / 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (Ω MAX.) 20˚C / 100kHz	16 (1C) Rated ripple (mA rms) 105˚C / 100kHz
22	220				4 × 7	0.49	230	5 × 7	0.26	350
33	330	4 × 7	0.48	230	5 × 7	0.26	350	5 × 7	0.26	350
47	470	5 × 7	0.26	350	5 × 7	0.26	350	6.3 × 7	0.15	480
100	101	6.3 × 7	0.15	480	6.3 × 7	0.15	480	6.3 × 11	0.078	640
220	221	6.3 × 11	0.077	640	8 × 11.5	0.044	910	8 × 11.5	0.044	910
330	331	8 × 11.5	0.043	910	8 × 11.5	0.043	910	10 × 12.5	0.030	1230
470	471	8 × 11.5	0.043	910	10 × 12.5	0.030	1230	10 × 16	0.025	1650
1000	102	10 × 16	0.024	1650						

Cap. (μF)	Code	25 (1E) Case size φD × L (mm)	25 (1E) Impedance (Ω MAX.) 20˚C / 100kHz	25 (1E) Rated ripple (mA rms) 105˚C / 100kHz	35 (1V) Case size φD × L (mm)	35 (1V) Impedance (Ω MAX.) 20˚C / 100kHz	35 (1V) Rated ripple (mA rms) 105˚C / 100kHz
4.7	4R7				4 × 7	0.64	230
10	100	4 × 7	0.52	230	5 × 7	0.33	350
22	220	5 × 7	0.27	350	6.3 × 7	0.17	480
33	330	6.3 × 7	0.16	480	6.3 × 7	0.16	480
47	470	6.3 × 7	0.15	480	6.3 × 11	0.089	640
100	101	6.3 × 11	0.078	640	8 × 11.5	0.048	910
220	221	10 × 12.5	0.031	1230	10 × 16	0.026	1650
330	331	10 × 16	0.026	1650			

●Frequency coefficient of rated ripple current

Cap. (μF) \ Frequency	120Hz	1kHz	10kHz	100kHz
4.7 ~ 33	0.40	0.68	0.90	1.00
47 ~ 330	0.47	0.75	0.95	1.00
470 ~ 1000	0.55	0.85	0.98	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

HD

High Ripple Low Impedance

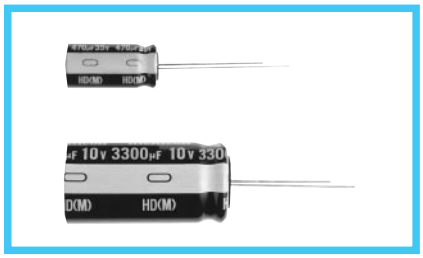
series

Z Low Impedance

Anti-Solvent Feature

- Lower impedance at high frequency range.
- Smaller case size and high ripple current.

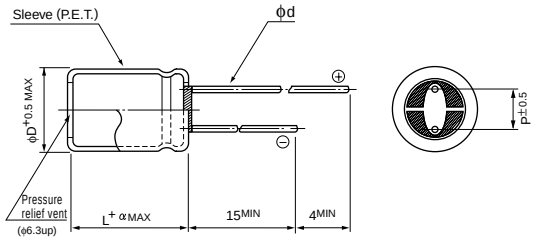
HC ← Low Impedance **HD**



■Specifications

Item	Performance Characteristics								
Category Temperature Range	–40 ~ +105˚C								
Rated Voltage Range	6.3 ~ 50V								
Rated Capacitance Range	22 ~ 6800μF								
Capacitance Tolerance	±20% at 120Hz, 20˚C								
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.								
tan δ	Rated voltage (V)		6.3	10	16	25	35	50	120Hz 20˚C
	tan δ (MAX.)		0.22	0.19	0.16	0.14	0.12	0.10	
	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.								
Stability at Low Temperature	Rated voltage (V)		6.3	10	16	25	35	50	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	2	2	2	2	2	2	
		Z–40˚C / Z+20˚C	3	3	3	3	3	3	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 5000 hours (φD ≦ 6.3 : 2000 hours, φD=8 : 3000 hours, φD=10 : 4000 hours) at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.								
	Capacitance change	Within ± 25% of initial value							
	tan δ	200% or less of initial specified value							
	Leakage current	Initial specified value or less							
Marking	Printed with white color letter on black sleeve.								

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

(mm)

φD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.5	0.6	0.6	※0.6	0.8

※In case L > 25 for the φ12.5 dia. unit, lead dia. φ d = 0.8mm.

Type numbering system (Example : 10V 3300μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	H	D	1	A	3	3	2	M	H	D	

- Size code
- Configuration ※
- Capacitance tolerance (± 20%)
- Rated Capacitance (3300μF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 · 16	HD	HH

※ Please contact to us if other configurations are required.

The laminated case is also available upon request.
Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

HD series

■Standard ratings

Cap.(μF)	Code	6.3 (0J) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz
100	101					5 × 11	0.30	1.0	250
150	151	5 × 11	0.30	1.0	250				
220	221					6.3 × 11	0.13	0.41	405
330	331	6.3 × 11	0.13	0.41	405				
470	471					8 × 11.5	0.072	0.22	760
560	561	8 × 11.5	0.072	0.22	760				
680	681					8 × 15	0.056	0.17	995
						▲10 × 12.5	0.053	0.16	1030
820	821	8 × 15	0.056	0.17	995				
1000	102	10 × 12.5	0.053	0.16	1030	8 × 20	0.041	0.13	1250
						▲10 × 16	0.038	0.12	1430
1200	122	8 × 20	0.041	0.13	1250	10 × 20	0.023	0.069	1820
		▲10 × 16	0.038	0.12	1430				
1500	152	10 × 20	0.023	0.069	1820	10 × 25	0.022	0.066	2150
2200	222	10 × 25	0.022	0.066	2150	12.5 × 20	0.021	0.053	2360
3300	332	12.5 × 20	0.021	0.053	2360	12.5 × 25	0.018	0.045	2770
3900	392	12.5 × 25	0.018	0.045	2770	12.5 × 31.5	0.016	0.041	3290
						▲16 × 20	0.018	0.045	3140
4700	472	12.5 × 31.5	0.016	0.041	3290	12.5 × 35.5	0.015	0.039	3400
5600	562	12.5 × 35.5	0.015	0.039	3400	16 × 25	0.016	0.043	3460
		▲16 × 20	0.018	0.045	3140				
6800	682	16 × 25	0.016	0.043	3460				

Cap. (μF)	Code	16 (1C) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz	25 (1E) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz
47	470					5 × 11	0.30	1.0	250
56	560	5 × 11	0.30	1.0	250				
100	101					6.3 × 11	0.13	0.41	405
120	121	6.3 × 11	0.13	0.41	405				
220	221					8 × 11.5	0.072	0.22	760
330	331	8 × 11.5	0.072	0.22	760	8 × 15	0.056	0.17	995
						▲10 × 12.5	0.053	0.16	1030
470	471	8 × 15	0.056	0.17	995	8 × 20	0.041	0.13	1250
		▲10 × 12.5	0.053	0.16	1030	▲10 × 16	0.038	0.12	1430
680	681	8 × 20	0.041	0.13	1250	10 × 20	0.023	0.069	1820
		▲10 × 16	0.038	0.12	1430				
820	821					10 × 25	0.022	0.066	2150
1000	102	10 × 20	0.023	0.069	1820	12.5 × 20	0.021	0.053	2360
1200	122	10 × 25	0.022	0.066	2150				
1500	152	12.5 × 20	0.021	0.053	2360	12.5 × 25	0.018	0.045	2770
1800	182					12.5 × 31.5	0.016	0.041	3290
						▲16 × 20	0.018	0.045	3140
2200	222	12.5 × 25	0.018	0.045	2770	12.5 × 35.5	0.015	0.039	3400
2700	272	12.5 × 31.5	0.016	0.041	3290	16 × 25	0.016	0.043	3460
		▲16 × 20	0.018	0.045	3140				
3300	332	12.5 × 35.5	0.015	0.039	3400				
3900	392	16 × 25	0.016	0.043	3460				

▲ : In this case, 6 will be put at 12th digit of type numbering system.

HD series

■Standard ratings

Cap.(μF)	Code	35 (1V) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz	50 (1H) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz
22	220					5 × 11	0.34	1.18	238
33	330	5 × 11	0.30	1.0	250				
56	560	6.3 × 11	0.13	0.41	405	6.3 × 11	0.14	0.50	385
100	101					8 × 11.5	0.074	0.22	724
120	121					8 × 15	0.061	0.18	950
150	151	8 × 11.5	0.072	0.22	760	10 × 12.5	0.061	0.18	979
180	181					8 × 20	0.046	0.14	1190
220	221	8 × 15	0.056	0.17	995	10 × 16	0.042	0.12	1370
		▲10 × 12.5	0.053	0.16	1030				
270	271	8 × 20	0.041	0.13	1250	10 × 20	0.030	0.090	1580
330	331	10 × 16	0.038	0.12	1430	10 × 25	0.028	0.085	1870
470	471	10 × 20	0.023	0.069	1820	12.5 × 20	0.027	0.068	2050
560	561	10 × 25	0.022	0.066	2150	12.5 × 25	0.023	0.059	2410
680	681	12.5 × 20	0.021	0.053	2360	12.5 × 31.5	0.021	0.052	2860
820	821					12.5 × 35.5	0.019	0.051	2960
						▲16 × 20	0.023	0.059	2730
1000	102	12.5 × 25	0.018	0.045	2770	16 × 25	0.021	0.056	3010
1200	122	12.5 × 31.5	0.016	0.041	3290				
		▲16 × 20	0.018	0.045	3140				
1500	152	12.5 × 35.5	0.015	0.039	3400				
1800	182	16 × 25	0.016	0.043	3460				

▲ : In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

Cap. (μF) \ Frequency	50Hz	120Hz	1kHz	10kHz	100kHz
22 ~ 33	0.45	0.55	0.75	0.90	1.00
39 ~ 330	0.60	0.70	0.85	0.95	1.00
390 ~ 1000	0.65	0.75	0.90	0.98	1.00
1200 ~ 6800	0.75	0.80	0.95	1.00	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

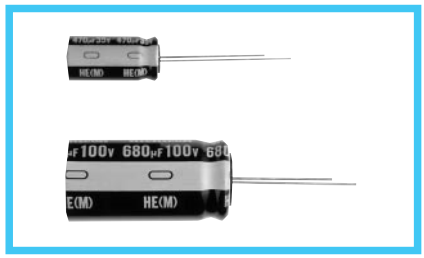
HE series

Miniature Sized, Low Impedance,High Reliability

Smaller | Low Impedance | Long Life | Anti-Solvent Feature

● Low impedance and high reliability withstanding 4000hours to 10000hours.

HD
Long Life
HE



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105˚C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	6.8 ~ 18000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.

tan δ

Rated voltage (V)	6.3	10	16	25	35	50	63	100	120Hz 20˚C
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF.

Stability at Low Temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100	120Hz
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	4	3	2	2	2	2	2	2	
	Z–40˚C / Z+20˚C	8	6	4	3	3	3	3	3	

Endurance

After an application of D.C. bias voltage plus the rated ripple current for stated in the below at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors shall meet the following requirements.

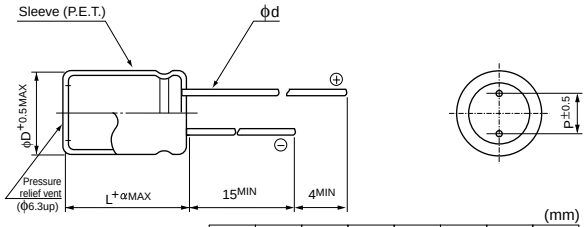
Case size		φD ≦ 6.3	φD = 8 , 10	φD ≧ 12.5
Rated voltage (V)	6.3 ~ 10WV	4000hours	6000hours	8000hours
	16 ~ 100WV	5000hours	7000hours	10000hours

Capacitance change	Within ±25% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life: After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking: Printed with white color letter on black sleeve.

■Radial Lead Type



(mm)

α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6※	0.8	0.8

※In case L > 25 for the φ12.5 dia. unit, lead dia. φd = 0.8mm

Type numbering system (Example : 10V 1000µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	H	E	1	A	1	0	2	M	P	D	

- Size code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (1000µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

● Frequency coefficient of rated ripple current

Cap. (µF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
6.8 ~ 33	0.45	0.55	0.70	0.90	1.00
39 ~ 330	0.60	0.70	0.85	0.95	1.00
390 ~ 1000	0.65	0.75	0.90	0.98	1.00
1200 ~ 18000	0.75	0.80	0.95	1.00	1.00

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

HE series

Standard ratings

Cap.(μF)	Code	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (Ω MAX.) 20˚C / 100kHz	6.3 (0J) Impedance (Ω MAX.) –10˚C / 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (Ω MAX.) 20˚C / 100kHz	10 (1A) Impedance (Ω MAX.) –10˚C / 100kHz	10 (1A) Rated ripple (mA rms) 105˚C / 100kHz
100	101					5 × 11	0.58	2.3	210
150	151	5 × 11	0.58	2.3	210				
220	221					6.3 × 11	0.22	0.87	340
330	331	6.3 × 11	0.22	0.87	340				
470	471					8 × 11.5	0.13	0.52	640
680	681	8 × 11.5	0.13	0.52	640	8 × 15	0.087	0.35	840
						▲ 10 × 12.5	0.080	0.32	865
820	821	10 × 12.5	0.080	0.32	865				
1000	102	8 × 15	0.087	0.35	840	8 × 20	0.069	0.27	1050
						▲ 10 × 16	0.060	0.24	1210
1200	122	8 × 20	0.069	0.27	1050	10 × 20	0.046	0.18	1400
		▲10 × 16	0.060	0.24	1210				
1500	152	10 × 20	0.046	0.18	1400	10 × 25	0.042	0.17	1650
						▲ 12.5 × 15	0.049	0.16	1450
1800	182	12.5 × 15	0.049	0.16	1450				
2200	222	10 × 25	0.042	0.17	1650	10 × 31.5	0.031	0.12	1910
						▲ 12.5 × 20	0.035	0.12	1900
						● 16 × 15	0.042	0.12	1940
2700	272	▲10 × 31.5	0.031	0.12	1910	18 × 15	0.043	0.11	2210
		16 × 15	0.042	0.12	1940				
3300	332	12.5 × 20	0.035	0.12	1900	12.5 × 25	0.027	0.089	2230
3900	392	12.5 × 25	0.027	0.089	2230	12.5 × 31.5	0.024	0.078	2650
		▲ 18 × 15	0.043	0.11	2210	▲ 16 × 20	0.027	0.078	2530
4700	472	12.5 × 31.5	0.024	0.078	2650	12.5 × 35.5	0.020	0.065	2880
5600	562	12.5 × 35.5	0.020	0.065	2880	12.5 × 40	0.017	0.056	3350
		▲16 × 20	0.027	0.078	2530	▲ 16 × 25	0.021	0.060	2930
						● 18 × 20	0.026	0.067	2860
6800	682	12.5 × 40	0.017	0.056	3350	16 × 31.5	0.017	0.050	3450
		▲16 × 25	0.021	0.060	2930				
		●18 × 20	0.026	0.067	2860	▲ 18 × 25	0.019	0.049	3140
8200	822	16 × 31.5	0.017	0.050	3450	16 × 35.5	0.015	0.044	3610
						▲ 18 × 31.5	0.015	0.040	4170
10000	103	16 × 35.5	0.015	0.044	3610	16 × 40	0.013	0.038	4080
		▲18 × 25	0.019	0.049	3140	▲ 18 × 35.5	0.014	0.038	4220
12000	123	16 × 40	0.013	0.038	4080	18 × 40	0.012	0.032	4280
		▲18 × 31.5	0.015	0.040	4170				
15000	153	18 × 35.5	0.014	0.038	4220				
18000	183	18 × 40	0.012	0.032	4280				

▲: In this case, 6 will be put 12th digit type numbering system.
●: In this case, 3 will be put 12th digit type numbering system.

HE series

Standard ratings

Cap.(μF)	Code	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (Ω MAX.) 20˚C / 100kHz	16 (1C) Impedance (Ω MAX.) –10˚C / 100kHz	16 (1C) Rated ripple (mA rms) 105˚C / 100kHz	25 (1E) Case size φD × L (mm)	25 (1E) Impedance (Ω MAX.) 20˚C / 100kHz	25 (1E) Impedance (Ω MAX.) –10˚C / 100kHz	25 (1E) Rated ripple (mA rms) 105˚C / 100kHz
47	470					5 × 11	0.58	2.3	210
56	560	5 × 11	0.58	2.3	210				
100	101					6.3 × 11	0.22	0.87	340
120	121	6.3 × 11	0.22	0.87	340				
220	221					8 × 11.5	0.13	0.52	640
330	331	8 × 11.5	0.13	0.52	640	8 × 15	0.087	0.35	840
						▲ 10 × 12.5	0.080	0.32	865
470	471	8 × 15	0.087	0.35	840	8 × 20	0.069	0.27	1050
		▲ 10 × 12.5	0.080	0.32	865	▲ 10 × 16	0.06	0.24	1210
680	681	8 × 20	0.069	0.27	1050	10 × 20	0.046	0.18	1400
		▲ 10 × 16	0.060	0.24	1210	▲ 12.5 × 15	0.049	0.16	1450
820	821					10 × 25	0.042	0.17	1650
1000	102	10 × 20	0.046	0.18	1400	10 × 31.5	0.031	0.12	1910
		▲ 12.5 × 15	0.049	0.16	1450	▲ 12.5 × 20	0.035	0.12	1900
						● 16 × 15	0.042	0.12	1940
1200	122	10 × 25	0.042	0.17	1650	18 × 15	0.043	0.11	2210
1500	152	10 × 31.5	0.031	0.12	1910	12.5 × 25	0.027	0.089	2230
		▲ 12.5 × 20	0.035	0.12	1900				
		● 16 × 15	0.042	0.12	1940				
1800	182					12.5 × 31.5	0.024	0.078	2650
						▲ 16 × 20	0.027	0.078	2530
2200	222	12.5 × 25	0.027	0.089	2230	12.5 × 35.5	0.020	0.065	2880
		▲ 18 × 15	0.043	0.11	2210	▲ 18 × 20	0.026	0.067	2860
2700	272	12.5 × 31.5	0.024	0.078	2650	12.5 × 40	0.017	0.056	3350
		▲ 16 × 20	0.027	0.078	2530	▲ 16 × 25	0.021	0.060	2930
3300	332	12.5 × 35.5	0.020	0.065	2880	16 × 31.5	0.017	0.050	3450
						▲ 18 × 25	0.019	0.049	3140
3900	392	12.5 × 40	0.017	0.056	3350	16 × 35.5	0.015	0.044	3610
		▲ 16 × 25	0.021	0.060	2930				
		● 16 × 20	0.026	0.067	2860	▲ 18 × 31.5	0.015	0.040	4170
4700	472	16 × 31.5	0.017	0.050	3450	16 × 40	0.013	0.038	4080
		▲ 18 × 25	0.019	0.049	3140	▲ 18 × 35.5	0.014	0.038	4220
5600	562	16 × 35.5	0.015	0.044	3610	18 × 40	0.012	0.032	4280
		▲ 18 × 31.5	0.015	0.040	4170				
6800	682	16 × 40	0.013	0.038	4080				
8200	822	18 × 35.5	0.014	0.038	4220				
10000	103	18 × 40	0.012	0.032	4280				

▲ : In this case, 6 will be put 12th digit type numbering system.
● : In this case, 3 will be put 12th digit type numbering system.

HE series

Standard ratings

Cap.(μF)	Code	35 (1V) Case size φD × L (mm)	35 (1V) Impedance (Ω MAX.) 20˚C / 100kHz	35 (1V) Impedance (Ω MAX.) –10˚C / 100kHz	35 (1V) Rated ripple (mA rms) 105˚C / 100kHz	50 (1H) Case size φD × L (mm)	50 (1H) Impedance (Ω MAX.) 20˚C / 100kHz	50 (1H) Impedance (Ω MAX.) –10˚C / 100kHz	50 (1H) Rated ripple (mA rms) 105˚C / 100kHz
22	220					5 × 11	0.70	2.8	180
33	330	5 × 11	0.58	2.3	210				
47	470								
56	560	6.3 × 11	0.22	0.87	340	6.3 × 11	0.30	1.2	295
100	101					8 × 11.5	0.17	0.68	555
120	121					8 × 15	0.12	0.48	730
150	151	8 × 11.5	0.13	0.52	640	10 × 12.5	0.12	0.48	760
180	181					8 × 20	0.091	0.36	910
220	221	8 × 15	0.087	0.35	840	10 × 16	0.084	0.34	1050
		▲10 × 12.5	0.080	0.32	865				
270	271	8 × 20	0.069	0.27	1050	10 × 20	0.060	0.24	1220
						▲12.5 × 15	0.061	0.20	1260
330	331	10 × 16	0.060	0.24	1210	10 × 25	0.055	0.22	1440
470	471	10 × 20	0.046	0.18	1400	10 × 31.5	0.043	0.17	1690
		▲12.5 × 15	0.049	0.16	1450	▲12.5 × 20	0.045	0.15	1660
						● 16 × 15	0.055	0.17	1690
560	561	10 × 25	0.042	0.17	1650	12.5 × 25	0.034	0.11	1950
						18 × 15	0.054	0.15	1930
680	681	10 × 31.5	0.031	0.12	1910	12.5 × 31.5	0.030	0.10	2310
		▲12.5 × 20	0.035	0.12	1900				
		● 16 × 15	0.042	0.12	1940				
820	821					12.5 × 35.5	0.025	0.083	2510
						▲16 × 20	0.034	0.10	2210
1000	102	12.5 × 25	0.027	0.089	2230	12.5 × 40	0.021	0.069	2920
		▲18 × 15	0.043	0.11	2210	▲16 × 25	0.025	0.075	2555
						●18 × 20	0.036	0.097	2490
1200	122	12.5 × 31.5	0.024	0.078	2650	16 × 31.5	0.022	0.066	3010
		▲16 × 20	0.027	0.078	2530	▲18 × 25	0.026	0.070	2740
1500	152	12.5 × 35.5	0.020	0.065	2880	16 × 35.5	0.019	0.057	3150
1800	182	12.5 × 40	0.017	0.056	3350	16 × 40	0.016	0.048	3710
		▲16 × 25	0.021	0.060	2930				
		●18 × 20	0.026	0.067	2860	▲18 × 31.5	0.021	0.057	3635
2200	222	16 × 31.5	0.017	0.050	3450	▲18 × 35.5	0.017	0.046	3680
		▲ 18 × 25	0.019	0.049	3140				
2700	272	16 × 35.5	0.015	0.044	3610	18 × 40	0.014	0.038	3800
		▲18 × 31.5	0.015	0.040	4170				
3300	332	16 × 40	0.013	0.038	4080				
		▲18 × 35.5	0.014	0.038	4220				
3900	392	18 × 40	0.012	0.032	4280				

▲ : In this case, 6 will be put 12th digit type numbering system.
● : In this case, 3 will be put 12th digit type numbering system.

HE series

■Standard ratings

Cap.(μF)	Code	63 (1J) Case size φD × L (mm)	63 (1J) Impedance (Ω MAX.) 20˚C / 100kHz	63 (1J) Impedance (Ω MAX.) –10˚C / 100kHz	63 (1J) Rated ripple (mA rms) 105˚C / 100kHz	100 (2A) Case size φD × L (mm)	100 (2A) Impedance (Ω MAX.) 20˚C / 100kHz	100 (2A) Impedance (Ω MAX.) –10˚C / 100kHz	100 (2A) Rated ripple (mA rms) 105˚C / 100kHz
6.8	6R8					5 × 11	2.3	9.3	55
15	150	5 × 11	2.3	9.3	55	6.3 × 11	1.2	5.0	115
27	270					8 × 11.5	0.63	2.8	232
33	330	6.3 × 11	1.2	5.0	115				
39	390					8 × 15	0.45	2.1	300
47	470					10 × 12.5	0.43	1.8	288
56	560	8 × 11.5	0.63	2.8	232	8 × 20	0.33	1.6	362
68	680					10 × 16	0.31	1.5	357
82	820	8 × 15	0.45	2.1	300	10 × 20	0.21	0.94	466
		▲10 × 12.5	0.43	1.8	288	▲12.5 × 15	0.23	1.1	466
100	101					10 × 25	0.20	0.84	531
120	121	8 × 20	0.33	1.6	362	10 × 31.5	0.15	0.71	663
		▲10 × 16	0.31	1.5	357	▲12.5 × 20	0.16	0.64	690
150	151					16 × 15	0.14	0.66	795
180	181	10 × 20	0.21	0.94	466	12.5 × 25	0.12	0.45	784
		▲12.5 × 15	0.23	1.1	466	▲18 × 15	0.12	0.50	920
220	221	10 × 25	0.20	0.84	531	12.5 × 31.5	0.10	0.42	905
						▲16 × 20	0.091	0.38	1040
270	271	10 × 31.5	0.15	0.71	663	12.5 × 35.5	0.083	0.35	1050
		▲12.5 × 20	0.16	0.64	690				
		● 16 × 15	0.14	0.66	795	▲16 × 25	0.073	0.27	1250
330	331	12.5 × 25	0.12	0.45	784	12.5× 40	0.071	0.30	1180
						▲18 × 20	0.080	0.30	1240
390	391	18 × 15	0.12	0.50	920	16 × 31.5	0.054	0.20	1570
						▲18 × 25	0.057	0.21	1490
470	471	12.5 × 31.5	0.10	0.42	905	16 × 35.5	0.045	0.17	1790
		▲16 × 20	0.091	0.38	1040	▲18 × 31.5	0.047	0.17	1630
560	561	12.5 × 35.5	0.083	0.35	1050	16 × 40	0.040	0.15	2020
		▲16 × 25	0.073	0.27	1250				
680	681	12.5 × 40	0.071	0.30	1180	18 × 35.5	0.040	0.15	1790
		▲18 × 20	0.080	0.30	1240				
820	821	16 × 31.5	0.054	0.20	1570	18 × 40	0.036	0.13	2330
		▲18 × 25	0.057	0.21	1490				
1000	102	16 × 35.5	0.045	0.17	1790				
		▲18 × 31.5	0.047	0.17	1630				
1200	122	16 × 40	0.040	0.15	2020				
		▲18 × 35.5	0.040	0.15	1790				
1500	152	18 × 40	0.036	0.13	2330				

▲ : In this case, 6 will be put 12th digit type numbering system.
● : In this case, 3 will be put 12th digit type numbering system.

Custom-made Hybrid ICs

Nichicon can design and manufacture custom-made Hybrid ICs with special function, shape and rational design, based on the specific circuitry from the customer.
Hybrid ICs "Hi-Net" is available with either miniature molded semiconductors or chip-bonded semiconductors for high density mounting.

Custom-made "Hi-Net" is to be designed and manufactured in the following stages:

Customer	Nichicon	
Planning of new model	Inquiry	Inquiring with circuit drawing, specific parts required, quantity basis, delivery schedule.
Study	Quotation	Pricing, structure, shape, dimension, etc. (Generally within 5 days)
Designing	Sample order	Start of designing, Information on test method/regulations function of circuit requested.
Trial production	Sample submission	Generally 10 pcs. of samples are to be submitted. (Generally within 3 weeks)
Preparation for mass production	Approval of specifications	In case samples found good, final specifications for approval are to be submitted.
Pre-production	Sample delivery for pre-production	Final approval on samples and specifications

	INDISPENSABLE INFORMATION	NEEDFUL INFORMATION	INFORMATION FOR A MORE STRICT ESTIMATE
CIRCUIT INFORMATION	• CIRCUIT DRAWING • SPECIFIC PARTS SHOULD BE USED • QUANTITY BASIS	• PART CAN BE SUBSTITUTE • DESCRIPTION OF CIRCUIT FUNCTION • TEST METHOD / REGULATION SPECIFICATION	• CIRCUIT DRAWING SURROUNDING TO THE SUBJECTED CIRCUIT • DESCRIPTION OF SYSTEM FUNCTION
STRUCTURE INFORMATION	• STRUCTURE, DIMENSION, SHAPE, REQUIREMENTS	• PIN LAYOUT • APPLICABLE SPECIFICATION (UL, ETC.) • MARKING REQUIREMENT • APPEARANCE REQUIREMENT	• INFORMATION OF SPACE SURROUNDING THE POSITION THAT HYBRID IC WILL BE INSTALLED • STRUCTURE INFORMATION OF THE WHOLE UNIT
RELIABILITY REQUIREMENT INFORMATION	• PURPOSE OF USE	• AMBIENT CONDITIONS INFORMATION • QUALITY ASSURANCE REQUIREMENT • SCREENING REQUIREMENT	• WHETHER SPECIAL CONTRACT IS REQUIRED
PRODUCTION INFORMATION	• ANNUAL USAGE • MASS-PRODUCTION STARTING DATE	• TARGET LIFE TIME • DEVELOPING SCHEDULE • NEW PROJECT OR CURRENT MODEL	• TOTAL USAGE OF OTHER UNIT INCLUDED • PAST USAGE

Notice:
Confidential information given by the customer will be strictly kept secret without permission in writing.

Standard Type DC-DC Converter (1.5W・3W・6W・10W)

We can comply with various types of converters including DIP type and SIP type.

Characteristics

(1) Thin and lightweight
(2) Excellent heat radiation and miniaturization due to alumina substrate
(3) Excellent isolation ability between input and output
(4) No attachment necessary
(5) Circuit with built-in excess current protection

Specification

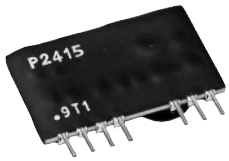
Output Power	Input Voltage	Output Voltage	Output Current	Efficiency	Part Number	Style code B	Style code C	Style code D	Style code E
1.5W	4.5 ~ 7.2V (5V$_{TYP}$)	5V	300mA	68%	ZHRM1R50505□	■	■	■	
		12V	125mA	70%	0512□				
		15V	100mA	71%	0515□				
	8 ~ 16.5V (12V$_{TYP}$)	5V	300mA	72%	1205□	■	■	■	
		12V	125mA	73%	1212□				
		15V	100mA	74%	1215□				■
	18 ~ 32V (24V$_{TYP}$)	5V	300mA	73%	2405□	■	■	■	
		12V	125mA	76%	2412□				
		15V	100mA	76%	2415□				■
	4.5 ~ 7.2V (5V$_{TYP}$)	±12V	±63mA	70%	ZHRP1R50512□				
		±15V	±50mA	68%	0515□				■
	8 ~ 16.5V (12V$_{TYP}$)	±12V	±63mA	71%	1212□				
		±15V	±50mA	73%	1215□				
	18 ~ 32V (24V$_{TYP}$)	±12V	±63mA	72%	2412□				
		±15V	±50mA	74%	2415□				■
3W	4.5 ~ 7.2V (5V$_{TYP}$)	5V	600mA	72%	ZHRM0300505□	■	■	■	
		12V	250mA	77%	0512□				
		15V	200mA	77%	0515□				
	8 ~ 16.5V (12V$_{TYP}$)	5V	600mA	74%	1205□	■	■	■	
		12V	250mA	80%	1212□				
		15V	200mA	80%	1215□				
	18 ~ 32V (24V$_{TYP}$)	5V	600mA	76%	2405□	■	■	■	
		12V	250mA	81%	2412□				
		15V	200mA	81%	2415□				
	4.5 ~ 7.2V (5V$_{TYP}$)	±12V	±125mA	72%	ZHRP0300512□				
		±15V	±100mA	75%	0515□				
	8 ~ 16.5V (12V$_{TYP}$)	±12V	±125mA	74%	1212□				
		±15V	±100mA	75%	1215□				
	18 ~ 32V (24V$_{TYP}$)	±12V	±125mA	74%	2412□				
		±15V	±100mA	76%	2415□				
6W	4.5 ~ 7.2V (5V$_{TYP}$)	5V	1.0A	76%	ZHRM0600505C	—		—	—
		12V	0.5A	76%	0512C				
		15V	0.4A	76%	0515C				
	8 ~ 16.5V (12V$_{TYP}$)	5V	1.2A	82%	1205C				
		12V	0.5A	84%	1212C				
		15V	0.4A	84%	1215C				
	18 ~ 32V (24V$_{TYP}$)	5V	1.2A	83%	2405C				
		12V	0.5A	86%	2412C				
		15V	0.4A	86%	2415C				
	4.5 ~ 7.2V (5V$_{TYP}$)	±12V	±0.25A	79%	ZHRP0600512C				
		±15V	±0.20A	79%	0515C				
	8 ~ 16.5V (12V$_{TYP}$)	±12V	±0.25A	84%	1212C				
		±15V	±0.20A	84%	1215C				
	18 ~ 32V (24V$_{TYP}$)	±12V	±0.25A	85%	2412C				
		±15V	±0.20A	85%	2415C				
10W	4.5 ~ 7.2V (5V$_{TYP}$)	5V	1.60A	76%	ZHRM1000505C	—		—	—
		12V	0.70A	76%	0512C				
		15V	0.60A	76%	0515C				
	8 ~ 16.5V (12V$_{TYP}$)	5V	2.00A	83%	1205C				
		12V	0.84A	83%	1212C				
		15V	0.67A	83%	1215C				
	18 ~ 32V (24V$_{TYP}$)	5V	2.00A	84%	2405C				
		12V	0.84A	84%	2412C				
		15V	0.67A	84%	2415C				
	4.5 ~ 7.2V (5V$_{TYP}$)	±12V	±0.35A	79%	ZHRP1000512C				
		±15V	±0.30A	79%	0515C				
	8 ~ 16.5V (12V$_{TYP}$)	±12V	±0.42A	84%	1212C				
		±15V	±0.34A	85%	1215C				
	18 ~ 32V (24V$_{TYP}$)	±12V	±0.42A	84%	2412C				
		±15V	±0.34A	85%	2415C				

□: Style code Except ■: Accept an order

Output Power	Style No.	Measurement L	Measurement W	Measurement H	Measurement S	Style Code
1.5W	①	26.5$^{\pm0.2}$	17.4$^{\pm0.2}$	8.1^{MAX}	24.95$^{\pm0.5}$	B
	②	28.0^{MAX}	18.7^{MAX}	8.8^{MAX}	24.95$^{\pm0.5}$	C
	③	26.0^{MAX}	16.5^{MAX}	7.3^{MAX}	24.95$^{\pm0.5}$	D
	④	—	26.5^{MAX}	18.0^{MAX}	—	E
		T=10.5MAX (Single Output) T= 9.0MAX (Double Output)				
3W	①	34.5$^{\pm0.2}$	24.7$^{\pm0.2}$	8.8^{MAX}	32.95$^{\pm0.5}$	B
	②	36.0^{MAX}	26.0^{MAX}	9.5^{MAX}	32.95$^{\pm0.5}$	C
	③	34.0^{MAX}	23.5^{MAX}	7.5^{MAX}	32.95$^{\pm0.5}$	D
	④	—	29.5^{MAX}	21.0^{MAX}	—	E
		T=11.0MAX				
6W	②	40.5$^{\pm0.5}$	25.8$^{\pm0.5}$	11.5^{MAX}	37.45$^{\pm0.5}$	C
10W	②	41.0$^{\pm0.5}$	31.8$^{\pm0.5}$	13.5^{MAX}	37.45$^{\pm0.5}$	C

Output Tolerance : ±5%
Over Current Protection : Functions at 105% or more of the rated output current・Automatically restored
Withstanding Voltage : Between input and output AC500V for 1minute 5mA

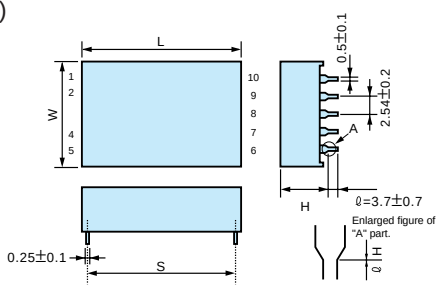
Insulation Resistance : Between input and output terminals DC500V, more than 100MΩ (25˚C 70%)
Operating Temperature/Humidity : -10 ~ +71˚C 20 ~ 95%RH (No dewdrops)
Storage Temperature/Humidity : -40 ~ +85˚C 20 ~ 95%RH (No dewdrops)



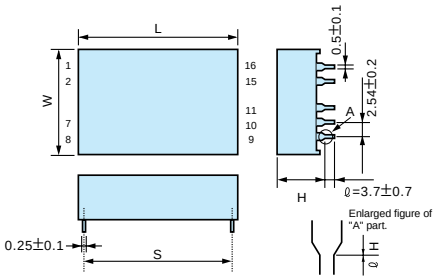
Exterior and Measurement Map

DIP Type

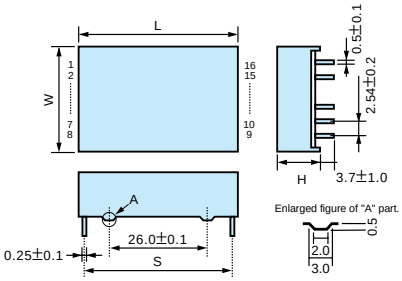
(1.5W)



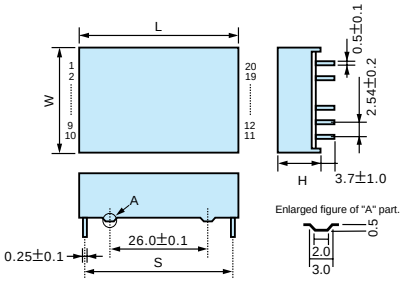
(3W)



(6W)



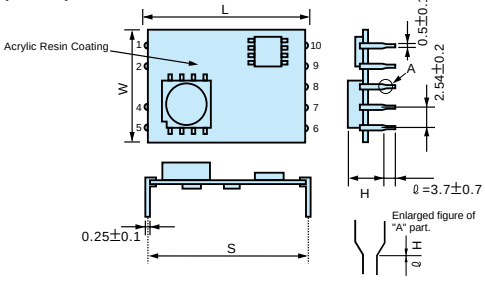
(10W)



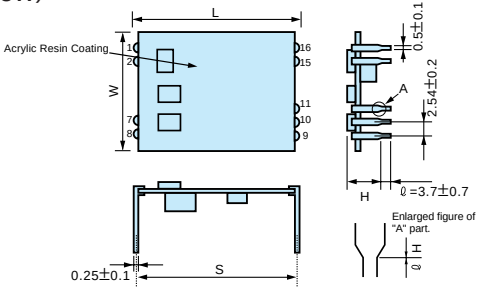
①Resin Case
- 1.5W・3W Only
- Flow Compliant

②Steel Cover
- Reduce Radiation Noise

(1.5W)



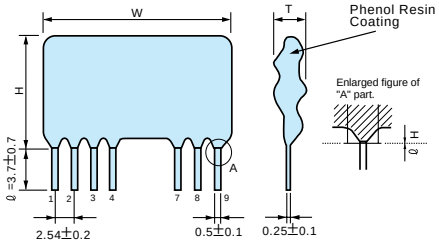
(3W)



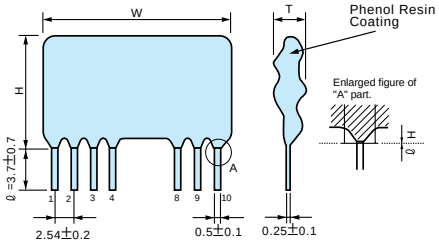
③Resin Coating
- Low Cost
- DIP Style

SIP Type

(1.5W)



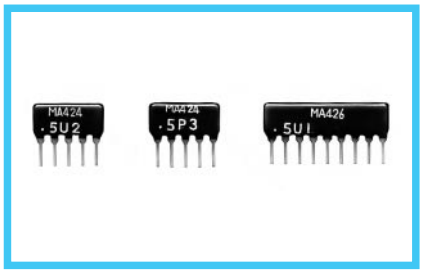
(3W)



④Resin Coating
- Low Cost
- Horizontal Type, Space Saver

Diode Arrays

High-speed switching diode arrays are of NICHICON's standard series. They are combined to be conveniently used for both binary and decimal systems. High-speed series is ideal for computer peripherals, control boards and general electronic appliances.
These series are in stock for prompt delivery. Any special requirements with customer's particular circuits will be also welcome. Please consult us for the details.
(Samples for the items listed below are not always available on stock. Please contact our sales office for details together with your specific requirements.)



■ High-speed switching diode array series

● Absolute maximum ratings ※

Items	Symbol	Ratings
Peak reverse voltage	V_{RM}	40V
DC reverse voltage	V_R	40V
Surge current (1μs)	I_{FSM}	4.0A
Peak forward current	I_{FM}	300mA
Average rectified current	I_0	100mA
Storage temperature	T_{stg}	–25 ~ +85°C

※ 100mA for simultaneous energizing.

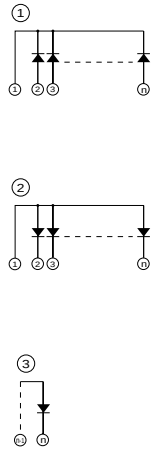
● Electrical characteristics

Ta : +25°C

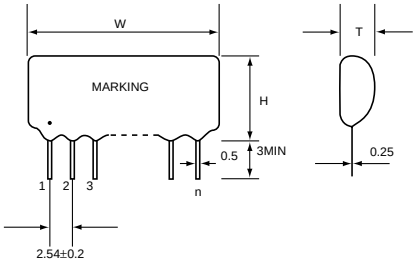
Items	Symbol	Conditions	Rating			Unit
			Min.	Typ.	Max.	
Reverse current	I_R	V_R=40V	—	—	0.5	μA
Forward voltage	V_{F1}	I_F=10mA	—	0.7	1.0	V
Forward voltage	V_{F2}	I_F=50mA	—	0.79	1.0	V
Forward voltage	V_{F3}	I_F=100mA	—	0.85	1.2	V
Reverse recovery time	t_{rr}	I_F=10mA, V_R=6V	—	—	4.0	ns

● Series List

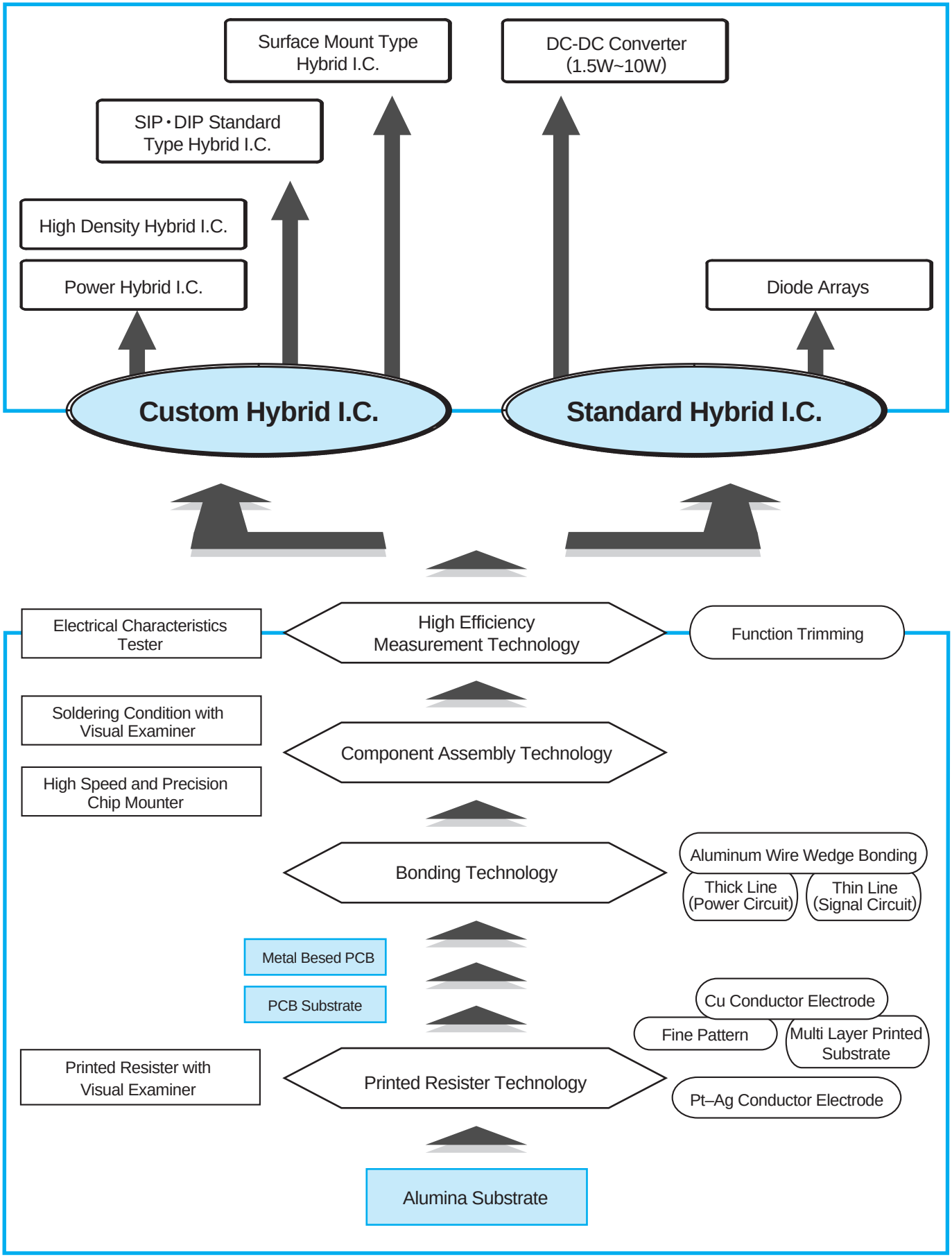
Code	Type	Number of diodes	Common electrode	Dimensions (m/m Max.) W	H	T	No.of Pins n	Circuit diagram
ZHMA0423	MA423	4	Cathode	14	9	3.5	5	①
ZHMA0424	MA424		Anode					②
ZHMA0425	MA425	8	Cathode	24	9	3.5	9	①
ZHMA0426	MA426		Anode					②
ZHMA0427	MA427	10	Cathode	29	9	3.5	11	①
ZHMA0428	MA428		Anode					②
ZHMA0429	MA429	5	Isolated	27	9	3.5	10	③
ZHMA0430	MA430	4	Isolated	21.5	9	3.5	8	③
ZHMA0431	MA431	6	Cathode	19	9	3.5	7	①
ZHMA0432	MA432		Anode					②



● Drawing



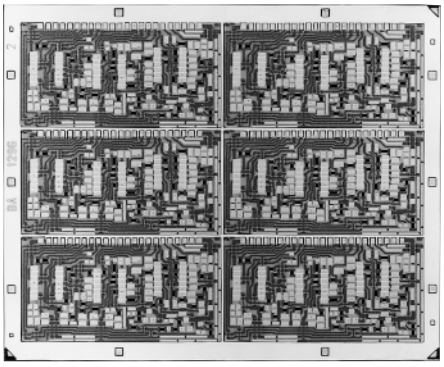
General Descriptions of Hybird I.C.s



Hybrid IC Technologies

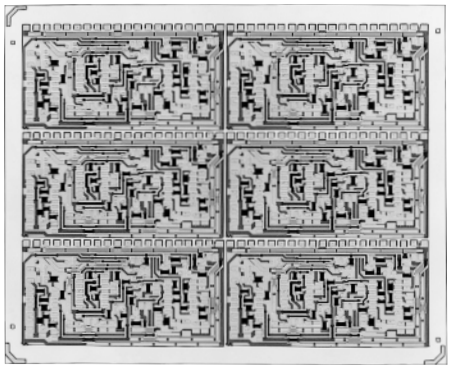
Copper Line

- It is the most suitable material for the circuits that require high frequency and current.
- High-density circuits such as fine pattern and multi layer printing can minimize the sizes of the products.
- Since metal migration does not occur, copper is highly reliable.



Platinum / Silver Line

- Platinum and silver lines are frequently used for automobiles since they have high performance of withstanding heat cycle and are highly reliable.



Printed Resistor Technology

- It is possible to create highly efficient thick film resistors by introducing the ruthenium oxide.
- The printing machine with visual examiner offers high reliability.

Bonding Technology

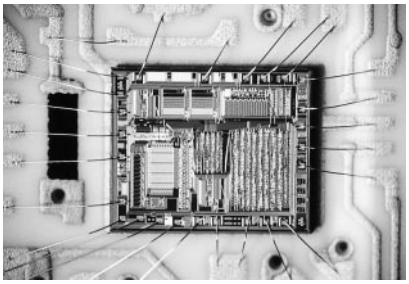
When semiconductor chips are bonded and unified with surrounding circuits, it is possible to get ultra miniature and high-density modules.

Aluminum Wire Wedge Bonding

The diameter of wires can be selected according to the purpose or usage (25um~200um). Also, the aluminum wire can be bonded without applying heat.

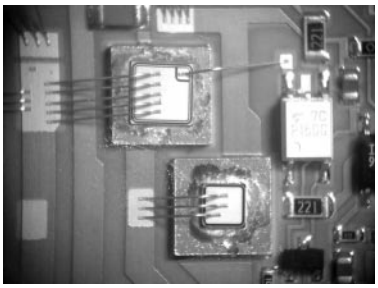
Signal Line Type

Due to the narrow wire pitch and low profile bonding, thin and high-density hybrid ICs, that are based on alumina board or printed board, can be achieved.



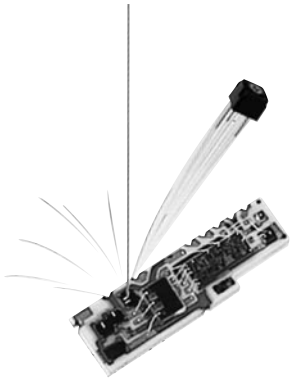
Power Line Type

It is possible to get a power module based on an alumina or a metal board, which is highly efficient in radiating heat.



Function Trimming

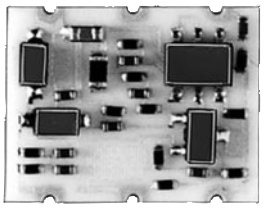
- By utilizing the highly efficient measurement technology, we laser-trim the registor in order to meet the required resistance value. By using function trimming, we can remove mechanical adjusters. This eliminates mechanical failures in sueface mount registors.
- By removing the mechanical adjuster, we can also achieve long term reliability, and it helps to save labors and eliminate a manufacturing process.



Various Technologies

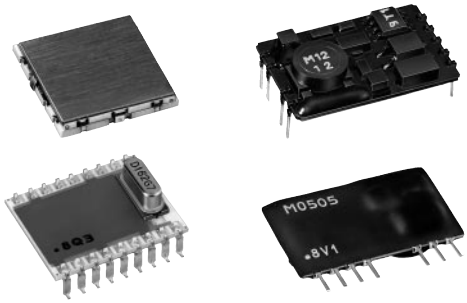
Mounting

By using a soldering condition tester, which checks mounting conditions and an efficient high speed chip mounter, we can achieve intricate and rapid soldering.



Structure

In addition to the SIP and DIP types, you can select from various types of package styles.
Also, we can customize according to your needs.



APPLICATION GUIDELINES FOR HYBRID I.C.s "Hi-Net"

General Observations

1. If parts are covered with a liquid—water, oil, etc., or any metallic material, this can cause part failure.
   Do not use the parts.
2. If voltage in excess of the rated voltage is applied the parts can fail and possibly flame out.
3. If parts are used with reactive gas, strong electrical field, or radioactive environment, parts will deteriorate greatly.

Notes on Usage

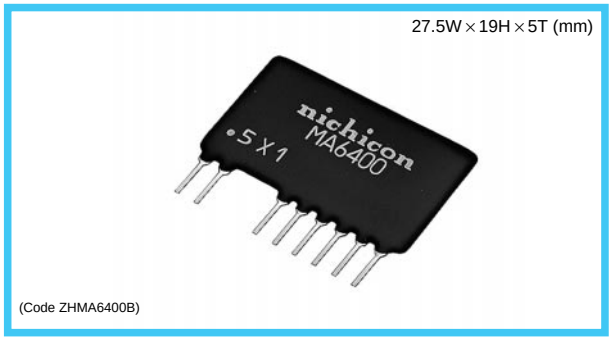
1. Please use parts within rated operating temperatures.
2. Please use parts within the rated voltages and applicable current.
3. Please use parts in a cooled down environment by using either heat sinks or fans to deflect heat.
4. Do not put excessive force onto the terminals.
5. Please use parts in stress-free environment with the exception of those meant to be bolted to the PC board.
6. Soldering conditions should be as follows: 260 degrees C maximum for no more than 5 seconds and cool down quickly to room temperatures.
   Take special precaution in controlling soldering conditions because the solder can very adversely affect the hybrid IC.
7. The part reliability will vary due to the environmental conditions of the application.
   Please verify the quality by testing the parts in actual environmental conditions.
8. Please use parts in accordance with the individual drawings.
9. Please use these parts with some protection against personal injury from possible fire.

Notes on Storage

Please store parts at normal room temperature, humidity and barometric pressure.

Hybrid I.C. for Control Circuit of Power Supply

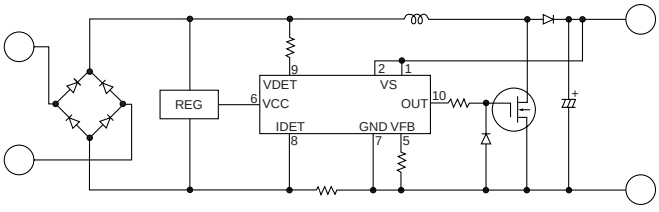
Higher Harmonics (MA6400B)



■Feature

This control circuit suited for power supplies and inverters for the higher harmonics application.
Very high power factor improvement can be obtained by boosting chopper circuitry.

■Applied circuit



ALUMINUM ELECTROLYTIC CAPACITORS

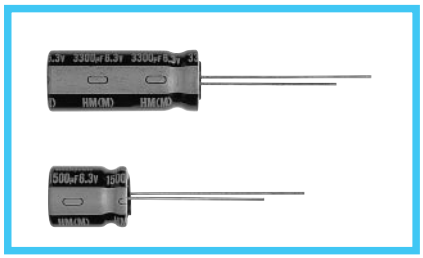
nichicon

HM

Low Impedance

series

Smaller | Low Impedance | Anti-Solvent Feature



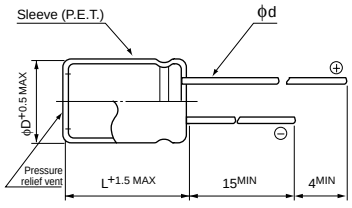
● Lower impedance than HD,HC series.

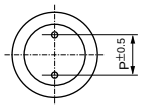
HM ← Low Impedance — HD

■Specifications

Item	Performance Characteristics				
Category Temperature Range	—40 ~ +105˚C				
Rated Voltage Range	6.3 ~ 16V				
Rated Capacitance Range	330 ~ 12000µF				
Capacitance Tolerance	±20% (120Hz, 20˚C)				
Leakage Current	After 2 minutes' application of rated voltage, leakage current is less than 0.03CV				
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF				
	Rated voltage (V)	6.3	10	16	120Hz 20˚C
	tan δ (MAX.)	0.22	0.19	0.16	
Stability at Low Temperature	Rated voltage (V)	6.3	10	16	120Hz
	Impedance ratio ZT / Z20 (MAX.) Z—40˚C / Z+20˚C	3	3	3	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.				
	Capacitance change	Within ±25% of initial value			
	tan δ	200% or less of initial specified value			
	Leakage current	Initial specified value or less			
Marking	Printed with white color black sleeve.				

■Radial Lead Type





φD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.6	0.8	0.8

Type numbering system (Example : 6.3V 1800µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	H	M	0	J	1	8	2	M	P	D	

- 12: Case Size Code
- 11: Configuration ※
- 10: Capacitance tolerance (±20%)
- 9: Rated Capacitance (1800µF)
- 8: Rated voltage (6.3V)
- 7: Series name
- 1: Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
8 · 10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

■Standard ratings

Cap.(µF)	Code	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (mΩ MAX.) 20˚C / 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (mΩ MAX.) 20˚C / 100kHz	10 (1A) Rated ripple (mA rms) 105˚C / 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (mΩ MAX.) 20˚C / 100kHz	16 (1C) Rated ripple (mA rms) 105˚C / 100kHz
330	331							8 × 11.5	30	1140
470	471				8 × 11.5	30	1140	8 × 11.5	30	1140
								▲ 10 × 12.5	25	1540
560	561	8 × 11.5	30	1140						
680	681				8 × 11.5	30	1140	10 × 12.5	25	1540
					▲ 10 × 12.5	25	1540	▲ 8 × 15	28	1490
								● 8 × 20	18	1870
								○ 10 × 16	18	2000
820	821	8 × 11.5	30	1140						
1000	102	8 × 15	28	1490	10 × 12.5	25	1540	10 × 16	18	2000
		▲10 × 12.5	25	1540	▲ 8 × 15	28	1490	▲ 8 × 20	18	1870
		● 8 × 11.5	30	1140	● 10 × 16	18	2000	● 10 × 20	13	2550
					○ 8 × 20	18	1870			
1200	122	8 × 15	28	1490						
1500	152	10 × 12.5	25	1540	10 × 16	18	2000	10 × 20	13	2550
		▲ 8 × 20	16	1950	▲ 8 × 20	18	1870			
		● 10 × 16	18	2000						
1800	182	10 × 16	19	2000	10 × 20	13	2550	10 × 25	12	2800
		▲ 8 × 20	16	1950				▲12.5 × 20	11	2800
2200	222	10 × 20	13	2550	10 × 25	12	2800			
		▲ 8 × 20	16	1950						
		● 10 × 16	18	2000						
2700	272	10 × 20	13	2550	12.5 × 20	11	3000	12.5 × 25	10	2900
3300	332	10 × 25	12	2800	12.5 × 25	10	2900	16 × 25	9	3070
		▲12.5 × 20	11	3000						
		○ 10 × 20	13	2550						
5600	562	12.5 × 25	10	2900				18 × 25	8	3250
6800	682				16 × 25	9	3070			
8200	822	16 × 25	9	3070	18 × 25	8	3250			
12000	123	18 × 25	8	3250						

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

▲ : In this case, 6 will be put at 12th digit of type numbering system.
● : In this case, 3 will be put at 12th digit of type numbering system.
○ : In this case, 9 will be put at 12th digit of type numbering system.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

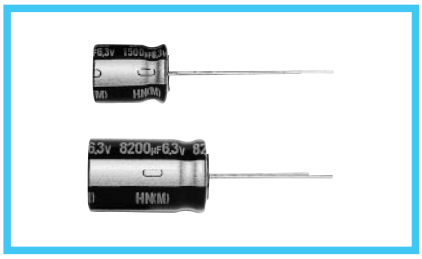
HN

Ultra Low Impedance series

Smaller | Low Impedance | Anti-Solvent Feature

● Lower impedance than HM series.

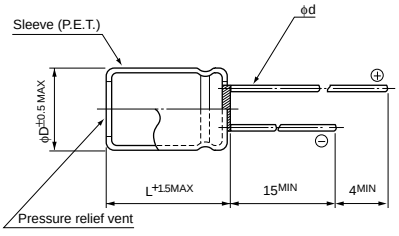
HN ← Low Impedance → HM

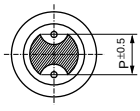


Specifications

Item	Performance Characteristics				
Category Temperature	—40 ~ +105˚C				
Rated Voltage Range	6.3 ~ 16V				
Rated Capacitance Range	330 ~ 8200μF				
Capacitance Tolerance	±20% (120Hz, 20˚C)				
Leakage Current	After 2 minutes' application of rated voltage, leakage current is less than 0.03CV				
tan δ	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF				
	Rated voltage (V)	6.3	10	16	120Hz
	tan δ (MAX)	0.22	0.19	0.16	20˚C
Stability at Low Temperature	Rated voltage (V)	6.3	10	16	120Hz
	Impedance ratio ZT / Z20 (MAX.) Z—40˚C / Z+20˚C	3	3	3	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.				
	Capacitance change	Within ±30% of initial value			
	tan δ	200% or less of initial specified value			
	Leakage current	Initial specified value or less			
Marking	Printed with gold color on black sleeve.				

Radial Lead Type





φD	8	10	12.5	16
P	3.5	5	5	7.5
φd	0.6	0.6	0.6	0.8

Type numbering system (Example : 6.3V 1800μF)

1 2 3 4 5 6 7 8 9 10 11 12

U H N 0 J 1 8 2 M P M

- Cace size code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated capacitance (1800μF)
- Rated voltage (6.3V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
8 · 10	PM	PJ
12.5 · 16	HM	HJ

※ Please contact to us if other configurations are required.

Standard ratings

Cap. (μF)	V (Code) / Item / Code	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (mΩ MAX.) 20˚C / 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (mΩ MAX.) 20˚C / 100kHz	10 (1A) Rated ripple (mA rms) 105˚C / 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (mΩ MAX.) 20˚C / 100kHz	16 (1C) Rated ripple (mA rms) 105˚C / 100kHz
330	331							8 × 11.5	21	1300
470	471				8 × 11.5	21	1300	8 × 11.5	21	1300
								▲ 10 × 12.5	18	1760
560	561	8 × 11.5	21	1300						
680	681				8 × 11.5	21	1300	10 × 12.5	18	1760
					▲ 10 × 12.5	18	1760	● 8 × 20	12	2220
								○ 10 × 16	11	2280
820	821	8 × 11.5	21	1300	10 × 12.5	18	1760	10 × 16	11	2280
1000	102	8 × 15	20	1700	10 × 12.5	18	1760	10 × 16	11	2280
		▲ 10 × 12.5	18	1760	● 10 × 16	11	2280	▲ 8 × 20	12	2220
					○ 8 × 20	12	2220	● 10 × 20	10	2900
1200	122	8 × 15	20	1700	10 × 16	11	2280	10 × 20	10	2900
1500	152	10 × 12.5	18	1760	10 × 16	11	2280	10 × 20	10	2900
		▲ 8 × 20	12	2220	▲ 8 × 20	12	2220			
		● 10 × 16	11	2280						
1800	182	10 × 16	11	2280	10 × 20	10	2900	10 × 25	9	3190
		▲ 8 × 20	12	2220				▲12.5 × 20	9	3190
2200	222	● 10 × 16	11	2280	10 × 25	9	3190	12.5 × 20	9	3190
		10 × 20	10	2900	▲12.5 × 20	9	3190	▲12.5 × 25	8	3370
2700	272	10 × 20	10	2900	12.5 × 20	9	3190	12.5 × 25	8	3370
3300	332	10 × 25	9	3190	12.5 × 25	8	3370	16 × 25	7	3610
		▲12.5 × 20	9	3190						
4700	472	12.5 × 20	9	3190	12.5 × 25	8	3370			
5600	562	12.5 × 25	8	3370	16 × 25	7	3610			
8200	822	16 × 25	7	3610						

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

▲ : In this case, 6 will be put at 12th digit of type numbering system.
● : In this case, 3 will be put at 12th digit of type numbering system.
○ : In this case, 9 will be put at 12th digit of type numbering system.

ALUMINUM ELECTROLYTIC CAPACITORS

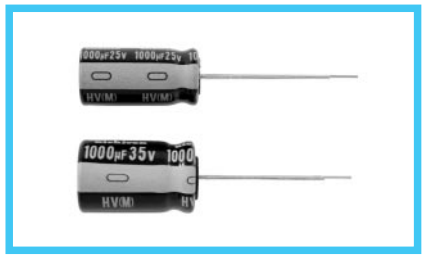
nichicon

HV High Ripple Low Impedance series

Smaller | Low Impedance | Long Life | Anti-Solvent Feature

- Lower impedance at high frequency range.
- Smaller case size and high ripple current.

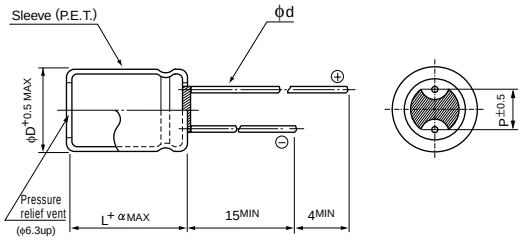
HD → Smaller → **HV**



■Specifications

Item	Performance Characteristics							
Category Temperature Range	–40 ~ +105˚C							
Rated Voltage Range	6.3 ~ 35V							
Rated Capacitance Range	47 ~ 8200µF							
Capacitance Tolerance	±20% at 120Hz, 20˚C							
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.							
tan δ	Rated voltage (V)		6.3	10	16	25	35	120Hz 20˚C
	tan δ (MAX.)		0.21	0.18	0.15	0.13	0.11	
	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF.							
Stability at Low Temperature	Rated voltage (V)		6.3	10	16	25	35	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	2	2	2	2	2	
		Z–40˚C / Z+20˚C	3	3	3	3	3	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 6000 hours (φD ≦ 6.3 : 5000 hours) at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.							
	Capacitance change	Within ± 25% of initial value (6.3V 10V : ±30%)						
	tan δ	200% or less of initial specified value						
	Leakage current	Initial specified value or less						
Marking	Printed with white color letter on black sleeve.							

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

(mm)

φD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8

Type numbering system (Example : 25V 150µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	H	V	1	E	1	5	1	M	E	D	

- Size code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (3300µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 ·10	PD	PH
12.5 ·16	HD	HH

※ Please contact to us if other configurations are required.

The laminated case is also available upon request.
Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

HV series

■Standard ratings

Cap.(μF)	Code	6.3 (0J) Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 100kHz	10 (1A) Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 100kHz	16 (1A) Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 100kHz
100	101									5 × 11	0.23	0.76	360
150	151					5 × 11	0.23	0.76	360	6.3 × 11	0.10	0.33	450
220	221	5 × 11	0.23	0.76	360	6.3 × 11	0.10	0.33	450	6.3 × 11	0.10	0.33	550
330	331	6.3 × 11	0.10	0.33	460	6.3 × 11	0.10	0.33	550	8 × 11.5	0.059	0.181	830
470	471	6.3 × 11	0.10	0.33	550	8 × 11.5	0.059	0.181	820	8 × 11.5	0.059	0.181	990
680	681	8 × 11.5	0.059	0.181	900	8 × 11.5	0.059	0.181	990	10 × 12.5	0.043	0.133	1360
										▲8 × 15	0.046	0.143	1330
820	821	8 × 11.5	0.059	0.181	990	10 × 12.5	0.043	0.133	1250	10 × 16	0.030	0.095	1650
1000	102	10 × 12.5	0.043	0.133	1250	10 × 12.5	0.043	0.133	1360	10 × 16	0.030	0.095	1815
						▲ 8 × 15	0.046	0.143	1330	8 × 20	0.031	0.105	1550
1200	122	10 × 12.5	0.043	0.133	1360	10 × 16	0.030	0.095	1650	10 × 20	0.019	0.057	1930
		▲8 × 15	0.046	0.143	1330								
1500	152	8 × 20	0.031	0.105	1550	10 × 16	0.030	0.095	1815	10 × 20	0.019	0.057	2160
						▲ 8 × 20	0.031	0.105	1550				
1800	182	10 × 16	0.030	0.095	1815	10 × 20	0.019	0.057	2160	10 × 25	0.017	0.051	2475
2200	222	10 × 20	0.019	0.057	2160	10 × 25	0.017	0.051	2475	12.5 × 20	0.016	0.041	2725
2700	272	10 × 25	0.017	0.051	2475	12.5 × 20	0.016	0.041	2450	12.5 × 25	0.014	0.036	3190
3300	332	12.5 × 20	0.016	0.041	2500	12.5 × 20	0.016	0.041	2725	12.5 × 31.5	0.012	0.031	3795
										▲16 × 20	0.014	0.036	3575
3900	392	12.5 × 20	0.016	0.041	2725	12.5 × 25	0.014	0.036	3190	12.5 × 35.5	0.011	0.029	3925
4700	472	12.5 × 25	0.014	0.036	3190	12.5 × 31.5	0.012	0.031	3795	16 × 25	0.012	0.033	3990
						▲16 × 20	0.014	0.036	3575				
5600	562	12.5 × 31.5	0.012	0.031	3795	12.5 × 35.5	0.011	0.029	3925				
6800	682	12.5 × 35.5	0.011	0.029	3925	16 × 25	0.012	0.033	3990				
		▲16 × 20	0.014	0.036	3575								
8200	822	16 × 25	0.012	0.033	3990								

Cap.(μF)	Code	25 (1E) Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 100kHz	35 (1V) Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 100kHz
47	470					5 × 11	0.23	0.76	360
68	680	5 × 11	0.23	0.76	360	6.3 × 11	0.10	0.33	450
100	101	6.3 × 11	0.10	0.33	450	6.3 × 11	0.10	0.33	550
150	151	6.3 × 11	0.10	0.33	550	8 × 11.5	0.059	0.181	820
220	221	8 × 11.5	0.059	0.181	810	8 × 11.5	0.059	0.181	990
270	271	8 × 11.5	0.059	0.181	900	8 × 15	0.046	0.143	1330
330	331	8 × 11.5	0.059	0.181	990	10 × 12.5	0.043	0.133	1360
390	391	8 × 15	0.046	0.143	1330	8 × 20	0.031	0.105	1550
470	471	10 × 12.5	0.043	0.133	1360	10 × 16	0.030	0.095	1815
560	561	8 × 20	0.031	0.105	1550	10 × 20	0.019	0.057	2160
680	681	10 × 16	0.030	0.095	1815	10 × 25	0.017	0.051	2475
820	821	10 × 20	0.019	0.057	2160	12.5 × 20	0.016	0.041	2725
1000	102	10 × 25	0.017	0.051	2475	12.5 × 20	0.016	0.041	2920
1200	122	12.5 × 20	0.016	0.041	2180	12.5 × 25	0.014	0.036	3190
1500	152	12.5 × 20	0.016	0.041	2725	12.5 × 31.5	0.012	0.031	3795
						▲16 × 20	0.014	0.036	3575
1800	182	12.5 × 25	0.014	0.036	3190	12.5 × 35.5	0.011	0.029	3925
2200	222	12.5 × 31.5	0.012	0.031	3795	16 × 25	0.012	0.033	3990
		▲16 × 20	0.014	0.036	3575				
2700	272	12.5 × 35.5	0.011	0.029	3925				
3300	332	16 × 25	0.012	0.033	3990				

▲ : In this case, 6 will be put at 12th digit of type numbering system.

● Frequency coefficient of rated ripple current

Cap. (μF) \ Frequency	120Hz	1kHz	10kHz	100kHz
47 ~ 150	0.40	0.75	0.90	1.00
220 ~ 560	0.50	0.85	0.94	1.00
680 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 3900	0.75	0.90	0.95	1.00
4700 ~ 8200	0.85	0.95	0.98	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

HZ

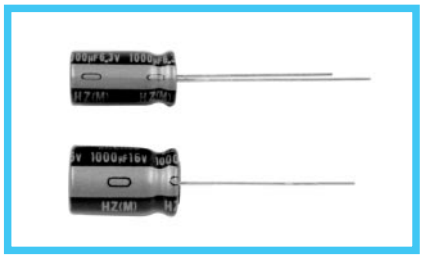
Ultra Low Impedance

series

Smaller | Low Impedance | Anti-Solvent Feature

● Lower impedance than HN series.

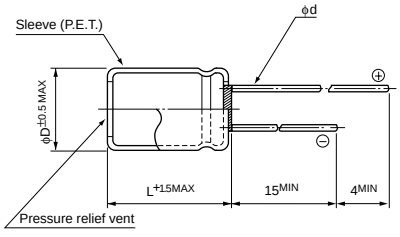
HZ ← Low Impedance — HN

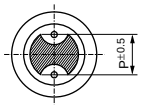


Specifications

Item	Performance Characteristics				
Category Temperature	−40 ~ +105˚C				
Rated Voltage Range	6.3 ~ 16V				
Rated Capacitance Range	470 ~ 3300µF				
Capacitance Tolerance	±20% (120Hz, 20˚C)				
Leakage Current	After 2 minutes' application of rated voltage, leakage current is less than 0.03CV				
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF				
	Rated voltage (V)	6.3	10	16	120Hz 20˚C
	tan δ (MAX)	0.22	0.19	0.16	
Stability at Low Temperature	Rated voltage (V)	6.3	10	16	120Hz
	Impedance ratio ZT / Z20 (MAX.) Z−40˚C / Z+20˚C	3	3	3	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 2000 hours at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed below.				
	Capacitance change	Within ±30% of initial value			
	tan δ	200% or less of initial specified value			
	Leakage current	Initial specified value or less			
Marking	Printed with gold color on black sleeve.				

Radial Lead Type





φD	8	10
P	3.5	5
φd	0.6	0.6

Type numbering system (Example : 6.3V 1800µF)

1 2 3 4 5 6 7 8 9 10 11 12

U H Z 0 J 1 8 2 M P M [ ]

- Cace size code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated capacitance (1800µF)
- Rated voltage (6.3V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
8	PM	PJ
10	PM	PJ

※ Please contact to us if other configurations are required.

Standard ratings

Cap. (µF) \ V (Code) / Code / Item		6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (mΩ MAX.) 20˚C / 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (mΩ MAX.) 20˚C / 100kHz	10 (1A) Rated ripple (mA rms) 105˚C / 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (mΩ MAX.) 20˚C / 100kHz	16 (1C) Rated ripple (mA rms) 105˚C / 100kHz
470	471							▲ 10×12.5	12	2280
680	681							10×12.5	12	2280
					▲ 10×12.5	12	2288	● 8×20	9	2880
								○ 10×16	10	2960
820	821				10×12.5	12	2280	10×16	10	2960
1000	102	8×11.5	14	2210	10×12.5	12	2280	10×16	10	2960
		▲ 10×12.5	12	2280	● 10×16	10	2960	▲ 8×20	9	2880
					○ 8×20	9	2880	● 10×20	7	3770
1200	122	8×15	14	2210	10×16	10	2960	10×20	7	3770
1500	152	10×12.5	12	2280	10×16	10	2960	10×20	7	3770
		▲ 8×20	9	2880	▲ 8×20	9	2880			
		● 10×18	10	2960						
1800	182	10×16	10	2960	10×20	7	3770	10×25	6.5	4140
		▲ 8×20	9	2880						
2200	222	● 10×16	10	2960	10×25	6.5	4140			
		10×20	7	3770						
2700	272	10×20	7	3770						
3300	332	10×25	6.5	4690						

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

▲ : In this case, 6 will be put at 12th digit of type numbering system.
● : In this case, 3 will be put at 12th digit of type numbering system.
○ : In this case, 9 will be put at 12th digit of type numbering system.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

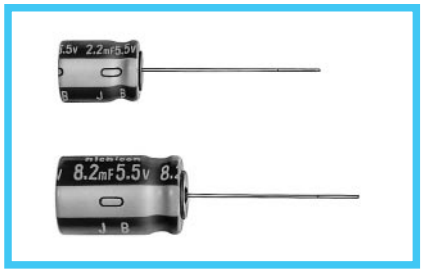
JB

Memory Back-Up Use

series

Anti-Solvent Feature

- Developed for memory back-up, with load life of 1000 hours at +85°C.
- Superior to electric double layer type capacitors in the following characteristics:
  - Better voltage maintenance.
  - Speedier charge-up available due to low impedance feature.
  - Wider operating temperature range of –25 ~ +85°C.



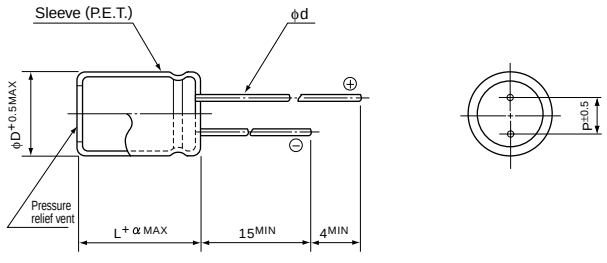
■Specifications

Item	Performance Characteristics
Category Temperature Range	–25 ~ +85°C
Rated Voltage Range	5.5V
Rated Capacitance Range	2.2 ~ 47mF See Note 1
Capacitance Tolerance	–10 ~ +50%
Leakage Current	C (μA) (C = Rated capacitance value in mF) See Note 2
Voltage Maintenance	More than 3.5V See Note 3
Stability at Low Temperature	Capacitance (–25°C) / Capacitance (20°C) × 100 ≧ 70%
Impedance See Note 4	
Endurance	After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.
Shelf Life	After leaveing capacitors under no load at 85°C for 500 hours, they meet the requirements for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

Capacitance (mF)	2.2	3.3	4.7	8.2	10	18	22	27	33	39	47
Impedance (Ω)	1.5	1.0	0.6	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1

Capacitance change	Within ±30% of initial value
Impedance	Within 4 times of initial specified value
Leakage current	Initial specified value or less
Voltage maintenance	Satisfies intial specified value

■Radial Lead Type



φD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.8	0.8

α	(L < 20) 1.5
	(L ≧ 20) 2.0

Type numbering system (Example : 5.5V 10mF)

1	2	3	4	5	6	7	8	9	10	11
U	J	B	0	L	1	0	3	T	H	D

- Configuration ※
- Capacitance tolerance (–10 ~ +50%)
- Rated Capacitance (10mF)
- Rated voltage (5.5V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
10	PD	PA
12.5 ~ 18	HD	HA

※ Please contact to us if other configurations are required.

Note :
1. After charging a capacitor at the rated voltage of 5.5V for an hour, the capacitance is calculated by the following formula, measuring the time of duration, ΔT (Sec.) from 4V down to 3V when constant current dischage at i (mA) = 0.02 × nominal capacitance is carried out.
   Capacitance (mF) = i × ΔT
2. Current value (20°C) after applying the rated voltage of 5.5V for an hour.
3. Voltage value maintained after the capacitor is subjected to 1 hour voltage application at 5V and then left at room temperature (lower than 25°C) for 24 hours.
4. Measuring Frequency : 1kHz (20°C)

■Dimensions

Ratings (V—mF)	Case Size φD × L (mm)
5.5—2.2	10×12.5
5.5—3.3	10×16
5.5—4.7	10×20
5.5—8.2	12.5×20
5.5—10	12.5×25
5.5—18	16×25
5.5—22	16×31.5
5.5—27	16×35.5
5.5—33	18×31.5
5.5—39	18×35.5
5.5—47	18×40

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

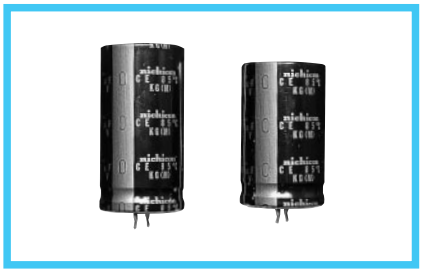
KG

Lug / Snap-in Terminal Type,
For Audio Equipment
series

For Audio Use

- Disigned for high grade audio equipment, giving priority to high fidelity sound quality.
- The variation expansion of the KG series.
  - TYPE-Ⅰ: The low profile high tone quality grade of the new development electrolyte adoption.
  - TYPE-Ⅱ: The center grade that the best sound is provided electrode foil, with the multiple use.
  - TYPE-Ⅲ: The highest tone quality grade by the low drag the gold plating terminal adoption.
- The sound quality that it meets the high tone quality needs of the DVD age.

Super Through
High Grade
Gold Tune



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +85°C
Rated Voltage Range	16 ~ 100V (TYPE-Ⅰ・TYPE-Ⅱ), 50~100V (TYPE-Ⅲ)
Rated Capacitance Range	680 ~ 33000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than $3\sqrt{CV}$ (μA), [C:Rated Capacitance(μF),V:Voltage]
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

TYPE	TYPE-Ⅰ・TYPE-Ⅱ			TYPE-Ⅲ	
Rated voltage(V)	16	25・63	80・100	50・63	80・100
tan δ	0.35	0.3	0.25	0.22	0.2

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage(V)		16~100
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C	4
	Z—40°C/Z+20°C	12

Endurance — After 1000 hours application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with gold color letter on black sleeve

Type numbering system (Snap-in terminal type)

(Example : Gold Tune 25 V 6800μF, Dia.φ30)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
L K G 1 E 6 8 2 M E S B B K

Grade	Code
TYPE-Ⅰ(Fine Tune)	AK
TYPE-Ⅱ(Gold Tune)	BK
TYPE-Ⅲ(Super Through)	CK

Grade
Case dia.code
Configuration ※1
Capacitance tolerance (±20%)
Rated Capacitance(6800μF)
Rated voltage(25V)
Series name
Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※1 Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
ES	HS

※Please contact to us if other configurations are required.

Type numbering system (Lug terminal type)

(Example : Super Through 50 V 15000μF)

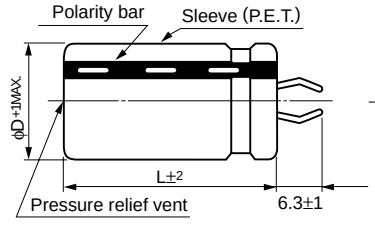
1 2 3 4 5 6 7 8 9 10 11 12
L K G 1 H 1 5 3 M L Z S

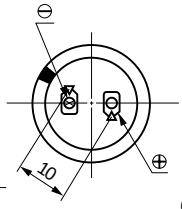
Grade	Code
TYPE-Ⅰ(Fine Tune)	F
TYPE-Ⅱ(Gold Tune)	—
TYPE-Ⅲ(Super Through)	S

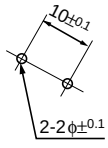
Grade
Configuration ※2
Capacitance tolerance(±20%)
Rated Capacitance(15000μF)
Rated voltage(50V)
Series name
Type

※Please contact to us if Eco-products are required.

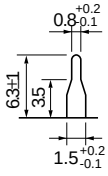
(Snap-in terminal type)





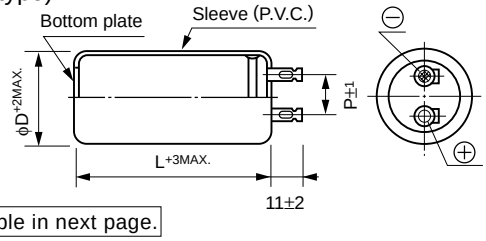


(PC board hole dimensions)



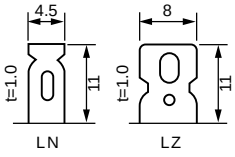
(Terminal dimensions)

(Lug terminal type)



■Configuration

φ35 ~ φ40 φ50~φ76



φD	35	40	50	63	76
P	14	14	18	25	25
Configuration	LN		LZ		

● Dimension table in next page.

KG series

■Dimensions (Snap-in Terminal Type : Gold Tune)

D × L (mm)

Cap.(μF)	Code	Grade	16V (1C)					25V (1E)					35V (1V)					50V (1H)				
			φ20	φ22	φ25	φ30	φ35	φ20	φ22	φ25	φ30	φ35	φ20	φ22	φ25	φ30	φ35	φ20	φ22	φ25	φ30	φ35
820	821	TYPE- Ⅱ																	22×20 1.00			
1000	102	TYPE- Ⅱ																20×25 1.50		25×20 1.50		
1200	122	TYPE- Ⅱ												22×20 1.30				20×30 1.65	22×25 1.65			
1500	152	TYPE- Ⅰ																	22×20 1.55			
		TYPE- Ⅱ											20×25 1.40					20×35 1.80	22×30 1.80		30×20 1.80	
1800	182	TYPE- Ⅰ																20×25 1.70		25×20 1.65		
		TYPE- Ⅱ							22×20 1.40					22×25 1.55	25×20 1.70					25×25 2.15		
2200	222	TYPE- Ⅰ												22×20 1.45				20×30 1.85	22×25 1.85			
		TYPE- Ⅱ						20×25 1.50		25×20 1.50			20×30 1.75					20×45 2.35	22×35 2.35	25×30 2.30		35×20 2.25
2700	272	TYPE- Ⅰ											20×25 1.60		25×20 1.55			20×35 2.00	22×30 2.00	25×25 1.95	30×20 2.05	
		TYPE- Ⅱ						20×30 1.70	22×25 1.70				20×35 2.05	22×30 2.05	25×25 2.00	30×20 2.05		20×50 2.45	22×45 2.45	25×35 2.50	30×25 2.60	
3300	332	TYPE- Ⅰ							22×20 1.50				20×30 1.75	22×25 1.75				20×40 2.25	22×35 2.20			
		TYPE- Ⅱ		22×20 1.50				20×35 1.80	22×30 1.80		30×20 1.85		20×40 2.25	22×35 2.25	25×30 2.20				22×50 2.80	25×40 2.80	30×30 2.80	
3900	392	TYPE- Ⅰ						20×25 1.60		25×20 1.55						30×20 1.85		20×45 2.45	22×40 2.35	25×30 2.50	30×25 2.35	35×20 2.45
		TYPE- Ⅱ	20×25 1.55		25×20 1.55					25×25 2.10			20×45 2.40	22×40 2.40	25×35 2.30	30×25 2.40	35×20 2.50			25×45 3.00	30×35 3.00	35×25 3.15
4700	472	TYPE- Ⅰ		22×20 1.35				20×30 1.70	22×25 1.70				20×35 2.20	22×30 2.20	25×25 2.15			20×50 2.75	22×45 2.60	25×35 2.70		
		TYPE- Ⅱ	20×30 1.75	22×25 1.75				20×45 2.30	22×35 2.30	25×30 2.25		35×20 2.20		22×45 2.70		30×30 2.55				25×50 3.40	30×40 3.30	35×30 3.35
5600	562	TYPE- Ⅰ	20×25 1.45								30×20 1.85		20×40 2.40	22×35 2.35	25×30 2.25		35×20 2.25		22×50 2.90	25×40 2.90	30×30 3.00	35×25 2.85
		TYPE- Ⅱ				30×20 1.85		20×50 2.50	22×40 2.50	25×35 2.40	30×25 2.50			22×50 3.00	25×40 3.00		35×25 2.85				30×45 3.60	35×35 3.60
6800	682	TYPE- Ⅰ			25×20 1.70			20×35 2.20	22×30 2.20	25×25 2.15			20×50 2.50	22×40 2.60		30×25 2.60				25×45 3.30	30×35 3.25	
		TYPE- Ⅱ	20×35 2.20	22×30 2.20	25×25 2.15				22×50 2.65	25×40 2.65	30×30 2.65				25×50 3.10	30×35 3.30	35×30 3.05				30×50 4.10	35×40 3.95
8200	822	TYPE- Ⅰ	20×30 1.90	22×25 1.90				20×40 2.40	22×35 2.35	25×30 2.30		35×20 2.25		22×45 2.90	25×40 2.70	30×30 2.75					30×40 3.55	35×30 3.65
		TYPE- Ⅱ	20×40 2.40	22×35 2.40	25×30 2.30		35×20 2.25			25×45 2.90	30×35 2.85	35×25 3.05				30×40 3.60	35×35 3.30					35×45 4.40
10000	103	TYPE- Ⅰ	20×35 2.05	22×30 2.05	25×25 2.00	30×20 2.10		20×50 2.55	22×40 2.65	25×35 2.50	30×25 2.65				25×45 3.05	30×35 3.00	35×25 3.20				30×45 4.00	35×35 4.00
		TYPE- Ⅱ	20×50 2.65	22×40 2.65	25×35 2.45	30×25 2.50				25×50 3.30	30×40 3.30	35×30 3.30				30×50 3.80	35×40 3.70					35×50 5.05
12000	123	TYPE- Ⅰ	20×40 2.25	22×35 2.20	25×30 2.15		35×20 2.10		22×45 2.90	25×40 2.75	30×30 2.80	35×25 2.65			25×50 3.45	30×40 3.30	35×30 3.40					35×40 4.35
		TYPE- Ⅱ		22×50 2.75	25×40 2.75	30×30 2.75	35×25 2.60				30×45 3.55	35×35 3.50					35×45 4.10					
15000	153	TYPE- Ⅰ	20×45 2.60	22×40 2.50	25×35 2.40	30×25 2.50				25×45 3.15	30×35 3.10					30×45 3.80	35×35 3.80					35×50 4.70
		TYPE- Ⅱ			25×45 3.10	30×35 3.10					30×50 4.15	35×40 4.00					35×50 4.80					
18000	183	TYPE- Ⅰ		22×45 2.80	25×40 2.60	30×30 2.65				25×50 3.55	30×40 3.40	35×30 3.50				30×50 4.30	35×40 4.15					
		TYPE- Ⅱ			25×50 3.50	30×40 3.40	35×30 3.45					35×45 4.45										
22000	223	TYPE- Ⅰ			25×45 2.95	30×35 2.90	35×25 2.90				30×45 3.85	35×35 3.85					35×45 4.70					
		TYPE- Ⅱ				30×45 3.80	35×35 3.80															
27000	273	TYPE- Ⅰ			25×50 3.40	30×40 3.25	35×30 3.35					35×40 4.30										
		TYPE- Ⅱ				30×50 4.25	35×40 4.25															
33000	333	TYPE- Ⅰ				30×45 3.70	35×35 3.65					35×45 4.85										
		TYPE- Ⅱ					35×45 4.50															Case size

Rated ripple (A rms) at 85°C 120 Hz

KG series

■Dimensions (Snap-in Terminal Type : Gold Tune)

D × L (mm)

Cap.(μF)	Code	Grade	63V (1J)					80V (1K)					100V (2A)				
			φ20	φ22	φ25	φ30	φ35	φ20	φ22	φ25	φ30	φ35	φ20	φ22	φ25	φ30	φ35
680	681	TYPE- Ⅰ											20×30 1.70	22×25 1.75			
		TYPE- Ⅱ											20×40 2.15	22×35 2.15	25×30 2.10		
		TYPE- Ⅲ	20×30 1.75	22×25 1.75				20×45 2.10	22×35 2.25	25×30 2.15				22×45 2.65	25×35 2.70		
820	821	TYPE- Ⅰ		22×20 1.30		30×20 1.90		20×25 1.70		25×20 1.65			20×35 1.85	22×30 1.85	25×25 1.80	30×20 1.90	
		TYPE- Ⅱ	20×25 1.65		25×20 1.65			20×35 2.05	22×30 2.05	25×25 2.00	30×20 2.05		20×45 2.40	22×40 2.40		30×25 2.35	35×20 2.45
		TYPE- Ⅲ	20×35 1.90	22×30 1.90	25×25 1.85			20×50 2.40	22×40 2.45	25×35 2.35	30×25 2.40	35×20 2.55		22×50 3.00	25×40 3.00	30×30 3.00	35×25 2.85
1000	102	TYPE- Ⅰ	20×25 1.45					20×30 1.80	22×25 1.85				20×40 2.05				
		TYPE- Ⅱ	20×30 1.85	22×25 1.85				20×45 2.20	22×35 2.20	25×30 2.15		35×20 2.10		22×45 2.70	25×35 2.75		
		TYPE- Ⅲ	20×40 2.10	22×35 2.05	25×30 2.00				22×50 2.60	25×40 2.60	30×30 2.60				25×50 3.10	30×35 3.30	35×30 3.05
1200	122	TYPE- Ⅰ			25×20 1.65			20×35 1.95	22×30 1.95	25×25 1.90	30×20 2.00		20×45 2.30	22×40 2.20	25×30 2.35	30×25 2.20	35×20 2.30
		TYPE- Ⅱ	20×35 1.95	22×30 1.95	25×25 1.90	30×20 1.95		20×50 2.45	22×40 2.45	25×35 2.30	30×25 2.40			22×50 3.00	25×40 2.75	30×30 3.05	35×25 2.90
		TYPE- Ⅲ	20×45 2.35	22×40 2.25		30×25 2.20	35×20 2.30			25×45 2.85	30×35 2.80	35×25 2.95				30×40 3.60	35×35 3.30
1500	152	TYPE- Ⅰ	20×30 1.90	22×25 1.90				20×40 2.20	22×35 2.15	25×30 2.10			20×50 2.65	22×45 2.55	25×35 2.60		
		TYPE- Ⅱ	20×40 2.15	22×35 2.15	25×30 2.10				22×50 2.60	25×40 2.65	30×30 2.65				25×50 3.20	30×35 3.40	35×30 3.20
		TYPE- Ⅲ		22×45 2.60	25×35 2.65					25×50 3.30	30×40 3.20	35×30 3.25				30×50 3.90	35×40 3.75
1800	182	TYPE- Ⅰ	20×35 2.05	22×30 2.00	25×25 2.00	30×20 2.05		20×45 2.45	22×40 2.35		30×25 2.40	35×20 2.50		22×50 2.85	25×40 2.85	30×30 2.90	35×25 2.75
		TYPE- Ⅱ	20×45 2.35	22×40 2.35		30×25 2.35	35×20 2.45			25×45 2.85	30×35 2.85	35×25 3.00				30×40 3.70	35×35 3.40
		TYPE- Ⅲ		22×50 2.90	25×40 2.90	30×30 2.90	35×25 2.75				30×45 3.55	35×35 3.50					35×45 4.15
2200	222	TYPE- Ⅰ	20×40 2.25	22×35 2.20	25×30 2.15		35×20 2.10		22×45 2.70	25×35 2.75	30×30 2.55				25×45 3.20	30×35 3.20	35×30 3.00
		TYPE- Ⅱ		22×45 2.70	25×35 2.75	30×30 2.50				25×50 3.25	30×40 3.15	35×30 3.25				30×50 3.95	35×40 3.80
		TYPE- Ⅲ			25×45 3.25	30×35 3.20					30×50 4.05	35×40 3.90					35×50 4.75
2700	272	TYPE- Ⅰ	20×50 2.40	22×40 2.45	25×35 2.35	30×25 2.50					30×35 2.80	35×25 3.00				30×40 3.55	35×35 3.25
		TYPE- Ⅱ			25×45 2.80	30×35 2.75	35×25 2.95				30×45 3.60	35×35 3.55					35×45 4.30
		TYPE- Ⅲ				30×45 3.30	35×30 3.65					35×45 4.45					
3300	332	TYPE- Ⅰ		22×45 2.80	25×40 2.60	30×30 2.70				25×50 3.25	30×40 3.15	35×30 3.20				30×50 3.75	
		TYPE- Ⅱ			25×50 3.20	30×40 3.20	35×30 3.15				30×50 4.10	35×40 3.95					35×50 4.95
		TYPE- Ⅲ				30×50 3.80	35×35 4.00					35×50 5.05					
3900	392	TYPE- Ⅰ			25×45 2.85	30×35 2.85	35×25 3.00				30×45 3.45	35×35 3.40					35×40 4.30
		TYPE- Ⅱ				30×45 3.35	35×35 3.35					35×45 4.35					
		TYPE- Ⅲ					35×40 4.30										
4700	472	TYPE- Ⅰ			25×50 3.20	30×40 3.10	35×30 3.20				30×45 3.85	35×40 3.75					35×50 4.50
		TYPE- Ⅱ				30×50 3.80						35×50 4.85					
		TYPE- Ⅲ					35×50 4.50										
5600	562	TYPE- Ⅰ				30×45 3.45	35×35 3.40					35×45 4.10					
		TYPE- Ⅱ					35×40 4.35										
6800	682	TYPE- Ⅰ				30×50 3.90	35×40 3.75					35×50 4.65					
		TYPE- Ⅱ					35×50 4.60										
8200	822	TYPE- Ⅰ					35×45 4.20										
10000	103	TYPE- Ⅰ					35×50 4.80										Case size Rated

Rated ripple (A rms) at 85°C 120 Hz

■Dimensions (Lug Terminal Type : Gold Tune, Super Through)

D × L (mm)

Cap.(μF)	Code	Grade	50 (1H)		63 (1J)		80 (1K)		100 (2A)	
6800	682	TYPE- Ⅰ							40×68	5.1
		TYPE- Ⅱ			35×68	4.3	40×100	6.1	50×80	6.2
		TYPE- Ⅲ	40×80	5.5	40×100	6.1	50×80	6.7	50×100	7.3
10000	103	TYPE- Ⅰ					40×68	5.4	40×100	6.0
		TYPE- Ⅱ	35×80	4.6	40×80	4.9	50×80	6.2	50×100	6.9
		TYPE- Ⅲ	40×100	6.1	50×80	6.2	63×80	7.6	63×100	8.3
15000	153	TYPE- Ⅰ			40×68	5.6	40×100	6.5	50×100	7.4
		TYPE- Ⅱ	40×80	6.1	40×100	6.7	50×100	8.4	63×80	8.7
		TYPE- Ⅲ	50×100	8.4	63×80	8.7	63×100	10.1	76×100	11.3
22000	223	TYPE- Ⅰ	40×68	5.4	40×100	6.6	50×100	7.8	63×80	9.7
		TYPE- Ⅱ	50×80	8.3	50×100	9.1	63×100	11.6	76×100	12.9
		TYPE- Ⅲ	63×80	10.5	63×100	11.6	76×100	13.7	Case size	Rated ripple

Rated ripple (A rms) at 85°C 120 Hz

ALUMINUM ELECTROLYTIC CAPACITORS

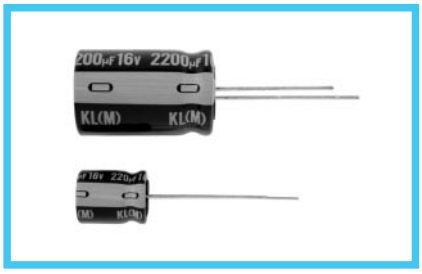
nichicon

KL Low Leakage Current series

Low Leakage Current | Anti-Solvent Feature

● Standard low leakage current series.

KL ← Low Leakage Current VR



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C (※ −40 ~ +105°C product also available upon request, but product rated at up to 50V less than or equal to ϕ10 × 12.5 Lmm)
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.1 ~ 10000μF
Capacitance Tolerance	±20% (M), ±10% (K) at 120Hz 20°C
Leakage Current	After 1 minute's (for case size 10 × 12.5 or smaller) or 2 minute's (for case size 10 × 16 or larger) application of rated voltage, leakage current is not more than 0.002CV or 0.2 (μA) whichever is greater.
tan δ	For capacitance of more than 1000μF, add 0.02 for every increace of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)		6.3	10	16	25	35	50	63	100
tan δ (MAX.)	~ϕ10 × 12.5	0.18	0.15	0.12	0.08	0.08	0.08	0.07	0.07
	ϕ10 × 16 ~	0.21	0.17	0.14	0.12	0.12	0.10	0.08	0.08

stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	3 (4)	2 (3)	2	1.5	1.5	1.5	1.5	1.5
	Z−40°C / Z+20°C	5 (8)	4 (6)	3 (4)	2 (4)	2 (3)	2 (3)	2 (3)	2 (3)

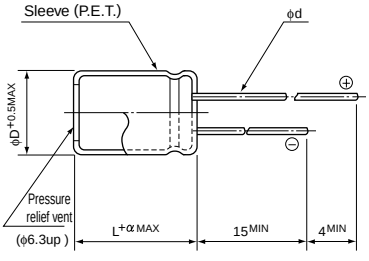
Values in ( ) applicable to ϕ10 × 16 or larger case size.

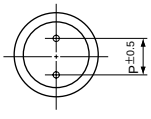
Endurance — After 2000 hours' application of rated voltage at 85°C, or 1000 hours' at 105°C, capacitors meet the characteristics requirements listed at right.

Capacitance change	Within ±15% of initial value (6.3V : Within ±20%)
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve. (PVC sleeve product : Printed with black color letter on orange sleeve.)

■Radial Lead Type





α	
	(~ ϕ10 × 12.5) 1.0
	(ϕ10 × 16 ~) 1.5

(mm)

ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8

Type numbering system (Example : 10V 47μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	K	L	1	A	4	7	0	M	D	D	A	N	A

- ※2
- Configuration ※1
- Capacitance tolerance (M : ±20%, K : ±10%)
- Rated Capacitance (47μF)
- Rated voltage (10V)
- Series name
- Type

※2 In case 105°C unit is required

※1 Configuration

ϕ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DA
6.3	ED	EA
8 · 10	PD	PA
12.5 ~ 18	HD	HA

※ Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
~ 68	0.75	1.00	1.35	1.57	2.00
100 ~ 680	0.80	1.00	1.23	1.34	1.50
1000 ~ 10000	0.85	1.00	1.10	1.13	1.15

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

Dimension table in next page.

KL series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25	
		0J		1A		1C		1E	
4.7	4R7							5 × 11	45
6.8	6R8							5 × 11	55
10	100					5 × 11	55	5 × 11	70
15	150					5 × 11	70	5 × 11	85
22	220					5 × 11	85	5 × 11	100
33	330					5 × 11	100	6.3 × 11	140
47	470			5 × 11	110	6.3 × 11	140	6.3 × 11	170
68	680			6.3 × 11	150	6.3 × 11	160	8 × 11.5	230
100	101			6.3 × 11	180	8 × 11.5	230	8 × 11.5	280
150	151			8 × 11.5	250	8 × 11.5	280	10 × 12.5	370
220	221			8 × 11.5	310	10 × 12.5	370	10 × 16	400
330	331			10 × 12.5	400	10 × 16	420	10 × 20	490
470	471	10 × 12.5	390	10 × 16	530	10 × 20	550	12.5 × 20	660
680	681	10 × 16	480	10 × 20	600	12.5 × 20	730	12.5 × 25	810
1000	102	10 × 20	650	12.5 × 20	810	12.5 × 25	910	16 × 25	1010
1500	152	12.5 × 25	910	12.5 × 25	1020	16 × 25	1150	16 × 31.5	1270
2200	222	12.5 × 25	1060	16 × 25	1200	16 × 25	1300	16 × 35.5	1440
3300	332	16 × 25	1270	16 × 31.5	1420	16 × 35.5	1550	18 × 40	1720
4700	472	16 × 31.5	1500	16 × 35.5	1650	18 × 35.5	1820		
6800	682	18 × 35.5	1760	18 × 35.5	1890				
10000	103	18 × 40	1900						

Cap.(μF) \ V	Code	35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			5 × 11	1.1			5 × 11	2.1
0.15	R15			5 × 11	1.6			5 × 11	3.2
0.22	R22			5 × 11	2.3			5 × 11	4.7
0.33	R33			5 × 11	3.5			5 × 11	7.0
0.47	R47			5 × 11	5.0			5 × 11	10.1
0.68	R68			5 × 11	7.3			5 × 11	14.5
1	010			5 × 11	10.7			5 × 11	19
1.5	1R5			5 × 11	16			5 × 11	23
2.2	2R2			5 × 11	23			5 × 11	28
3.3	3R3			5 × 11	40			5 × 11	45
4.7	4R7			5 × 11	45			5 × 11	50
6.8	6R8			5 × 11	55	5 × 11	59	6.3 × 11	65
10	100			5 × 11	70	6.3 × 11	75	8 × 11.5	90
15	150	5 × 11	85	6.3 × 11	95	6.3 × 11	100	8 × 11.5	110
22	220	6.3 × 11	110	6.3 × 11	110	8 × 11.5	115	10 × 12.5	136
33	330	6.3 × 11	140	8 × 11.5	165	8 × 11.5	170	10 × 16	180
47	470	8 × 11.5	190	8 × 11.5	190	10 × 12.5	200	10 × 20	220
68	680	8 × 11.5	230	10 × 12.5	250	10 × 16	270	10 × 20	290
100	101	10 × 12.5	300	10 × 16	320	10 × 20	330	12.5 × 20	370
150	151	10 × 16	400	10 × 20	420	12.5 × 20	450	12.5 × 25	470
220	221	10 × 20	440	12.5 × 20	490	12.5 × 20	550	16 × 25	580
330	331	12.5 × 20	550	12.5 × 20	600	12.5 × 25	710	16 × 31.5	730
470	471	12.5 × 25	680	16 × 25	760	16 × 25	850	18 × 35.5	910
680	681	16 × 25	840	16 × 25	910	16 × 31.5	1050		
1000	102	16 × 25	1100	16 × 31.5	1140	18 × 35.5	1330		
1500	152	16 × 35.5	1390	18 × 40	1480				Rated ripple
2200	222	18 × 35.5	1580					Case size	

Rated Ripple (mA rms) at 85°C 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS

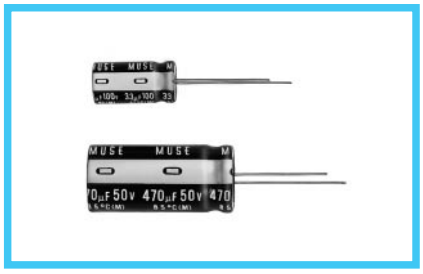
nichicon

nichicon MUSE **KZ** series

Premium Grade Type, For Audio Equipment

For Audio Use Anti-Solvent Feature

- Premium grade "nichicon MUSE" acoustic series.
- Ideally suited for first class audio equipment where qualitative and quantitative comfortableness is required.

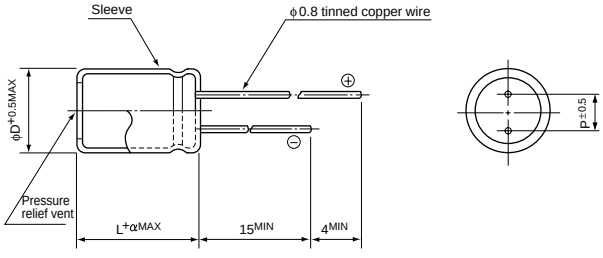


KZ High Grade **FG**

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	25 ~ 100V
Rated Capacitance Range	10 ~ 1000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is 0.01CV or less.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 25 / 50 / 100 tan δ (MAX.): 0.12 / 0.08 / 0.07
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 25 / 50 / 100 Impedance ratio ZT / Z20 (MAX.) Z–25°C / Z+20°C: 2 / 2 / 2 Impedance ratio ZT / Z20 (MAX.) Z–40°C / Z+20°C: 4 / 3 / 3
Endurance	After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 150% or less of initial specified value Leakage Current: Initial specifed value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with gold color letter on black sleeve.

■Radial Lead Type



α	
	(φD < 10) 1.0
	(φD ≧ 10) 1.5

φD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5

Type numbering system (Example : 25V 100μF)

1	2	3	4	5	6	7	8	9	10	11
U	K	Z	1	E	1	0	1	M	P	B

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (100μF)
- Rated voltage (25V)
- Series name
- Type

φD	Code
8・10	PB
12.5 ~ 18	HB

※ Please contact to us if Eco-Products are required.

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	25	50	100
		1E	1H	2A
10	100			8×11.5
22	220		8×11.5	10×16
33	330	8×11.5	10×12.5	10×20
47	470	10×12.5	10×16	12.5×20
100	101	10×16	12.5×20	16×25
220	221	12.5×20	16×25	16×35.5
330	331	12.5×25	16×31.5	18×35.5
470	471	16×25	16×35.5	
1000	102	16×35.5	18×40	

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

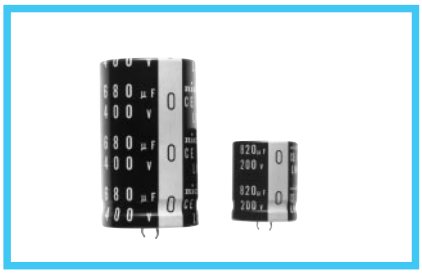
LN

Snap-in Terminal Type, Ultra-Smaller-Sized series

Smaller

- Withstanding 2000 hours application of ripple current at 85°C.
- One rank smaller case sized than LS series.

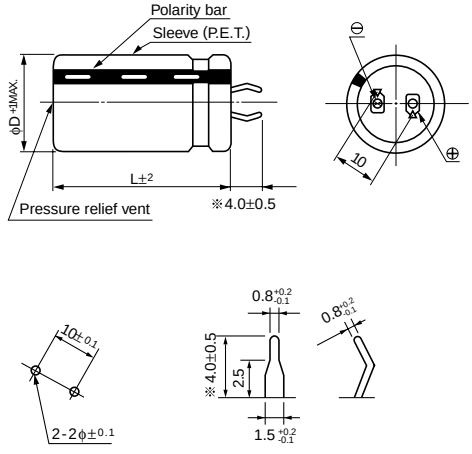
LS
Smaller
LN



■Specifications

Item	Performance Characteristics
Category Temperaturer Range	– 40 ~ + 85°C (160 ~ 250V), – 25 ~ + 85°C (400 ~ 450V)
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	68 ~ 3900μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF) V : Voltage(V)]
tan δ	Rated voltage (V): 160 ~ 400 — tan δ (MAX.): 0.15; Rated voltage (V): 450 — tan δ (MAX.): 0.20. Measurement frequency : 120Hz, Temperature : 20°C
Stability at Low Temperature	Rated voltage(V): 160 ~ 250 — Impedance ratio ZT/Z20 (MAX.) Z—25°C/Z+20°C: 4; Rated voltage(V): 350 ~ 450 — Impedance ratio ZT/Z20 (MAX.) Z—25°C/Z+20°C: 8. Measurement frequency : 120Hz
Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 2000 hours at 85°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value; tan δ: 200% or less of initial specified value; Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value; tan δ: 200% or less of initial specified value; Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.

■Drawing



(PC board hole dimensions) (Terminal dimensions)

※ The other terminal is also available upon request.
Please refer to page 197 for schematic of dimensions.

Type numbering system (Example : 400V 180μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
L L N 2 G 1 8 1 M E L A 3 0

- Case length code
- Case dia.code
- Configuration ※1
- Capacitance tolerane (±20%)
- Rated Capacitance (180μF)
- Rated voltage (400V)
- Series name
- Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※1 Configuration

Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
EL	HL

※ Please contact to us if other configurations are required.

Minimum order quantity : 50pcs.

● Dimension table in next page.

LN series

■Dimensions

160V (2C)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
390	20 × 25	1190	0.15	0.74	LLN2C391MELY25
470	20 × 30	1760	0.15	0.82	LLN2C471MELY30
	22 × 25	1760	0.15	0.82	LLN2C471MELZ25
560	20 × 30	2250	0.15	0.89	LLN2C561MELY30
	22 × 25	2250	0.15	0.89	LLN2C561MELZ25
680	20 × 35	2500	0.15	0.98	LLN2C681MELY35
	22 × 30	2500	0.15	0.98	LLN2C681MELZ30
	25 × 25	2500	0.15	0.98	LLN2C681MELA25
820	20 × 40	2750	0.15	1.08	LLN2C821MELY40
	22 × 35	2750	0.15	1.08	LLN2C821MELZ35
	25 × 30	2750	0.15	1.08	LLN2C821MELA30
1000	22 × 40	3000	0.15	1.20	LLN2C102MELZ40
	25 × 30	3000	0.15	1.20	LLN2C102MELA30
	30 × 25	3000	0.15	1.20	LLN2C102MELB25
1200	22 × 45	3250	0.15	1.31	LLN2C122MELZ45
	25 × 35	3250	0.15	1.31	LLN2C122MELA35
	30 × 30	3250	0.15	1.31	LLN2C122MELB30
1500	25 × 45	3730	0.15	1.46	LLN2C152MELA45
	30 × 35	3730	0.15	1.46	LLN2C152MELB35
1800	25 × 50	4200	0.15	1.60	LLN2C182MELA50
	30 × 35	4200	0.15	1.60	LLN2C182MELB35
	35 × 30	4200	0.15	1.60	LLN2C182MELC30
2200	30 × 45	4780	0.15	1.77	LLN2C222MELB45
	35 × 35	4780	0.15	1.77	LLN2C222MELC35
2700	30 × 50	5450	0.15	1.97	LLN2C272MELB50
	35 × 40	5450	0.15	1.97	LLN2C272MELC40
3300	35 × 45	5750	0.15	2.17	LLN2C332MELC45
3900	35 × 50	6000	0.15	2.36	LLN2C392MELC50

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

200V (2D)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
330	20 × 25	1440	0.15	0.77	LLN2D331MELY25
390	20 × 30	1660	0.15	0.83	LLN2D391MELY30
	22 × 25	1680	0.15	0.83	LLN2D391MELZ25
470	20 × 35	2030	0.15	0.91	LLN2D471MELY35
	22 × 30	1970	0.15	0.91	LLN2D471MELZ30
	25 × 25	1950	0.15	0.91	LLN2D471MELA25
560	22 × 30	2430	0.15	1.00	LLN2D561MELZ30
	25 × 25	2430	0.15	1.00	LLN2D561MELA25
680	22 × 35	2680	0.15	1.10	LLN2D681MELZ35
	25 × 30	2680	0.15	1.10	LLN2D681MELA30
	30 × 25	2680	0.15	1.10	LLN2D681MELB25
820	22 × 40	2930	0.15	1.21	LLN2D821MELZ40
	25 × 35	2930	0.15	1.21	LLN2D821MELA35
	30 × 25	2930	0.15	1.21	LLN2D821MELB25
1000	25 × 40	3250	0.15	1.34	LLN2D102MELA40
	30 × 30	3250	0.15	1.34	LLN2D102MELB30
	35 × 25	3250	0.15	1.34	LLN2D102MELC25
1200	25 × 45	3500	0.15	1.46	LLN2D122MELA45
	30 × 35	3610	0.15	1.46	LLN2D122MELB35
	35 × 30	3570	0.15	1.46	LLN2D122MELC30
1500	25 × 50	3870	0.15	1.64	LLN2D152MELA50
	30 × 40	3870	0.15	1.64	LLN2D152MELB40
	35 × 30	3870	0.15	1.64	LLN2D152MELC30
1800	30 × 45	4320	0.15	1.80	LLN2D182MELB45
	35 × 35	4320	0.15	1.80	LLN2D182MELC35
2200	30 × 50	4920	0.15	1.98	LLN2D222MELB50
	35 × 40	4920	0.15	1.98	LLN2D222MELC40
2700	35 × 50	5450	0.15	2.20	LLN2D272MELC50

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

250V (2E)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20 × 25	1230	0.15	0.70	LLN2E221MELY25
270	22 × 25	1310	0.15	0.77	LLN2E271MELZ25
330	22 × 30	1750	0.15	0.86	LLN2E331MELZ30
390	22 × 30	1910	0.15	0.93	LLN2E391MELZ30
	25 × 25	1910	0.15	0.93	LLN2E391MELA25
470	22 × 35	2110	0.15	1.02	LLN2E471MELZ35
	25 × 30	2110	0.15	1.02	LLN2E471MELA30
560	22 × 40	2250	0.15	1.12	LLN2E561MELZ40
	25 × 30	2250	0.15	1.12	LLN2E561MELA30
	30 × 25	2250	0.15	1.12	LLN2E561MELB25
680	22 × 45	2500	0.15	1.23	LLN2E681MELZ45
	25 × 35	2500	0.15	1.23	LLN2E681MELA35
	30 × 30	2500	0.15	1.23	LLN2E681MELB30
820	22 × 50	2770	0.15	1.35	LLN2E821MELZ50
	25 × 40	2770	0.15	1.35	LLN2E821MELA40
	30 × 30	2770	0.15	1.35	LLN2E821MELB30
	35 × 25	2770	0.15	1.35	LLN2E821MELC25
1000	25 × 50	3320	0.15	1.50	LLN2E102MELA50
	30 × 35	3320	0.15	1.50	LLN2E102MELB35
	35 × 30	3320	0.15	1.50	LLN2E102MELC30
1200	30 × 40	3840	0.15	1.64	LLN2E122MELB40
	35 × 35	3840	0.15	1.64	LLN2E122MELC35
1500	30 × 50	4250	0.15	1.83	LLN2E152MELB50
	35 × 40	4250	0.15	1.83	LLN2E152MELC40
1800	35 × 45	4550	0.15	2.01	LLN2E182MELC45

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

400V (2G)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
82	20 × 25	800	0.15	0.54	LLN2G820MELY25
100	20 × 25	940	0.15	0.60	LLN2G101MELY25
120	20 × 30	1080	0.15	0.65	LLN2G121MELY30
	22 × 25	1080	0.15	0.65	LLN2G121MELZ25
150	20 × 35	1210	0.15	0.73	LLN2G151MELY35
	22 × 30	1210	0.15	0.73	LLN2G151MELZ30
	25 × 25	1210	0.15	0.73	LLN2G151MELA25
180	20 × 40	1450	0.15	0.80	LLN2G181MELY40
	22 × 35	1450	0.15	0.80	LLN2G181MELZ35
	25 × 30	1450	0.15	0.80	LLN2G181MELA30
220	22 × 40	1580	0.15	0.88	LLN2G221MELZ40
	25 × 30	1580	0.15	0.88	LLN2G221MELA30
	30 × 25	1580	0.15	0.88	LLN2G221MELB25
270	22 × 45	1670	0.15	0.98	LLN2G271MELZ45
	25 × 35	1670	0.15	0.98	LLN2G271MELA35
	30 × 25	1670	0.15	0.98	LLN2G271MELB25
330	22 × 50	1900	0.15	1.08	LLN2G331MELZ50
	25 × 40	1900	0.15	1.08	LLN2G331MELA40
	30 × 30	1900	0.15	1.08	LLN2G331MELB30
	35 × 25	1900	0.15	1.08	LLN2G331MELC25
390	25 × 45	2130	0.15	1.18	LLN2G391MELA45
	30 × 35	2130	0.15	1.18	LLN2G391MELB35
	35 × 30	2130	0.15	1.18	LLN2G391MELC30
470	30 × 40	2390	0.15	1.30	LLN2G471MELB40
	35 × 30	2390	0.15	1.30	LLN2G471MELC30
560	30 × 45	2690	0.15	1.41	LLN2G561MELB45
	35 × 35	2690	0.15	1.41	LLN2G561MELC35
680	30 × 50	2960	0.15	1.56	LLN2G681MELB50
	35 × 40	2960	0.15	1.56	LLN2G681MELC40
820	35 × 45	3250	0.15	1.71	LLN2G821MELC45

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

LN series

■Dimensions

450V (2W)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
68	20 × 25	660	0.20	0.52	LLN2W680MELY25
82	20 × 25	830	0.20	0.57	LLN2W820MELY25
100	20 × 30	930	0.20	0.63	LLN2W101MELY30
	22 × 25	930	0.20	0.63	LLN2W101MELZ25
120	20 × 35	1040	0.20	0.69	LLN2W121MELY35
	22 × 30	1040	0.20	0.69	LLN2W121MELZ30
	25 × 25	1040	0.20	0.69	LLN2W121MELA25
150	20 × 40	1290	0.20	0.77	LLN2W151MELY40
	22 × 35	1290	0.20	0.77	LLN2W151MELZ35
	25 × 30	1290	0.20	0.77	LLN2W151MELA30
180	22 × 40	1400	0.20	0.85	LLN2W181MELZ40
	25 × 30	1400	0.20	0.85	LLN2W181MELA30
	30 × 25	1400	0.20	0.85	LLN2W181MELB25L
220	22 × 45	1660	0.20	0.94	LN2W221MELZ45
	25 × 35	1660	0.20	0.94	LLN2W221MELA35
	30 × 30	1660	0.20	0.94	LLN2W221MELB30
270	22 × 50	1810	0.20	1.04	LLN2W271MELZ50
	25 × 40	1810	0.20	1.04	LLN2W271MELA40
	30 × 30	1810	0.20	1.04	LLN2W271MELB30
	35 × 25	1810	0.20	1.04	LLN2W271MELC25
330	25 × 50	2100	0.20	1.15	LLN2W331MELA50
	30 × 35	2100	0.20	1.15	LLN2W331MELB35
	35 × 30	2100	0.20	1.15	LLN2W331MELC30
390	30 × 40	2320	0.20	1.25	LLN2W391MELB40
	35 × 35	2320	0.20	1.25	LLN2W391MELC35
470	30 × 45	2660	0.20	1.37	LLN2W471MELB45
	35 × 40	2660	0.20	1.37	LLN2W471MELC40
560	35 × 45	2820	0.20	1.50	LLN2W561MELC45
680	35 × 50	3000	0.20	1.65	LLN2W681MELC50

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product,
H L will be put at 10th and 11th digit of code.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
coeff	160~250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	400~450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

LS series

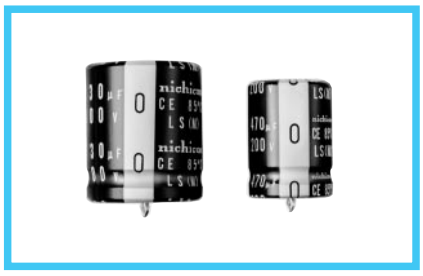
Snap-in Terminal Type, Smaller-Sized

Smaller

Anti-Solvent Feature (Through 100V only)

- Withstanding 3000 hours application of ripple current at 85°C.
- One rank smaller case sized than LU series.

LU
Smaller
LS



■Specifications

Item	Performance Characteristics
Category Temperaturer Range	– 40 ~ +85°C (16~250V), – 25 ~ +85°C (350 ~ 450V)
Rated Voltage Range	16 ~ 450V
Rated Capacitance Range	56 ~ 56000μF
Capacitance Tolerance	± 20% at 120Hz, 20°C
Leakage Current	I ≦ 3$\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF) V : Voltage(V)]

tan δ

Measurement frequency :120Hz, Temperature : 20°C

Rated voltage (V)	16	25	35	50	63	80	100	160	180	200	250	350	400	450
tan δ (MAX.)	0.50	0.40	0.35	0.30	0.25	0.20	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.20

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		16 ~ 100	160 ~ 250	350 ~ 450
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C	4	3	8
	Z—40°C/Z+20°C	20	12	—

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 3000 hours at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

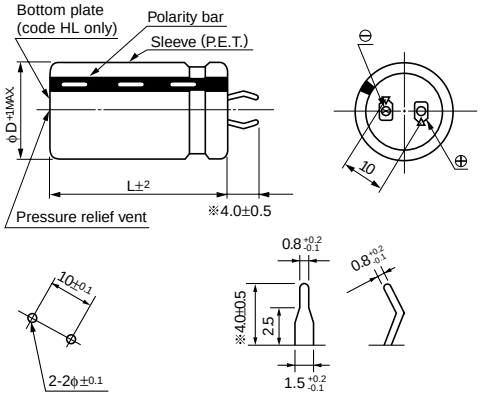
After leaving capacitors under no load at 85°C for 1000 hours, they meet the requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking

Printed with white color letter on black sleeve.

■Drawing



(PC board hole dimensions) (Terminal dimensions)

※ The other terminal is also available upon request.
Please refer to page 197 for schematic of dimensions.

Type numbering system (Example : 200V 390μF)

1	2	3	4	5	6	7	8	9	10	11	12
L	L	S	2	D	3	9	1	M	E	L	Z

- 12: Case dia.code
- 10–11: Configuration ※1
- 9: Capacitance tolerane(±20%)
- 6–8: Rated Capacitance(390μF)
- 4–5: Rated voltage(200V)
- 3: Series name
- 1–2: Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※1 Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※ Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1 k	10k	50k~
Coeff.	16~ 100V	0.88	0.90	1.00	1.07	1.15	1.15	1.15
	160~ 250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	350~ 450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

● Dimension table in next page.

LS series

■Dimensions

16V (1C)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
8200	22 × 25	2560	0.50	1.08	LLS1C822MELZ
10000	22 × 30	2890	0.50	1.20	LLS1C103MELZ
12000	22 × 30	3130	0.50	1.31	LLS1C123MELZ
	25 × 25	3010	0.50	1.31	LLS1C123MELA
15000	22 × 35	3690	0.50	1.46	LLS1C153MELZ
	25 × 30	3640	0.50	1.46	LLS1C153MELA
	30 × 25	3730	0.50	1.46	LLS1C153MELB
18000	22 × 40	3980	0.50	1.60	LLS1C183MELZ
	25 × 35	3980	0.50	1.60	LLS1C183MELA
	30 × 30	3880	0.50	1.60	LLS1C183MELB
22000	22 × 50	4520	0.50	1.77	LLS1C223MELZ
	25 × 40	4440	0.50	1.77	LLS1C223MELA
	30 × 30	4380	0.50	1.77	LLS1C223MELB
27000	25 × 45	4980	0.50	1.97	LLS1C273MELA
	30 × 35	4950	0.50	1.97	LLS1C273MELB
	35 × 30	4820	0.50	1.97	LLS1C273MELC
33000	25 × 50	5490	0.50	2.17	LLS1C333MELA
	30 × 40	5600	0.50	2.17	LLS1C333MELB
	35 × 30	5460	0.50	2.17	LLS1C333MELC
39000	30 × 45	6210	0.50	2.36	LLS1C393MELB
	35 × 35	6120	0.50	2.36	LLS1C393MELC
47000	30 × 50	6930	0.50	2.60	LLS1C473MELB
	35 × 40	6890	0.50	2.60	LLS1C473MELC
56000	35 × 45	7690	0.50	2.83	LLS1C563MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

25V (1E)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
5600	22 × 25	2310	0.40	1.12	LLS1E562MELZ
6800	22 × 30	2560	0.40	1.23	LLS1E682MELZ
	25 × 25	2470	0.40	1.23	LLS1E682MELA
8200	22 × 35	2860	0.40	1.35	LLS1E822MELZ
	25 × 25	2780	0.40	1.35	LLS1E822MELA
10000	22 × 35	3310	0.40	1.50	LLS1E103MELZ
	25 × 30	3160	0.40	1.50	LLS1E103MELA
12000	22 × 40	3770	0.40	1.64	LLS1E123MELZ
	25 × 35	3630	0.40	1.64	LLS1E123MELA
	30 × 25	3800	0.40	1.64	LLS1E123MELB
15000	22 × 50	4210	0.40	1.83	LLS1E153MELZ
	25 × 40	4100	0.40	1.83	LLS1E153MELA
	30 × 30	4000	0.40	1.83	LLS1E153MELB
18000	25 × 45	4680	0.40	2.01	LLS1E183MELA
	30 × 35	4660	0.40	2.01	LLS1E183MELB
	35 × 30	4680	0.40	2.01	LLS1E183MELC
22000	25 × 50	5190	0.40	2.22	LLS1E223MELA
	30 × 40	5330	0.40	2.22	LLS1E223MELB
	35 × 35	5260	0.40	2.22	LLS1E223MELC
27000	30 × 45	6020	0.40	2.46	LLS1E273MELB
	35 × 40	6020	0.40	2.46	LLS1E273MELC
33000	35 × 45	6750	0.40	2.72	LLS1E333MELC
39000	35 × 50	7560	0.40	2.96	LLS1E393MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

35V (1V)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
3900	22 × 25	2220	0.35	1.10	LLS1V392MELZ
4700	22 × 30	2460	0.35	1.21	LLS1V472MELZ
	25 × 25	2430	0.35	1.21	LLS1V472MELA
5600	22 × 35	2790	0.35	1.32	LLS1V562MELZ
	25 × 30	2750	0.35	1.32	LLS1V562MELA
6800	22 × 40	2970	0.35	1.46	LLS1V682MELZ
	25 × 30	2890	0.35	1.46	LLS1V682MELA
	30 × 25	3090	0.35	1.46	LLS1V682MELB
8200	22 × 45	3470	0.35	1.60	LLS1V822MELZ
	25 × 35	3330	0.35	1.60	LLS1V822MELA
	30 × 30	3290	0.35	1.60	LLS1V822MELB
10000	22 × 50	3750	0.35	1.77	LLS1V103MELZ
	25 × 40	3650	0.35	1.77	LLS1V103MELA
	30 × 30	3610	0.35	1.77	LLS1V103MELB
12000	25 × 45	4150	0.35	1.94	LLS1V123MELA
	30 × 35	4140	0.35	1.94	LLS1V123MELB
	35 × 30	4270	0.35	1.94	LLS1V123MELC
15000	25 × 50	4800	0.35	2.17	LLS1V153MELA
	30 × 40	4800	0.35	2.17	LLS1V153MELB
	35 × 35	4950	0.35	2.17	LLS1V153MELC
18000	30 × 45	5300	0.35	2.38	LLS1V183MELB
	35 × 40	5710	0.35	2.38	LLS1V183MELC
22000	35 × 45	6380	0.35	2.63	LLS1V223MELC
27000	35 × 50	6900	0.35	2.91	LLS1V273MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

50V (1H)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
2200	22 × 25	1930	0.30	0.99	LLS1H222MELZ
2700	22 × 30	2210	0.30	1.10	LLS1H272MELZ
3300	22 × 30	2410	0.30	1.21	LLS1H332MELZ
	25 × 25	2380	0.30	1.21	LLS1H332MELA
3900	22 × 35	2720	0.30	1.32	LLS1H392MELZ
	25 × 30	2680	0.30	1.32	LLS1H392MELA
4700	22 × 40	3020	0.30	1.45	LLS1H472MELZ
	25 × 30	3070	0.30	1.45	LLS1H472MELA
	30 × 25	3010	0.30	1.45	LLS1H472MELB
5600	22 × 45	3430	0.30	1.58	LLS1H562MELZ
	25 × 35	3470	0.30	1.58	LLS1H562MELA
	30 × 30	3430	0.30	1.58	LLS1H562MELB
6800	22 × 50	3940	0.30	1.74	LLS1H682MELZ
	25 × 40	3870	0.30	1.74	LLS1H682MELA
	30 × 35	3930	0.30	1.74	LLS1H682MELB
8200	25 × 45	4440	0.30	1.92	LLS1H822MELA
	30 × 35	4470	0.30	1.92	LLS1H822MELB
	35 × 30	4410	0.30	1.92	LLS1H822MELC
10000	30 × 40	5080	0.30	2.12	LLS1H103MELB
	35 × 35	4920	0.30	2.12	LLS1H103MELC
12000	30 × 50	5720	0.30	2.32	LLS1H123MELB
	35 × 40	5690	0.30	2.32	LLS1H123MELC
15000	35 × 45	6560	0.30	2.59	LLS1H153MELC
18000	35 × 50	7140	0.30	2.84	LLS1H183MELC

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

LS series

■Dimensions

63V (1J)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
1800	22 × 25	1900	0.25	1.01	LLS1J182MELZ
2200	22 × 30	2350	0.25	1.11	LLS1J222MELZ
	25 × 25	2300	0.25	1.11	LLS1J222MELA
2700	22 × 35	2500	0.25	1.23	LLS1J272MELZ
	25 × 30	2520	0.25	1.23	LLS1J272MELA
3300	22 × 35	2720	0.25	1.36	LLS1J332MELZ
	25 × 30	2740	0.25	1.36	LLS1J332MELA
	30 × 25	2840	0.25	1.36	LLS1J332MELB
3900	22 × 40	3090	0.25	1.48	LLS1J392MELZ
	25 × 35	3130	0.25	1.48	LLS1J392MELA
	30 × 30	3090	0.25	1.48	LLS1J392MELB
4700	22 × 50	3690	0.25	1.63	LLS1J472MELZ
	25 × 40	3590	0.25	1.63	LLS1J472MELA
	30 × 30	3540	0.25	1.63	LLS1J472MELB
5600	25 × 45	4010	0.25	1.78	LLS1J562MELA
	30 × 35	4000	0.25	1.78	LLS1J562MELB
	35 × 30	3750	0.25	1.78	LLS1J562MELC
6800	25 × 50	4520	0.25	1.96	LLS1J682MELA
	30 × 40	4550	0.25	1.96	LLS1J682MELB
	35 × 30	4440	0.25	1.96	LLS1J682MELC
8200	30 × 45	5120	0.25	2.15	LLS1J822MELB
	35 × 35	5050	0.25	2.15	LLS1J822MELC
10000	30 × 50	5780	0.25	2.38	LLS1J103MELB
	35 × 40	5750	0.25	2.38	LLS1J103MELC
12000	35 × 45	6470	0.25	2.60	LLS1J123MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

80V (1K)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
1200	22 × 25	1770	0.20	0.92	LLS1K122MELZ
1500	22 × 30	2010	0.20	1.03	LLS1K152MELZ
1800	22 × 30	2110	0.20	1.13	LLS1K182MELZ
	25 × 25	2260	0.20	1.13	LLS1K182MELA
2200	22 × 35	2530	0.20	1.25	LLS1K222MELZ
	25 × 30	2530	0.20	1.25	LLS1K222MELA
	30 × 25	2560	0.20	1.25	LLS1K222MELB
2700	22 × 40	2930	0.20	1.39	LLS1K272MELZ
	25 × 35	2930	0.20	1.39	LLS1K272MELA
	30 × 30	2910	0.20	1.39	LLS1K272MELB
3300	22 × 45	3230	0.20	1.54	LLS1K332MELZ
	25 × 40	3290	0.20	1.54	LLS1K332MELA
	30 × 30	3250	0.20	1.54	LLS1K332MELB
3900	22 × 50	3620	0.20	1.67	LLS1K392MELZ
	25 × 45	3710	0.20	1.67	LLS1K392MELA
	30 × 35	3700	0.20	1.67	LLS1K392MELB
4700	25 × 50	4280	0.20	1.83	LLS1K472MELA
	30 × 40	4230	0.20	1.83	LLS1K472MELB
	35 × 30	4120	0.20	1.83	LLS1K472MELC
5600	30 × 45	4700	0.20	2.00	LLS1K562MELB
	35 × 35	4640	0.20	2.00	LLS1K562MELC
6800	30 × 50	5270	0.20	2.21	LLS1K682MELB
	35 × 40	5240	0.20	2.21	LLS1K682MELC
8200	35 × 45	5890	0.20	2.42	LLS1K882MELC
10000	35 × 50	6630	0.20	2.68	LLS1K103MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

100V (2A)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
820	22 × 25	1860	0.20	0.85	LLS2A821MELZ
1000	22 × 30	2020	0.20	0.94	LLS2A102MELZ
1200	22 × 30	2120	0.20	1.03	LLS2A122MELZ
	25 × 25	2110	0.20	1.03	LLS2A122MELA
1500	22 × 35	2450	0.20	1.16	LLS2A152MELZ
	25 × 30	2470	0.20	1.16	LLS2A152MELA
	30 × 25	2560	0.20	1.16	LLS2A152MELB
1800	22 × 40	2770	0.20	1.27	LLS2A182MELZ
	25 × 35	2810	0.20	1.27	LLS2A182MELA
	30 × 25	2650	0.20	1.27	LLS2A182MELB
2200	22 × 45	3150	0.20	1.40	LLS2A222MELZ
	25 × 40	3210	0.20	1.40	LLS2A222MELA
	30 × 30	3170	0.20	1.40	LLS2A222MELB
2700	25 × 45	3660	0.20	1.55	LLS2A272MELA
	30 × 35	3650	0.20	1.55	LLS2A272MELB
	35 × 30	3770	0.20	1.55	LLS2A272MELC
3300	25 × 50	4150	0.20	1.72	LLS2A332MELA
	30 × 40	4180	0.20	1.72	LLS2A332MELB
	35 × 35	4070	0.20	1.72	LLS2A332MELC
3900	30 × 45	4670	0.20	1.87	LLS2A392MELB
	35 × 35	4610	0.20	1.87	LLS2A392MELC
4700	30 × 50	5260	0.20	2.05	LLS2A472MELB
	35 × 40	5230	0.20	2.05	LLS2A472MELC
5600	35 × 45	5880	0.20	2.24	LLS2A562MELC
6800	35 × 50	6010	0.20	2.47	LLS2A682MELC

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H|L will be put at 10th and 11th digit of code.

LS series

■Dimensions

160V (2C)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
270	20 × 25	1280	0.15	0.62	LLS2C271MELY
330	20 × 25	1550	0.15	0.68	LLS2C331MELY
390	20 × 30	1630	0.15	0.74	LLS2C391MELY
	22 × 25	1630	0.15	0.74	LLS2C391MELZ
470	20 × 30	1900	0.15	0.82	LLS2C471MELY
	22 × 30	1860	0.15	0.82	LLS2C471MELZ
	25 × 25	1860	0.15	0.82	LLS2C471MELA
560	20 × 35	2140	0.15	0.89	LLS2C561MELY
	22 × 30	2150	0.15	0.89	LLS2C561MELZ
	25 × 25	2150	0.15	0.89	LLS2C561MELA
680	20 × 40	2350	0.15	0.98	LLS2C681MELY
	22 × 35	2350	0.15	0.98	LLS2C681MELZ
	25 × 30	2330	0.15	0.98	LLS2C681MELA
	30 × 25	2330	0.15	0.98	LLS2C681MELB
820	22 × 40	2680	0.15	1.08	LLS2C821MELZ
	25 × 30	2650	0.15	1.08	LLS2C821MELA
	30 × 25	2640	0.15	1.08	LLS2C821MELB
1000	22 × 45	3020	0.15	1.20	LLS2C102MELZ
	25 × 35	3000	0.15	1.20	LLS2C102MELA
	30 × 30	2960	0.15	1.20	LLS2C102MELB
1200	25 × 40	3430	0.15	1.31	LLS2C122MELA
	30 × 30	3410	0.15	1.31	LLS2C122MELB
	35 × 25	3400	0.15	1.31	LLS2C122MELC
1500	25 × 50	3960	0.15	1.46	LLS2C152MELA
	30 × 35	3960	0.15	1.46	LLS2C152MELB
	35 × 30	3940	0.15	1.46	LLS2C152MELC
1800	30 × 40	4310	0.15	1.60	LLS2C182MELB
	35 × 35	4280	0.15	1.60	LLS2C182MELC
2200	30 × 50	4960	0.15	1.77	LLS2C222MELB
	35 × 40	4960	0.15	1.77	LLS2C222MELC
2700	35 × 45	5570	0.15	1.97	LLS2C272MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

180V (2Z)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
270	20 × 25	1290	0.15	0.66	LLS2Z271MELY
330	20 × 30	1770	0.15	0.73	LLS2Z331MELY
	22 × 25	1770	0.15	0.73	LLS2Z331MELZ
390	20 × 30	1840	0.15	0.79	LLS2Z391MELY
	22 × 25	1840	0.15	0.79	LLS2Z391MELZ
470	20 × 35	1910	0.15	0.87	LLS2Z471MELY
	22 × 30	1910	0.15	0.87	LLS2Z471MELZ
	25 × 25	2080	0.15	0.87	LLS2Z471MELA
560	20 × 40	2150	0.15	0.95	LLS2Z561MELY
	22 × 35	2250	0.15	0.95	LLS2Z561MELZ
	25 × 25	2150	0.15	0.95	LLS2Z561MELA
680	22 × 35	2480	0.15	1.04	LLS2Z681MELZ
	25 × 30	2500	0.15	1.04	LLS2Z681MELA
	30 × 25	2460	0.15	1.04	LLS2Z681MELB
820	22 × 40	2860	0.15	1.15	LLS2Z821MELZ
	25 × 35	2750	0.15	1.15	LLS2Z821MELA
	30 × 25	2690	0.15	1.15	LLS2Z821MELB
1000	22 × 50	3100	0.15	1.27	LLS2Z102MELZ
	25 × 40	3060	0.15	1.27	LLS2Z102MELA
	30 × 30	3100	0.15	1.27	LLS2Z102MELB
1200	25 × 45	3630	0.15	1.39	LLS2Z122MELA
	30 × 35	3550	0.15	1.39	LLS2Z122MELB
	35 × 30	3490	0.15	1.39	LLS2Z122MELC
1500	30 × 40	4100	0.15	1.55	LLS2Z152MELB
	35 × 35	4020	0.15	1.55	LLS2Z152MELC
1800	30 × 45	4550	0.15	1.70	LLS2Z182MELB
	35 × 35	4540	0.15	1.70	LLS2Z182MELC
2200	35 × 40	4830	0.15	1.88	LLS2Z222MELC
2700	35 × 50	5300	0.15	2.09	LLS2Z272MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

200V (2D)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20 × 25	1190	0.15	0.62	LLS2D221MELY
270	20 × 25	1390	0.15	0.69	LLS2D271MELY
	22 × 25	1370	0.15	0.69	LLS2D271MELZ
330	20 × 30	1560	0.15	0.77	LLS2D331MELY
	22 × 25	1510	0.15	0.77	LLS2D331MELZ
390	20 × 35	1740	0.15	0.83	LLS2D391MELY
	22 × 30	1730	0.15	0.83	LLS2D391MELZ
	25 × 25	1710	0.15	0.83	LLS2D391MELA
470	20 × 35	2030	0.15	0.91	LLS2D471MELY
	22 × 30	1970	0.15	0.91	LLS2D471MELZ
	25 × 25	1950	0.15	0.91	LLS2D471MELA
560	20 × 40	2180	0.15	1.00	LLS2D561MELY
	22 × 35	2180	0.15	1.00	LLS2D561MELZ
	25 × 30	2150	0.15	1.00	LLS2D561MELA
	30 × 25	2150	0.15	1.00	LLS2D561MELB
680	22 × 40	2480	0.15	1.10	LLS2D681MELZ
	25 × 30	2480	0.15	1.10	LLS2D681MELA
	30 × 25	2480	0.15	1.10	LLS2D681MELB
820	22 × 45	2810	0.15	1.21	LLS2D821MELZ
	25 × 35	2790	0.15	1.21	LLS2D821MELA
	30 × 30	2800	0.15	1.21	LLS2D821MELB
1000	22 × 50	3280	0.15	1.34	LLS2D102MELZ
	25 × 40	3280	0.15	1.34	LLS2D102MELA
	30 × 35	3150	0.15	1.34	LLS2D102MELB
1200	30 × 35	3610	0.15	1.46	LLS2D122MELB
	35 × 30	3570	0.15	1.46	LLS2D122MELC
1500	30 × 45	4130	0.15	1.64	LLS2D152MELB
	35 × 35	4060	0.15	1.64	LLS2D152MELC
1800	30 × 50	4600	0.15	1.80	LLS2D182MELB
	35 × 40	4590	0.15	1.80	LLS2D182MELC
2200	35 × 45	5250	0.15	1.98	LLS2D222MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

250V (2E)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
180	20 × 25	1200	0.15	0.63	LLS2E181MELY
220	20 × 25	1260	0.15	0.70	LLS2E221MELY
	22 × 25	1240	0.15	0.70	LLS2E221MELZ
270	20 × 30	1420	0.15	0.77	LLS2E271MELY
	22 × 25	1500	0.15	0.77	LLS2E271MELZ
330	20 × 35	1680	0.15	0.86	LLS2E331MELY
	22 × 30	1660	0.15	0.86	LLS2E331MELZ
	25 × 25	1610	0.15	0.86	LLS2E331MELA
390	20 × 40	1920	0.15	0.93	LLS2E391MELY
	22 × 35	1880	0.15	0.93	LLS2E391MELZ
	25 × 30	1880	0.15	0.93	LLS2E391MELA
470	22 × 35	2150	0.15	1.02	LLS2E471MELZ
	25 × 35	2150	0.15	1.02	LLS2E471MELA
	30 × 25	2040	0.15	1.02	LLS2E471MELB
560	22 × 40	2480	0.15	1.12	LLS2E561MELZ
	25 × 35	2350	0.15	1.12	LLS2E561MELA
	30 × 25	2350	0.15	1.12	LLS2E561MELB
680	25 × 40	2670	0.15	1.23	LLS2E681MELA
	30 × 30	2710	0.15	1.23	LLS2E681MELB
820	25 × 45	3010	0.15	1.35	LLS2E821MELA
	30 × 35	2980	0.15	1.35	LLS2E821MELB
	35 × 30	2960	0.15	1.35	LLS2E821MELC
1000	30 × 40	3560	0.15	1.50	LLS2E102MELB
	35 × 35	3480	0.15	1.50	LLS2E102MELC
1200	30 × 45	3990	0.15	1.64	LLS2E122MELB
	35 × 35	3840	0.15	1.64	LLS2E122MELC
1500	35 × 40	4330	0.15	1.83	LLS2E152MELC
1800	35 × 50	4540	0.15	2.01	LLS2E182MELC

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

LS series

■Dimensions

350V (2V)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
120	20 × 30	960	0.15	0.61	LLS2V121MELY
	22 × 25	1040	0.15	0.61	LLS2V121MELZ
150	20 × 30	1100	0.15	0.68	LLS2V151MELY
	22 × 30	1200	0.15	0.68	LLS2V151MELZ
	25 × 25	1220	0.15	0.68	LLS2V151MELA
180	20 × 35	1240	0.15	0.75	LLS2V181MELY
	22 × 30	1340	0.15	0.75	LLS2V181MELZ
	25 × 25	1370	0.15	0.75	LLS2V181MELA
220	22 × 35	1470	0.15	0.83	LLS2V221MELZ
	25 × 30	1530	0.15	0.83	LLS2V221MELA
	30 × 25	1540	0.15	0.83	LLS2V221MELB
270	22 × 40	1700	0.15	0.92	LLS2V271MELZ
	25 × 35	1730	0.15	0.92	LLS2V271MELA
	30 × 25	1800	0.15	0.92	LLS2V271MELB
330	22 × 45	1870	0.15	1.01	LLS2V331MELZ
	25 × 35	1970	0.15	1.01	LLS2V331MELA
	30 × 30	2030	0.15	1.01	LLS2V331MELB
390	25 × 40	2140	0.15	1.10	LLS2V391MELA
	30 × 35	2230	0.15	1.10	LLS2V391MELB
	35 × 30	2300	0.15	1.10	LLS2V391MELC
470	25 × 50	2550	0.15	1.21	LLS2V471MELA
	30 × 35	2530	0.15	1.21	LLS2V471MELB
	35 × 30	2550	0.15	1.21	LLS2V471MELC
560	30 × 40	2730	0.15	1.32	LLS2V561MELB
	35 × 35	2750	0.15	1.32	LLS2V561MELC
680	30 × 50	3150	0.15	1.46	LLS2V681MELB
	35 × 40	3150	0.15	1.46	LLS2V681MELC
820	35 × 45	3470	0.15	1.60	LLS2V821MELC
1000	35 × 50	3600	0.15	1.77	LLS2V102MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

450V (2W)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
56	20 × 25	610	0.20	0.47	LLS2W560MELY
68	20 × 30	710	0.20	0.52	LLS2W680MELY
	22 × 25	710	0.20	0.52	LLS2W680MELZ
82	20 × 35	800	0.20	0.57	LLS2W820MELY
	22 × 25	860	0.20	0.57	LLS2W820MELZ
100	20 × 35	880	0.20	0.63	LLS2W101MELY
	22 × 30	950	0.20	0.63	LLS2W101MELZ
	25 × 25	970	0.20	0.63	LLS2W101MELA
120	20 × 40	990	0.20	0.69	LLS2W121MELY
	22 × 35	1070	0.20	0.69	LLS2W121MELZ
	25 × 30	1090	0.20	0.69	LLS2W121MELA
	30 × 25	1120	0.20	0.69	LLS2W121MELB
150	22 × 40	1180	0.20	0.77	LLS2W151MELZ
	25 × 30	1250	0.20	0.77	LLS2W151MELA
	30 × 25	1290	0.20	0.77	LLS2W151MELB
180	22 × 45	1320	0.20	0.85	LLS2W181MELZ
	25 × 35	1400	0.20	0.85	LLS2W181MELA
	30 × 30	1450	0.20	0.85	LLS2W181MELB
220	25 × 40	1590	0.20	0.94	LLS2W221MELA
	30 × 30	1640	0.20	0.94	LLS2W221MELB
	35 × 25	1590	0.20	0.94	LLS2W221MELC
270	30 × 35	1890	0.20	1.04	LLS2W271MELB
	35 × 30	1900	0.20	1.04	LLS2W271MELC
330	30 × 40	2120	0.20	1.15	LLS2W331MELB
	35 × 35	2150	0.20	1.15	LLS2W331MELC
390	30 × 45	2350	0.20	1.25	LLS2W391MELB
	35 × 40	2380	0.20	1.25	LLS2W391MELC
470	35 × 45	2680	0.20	1.37	LLS2W471MELC
560	35 × 50	2880	0.20	1.50	LLS2W561MELC

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

400V (2G)					
Cap. (μF)	Size φD × L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
68	20 × 25	750	0.15	0.49	LLS2G680MELY
82	20 × 30	820	0.15	0.54	LLS2G820MELY
	22 × 25	840	0.15	0.54	LLS2G820MELZ
100	20 × 30	950	0.15	0.60	LLS2G101MELY
	22 × 25	950	0.15	0.60	LLS2G101MELZ
120	20 × 35	1070	0.15	0.65	LLS2G121MELY
	22 × 30	1090	0.15	0.65	LLS2G121MELZ
	25 × 25	1130	0.15	0.65	LLS2G121MELA
150	20 × 40	1220	0.15	0.73	LLS2G151MELY
	22 × 35	1240	0.15	0.73	LLS2G151MELZ
	25 × 30	1270	0.15	0.73	LLS2G151MELA
180	22 × 40	1410	0.15	0.80	LLS2G181MELZ
	25 × 30	1440	0.15	0.80	LLS2G181MELA
	30 × 25	1520	0.15	0.80	LLS2G181MELB
220	22 × 45	1580	0.15	0.88	LLS2G221MELZ
	25 × 35	1640	0.15	0.88	LLS2G221MELA
	30 × 30	1660	0.15	0.88	LLS2G221MELB
270	25 × 40	1790	0.15	0.98	LLS2G271MELA
	30 × 30	1820	0.15	0.98	LLS2G271MELB
330	25 × 45	2000	0.15	1.08	LLS2G331MELA
	30 × 35	2050	0.15	1.08	LLS2G331MELB
	35 × 30	2050	0.15	1.08	LLS2G331MELC
390	30 × 40	2260	0.15	1.18	LLS2G391MELB
	35 × 35	2280	0.15	1.18	LLS2G391MELC
470	30 × 45	2510	0.15	1.30	LLS2G471MELB
	35 × 35	2510	0.15	1.30	LLS2G471MELC
560	30 × 50	2850	0.15	1.41	LLS2G561MELB
	35 × 40	2850	0.15	1.41	LLS2G561MELC
680	35 × 50	3100	0.15	1.56	LLS2G681MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

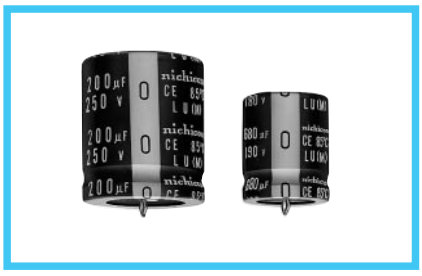
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

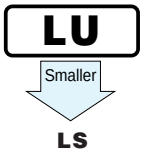
LU Snap-in Terminal Type, Standard series

RCJ Approved

Approved by Reliability Center for Electronic Component, Japan-Certification No. RCJ-03-25D



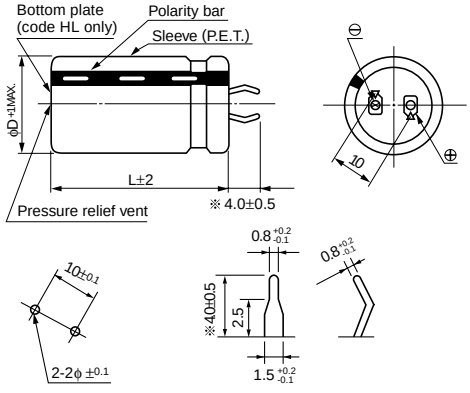
- Withstanding 3000 hours application of ripple current at 85°C.
- Higher production efficiency due to 4.0mm long terminal.



■Specifications

Item	Performance Characteristics
Category Temperaturer Renge	–40 ~ +85°C (160 ~ 250V), –25 ~ +85°C (400 ~ 450V)
Rated Voltage Range	160 ~ 450V
Rated Capacitance Range	56 ~ 2700μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	$I \leqq 3\sqrt{CV}$ (μA) (After 5 minutes' application of rated voltage) [C : Rated Capacitance (μF) V : Voltage(V)]
tan δ	Measurement frequency :120Hz, Temperature : 20°C Rated voltage (V): 160, 180, 200, 250, 400, 450 tan δ (MAX.): 0.15, 0.15, 0.15, 0.15, 0.15, 0.20
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage(V): 160 ~ 250 / 400 ~ 450 Impedance ratio ZT/Z20 (MAX.): Z—25°C/Z+20°C: 3 / 8; Z—40°C/Z+20°C: 12 / —
Endurance	After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 3000 hours at 85°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the requirements listed at right. Capacitance change: Within ±15% of initial value tan δ: 150% or less of initial specified value Leakage current: Initial specified value or less
Marking	Printed with white color letter on black sleeve.

■Drawing



(PC board hole dimensions) (Terminal dimensions)

※ The other terminal is also available upon request.
Please refer to page 197 for schematic of dimensions.

Type numbering system (Example : 400V 270μF)

1 2 3 4 5 6 7 8 9 10 11 12
L L U 2 G 2 7 1 M E L B

- Case dia.code
- Configuration ※1
- Capacitance tolerane(±20%)
- Rated Capacitance(270μF)
- Rated voltage(400V)
- Series name
- Type

φD	Code
20	Y
22	Z
25	A
30	B
35	C

※1 Configuration

Pb free lead finishing Pb free PET sleeve Without bottom plate	Sn-Pb lead finishing PVC sleeve contain Pb With bottom plate
EL	HL

※Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

Frequency (Hz)		50	60	120	300	1k	10k	50k~
Coeff.	160~ 250V	0.81	0.85	1.00	1.17	1.32	1.45	1.50
	400~ 450V	0.77	0.82	1.00	1.16	1.30	1.41	1.43

Minimum order quantity : 50pcs.

● Dimension table in next page.

LU series

■Dimensions

160V (2C)					
Cap.(μF)	Size φD×L(mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
330	20×25	1220	0.15	0.68	LLU2C331MELY
390	20×30	1550	0.15	0.74	LLU2C391MELY
	22×25	1550	0.15	0.74	LLU2C391MELZ
470	20×35	1810	0.15	0.82	LLU2C471MELY
	22×30	1770	0.15	0.82	LLU2C471MELZ
	25×25	1770	0.15	0.82	LLU2C471MELA
560	20×40	2040	0.15	0.89	LLU2C561MELY
	22×30	2110	0.15	0.89	LLU2C561MELZ
	25×25	2110	0.15	0.89	LLU2C561MELA
680	22×35	2250	0.15	0.98	LLU2C681MELZ
	25×30	2250	0.15	0.98	LLU2C681MELA
	30×25	2220	0.15	0.98	LLU2C681MELB
820	22×40	2500	0.15	1.08	LLU2C821MELZ
	25×35	2750	0.15	1.08	LLU2C821MELA
	30×25	2500	0.15	1.08	LLU2C821MELB
1000	22×45	2750	0.15	1.20	LLU2C102MELZ
	25×40	2860	0.15	1.20	LLU2C102MELA
	30×30	2900	0.15	1.20	LLU2C102MELB
	35×25	2900	0.15	1.20	LLU2C102MELC
1200	25×45	3270	0.15	1.31	LLU2C122MELA
	30×35	3300	0.15	1.31	LLU2C122MELB
	35×25	3100	0.15	1.31	LLU2C122MELC
1500	25×50	3600	0.15	1.46	LLU2C152MELA
	30×40	3770	0.15	1.46	LLU2C152MELB
	35×30	3600	0.15	1.46	LLU2C152MELC
1800	30×45	4200	0.15	1.60	LLU2C182MELB
	35×35	4100	0.15	1.60	LLU2C182MELC
2200	30×50	4700	0.15	1.77	LLU2C222MELB
	35×40	4700	0.15	1.77	LLU2C222MELC
2700	35×45	4780	0.15	1.97	LLU2C272MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

180V (2Z)					
Cap.(μF)	Size φD×L (mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
270	20×25	1230	0.15	0.66	LLU2Z271MELY
330	20×30	1770	0.15	0.73	LLU2Z331MELY
	22×25	1420	0.15	0.73	LLU2Z331MELZ
390	20×30	1840	0.15	0.79	LLU2Z391MELY
	22×25	1840	0.15	0.79	LLU2Z391MELZ
470	20×35	1910	0.15	0.87	LLU2Z471MELY
	22×30	1910	0.15	0.87	LLU2Z471MELZ
	25×25	2080	0.15	0.87	LLU2Z471MELA
560	20×40	2150	0.15	0.95	LLU2Z561MELY
	22×35	2250	0.15	0.95	LLU2Z561MELZ
	25×30	2250	0.15	0.95	LLU2Z561MELA
680	22×40	2500	0.15	1.04	LLU2Z681MELZ
	25×30	2500	0.15	1.04	LLU2Z681MELA
	30×25	2460	0.15	1.04	LLU2Z681MELB
820	22×45	2750	0.15	1.15	LLU2Z821MELZ
	25×35	2750	0.15	1.15	LLU2Z821MELA
	30×30	2750	0.15	1.15	LLU2Z821MELB
	35×25	2600	0.15	1.15	LLU2Z821MELC
1000	22×50	2800	0.15	1.27	LLU2Z102MELZ
	25×40	2860	0.15	1.27	LLU2Z102MELA
	30×35	3000	0.15	1.27	LLU2Z102MELB
	35×25	2800	0.15	1.27	LLU2Z102MELC
1200	25×50	3460	0.15	1.39	LLU2Z122MELA
	30×35	3380	0.15	1.39	LLU2Z122MELB
	35×30	3320	0.15	1.39	LLU2Z122MELC
1500	30×45	3900	0.15	1.55	LLU2Z152MELB
	35×35	3830	0.15	1.55	LLU2Z152MELC
1800	30×50	4330	0.15	1.70	LLU2Z182MELB
	35×40	4320	0.15	1.70	LLU2Z182MELC
2200	35×45	4800	0.15	1.88	LLU2Z222MELC
2700	35×50	5050	0.15	2.09	LLU2Z272MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

200V (2D)					
Cap.(μF)	Size φD×L (mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
220	20×25	1130	0.15	0.62	LLU2D221MELY
270	20×30	1320	0.15	0.69	LLU2D271MELY
	22×25	1300	0.15	0.69	LLU2D271MELZ
330	20×30	1490	0.15	0.77	LLU2D331MELY
	22×25	1440	0.15	0.77	LLU2D331MELZ
390	20×35	1660	0.15	0.83	LLU2D391MELY
	22×30	1650	0.15	0.83	LLU2D391MELZ
	25×25	1630	0.15	0.83	LLU2D391MELA
470	20×40	1930	0.15	0.91	LLU2D471MELY
	22×35	1900	0.15	0.91	LLU2D471MELZ
	25×30	1860	0.15	0.91	LLU2D471MELA
560	22×35	1960	0.15	1.00	LLU2D561MELZ
	25×30	2050	0.15	1.00	LLU2D561MELA
	30×25	2100	0.15	1.00	LLU2D561MELB
680	22×40	2430	0.15	1.10	LLU2D681MELZ
	25×35	2680	0.15	1.10	LLU2D681MELA
	30×30	2680	0.15	1.10	LLU2D681MELB
820	22×50	2800	0.15	1.21	LLU2D821MELZ
	25×40	2800	0.15	1.21	LLU2D821MELA
	30×30	2800	0.15	1.21	LLU2D821MELB
	35×25	2930	0.15	1.21	LLU2D821MELC
1000	25×45	3120	0.15	1.34	LLU2D102MELA
	30×35	3000	0.15	1.34	LLU2D102MELB
	35×30	3250	0.15	1.34	LLU2D102MELC
1200	25×50	3440	0.15	1.46	LLU2D122MELA
	30×40	3440	0.15	1.46	LLU2D122MELB
	35×30	3400	0.15	1.46	LLU2D122MELC
1500	30×45	3500	0.15	1.64	LLU2D152MELB
	35×35	3500	0.15	1.64	LLU2D152MELC
1800	35×40	3870	0.15	1.80	LLU2D182MELC
2200	35×50	5000	0.15	1.98	LLU2D222MELC

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

250V (2E)					
Cap.(μF)	Size φD×L (mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
180	20×25	1140	0.15	0.63	LLU2E181MELY
220	20×30	1200	0.15	0.70	LLU2E221MELY
	22×25	1200	0.15	0.70	LLU2E221MELZ
270	20×30	1350	0.15	0.77	LLU2E271MELY
	22×30	1430	0.15	0.77	LLU2E271MELZ
	25×25	1400	0.15	0.77	LLU2E271MELA
330	20×35	1600	0.15	0.86	LLU2E331MELY
	22×30	1580	0.15	0.86	LLU2E331MELZ
	25×25	1550	0.15	0.86	LLU2E331MELA
390	20×40	1860	0.15	0.93	LLU2E391MELY
	22×35	1810	0.15	0.93	LLU2E391MELZ
	25×30	1870	0.15	0.93	LLU2E391MELA
	30×25	1800	0.15	0.93	LLU2E391MELB
470	22×40	2080	0.15	1.02	LLU2E471MELZ
	25×35	2050	0.15	1.02	LLU2E471MELA
	30×25	2040	0.15	1.02	LLU2E471MELB
560	22×45	2360	0.15	1.12	LLU2E561MELZ
	25×35	2240	0.15	1.12	LLU2E561MELA
	30×30	2240	0.15	1.12	LLU2E561MELB
	35×25	2300	0.15	1.12	LLU2E561MELC
680	25×40	2540	0.15	1.23	LLU2E681MELA
	30×35	2600	0.15	1.23	LLU2E681MELB
	35×25	2620	0.15	1.23	LLU2E681MELC
820	25×50	2870	0.15	1.35	LLU2E821MELA
	30×35	2850	0.15	1.35	LLU2E821MELB
	35×30	2820	0.15	1.35	LLU2E821MELC
1000	30×45	3390	0.15	1.50	LLU2E102MELB
	35×35	3340	0.15	1.50	LLU2E102MELC
1200	30×50	3800	0.15	1.64	LLU2E122MELB
	35×40	3770	0.15	1.64	LLU2E122MELC
1500	35×45	4190	0.15	1.83	LLU2E152MELC
1800	35×50	4310	0.15	2.01	LLU2E182MELC

Rated Ripple (mA rms) at 85°C 120Hz

※In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, HL will be put at 10th and 11th digit of code.

LU series

■Dimensions

400V (2G)					
Cap. (μF)	Size φD × L (mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
68	20 × 25	710	0.15	0.49	LLU2G680MELY
82	20 × 30	780	0.15	0.54	LLU2G820MELY
	22 × 25	800	0.15	0.54	LLU2G820MELZ
100	20 × 30	900	0.15	0.60	LLU2G101MELY
	22 × 25	850	0.15	0.60	LLU2G101MELZ
120	20 × 35	1020	0.15	0.65	LLU2G121MELY
	22 × 30	1040	0.15	0.65	LLU2G121MELZ
	25 × 25	1080	0.15	0.65	LLU2G121MELA
150	20 × 40	1170	0.15	0.73	LLU2G151MELY
	22 × 35	1200	0.15	0.73	LLU2G151MELZ
	25 × 30	1210	0.15	0.73	LLU2G151MELA
180	22 × 40	1380	0.15	0.80	LLU2G181MELZ
	25 × 30	1250	0.15	0.80	LLU2G181MELA
	30 × 25	1450	0.15	0.80	LLU2G181MELB
220	22 × 45	1550	0.15	0.88	LLU2G221MELZ
	25 × 35	1560	0.15	0.88	LLU2G221MELA
	30 × 30	1610	0.15	0.88	LLU2G221MELB
	35 × 25	1500	0.15	0.88	LLU2G221MELC
270	25 × 40	1700	0.15	0.98	LLU2G271MELA
	30 × 35	1730	0.15	0.98	LLU2G271MELB
	35 × 25	1720	0.15	0.98	LLU2G271MELC
330	25 × 50	1920	0.15	1.08	LLU2G331MELA
	30 × 40	1950	0.15	1.08	LLU2G331MELB
	35 × 30	1950	0.15	1.08	LLU2G331MELC
390	30 × 40	2150	0.15	1.18	LLU2G391MELB
	35 × 35	2170	0.15	1.18	LLU2G391MELC
470	30 × 45	2350	0.15	1.30	LLU2G471MELB
	35 × 35	2330	0.15	1.30	LLU2G471MELC
560	35 × 40	2420	0.15	1.41	LLU2G561MELC
680	35 × 50	3080	0.15	1.56	LLU2G681MELC

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

450V (2W)					
Cap. (μF)	Size φD × L (mm)	Rated ripple (mA)	tan δ	Leakage Current (mA)	※ Code
56	20 × 25	590	0.20	0.47	LLU2W560MELY
68	20 × 30	710	0.20	0.52	LLU2W680MELY
	22 × 25	680	0.20	0.52	LLU2W680MELZ
82	20 × 35	760	0.20	0.57	LLU2W820MELY
	22 × 30	820	0.20	0.57	LLU2W820MELZ
	25 × 25	720	0.20	0.57	LLU2W820MELA
100	20 × 35	850	0.20	0.63	LLU2W101MELY
	22 × 30	850	0.20	0.63	LLU2W101MELZ
	25 × 25	920	0.20	0.63	LLU2W101MELA
120	20 × 40	970	0.20	0.69	LLU2W121MELY
	22 × 35	1020	0.20	0.69	LLU2W121MELZ
	25 × 30	1040	0.20	0.69	LLU2W121MELA
	30 × 25	1070	0.20	0.69	LLU2W121MELB
150	22 × 40	1150	0.20	0.77	LLU2W151MELZ
	25 × 35	1210	0.20	0.77	LLU2W151MELA
	30 × 25	1130	0.20	0.77	LLU2W151MELB
180	22 × 45	1290	0.20	0.85	LLU2W181MELZ
	25 × 40	1380	0.20	0.85	LLU2W181MELA
	30 × 30	1380	0.20	0.85	LLU2W181MELB
	35 × 25	1300	0.20	0.85	LLU2W181MELC
220	25 × 45	1540	0.20	0.94	LLU2W221MELA
	30 × 35	1560	0.20	0.94	LLU2W221MELB
	35 × 25	1430	0.20	0.94	LLU2W221MELC
270	25 × 50	1700	0.20	1.04	LLU2W271MELA
	30 × 40	1800	0.20	1.04	LLU2W271MELB
	35 × 30	1680	0.20	1.04	LLU2W271MELC
330	30 × 45	2020	0.20	1.15	LLU2W331MELB
	35 × 35	2050	0.20	1.15	LLU2W331MELC
390	30 × 50	2240	0.20	1.25	LLU2W391MELB
	35 × 40	2270	0.20	1.25	LLU2W391MELC
470	35 × 45	2550	0.20	1.37	LLU2W471MELC

Rated Ripple (mA rms) at 85°C 120Hz

※ In case of Sn-Pb lead finishing · PVC sleeve contain Pb product, H L will be put at 10th and 11th digit of code.

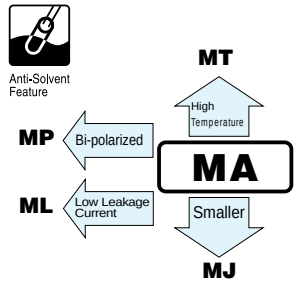
ALUMINUM ELECTROLYTIC CAPACITORS

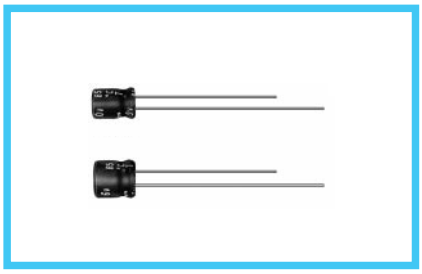
nichicon

MA series

5mmL, Standard, For General Purposes

● Standard series with 5mm height.





■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 470μF
Rated Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3(μA),whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.35	0.24 (0.30)	0.20 (0.24)	0.16 (0.20)	0.14 (0.18)	0.12 (0.16)	0.10 (0.13)

Figures in ( ) are for MR series.

Stability at Low Temperature — Measurement frequency : 120Hz

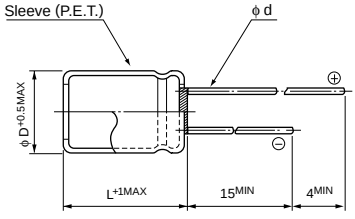
Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	7	4	3	2	2	2	2
	Z−40°C / Z+20°C	15	8	6	4	4	3	3

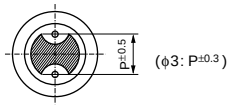
Endurance — After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value (MR series & φ 3 product : Within ±25%)
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type





φ D	3	4	5	6.3	8
P	1.0	1.5	2.0	2.5	2.5
φ d	0.4	0.45	0.45	0.45	0.45

Type numbering system (Example : 25V 10μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	M	A	1	E	1	0	0	M	D	D	

※2 Case dia. code

φ D	Code
3	2
4 ~ 8	——

Configuration ※1
Capacitance tolerance (± 20%)
Rated capacitance (10μF)
Rated voltage (25V)
Series name
Type

※1 Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
3	CD	CA
4 ~ 8	DD	DA

※ Please contact to us if other configurations are required.
※ 2 In case at φ 3 units, put 2 as case dia. code.

■Dimensions

D×L (mm)

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4×5(3×5)	1.0(1.0)
0.22	R22													4×5(3×5)	2.0(2.0)
0.33	R33													4×5(3×5)	2.8(2.8)
0.47	R47													4×5(3×5)	4.0(4.0)
1	010													4×5(3×5)	8.4(8.0)
2.2	2R2											3×5	8.4	● 4×5	13(10)
3.3	3R3									3×5	10	● 4×5	15(10)	4×5	17
4.7	4R7							3×5	10	● 4×5	16(12)	4×5	18	5×5	20
10	100			3×5	15			● 4×5	23(18)	5×5	27	5×5	29	6.3×5	33
22	220	3×5	19	● 4×5	28(21)	5×5	33	5×5	37	6.3×5	42	6.3×5	46	□ 8×5	52(48)
33	330	4×5	28	5×5	37	5×5	41	○ 6.3×5	49(43)	6.3×5	52	□ 8×5	62(52)	8×5	71
47	470	4×5	33	5×5	45	○ 6.3×5	52(43)	6.3×5	58	□ 8×5	70(62)	8×5	80		
100	101	5×5	56	○ 6.3×5	70(68)	□ 8×5	80(76)	□ 8×5	92(86)	8×5	110				
220	221	6.3×5	96	□ 8×5	110(90)	8×5	135								
330	331	8×5	145	8×5	170										Rated ripple
470	471	8×5	185											Case size	

Size 3×5 is available for capacitors marked. " ● "/ Size 5×5 is available for capacitors marked. " ○ "
Size 6.3×5 is available for capacitors marked. " □" In such a case, MR will be put at 2nd and 3rd digit of type numbering system.
( ) = φ3 units and MR series.

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

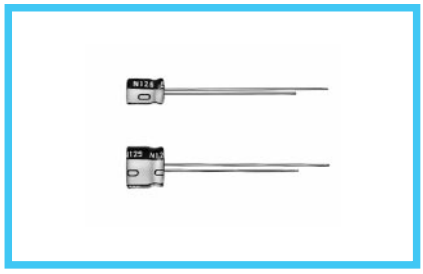
nichicon MUSE **MC** series

5mmL, For Audio Equipment

For Audio Use Anti-Solvent Feature

- "nichicon MUSE" acoustic series, with 5mm height.
- Ideally suited for very compact audio products in very thin and small dimensions.

SK
Smaller
MC



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) ,whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2
	Z–40°C / Z+20°C	15	8	6	4	4	3	3

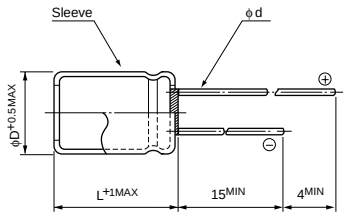
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristics requirement listed at right.

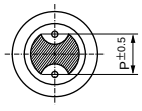
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C tor 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type





φD	4	5	6.3
P	1.5	2.0	2.5
φd	0.45	0.45	0.45

Type numbering system (Example : 25V 10μF)

1 2 3 4 5 6 7 8 9 10 11
U M C 1 E 1 0 0 M D J

- Configuration: D J
- Capacitance tolerance (±20%): M
- Rated Capacitance (10μF): 1 0 0
- Rated voltage (25V): 1 E
- Series name: M C
- Type: U

φD	Code
4 ~ 6.3	DJ

※ Please contact to us if Eco-Products are required.

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4×5	1.0
0.22	R22													4×5	2.0
0.33	R33													4×5	2.8
0.47	R47													4×5	4.0
1	010													4×5	8.4
2.2	2R2													4×5	13
3.3	3R3													4×5	17
4.7	4R7									4×5	16	4×5	18	5×5	20
10	100							4×5	23	5×5	27	5×5	29	6.3×5	33
22	220			4×5	28	5×5	33	5×5	37	6.3×5	42	6.3×5	46		
33	330	4×5	28	5×5	37	5×5	41	6.3×5	49	6.3×5	52				
47	470	4×5	33	5×5	45	6.3×5	52	6.3×5	58						
100	101	5×5	56	6.3×5	70										Rated ripple
220	221	6.3×5	96											Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

MF

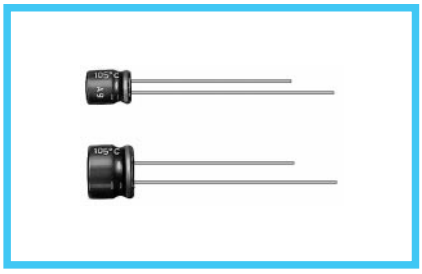
5mmL, Low Impedance

series

Low Impedance Anti-Solvent Feature

- Low impedance over wide temperature range of –55 ~ +105°C, with 5mm height.
- Suited for DC-DC converters where smaller case size and lower impedance are required.

MF ← Low Impedance MT



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 35V
Rated Capacitance Range	1 ~ 100μF
Rated Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35
tan δ (MAX.)	0.22	0.20	0.18	0.14	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	2	2	2	2	2
	Z–55°C /Z+20°C	4	4	3	3	3

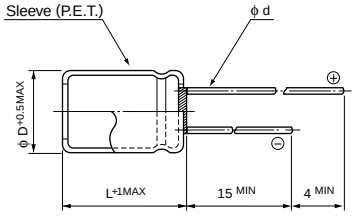
Endurance — After 1000 hours' application of rated voltage at 105°C capacitors meet the characteristic requirements listed at right.

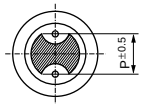
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on dark brown sleeve.

■Radial Lead Type





φ D	4	5	6.3
P	1.5	2.0	2.5
φ d	0.45	0.45	0.45

Type numbering system (Example : 25V 10μF)

1	2	3	4	5	6	7	8	9	10	11
U	M	F	1	E	1	0	0	M	D	D

- Configuration ※
- Capacitance tolerance (± 20%)
- Rated capacitance (10μF)
- Rated voltage (25V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DH

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(μF) \ V	Code	6.3			10			16			25			35		
		0J			1A			1C			1E			1V		
1	010													4×5	5.0	50
1.5	1R5													4×5	5.0	50
2.2	2R2													4×5	5.0	50
3.3	3R3													4×5	5.0	50
4.7	4R7										4×5	5.0	50	4×5	5.0	50
6.8	6R8										4×5	5.0	50	5×5	2.6	80
10	100							4×5	5.0	50	5×5	2.6	80	5×5	2.6	80
15	150							5×5	2.6	80	6.3×5	1.3	115	6.3×5	1.3	115
22	220	4×5	5.0	50	5×5	2.6	80	5×5	2.6	80	6.3×5	1.3	115	6.3×5	1.3	115
33	330	5×5	2.6	80	5×5	2.6	80	6.3×5	1.3	115	6.3×5	1.3	115			
47	470	5×5	2.6	80	6.3×5	1.3	115	6.3×5	1.3	115						
68	680	6.3×5	1.3	115										Case size	Impedance	Rated ripple
100	101	6.3×5	1.3	115												

Max. Impedance (Ω) at 20°C 100kHz
Rated Ripple (mA rms) at 105°C 100kHz

- **Frequency coefficient of rated ripple current**

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.35	0.50	0.64	0.83	1.00

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

※Trimmed (Cut) or Formed Leads

● Radial lead type
In order to identify correct part number for the processed lead product, cut/formed lead code must be added to bulk part number.

● If the bulk part number is up to 11th digit, Iprocessed lead coding shall be as follows:

12	13	14
1	□	□
	code	

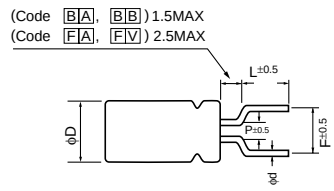
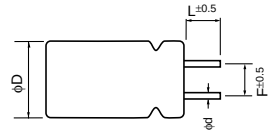
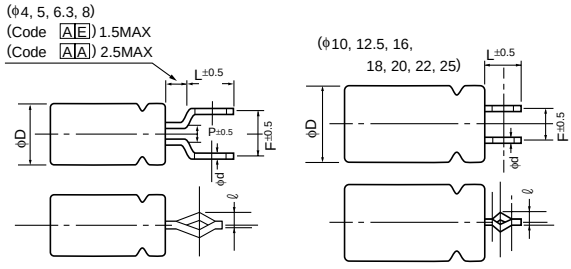
● In case 12th digit is numeral, it shall be:

12	13	14
□	□	□
	code	

● In case 12th digit is alphabet, it shall be:

12	13	14	15	16
□	×	×	□	□
			code	

(mm)

Configurations	Cut / Formed lead code		Dimensions (mm)				Lead configurations
	Code	Applicable series	ϕD	F	L	ℓ	
Forming and cutting	BA	5mmL,7mmL series	4	5	5.0	—	
			5	5	5.0	—	
	FA	Other series	6.3	5	5.0	—	
			8	5	5.0	—	
	BB	5mmL,7mmL series	4	5	3.5	—	
			5	5	3.5	—	
	FV	Other series	6.3	5	3.5	—	
			8	5	3.5	—	
Cutting	CA	All series	3	1.0	5.0	—	
			4	1.5	5.0	—	
			5	2.0	5.0	—	
			6.3	2.5	5.0	—	
			8	※3.5	5.0	—	
			10	5	5.0	—	
			12.5	5	5.0	—	
			16	7.5	5.0	—	
			18	7.5	5.0	—	
			20	10	5.0	—	
			22	10	5.0	—	
			25	12.5	5.0	—	
	CP	All series	Same as above.		4.5	—	
	CC	All series	Same as above.		4.0	—	
	CV	All series	Same as above.		3.5	—	
	CT	All series	Same as above.		3.2	—	
	CM	All series	Same as above.		3.0	—	※ϕ8 × 5 = F: 2.5
Snap-in	AE	5mmL,7mmL series	4	5	4.5	1.1	
			5	5	4.5	1.1	
	AA	Other series	6.3	5	4.5	1.1	
			8	5	4.5	1.3	
	AA	All series	10	5	4.5	1.3	
			12.5	5	4.5	1.3	
			16	7.5	4.5	1.3	
			18	7.5	4.5	1.3	
			20	10	5.0	1.8	
			22	10	5.0	1.8	
			25	12.5	5.0	1.8	

*Lead diameter (ϕd) and lead pitch (P) are subject to capacitor specifications.

※Taped Leads for Automatic Insertion Systems

※Solid conductive polymer capacitors are only available for straight lead.

- Radial lead type (Applicable standard JIS C0806-2)
  In order to identify correct part number for the taped product, taping code must be added.
- If the bulk part number is up to 11th digit, taping code shall be as follows: 12 13 14
  1 [ ] [ ]
  code
- In case 12th digit is numeral, it shall be
  12 13 14
  [ ] [ ] [ ]
  code

(mm)

Specifications					Capacitor diameter (ϕ)	Taping code	
Packaging	Lead style	⊕ ⊖ Leader	F	P_0		Code	Applicable size
Ammo-pack	Formed lead	———	See Table 1	12.7	3 ~ 8	TE TP TA	Body length (5mmL, 7mmL) (ϕ3 × 5) (ϕ5×9 ~ ϕ8×9, ϕ5×11 ~ ϕ8×20)
	Straight lead	———	See Table 2	12.7	4 ~ 10	TP TD	Body length (5mmL, 7mmL) (ϕ8×7, ϕ5×9 ~ ϕ10×25)
		———	See Table 2	15.0	12.5	TO	(ϕ12.5×12.5 ~ ϕ12.5×25)
		———	See Table 2	15.0	16, 18	TN	(ϕ16, ϕ18×15 ~ 25)

(Formed lead type)

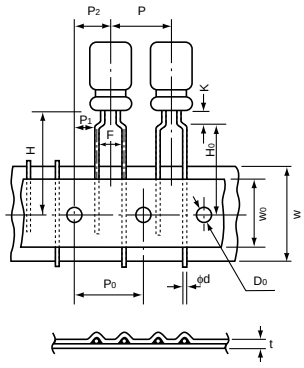


Table 1

(mm)

Item \ Case Size / Taping Code	Tolerance	Formed Lead Type							
		ϕ3 × 5	ϕ4 × 5 ϕ4 × 7	ϕ5 × 5 ϕ5 × 7	ϕ4 × 11 ϕ5 × 9 ϕ5 × 11	ϕ6.3 × 5 ϕ6.3 × 7	ϕ8 × 5 ϕ8 × 7	ϕ6.3 × 9 ϕ6.3 × 11 ϕ6.3 × 15	ϕ8 × 9 ϕ8 × 11.5 ϕ8 × 15 ϕ8 × 20
		TP	TE	TE	TA	TE	TE	TA	TA
ϕd Lead-wire diameter	±0.05	0.40	0.45	0.45	0.45 0.5	0.45	0.45 0.5	0.5	0.6
P Pitch of component	±1.0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
P_0 Feed hole pitch	±0.2	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
P_1 Hole center to lead	±0.5	5.1	3.85	3.85	3.85	3.85	3.85	3.85	3.85
P_2 Feed hole center to component center	±1.0	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
F Lead-to-lead distance	+0.8 −0.2	2.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
K Clinch height	MAX	1.5	1.5	1.5	2.5	1.5	1.5	2.5	4.0
H Height of component from tape center	+0.75 −0.5	18.5	17.5	17.5	18.5	17.5	17.5	18.5	20.0
H_0 Lead-wire clinch height	±0.5	16.0 ※3	16.0	16.0	16.0	16.0	16.0	16.0	16.0
W Tape Width	±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
W_0 Hold down tape width	MIN	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
ϕD_0 Feed hole diameter	±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
t Total tape thickness	±0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

(Straight lead type)

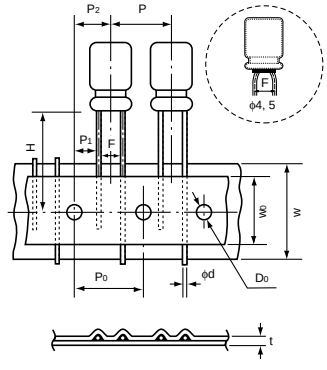


Table 2

(mm)

Item \ Case Size / Taping Code	Tolerance	Straight Lead Type								
		ϕ4	ϕ5	ϕ6.3	ϕ8 × 5	ϕ8 × 7	ϕ8	ϕ10	ϕ12.5	ϕ16 ϕ18
		TP	TP, TD	TP, TD	TP	TD	TD	TD	TO	TN
ϕd Lead-wire diameter	±0.05	0.45	0.45 0.5	0.45 0.5	0.45	0.5	0.6	0.6	0.6	0.8
P Pitch of component	±1.0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	15.0	30.0
P_0 Feed hole pitch	±0.2	12.7	12.7	12.7	12.7	12.7	12.7	12.7	15.0	15.0
P_1 Hole center to lead	±0.5	5.1 (※1 5.35)	5.1 (※1 5.35)	5.1	5.1	4.6	4.6	3.85	5.0	3.75
P_2 Feed hole center to component center	±1.0	6.35	6.35	6.35	6.35	6.35	6.35	6.35	7.5	7.5
F Lead-to-lead distance	+0.8 −0.2	2.5※1	2.5※1	2.5	2.5	3.5	3.5	5.0	5.0	7.5※2
H Height of component from tape center	+0.75 −0.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
W Tape Width	±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
W_0 Hold down tape width	MIN	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.5	12.5
ϕD_0 Feed hole diameter	±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
t Total tape thickness	±0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Notes:
※1 F = 2.0mm is also available, provided that capacitor body height is less than 9mm. Taping code to be TC.
※2 Tolerance on F for ϕ16 and ϕ18 units shall be ±0.8mm.
※3 Tolerance on Ho for ϕ3 units shall be 16.0MIN.

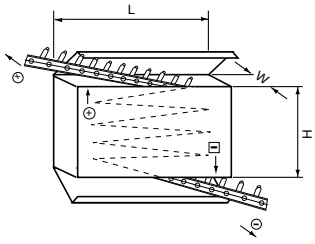
Special taping specifications on H. F. and K. dimensions other than the above figures are available upon request.

(mm)

L	H	W	Case Size	Q'ty / Box
340	150	50	3 × 5	2000
340	200	50	4 × 5, 4 × 7	2000
340	250	50	5 × 5, 5 × 7	2000
			8 × 5, 8 × 7	1000
340	300	50	6.3 × 5, 6.3 × 6, 6.3 × 7	2000
340	260	54	4 × 11, 5 × 9, 5 × 11	2000
			8 × 9, 8 × 10, 8 × 11.5, 8 × 15	1000
340	200	54	10 × 8, 10 × 9, 10 × 10, 10 × 12.5, 10 × 15, 10 × 16	500
340	300	54	6.3 × 9, 6.3 × 11, 6.3 × 15	2000
340	260	62	8 × 20	1000
340	200	62	10 × 20	500
340	200	65	10 × 25	500
330	290	65	12.5 × 12.5, 12.5 × 15, 12.5 × 20	500
			12.5 × 25	
			18 × 15, 18 × 20, 18 × 25	250
320	230	65	16 × 15, 16 × 20, 16 × 25	250

Packaging

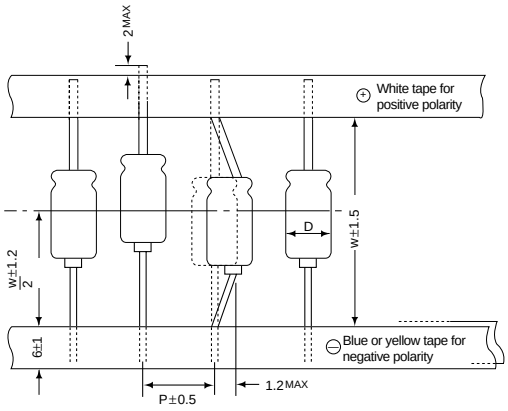
● Ammo-pack (Flat box type)



● Axial lead type (Applicable standard JIS C0805)
The following code shall be put at 12th ~ 14th digit of the corresponding type number of capacitors. (mm)

Taping Specifications		Case dia (ϕ)	Taping code	Q'ty / Reel (pcs.)
Dim. W (Tape distance)	Dim. P (Component Pitch)			
52.4	10	5	1LS	1600
		6.3		1300
		8		1000
63.5	10	5	1LV	1600
		6.3		1300
		8		1000
73.0	10	5	1LY	1600
		6.3		1300
		8		1000
52.4	15	10	1LT	500
		13 (except 31.5L)		350
63.5	15	10	1LW	500
		13		350
73.0	15	10	1LZ	500
		13		350

Please contact us for complete information on the package dimensions for tapes axial lead capacitors.



ALUMINUM ELECTROLYTIC CAPACITORS

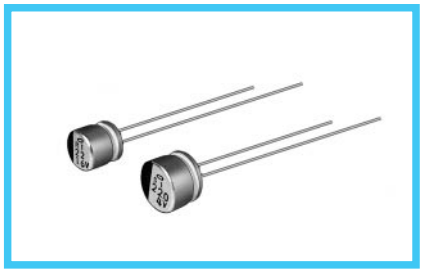
nichicon

MJ 5.2mmL MAX. series

Smaller

Anti-Solvent Feature

● 5.2mmL MAX. height.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA),whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.35	0.26	0.20	0.16	0.14	0.12	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2
	Z–40°C / Z+20°C	15	8	8	4	4	3	3

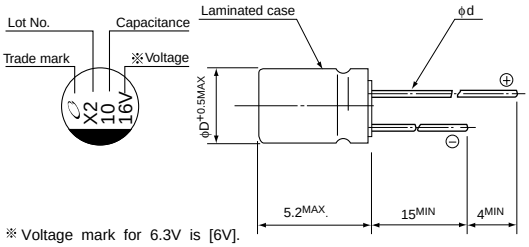
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

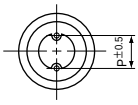
Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Black print on the case top.

■Radial Lead Type



※ Voltage mark for 6.3V is [6V].



φD	4	5	6.3
P	1.5	2.0	2.5
φd	0.45	0.45	0.45

Type numbering system (Example : 25V 10μF)

1	2	3	4	5	6	7	8	9	10	11
U	M	J	1	E	1	0	0	M	D	R

- Configuration
- Capacitance tolerance (± 20%)
- Rated Capacitance (10μF)
- Rated voltage (25V)
- Series name
- Type

φD	Code
4 ~ 6.3	DR

● The lead-free product is also available upon request. In this case, [L] will be put at 11th digit of type numbering system.

■Dimensions

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.0
0.33	R33													4	2.8
0.47	R47													4	4.0
1	010													4	8.4
2.2	2R2													4	13
3.3	3R3													4	17
4.7	4R7									4	16	4	18	5	20
10	100							4	23	5	27	5	29	6.3	33
22	220			4	28	5	33	5	37	6.3	42	6.3	46		
33	330	4	28	5	37	5	41	6.3	49	6.3	52				
47	470	4	33	5	45	6.3	52	6.3	58						
100	101	5	56	6.3	70										Rated ripple
220	221	6.3	96											Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

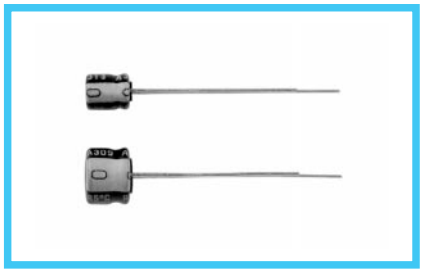
ML

5mmL, Low Leakage Current

series

Low Leakage Current Anti-Solvent Feature

● Low leakage current series with 5mm height.



ML ← Low Leakage Current MA

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 100μF
Rated Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.002CV or 0.4 (μA),whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2
	Z–40°C / Z+20°C	15	10	8	6	4	3	3

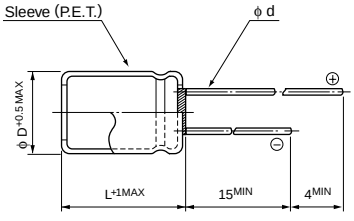
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

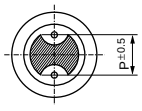
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve. (PVC sleeve product : Printed with black color letter on yellow sleeve.)

■Radial Lead Type





φ D	4	5	6.3
P	1.5	2.0	2.5
φ d	0.45	0.45	0.45

Type numbering system (Example : 10V 33μF)

1	2	3	4	5	6	7	8	9	10	11
U	M	L	1	A	3	3	0	M	D	D

- Configuration ※
- Capacitance tolerance (± 20%)
- Rated capacitance (33μF)
- Rated voltage (10V)
- Serise name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DA

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4×5	1.0
0.22	R22													4×5	2.0
0.33	R33													4×5	2.8
0.47	R47													4×5	4.0
1	010													4×5	8.4
2.2	2R2													4×5	13
3.3	3R3													5×5	17
4.7	4R7									4×5	16	4×5	18	5×5	20
10	100							4×5	23	5×5	27	5×5	29	6.3×5	33
22	220			4×5	28	5×5	33	5×5	37	6.3×5	42	6.3×5	46		
33	330	5×5	28	5×5	37	5×5	41	6.3×5	49	6.3×5	52				
47	470	5×5	33	5×5	45	6.3×5	52	6.3×5	58						Rated ripple
100	101	6.3×5	56	6.3×5	70									Case size	

Rated Ripple (mA rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

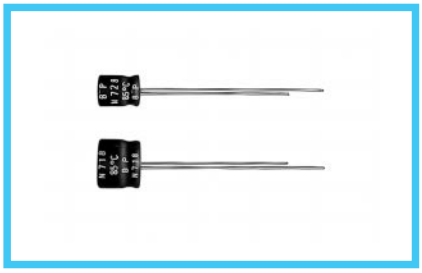
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

MP 5mmL, Bi-Polarized series

BP Bi-polarized | Anti-Solvent Feature

● Bi-polarized series with 5mm height.



MP ← Bi-polarized MA

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 47µF
Rated Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05CV or 10 (µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.17	0.17	0.15	0.15

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	3	3

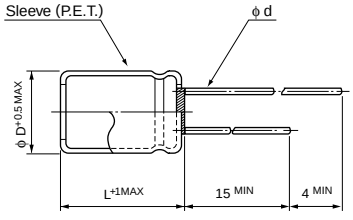
Endurance — After 2000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

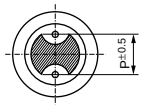
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type





φ D	4	5	6.3
P	1.5	2.0	2.5
φ d	0.45	0.45	0.45

Type numbering system (Example : 10V 33µF)

1	2	3	4	5	6	7	8	9	10	11
U	M	P	1	A	3	3	0	M	D	D

- Configuration※
- Capacitance tolerance (± 20%)
- Rated capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DA

※Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×5	1.0
0.22	R22											4×5	2.0
0.33	R33											4×5	2.8
0.47	R47											4×5	4.0
1	010											4×5	8.4
2.2	2R2									4×5	8.4	5×5	13
3.3	3R3							5×5	12	5×5	16	5×5	17
4.7	4R7					4×5	12	5×5	16	5×5	18	6.3×5	20
10	100			4×5	17	5×5	23	6.3×5	27	6.3×5	29		
22	220	5×5	28	6.3×5	33	6.3×5	37						
33	330	6.3×5	37	6.3×5	41	6.3×5	49						Rated
47	470	6.3×5	45									Case size	ripple

Rated Ripple (mA rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

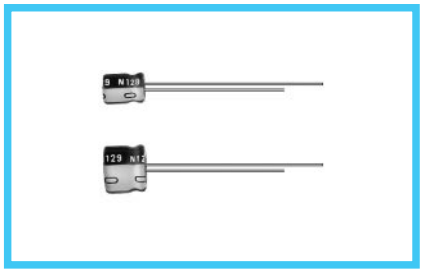
MT

5mmL, Wide Temperature Range

series

Anti-Solvent Feature

● Wide temperature range of –55 ~ +105°C, with 5mm height.



MT

High Temperature

MA

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 100µF
Rated Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.

tan δ

Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.37	0.28	0.24	0.20	0.16	0.13 (0.14)	0.12 (0.14)

Figures in ( ) are for φ 3 product.

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	6	3	3	2	2	2	2
	Z–40°C / Z+20°C	12	8	5	4	3	3	3

Endurance

After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value (φ 3mm unit,and ≤ 16V) Within ±20% of initial value (≥ 25V)
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

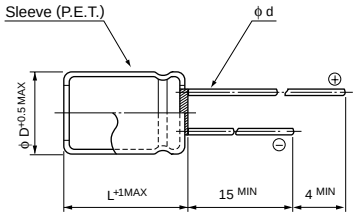
Shelf Life

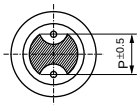
After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type





(φ 3 : P±0.3)

φ D	3	4	5	6.3
P	1.0	1.5	2.0	2.5
φ d	0.40	0.45	0.45	0.45

Type numbering system (Example : 25V 10µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	M	T	1	E	1	0	0	M	D	D	

φ D	Code
3	2
4 ~ 6.3	—

※2 Case dia code

Configuration ※1

Capacitance tolerance (± 20%)

Rated capacitance (10µF)

Rated voltage (25V)

Series name

Type

※1 Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
3	CD	CH
4 ~ 6.3	DD	DH

※1 Please contact to us if other configurations are required.

※2 For φ 3mm unit, place case dia. code of 2 to 12th digit.

■Dimensions

D×L (mm)

Cap.(µF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													●4×5	1.0
0.22	R22													●4×5	2.6
0.33	R33													●4×5	3.2
0.47	R47													●4×5	3.8
1	010													●4×5	6.2 (5.9)
2.2	2R2											3 ×5	7.5	●4×5	11 (9)
3.3	3R3											● 4 ×5	11 (9)	4×5	14
4.7	4R7									●4×5	13 (10)	4 ×5	15	5×5	19
10	100							● 4×5	18 (14)	5×5	23	5×5	25	6.3×5	30
22	220	4×5	22	4×5	22	5×5	27	5×5	30	6.3×5	38	6.3×5	48		
33	330	5×5	30	5×5	30	5×5	35	6.3×5	40	6.3×5	48				
47	470	5×5	36	5×5	36	6.3×5	46	6.3×5	50						Rated ripple
100	101	6.3×5	60	6.3 × 5	60									Case size	

Size 3 × 5 is available for capacitors marked " ●"
Figures in ( ) are for φ 3 product.

Rated Ripple (mA rms) at 105°C 120Hz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

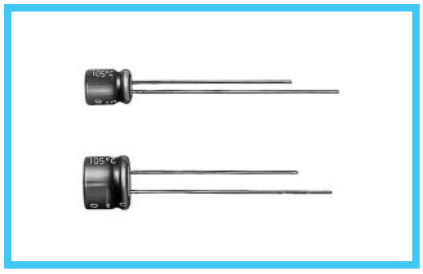
MV

5mmL, Long Life Assurance

series

Long Life

● Extended load life of 5000 hours at +105°C, with 5mm height.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 100μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA),whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.37	0.28	0.24	0.20	0.16	0.13	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	8	4	3	2	2	2	2
	Z–40°C / Z+20°C	14	10	7	5	3	3	3

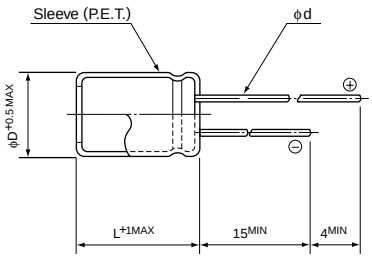
Endurance — After 5000 hours' application of rated voltage at 105°C capacitors meet the characteristic requirements listed at right.

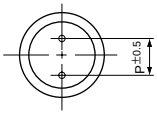
Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with silver color letter on dark brown sleeve.

■Radial Lead Type





φD	4	5	6.3
P	1.5	2.0	2.5
φd	0.45	0.45	0.45

Type numbering system (Example : 25V 10μF)

1 2 3 4 5 6 7 8 9 10 11

U M V 1 E 1 0 0 M F D

- Configuration※
- Capacitance tolerance (± 20%)
- Rated Capacitance (10μF)
- Rated voltage (25V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	FD	FH

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4×5	1.0
0.22	R22													4×5	2.6
0.33	R33													4×5	3.2
0.47	R47													4×5	3.8
1	010													4×5	6.2
2.2	2R2													4×5	11
3.3	3R3													4×5	14
4.7	4R7									4×5	13	4×5	15	5×5	19
10	100							4×5	18	5×5	23	5×5	25	6.3×5	30
22	220	4×5	22	4×5	22	5×5	27	5×5	30	6.3×5	38	6.3×5	42		
33	330	5×5	30	5×5	30	5×5	35	6.3×5	40	6.3×5	48				
47	470	5×5	36	5×5	36	6.3×5	46	6.3×5	50						Rated ripple
100	101	6.3×5	60	6.3×5	60									Case size	

Rated Ripple (mA rms) at 105°C 120Hz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

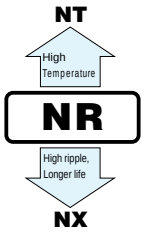
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

NR Screw Terminal Type series

High Ripple Current

- Load life of 5000 hours application of ripple current at 85°C .
- Extended range up to φ100 × 250ℓ size.



■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +85°C (10~100V) , – 25 ~ +85°C (160~250V)
Rated Voltage Range	10 ~ 250V
Rated Capacitance Range	1000 ~ 2200000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than $3\sqrt{CV}$ (μA) or 5 mA, whichever is smaller (at 20°C) . [C:Rated Capacitance (μF) , V:Voltage(V)]

tan δ

φD	L \ V	10	16	25	35	50	63	80	100	160~250
35	80~100	0.6	0.4	0.35	0.3	0.25	0.25	0.2	0.12	0.15
	120	0.7	0.55	0.4	0.3	0.25	0.25	0.2	0.15	0.15
51	70~100	0.9	0.6	0.45	0.35	0.25	0.25	0.2	0.15	0.15
	120~140	1.0	0.8	0.5	0.4	0.3	0.25	0.2	0.15	0.15
63.5	100	0.9	—	—	0.5	0.35	0.3	0.25	—	0.2
	120~140	1.2	0.75	0.65	—	—	0.3	0.3	0.2	0.2
76.2	100	1.6	—	—	0.65	—	—	—	—	0.2
	120~140	1.6	1.1	0.75	0.75	0.55	0.5	0.35	0.3	0.2
90	140~220	2.0	1.5	1.0	0.9	0.75	0.6	0.4	0.3	0.25
100	250	2.4	1.5	1.0	0.9	0.75	0.6	0.4	0.3	0.25

Measurement frequency: 120Hz, Temperature : 20°C

Stability at Low Temperature

Measurement frequeny : 120Hz

Rated voltage(V)	10~100	160~250
Impedance ratio ZT/Z20(MAX.)	Z—40°C / Z+20°C	Z—25°C / Z+20°C
	12	8

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 5000 hours at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±15% of initial value
tan δ	175% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

After leaving capacitors under no load at 85°C for 1000 hours, they meet the requirements listed at right.

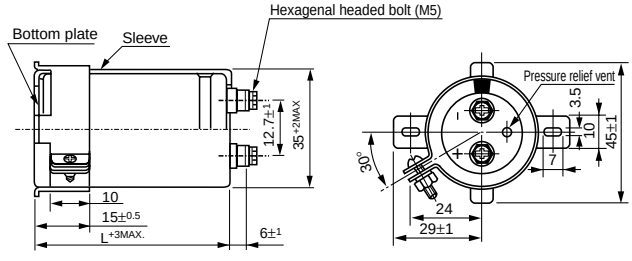
Capacitance change	Within ±20% of initial value
tan δ	175% or less of initial specified value
Leakage current	Initial specified value or less

Marking

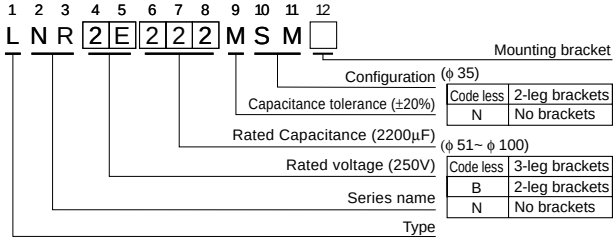
Printed with black color letter on light blue sleeve.

■Drawing

φ 35 Screw terminal type



Type numbering system (Example : 250V 2200μF)

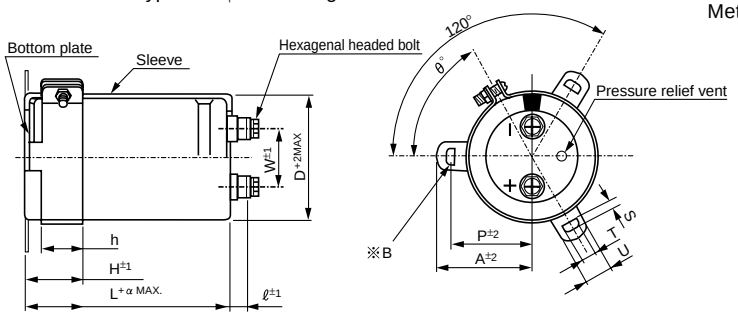


※ Please contact to us if PVCless products are required.

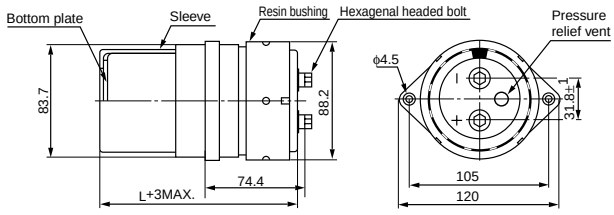
● Dimension table in next page.

NR series

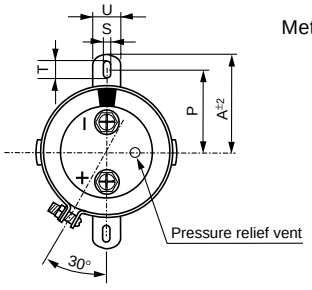
Screw terminal types for ϕ51 and larger



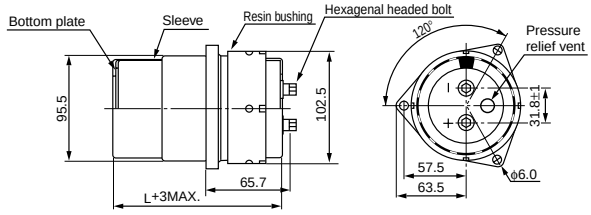
Method to mount resin bushing (ϕ76.2) (Apply to L=150 or more)



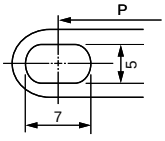
Note:
Capacitors with body dia. ϕ51 or larger are furnished with 3-leg brackets shown above as standard.
If these capacitors are preferred to have 2-leg brackets as shown right, add "B" in the 12th digit of type numbering system.



Method to mount resin bushing (ϕ90) (Apply to L=150 or more)



※B
3-leg brackets for ϕ90 capacitors have different hole shapes from the ordinary ones as illustrated below.



● Dimension of terminal pitch (W) and length (ℓ) and Nominal dia.of bolt (mm)

ϕD	W	ℓ	α	Nominal dia.of bolt
51	22.0	6	3	M5
63.5	28.6	6	3	M5
76.2	31.8	6	3	M5
90	31.8	6	3	M5
100	41.5	10	4	M8

● Dimensions of mounting bracket (mm)

Leg Shape / Symbol / ϕD	3-Legs					2-Legs			
	51	63.5	76.2	90	100	51	63.5	76.2	90
P	32.5	38.1	44.5	50.8	56.3	33.2	40.5	46.5	53
A	38.5	43	49.2	58.5	62	40	46.5	53	59
T	7.5	8.0	7.0	8.0	8.0	6.0	7.0	6.0	6.0
S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
U	12	14	14	18	16	14	14	14	14
θ°	60	60	60	60	60	30	30	30	30
H	20	25	30	35	36	25	35	35	35
h	15	20	24	25	30	15	20	20	20

■Dimensions

D × L (mm)

V(Code)		10V (1A)		16V (1C)		25V (1E)	
Surge		13V		20V		32V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
33000	333					35×80	6.2
47000	473	35×80	6.0	35×80	6.4	35×100	8.2
68000	683	35×80	7.2	35×100	7.9	35×120	9.4
100000	104	35×100	8.8	35×120	10.6	51×100	12.0
150000	154	51×80	10.7	51×100	11.5	51×120	15.3
220000	224	51×100	13.0	51×120	15.6	63.5×120	18.9
330000	334	63.5×100	15.9	63.5×120	25.1	76.2×120	24.8
470000	474	63.5×120	19.0	76.2×120	30.5	90×170	30.8
680000	684	76.2×120	22.8	90×170	33.0	90×220	33.3
1000000	105	90×170	27.7	90×220	36.0	100×250	36.4
1500000	155	90×220	33.9	100×250	39.7		
2200000	225	100×250	41.1				

Rated Ripple (A rms) at 85°C 120Hz

NR series

■Dimensions

D × L (mm)

V(Code)		35V (1V)		50V (1H)		63V (1J)	
Surge		44V		63V		79V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
10000	103					35×80	4.1
15000	153			35×80	5.4	35×100	5.5
22000	223			35×100	6.1	35×120	7.1
33000	333	35×80	6.2	51×70	7.0	51×80	8.8
47000	473	35×120	8.2	51×90	8.6	51×120	11.7
68000	683	51×80	9.3	51×100	11.0	63.5×100	15.0
100000	104	51×120	13.6	63.5×100	14.2	63.5×140	20.8
150000	154	63.5×100	14.5	76.2×120	18.6	76.2×140	26.0
220000	224	76.2×100	16.8	90×140	20.3	90×170	28.3
330000	334	76.2×140	24.8	90×170	25.3	90×220	31.2
470000	474	90×170	32.6	90×220	33.2	100×250	33.6
680000	684	90×220	35.2	100×250	36.0		
1000000	105	100×250	38.5				

V(Code)		80V (1K)		100V (2A)		160V (2C)	
Surge		100V		125V		200V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
2200	222					35×80	3.2
3300	332					35×120	4.7
4700	472			35×80	3.8	51×80	5.0
6800	682			35×100	4.5	51×100	6.4
10000	103	35×80	4.2	35×120	5.3	63.5×100	9.1
15000	153	35×120	6.0	51×80	6.0	76.2×100	12.0
22000	223	51×80	6.5	51×100	6.8	76.2×140	16.9
33000	333	51×120	9.2	51×140	10.0	90×140	19.2
47000	473	63.5×100	12.7	63.5×140	14.4	90×170	20.6
68000	683	63.5×140	15.5	76.2×140	18.2	90×220	22.3
100000	104	76.2×140	21.3	90×170	22.1	100×250	24.4
150000	154	90×170	26.5	90×220	27.0		
220000	224	90×220	28.9	100×250	32.7		
330000	334	100×250	31.8				

V(Code)		200V (2D)		250V (2E)	
Surge		250V		300V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple
1000	102			35×80	2.4
1500	152	35×80	2.9	35×100	3.0
2200	222	35×100	3.5	51×80	4.0
3300	332	51×80	4.8	51×100	5.4
4700	472	51×100	6.3	63.5×100	7.3
6800	682	51×140	7.3	63.5×120	8.9
10000	103	63.5×120	9.8	76.2×120	11.8
15000	153	76.2×120	13.0	90×140	16.4
22000	223	90×140	15.9	90×170	17.9
33000	333	90×170	19.5	90×220	19.7
47000	473	90×220	20.9	100×250	21.2
68000	683	100×250	22.6		

Rated Ripple (A rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		60	120	360	1k	10k~
Coeff.	10~100V	0.90	1.00	1.08	1.15	1.15
	160~250V	0.88	1.00	1.08	1.15	1.20

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

NT

Screw Terminal Type, Wide Temperature Range

series

HR High Ripple Current

- Load life of 5,000 hours (2,000 hours for 10~250V,500V) application of ripple current at +105°C.
- Extended voltage range from 10V up to 500V.
- Extended range up to $\phi 100 \times 250\ell$ size.

NT

High Temperature

NR

■Specifications

Item	Performance Characteristics
Category Temperature Range	– 40 ~ +105°C (10~100V) , – 25 ~ +105°C (160~500V)
Rated Voltage Range	10 ~ 500V
Rated Capacitance Range	220 ~ 1500000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than $3\sqrt{CV}$ (μA) or 5mA, whichever is smaller. (at 20°C) [C:Rated Capacitance (μF) , V:Voltage(V)]

tan δ — Measurement frequency:120Hz, Temperature:20°C

φD	L \ V	10	16	25	35	50	63	80	100	160~250	250~500
35	80~100	0.65	0.45	0.4	0.3	0.25	0.25	0.2	0.12	0.15	0.2
51	80~100	0.9	0.6	0.5	0.4	0.25	0.25	0.2	0.15	0.15	0.2
	120	0.85	0.6	0.5	0.4	0.3	—	—	—	—	0.2
63.5	100	—	—	0.65	—	0.35	0.3	0.25	0.2	0.2	0.2
	110~130	1.2	0.8	0.7	0.5	0.35	0.3	—	—	0.2	0.2
76.2	100	2.0	1.2	0.9	0.7	0.55	0.5	0.3	0.3	—	0.2
	120~150	2.0	1.2	0.9	0.7	0.55	0.5	0.35	0.3	0.2	0.2
90	140~220	2.4	2.0	1.5	1.0	0.75	0.6	0.4	0.3	0.25	0.2
100	220 ,250	2.4	2.0	1.5	1.0	0.75	0.6	0.4	0.3	0.25	0.2

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage(V)		10~100	160~500
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C	—	8
	Z—40°C/Z+20°C	12	—

Endurance

After an application of DC voltage (in the range of rated DC voltage even after over-lapping the specified ripple current) for 5000 hours (2000 hours for 10~250V,500V) at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the requirements listed at right.

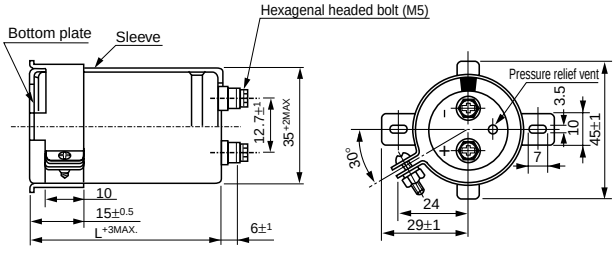
Capacitance change	Within ±20% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Marking

Printed with white color letter on black sleeve.

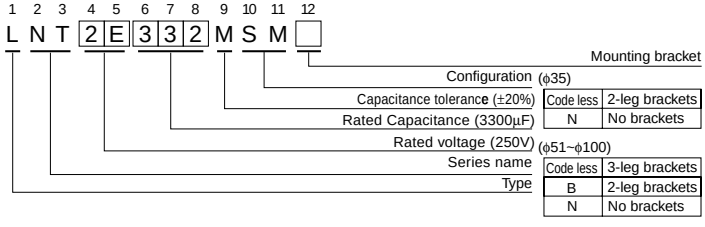
■Drawing

φ35 Screw terminal type

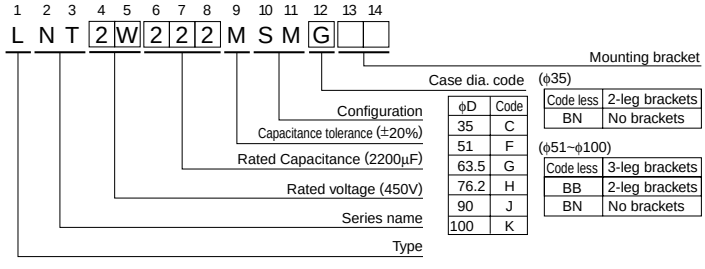


Type numbering system

Voltage 250V or less (Example : 250V 3300μF)



Voltage 350V or more (Example : 450V 2200μF)

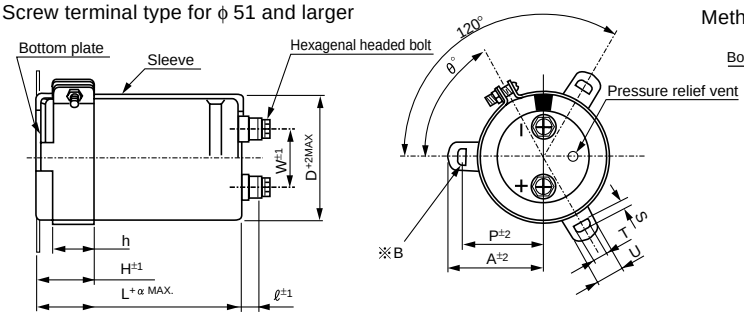


※ Please contact to us if PVCless products are required.

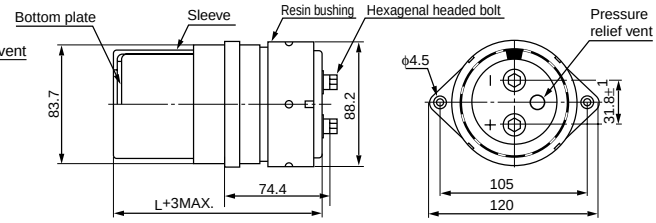
● Dimension table in next page.

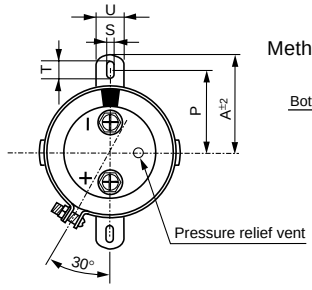
NT series

Screw terminal type for ϕ 51 and larger

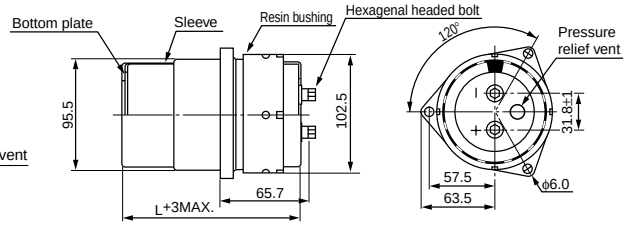


Method to mount resin bushing (ϕ76.2) (Apply to L=150 or more)



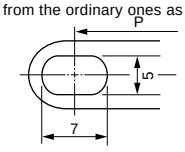


Method to mount resin bushing (ϕ90) (Apply to L=150 or more)



*B

3-leg brackets for ϕ90 capacitors have different hole shapes from the ordinary ones as illustrated below.



● Dimension of terminal pitch (W) and length (ℓ) and Nominal dia.of bolt (mm)

ϕD	W	ℓ	α	Nominal.of bolt
51	22.0	6	3	M5
63.5	28.6	6	3	M5
76.2	31.8	6	3	M5
90	31.8	6	3	M5
100	41.5	10	4	M8

● Dimensions of mounting bracket (mm)

Leg Shape / Symbol	3-Legs					2-Legs			
ϕD	51	63.5	76.2	90	100	51	63.5	76.2	90
P	32.5	38.1	44.5	50.8	56.3	33.2	40.5	46.5	53
A	38.5	43	49.2	58.5	62	40	46.5	53	59
T	7.5	8.0	7.0	8.0	8.0	6.0	7.0	6.0	6.0
S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
U	12	14	14	16	16	14	14	14	14
θ°	60	60	60	60	60	30	30	30	30
H	20	25	30	35	36	25	35	35	35
h	15	20	24	25	30	15	20	20	20

■Dimensions

D×L (mm)

V(Code)		10V (1A)		16V (1C)		25V (1E)		35V (1V)	
Surge		13V		20V		32V		44V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
10000	103							35×80	4.7
15000	153							35×80	5.1
22000	223					35×80	4.9	35×100	5.6
33000	333	35×80	4.8	35×80	5.2	35×100	6.2	51×80	7.4
47000	473	35×100	6.2	35×100	6.8	51×80	8.3	51×100	8.4
68000	683	51×80	6.8	51×80	7.1	51×120	10.2	51×120	12.3
100000	104	51×100	8.6	51×100	9.6	63.5×100	11.5	63.5×120	13.6
150000	154	51×120	10.8	51×120	11.0	63.5×120	13.8	76.2×120	15.1
220000	224	63.5×120	13.2	63.5×120	14.1	76.2×120	17.0	90×140	17.4
330000	334	76.2×120	15.8	76.2×120	20.6	90×140	20.8	90×170	21.3
470000	474	90×140	17.0	90×140	22.1	90×170	22.4	90×220	25.4
680000	684	90×170	18.4	90×170	24.0	90×220	24.2	100×250	27.5
1000000	105	90×220	20.1	90×220	26.1	100×220	26.4		
1500000	155	100×220	22.1	100×250	28.8				

Rated Ripple (A rms) at 105°C 120Hz

NT series

■Dimensions

D × L (mm)

V(Code)		50V (1H)		63V (1J)		80V (1K)		100V (2A)	
Surge		63V		79V		100V		125V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
2200	222							35×80	2.4
3300	332							35×80	3.3
4700	472					35×80	3.5	35×100	3.8
6800	682					35×100	3.9	51×80	5.2
10000	103	35×80	4.9	35×100	5.0	51×80	5.4	51×100	6.7
15000	153	35×100	5.5	51×80	5.9	51×100	6.4	63.5×100	7.8
22000	223	51×80	6.3	51×100	6.9	63.5×100	8.4	76.2×100	9.9
33000	333	51×120	8.0	63.5×100	9.4	76.2×100	9.9	76.2×140	12.7
47000	473	63.5×100	9.9	63.5×120	11.2	76.2×120	13.4	90×140	17.0
68000	683	63.5×120	12.8	76.2×120	13.5	90×140	17.0	90×170	18.2
100000	104	76.2×120	16.8	90×140	17.8	90×170	18.6	90×220	20.6
150000	154	90×140	19.5	90×170	21.0	90×220	21.6	100×220	23.4
220000	224	90×170	22.0	90×220	23.7	100×250	24.8		
330000	334	90×220	24.3	100×250	26.1				
470000	474	100×250	26.1						

V(Code)		160V (2C)		200V (2D)		250V (2E)	
Surge		200V		250V		300V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
680	681					35×80	1.4
1000	102	35×80	1.6	35×80	1.7	35×100	1.9
1500	152	35×80	2.1	35×100	2.3	51×80	2.4
2200	222	35×100	2.7	51×80	2.9	51×100	3.2
3300	332	51×80	3.8	51×100	3.9	63.5×100	4.3
4700	472	51×100	4.5	63.5×100	5.1	63.5×120	5.9
6800	682	63.5×100	6.8	63.5×120	7.0	76.2×120	7.1
10000	103	63.5×120	7.8	76.2×120	8.2	90×140	9.6
15000	153	76.2×120	9.8	76.2×140	10.4	90×170	12.7
22000	223	76.2×140	12.5	90×140	15.1	90×220	15.4
33000	333	90×140	13.4	90×220	16.6	100×250	17.0
47000	473	90×220	17.2	90×250	19.9		
68000	683	100×250	19.2				

V(Code)		350V (2V)		400V (2G)		450V (2W)		500V (2H)	
Surge		400V		450V		500V		550V	
Cap.(μF)	Code	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple	Case size	Rated ripple
220	221			35×80	1.6	35×80	1.8		
330	331	35×80	2.1	35×80	2.3	35×100	2.4	51×80	2.7
470	471	35×80	2.8	35×100	3.1	51×80	3.4	51×80	3.2
680	681	51×80	4.1	51×80	4.2	51×100	4.4	51×100	4.2
1000	102	51×80	6.5	51×80	6.6	51×100	7.0	51×120	5.5
1500	152	51×100	8.6	51×120	9.1	51×120	9.2	63.5×110	7.1
2200	222	51×120	11.0	63.5×100	11.5	63.5×110	11.8	63.5×130	9.3
2700	272	63.5×100	12.7	63.5×110	13.1	63.5×130	13.8	63.5×150	11.0
						76.2×110	14.5	76.2×130	11.0
3300	332	63.5×110	14.4	63.5×130	15.4	63.5×150	16.5	63.5×170	12.9
						76.2×130	17.1	76.2×150	13.0
3900	392	63.5×130	16.8	63.5×150	17.9	63.5×170	18.3		
				76.2×110	18.2			76.2×150	14.1
4700	472	63.5×150	19.8	63.5×170	20.7			76.2×190	17.2
		76.2×120	19.7	76.2×130	20.3	76.2×150	21.7	90×150	16.3
5600	562	63.5×170	22.7						
		76.2×130	22.2	76.2×150	23.7	76.2×190	26.4		
						90×150	24.1	90×150	17.8
6800	682	76.2×150	26.2	76.2×170	27.6				
				90×150	26.9	90×170	28.3	90×170	20.7
8200	822	76.2×170	30.3						
		90×150	29.3	90×170	31.0	90×190	32.5	90×220	25.5
10000	103	90×150	32.4	90×190	32.9	90×220	35.1	90×250	29.9
12000	123	90×190	36.0	90×220	38.3	90×230	39.2		
15000	153	90×220	42.9	100×220	44.5	90×250	45.6		
22000	223	100×250	48.0						

Rated Ripple (A rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency (Hz)		60	120	360	1k	10k~
Coeff.	10~100V	0.90	1.00	1.08	1.15	1.15
	160~250V	0.88	1.00	1.08	1.15	1.20
	350~500V	0.82	1.00	1.20	1.35	1.40

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

NX series

Screw Terminal Type, High ripple longer life.

HR High Ripple Current

L Long Life

NR Longer life NX

- Suited for use in industrial power supplies for inverter circuitry, etc.
- High ripple current, extra-high voltage application.
- High reliability, long life for 20,000 hours application of ripple current at +85°C.
- Extended range up to φ100 × 250ℓ size.
- Flame retardant electroly to type available.
- Bushing type for better vibration and insulation also available.

■Specifications

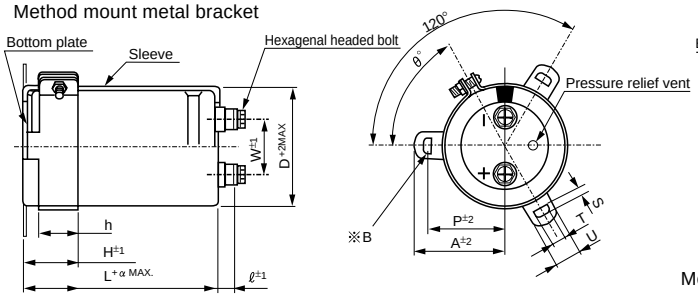
Item	Performance Characteristics
Category Temperature Range	– 25 ~ +85°C
Rated Voltage Range	350 ~ 630V
Rated Capacitance Range	1000 ~ 27000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than $3\sqrt{CV}$ (μA) or 5 mA, whichever is smaller (at 20°C). [C : Rated Capacitance(μF), V : Voltage (V)]
tan δ	See P199 (Measurement frequency:120Hz, Temperature:20°C)
Stability at Low Temperature	Rated voltage (V): 350 ~ 630; Impedance ratio ZT/Z20(MAX.): Z—25°C/Z+20°C: 8. Measurement frequency : 120Hz
Endurance	After an application of DC voltage (in the range of rated voltage even after over-lapping the standard ripple current) for 20,000 hours at 85°C, capacitors shall meet the characteristics requirements indicated at right. (2000 hours at 85°C for the parts rated at 630V, 5000 hours at 85°C for the parts rated at 500V and 550V) After an application of DC voltage (in the range of rated DC voltage even after over-lapping the maximum allowable ripple current) for 5000 hours at 85°C, capacitors meet the characteristic requirements listed at right.
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

Rated voltage (V)	350 ~ 630
Impedance ratio ZT/Z20(MAX.)	Z—25°C/Z+20°C
	8

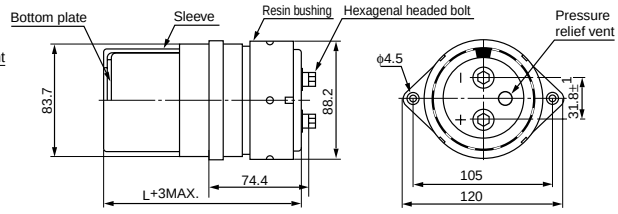
Capacitance change	Within ±20% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

■Drawing

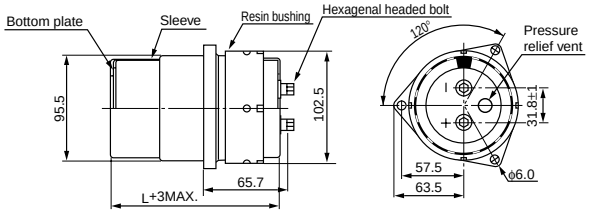
Method mount metal bracket



Method to mount resin bushing (φ76.2) (Apply to L=150 or more)

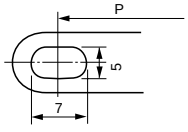


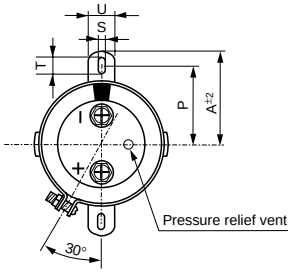
Method to mount resin bushing (φ90) (Apply to L=150 or more)



※B

3-leg brackets for φ90 capacitors have different hole shapes from the ordinary ones illustrated below.





● Dimension of terminal pitch (W) and length (ℓ) and Nominal dia. of (mm)

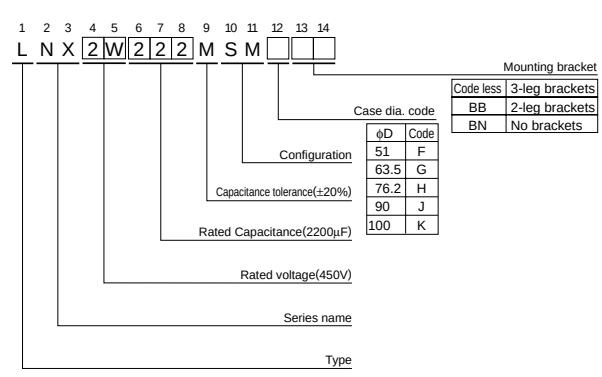
φD	W	ℓ	α	Nominal dia. of bolt
51	22.0	6	3	M 5
63.5	28.6	6	3	M 5
76.2	31.8	6	3	M 5
90	31.8	6	3	M 5
100	41.5	10	4	M 8

● Dimension of mounting bracket (mm)

Leg shape / Symbol \ φD	3–Leg					2–Leg			
	51	63.5	76.2	90	100	51	63.5	76.2	90
P	32.5	38.1	44.5	50.8	56.3	33.2	40.5	46.5	53
A	38.5	43	49.2	58.5	62	40	46.5	53	59
T	7.5	8.0	7.0	8.0	8.0	6.0	7.0	6.0	6.0
S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
U	12	14	14	18	16	14	14	14	14
θ°	60	60	60	60	60	30	30	30	30
H	20	25	30	35	36	25	35	35	35
h	15	20	24	25	30	15	20	20	20

● Dimension table in next page.

Type numbering system (Example : 450V 2200μF)



Code less	3-leg brackets
BB	2-leg brackets
BN	No brackets

φD	Code
51	F
63.5	G
76.2	H
90	J
100	K

Resin bushing available upon request.

※Please contact to us if PVCless products are required.

NX series

■Dimensions

V (Surge) (Code)	Cap.(μF)	Case size φ D×L(mm)	Standard ripple (Arms) ※1	Maximum rated ripple (Arms) ※2	tan δ (MAX)	Leakage current (mA MAX) ※3	Code
350V (400) (2V)	1000	51×60	3.5	4.6	0.2	1.77	LNX2V102MSMF
	1200	51×70	4.2	5.3	0.2	1.94	LNX2V122MSMF
	1500	51×80	4.9	6.3	0.2	2.17	LNX2V152MSMF
	1800	51×90	5.6	7.3	0.2	2.38	LNX2V182MSMF
	2200	51×110	6.7	8.8	0.2	2.63	LNX2V222MSMF
	2700	51×130	8.0	10.3	0.2	2.92	LNX2V272MSMF
		63.5×90	7.7	9.9	0.2	2.92	LNX2V272MSMG
	3300	51×150	9.2	12.1	0.2	3.22	LNX2V332MSMF
		63.5×100	9.0	11.8	0.2	3.22	LNX2V332MSMG
	3900	63.5×110	10.4	12.5	0.2	3.50	LNX2V392MSMG
		76.2×90	10.3	12.2	0.2	3.50	LNX2V392MSMH
	4700	63.5×130	12.0	14.8	0.2	3.85	LNX2V472MSMG
		76.2×100	11.9	14.0	0.2	3.85	LNX2V472MSMH
	5600	63.5×150	14.0	17.0	0.2	4.20	LNX2V562MSMG
		76.2×110	13.5	16.4	0.2	4.20	LNX2V562MSMH
	6800	63.5×170	16.3	19.6	0.2	4.63	LNX2V682MSMG
		76.2×130	16.0	19.1	0.2	4.63	LNX2V682MSMH
	8200	76.2×150	18.7	22.0	0.2	5.00	LNX2V822MSMH
		90×130	18.2	21.4	0.2	5.00	LNX2V822MSMJ
	10000	76.2×170	21.8	25.5	0.2	5.00	LNX2V103MSMH
		90×150	21.3	25.3	0.2	5.00	LNX2V103MSMJ
	12000	76.2×190	25.1	29.1	0.2	5.00	LNX2V123MSMH
		90×150	24.8	28.8	0.2	5.00	LNX2V123MSMJ
	15000	90×190	29.0	36.0	0.2	5.00	LNX2V153MSMJ
	18000	90×220	32.4	39.7	0.2	5.00	LNX2V183MSMJ
	22000	100×220	38.0	43.2	0.2	5.00	LNX2V223MSMK
	27000	100×250	42.0	47.0	0.2	5.00	LNX2V273MSMK
400V (450) (2G)	1000	51×70	3.8	5.0	0.2	1.90	LNX2G102MSMF
	1200	51×80	4.5	5.8	0.2	2.08	LNX2G122MSMF
	1500	51×100	5.3	6.8	0.2	2.32	LNX2G152MSMF
	1800	51×110	6.0	8.2	0.2	2.55	LNX2G182MSMF
	2200	51×130	7.0	9.3	0.2	2.81	LNX2G222MSMF
		63.5×90	6.8	8.9	0.2	2.81	LNX2G222MSMG
	2700	63.5×110	8.2	10.8	0.2	3.12	LNX2G272MSMG
		76.2×90	8.1	10.6	0.2	3.12	LNX2G272MSMH
	3300	63.5×130	9.6	12.9	0.2	3.45	LNX2G332MSMG
		76.2×100	9.3	12.4	0.2	3.45	LNX2G332MSMH
	3900	63.5×150	11.0	14.4	0.2	3.75	LNX2G392MSMG
		76.2×100	10.5	13.9	0.2	3.75	LNX2G392MSMH
	4700	63.5×170	12.6	16.6	0.2	4.11	LNX2G472MSMG
		76.2×130	12.3	16.0	0.2	4.11	LNX2G472MSMH
	5600	63.5×190	14.7	18.8	0.2	4.49	LNX2G562MSMG
		76.2×150	14.3	18.3	0.2	4.49	LNX2G562MSMH
	6800	76.2×170	16.7	21.2	0.2	4.95	LNX2G682MSMH
		90×130	16.3	20.7	0.2	4.95	LNX2G682MSMJ
	8200	76.2×190	19.3	24.1	0.2	5.00	LNX2G822MSMH
		90×150	19.0	23.7	0.2	5.00	LNX2G822MSMJ
	10000	76.2×220	22.7	28.3	0.2	5.00	LNX2G103MSMH
		90×170	22.2	28.0	0.2	5.00	LNX2G103MSMJ
	12000	90×190	25.5	31.9	0.2	5.00	LNX2G123MSMJ
	15000	100×190	29.6	37.0	0.2	5.00	LNX2G153MSMK
	18000	100×220	33.0	40.5	0.2	5.00	LNX2G183MSMK
	22000	100×250	41.4	44.7	0.2	5.00	LNX2G223MSMK

●Frequency coefficient of rated ripple current

Frequency (Hz)	60	120	360	1k	10k~
Coefficient	0.82	1.00	1.20	1.35	1.40

(※1) • Standard ripple current:
Ripple current value allowable for the life time of 20,000 hours at 85°C.
(5,000 hours at 85°C for the voltage rating of 500V and 550V).

(※2) • Maximum rated ripple current:
Ripple current value allowable for the life time of 5,000 hours at 85°C.

• Estimated life time of capacitor is calculated by the following formula, taking the operating temperature, inner temperature rise due to the ripple and derated voltage into consideration.

$$Ln = Lo \times 2^{\frac{85-T}{10}} \times 2^{-\frac{\Delta T}{K}} \times \alpha$$

Where,
Ln : Lifetime under normal operating conditions.(h)
Lo : Lifetime under maximum operating temperature of 85°C and applied DC voltage. (28000h)
T : Ambient temperature.(°C)
ΔT : Inner temperature rise of capacitor due to ripple current(°C)
K : Acceleration coefficient for temperature rise due to the ripple current.
when T+ΔT ≦ 90°C,K=10
when T+ΔT>90°C, K=2.5
α : Life factor

V (Surge) (Code)	Cap.(μF)	Case size φ D×L(mm)	Standard ripple (Arms) ※1	Maximum rated ripple (Arms) ※2	tan δ (MAX)	Leakage current (mA MAX) ※3	Code
450V (500) (2W)	1000	51×80	4.0	5.2	0.2	2.01	LNX2W102MSMF
	1200	51×100	4.7	6.3	0.2	2.20	LNX2W122MSMF
	1500	51×110	5.4	7.3	0.2	2.46	LNX2W152MSMF
	1800	51×130	6.4	8.7	0.2	2.70	LNX2W182MSMF
		63.5×90	6.1	7.6	0.2	2.70	LNX2W182MSMG
	2200	63.5×110	7.2	9.6	0.2	2.98	LNX2W222MSMG
		76.2×90	7.1	9.4	0.2	2.98	LNX2W222MSMH
	2700	63.5×130	8.6	11.3	0.2	3.31	LNX2W272MSMG
		76.2×100	8.3	11.0	0.2	3.31	LNX2W272MSMH
	3300	63.5×150	10.0	13.3	0.2	3.66	LNX2W332MSMG
		76.2×110	9.7	12.9	0.2	3.66	LNX2W332MSMH
	3900	63.5×170	11.4	15.1	0.2	3.97	LNX2W392MSMG
		76.2×130	11.2	14.6	0.2	3.97	LNX2W392MSMH
	4700	63.5×190	13.0	17.3	0.2	4.36	LNX2W472MSMG
		76.2×150	12.9	16.9	0.2	4.36	LNX2W472MSMH
	5600	76.2×170	15.4	19.4	0.2	4.76	LNX2W562MSMH
		90×150	15.3	19.1	0.2	4.76	LNX2W562MSMJ
	6800	76.2×190	17.3	22.0	0.2	5.00	LNX2W682MSMH
		90×150	17.1	21.6	0.2	5.00	LNX2W682MSMJ
	8200	76.2×220	20.3	25.7	0.2	5.00	LNX2W822MSMH
		90×170	19.8	25.4	0.2	5.00	LNX2W822MSMJ
	10000	90×190	23.0	29.6	0.2	5.00	LNX2W103MSMJ
	12000	90×220	26.9	33.5	0.2	5.00	LNX2W123MSMJ
	15000	100×220	31.1	38.0	0.2	5.00	LNX2W153MSMK
	18000	100×250	37.0	41.3	0.2	5.00	LNX2W183MSMK
500V (550) (2H)	1000	51×110	4.2	—	0.2	2.12	LNX2H102MSMF
	1200	63.5×90	4.8	—	0.2	2.32	LNX2H122MSMG
	1500	63.5×90	5.5	—	0.2	2.60	LNX2H152MSMG
	1800	63.5×110	6.5	—	0.2	2.85	LNX2H182MSMG
	2200	63.5×130	7.7	—	0.2	3.15	LNX2H222MSMG
	2700	76.2×110	8.8	—	0.2	3.49	LNX2H272MSMH
	3300	76.2×130	10.4	—	0.2	3.85	LNX2H332MSMH
	3900	76.2×150	12.1	—	0.2	4.19	LNX2H392MSMH
	4700	90×130	13.7	—	0.2	4.60	LNX2H472MSMJ
	5600	90×150	15.9	—	0.2	5.00	LNX2H562MSMJ
	6800	90×170	18.5	—	0.2	5.00	LNX2H682MSMJ
	8200	90×190	21.4	—	0.2	5.00	LNX2H822MSMJ
	10000	100×190	23.8	—	0.2	5.00	LNX2H103MSMK
	12000	100×220	27.8	—	0.2	5.00	LNX2H123MSMK
550V (600) (2L)	1000	51×130	4.3	—	0.2	2.22	LNX2L102MSMF
	1200	63.5×110	5.0	—	0.2	2.44	LNX2L122MSMG
	1500	63.5×130	6.0	—	0.2	2.72	LNX2L152MSMG
	1800	76.2×110	6.7	—	0.2	2.98	LNX2L182MSMH
	2200	76.2×130	8.0	—	0.2	3.30	LNX2L222MSMH
	2700	76.2×150	9.4	—	0.2	3.66	LNX2L272MSMH
	3300	76.2×170	11.0	—	0.2	4.04	LNX2L332MSMH
	3900	90×150	12.5	—	0.2	4.39	LNX2L392MSMJ
	4700	90×170	14.5	—	0.2	4.82	LNX2L472MSMJ
	5600	90×190	16.6	—	0.2	5.00	LNX2L562MSMJ
	6800	90×220	19.5	—	0.2	5.00	LNX2L682MSMJ
	8200	100×220	21.6	—	0.2	5.00	LNX2L822MSMK
	10000	100×250	25.2	—	0.2	5.00	LNX2L103MSMK
630 (680) (2J)	1000	63.5×130	5.9	—	0.3	2.38	LNX2J102MSMG
	1200	76.2×110	6.7	—	0.3	2.61	LNX2J122MSMH
	1500	76.2×130	8.1	—	0.3	2.92	LNX2J152MSMH
	1800	76.2×150	9.6	—	0.3	3.19	LNX2J182MSMH
	2200	90×130	10.7	—	0.3	3.53	LNX2J222MSMJ
	2700	90×150	12.6	—	0.3	3.91	LNX2J272MSMJ
	3300	90×170	14.7	—	0.3	4.33	LNX2J332MSMJ
	3900	90×190	17.3	—	0.3	4.70	LNX2J392MSMJ
	4700	100×220	21.4	—	0.3	5.00	LNX2J472MSMK
	5600	100×250	24.7	—	0.3	5.00	LNX2J562MSMK

Ripple (A rms) at 85°C 120Hz

• Life factor α due to the voltage derating shall be decided by the temperature and the applied voltage

Oper.temp.	T ≦ 70°C	70°C<T ≦ 85°C		
Voltage ratio	—	V/Vo ≦ 0.8	0.8<V/Vo ≦ 0.9	0.9<V/Vo ≦ 1.0
α	1.0	1.0	0.8	0.7

V : Applied voltage(V) Vo : Rated voltage(V)

(※3) Leakage current: $I = 3\sqrt{CV} \times 10^{-3}$ or 5mA, whichever the smaller.
I : Leakage Current (mA)
C : Rated Capacitance (μF)
V : Voltage (V)

• 3-leg bracket is furnished as standard.
In case no-bracket or 2-leg bracket required, please put BN or BB at the and of type number.

Ex. 3-leg bracket LNX2G472MSMH
2-leg bracket LNX2G472MSMHBB
No bracket LNX2G472MSMHBN

• Flame-retardant type electrolyte is also available.
Please contact to Nichicon representative for the rated ripple current value.

■ ORDERING INFORMATION

Please note the order quantity must be in multiples of the minimum quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

Size of product			Bulk				Taping minimum quantity
			Quantity vinyl bag		Minimum quantity		
			Long lead	Lead forming	Long lead	Lead forming	
Chip Type	φ3		—				2,000
	φ4		—				2,000
	φ5		—				1,000
	φ6.3		—				1,000 (900 : 7.7 mmL product)
	φ8	5.5 L 6.2 L 7 L	—				1,000
		10 L	—				500
	φ10	8 L 10 L	—				500
	φ12.5	13.5 L	—				200 (tray 70)
		16 L	—				150 (tray 70)
		21 L	—				125 (tray 70)
	φ16	16.5 L	—				125 (tray 60)
		21.5 L	—				75 (tray 60)
	φ18	16.5 L	—				125 (tray 40)
		21.5 L	—				75 (tray 40)
	φ20	16.5 L	—				100 (tray 40)
		21.5 L	—				50 (tray 40)
Radiallead Type	φ3		200	200	5,000	8,000	2,000
	φ4	5 L 7 L	200	200	5,000	8,000	2,000
		11 L			7,000	8,000	
	φ5	5 L 7 L	200	200	4,000	5,000	2,000
		9 L 11 L 15 L			6,000	8,000	
	φ6.3	5 L 7 L	200	200	6,000	8,000	2,000
		9 L			6,000	7,000	
		11 L			4,000	7,000	
		15 L			4,000	6,000	
	φ8	5 L	200	200	6,000	7,000	1,000
		7 L			4,000	5,000	
		9 L 11.5 L			3,000	4,000	
		15 L			2,000	3,600	
		20 L			2,000	2,200	
	φ10	9 L	200	200	2,400	3,600	500
		12.5 L			2,000	2,800	
		15 L			1,800	2,000	
		20 L			1,400	1,600	
		25 L			1,200	1,600	
		31.5 L			1,000	1,200	—
	φ12.5	12.5 L	100	100	1,500	1,800	500
		15 L			1,200	1,400	
		20 L			1,000	1,000	
		25 L			800	900	
		31.5 L			600	800	—
		35.5 L			500	700	
		40 L			400	600	
	φ16	12.5 L 15 L	50	50	700	900	250
		20 L			600	700	
		25 L			400	400	
		31.5 L			300	400	—
		35.5 L			300	300	
		40 L		—	300	400	
	φ18	12.5 L 15 L	50	50	400	500	—
		20 L			400	400	
		25 L			300	400	
		31.5 L		—	300	450	
		35.5 L			250	300	
		40 L			200	300	
	φ20	12.5 L 15 L	50	—	300	400	—
		20 L			250	400	
		25 L			250	300	
		31 L			200	300	
		35 L			200	200	
		40 L			150	200	
	φ22		—		250	250	—
	φ25	30 L	—		160	250	
		40 L			180	250	
		50 L			140	250	
Axial Lead Type	φ5		500		500		1,600
	φ6.3		500		500		1,300
	φ8		200		200		1,000
	φ10		200		200		500
	φ13		100		100		350 (Except 31.5mmL product)
	φ16 ~ 31.5 mmL		100		100		—
	41.5 mmL		50		50		—
	φ18		50		50		—
692 Type	φ20 ~φ35		50				—

There are some differences between actual minimum quantity and above list.
Please comfirm before you order.

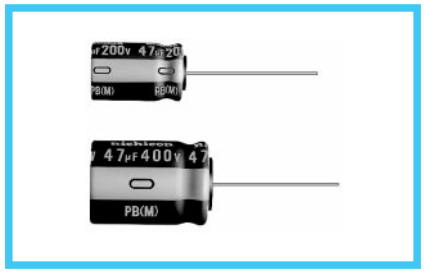
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

PB series

Miniature Sized, High Ripple Current High Reliability

Smaller | High Ripple Current | Long Life | Anti-Solvent Feature (Through 100V only)



- High ripple current and highly dependable product withstanding load life of 5000 / 7000 hours at +105°C.
- Suited for ballast application.

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C (10 ~ 50V), –25 ~ +105°C (160 ~ 450V)
Rated Voltage Range	10 ~ 450V
Rated Capacitance Range	0.47 ~ 3300μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated Voltage (V)	10 ~ 50V	160 ~ 450V
——	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) , whichever is greater.	After 2 minutes' application of rated voltage, leakage current is not more than 0.06CV+10 (μA) , whichever is greater.

tan δ

Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	10	16	25	35	50	160	200	250	350	400	450
tan δ (MAX.)	0.30	0.25	0.22	0.18	0.15	0.15	0.15	0.15	0.20	0.24	0.24

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		10	16	25	35	50	160	200	250	350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	3	2	2	2	2	3	3	3	4	6	6

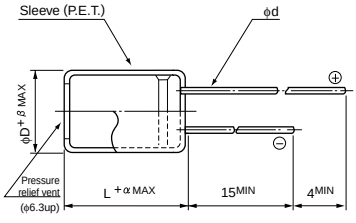
Endurance

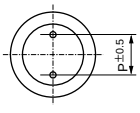
After an application of D.C. bias voltage plus the rated ripple current for 5000 hours (ϕ10 · ϕ12.5 (10 ~ 50V) : 7000 hours) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±30% of initial value (10 ~ 50V) Within ±20% of initial value (160 ~ 450V)
tan δ	300% or less of initial specified value (10 ~ 50V) 200% or less of initial specified value (160 ~ 450V)
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed above.
Marking	Printed with white color letter on dark brown sleeve.

■Radial Lead Type





ϕD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(ϕD ≦ 18) 1.5
	(ϕD ≧ 22) 2.0

Type numbering system (Example : 160V 22μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	P	B	2	C	2	2	0	M	P	D	

- 12: Case Size Code
- 10, 11: Configuration ※
- 9: Capacitance tolerance (±20%)
- 6, 7, 8: Rated Capacitance (22μF)
- 4, 5: Rated voltage (160V)
- 3: Series name
- 1, 2: Type

※Configuration

ϕD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH
22 · 25	RD	RH

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

PB series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	10		16		25		35		50	
		1A		1C		1E		1V		1H	
0.47	R47									5×11	5
1	010									5×11	10
2.2	2R2									5×11	15
3.3	3R3									5×11	20
4.7	4R7									5×11	25
10	100									5×11	30
22	220									5×11	40
33	330							5×11	50	6.3×11	55
47	470					5×11	55	6.3×11	60	6.3×11	65
100	101	5×11	70	6.3×11	85	6.3×11	95	8×11.5	100	8×11.5	100
220	221	6.3×11	100	8×11.5	130	8×11.5	195	10×12.5	200	10×16	235
330	331	8×11.5	150	8×11.5	195	10×12.5	255	10×16	280	10×20	295
470	471	8×11.5	180	10×12.5	270	10×16	325	10×20	350	12.5×20	370
1000	102	10×16	350	10×20	430	12.5×20	500	12.5×25	570		
2200	222	12.5×20	550	12.5×25	710						Rated
3300	332	12.5×25	810							Case size	ripple

Rated Ripple (mA rms) at 105°C 120Hz

D × L (mm)

Cap.(μF) \ V	Code	160		200		250		350		400		450	
		2C		2D		2E		2V		2G		2W	
10	100							10 × 20	125/250	10 × 20	125/250	12.5 × 20	150/300
22	220	10 × 20	250/500	10 × 20	250/500	12.5 × 20	300/600	12.5 × 20	175/350	12.5 × 25	200/400	16 × 25	275/550
33	330	10 × 20	250/500	12.5 × 20	300/600	12.5 × 20	300/600	16 × 20	250/500	16 × 25	300/600	18 × 25	350/700
47	470	12.5 × 20	300/600	12.5 × 20	300/600	12.5 × 25	350/700	16 × 25	325/650	18 × 25	375/750	18 × 31.5	425/850
56	560											18 × 35.5	475/950
68	680	12.5 × 25	375/750	12.5 × 25	375/750	16 × 25	500/1000	18 × 25	400/800	18 × 31.5	450/900	18 × 40	500/1000
82	820									18 × 35.5	500/1000	22 × 40	550/1100
100	101	16 × 25	550/1100	16 × 25	550/1100	18 × 25	600/1200	18 × 31.5	500/1000	18 × 40	550/1100		
120	121							18 × 35.5	575/1150	22 × 40	600/1200	22 × 50 / ▲25 × 40	700/1400
150	151	18 × 25	650/1300	18 × 25	650/1300	18 × 31.5	750/1500	18 × 40	650/1300			25 × 50	800/1600
180	181					18 × 35.5	850/1700	22 × 40	750/1500	22 × 50 / ▲25 × 40	800/1600		
220	221			18 × 31.5	850/1700	18 × 40	950/1900			25 × 50	900/1800		
270	271			18 × 31.5	950/1900	22 × 40	1050/2100	22 × 50 / ▲25 × 40	950/1900				
330	331	18 × 31.5	850/1700	18 × 40	1050/2100			25 × 50	1050/2100				
390	391	18 × 35.5	950/1900	22 × 40	1150/2300	22 × 50 / ▲25 × 40	1150/2300						
470	471	18 × 40	1050/2100			25 × 50	1400/2800						
560	561	22 × 40	1150/2300	22 × 50 / ▲25 × 40	1250/2700								
680	681	22 × 50 / ▲25 × 40	1250/2700	25 × 50	1500/3000								
820	821	25 × 50	1500/3000									Case Size	Rated ripple ● △

●: Rated ripple (mA rms) at 105°C 120Hz
△: Rated ripple (mA rms) at 105°C 100kHz
▲: In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10k ~ 50kHz	100kHz
10 ~ 50	0.47 ~ 10	0.75	1.00	1.20	1.40	1.55	1.65
	22 ~ 470	0.85	1.00	1.10	1.20	1.25	1.30
	1000 ~ 3300	0.95	1.00	1.03	1.05	1.10	1.15
160 ~ 450	10 ~ 820	0.60	1.00	1.20	1.60	1.80	2.00

ALUMINUM ELECTROLYTIC CAPACITORS

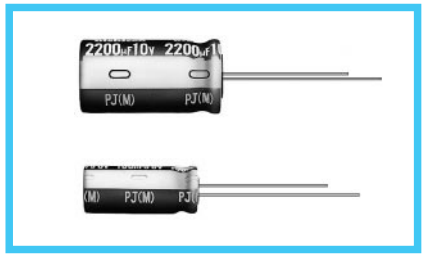
nichicon

PJ series

Low Impedance, For Switching Power Supplies

Low Impedance | Long Life | RCJ Approved | Anti-Solvent Feature (Through 100V only)

Approved by Reliability Center for Electronic Component, Japan-Certification No. RCJ-03-23C



- Low impedance and high reliability withstanding 5000 hours load life at +105˚C (3000 / 2000 hours for smaller case sizes as specified below).
- Capacitance ranges available based on the numerical values in E12 series under JIS.
- Ideally suited for use of switching power supplies.

PJ ← Low Impedance High Ripple current — PS

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105˚C (6.3 ~ 100V), −40 ~ +105˚C (160 ~ 400V), −25 ~ +105˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 15000μF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated Voltage (V)	6.3 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	CV ≦ 1000 : I = 0.1CV+40 (μA) max. (1 minute's) CV > 1000 : I = 0.04CV+100 (μA) max. (1 minute's)

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated Voltage (V)	6.3	10	16	25	35	50	63 ~ 100	160 ~ 350	400 ·450
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Rated voltage (V)		6.3 ·10	16	25 ·35	50 ~ 100	160 ~ 200	250	315 ~ 350	400	450	120Hz
Impedance ratio	Z−55˚C / Z+20˚C	4	3	3	2	—	—	—	—	—	
	Z−40˚C / Z+20˚C	—	—	—	—	4	6	8	10	—	
	Z−25˚C / Z+20˚C	—	—	—	—	—	—	—	—	15	

Endurance

After an application of D.C. bias voltage plus the rated ripple current for 5000 hours (2000 hours for D = 5 and 6.3, 3000 hours for D = 8)at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements shown on the right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

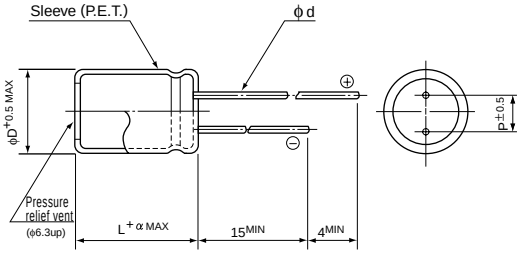
Shelf Life

After leaving capacitors under no load at 105˚C for 1000 hours, they meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking: Printed with white color letter on dark brown sleeve.

■Radial Lead Type



α	
	(φD < 10) 1.0
	(φD ≧ 10) 1.5

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6※	0.8	0.8

※ In case L >25 for the φ12.5 dia. unit, lead dia. φ d=0.8mm.

Type numbering system (Example : 25V 470μF)

1 2 3 4 5 6 7 8 9 10 11 12

U P J 1 E 4 7 1 M H D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (470μF)
- Rated voltage (25V)
- Series name
- Type

Type	Code
Small Dia	—
Low Profile	6

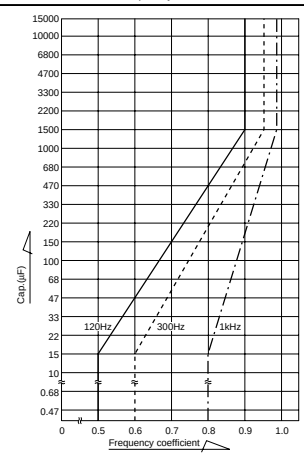
Case size code

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8・10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

● Frequency coefficient of rated ripple current

Rated voltage	Frequency coefficient
6.3 ~ 100V (10kHz ~ 200kHz = 1)	

160 ~ 450V	50Hz	120Hz	300Hz	1kHz	10kHz~
	0.80	1.00	1.25	1.40	1.60

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next pages.

PJ series

■Dimensions

D × L (mm)

Cap. (μF)	V (Code) / Size code / Code	6.3 (0J)		10 (1A)		16 (1C)		25 (1E)		35 (1V)	
		—	6	—	6	—	6	—	6	—	6
22	220									5 × 11	
27	270									5 × 11	
33	330							5 × 11		6.3 × 11	
39	390							5 × 11		6.3 × 11	
47	470					5 × 11		6.3 × 11		6.3 × 11	
56	560					5 × 11		6.3 × 11		6.3 × 11	
68	680			5 × 11		6.3 × 11		6.3 × 11		6.3 × 15	
82	820			5 × 11		6.3 × 11		6.3 × 11		6.3 × 15	
100	101	5 × 11		6.3 × 11		6.3 × 11		6.3 × 15		8 × 11.5	
120	121	5 × 11		6.3 × 11		6.3 × 11		6.3 × 15		8 × 15	10 × 12.5
150	151	6.3 × 11		6.3 × 11		6.3 × 15		8 × 11.5		8 × 15	10 × 12.5
180	181	6.3 × 11		6.3 × 11		6.3 × 15		8 × 15	10 × 12.5	8 × 20	10 × 15
220	221	6.3 × 11		6.3 × 15		8 × 11.5		8 × 15	10 × 12.5	8 × 20	10 × 15
270	271	6.3 × 15		6.3 × 15		8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15
330	331	6.3 × 15		8 × 11.5		8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15
390	391	8 × 11.5		8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 25	12.5 × 15
470	471	8 × 15	10 × 12.5	8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 31.5	16 × 15
560	561	8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 25	12.5 × 15	12.5 × 20	16 × 15
680	681	8 × 20	10 × 15	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	18 × 15
820	821	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 25	12.5 × 15	12.5 × 20	16 × 15	12.5 × 25	18 × 15
1000	102	10 × 20	12.5 × 15	10 × 20	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	18 × 15	12.5 × 31.5	16 × 20
1200	122	10 × 20	12.5 × 15	10 × 25	12.5 × 15	12.5 × 20	16 × 15	12.5 × 25	18 × 15	12.5 × 35.5	16 × 25
1500	152	10 × 25	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	18 × 15	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20
1800	182	10 × 31.5	16 × 15	12.5 × 20	16 × 15	12.5 × 31.5	16 × 20	12.5 × 35.5	16 × 25	16 × 31.5	18 × 25
2200	222	10 × 31.5	16 × 15	12.5 × 25	18 × 15	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20	16 × 35.5	18 × 31.5
2700	272	12.5 × 25	18 × 15	12.5 × 31.5	16 × 20	12.5 × 35.5	16 × 25	16 × 31.5	18 × 25	16 × 40	18 × 35.5
3300	332	12.5 × 25	18 × 15	12.5 × 35.5	16 × 20	12.5 × 40	18 × 20	16 × 35.5	18 × 31.5	18 × 40	
3900	392	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20	16 × 31.5	18 × 25	16 × 40	18 × 35.5		
4700	472	12.5 × 35.5	18 × 20	16 × 31.5	18 × 25	16 × 35.5	18 × 31.5	18 × 40			
5600	562	12.5 × 40	18 × 20	16 × 35.5	18 × 25	16 × 40	18 × 35.5				
6800	682	16 × 31.5	18 × 25	16 × 35.5	18 × 31.5	18 × 35.5					
8200	822	16 × 35.5	18 × 31.5	16 × 40	18 × 35.5	18 × 40					
10000	103	16 × 40	18 × 31.5	18 × 40							
12000	123	18 × 35.5									
15000	153	18 × 40									

Cap. (μF)	V (Code) / Size code / Code	50 (1H)		63 (1J)		80 (1K)		100 (2A)	
		—	6	—	6	—	6	—	6
0.47	R47	5 × 11						5 × 11	
0.68	R68	5 × 11						5 × 11	
1	010	5 × 11						5 × 11	
1.5	1R5	5 × 11						5 × 11	
2.2	2R2	5 × 11						5 × 11	
3.3	3R3	5 × 11						5 × 11	
4.7	4R7	5 × 11				5 × 11		6.3 × 11	
6.8	6R8	5 × 11				5 × 11		6.3 × 11	
10	100	5 × 11		5 × 11		6.3 × 11		6.3 × 11	
12	120	5 × 11		5 × 11		6.3 × 11		6.3 × 11	
15	150	5 × 11		6.3 × 11		6.3 × 11		6.3 × 15	
18	180	5 × 11		6.3 × 11		6.3 × 11		6.3 × 15	
22	220	6.3 × 11		6.3 × 11		6.3 × 15		8 × 11.5	
27	270	6.3 × 11		6.3 × 11		6.3 × 15		8 × 15	10 × 12.5
33	330	6.3 × 11		6.3 × 15		8 × 11.5		8 × 15	10 × 12.5
39	390	6.3 × 11		6.3 × 15		8 × 15	10 × 12.5	8 × 20	10 × 15
47	470	6.3 × 15		8 × 11.5		8 × 15	10 × 12.5	10 × 20	12.5 × 15
56	560	6.3 × 15		8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15
68	680	8 × 11.5		8 × 15	10 × 12.5	10 × 20	12.5 × 15	10 × 25	12.5 × 15
82	820	8 × 15	10 × 12.5	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 31.5	16 × 15
100	101	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 25	12.5 × 15	10 × 31.5	16 × 15
120	121	8 × 20	10 × 15	10 × 20	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	16 × 15
150	151	10 × 20	12.5 × 15	10 × 25	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	18 × 15
180	181	10 × 20	12.5 × 15	10 × 31.5	16 × 15	12.5 × 25	16 × 15	12.5 × 31.5	16 × 20
220	221	10 × 25	12.5 × 15	12.5 × 20	16 × 15	12.5 × 31.5	18 × 15	12.5 × 35.5	16 × 25
270	271	10 × 31.5	16 × 15	12.5 × 25	18 × 15	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20
330	331	10 × 31.5	16 × 15	12.5 × 25	18 × 15	12.5 × 35.5	16 × 25	16 × 31.5	18 × 25
390	391	12.5 × 25	16 × 15	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20	16 × 35.5	18 × 31.5
470	471	12.5 × 25	18 × 15	12.5 × 35.5	16 × 25	16 × 31.5	18 × 25	16 × 40	18 × 35.5
560	561	12.5 × 31.5	16 × 20	12.5 × 40	18 × 20	16 × 35.5	18 × 31.5	18 × 35.5	
680	681	12.5 × 35.5	16 × 20	16 × 31.5	18 × 25	16 × 40	18 × 31.5	18 × 40	
820	821	12.5 × 40	18 × 20	16 × 35.5	18 × 31.5	18 × 35.5			
1000	102	16 × 31.5	18 × 25	16 × 40	18 × 35.5	18 × 40			
1200	122	16 × 35.5	18 × 31.5	18 × 40					
1500	152	16 × 40	18 × 31.5						
1800	182	18 × 35.5							
2200	222	18 × 40							

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

Dimension table for 160 ~ 450V products are shown in 138 page.

PJ series

■Standard ratings

Cap. (μF)	Code	V (Code) / Size code / Item	6.3 (0J) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	6.3 (0J) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
100	101	5 × 11	1.40	3.50	150	99						
120	121	5 × 11	1.10	2.80	175	115						
150	151	6.3 × 11	0.78	2.10	225	155						
180	181	6.3 × 11	0.60	1.50	250	175						
220	221	6.3 × 11	0.48	1.20	285	205						
270	271	6.3 × 15	0.39	1.00	370	275						
330	331	6.3 × 15	0.32	0.80	405	310						
390	391	8 × 11.5	0.27	0.68	445	345						
470	471	8 × 15	0.22	0.55	550	435	10 × 12.5	0.23	0.58	575	455
560	561	8 × 15	0.19	0.48	595	480	10 × 12.5	0.21	0.53	600	485
680	681	8 × 20	0.16	0.40	730	605	10 × 15	0.18	0.45	700	580
820	821	8 × 20	0.13	0.33	795	670	10 × 15	0.15	0.38	750	635
1000	102	10 × 20	0.12	0.30	950	820	12.5 × 15	0.13	0.33	890	765
1200	122	10 × 20	0.10	0.25	1020	895	12.5 × 15	0.12	0.30	950	835
1500	152	10 × 25	0.084	0.21	1220	1090	12.5 × 15	0.10	0.25	1020	915
1800	182	10 × 31.5	0.078	0.20	1370	1230	16 × 15	0.084	0.21	1270	1140
2200	222	10 × 31.5	0.066	0.17	1470	1320	16 × 15	0.078	0.20	1340	1200
2700	272	12.5 × 25	0.051	0.14	1590	1430	18 × 15	0.072	0.18	1500	1350
3300	332	12.5 × 25	0.045	0.11	1710	1530	18 × 15	0.065	0.16	1600	1440
3900	392	12.5 × 31.5	0.037	0.093	1910	1710	16 × 20	0.056	0.14	1720	1540
4700	472	12.5 × 35.5	0.034	0.085	2100	1890	18 × 20	0.050	0.13	1920	1720
5600	562	12.5 × 40	0.031	0.078	2270	2040	18 × 20	0.047	0.12	1980	1780
6800	682	16 × 31.5	0.029	0.073	2370	2130	18 × 25	0.039	0.098	2210	1980
8200	822	16 × 35.5	0.027	0.068	2550	2290	18 × 31.5	0.031	0.078	2390	2150
10000	103	16 × 40	0.025	0.063	2750	2470	18 × 31.5	0.028	0.070	2490	2240
12000	123	18 × 35.5	0.023	0.058	2820	2530					
15000	153	18 × 40	0.022	0.055	2960	2660					

Cap.(μF)	Code	V (Code) / Size code / Item	10 (1A) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	10 (1A) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
68	680	5 × 11	1.30	3.30	155	97						
82	820	5 × 11	1.10	2.80	175	110						
100	101	6.3 × 11	0.84	2.10	210	135						
120	121	6.3 × 11	0.72	1.80	235	160						
150	151	6.3 × 11	0.55	1.40	265	185						
180	181	6.3 × 11	0.46	1.20	290	205						
220	221	6.3 × 15	0.38	0.95	370	270						
270	271	6.3 × 15	0.31	0.78	405	300						
330	331	8 × 11.5	0.26	0.65	460	350						
390	391	8 × 15	0.22	0.55	550	430	10 × 12.5	0.24	0.60	555	430
470	471	8 × 15	0.19	0.48	595	475	10 × 12.5	0.21	0.53	600	475
560	561	8 × 20	0.16	0.40	730	590	10 × 15	0.18	0.45	700	565
680	681	8 × 20	0.13	0.33	795	660	10 × 15	0.14	0.35	770	635
820	821	10 × 20	0.11	0.28	985	835	12.5 × 15	0.13	0.33	920	780
1000	102	10 × 20	0.096	0.24	1060	915	12.5 × 15	0.10	0.25	1040	895
1200	122	10 × 25	0.078	0.20	1280	1120	12.5 × 15	0.096	0.24	1060	930
1500	152	10 × 31.5	0.072	0.18	1440	1290	16 × 15	0.078	0.20	1330	1190
1800	182	12.5 × 20	0.057	0.14	1470	1320	16 × 15	0.072	0.18	1420	1270
2200	222	12.5 × 25	0.045	0.11	1710	1530	18 × 15	0.060	0.15	1600	1440
2700	272	12.5 × 31.5	0.036	0.090	1940	1740	16 × 20	0.051	0.13	1740	1560
3300	332	12.5 × 35.5	0.032	0.080	2180	1960	16 × 20	0.045	0.11	1850	1660
3900	392	12.5 × 40	0.030	0.075	2360	2120	18 × 20	0.041	0.10	2050	1840
4700	472	16 × 31.5	0.028	0.070	2420	2170	18 × 25	0.035	0.088	2250	2020
5600	562	16 × 35.5	0.026	0.065	2610	2340	18 × 25	0.033	0.083	2340	2100
6800	682	16 × 35.5	0.024	0.060	2680	2410	18 × 31.5	0.027	0.068	2540	2280
8200	822	16 × 40	0.023	0.058	2820	2530	18 × 35.5	0.025	0.063	2690	2420
10000	103	18 × 40	0.021	0.053	3040	2730					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PJ series

■Standard ratings

Cap. (μF)	Code	16 (1C) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	16 (1C) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
47	470	5 × 11	1.30	3.30	155	92					
56	560	5 × 11	1.10	2.80	175	105					
68	680	6.3 × 11	0.78	2.00	220	135					
82	820	6.3 × 11	0.66	1.70	240	155					
100	101	6.3 × 11	0.55	1.40	265	175					
120	121	6.3 × 11	0.45	1.10	290	195					
150	151	6.3 × 15	0.37	0.93	375	260					
180	181	6.3 × 15	0.31	0.78	405	285					
220	221	8 × 11.5	0.26	0.65	460	335					
270	271	8 × 15	0.22	0.55	550	410	10 × 12.5	0.22	0.55	575	430
330	331	8 × 15	0.18	0.45	595	455	10 × 12.5	0.18	0.45	625	480
390	391	8 × 20	0.16	0.40	730	570	10 × 15	0.16	0.40	730	570
470	471	8 × 20	0.14	0.35	770	615	10 × 15	0.14	0.35	770	615
560	561	10 × 20	0.12	0.30	950	770	12.5 × 15	0.13	0.33	920	745
680	681	10 × 20	0.10	0.25	1020	845	12.5 × 15	0.11	0.28	985	815
820	821	10 × 25	0.084	0.21	1220	1030	12.5 × 15	0.096	0.24	1060	895
1000	102	10 × 31.5	0.072	0.18	1410	1210	16 × 15	0.084	0.21	1270	1090
1200	122	12.5 × 20	0.060	0.15	1430	1250	16 × 15	0.072	0.18	1390	1220
1500	152	12.5 × 25	0.048	0.12	1660	1490	18 × 15	0.066	0.17	1560	1400
1800	182	12.5 × 31.5	0.039	0.10	1880	1690	16 × 20	0.054	0.14	1700	1530
2200	222	12.5 × 31.5	0.034	0.085	2010	1800	16 × 20	0.048	0.12	1800	1620
2700	272	12.5 × 35.5	0.031	0.078	2220	1990	16 × 25	0.040	0.10	2010	1800
3300	332	12.5 × 40	0.028	0.070	2410	2160	18 × 20	0.039	0.10	2090	1880
3900	392	16 × 31.5	0.027	0.068	2470	2220	18 × 25	0.034	0.085	2290	2060
4700	472	16 × 35.5	0.025	0.063	2680	2410	18 × 31.5	0.028	0.070	2490	2240
5600	562	16 × 40	0.024	0.060	2820	2530	18 × 35.5	0.027	0.068	2620	2350
6800	682	18 × 35.5	0.022	0.055	2900	2610					
8200	822	18 × 40	0.021	0.053	3040	2730					

Cap. (μF)	Code	25 (1E) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	25 (1E) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) –10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
33	330	5 × 11	1.30	3.30	155	88					
39	390	5 × 11	1.10	2.80	175	100					
47	470	6.3 × 11	0.84	2.10	210	125					
56	560	6.3 × 11	0.72	1.80	235	140					
68	680	6.3 × 11	0.57	1.40	260	160					
82	820	6.3 × 11	0.47	1.20	285	180					
100	101	6.3 × 15	0.39	0.98	370	245					
120	121	6.3 × 15	0.32	0.80	405	275					
150	151	8 × 11.5	0.26	0.65	460	320					
180	181	8 × 15	0.22	0.55	550	390	10 × 12.5	0.24	0.60	555	395
220	221	8 × 15	0.18	0.45	625	455	10 × 12.5	0.21	0.53	600	435
270	271	8 × 20	0.15	0.38	750	560	10 × 15	0.18	0.45	700	525
330	331	8 × 20	0.13	0.33	795	610	10 × 15	0.15	0.38	750	575
390	391	10 × 20	0.11	0.28	985	770	12.5 × 15	0.13	0.33	920	720
470	471	10 × 20	0.10	0.25	1020	810	12.5 × 15	0.11	0.28	985	785
560	561	10 × 25	0.084	0.21	1220	990	12.5 × 15	0.10	0.25	1060	860
680	681	10 × 31.5	0.072	0.18	1420	1180	16 × 15	0.084	0.21	1270	1050
820	821	12.5 × 20	0.059	0.15	1430	1210	16 × 15	0.079	0.20	1340	1130
1000	102	12.5 × 25	0.048	0.12	1660	1430	18 × 15	0.066	0.17	1520	1310
1200	122	12.5 × 25	0.043	0.11	1760	1550	18 × 15	0.061	0.15	1600	1400
1500	152	12.5 × 31.5	0.035	0.088	1980	1780	16 × 20	0.050	0.13	1770	1590
1800	182	12.5 × 35.5	0.032	0.080	2180	1960	16 × 25	0.041	0.10	1980	1780
2200	222	12.5 × 40	0.029	0.073	2360	2120	18 × 20	0.040	0.10	2050	1840
2700	272	16 × 31.5	0.027	0.068	2470	2220	18 × 25	0.034	0.085	2290	2060
3300	332	16 × 35.5	0.025	0.063	2680	2410	18 × 31.5	0.029	0.073	2490	2240
3900	392	16 × 40	0.023	0.058	2820	2530	18 × 35.5	0.026	0.065	2690	2420
4700	472	18 × 40	0.022	0.055	2960	2660					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PJ series

■Standard ratings

Cap. (μF)	Code	35 (1V) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	35 (1V) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
22	220	5 × 11	1.30	3.30	160	85					
27	270	5 × 11	1.00	2.50	180	99					
33	330	6.3 × 11	0.78	2.00	225	125					
39	390	6.3 × 11	0.66	1.70	245	140					
47	470	6.3 × 11	0.54	1.40	270	160					
56	560	6.3 × 11	0.45	1.10	295	180					
68	680	6.3 × 15	0.37	0.93	370	230					
82	820	6.3 × 15	0.31	0.78	415	265					
100	101	8 × 11.5	0.26	0.65	460	305					
120	121	8 × 15	0.22	0.55	550	370	10 × 12.5	0.24	0.60	555	375
150	151	8 × 15	0.18	0.45	595	415	10 × 12.5	0.20	0.50	625	435
180	181	8 × 20	0.16	0.40	730	520	10 × 15	0.18	0.45	700	500
220	221	8 × 20	0.13	0.33	795	580	10 × 15	0.14	0.35	770	560
270	271	10 × 20	0.11	0.28	985	735	12.5 × 15	0.13	0.33	920	690
330	331	10 × 20	0.096	0.24	1060	810	12.5 × 15	0.10	0.25	1020	780
390	391	10 × 25	0.084	0.21	1220	955	12.5 × 15	0.096	0.24	1060	825
470	471	10 × 31.5	0.072	0.18	1420	1130	16 × 15	0.084	0.21	1270	1010
560	561	12.5 × 20	0.059	0.15	1430	1160	16 × 15	0.075	0.19	1360	1100
680	681	12.5 × 25	0.048	0.12	1660	1370	18 × 15	0.066	0.17	1540	1270
820	821	12.5 × 25	0.042	0.11	1760	1490	18 × 15	0.060	0.15	1620	1370
1000	102	12.5 × 31.5	0.035	0.088	1980	1710	16 × 20	0.050	0.13	1770	1530
1200	122	12.5 × 35.5	0.031	0.078	2180	1920	16 × 25	0.041	0.10	1980	1740
1500	152	12.5 × 40	0.029	0.073	2360	2120	18 × 20	0.040	0.10	2050	1840
1800	182	16 × 31.5	0.027	0.068	2470	2220	18 × 25	0.034	0.085	2290	2060
2200	222	16 × 35.5	0.024	0.060	2680	2410	18 × 31.5	0.028	0.070	2490	2240
2700	272	16 × 40	0.022	0.055	2900	2610	18 × 35.5	0.026	0.065	2690	2420
3300	332	18 × 40	0.021	0.053	3040	2730					

Cap. (μF)	Code	50 (1H) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	50 (1H) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
0.47	R47	5 × 11	31.0	80.0	22	11					
0.68	R68	5 × 11	21.0	55.0	28	14					
1	010	5 × 11	14.0	38.0	36	18					
1.5	1R5	5 × 11	9.80	28.0	45	22					
2.2	2R2	5 × 11	6.50	18.0	54	27					
3.3	3R3	5 × 11	4.60	12.0	66	33					
4.7	4R7	5 × 11	3.10	7.80	81	40					
6.8	6R8	5 × 11	2.50	6.30	91	45					
10	100	5 × 11	2.00	5.00	115	57					
12	120	5 × 11	1.70	4.30	125	62					
15	150	5 × 11	1.30	3.30	145	72					
18	180	5 × 11	1.10	2.80	155	79					
22	220	6.3 × 11	0.91	2.30	195	100					
27	270	6.3 × 11	0.74	1.90	215	115					
33	330	6.3 × 11	0.60	1.50	240	135					
39	390	6.3 × 11	0.50	1.30	260	150					
47	470	6.3 × 15	0.42	1.10	330	195					
56	560	6.3 × 15	0.35	0.88	360	220					
68	680	8 × 11.5	0.28	0.70	410	255					
82	820	8 × 15	0.22	0.55	500	320	10 × 12.5	0.23	0.58	510	330
100	101	8 × 20	0.18	0.45	620	410	10 × 15	0.21	0.53	580	385
120	121	8 × 20	0.16	0.40	670	455	10 × 15	0.17	0.43	640	435
150	151	10 × 20	0.13	0.33	820	570	12.5 × 15	0.14	0.35	785	545
180	181	10 × 20	0.11	0.28	890	635	12.5 × 15	0.12	0.31	845	605
220	221	10 × 25	0.098	0.25	1040	760	12.5 × 15	0.10	0.25	920	670
270	271	10 × 31.5	0.085	0.21	1200	900	16 × 15	0.091	0.23	1120	840
330	331	10 × 31.5	0.072	0.18	1300	995	16 × 15	0.078	0.20	1210	925
390	391	12.5 × 25	0.053	0.13	1440	1120	16 × 15	0.072	0.18	1270	990
470	471	12.5 × 25	0.048	0.12	1500	1190	18 × 15	0.060	0.15	1470	1170
560	561	12.5 × 31.5	0.040	0.10	1680	1360	16 × 20	0.053	0.13	1550	1260
680	681	12.5 × 35.5	0.036	0.090	1850	1530	16 × 20	0.048	0.12	1630	1350
820	821	12.5 × 40	0.033	0.083	2010	1700	18 × 20	0.043	0.11	1810	1530
1000	102	16 × 31.5	0.030	0.075	2120	1830	18 × 25	0.036	0.090	2000	1730
1200	122	16 × 35.5	0.028	0.070	2260	1990	18 × 31.5	0.031	0.078	2140	1880
1500	152	16 × 40	0.026	0.065	2410	2170	18 × 31.5	0.029	0.073	2220	1990
1800	182	18 × 35.5	0.025	0.063	2460	2210					
2200	222	18 × 40	0.024	0.060	2560	2300					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PJ series

■Standard ratings

Cap. (μF)	Code	63 (1J) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	63 (1J) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
10	100	5 × 11	1.60	4.00	135	67					
12	120	5 × 11	1.40	3.50	145	72					
15	150	6.3 × 11	1.10	2.80	185	92					
18	180	6.3 × 11	0.95	2.40	195	100					
22	220	6.3 × 11	0.78	2.00	215	110					
27	270	6.3 × 11	0.64	1.60	240	130					
33	330	6.3 × 15	0.52	1.30	305	170					
39	390	6.3 × 15	0.45	1.10	330	190					
47	470	8 × 11.5	0.37	0.93	365	215					
56	560	8 × 15	0.31	0.78	450	275	10 × 12.5	0.34	0.85	450	275
68	680	8 × 15	0.26	0.65	500	315	10 × 12.5	0.28	0.70	495	310
82	820	8 × 20	0.22	0.55	600	385	10 × 15	0.24	0.60	580	375
100	101	10 × 20	0.18	0.45	750	495	12.5 × 15	0.20	0.50	695	460
120	121	10 × 20	0.15	0.38	820	555	12.5 × 15	0.18	0.45	750	510
150	151	10 × 25	0.13	0.33	950	665	12.5 × 15	0.14	0.35	845	590
180	181	10 × 31.5	0.11	0.28	1110	790	16 × 15	0.12	0.30	1050	750
220	221	12.5 × 20	0.094	0.24	1140	835	16 × 15	0.10	0.25	1120	820
270	271	12.5 × 25	0.081	0.20	1340	1000	18 × 15	0.088	0.22	1290	965
330	331	12.5 × 25	0.072	0.18	1420	1090	18 × 15	0.078	0.20	1410	1080
390	391	12.5 × 31.5	0.059	0.15	1620	1260	16 × 20	0.070	0.18	1500	1170
470	471	12.5 × 35.5	0.052	0.13	1780	1420	16 × 25	0.063	0.16	1700	1350
560	561	12.5 × 40	0.047	0.12	1950	1580	18 × 20	0.058	0.15	1730	1400
680	681	16 × 31.5	0.043	0.11	2050	1700	18 × 25	0.051	0.13	1940	1610
820	821	16 × 35.5	0.040	0.10	2220	1880	18 × 31.5	0.043	0.12	2110	1780
1000	102	16 × 40	0.037	0.093	2370	2050	18 × 35.5	0.040	0.10	2280	1970
1200	122	18 × 40	0.034	0.085	2510	2210					

Cap. (μF)	Code	80 (1K) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	80 (1K) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
4.7	4R7	5 × 11	4.20	11.00	53	26					
6.8	6R8	5 × 11	2.60	7.00	68	34					
10	100	6.3 × 11	1.70	4.60	87	43					
12	120	6.3 × 11	1.40	3.80	96	48					
15	150	6.3 × 11	1.20	3.20	104	52					
18	180	6.3 × 11	1.00	2.70	114	58					
22	220	6.3 × 15	0.77	2.10	135	71					
27	270	6.3 × 15	0.63	1.70	149	80					
33	330	8 × 11.5	0.53	1.40	234	132					
39	390	8 × 15	0.46	1.20	272	156	10 × 12.5	0.49	1.30	271	155
47	470	8 × 15	0.39	1.10	295	175	10 × 12.5	0.42	1.10	293	174
56	560	8 × 20	0.34	0.92	347	208	10 × 15	0.36	0.97	337	202
68	680	10 × 20	0.28	0.76	426	264	12.5 × 15	0.31	0.84	402	249
82	820	10 × 20	0.25	0.68	447	284	12.5 × 15	0.27	0.73	430	273
100	101	10 × 25	0.21	0.57	526	347	12.5 × 15	0.23	0.62	466	308
120	121	10 × 31.5	0.18	0.49	606	406	16 × 15	0.20	0.54	663	444
150	151	10 × 31.5	0.15	0.41	663	459	16 × 15	0.18	0.47	699	484
180	181	12.5 × 25	0.13	0.35	734	520	16 × 15	0.15	0.41	766	543
220	221	12.5 × 31.5	0.12	0.32	816	595	18 × 15	0.13	0.35	881	643
270	271	12.5 × 31.5	0.10	0.27	894	667	16 × 20	0.11	0.30	995	742
330	331	12.5 × 35.5	0.088	0.24	1000	767	16 × 25	0.099	0.27	1140	874
390	391	12.5 × 40	0.078	0.21	1060	822	18 × 20	0.089	0.24	1170	908
470	471	16 × 31.5	0.069	0.19	1450	1150	18 × 25	0.080	0.22	1330	1060
560	561	16 × 35.5	0.062	0.17	1600	1300	18 × 31.5	0.072	0.19	1490	1210
680	681	16 × 40	0.055	0.15	1770	1470	18 × 31.5	0.065	0.18	1560	1300
820	821	18 × 35.5	0.049	0.13	1890	1590					
1000	102	18 × 40	0.044	0.12	2080	1790					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PJ series

■Standard ratings

Cap. (μF)	Code	100 (2A) — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz	100 (2A) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105˚C / 120Hz
0.47	R47	5 × 11	43.0	116.0	17	8					
0.68	R68	5 × 11	23.0	62.0	23	11					
1	010	5 × 11	17.0	46.0	27	13					
1.5	1R5	5 × 11	10.0	27.0	35	17					
2.2	2R2	5 × 11	6.60	18.0	43	21					
3.3	3R3	5 × 11	4.10	11.0	54	27					
4.7	4R7	6.3 × 11	2.80	7.60	68	34					
6.8	6R8	6.3 × 11	1.90	5.10	83	41					
10	100	6.3 × 11	1.20	3.20	104	52					
12	120	6.3 × 11	1.00	2.70	114	57					
15	150	6.3 × 15	0.81	2.20	131	65					
18	180	6.3 × 15	0.67	1.80	155	73					
22	220	8 × 11.5	0.55	1.50	230	122					
27	270	8 × 15	0.47	1.30	269	146	10 × 12.5	0.50	1.40	268	145
33	330	8 × 15	0.38	1.00	299	169	10 × 12.5	0.42	1.10	293	166
39	390	8 × 20	0.33	0.89	352	202	10 × 15	0.36	0.97	337	193
47	470	10 × 20	0.28	0.76	423	252	12.5 × 15	0.31	0.84	402	239
56	560	10 × 20	0.24	0.65	456	274	12.5 × 15	0.27	0.73	430	258
68	680	10 × 25	0.21	0.57	526	326	12.5 × 15	0.23	0.62	466	289
82	820	10 × 31.5	0.18	0.49	606	386	16 × 15	0.19	0.51	681	433
100	101	10 × 31.5	0.15	0.41	663	438	16 × 15	0.17	0.46	719	475
120	121	12.5 × 25	0.13	0.35	774	519	16 × 15	0.14	0.38	793	531
150	151	12.5 × 25	0.11	0.30	798	553	18 × 15	0.12	0.32	917	635
180	181	12.5 × 31.5	0.098	0.26	904	641	16 × 20	0.11	0.30	995	706
220	221	12.5 × 35.5	0.087	0.23	1000	730	16 × 25	0.093	0.25	1170	854
270	271	12.5 × 40	0.072	0.19	1130	843	18 × 20	0.080	0.22	1230	918
330	331	16 × 31.5	0.062	0.17	1520	1160	18 × 25	0.070	0.19	1420	1080
390	391	16 × 35.5	0.053	0.14	1730	1340	18 × 31.5	0.062	0.17	1600	1240
470	471	16 × 40	0.047	0.13	1920	1530	18 × 35.5	0.056	0.15	1770	1410
560	561	18 × 35.5	0.041	0.11	2070	1680					
680	681	18 × 40	0.036	0.097	2300	1910					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

Cap. (μF)	Code	160 2C		200 2D		250 2E		315 2F		350 2V		400 2G		450 2W	
1	010	8 × 11.5	19	8 × 11.5	19	8 × 11.5	19	8 × 11.5	19	10 × 12.5	21	10 × 12.5	17	10 × 15	17
2.2	2R2	8 × 11.5	30	8 × 11.5	30	10 × 12.5	32	10 × 12.5	32	10 × 15	34	10 × 15	28	10 × 20	28
3.3	3R3	10 × 12.5	50	10 × 12.5	50	10 × 15	52	10 × 15	52	10 × 20	54	10 × 20	47	12.5 × 20	48
4.7	4R7	10 × 12.5	57	10 × 15	60	10 × 15	60	10 × 20	65	10 × 20	65	12.5 × 20	55	12.5 × 25	55
10	100	10 × 15	90	10 × 20	95	12.5 × 20	98	12.5 × 20	98	12.5 × 25	100	12.5 × 25	85	16 × 25	90
22	220	12.5 × 20	140	12.5 × 25	145	16 × 25	150	16 × 25	150	16 × 25	150	16 × 31.5	130	16 × 35.5	135
33	330	12.5 × 25	175	16 × 25	180	16 × 25	180	16 × 31.5	185	16 × 35.5	190	18 × 35.5	170	18 × 40	170
47	470	16 × 25	220	16 × 25	220	16 × 31.5	225	18 × 35.5	235	18 × 40	240				
100	101	16 × 35.5	330	18 × 40	345	18 × 40	345							Case size	※

※Rated Ripple (mA rms) at 105˚C 120Hz

Eco-Products “GeoCap”

Nichicon promotes environmentally conscious practices.

Nichicon offers “GeoCap”,which has completely lead free terminals and contains no polyvinyl chloride in the sleeve.

■ Plastic Film Capacitors

Type・Classification	Series	Lead-Free Compliance	Anti Polyvinyl Chloride Compliance
For Electronic Equipment	XJ, XN, XD, XF, AS, AF YX, YS, YP, YR, YK	Complied	Complied
For Noise Filter	XU		
For Electric Equipment	EH, EN		

APPLICATION GUIDELINES FOR PLASTIC FILM CAPACITORS

1.Circuit Design

(1) Please make sure the environmental and mounting conditions to which capacitor will be exposed are within the conditions specified in Nichicon's catalog (or alternate Nichicon specifications, such as series drawing).

(2) Category Temperature and Humidity
① In case that the category temperature is specified differently from store temperature, please follow the specific drawing.
② Do not expose film capacitors to rapid temperature variations. Even if the range of change is within the specified limits.
③ Do not use film capacitors in such high humidity conditions that result in the capacitor being exposed to water (including condensation).

(3) When you choosing film capacitors for your circuit. Be sure the capacitor match the requirement of the application. If film capacitors are chosen in incorrectly, deterioration of the characteristics will be accelerated. Therefore, please chose the capacitor carefully.

(4) Please contact out sales office. Prior to using film capacitors in applications other than those for which the capacitor was designed.

(5) Unless otherwise specified, do not use film capacitors in the circuits requiring rapid and very frequent charge/discharge. Doing so may result in degrading or destruction of the capacitor.

(6) Applying Voltage
① Rated voltage of film capacitors designed for "AC" applications are marked with "VAC". In the case of capacitors designed for "DC" applications, only the voltage is marked.
② "AC" rated capacitors (series: XU) must be used within a maximum of 110% of rated voltage including the input voltage variation.
③ In case of "DC" voltage rated capacitors, the applied voltage shall be within a range where the peak value of ripple voltage (DC voltage + peak value of AC voltage) does not exceed the DC rated voltage. If there is a possibility that the applied voltage will exceed the rated voltage, please contact our sales office. In addition, if you use film capacitors in an ambient temperature condition that exceeds the category temperature range, the voltage should be derated in accordance with Fig. 1.
④ In cases where you apply alternate voltage to XN,XJ,XF series, please refer to table-1 for the allowable max AC voltage.
As for XJ,XN and XF series, do not use in across-the-line application even with the derating.
⑤ Do not use more than two (2) pieces of film capacitors in series.

Fig.1 Derating of Voltage and Operating Temperature XJ, XN, XF, XD Series

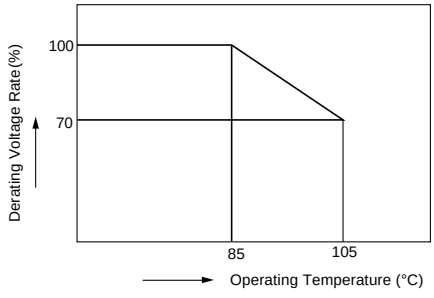


Table 1 Maximum Operating AC Voltage (at 50, 60Hz)

Rated Voltage	XN	XJ	XF
100VDC	50VAC	——	——
250VDC	125VAC	125VAC	125VAC
400VDC	200VAC	200VAC	160VAC
630VDC	250VAC	250VAC	200VAC
800VDC	——	——	250VAC

(7) Derating of Rated Voltage to High Frequency
When using the XN, XJ or XF series in a high frequent circuit, please use the capacitor within the voltage limit calculated by the rated voltage multiplied by the coefficient listed in table 2.
However, be sure that effective current and the effective VA does not exceed the values specified in table 3 to 8.
Please consult our sales office, prior to operating capacitors at sinusoidal waves other than sine-wave. (In case of sinuous waves, the effective current and the effective VA values shall be calculated from peak voltage and current of applied current wave, pulse and frequency)

Table 2 Derating of Voltage at High Frequency

XJ, XN Series		XF Series	
Frequency	Derating Rate to 50/60Hz AC Rated voltage	Frequency	Derating Rate to 50/60Hz AC Rated voltage
50/60 (Hz)	100 (%)	50/60 (Hz)	100 (%)
1k	54	1k	76
5k	39	5k	55
10k	34	10k	49
20k	30	20k	41
30k	27	30k	38
40k	26	40k	36
50k	25	50k	35
60k	24	60k	33
70k	23	70k	32
80k	22	80k	31
90k	21	90k	30
100k	21	100k	30

(8) Permissible Current, VA value and Inherent Temperature Rise

① Do not use film capacitors in circuits that may exceed the maximum permissible current as specified in tables 3 to 8. The permissible current will values will vary due to material and design, even though appearance is similar, therefore, please carefully confirm all perimeters using the specification.
Also, if the capacitors to be subjected to a sinuous wave flow, please contact our sales office to select the proper capacitor.

② The permissible VA value is restricted by the upper category temperature(ambient temperature + inherent temperature + radiant heat).
Do not use the capacitor in circuits which exceed the maximum permissible VA value specified in table 3 to 8. The permissible values will vary due to material and design, even though appearance is similar, therefore, please carefully confirm all perimeters using the specification.
Also, if the capacitors to be subjected to a sinuous wave flow, please contact our sales office to select the proper capacitor.

③ The inherent temperature under a no air flow shall be within the value listed below.
XJ, XN series‥+10°C or below
XF, XD series‥+5°C or below

(9) A "hum" may be produced under certain high frequency wave conditions. The "hum" does not effect the capacitor characteristics. Please consult our sales office if your application does not permit a "hum".

(10) When designing circuit boards, please take into consideration how other parts would be affected should the capacitor develop a short or open circuit.

2. Mounting

(1) Installation

① When installing capacitors, you must avoid any pulling, pushing or twisting stress to the leads or terminals.

② Certain coditions, such as large capacitor body size or serious vibration, require the capacitor body to be affixed to the board using holders or resin coating. When using such materials, please be sure they do not effect the capacitor characteristics.

(2) Soldering

① When soldering capacitors, avoid proesses that require a long dwell time or high temperatures. Such conditions will result in deterioration of characteristics or short-circuit defects. Please ensure that the soldering process is within the range shown in the following Fig. 2.

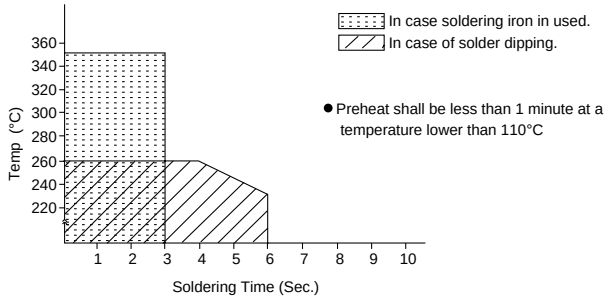
② When using a soldering iron to solder the capacitor, the soldering condition must be within the following specifications:
Bit temperature: 350 ± 10°C
Application time of soldering iron : 3 sedond

③ If re-work is necessary, please wait until the capacitor temperature is equal to room temperature. Do not re-work more than twice.

④ Please do not use Infrared-reflow an it will cause serious heat stress to the capacitor.

⑤ Prior to soldering film capacitors on the same PC board as chip type capacitors, please consult our sales office to confirm the compatibility of the soldering process.

Fig. 2 Solder temp. and soldering time



(3) Cleaning
① If it is necessary to use cleaning agents to wash the board after soldering, please select alcohol based agents such as isopropyl alcohol.
② Please wash the board as soon as possible after soldering.
③ Please dry the board as soon as possible after cleaning.

3. In the equipment

(1) Do not directly touch the terminal with your hand.
(2) Do not short between terminals be conductor, nor spill conductible liquid such as alkaline nor acidic solution on or near the capacitor.
(3) Please make sure that the ambient conditions where the set is installed will be free from spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gas, vibration or mechanical shock.

4. Maintenance and Inspection

(1) If periodical inspection is required, please inspect the capacitor based on the specification of the drawings or catalog.

5. In an Emergency

(1) If you see or smell smoke, immediately turn off the main switch or pull out the plug from the outlet.

6. Storage

(1) Storage
① Do not store the capacitor in high temperature or high humidity. The ambient storage conditions should be:
Temperature : −10°C～+40°C
Humidity : lower than 75%
Place : indoor
Ambient conditions to avoid;
quick temperature change
Exposure to spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chorine, ammonium, etc..
② Please store the capacitors in the original packed condition to avoid any physical stress to the capacitor.
(2) Handling
① Do not apply excess vibration, mechanical shock (drop) or pressure to the capacitor.
② Do not apply stress to the lead such as bending, pulling or twisting.

7. Disposal

(1) Please dispose capacitors as industrial waste.

8. Other

(1) Contents of this catalog (specifications, material, etc.) are subject to change without notice.
Technical information (data) contained in this material is for description representation and application of the product and does not constitute any guarantee.
(2) When ordering, please include the following information:
① Voltage to be applied ("DC" or "AC", ripple value)
② Rated capacitance value and rated capacitance tolerance
③ Category temperature range (inherent temperature + radiant heat should be inclued)
④ Specific operating condition (wave form, effective current, dv/dt, etc.)
⑤ Estimated failure mode
If the capacitor should fail, what effect will this have on the components or set.
If other components should fail, what effect will it have on the capacitor.
⑥ Soldering condition (pre-heat condition, solder temperature, Dipping time, profile when chip parts are mounted on the same board)
⑦ Set ambient condition (max. operating temperature, method of affixing, automobile use, existence of any gas surrounding capacitor)

(3) Do not use parts provided as samples in sets for resale.

The above mentioned material is according to EIAJ RCR2350B (issued in July 2002) titled "Guideline of notabilia for Fixed Plastic Film Capacitors for use in Electronic Equipment". Please refer to the book for details.

Type numbering system

1	2 3	4 5	6 7 8	9	10 11	12 13 14 15 16
Type	Series name	Rated voltage	Rated Capacitance	Capacitance tolerance	Configuration	Specification classification

See page 225

See pages 236 ~ 247

Item	Code
Plastic film Capacitiors	Q

Rated Voltage (V)	Code
50	1H
100	2A
125	2B
250	2E
400	2G
630	2J
800	2K

Rated Capacitance (μF)	Code
0.001	102
0.0047	472
0.01	103
0.047	473
0.1	104
0.47	474
1.0	105
4.7	475
10	106

Capacitance Tolerance (%)	Code
±5	J
±10	K

10

Dielectric Film	Code
Polyester film or Polyester film & Polypropylene film	T
Polypropylene film	R

11

Lead	Code
Soldered CP wire	P
Tinned CP wire	N

■ Table 3 XJ Series Permissible Current and VA Value

Rated Capacitance (μF)	250VDC (2E)				400VDC (2G)				630VDC (2J)			
	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)
0.01									0.1	1.0	2.6	11.2
0.015									0.15	1.5	2.9	12.5
0.022					0.2	2.0	2.3	10.2	0.25	2.5	3.2	14.2
0.033					0.25	2.5	2.6	11.4	0.3	3.0	3.8	16.6
0.047	0.3	3.0	2.2	9.8	0.3	3.0	2.9	12.6	0.3	3.0	4.3	18.6
0.068	0.35	3.5	2.2	9.8	0.45	4.5	3.3	14.3	0.45	4.5	5.0	21.8
0.1	0.4	4.0	2.5	10.9	0.45	4.5	3.8	16.4	0.6	6.0	5.6	24.6
0.15	0.5	5.0	2.9	12.6	0.6	6.0	4.5	19.6	0.7	7.0	7.2	31.4
0.22	0.85	8.5	3.3	14.3	0.8	8.0	5.1	22.5	1.0	10.0	8.4	36.9
0.33	0.9	9.0	3.8	16.6	1.3	13.0	6.1	26.9	1.5	15.0	10.1	44.3
0.47	1.0	10.0	4.5	19.8	1.5	15.0	7.2	31.4	1.6	16.0	11.0	52.7
0.68	1.5	15.0	5.3	23.0	1.8	18.0	9.0	39.4				
1.0	2.25	22.5	6.1	26.9	2.5	25.0	10.6	46.6				
1.5	2.4	24.0	7.9	34.8	3.0	30.0	13.0	56.8				
2.2	3.5	35.0	9.4	40.9								
3.3	4.0	40.0	11.5	50.2								

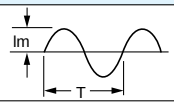
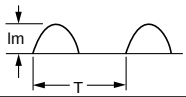
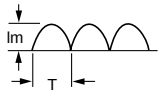
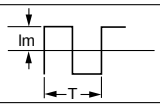
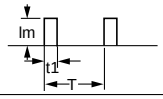
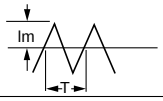
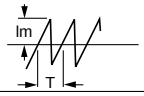
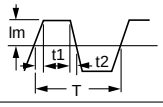
■ Table 4 XF Series Permissible Current and VA Value

Rated Capacitance (μF)	250VDC (2E)				400VDC (2G)				630VDC (2J)				800VDC (2K)			
	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. Max.65°C (VA)
0.01									0.15	1.5	8	26	0.2	2.0	9	29
0.015									0.2	2.0	8	29	0.25	2.5	10	33
0.022					0.2	2.0	8	26	0.3	3.0	9	32	0.25	2.5	11	39
0.033					0.35	3.5	9	31	0.35	3.5	10	35	0.3	3.0	13	45
0.047	0.3	3.0	8	26	0.5	5.0	10	34	0.35	3.5	13	43	0.5	5.0	16	52
0.068	0.4	4.0	8	29	0.5	5.0	12	40	0.5	5.0	15	50	0.7	7.0	18	60
0.1	0.6	6.0	9	32	0.6	6.0	14	47	0.75	7.5	17	57	0.85	8.5	22	72
0.15	0.8	8.0	11	37	0.9	9.0	16	55	1.0	10.0	20	67	1.0	10.0	27	90
0.22	0.8	8.0	13	45	1.3	13.0	19	64	1.1	11.0	25	84	1.4	14.0	31	103
0.33	1.2	12.0	16	52	1.6	16.0	23	78	1.75	17.5	30	100	1.75	17.5	39	130
0.47	1.7	17.0	18	60	1.9	19.0	29	97	1.9	19.0	36	119	2.5	25.0	47	155
0.68	2.5	25.0	21	72	2.6	26.0	34	114	2.7	27.0	42	141				
1.0	2.6	26.0	28	92	3.1	31.0	42	139								
1.5	3.85	38.5	33	110	4.75	47.5	51	169								
2.2	4.4	44.0	41	135												
3.3	5.0	50.0	49	163												

■ Table 5 XN Series Permissible Current and VA Value

Rated Capacitance (μF)	250VDC (2E)				400VDC (2G)				630VDC (2J)			
	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)	Permissible Effective Current Ie (A)	Permissible Peak Current at Single Pulse Ip2 (A)	Permissible VA Value(Ie×Ve) Operating Temp. 85°C (VA)	Permissible VA Value(Ie×Ve) Operating Temp. 65°C (VA)
0.01	0.1	1.0	1.2	5.2	0.1	1.0	1.2	5.2	0.08	0.8	1.8	7.9
0.015	0.1	1.0	1.2	5.2	0.1	1.0	1.3	5.5	0.10	1.0	2.0	8.9
0.022	0.15	1.5	1.3	5.5	0.15	1.5	1.5	6.4	0.15	1.5	2.5	10.6
0.033	0.15	1.5	1.4	5.9	0.15	1.5	1.7	7.6	0.15	1.5	2.9	12.5
0.047	0.15	1.5	1.4	5.9	0.2	2.0	2.1	9.0	0.2	2.0	3.2	14.0
0.068	0.25	2.5	1.6	6.8	0.25	2.5	2.4	10.4	0.25	2.5	3.8	16.3
0.1	0.35	3.5	1.9	8.1	0.3	3.0	2.8	12.3	0.3	3.0	4.8	21.0
0.15	0.4	4.0	2.3	9.9	0.35	3.5	4.0	17.2	0.5	5.0	6.1	26.4
0.22	0.6	6.0	2.6	11.5	0.5	5.0	4.5	19.6	0.6	6.0	6.5	28.2
0.33	0.6	6.0	3.3	14.3	0.7	7.0	5.0	21.5	0.7	7.0	7.9	34.4
0.47	0.7	7.0	4.2	18.2	0.8	8.0	6.3	27.1	0.9	9.0	9.3	40.1
0.68	1.0	10.0	5.2	22.7	0.9	9.0	7.4	31.9	1.3	13.0	11.1	48.0
1.0	1.4	14.0	6.1	26.5	1.2	12.0	8.7	37.6	1.5	15.0	12.9	55.8
1.5	1.6	16.0	6.7	29.1	1.5	15.0	10.3	44.5	2.0	20.0	15.9	69.0
2.2	1.8	18.0	8.1	35.3	2.2	22.0	12.3	53.5	3.0	30.0	19.0	82.0
3.3	2.5	25.0	9.8	42.6								
4.7	3.0	30.0	11.8	51.0								
6.8	3.0	30.0	13.7	59.3								
10.0	3.0	30.0	16.9	73.2								

■ Table 6 Example of current wave forms.

Item	Wave form diagram	Maximum	Effective value
Sine wave		Im	$\frac{Im}{\sqrt{2}}$
Harf-wave rectification sine wave		Im	$\frac{Im}{2}$
Fill-wave rectification sine wave		Im	$\frac{Im}{\sqrt{2}}$
Rectangular wave		Im	Im
Rectangular pulse wave		Im	$Im\sqrt{\frac{t_1}{T}}$
Isosceles trangular wave		Im	$\frac{Im}{\sqrt{3}}$
Saw tooth wave		Im	$\frac{Im}{\sqrt{3}}$
Trapezoidal wave		Im	$Im\sqrt{\frac{6t_2-2t_1}{3T}}$

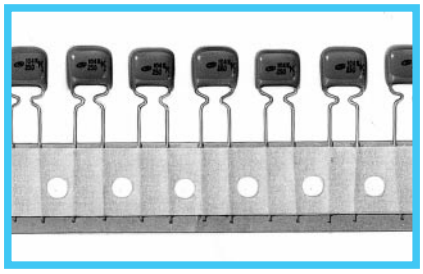
■ Table 7 AS Series Permissible Current and VA Value

Rated Capacitance	250VDC (2E)				400VDC (2G)				630VDC (2J)			
	Permissible Effective Current	Permissible Peak Current at Single Pulse	Permissible VA Value (IexVe)		Permissible Effective Current	Permissible Peak Current at Single Pulse	Permissible VA Value (IexVe)		Permissible Effective Current	Permissible Peak Current at Single Pulse	Permissible VA Value (IexVe)	
			Operating Temp. 85°C	Operating Temp. 65°C			Operating Temp. 85°C	Operating Temp. 65°C			Operating Temp. 85°C	Operating Temp. 65°C
(μF)	Ie(A)	Ip2(A)	(VA)	(VA)	Ie(A)	Ip2(A)	(VA)	(VA)	Ie(A)	Ip2(A)	(VA)	(VA)
0.1									0.5	5	6	26
0.15									0.8	8	7	33
0.22									1.1	11	8	38
0.33					1.4	14	7	30	1.7	17	10	46
0.47	1.1	11	4	20	1.7	17	8	35	1.8	18	12	53
0.68	1.6	16	5	24	1.9	19	9	38	2.1	21	14	62
1.0	2.3	23	7	30	2.8	28	10	46	2.5	25	17	77
1.5	2.5	25	8	34	3.5	35	13	59	3.5	35	22	95
2.2	3.0	30	9	40	3.5	35	15	68	4.0	40	25	110
3.3	4.0	40	11	50	4.5	45	19	85	5.5	55	32	138
4.7	4.5	45	13	59	5.0	50	22	97				
6.8	5.0	50	16	69								
10.0	5.5	55	19	85								

■ Table 8 AF Series Permissible Current and VA Value

Rated Capacitance	250VDC (2E)				400VDC (2G)				630VDC (2J)			
	Permissible Effective Current	Permissible Peak Current at Sinle Pulse	Permissible VA Value (IexVe)		Permissible Effective Current	Permissible Peak Current at Single Pulse	Permissible VA Value (IexVe)		Permissible Effective Current	Permissible Peak Current at Single Pulse	Permissible VA Value (IexVe)	
			Operating Temp. 85°C	Operating Temp. 65°C			Operating Temp. 85°C	Operating Temp. 65°C			Operating Temp. 85°C	Operating Temp. 65°C
(μF)	Ie(A)	Ip2(A)	(VA)	(VA)	Ie(A)	Ip2(A)	(VA)	(VA)	Ie(A)	Ip2(A)	(VA)	(VA)
0.15									0.8	8	21	73
0.22									1.2	12	26	90
0.33					1.4	14	24	85	1.8	18	31	108
0.47	1.2	12	19	67	2.0	20	28	100	1.9	19	35	123
0.68	1.8	18	23	83	2.6	26	35	124	2.7	27	42	147
1.0	2.6	26	28	98	3.0	30	41	144	3.0	30	48	170
1.5	3.5	35	34	118	4.0	40	52	182	4.0	40	60	213
2.2	4.0	40	39	138	5.0	50	59	206	5.0	50	74	260
3.3	5.0	50	50	175	5.0	50	74	260	5.5	55	87	287
4.7	5.5	55	56	196	5.5	55	85	299				
6.8	5.5	55	69	223								
10.0	5.5	55	81	284								

Taped Capacitors for Automatic Insertion Systems



■ Type numbering system

Q	X	J	2	J	1	0	3	K	T	P	3 (12)	T (13)	R (14)

- 12: Representing taped unit
- 13: T : Ammo-pack
- 14: Code

Code	Lead-to-lead distance (F)	Pitch of component (P)
A	5.0	12.7
L	5.0	15.0
M	5.0	25.4
E	7.5	15.0
R	7.5	30.0

■ Dimensions

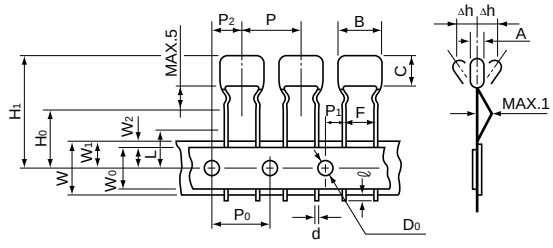
Item	Symbol	Dimensions (mm)					
		A	L	M	E	R	Tolerance
Pitch of component	P	12.7	15.0	25.4	15.0	30.0	± 1.0
Feed hole pitch	P_0*	12.7	15.0	25.4	15.0	30.0	± 0.3
Feed hole pitch	P'_0*	–	–	12.7	–	15.0	± 0.3
Distance between hole and lead wire	P_1	3.85	5.0	3.85	3.75	3.75	± 0.7
Distance between hole and component	P_2	6.35	7.5	6.35	7.5	7.5	± 1.3
Lead-to-lead distance	F	5.0	5.0	5.0	7.5	7.5	± 0.8
Tilt of component	Δh	0 ± 2.0					
Tape width	W	$18^{+1.0}$					
Hold-down tape width	W_0	12.5 MIN.					
Slip out of hole	W_1	9.0 ± 0.5					
Slip out of hold-down tape	W_2	3.0 MAX.					
Lead-wire clinch height	H_0	16.0 ± 0.5					
Length of cut lead	ℓ	2.0 MAX.					
Feed hole diameter	D_0	4.0 ± 0.2					
Total tape thickness	t	0.7 ± 0.2					
Cut length of rejected component	L	11.0 MAX.					
Upper side position	H_1	H_0 + 5 + C					

Remarks * : No feed hole omission is allowed.

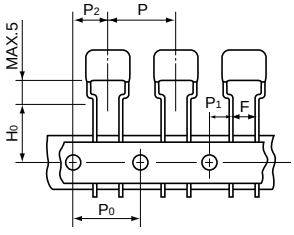
Note
1) Measuring positions for P_1, F, and H_0 shall be at the lower part of lead wire clinch.
2) Conseecutive omissions due to rejected components shall be allowed up to 1 piece, provided that the first one after turn-up shall be with no taping and not be counted among the omission numbers.
3) When connecting tapes, both of front and back sides shall be sticked with hold-down tape.
4) At the start and end of taping, empty feeding shall be corresponding to more than 8, and less than 11 pieces.
5) Marking shall be allowed at either side of components.

■ Taping specifications

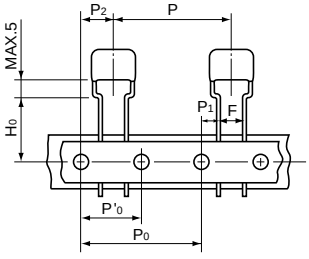
Style A (Lead pitch 5mm)



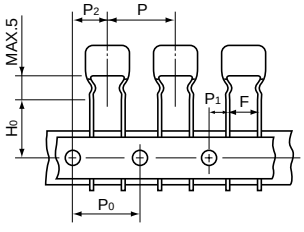
Style L (Lead pitch 5mm)



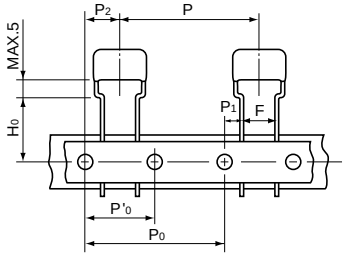
Style M (Lead pitch 5mm)



Style E (Lead pitch 7.5mm)



Style R (Lead pitch 7.5mm)



The order quantity must be in multiples of the base quantity.

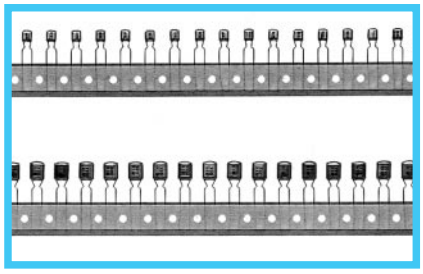
nichicon

Taped Capacitors for Automatic Insertion Systems (YX, YS, YP series)

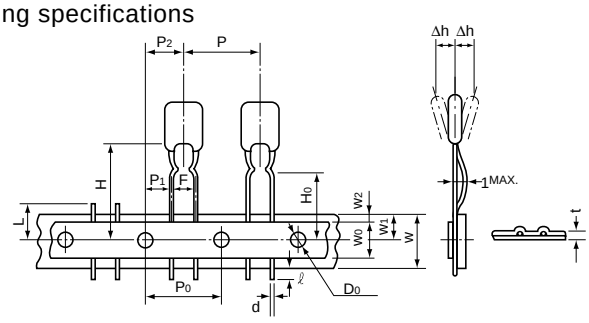
■ Type numbering system

Q	Y	X	2	A	1	0	3	K	T	P	3 (12)	T (13)	A (14)	

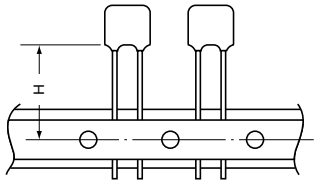
- 14: Packaging (A : standard)
- 13: T : Ammo - pack L : Reel pack
- 12: Representing taping style (3 : Formed lead type / 5 : Straight lead type)



■ Taping specifications



Formed lead type



Straight lead type

■ Dimensions

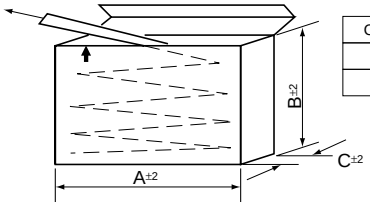
Item	Symbol	Dimensions (mm)	
		Dimensions	Dimensions
Pitch of component	P	12.7	± 1.0
Feed hole pitch	P_0	12.7	± 0.3
Distance between hole and lead wire	P_1	3.85	± 0.7
Distance between hole and component	P_2	6.35	± 1.3
Lead-to-lead distance	F	5.0	$^{+0.8}_{-0.2}$
Tilt of component	Δh	0	± 2.0
Tape width	W	18.0	$^{+1.0}_{-0.5}$
Hold down tape width	W_0	15.0	$^{+0.5}_{-2.5}$
Slip out of hole	W_1	9.0	± 0.5

Item	Symbol	Dimensions (mm)	
		Dimensions	Tolerance
Slip out of hold down tape	W_2	2.5	MAX.
Height of component from tape center	※ H	20.0 (16.0)	± 0.75
Lead-wire clinch height	H_0	16.0	± 0.5
Length of cut lead	ℓ	2.0	MAX.
Feed hole diameter	D_0	4.0	± 0.2
Total tape thickness	t	0.7	± 0.2
Cut length of rejected component	L	11.0	MAX.
Lead wire diameter	φd	0.5	± 0.05

※ Straight lead type is available only for 5mm lead pitch on "YX"and "YP" series, and "H" dimension will be 16mm.

■ Packaging

Ammo-pack



(mm)

Case Code	A	B	C
NO. 1	330	235	55
NO. 2	330	300	55

Series	Cap.range (μF)	Q'ty/Case (pcs.)	Case code
YX (50V)	0.001~ 0.0018	2,000	1
	0.0022 ~ 0.027	2,000	2
	0.033 ~ 0.082	1,000	1
	0.1 ~ 0.22	1,000	2
YX (100V)	0.001~ 0.0068	2,000	1
	0.0082 ~ 0.027	2,000	2
	0.033 ~ 0.082	1,000	1
	0.1	1,000	2
YS	0.001 ~ 0.015	2,000	2
	0.022 ~ 0.068	1,000	1
	0.1 ~ 0.22	1,000	2
	0.33 ~ 0.47	500	2
YP	0.001 ~ 0.015	2,000	2
	0.022 ~ 0.068	1,000	1
	0.1	1,000	2

The order quantity must be in multiples of the base quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

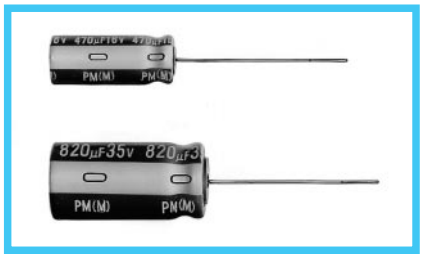
PM

Extremely Low Impedance, High Reliability

series

Low Impedance | Long Life | Anti-Solvent Feature (through 100V only)

PM → Smaller → PW



- High reliability withstanding 5000hour load life at +105°C (3000/2000hours for smaller case sizes as specified below).
- Capacitance ranges available based on the numerical values in E12 series under JIS.

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C (6.3 ~ 100V), –40 ~ +105°C (160 ~ 400V), –25 ~ +105°C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 15000μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated Voltage (V)	6.3 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	CV ≦ 1000 : I = 0.1CV+40 (μA) max. (1 minute's) CV > 1000 : I = 0.04CV+100 (μA) max. (1 minute's)

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C

Rated Voltage (V)	6.3	10	16	25	35	50	63 ~ 100	160 ~ 350	400 · 450
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Rated voltage (V)		6.3 · 10	16	25 · 35	50~100	160~200	250	315~350	400	450
Impedance ratio	Z–55°C / Z+20°C	4	3	3	2	—	—	—	—	—
	Z–40°C / Z+20°C	—	—	—	—	4	6	8	10	—
	Z–25°C / Z+20°C	—	—	—	—	—	—	—	—	15

120Hz

Endurance

After an application of D.C. bias voltage plus the rated ripple current for 5000 hours (2000 hours for D = 5 and 6.3, 3000 hours for D=8) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

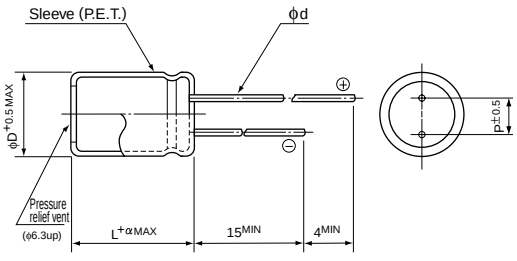
Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Marking: Printed with white color letter on dark brown sleeve.

■Radial Lead Type



α	
(φD < 10)	1.5
(φD ≧ 10)	2.0

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6※	0.8	0.8

※In case L > 25 for the φ12.5 dia. unit, lead dia. φ d = 0.8mm.

Type numbering system (Example : 25V 470μF)

1 2 3 4 5 6 7 8 9 10 11 12

U P M 1 E 4 7 1 M H D

- Case size code
- Configuration ※
- Capacitance tolerance (± 20%)
- Rated Capacitance (470μF)
- Rated voltage (25V)
- Series name
- Type

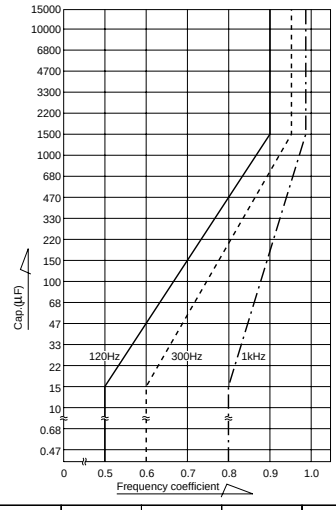
Type	Code
Small Dia	—
Low Profile	6

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH

※ Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

Rated voltage	Frequency coefficient
6.3~100V (10kHz~200kHz=1)	

160~450V	50Hz	120Hz	100Hz	11kHz	110kHz~
	0.80	1.00	1.25	1.40	1.60

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

●Dimension table in next page.

PM series

■Dimensions

D × L (mm)

Cap.(μF)	Code / Size code	6.3 (0J) —	6.3 (0J) 6	10 (1A) —	10 (1A) 6	16 (1C) —	16 (1C) 6	25 (1E) —	25 (1E) 6	35 (1V) —	35 (1V) 6
22	220									5×11	
27	270									5×11	
33	330							5×11		6.3×11	
39	390							5×11		6.3×11	
47	470					5×11		6.3×11		6.3×11	
56	560					5×11		6.3×11		6.3×11	
68	680			5×11		6.3×11		6.3×11		6.3×15	
82	820			5×11		6.3×11		6.3×11		6.3×15	
100	101	5×11		6.3×11		6.3×11		6.3×15		8×11.5	
120	121	5×11		6.3×11		6.3×11		6.3×15		8×15	10×12.5
150	151	6.3×11		6.3×11		6.3×15		8×11.5		8×15	10×12.5
180	181	6.3×11		6.3×11		6.3×15		8×15	10×12.5	8×20	10×15
220	221	6.3×11		6.3×15		8×11.5		8×15	10×12.5	8×20	10×15
270	271	6.3×15		6.3×15		8×15	10×12.5	8×20	10×15	10×20	12.5×15
330	331	6.3×15		8×11.5		8×15	10×12.5	8×20	10×15	10×20	12.5×15
390	391	8×11.5		8×15	10×12.5	8×20	10×15	10×20	12.5×15	10×25	12.5×15
470	471	8×15	10×12.5	8×15	10×12.5	8×20	10×15	10×20	12.5×15	10×31.5	16×15
560	561	8×15	10×12.5	8 × 20	10×15	10×20	12.5×15	10×25	12.5×15	12.5×20	16×15
680	681	8×20	10×15	8×20	10×15	10×20	12.5×15	10×31.5	16×15	12.5×25	18×15
820	821	8×20	10×15	10×20	12.5×15	10×25	12.5×15	12.5×20	16×15	12.5×25	18×15
1000	102	10×20	12.5×15	10×20	12.5×15	10×31.5	16×15	12.5×25	18×15	12.5×31.5	16×20
1200	122	10×20	12.5×15	10×25	12.5×15	12.5×20	16×15	12.5×25	18×15	12.5×35.5	16×25
1500	152	10×25	12.5×15	10×31.5	16×15	12.5×25	18×15	12.5×31.5	16×20	12.5×40	18×20
1800	182	10×31.5	16×15	12.5×20	16×15	12.5×31.5	16×20	12.5×35.5	16×25	16×31.5	18×25
2200	222	10×31.5	16×15	12.5×25	18×15	12.5×31.5	16×20	12.5×40	18×20	16×35.5	18×31.5
2700	272	12.5×25	18×15	12.5×31.5	16×20	12.5×35.5	16×25	16×31.5	18×25	16×40	18×35.5
3300	332	12.5×25	18×15	12.5×35.5	16×20	12.5×40	18×20	16×35.5	18×31.5	18×40	
3900	392	12.5×31.5	16×20	12.5×40	18×20	16×31.5	18×25	16×40	18×35.5		
4700	472	12.5×35.5	18×20	16×31.5	18×25	16×35.5	18×31.5	18×40			
5600	562	12.5×40	18×20	16×35.5	18×25	16×40	18×35.5				
6800	682	16×31.5	18×25	16×35.5	18×31.5	18×35.5					
8200	822	16×35.5	18×31.5	16×40	18×35.5	18×40					
10000	103	16×40	18×31.5	18×40							
12000	123	18×35.5									
15000	153	18×40									

Cap.(μF)	Code / Size code	50 (1H) —	50 (1H) 6	63 (1J) —	63 (1J) 6	80 (1K) —	80 (1K) 6	100 (2A) —	100 (2A) 6
0.47	R47	5×11						5×11	
0.68	R68	5×11						5×11	
1	010	5×11						5×11	
1.5	1R5	5×11						5×11	
2.2	2R2	5×11						5×11	
3.3	3R3	5×11						5×11	
4.7	4R7	5×11				5×11		6.3×11	
6.8	6R8	5×11				5×11		6.3×11	
10	100	5×11		5×11		6.3×11		6.3×11	
12	120	5×11		5×11		6.3×11		6.3×11	
15	150	5×11		6.3×11		6.3×11		6.3×15	
18	180	5×11		6.3×11		6.3×11		6.3×15	
22	220	6.3×11		6.3×11		6.3×15		8×11.5	
27	270	6.3×11		6.3×11		6.3×15		8×15	10×12.5
33	330	6.3×11		6.3×15		8×11.5		8×15	10×12.5
39	390	6.3×11		6.3×15		8×15	10×12.5	8×20	10×15
47	470	6.3×15		8×11.5		8×15	10×12.5	10×20	12.5×15
56	560	6.3×15		8×15	10×12.5	8×20	10×15	10×20	12.5×15
68	680	8×11.5		8×15	10×12.5	10×20	12.5×15	10×25	12.5×15
82	820	8×15	10×12.5	8×20	10×15	10×20	12.5×15	10×31.5	16×15
100	101	8×20	10×15	10×20	12.5×15	10×25	12.5×15	10×31.5	16×15
120	121	8×20	10×15	10×20	12.5×15	10×31.5	16×15	12.5×25	16×15
150	151	10×20	12.5×15	10×25	12.5×15	10×31.5	16×15	12.5×25	18×15
180	181	10×20	12.5×15	10×31.5	16×15	12.5×25	16×15	12.5×31.5	16×20
220	221	10×25	12.5×15	12.5×20	16×15	12.5×31.5	18×15	12.5×35.5	16×25
270	271	10×31.5	16×15	12.5×25	18×15	12.5×31.5	16×20	12.5×40	18×20
330	331	10×31.5	16×15	12.5×25	18×15	12.5×35.5	16×25	16×31.5	18×25
390	391	12.5×25	16×15	12.5×31.5	16×20	12.5×40	18×20	16×35.5	18×31.5
470	471	12.5×25	18×15	12.5×35.5	16×25	16×31.5	18×25	16×40	18×35.5
560	561	12.5×31.5	16×20	12.5×40	18×20	16×35.5	18×31.5	18×35.5	
680	681	12.5×35.5	16×20	16×31.5	18×25	16×40	18×31.5	18×40	
820	821	12.5×40	18×20	16×35.5	18×31.5	18×35.5			
1000	102	16×31.5	18×25	16×40	18×35.5	18×40			
1200	122	16×35.5	18×31.5	18×40					
1500	152	16×40	18×31.5						
1800	182	18×35.5							
2200	222	18×40							

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

Dimension table for 160 ~ 450V products are shown in 95 page.

PM series

■Standard ratings

Cap.(μF)	Code	V(Code) / Size code	6.3 (0J) — Case size φD×L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	6.3 (0J) 6 — Case size φD×L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
100	101	5×11	0.85	1.70	150	99						
120	121	5×11	0.65	1.30	175	115						
150	151	6.3×11	0.49	0.98	225	155						
180	181	6.3×11	0.39	0.78	250	175						
220	221	6.3×11	0.30	0.60	285	205						
270	271	6.3×15	0.24	0.48	370	275						
330	331	6.3×15	0.20	0.40	405	310						
390	391	8×11.5	0.17	0.34	445	345						
470	471	8×15	0.14	0.28	550	435	10×12.5	0.14	0.28	575	455
560	561	8×15	0.12	0.24	595	480	10×12.5	0.13	0.26	600	485
680	681	8×20	0.10	0.20	730	605	10×15	0.11	0.22	700	580
820	821	8×20	0.085	0.17	795	670	10×15	0.095	0.19	750	635
1000	102	10×20	0.075	0.15	950	820	12.5×15	0.085	0.17	890	765
1200	122	10×20	0.065	0.13	1020	895	12.5×15	0.075	0.15	950	835
1500	152	10×25	0.055	0.11	1220	1090	12.5×15	0.065	0.13	1020	915
1800	182	10×31.5	0.050	0.10	1370	1230	16×15	0.055	0.11	1270	1140
2200	222	10×31.5	0.043	0.086	1470	1320	16×15	0.049	0.098	1340	1200
2700	272	12.5×25	0.038	0.076	1590	1430	18×15	0.044	0.088	1500	1350
3300	332	12.5×25	0.034	0.068	1710	1530	18×15	0.039	0.078	1600	1440
3900	392	12.5×31.5	0.031	0.062	1910	1710	16×20	0.036	0.072	1720	1540
4700	472	12.5×35.5	0.028	0.056	2100	1890	18×20	0.032	0.064	1920	1720
5600	562	12.5×40	0.026	0.052	2270	2040	18×20	0.030	0.060	1980	1780
6800	682	16×31.5	0.024	0.048	2370	2130	18×25	0.027	0.054	2210	1980
8200	822	16×35.5	0.022	0.044	2550	2290	18×31.5	0.025	0.050	2390	2150
10000	103	16×40	0.020	0.040	2750	2470	18×31.5	0.023	0.046	2490	2240
12000	123	18×35.5	0.019	0.038	2820	2530					
15000	153	18×40	0.018	0.036	2960	2660					

Cap.(μF)	Code	V(Code) / Size code	10 (1A) — Case size φD×L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	10 (1A) 6 — Case size φD×L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
68	680	5×11	0.80	1.60	155	97						
82	820	5×11	0.65	1.30	175	110						
100	101	6.3×11	0.55	1.10	210	135						
120	121	6.3× 11	0.44	0.88	235	160						
150	151	6.3×11	0.35	0.70	265	185						
180	181	6.3×11	0.29	0.58	290	205						
220	221	6.3×15	0.24	0.48	370	270						
270	271	6.3×15	0.20	0.40	405	300						
330	331	8×11.5	0.16	0.32	460	350						
390	391	8×15	0.14	0.28	550	430	10×12.5	0.15	0.30	555	430
470	471	8×15	0.12	0.24	595	475	10×12.5	0.13	0.26	600	475
560	561	8×20	0.10	0.20	730	590	10×15	0.11	0.22	700	565
680	681	8×20	0.085	0.17	795	660	10×15	0.090	0.18	770	635
820	821	10×20	0.070	0.14	985	835	12.5×15	0.080	0.16	920	780
1000	102	10×20	0.060	0.12	1060	915	12.5×15	0.065	0.13	1040	895
1200	122	10×25	0.050	0.10	1280	1120	12.5×15	0.060	0.12	1060	930
1500	152	10×31.5	0.045	0.090	1440	1290	16×15	0.050	0.10	1330	1190
1800	182	12.5×20	0.039	0.078	1470	1320	16×15	0.044	0.088	1420	1270
2200	222	12.5×25	0.034	0.068	1710	1530	18×15	0.039	0.078	1600	1440
2700	272	12.5×31.5	0.030	0.060	1940	1740	16×20	0.035	0.070	1740	1560
3300	332	12.5×35.5	0.026	0.052	2180	1960	16×20	0.031	0.062	1850	1660
3900	392	12.5×40	0.024	0.048	2360	2120	18×20	0.028	0.056	2050	1840
4700	472	16×31.5	0.023	0.046	2420	2170	18×25	0.026	0.052	2250	2020
5600	562	16×35.5	0.021	0.042	2610	2340	18×25	0.024	0.048	2340	2100
6800	682	16×35.5	0.020	0.040	2680	2410	18×31.5	0.022	0.044	2540	2280
8200	822	16×40	0.019	0.038	2820	2530	18×35.5	0.021	0.042	2690	2420
10000	103	18×40	0.017	0.034	3040	2730					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PM series

■Standard ratings

Cap.(μF)	Code	V(Code) / Size Code	16 (1C) — Case size φD × L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	16 (1C) 6 — Case size φD × L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
47	470	5 × 11	0.80	1.60	155	92						
56	560	5 × 11	0.65	1.30	175	105						
68	680	6.3 × 11	0.50	1.00	220	135						
82	820	6.3 × 11	0.42	0.84	240	155						
100	101	6.3 × 11	0.35	0.70	265	175						
120	121	6.3 × 11	0.29	0.58	290	195						
150	151	6.3 × 15	0.23	0.46	375	260						
180	181	6.3 × 15	0.20	0.40	405	285						
220	221	8 × 11.5	0.16	0.32	460	335						
270	271	8 × 15	0.14	0.28	550	410	10 × 12.5	0.14	0.28	575	430
330	331	8 × 15	0.12	0.24	595	455	10 × 12.5	0.12	0.24	625	480
390	391	8 × 20	0.10	0.20	730	570	10 × 15	0.10	0.20	730	570
470	471	8 × 20	0.090	0.18	770	615	10 × 15	0.090	0.18	770	615
560	561	10 × 20	0.075	0.15	950	770	12.5 × 15	0.080	0.16	920	745
680	681	10 × 20	0.065	0.13	1020	845	12.5 × 15	0.070	0.14	985	815
820	821	10 × 25	0.055	0.11	1220	1030	12.5 × 15	0.060	0.12	1060	895
1000	102	10 × 31.5	0.047	0.094	1410	1210	16 × 15	0.055	0.11	1270	1090
1200	122	12.5 × 20	0.041	0.082	1430	1250	16 × 15	0.046	0.092	1390	1220
1500	152	12.5 × 25	0.036	0.072	1660	1490	18 × 15	0.041	0.082	1560	1400
1800	182	12.5 × 31.5	0.032	0.064	1880	1690	16 × 20	0.037	0.074	1700	1530
2200	222	12.5 × 31.5	0.028	0.056	2010	1800	16 × 20	0.033	0.066	1800	1620
2700	272	12.5 × 35.5	0.025	0.050	2220	1990	16 × 25	0.030	0.060	2010	1800
3300	332	12.5 × 40	0.023	0.046	2410	2160	18 × 20	0.027	0.054	2090	1880
3900	392	16 × 31.5	0.022	0.044	2470	2220	18 × 25	0.025	0.050	2290	2060
4700	472	16 × 35.5	0.020	0.040	2680	2410	18 × 31.5	0.023	0.046	2490	2240
5600	562	16 × 40	0.019	0.038	2820	2530	18 × 35.5	0.022	0.044	2620	2350
6800	682	18 × 35.5	0.018	0.036	2900	2610					
8200	822	18 × 40	0.017	0.034	3040	2730					

Cap.(μF)	Code	V(Code) / Size Code	25 (1E) — Case size φD × L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	25 (1E) 6 — Case size φD × L (mm)	Impedance (Ω MAX) 20°C / 100kHz	Impedance (Ω MAX) −10°C / 100kHz	Rated ripple (mA rms) 105°C 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
33	330	5 × 11	0.80	1.60	155	88						
39	390	5 × 11	0.65	1.30	175	100						
47	470	6.3 × 11	0.55	1.10	210	125						
56	560	6.3 × 11	0.44	0.88	235	140						
68	680	6.3 × 11	0.36	0.72	260	160						
82	820	6.3 × 11	0.30	0.60	285	180						
100	101	6.3 × 15	0.24	0.48	370	245						
120	121	6.3 × 15	0.20	0.40	405	275						
150	151	8 × 11.5	0.16	0.32	460	320						
180	181	8 × 15	0.14	0.28	550	390	10 × 12.5	0.15	0.30	555	395
220	221	8 × 15	0.11	0.22	625	455	10 × 12.5	0.13	0.26	600	435
270	271	8 × 20	0.095	0.19	750	560	10 × 15	0.11	0.22	700	525
330	331	8 × 20	0.085	0.17	795	610	10 × 15	0.095	0.19	750	575
390	391	10 × 20	0.070	0.14	985	770	12.5 × 15	0.080	0.16	920	720
470	471	10 × 20	0.065	0.13	1020	810	12.5 × 15	0.070	0.14	985	785
560	561	10 × 25	0.055	0.11	1220	990	12.5 × 15	0.060	0.12	1060	860
680	681	10 × 31.5	0.046	0.092	1420	1180	16 × 15	0.055	0.11	1270	1050
820	821	12.5 × 20	0.041	0.082	1430	1210	16 × 15	0.049	0.098	1340	1130
1000	102	12.5 × 25	0.036	0.072	1660	1430	18 × 15	0.043	0.086	1520	1310
1200	122	12.5 × 25	0.032	0.064	1760	1550	18 × 15	0.039	0.078	1600	1400
1500	152	12.5 × 31.5	0.029	0.058	1980	1780	16 × 20	0.034	0.068	1770	1590
1800	182	12.5 × 35.5	0.026	0.052	2180	1960	16 × 25	0.031	0.062	1980	1780
2200	222	12.5 × 40	0.024	0.048	2360	2120	18 × 20	0.028	0.056	2050	1840
2700	272	16 × 31.5	0.022	0.044	2470	2220	18 × 25	0.025	0.050	2290	2060
3300	332	16 × 35.5	0.020	0.040	2680	2410	18 × 31.5	0.023	0.046	2490	2240
3900	392	16 × 40	0.019	0.038	2820	2530	18 × 35.5	0.021	0.042	2690	2420
4700	472	18 × 40	0.018	0.036	2960	2660					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PM series

■Standard ratings

Cap.(μF)	Code	35 (1V) — Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	35 (1V) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
22	220	5 × 11	0.75	1.50	160	85					
27	270	5 × 11	0.60	1.20	180	99					
33	330	6.3 × 11	0.49	0.98	225	125					
39	390	6.3 × 11	0.41	0.82	245	140					
47	470	6.3 × 11	0.34	0.68	270	160					
56	560	6.3 × 11	0.28	0.56	295	180					
68	680	6.3 × 15	0.24	0.48	370	230					
82	820	6.3 × 15	0.19	0.38	415	265					
100	101	8 × 11.5	0.16	0.32	460	305					
120	121	8 × 15	0.14	0.28	550	370	10 × 12.5	0.15	0.30	555	375
150	151	8 × 15	0.12	0.24	595	415	10 × 12.5	0.12	0.24	625	435
180	181	8 × 20	0.10	0.20	730	520	10 × 15	0.11	0.22	700	500
220	221	8 × 20	0.085	0.17	795	580	10 × 15	0.090	0.18	770	560
270	271	10 × 20	0.070	0.14	985	735	12.5 × 15	0.080	0.16	920	690
330	331	10 × 20	0.060	0.12	1060	810	12.5 × 15	0.065	0.13	1020	780
390	391	10 × 25	0.055	0.11	1220	955	12.5 × 15	0.060	0.12	1060	825
470	471	10 × 31.5	0.046	0.092	1420	1130	16 × 15	0.055	0.11	1270	1010
560	561	12.5 × 20	0.041	0.082	1430	1160	16 × 15	0.048	0.096	1360	1100
680	681	12.5 × 25	0.036	0.072	1660	1370	18 × 15	0.042	0.084	1540	1270
820	821	12.5 × 25	0.032	0.064	1760	1490	18 × 15	0.038	0.076	1620	1370
1000	102	12.5 × 31.5	0.029	0.058	1980	1710	16 × 20	0.034	0.068	1770	1530
1200	122	12.5 × 35.5	0.026	0.052	2180	1920	16 × 25	0.031	0.062	1980	1740
1500	152	12.5 × 40	0.024	0.048	2360	2120	18 × 20	0.028	0.056	2050	1840
1800	182	16 × 31.5	0.022	0.044	2470	2220	18 × 25	0.025	0.050	2290	2060
2200	222	16 × 35.5	0.020	0.040	2680	2410	18 × 31.5	0.023	0.046	2490	2240
2700	272	16 × 40	0.018	0.036	2900	2610	18 × 35.5	0.021	0.042	2690	2420
3300	332	18 × 40	0.017	0.034	3040	2730					

Cap.(μF)	Code	50 (1H) — Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	50 (1H) 6 Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
0.47	R47	5 × 11	23.0	46.0	22	11					
0.68	R68	5 × 11	16.0	32.0	28	14					
1	010	5 × 11	11.0	22.0	36	18					
1.5	1R5	5 × 11	7.50	15.0	45	22					
2.2	2R2	5 × 11	5.00	10.0	54	27					
3.3	3R3	5 × 11	3.30	6.60	66	33					
4.7	4R7	5 × 11	2.20	4.40	81	40					
6.8	6R8	5 × 11	1.80	3.60	91	45					
10	100	5 × 11	1.40	2.80	115	57					
12	120	5 × 11	1.20	2.40	125	62					
15	150	5 × 11	0.93	1.86	145	72					
18	180	5 × 11	0.80	1.60	155	79					
22	220	6.3 × 11	0.65	1.30	195	100					
27	270	6.3 × 11	0.53	1.06	215	115					
33	330	6.3 × 11	0.43	0.86	240	135					
39	390	6.3 × 11	0.36	0.72	260	150					
47	470	6.3 × 15	0.30	0.60	330	195					
56	560	6.3 × 15	0.25	0.50	360	220					
68	680	8 × 11.5	0.20	0.40	410	255					
82	820	8 × 15	0.17	0.34	500	320	10 × 12.5	0.18	0.36	510	330
100	101	8 × 20	0.14	0.28	620	410	10 × 15	0.16	0.32	580	385
120	121	8 × 20	0.12	0.24	670	455	10 × 15	0.13	0.26	640	435
150	151	10 × 20	0.10	0.20	820	570	12.5 × 15	0.11	0.22	785	545
180	181	10 × 20	0.085	0.17	890	635	12.5 × 15	0.095	0.19	845	605
220	221	10 × 25	0.075	0.15	1040	760	12.5 × 15	0.080	0.16	920	670
270	271	10 × 31.5	0.065	0.13	1200	900	16 × 15	0.070	0.14	1120	840
330	331	10 × 31.5	0.055	0.11	1300	995	16 × 15	0.060	0.12	1210	925
390	391	12.5 × 25	0.048	0.096	1440	1120	16 × 15	0.055	0.11	1270	990
470	471	12.5 × 25	0.044	0.088	1500	1190	18 × 15	0.046	0.092	1470	1170
560	561	12.5 × 31.5	0.040	0.080	1680	1360	16 × 20	0.044	0.088	1550	1260
680	681	12.5 × 35.5	0.036	0.072	1850	1530	16 × 20	0.040	0.080	1630	1350
820	821	12.5 × 40	0.033	0.066	2010	1700	18 × 20	0.036	0.072	1810	1530
1000	102	16 × 31.5	0.030	0.060	2120	1830	18 × 25	0.033	0.066	2000	1730
1200	122	16 × 35.5	0.028	0.056	2260	1990	18 × 31.5	0.031	0.062	2140	1880
1500	152	16 × 40	0.026	0.052	2410	2170	18 × 31.5	0.029	0.058	2220	1990
1800	182	18 × 35.5	0.025	0.050	2460	2210					
2200	222	18 × 40	0.024	0.048	2560	2300					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PM series

■Standard ratings

Cap.(μF)	Code	Case size φD×L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz	Case size φD×L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz~200kHz	Rated ripple (mA rms) 105°C / 120Hz
V(Code)		63 (1J)									
Size code		—					6				
10	100	5×11	1.06	2.12	135	67					
12	120	5×11	0.93	1.86	145	72					
15	150	6.3×11	0.73	1.46	185	92					
18	180	6.3×11	0.63	1.26	195	100					
22	220	6.3×11	0.52	1.04	215	110					
27	270	6.3×11	0.43	0.86	240	130					
33	330	6.3×15	0.35	0.70	305	170					
39	390	6.3×15	0.30	0.60	330	190					
47	470	8×11.5	0.25	0.50	365	215					
56	560	8×15	0.21	0.42	450	275	10×12.5	0.23	0.46	450	275
68	680	8×15	0.17	0.34	500	315	10×12.5	0.19	0.38	495	310
82	820	8×20	0.15	0.30	600	385	10×15	0.16	0.32	580	375
100	101	10×20	0.12	0.24	750	495	12.5×15	0.14	0.28	695	460
120	121	10×20	0.10	0.20	820	555	12.5×15	0.12	0.24	750	510
150	151	10×25	0.090	0.18	950	665	12.5×15	0.095	0.19	845	590
180	181	10×31.5	0.075	0.15	1110	790	16×15	0.080	0.16	1050	750
220	221	12.5×20	0.065	0.13	1140	835	16×15	0.070	0.14	1120	820
270	271	12.5×25	0.055	0.11	1340	1000	18×15	0.060	0.12	1290	965
330	331	12.5×25	0.049	0.098	1420	1090	18×15	0.050	0.10	1410	1080
390	391	12.5×31.5	0.043	0.086	1620	1260	16×20	0.047	0.094	1500	1170
470	471	12.5×35.5	0.039	0.078	1780	1420	16×25	0.042	0.084	1700	1350
560	561	12.5×40	0.035	0.070	1950	1580	18×20	0.039	0.078	1730	1400
680	681	16×31.5	0.032	0.064	2050	1700	18×25	0.035	0.070	1940	1610
820	821	16×35.5	0.029	0.058	2220	1880	18×31.5	0.032	0.064	2110	1780
1000	102	16×40	0.027	0.054	2370	2050	18×35.5	0.029	0.058	2280	1970
1200	122	18×40	0.025	0.050	2510	2210					

Cap.(μF)	Code	Case size φD×L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105°C / 120Hz	Case size φD×L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105°C / 120Hz
V(Code)		80 (1K)									
Size code		—					6				
4.7	4R7	5×11	4.20	11.00	53	26					
6.8	6R8	5×11	2.60	7.00	68	34					
10	100	6.3×11	1.70	4.60	87	43					
12	120	6.3×11	1.40	3.80	96	48					
15	150	6.3×11	1.20	3.20	104	52					
18	180	6.3×11	1.00	2.70	114	58					
22	220	6.3×15	0.77	2.10	135	71					
27	270	6.3×15	0.63	1.70	149	80					
33	330	8×11.5	0.53	1.40	234	132					
39	390	8×15	0.46	1.20	272	156	10×12.5	0.49	1.30	271	155
47	470	8×15	0.39	1.10	295	175	10×12.5	0.42	1.10	293	174
56	560	8×20	0.34	0.92	347	208	10×15	0.36	0.97	337	202
68	680	10×20	0.28	0.76	426	264	12.5×15	0.31	0.84	402	249
82	820	10×20	0.25	0.68	447	284	12.5×15	0.27	0.73	430	273
100	101	10×25	0.21	0.57	526	347	12.5×15	0.23	0.62	466	308
120	121	10×31.5	0.18	0.49	606	406	16×15	0.20	0.54	663	444
150	151	10×31.5	0.15	0.41	663	459	16×15	0.18	0.47	699	484
180	181	12.5×25	0.13	0.35	734	520	16×15	0.15	0.41	766	543
220	221	12.5×31.5	0.12	0.32	816	595	18×15	0.13	0.35	881	643
270	271	12.5×31.5	0.10	0.27	894	667	16×20	0.11	0.30	995	742
330	331	12.5×35.5	0.088	0.24	1000	767	16×25	0.099	0.27	1140	874
390	391	12.5×40	0.078	0.21	1060	822	18×20	0.089	0.24	1170	908
470	471	16×31.5	0.069	0.19	1450	1150	18×25	0.080	0.22	1330	1060
560	561	16×35.5	0.062	0.17	1600	1300	18×31.5	0.072	0.19	1490	1210
680	681	16×40	0.055	0.15	1770	1470	18×31.5	0.065	0.18	1560	1300
820	821	18×35.5	0.049	0.13	1890	1590					
1000	102	18×40	0.044	0.12	2080	1790					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PM series

■Standard ratings

Cap.(μF)	Code	V(Code) / Size code	100 (2A) — Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105°C / 120Hz	100 (2A) 6 — Case size φD × L (mm)	Impedance (Ω MAX.) 20°C / 100kHz	Impedance (Ω MAX.) −10°C / 100kHz	Rated ripple (mA rms) 105°C / 10kHz ~ 200kHz	Rated ripple (mA rms) 105°C / 120Hz
0.47	R47	5 × 11	43.0	116.0	17	8						
0.68	R68	5 × 11	23.0	62.0	23	11						
1	010	5 × 11	17.0	46.0	27	13						
1.5	1R5	5 × 11	10.0	27.0	35	17						
2.2	2R2	5 × 11	6.60	18.0	43	21						
3.3	3R3	5 × 11	4.10	11.0	54	27						
4.7	4R7	6.3 × 11	2.80	7.60	68	34						
6.8	6R8	6.3 × 11	1.90	5.10	83	41						
10	100	6.3 × 11	1.20	3.20	104	52						
12	120	6.3 × 11	1.00	2.70	114	57						
15	150	6.3 × 15	0.81	2.20	131	65						
18	180	6.3 × 15	0.67	1.80	155	73						
22	220	8 × 11.5	0.55	1.50	230	122						
27	270	8 × 15	0.47	1.30	269	146	10 × 12.5	0.50	1.40	268	145
33	330	8 × 15	0.38	1.00	299	169	10 × 12.5	0.42	1.10	293	166
39	390	8 × 20	0.33	0.89	352	202	10 × 15	0.36	0.97	337	193
47	470	10 × 20	0.28	0.76	423	252	12.5 × 15	0.31	0.84	402	239
56	560	10 × 20	0.24	0.65	456	274	12.5 × 15	0.27	0.73	430	258
68	680	10 × 25	0.21	0.57	526	326	12.5 × 15	0.23	0.62	466	289
82	820	10 × 31.5	0.18	0.49	606	386	16 × 15	0.19	0.51	681	433
100	101	10 × 31.5	0.15	0.41	663	438	16 × 15	0.17	0.46	719	475
120	121	12.5 × 25	0.13	0.35	774	519	16 × 15	0.14	0.38	793	531
150	151	12.5 × 25	0.11	0.30	798	553	18 × 15	0.12	0.32	917	635
180	181	12.5 × 31.5	0.098	0.26	904	641	16 × 20	0.11	0.30	995	706
220	221	12.5 × 35.5	0.087	0.23	1000	730	16 × 25	0.093	0.25	1170	854
270	271	12.5 × 40	0.072	0.19	1130	843	18 × 20	0.080	0.22	1230	918
330	331	16 × 31.5	0.062	0.17	1520	1160	18 × 25	0.070	0.19	1420	1080
390	391	16 × 35.5	0.053	0.14	1730	1340	18 × 31.5	0.062	0.17	1600	1240
470	471	16 × 40	0.047	0.13	1920	1530	18 × 35.5	0.056	0.15	1770	1410
560	561	18 × 35.5	0.041	0.11	2070	1680					
680	681	18 × 40	0.036	0.097	2300	1910					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

Cap.(μF)	Code	V(Code) 160		200		250		315		350		400		450	
		2C		2D		2E		2F		2V		2G		2W	
1	010	8 × 11.5	19	8 × 11.5	19	8 × 11.5	19	8 × 11.5	19	10 × 12.5	21	10 × 12.5	17	10 × 15	17
2.2	2R2	8 × 11.5	30	8 × 11.5	30	10 × 12.5	32	10 × 12.5	32	10 × 15	34	10 × 15	28	10 × 20	28
3.3	3R3	10 × 12.5	50	10 × 12.5	50	10 × 15	52	10 × 15	52	10 × 20	54	10 × 20	47	12.5 × 20	48
4.7	4R7	10 × 12.5	57	10 × 15	60	10 × 15	60	10 × 20	65	10 × 20	65	12.5 × 20	55	12.5 × 25	55
10	100	10 × 15	90	10 × 20	95	12.5 × 20	98	12.5 × 20	98	12.5 × 25	100	12.5 × 25	85	16 × 25	90
22	220	12.5 × 20	140	12.5 × 25	145	16 × 25	150	16 × 25	150	16 × 25	150	16 × 31.5	130	16 × 35.5	135
33	330	12.5 × 25	175	16 × 25	180	16 × 25	180	16 × 31.5	185	16 × 35.5	190	18 × 35.5	170	18 × 40	170
47	470	16 × 25	220	16 × 25	220	16 × 31.5	225	18 × 35.5	235	18 × 40	240				
100	101	16 × 35.5	330	18 × 40	345	18 × 40	345							Case size	※

※Rated Ripple (mA rms) at 105°C 120Hz

APPLICATION GUIDELINES FOR POSITIVE THERMISTORS, "Posi-R"

General Observations

1. Do not use"Posi-R" in the presence of oil or water.The parts could fail.
2. Do not apply voltage in excess of the rated voltage－this could cause a short circuit or burn-out.
3. Do not use "Posi-R" with reactive gas,reducing gas, or oxygen-free environment－electrical characteristics may deteriorate or burn-out may occur.

Notes on Usage

1. Please use the parts within the rated operating temperatures according to the catalog.
2. Please use the parts wihtin the maximum operating voltage and maximum inrush current as specified in the catalog.
3. The surface temperatures for the "Posi-R" during operation are：
   for degaussing 110 to 120˚C
   for overcurrent protection 100 to 160˚C
   Please take into consideration the effect of generated heat around the PTC Thermistor.
4. Do not apply more lead stress than specified.
5. Do not allow flux to come in contact with PTC,it may cause failure.
6. The outer resin on the leads may be partially peeled off. This will not affect the function of products.

Notes on Storage

1. Packaged parts should be stored under the following conditions：
   temperature：－10 to +40˚C
   humidity：85% or less
2. Prolonged storage of PTC devices may result in increased resistive characteristics. They will return to the initial value by applying max. operating voltage prior to using the parts.
3. Shall be used shortly after opening the package. The prolonged exposure to the air may case to deteriorate the solderability.

Characteristics of Positive Thermistors "Posi-R"

● Switching Temperature (Resistance Anomaly Point)
At the resistance / temperature characteristics of positive thermistors "Posi-R", the temperature which the resistance value becomes twice as high as that of at 25˚C, is called as "switching temperature" (Curie point)
Thermistors "Posi-R" show anomalous temperature characteristics of resistivity, and typical characteristics are represented in Fig. 1.
Optimum characteristics can be selected for each application.

● Temperature Coefficient
The temperature coefficient is calculated from the linear range at the steepest portion of resistance (T_1~T_2) as illustrated in Fig. 2.

$$\text{Temperature coefficient} = \frac{2.303\ (\log_{10} R_2 / R_1)}{t_2 - t_1} \times 100\ (\%/\ ^\circ C)$$

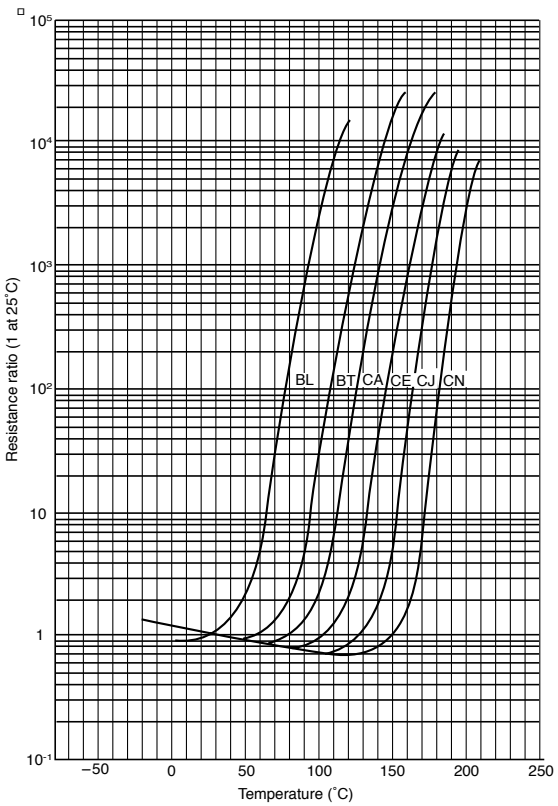


Fig. 1 Resistance / Temperature Characteristics

● Maximum Inrush Current
The maximum inrush current is the maximum allowable current (effective value) flowed into a Posi-R. No current higher than this shall be flowed as it causes breakdown of a Posi-R.

● Recovery Time
The returning time is the time constant necessary for a Posi-R to quickly return to the switching temperature (resistance of twice as high as the initial value) after the power source is cut off.

● Dissipation Factor
When a power source is applied to Posi-R and thermal equilibrium will have been reached, the following equation is established.

$$V \bullet I = C\ (T_1 - T_0)$$

Where, V : Applied voltage (V)
I : Equilibrium current (A)
C : Dissipation factor (W/˚C)
T_1 : Equilibrium temperature of Posi-R (˚C)
T_0 : Ambient temperature (˚C)

In case that the dissipation factor is known by putting arbitrary values of voltage and current into the above equation, the equilibrium temperature at the then voltage can be attained.
The temperature rise ($T_1 - T_0$) of Posi-R due to voltage application can be also computed easily.

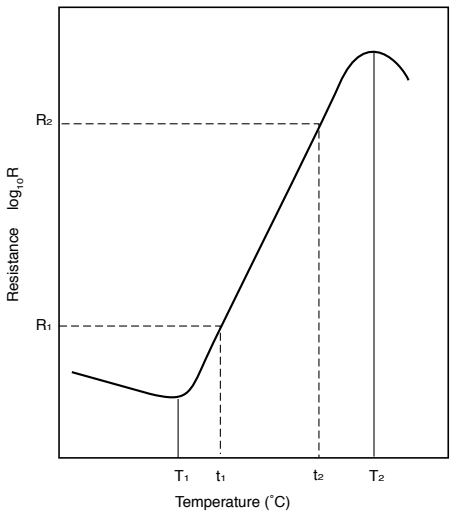


Fig. 2 Temperature Characteristics of "Posi-R"

● Voltage / Current Characteristics

In the Fig. 3 circuit, the relationship between voltage and current is called as the voltage/current characteristics when the voltage is applied to Posi-R and it gets the thermal equilibrium.

As seen in Fig. 4, the characteristic follows Ohm's law up to E_1 point. The current increases when the voltage is raised, provided that the temperature characteristics is within the range of switching temperature or lower. The range between E_1 and E_2 is over the switching temperature but within the constant range of power dissipation. However, beyond E_2 point, an excess power will run and Posi-R will result in breakdown, accordingly.

Therefore, the operating voltage of Posi-R shall be lower than E_2, and its rated voltage shall be defined to half of E_2 value or lower, taking the safety into account.

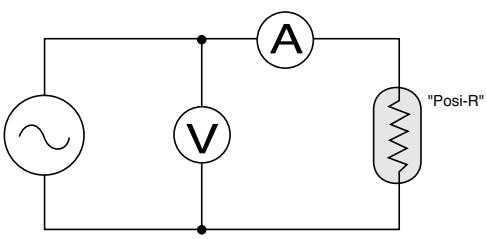


Fig. 3 Measuring Circuit

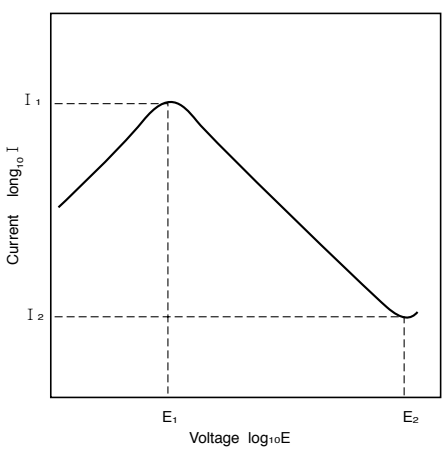


Fig. 4 Voltage , Current Characteristics

● Equilibrium Current, Equilibrium Resistance

The current, which Posi-R gets thermal equilibrium with an arbitrary voltage application (for 30 seconds or longer), is called as the equilibrium current.
Besides, the quotient which the applied voltage is divided by the equilibrium current is specified as the equilibrium resistance.

● Current , Time Characteristics

In the Fig. 5 circuit, when a load resistance (R) and a Posi-R are connected in series and an arbitrary voltage higher than E_1 in Fig. 4 is applied, the Posi-R will have inherent temperature due to a current flowing through it. Its temperature rises as time passes by, and it exceeds the switching temperature in a certain time, resulting in a rapid damp of the current. The trip time can be adjusted by the current volume as shown in Fig. 6.
By making use of these characteristics, a Posi-R can be used for the following applications;

1. Timing circuit
2. Switching use for motor starting
3. Overcurrent protection

When the parameters of I_1, t_1, I_2 and t_2 in Fig. 6 are expressed in a logarithmic graph in the manner of Fig. 7, an almost linear graph is formed and the relationship between the circuit current and the trip time can be obtained.
But, when a Posi-R is used for a timing application such as a timer, the voltage shall be appropriately applied for 30 seconds or less as the changes of conditions may affect much more as time passes by.

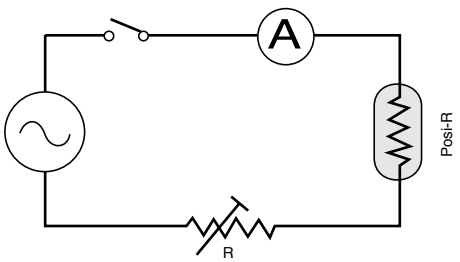
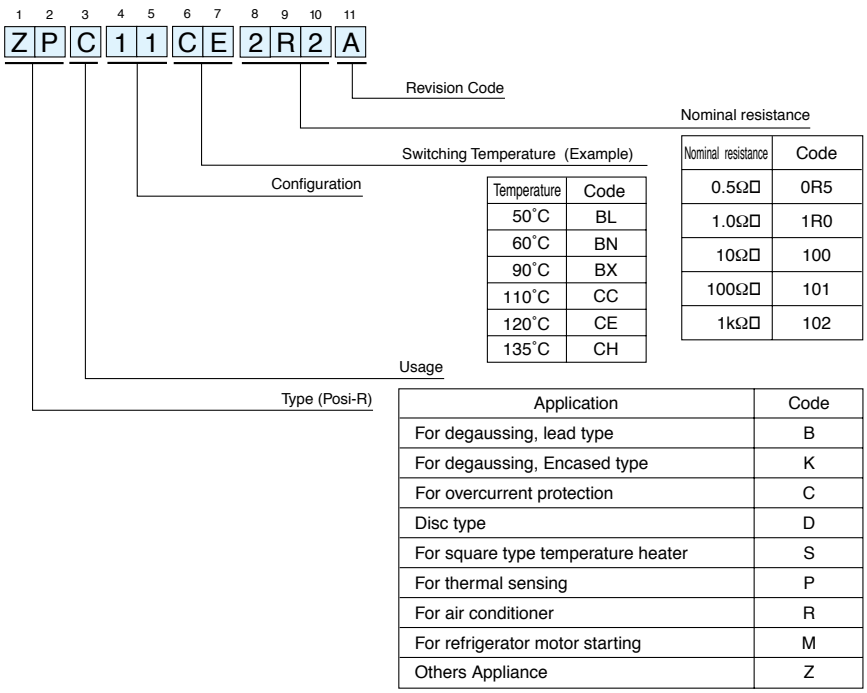


Fig. 5 Measuring Circuit

■ Type numbering system

(Example for overcurrent protection 12V. 2.2Ω)



Temperature	Code
50˚C	BL
60˚C	BN
90˚C	BX
110˚C	CC
120˚C	CE
135˚C	CH

Nominal resistance	Code
0.5Ω□	0R5
1.0Ω□	1R0
10Ω□	100
100Ω□	101
1kΩ□	102

Application	Code
For degaussing, lead type	B
For degaussing, Encased type	K
For overcurrent protection	C
Disc type	D
For square type temperature heater	S
For thermal sensing	P
For air conditioner	R
For refrigerator motor starting	M
Others Appliance	Z

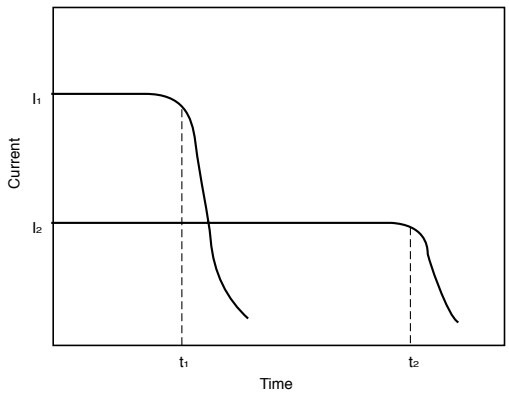


Fig. 6 Current , Time Characteristics

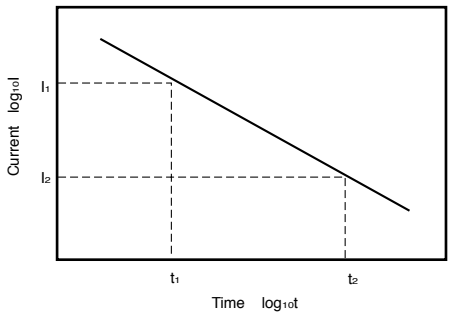


Fig. 7 Current , Time Characteristics

For Overcurrent Protection

When something abnormal occurs at the load such as a transistor circuit or a small-type motor, an abnormal current rushes into the power source circuit. Then, a power transistor at the transformer or the switching power supply generates heat in an abnormal level and causes breakdown.
If a Posi-R for overcurrent protection is used in such a circuit, it can make the temperature compensation and protection for the power source and the load. An example is as shown in Fig. 8.
As to the temperature protection, it can be perfectly made in use of this Posi-R owing to the excellent characteristics of resistance anomaly, that is, a current is reduced by the increased resistance due to the selfheating of Posi-R.
At the voltage/current characteristics in Fig. 9, there is a peak current. If a current larger than this peak current flows, a Posi-R acts. But if a current less than the peak current flows, a Posi-R does not act. The peak current varies depending upon the size of Posi-R, resistance and ambient temperature. Fig. 10 shows an example of current characteristics.
At the current higher than the upper limit of fluctuation range, a Posi-R acts. Contrary, at the current less than the lower limit, it does not act. But the fluctuation range varies owing to ambient temperature.
For instance, if the operating temperature range is supposed to be at –10 ~ +60˚C, the lower limit at +60˚C becomes the maximum value for a normal current (non-acting) and the upper limit at –10˚C becomes the minimum value for a limiting current (acting), respectively.
Judging from the above explained relations, a Posi-R can be suited for the circuit where the ratio of a limiting current to a normal current is more than 2.5 ~ 3 times.

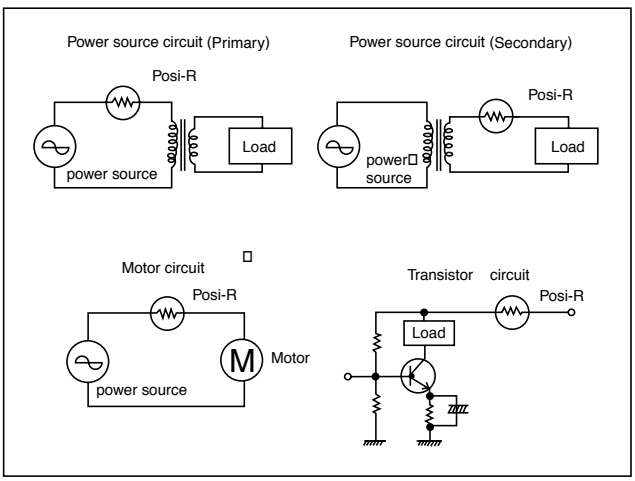


Fig. 8 Examples of applications

Characteristics of ZPC4MCE100D

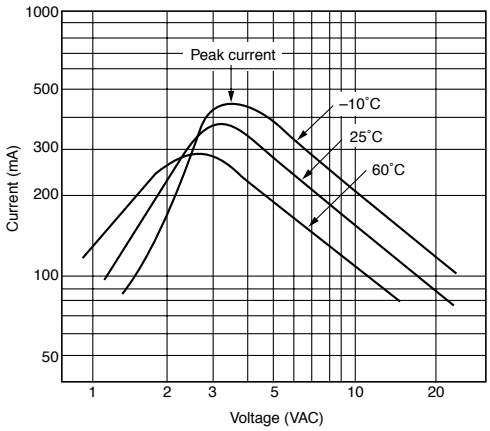


Fig. 9 Voltage / Current Characteristics

Characteristic of ZPC4MCE100D

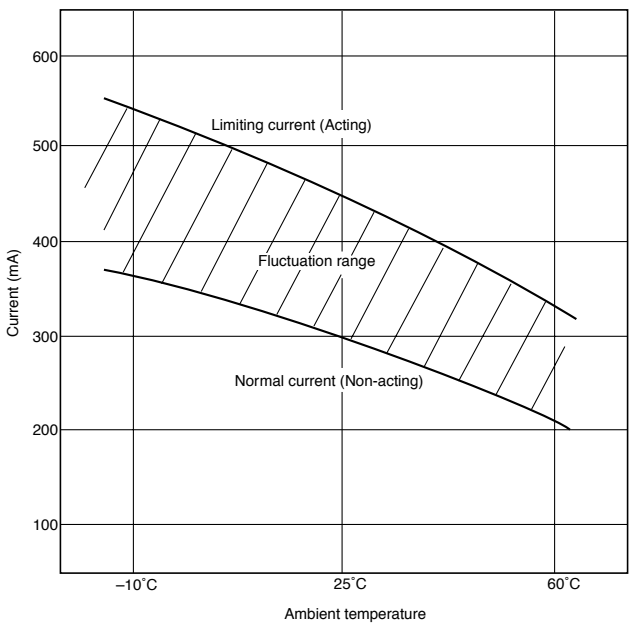


Fig. 10 Current Characteristics

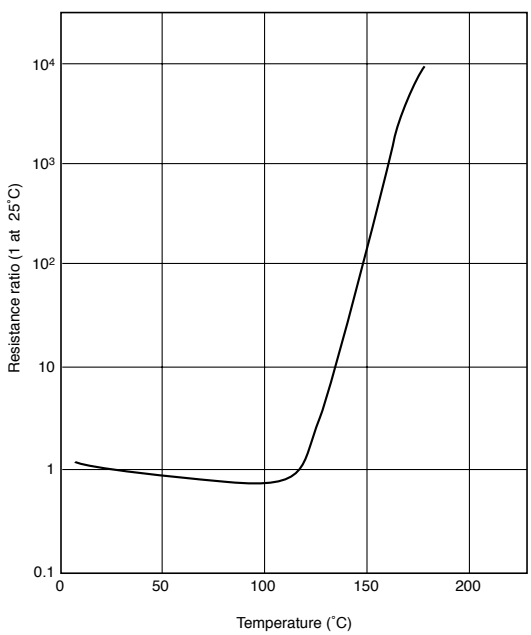


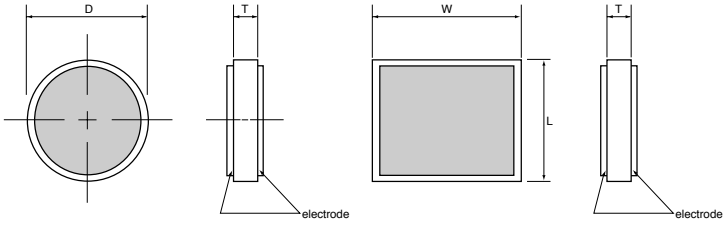
Fig. 11 Resistance , Temperature Characteristics

For Heater

A disc type Posi-R is ideal for a small-power heater, making use of its self-heating and self-equilibrium characteristics. As a Posi-R self-heats when voltage is applied, the size of a heater element and the switching temperature can be optionally selected in accordance with the shape of appliances.
Since this is of a non-contact control type, it is highly reliable for such applications.

Dimensions	Disc type	Square type
	D : φ20mm max.	W : 25mm max.
	T : 2 ~ 3mm	L : 16mm max.
		T : 1 ~ 3mm

Switching temperature	280˚C or lower
Resistance	For 100V : 100Ω or more
	For 200V : 500Ω or more
	(Resistance value various by size.)



Disc type Square type

For Motor Starting,(Fail Safe Type)

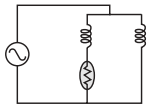
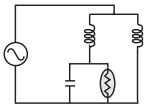
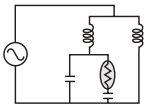
This case type Posi-R is ideally suited for motor starting in various home appliances like refrigerators, freezer and home-type air conditioners.
In case of failer on products, circuit will be opend with fail safe system.

Type numbering system

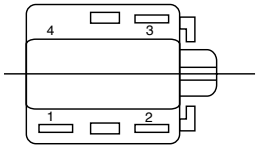
1 2 3 4 5 6 7 8 9 10 11 12 13 14

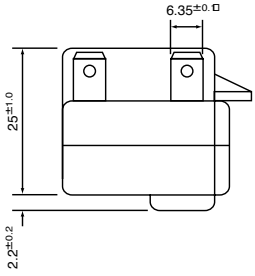
ZPM □ □ CH 4R7 B 180

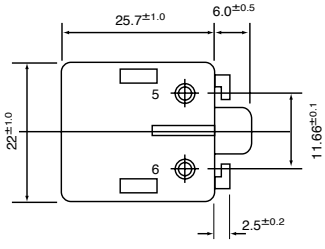
- 180 — Max. Operating Voltage (Vrms)
- B — Revision Code
- 4R7 — Initial Resistance (4R7 : 4.7Ω)
- CH — Switching Temperature (CH : 135˚C)
- □ — Diameter of Element (S : ϕ16, Y : ϕ20)
- □ — Number of starting circuit
- ZPM — For Motor Starting

Form of motor starting circuit	RSIR	RSCR	CSR
Number of starting circuit	1	2	3
Motor starting circuit			

(unit : mm)







Specification

Type No.	Initial Resistance (at 25˚C)	Switching Temperature	Max. Operating Voltage (Vrms)	Max. Inrush Current (Arms)
ZPM□SCH4R7N180	4.7Ω ±25%	135˚C	180	12
ZPM□SCH6R8N200	6.8Ω ±25%		200	10
ZPM□SCH100N225	10Ω ±25%		225	9
ZPM□SCH150N225	15Ω ±25%		250	7
ZPM□SCH220N250	22Ω ±25%		300	6
ZPM□SCH330N355	33Ω ±25%		355	6
ZPM□YCH4R7N180	4.7Ω ±25%		180	12
ZPM□YCH6R8N200	6.8Ω ±25%		200	10
ZPM□YCH100N225	10Ω ±25%		225	9
ZPM□YCH150N250	15Ω ±25%		250	8
ZPM□YCH220N300	22Ω ±25%		300	7
ZPM□YCH330N355	33Ω ±25%		355	6

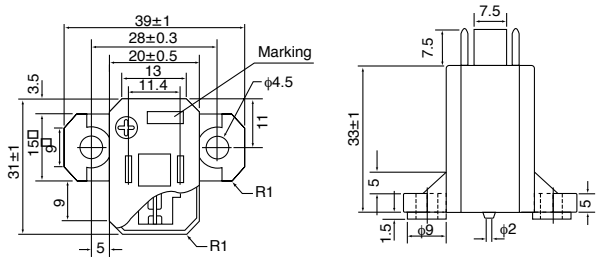
Symbol □ is number of starting circuit.

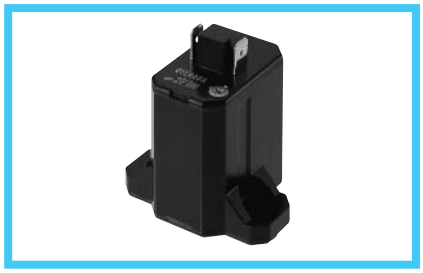
UL approval types are also available upon request.

Please contact us if you have any request for other specifications.

For Motor Starting

(unit : mm)





Type No.	Initial Resistance (at 25˚C)	Max.OperatingVoltage (Vrms)	Max Current (Arms)	Terminal
ZPR0YCE400C300	40Ω ±25%	300	8	#187 Tab Terminals
ZPR0YCE470A250	47Ω ±25%	250	12	
		300	9	
ZPR0YCE400A300	40Ω ±25%	300	10	
ZPR0YCE101A500	100Ω $^{+30}_{-20}$%	500	13	

POSITIVE THERMISTORS "Posi-R"

Series		Bulk	Taping
			Ammo-pack
For Overcurrent Protection	ZPC Type	500	1,000
For Color TV Automatic Degaussing Circuit	ZPB Type	500	—
	ZPK Type	250	
For Thermal Sensing	ZPP35 Type	500	—
	ZPP22 Type	200	

For Overcurrent Protection

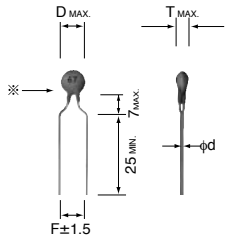


Fig. 1 (Formed Lead Type : Y)

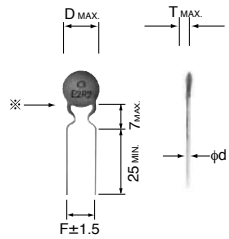


Fig. 2 (Formed Lead Type : U)

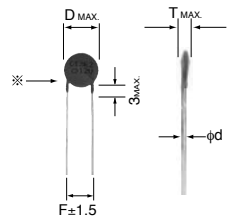


Fig. 3 (Formed Straight)

※ : An internal element may be exposed. However, this would not affect the function of products.

●12V Class

Type No.	Initial Resistance (at 25˚C)	Max. Operating Voltage	Max. Inrush Current	Current Characteristic		Dimensions (mm)				Fig.
				Normal Current (60˚C)	Limiting Current (−10˚C)	D	T	F	d	
ZPC11CE2R2A	2.2Ω ±20%	16V	2.1A	300mA or less	760mA or more	5.5	3.0	5.0	0.5	1
ZPC12CE1R8A	1.8Ω ±20%		2.4A	330mA or less	830mA or more	6.3				
ZPC13CE1R5B	1.5Ω ±20%		3.0A	410mA or less	1030mA or more	7.0			0.6	2
ZPC15CE1R0B	1.0Ω ±20%		3.6A	520mA or less	1300mA or more	8.0				
ZPC17CE0R8B	0.8Ω ±20%		4.1A	600mA or less	1490mA or more	8.8				
ZPC1CCC0R5D	0.5Ω ±20%		5.0A	730mA or less	1830mA or more	10.6				
ZPC1MCC0R3B	0.3Ω ±20%		7.0A	1030mA or less	2580mA or more	14.5				

●25V Class

Type No.	Initial Resistance (at 25˚C)	Max. Operating Voltage	Max. Inrush Current	Current Characteristic		Dimensions (mm)				Fig.
				Normal Current (60˚C)	Limiting Current (−10˚C)	D	T	F	d	
ZPC25CE8R2A	8.2Ω ±20%	35V	1.3A	120mA or less	310mA or more	8.0	3.5	5.0	0.5	3
ZPC29CE6R8A	6.8Ω ±20%		1.4A	200mA or less	510mA or more	9.7			0.6	
ZPC29CE4R7A	4.7Ω ±20%		1.6A	230mA or less	570mA or more	9.7				
ZPC2DCE4R7A	4.7Ω ±20%		1.8A	270mA or less	680mA or more	11.4				
ZPC2DCE3R9A	3.9Ω ±20%		1.9A	280mA or less	700mA or more	11.4				
ZPC2ECE3R9A	3.9Ω ±20%		2.1A	300mA or less	760mA or more	11.9				
ZPC2ECE3R3A	3.3Ω ±20%		2.2A	310mA or less	790mA or more	11.9				
ZPC2LCE2R7A	2.7Ω ±20%		2.5A	370mA or less	930mA or more	14.3		10.0		
ZPC2LCE2R2A	2.2Ω ±20%		2.8A	400mA or less	1020mA or more	14.3				
ZPC2RCE2R2A	2.2Ω ±20%		3.1A	450mA or less	1150mA or more	15.9				
ZPC2RCE1R8A	1.8Ω ±20%		3.4A	500mA or less	1250mA or more	15.9				

●50V Class

Type No.	Initial Resistance (at 25˚C)	Max. Operating Voltage	Max. Inrush Current	Current Characteristic		Dimensions (mm)				Fig.
				Normal Current (60˚C)	Limiting Current (−10˚C)	D	T	F	d	
ZPC32CE240D	24Ω ±20%	60V	0.7A	100mA or less	250mA or more	6.5	4.5	5.0	0.5	1
ZPC35CE150A	15Ω ±20%		0.9A	130mA or less	320mA or more	8.0				3
ZPC3ACE8R2C	8.2Ω ±20%		1.3A	190mA or less	480mA or more	10.1			0.6	2
ZPC3DCE6R2C	6.2Ω ±20%		1.5A	220mA or less	560mA or more	11.4				
ZPC3HCE4R7A	4.7Ω ±20%		1.9A	270mA or less	690mA or more	13.0		10.0		3
ZPC3MCE3R6A	3.6Ω ±20%		2.2A	310mA or less	790mA or more	14.7				
ZPC3RCE3R0A	3.0Ω ±20%		2.5A	370mA or less	920mA or more	15.9				

●100V,120V,220V Class

Type No.	Initial Resistance (at 25˚C)	Max. Operating Voltage	Max. Inrush Current	Current Characteristic		Dimensions (mm)				Fig.
				Normal Current (60˚C)	Limiting Current (−10˚C)	D	T	F	d	
ZPC42CE560A	56Ω ±20%	140V	0.5A	65mA or less	160mA or more	7.0	6.0	5.0	0.5	3
ZPC45CE300B	30Ω ±20%		0.7A	100mA or less	250mA or more	8.7				2
ZPC49CE220A	22Ω ±20%		1.0A	130mA or less	340mA or more	10.4			0.6	3
ZPC4CCE150A	15Ω ±20%		1.1A	160mA or less	410mA or more	11.7				
ZPC4MCE100A	10Ω ±20%		1.5A	210mA or less	540mA or more	15.3		10.0		
ZPC4PCE6R8A	6.8Ω ±20%		1.8A	260mA or less	660mA or more	16.2				
ZPC4RCE5R0A	5Ω ±20%	120V	3.5A	290mA or less	730mA or more	16.8			0.65	
ZPC59CE390A	39Ω ±20%	265V	0.8A	100mA or less	250mA or more	10.0		5.0	0.6	
ZPC5JCE270A	27Ω ±20%		1.2A	140mA or less	350mA or more	14.0		10.0		

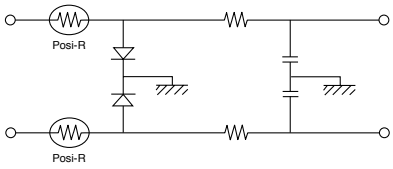
●Other current values are also available upon request.

For Overcurrent Protection in Telecommunications Equipment.

Features

1 . This type responds quickly as having low heat capacity.
2 . Noise shall not be generated as this is a non-contact type.
3 . Once "Posi-R" is operated, it keeps protecting unless switch is turned off.
4 . "Posi-R" returns to the original resistance level by turning off the switch and can be used repeatedly, after abnormal conditions are removed. (There is no need to exchange.)

Examples of applications

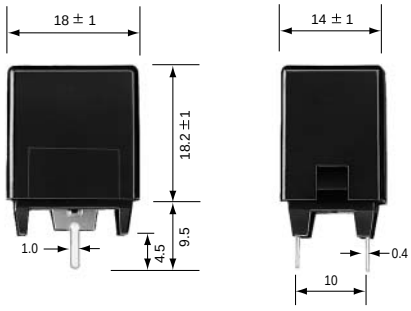


Type No.	Initial Resistance (at 25˚C)	Max. Operating Voltage	Max. Inrush Current	Current Characteristic		Dimensions (mm)				Fig.
				Normal Current (60˚C)	Limiting Current (−10˚C)	D	T	F	d	
ZPC2CBX1R0B	1Ω ±20%	33V	2.4A	290mAp-p or less	900mAp-p or more	11.5	3.5	5.0	0.5	2
ZPC47BX100B	10Ω ±20%	56V	1.0A	100mAp-p or less	330mAp-p or more	9.0	5.0		0.6	1
ZPC4RCE5R0A	5Ω ±20%	120V	3.5A	290mAp-p or less	730mAp-p or more	16.8	6.0	10.0	0.65	3
ZPC4MCE100A	10Ω ±20%	140V	1.5A	210mAp-p or less	540mAp-p or more	15.3			0.6	
ZPC52CE121A	120Ω ±20%	265V	0.3A	40mAp-p or less	100mAp-p or more	6.5	5.0	5.0	0.5	1

In rush current limitation

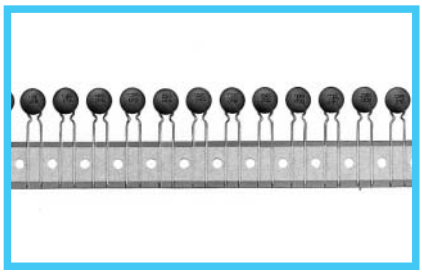
Dimensions

(unit : mm)



Type No.	Initial Resistance (at 25°C)	Rated Voltage (Vrms)	Max.OperatingVoltage (Vrms)	Max Current
ZPM0RCH330A250	33Ω ±25%	220 / 240	276	4Arms (250V/30Ω)
ZPR0RCH400A250	40Ω ±25%			8Arms (230V/20Ω)
ZPR0RCE470A250	47Ω ±25%			12.5Arms (250V/100Ω)
ZPR0RCE101A250	100Ω ±25%		280	15Arms (280V/20Ω)

Taping Specifications for Automatic Insertion

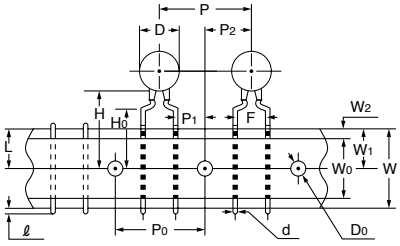


Type numbering system

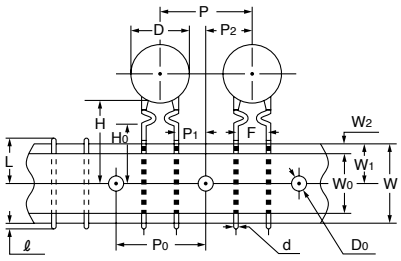
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Z	P	C	1	1	C	E	2	R	2	A	1	Y	C

- 14: Packing (C : Ammo-Pack)
- 13: Formed Lead Type (Y, U)
- 12: Pitch of Component (1 : 12.7mm, 3 : 25.4mm)
- 11: Revision code

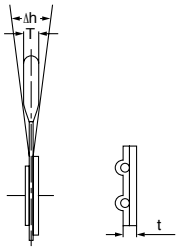
Taping Form



Formed lead type (Y)



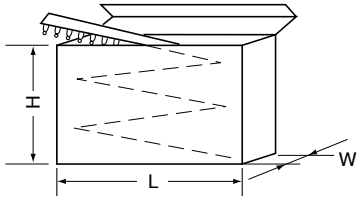
Formed lead type (U)



Dimemsions

Item	Symbol	Dimensions (mm)			Note
		Nominal		Tolerance	
Diameter	D	Less ϕ12	Above ϕ12	–	Subject to part DWG
Thickness	T	–		–	Subject to part DWG
Lead dia	d	–		–	Subject to part DWG
Pitch of component	P	12.7	25.4	± 1.0	
Feed hole pitch	P_0	12.7		± 0.3	
Hole center to lead	P_1	3.85		± 0.7	
Feed hole center to component center	P_2	6.35		± 1.3	
Lead to lead distance	F	5.0	7.5, 10.0	$^{+0.8}_{-0.2}$	Subject to part DWG
Tilt of component	Δh	0		± 2.0	
Tape width	W	18.0		$^{+1.0}_{-0.5}$	
Hold down tape width	W_0	12.5		MIN.	
Slip out of hole	W_1	9.0		$^{+0.75}_{-0.5}$	
Slip out of hole down tape	W_2	3.0		MAX.	
Height of component from tape center	H	23.5		MAX.	
Lead wire clinch height	H_0	16.0		± 0.5	
Length of cut lead	ℓ	1.0		MAX.	
Feed hole diameter	ϕD_0	4.0		± 0.2	
Total tape thickness	t	0.6		± 0.3	
Cut length of rejected component	L	11.0		MAX	

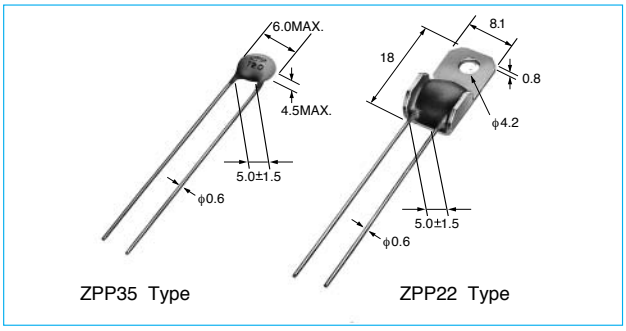
Packaging
(Ammo-pack)



Symbol	Dimension (mm)
H	230
L	330
W	50

For Thermal Sensing

This series of Posi-R as a temperature indicator is small in size and little in calorific capacity. It is so useful for indicating any overheating of power transistors and thyristors in the power sources.



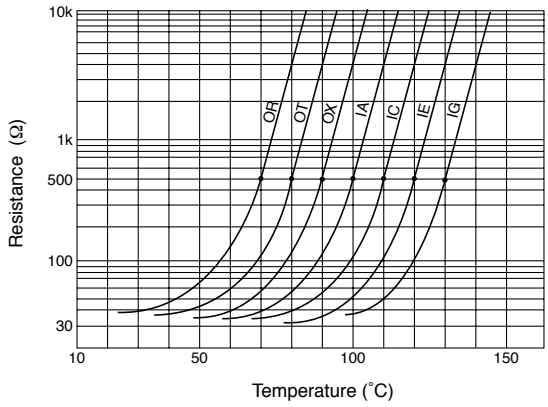


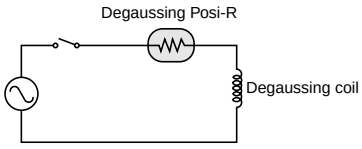
Fig. 12 Resistance / Temperature Characteristics

Type No.		Temperature Indication				Max. Operating Voltage	Max. Inrush Current
ZPP35 Type	ZPP22 Type	25˚C	Tr(˚C)	Tr−5˚C	Tr+5˚C		
ZPP350R500E	ZPP220R501E	100Ω or less	70	500Ω or less	500Ω or more	16VDC	100mA
ZPP350T500E	ZPP220T501E		80				
ZPP350X500E	ZPP220X501E		90				
ZPP351A500E	ZPP221A501E		100				
ZPP351C500E	ZPP221C501E		110				
ZPP351E500E	ZPP221E501E		120				
ZPP351G500E	ZPP221G501E		130				

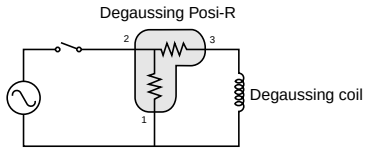
※The current flowed in a Posi-R shall be within the range lest it should generate heat.
※Resistance at trip temperature (Tr) is available up to 3kΩ, upon request.

For Degaussing Circuit in Color CRT (Lead type)

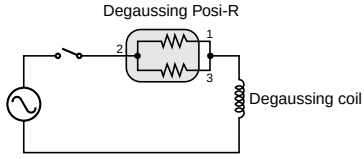
A Posi-R for a degaussing circuite in color TV is applicable to either single-element circuit paraller-element circuit and with high attenuation double-element circuit



Automatic Degaussing Circuit (Single-element)



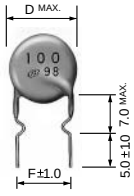
Automatic Degaussing Circuit (Double-elements)



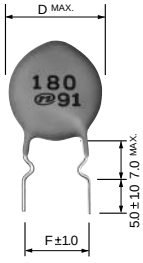
Automatic Degaussing Circuit (Parallel-elements)

Lead type Dimensions

(unit : mm)



ZPB45 type



ZPB58 type

ZPB31 type

Specification

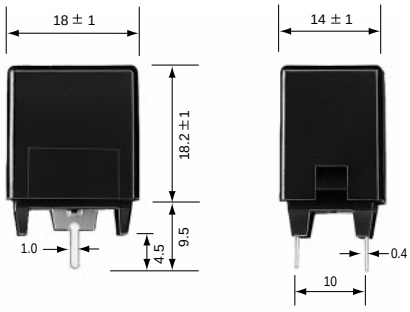
Type No.	Rated Voltage (Vrms)	Max.Operating Voltage (Vrms)	Initial Resistance (at 25°C)	Current Characteristics			Conditions		Dimensions(mm)	
				Inrush	3 seconds	60 seconds	Rated Voltage	Load Resistane	D	F
ZPB45BL3R0A	100/120	140	3Ω $^{+30}_{-20}$%	30Ap-p or more	300mAp-p or less	60mAp-p or less	120V	3.5Ω	12.5	5.0
ZPB45BL7R0A			7Ω $^{+30}_{-20}$%	25Ap-p or more	300mAp-p or less	60mAp-p or less	120V	3.5Ω	12.5	5.0
• ZPB45BL100M			10Ω ±30%	20Ap-p or more	240mAp-p or less	60mAp-p or less	120V	5Ω	12.5	7.5
ZPB58BL5R0B			5Ω $^{+30}_{-20}$%	21Ap-p or more	300mAp-p or less	60mAp-p or less	120V	8.5Ω	14.5	7.5
• ZPB31BL3R0C			3Ω $^{+30}_{-20}$%	26Ap-p or more	300mAp-p or less	80mAp-p or less	100V	5Ω	16.5	10.0
ZPB58BL180B	220	265	18Ω $^{+30}_{-20}$%	16Ap-p or more	200mAp-p or less	40mAp-p or less	200V	15Ω	14.5	10.0
ZPB58BL200A			20Ω $^{+30}_{-20}$%	15Ap-p or more	200mAp-p or less	40mAp-p or less	200V	15Ω	14.5	10.0
ZPB58BL300A			30Ω $^{+30}_{-20}$%	20Ap-p or more	220mAp-p or less	40mAp-p or less	220V	5Ω	14.5	10.0
• ZPB31BL9R0A			9Ω $^{+30}_{-20}$%	19Ap-p or more	250mAp-p or less	50mAp-p or less	220V	20Ω	16.5	10.0

● UL-1434 approval type is also available upon request.
※ Other specification types are also available upon request.

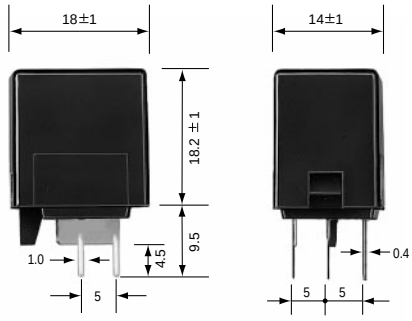
For Degaussing Circuit in Color CRT (Encased type)

Dimensions

(unit : mm)



Single-element type



Double-elements type and Parallel-elements type

Specification

● Single-element type

Type No.	Rated Voltage (Vrms)	Max.Operating Voltage (Vrms)	Initial Resistance (at 25˚C)	Current Characteristics			Conditions	
				Inrush	3 seconds	60 seconds	Rated Voltage	Load Resistane
ZPK68BL3R0B	120	140	3Ω $^{+30}_{-20}$%	17Ap-p or more	300mAp-p or more	70mAp-p or more	100V	10Ω
ZPK68BL5R0A			5Ω ±20%	35Ap-p or more	300mAp-p or more	60mAp-p or more	120V	1Ω
ZPK68BL9R0B	220/240	270	9Ω $^{+30}_{-20}$%	20Ap-p or more	200mAp-p or more	50mAp-p or more	220V	20Ω

● Double-elements type

Type No.	Rated Voltage (Vrms)	Max.Operating Voltage (Vrms)	Initial Resistance (at 25˚C)	Current Characteristics			Conditions	
				Inrush	3 seconds	60 seconds	Rated Voltage	Load Resistane
ZPK66BL3R0B	100/120	140	3Ω ±20%	18Ap-p or more	200mAp-p or more	15mAp-p or more	100V	8Ω
ZPK66BL5R0B	120		5Ω ±20%	35Ap-p or more	300mAp-p or more	20mAp-p or more	100V	1Ω
ZPK66BL7R0A			7Ω ±30%	20Ap-p or more	300mAp-p or more	7mAp-p or more	120V	2.7Ω
ZPK66BL9R0C	220	265	9Ω ±30%	19Ap-p or more	200mAp-p or more	10mAp-p or more	220V	20Ω
ZPK66BL180E			18Ω ±30%	20Ap-p or more	250mAp-p or more	10mAp-p or more	220V	10Ω

● Parallel-elements type

Type No.	Rated Voltage (Vrms)	Max.Operating Voltage (Vrms)	Initial Resistance (at 25˚C)	Current Characteristics			Conditions	
				Inrush	3 seconds	60 seconds	Rated Voltage	Load Resistane
ZPK67BL1R5A	120	140	1.5Ω ±20%	30Ap-p or more	250mAp-p or more	100mAp-p or more	100V	7Ω
ZPK67BN4R5A	220	265	4.5Ω ±20%	28Ap-p or more	300mAp-p or more	60mAp-p or more	220V	15Ω

※ Other specification types are also available upon request.

ALUMINUM ELECTROLYTIC CAPACITORS

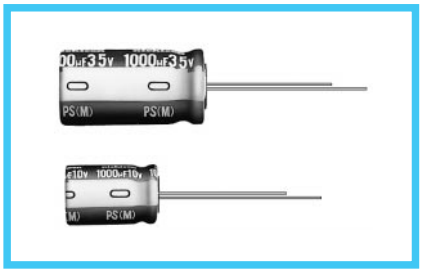
nichicon

PS Miniature Sized, Low Impedance, For Switching Power Supplies series

Smaller | Low Impedance | Anti-Solvent Feature (Through 100V only)

● Wide temperature range type, miniature sized.

PS → High Rippie Current High Reliablity → **PJ**



■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105˚C (6.3 ~ 100V), −40 ~ +105˚C (160 ~ 400V), −25 ~ +105˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 15000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA) , whichever is greater.	CV ≦ 1000 : I= 0.1CV+40 (µA)max. (1 minute's) CV > 1000 : I= 0.04CV+100 (µA)max. (1 minute's)

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	315 · 350	400 · 450
tan δ (MAX.)	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3 · 10	16 · 25	35 · 50	63 · 100	160 · 200	250	315 · 350	400	450
Impedance ratio	Z−55˚C / Z+20˚C	5	4	3	—	—	—	—	—	—
	Z−40˚C / Z+20˚C	—	—	—	3	4	6	8	10	—
	Z−25˚C / Z+20˚C	—	—	—	2	3	3	4	6	15

Endurance

After an application of D.C. bias voltage plus the rated ripple current for 3000 hours (2000 hours for D = 5 ~ 10) at 105˚C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

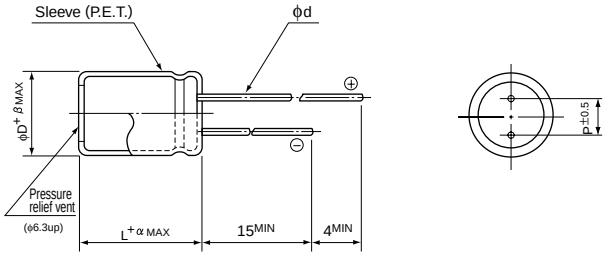
Shelf Life

After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on dark brown sleeve.

■Radial Lead Type



α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

Type numbering system (Example : 25V 470µF)

1 2 3 4 5 6 7 8 9 10 11 12

U P S 1 E 4 7 1 M P D □

- Case size
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (470µF)
- Rated voltage (25V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH
20 ~ 25	RD	RH

※ Please contact to us if other configurations are required.

● Frequency coefficient of rated ripple current

V	Cap.(µF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
6.3 ~ 100	~ 47	—	0.17	0.40	0.65	1.00
	100 ~ 220	0.30	0.50	0.65	0.80	1.00
	330 ~ 680	0.57	0.71	0.82	0.90	1.00
	1000 ~ 15000	0.75	0.87	0.96	0.98	1.00
160 ~ 450	0.47 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 470	0.90	1.00	1.10	1.13	1.15

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next pages.

PS series

■Standard ratings

Cap. (μF)	Code	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (Ω) MAX. 20˚C 100kHz	6.3 (0J) Rated ripple (mA rms) 105˚C 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (Ω) MAX. 20˚C 100kHz	10 (1A) Rated ripple (mA rms) 105˚C 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (Ω) MAX. 20˚C 100kHz	16 (1C) Rated ripple (mA rms) 105˚C 100kHz	25 (1E) Case size φD × L (mm)	25 (1E) Impedance (Ω) MAX. 20˚C 100kHz	25 (1E) Rated ripple (mA rms) 105˚C 100kHz
4.7	4R7										5×11	1.50	160
10	100							5×11	1.50	160	5×11	1.50	160
22	220	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160
33	330	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160
47	470	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160	5×11	1.50	160
100	101	5×11	1.50	160	5×11	1.50	160	6.3×11	0.50	250	6.3×11	0.50	250
150	151	6.3×11	0.50	250	6.3×11	0.50	250	6.3×11	0.50	250	8×11.5	0.28	410
220	221	6.3×11	0.50	250	6.3×11	0.50	250	8×11.5	0.28	410	8×11.5	0.28	410
330	331	6.3×11	0.50	250	8×11.5	0.28	410	8×11.5	0.28	410	10×12.5	0.19	600
470	471	8×11.5	0.28	410	8×11.5	0.28	410	10×12.5	0.19	600	10×16	0.14	800
680	681	10×12.5	0.19	600	10×12.5	0.19	600	10×16	0.14	800	10×20	0.11	1000
1000	102	10×12.5	0.19	600	10×16	0.14	800	10×20	0.11	1000	12.5×20	0.075	1250
1500	152	10×20	0.11	1000	10×20	0.11	1000	12.5×20	0.075	1250	16×25	0.038	1900
2200	222	12.5×20	0.075	1250	12.5×20	0.075	1250	12.5×25	0.057	1550	16×25	0.038	1900
3300	332	12.5×20	0.075	1250	12.5×25	0.057	1550	16×25	0.038	1900	16×31.5	0.033	2350
4700	472	16×25	0.038	1900	16×25	0.038	1900	16×31.5	0.033	2350	18×35.5	0.030	2700
6800	682	16×25	0.038	1900	16×31.5	0.033	2350	18×35.5	0.030	2700	18×40	0.027	3300
10000	103	16×31.5	0.033	2350	18×35.5	0.030	2700	18×40	0.027	3300			
15000	153	18×35.5	0.030	2700	18×40	0.027	3300						

Cap. (μF)	Code	35 (1V) Case size φD × L (mm)	35 (1V) Impedance (Ω) MAX. 20˚C 100kHz	35 (1V) Rated ripple (mA rms) 105˚C 100kHz	50 (1H) Case size φD × L (mm)	50 (1H) Impedance (Ω) MAX. 20˚C 100kHz	50 (1H) Rated ripple (mA rms) 105˚C 100kHz	63 (1J) Case size φD × L (mm)	63 (1J) Impedance (Ω) MAX. 20˚C 100kHz	63 (1J) Rated ripple (mA rms) 105˚C 100kHz	100 (2A) Case size φD × L (mm)	100 (2A) Impedance (Ω) MAX. 20˚C 100kHz	100 (2A) Rated ripple (mA rms) 105˚C 100kHz
0.47	R47				5×11	7.50	25				5×11	43.0	20
1	010				5×11	5.30	40				5×11	20.0	30
2.2	2R2				5×11	4.50	55				5×11	9.80	44
3.3	3R3				5×11	3.90	65				5×11	6.60	58
4.7	4R7	5×11	1.50	160	5×11	3.50	90	5×11	4.70	68	5×11	4.60	74
10	100	5×11	1.50	160	5×11	2.10	120	5×11	2.10	110	6.3×11	1.80	130
22	220	5×11	1.50	160	5×11	1.80	150	6.3×11	0.98	180	8×11.5	0.68	230
33	330	5×11	1.50	160	6.3×11	0.65	250	6.3×11	0.71	220	10×12.5	0.46	320
47	470	6.3×11	0.50	250	6.3×11	0.65	250	8×11.5	0.65	310	10×16	0.37	420
100	101	8×11.5	0.28	410	8×11.5	0.36	340	10×12.5	0.31	390	12.5×20	0.18	580
150	151	8×11.5	0.28	410	10×12.5	0.26	490	10×16	0.25	440	12.5×25	0.13	710
220	221	10×12.5	0.19	600	10×16	0.18	650	10×20	0.20	700	16×25	0.10	890
330	331	10×16	0.14	800	10×20	0.15	810	12.5×20	0.12	980	16×25	0.090	1080
470	471	10×20	0.11	1000	12.5×20	0.13	1100	12.5×25	0.081	1200	16×31.5	0.076	1310
680	681	12.5×20	0.075	1250	12.5×25	0.10	1200	16×25	0.058	1300	16×35.5	0.064	1410
1000	102	12.5×25	0.057	1550	16×25	0.058	1600	16×31.5	0.049	1380	18×40	0.047	1520
1500	152	16×25	0.038	1900	16×31.5	0.040	2000	18×35.5	0.038	1750			
2200	222	16×31.5	0.033	2350	18×35.5	0.035	2300	18×40	0.032	2120			
3300	332	18×35.5	0.030	2700									
4700	472	18×40	0.027	3300									

Cap.(μF)	Code	160		200		250		315		350		400		450	
		2C		2D		2E		2F		2V		2G		2W	
0.47	R47	6.3 × 11	12	6.3 × 11	12	6.3 × 11	12	8 × 11.5	11	8 × 11.5	11				
1	010	6.3 × 11	17	6.3 × 11	17	6.3 × 11	17	8 × 11.5	16	10 × 12.5	17	10 × 12.5	16	10 × 12.5	18
2.2	2R2	6.3 × 11	25	6.3 × 11	25	8 × 11.5	29	10 × 12.5	28	10 × 16	31	10 × 16	27	10 × 20	29
3.3	3R3	8 × 11.5	36	8 × 11.5	36	10 × 12.5	42	10 × 12.5	34	10 × 16	38	10 × 20	36	12.5 × 20	41
4.7	4R7	8 × 11.5	43	10 × 12.5	50	10 × 12.5	50	10 × 16	45	10 × 20	49	10 × 20	43	12.5 × 20	49
10	100	10 × 12.5	70	10 × 16	80	10 × 20	88	10 × 20	72	12.5 × 20	82	12.5 × 25	72	16 × 25	75
22	220	10 × 20	130	10 × 20	140	12.5 × 25	155	12.5 × 25	120	16 × 25	130	16 × 25	110	16 × 31.5	115
33	330	12.5 × 20	180	12.5 × 25	190	12.5 × 25	190	16 × 25	155	16 × 31.5	160	16 × 31.5	140	•18 × 35.5	145
47	470	12.5 × 25	220	12.5 × 25	220	16 × 25	230	16 × 35.5	190	•18 × 35.5	200	•18 × 35.5	170	20 × 40	175
100	101	16 × 25	330	16 × 31.5	335	•18 × 35.5	340	Δ18 × 40	285	20 × 40	290	22 × 50	350	25 × 50	350
220	221	•18 × 35.5	500	Δ18 × 40	515	20 × 40	525	22 × 50	540	25 × 50	550				
330	331	20 × 40	900	22 × 40	1100	22 × 50	1150								Rated ripple
470	471	22 × 50	1200	22 × 50	1310	25 × 50	1350							Case size	

Rated Ripple (mA rms) at 105˚C 120Hz
Size 20×31 is available for capacitors marked "•"
Size 20×35 is available for capacitors marked "Δ"
In this case, 6 will be put at 12th digit of type numbering system.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

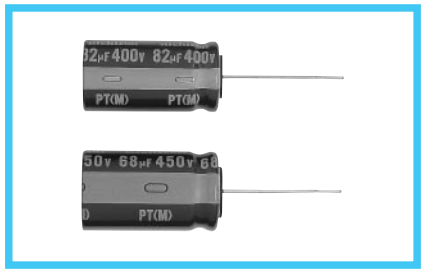
PT

Miniature Sized, High Ripple Current, Long Life series

Smaller | Long Life | High Ripple Current

- High ripple current.
- Suited for ballast application.

PB
Smaller
PT



■Specifications

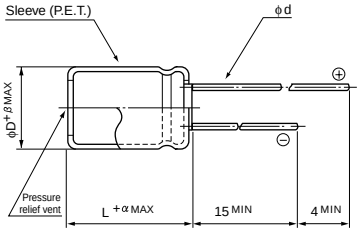
Item	Performance Characteristics
Category Temperature Range	–25 ~ +105°C
Rated Voltage Range	200 ~ 450V
Rated Capacitance Range	15 ~ 820µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.06CV+10 (µA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

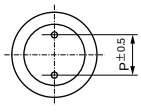
Rated voltage (V)	200	220	250	400	420	450
tan δ (MAX.)	0.12	0.12	0.12	0.15	0.20	0.20

Stability at Low Temperature	Measurement frequency : 120Hz						
Rated voltage (V)		200	220	250	400	420	450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	3	3	3	8	8	8

Endurance	After an application of D.C. bias voltage plus the rated ripple current for 5000 hours at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.	Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed above.	
Marking	Printed with white color letter on dark brown sleeve.	

■Radial Lead Type





φD	10	12.5	16	18	20	22	25
P	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.6	0.6※	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	1.0	1.0

※In case L > 25 for the φ12.5 dia. unit, lead dia. φ d = 0.8mm.

α	φD < 20 : 1.5
	φD ≧ 20 : 2.0

Type numbering system (Example : 250V 220µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	P	T	2	E	2	2	1	M	H	D	

- Case Size Code
- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (220µF)
- Rated voltage (250V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve
10	PD
12.5 ~ 18	HD
20 ~ 25	RD

※Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

●Dimension table in next page.

PT series

■Dimensions

D × L (mm)

Cap	Code	200 (2D)		220 (2P)		250 (2E)		400 (2G)		420 (W6)		450 (2W)	
15	150											10 × 31.5	0.15
18	180									10 × 31.5	0.17	12.5 × 25	0.18
22	220							10 × 31.5	0.21	12.5 × 25	0.20	12.5 × 31.5	0.22
27	270							12.5 × 25	0.24	12.5 × 31.5	0.24	12.5 × 31.5	0.25
33	330							12.5 × 31.5	0.29	12.5 × 31.5	0.27	12.5 × 35.5	0.28
39	390							12.5 × 31.5	0.32	12.5 × 35.5	0.31	12.5 × 40	0.32
47	470					10 × 31.5	0.27	12.5 × 35.5	0.37	12.5 × 40	0.36	16 × 31.5	0.38
56	560			10 × 31.5	0.29	12.5 × 25	0.31	12.5 × 40	0.42	16 × 31.5	0.43	16 × 35.5	0.44
68	680	10 × 31.5	0.35	12.5 × 25	0.34	12.5 × 31.5	0.36	16 × 31.5	0.46	16 × 35.5 ▲18 × 31.5	0.51 0.51	16 × 40 ▲18 × 31.5	0.49 0.48
82	820	12.5 × 25	0.41	12.5 × 31.5	0.39	12.5 × 31.5	0.40	16 × 31.5	0.50	16 × 40 ▲18 × 31.5	0.57 0.57	18 × 35.5	0.55
100	101	12.5 × 31.5	0.48	12.5 × 31.5	0.43	12.5 × 35.5	0.46	16 × 35.5 ▲ 18 × 31.5	0.58 0.58	18 × 35.5	0.61	18 × 40	0.65
120	121	12.5 × 31.5	0.53	12.5 × 35.5	0.49	12.5 × 40	0.53	16 × 40 ▲ 18 × 35.5	0.66 0.67	18 × 40	0.66	22 × 40	0.77
150	151	12.5 × 35.5	0.62	12.5 × 40	0.58	16 × 31.5	0.62	18 × 40	0.77	22 × 40	0.80	22 × 50 ▲25 × 40	0.92 0.92
180	181	12.5 × 40	0.70	16 × 31.5	0.67	16 × 35.5 ▲18 × 31.5	0.72 0.72	22 × 40	0.85	22 × 50 ▲25 × 40	0.95 0.95	25 × 50	1.10
220	221	16 × 31.5 ▲18 × 31.5	0.76 0.81	16 × 35.5 ▲ 18 × 31.5	0.77 0.77	16 × 40 ▲18 × 35.5	0.83 0.83						
270	271	16 × 35.5 ▲18 × 31.5	0.88 0.87	16 × 40 ▲ 18 × 35.5	0.88 0.88	18 × 40	0.95	22 × 50 ▲ 25 × 40	1.30 1.30	25 × 50	1.20		
330	331	18 × 35.5	1.01	18 × 40	1.01	22 × 40	1.05	25 × 50	1.40				
390	391	18 × 40	1.13	22 × 40	1.15								
470	471	22 × 40	1.20			22 × 50 ▲25 × 40	1.45 1.45						
560	561			22 × 50 ▲ 25 × 40	1.50 1.50	25 × 50	1.55						
680	681	22 × 50 ▲ 25 × 40	1.50 1.50	25 × 50	1.60								
820	822	25 × 50	1.60									Case size	※

※: Rated Ripple (A rms) at 105°C 120Hz
▲: In this case, 6 will be put at 12th digit of type numbering system.

• Frequency coefficient of rated ripple current

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient	0.80	1.00	1.25	1.40	1.60

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

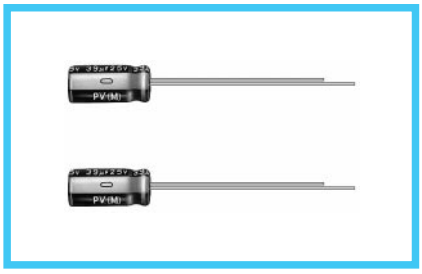
PV series

Miniature Sized, Low Impedance, High Reliability

Low Impedance | Long Life | Anti-Solvent Feature

● Miniature sized low impedance series withstanding 5000 hours load life at +105°C.

PJ → Long Life → PV



■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.47 ~ 390µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C
Stability at Low Temperature	Measurement frequency : 120Hz
Endurance	After 5000 hours' application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right.
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed at right.
Marking	Printed with white color letter on dark brown sleeve.

tan δ

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10

Stability at Low Temperature

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z−55°C / Z+20°C	5	5	4	3	3	2

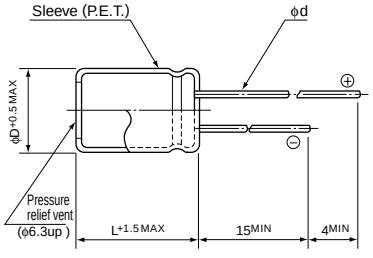
Endurance

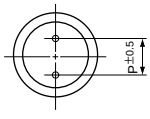
Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

Capacitance change	Within ±20% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

■Radial Lead Type





φD	5	6.3	8
P	2.0	2.5	3.5
φd	0.5	0.5	0.6

Type numbering system (Example : 25V 47µF)

1	2	3	4	5	6	7	8	9	10	11
U	P	V	1	E	4	7	0	M	G	D

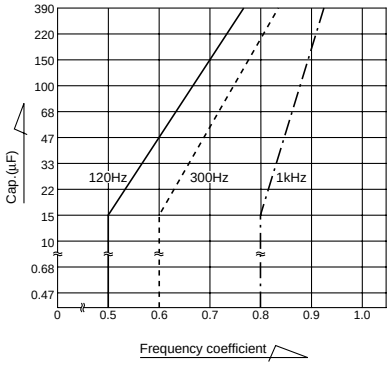
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (47µF)
- Rated voltage (25V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	FD	FH
6.3 · 8	GD	GH

※ Please contact to us if other configurations are required.

• Frequency coefficient of rated ripple current (10kHz~200kHz=1)



Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

PV series

■Dimensions

Cap.(μF)	Code \ Item \ V(Code)	6.3 (0J) Case size φD × L (mm)	6.3 (0J) Impedance (Ω) MAX. 20°C 100kHz	6.3 (0J) Rated ripple (mA rms) 105°C 100kHz	10 (1A) Case size φD × L (mm)	10 (1A) Impedance (Ω) MAX. 20°C 100kHz	10 (1A) Rated ripple (mA rms) 105°C 100kHz	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (Ω) MAX. 20°C 100kHz	16 (1C) Rated ripple (mA rms) 105°C 100kHz	25 (1E) Case size φD × L (mm)	25 (1E) Impedance (Ω) MAX. 20°C 100kHz	25 (1E) Rated ripple (mA rms) 105°C 100kHz
33	330										5 × 11	1.40	155
39	390										5 × 11	1.10	175
47	470							5 × 11	1.40	155	6.3 × 11	0.94	210
56	560							5 × 11	1.10	175	6.3 × 11	0.75	235
68	680				5 × 11	1.40	155	6.3 × 11	0.85	220	6.3 × 11	0.61	260
82	820				5 × 11	1.10	175	6.3 × 11	0.71	240	6.3 × 11	0.51	285
100	101	5 × 11	1.50	150	6.3 × 11	0.94	210	6.3 × 11	0.60	265	8 × 11.5	0.41	370
120	121	5 × 11	1.10	175	6.3 × 11	0.75	235	6.3 × 11	0.49	290	8 × 11.5	0.34	405
150	151	6.3 × 11	0.83	225	6.3 × 11	0.60	265	8 × 11.5	0.39	375	8 × 11.5	0.27	460
180	181	6.3 × 11	0.66	250	6.3 × 11	0.49	290	8 × 11.5	0.34	405			
220	221	6.3 × 11	0.51	285	8 × 11.5	0.41	370	8 × 11.5	0.27	460			
270	271	8 × 11.5	0.41	370	8 × 11.5	0.34	405						
330	331	8 × 11.5	0.34	405	8 × 11.5	0.27	460						
390	391	8 × 11.5	0.29	445									

Cap.(μF)	Code \ Item \ V(Code)	35 (1V) Case size φD × L (mm)	35 (1V) Impedance (Ω) MAX. 20°C 100kHz	35 (1V) Rated ripple (mA rms) 105°C 100kHz	50 (1H) Case size φD × L (mm)	50 (1H) Impedance (Ω) MAX. 20°C 100kHz	50 (1H) Rated ripple (mA rms) 105°C 100kHz
0.47	R47				5 × 11	32.0	22
0.68	R68				5 × 11	22.0	28
1	010				5 × 11	15.0	36
1.5	1R5				5 × 11	11.0	45
2.2	2R2				5 × 11	7.00	54
3.3	3R3				5 × 11	4.60	66
4.7	4R7				5 × 11	3.10	81
6.8	6R8				5 × 11	2.50	91
10	100				5 × 11	2.00	115
12	120				5 × 11	1.70	125
15	150				5 × 11	1.30	145
18	180				5 × 11	1.10	155
22	220	5 × 11	1.30	160	6.3 × 11	0.91	195
27	270	5 × 11	1.00	180	6.3 × 11	0.74	215
33	330	6.3 × 11	0.83	225	6.3 × 11	0.60	240
39	390	6.3 × 11	0.70	245	6.3 × 11	0.50	260
47	470	6.3 × 11	0.58	270	8 × 11.5	0.42	330
56	560	6.3 × 11	0.48	295	8 × 11.5	0.35	360
68	680	8 × 11.5	0.41	370	8 × 11.5	0.28	410
82	820	8 × 11.5	0.32	415			
100	101	8 × 11.5	0.27	460			

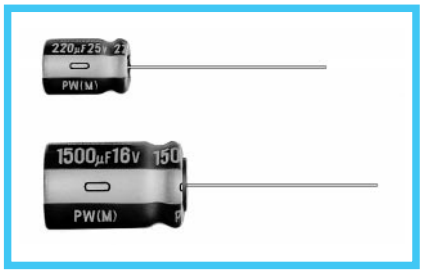
PW

Low Impedance, High Reliability
For Switching Power Supplies
series

Smaller | Low Impedance | Long Life | Anti-Solvent Feature (Through 100V only)

- Smaller case size and lower impedance than PM series.
- Low impedance and high reliability withstanding 2000 hours to 8000 hours.
- Capacitance ranges available based on the numerical values in E12 series under JIS.

PM → Smaller → PW



■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105˚C (6.3 ~ 100V), −40 ~ + 105˚C (160 ~ 400V), −25 ~ +105˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 15000μF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	CV ≦ 1000 : I = 0.1CV+40 (μA) max. (1 minute's) CV > 1000 : I = 0.04CV+100 (μA) max. (1 minute's)

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	315 · 350	400 · 450
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20	0.25

Stability at Low Temperature

120Hz

Rated voltage (V)		6.3 · 10	16 · 25	35 · 50	63 · 100	160 · 200	250	315 · 350	400	450
Impedance ratio	Z−55˚C / Z+20˚C	3	3	3	3	—	—	—	—	—
	Z−40˚C / Z+20˚C	—	—	—	—	4	6	8	10	—
	Z−25˚C / Z+20˚C	—	—	—	—	3	3	4	6	15

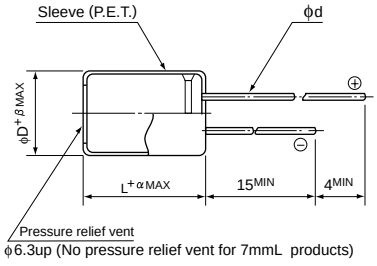
Endurance

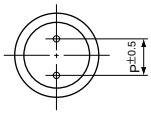
After an application of D.C. bias voltage plus the rated ripple current for 8000 hours (2000 hours for D = 4, 5 and 6.3, 3000 hours for D = 8, 5000 hours for D = 10, 7000 hours for D = 12.5) at 105˚C the peak voltage shall not exceed the rated D.C.voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed
Marking	Printed with white color letter on dark brown sleeve.

■Radial Lead Type





α	(L = 7) 1.0
	(L < 20) 1.5
	(L ≧ 20) 2.0

ϕD	4	5	6.3	8	10	12.5	16	18	20	22	25
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
ϕd	0.45	0.5 (0.45)	0.5 (0.45)	0.6	0.6	0.6 ※0.8	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

※: Applied to L>25 products
( ): Applied to 7mmL products

Type numbering system (Example : 10V 680μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	P	W	1	A	6	8	1	M	P	D	

- 12: Size code
- 11: Configuration ※
- 9: Capacitance tolerance (±20%)
- 6 7 8: Rated Capacitance (680μF)
- 4 5: Rated voltage (10V)
- 3: Series name
- 1: Type

※ Configuration

ϕD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 · 5	DD	DH
6.3	ED	EH (7mm L : DH)
8 · 10	PD	PH
12.5 ~ 18	HD	HH
20 ~ 25	RD	RH

※ Please contact to us if other configurations are required.

●Frequency coefficient of rated ripple current

V	Cap. (μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
6.3 ~ 100	~ 56	0.20	0.30	0.50	0.80	1.00
	68 ~ 330	0.55	0.65	0.75	0.85	1.00
	390 ~ 1000	0.70	0.75	0.80	0.90	1.00
	1200 ~ 15000	0.80	0.85	0.90	0.95	1.00
160 ~ 450	0.47 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 470	0.90	1.00	1.10	1.13	1.15

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

●Dimension table in next page.

PW series

■Standard ratings

Cap.(μF)	Code	V (Code)	6.3 (0J) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz	10 (1A) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz
22	220		5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
							▲4 × 7	2.00	5.00	65
27	270		4 × 7	2.00	5.00	65				
33	330		5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
			▲5 × 7	0.95	2.40	120	▲5 × 7	0.95	2.40	120
39	390						5 × 7	0.95	2.40	120
47	470		5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
			▲5 × 7	0.95	2.40	120	▲4 × 11	1.30	2.60	120
56	560		5 × 7	0.95	2.40	120				
68	680		4 × 11	1.30	2.60	120				
82	820						5 × 11	0.60	1.20	180
							▲6.3 × 7	0.45	1.20	200
100	101		5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
							▲5 × 15	0.50	1.00	235
120	121		6.3 × 7	0.45	1.20	200				
150	151		6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290
			▲5 × 15	0.50	1.00	235				
180	181						6.3 × 11	0.25	0.50	290
220	221		6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290
							▲6.3 × 15	0.23	0.46	430
330	331		6.3 × 11	0.25	0.50	290	8 × 11.5	0.117	0.234	555
			▲6.3 × 15	0.23	0.46	430				
470	471		8 × 11.5	0.117	0.234	555	8 × 11.5	0.117	0.234	555
560	561		8 × 11.5	0.117	0.234	555				
680	681		10 × 12.5	0.090	0.18	755	10 ×12.5	0.090	0.18	755
							▲8 × 15	0.085	0.17	730
820	821		8 × 15	0.085	0.17	730				
			▲10 × 12.5	0.090	0.18	755				
1000	102		10 × 12.5	0.090	0.18	755	10 × 16	0.068	0.136	1050
							▲8 × 20	0.065	0.13	995
1200	122		8 × 20	0.065	0.13	995	10 × 20	0.052	0.104	1220
			▲10 × 16	0.068	0.136	1050				
1500	152		10 × 20	0.052	0.104	1220	10 × 20	0.052	0.104	1220
							▲10 × 25	0.045	0.090	1440
2200	222		12.5 × 20	0.038	0.076	1655	12.5 × 20	0.038	0.076	1655
			▲10 × 25	0.045	0.090	1440	▲10 × 31.5	0.035	0.070	1815
2700	272		10 × 31.5	0.035	0.070	1815	12.5 × 25	0.030	0.060	1945
3300	332		12.5 × 20	0.038	0.076	1655	12.5 × 25	0.030	0.060	1945
							▲12.5 × 31.5	0.025	0.050	2310
3900	392		12.5 × 25	0.030	0.060	1945	12.5 × 35.5	0.022	0.044	2510
							▲16 × 20	0.029	0.058	2205
4700	472		16 × 25	0.022	0.044	2555	16 × 25	0.022	0.044	2555
			▲12.5 × 31.5	0.025	0.050	2310				
5600	562		12.5 × 35.5	0.022	0.044	2510	16 × 25	0.022	0.044	2555
			▲16 × 20	0.029	0.058	2205	▲18 × 20	0.028	0.056	2490
6800	682		16 × 25	0.022	0.044	2555	16 × 31.5	0.018	0.036	3010
			▲18 × 20	0.028	0.056	2490	▲18 × 25	0.020	0.040	2740
8200	822		16 × 31.5	0.018	0.036	3010	16 × 35.5	0.016	0.032	3150
							▲18 × 31.5	0.016	0.032	3635
10000	103		16 × 31.5	0.016	0.032	3150	18 × 35.5	0.015	0.030	3680
			▲18 × 25	0.020	0.040	2740				
12000	123		18 × 31.5	0.016	0.032	3635				
15000	153		18 × 35.5	0.015	0.030	3680	18 × 40	0.014	0.028	3800

▲ : In this case, 6 will be put at 12th digit of type numbering system.

PW series

■Standard ratings

Cap. (μF)	Code	16 (1C) Case size φD × L (mm)	16 (1C) Impedance (Ω MAX.) 20°C / 100kHz	16 (1C) Impedance (Ω MAX.) −10°C / 100kHz	16 (1C) Rated ripple (mA rms) 105°C / 100kHz	25 (1E) Case size φD × L (mm)	25 (1E) Impedance (Ω MAX.) 20°C / 100kHz	25 (1E) Impedance (Ω MAX.) −10°C / 100kHz	25 (1E) Rated ripple (mA rms) 105°C / 100kHz
4.7	4R7					5 × 11	0.60	1.20	180
10	100	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
						▲4 × 7	2.00	5.00	65
15	150	4 × 7	2.00	5.00	65				
22	220	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
		▲5 × 7	0.95	2.40	120	▲5 × 7	0.95	2.40	120
27	270	5 × 7	0.95	2.40	120	4 × 11	1.30	2.60	120
33	330	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
		▲6.3 × 7	0.45	1.20	200				
39	390	4 × 11	1.30	2.60	120	5 × 11	0.60	1.20	180
						▲6.3 × 7	0.45	1.20	200
47	470	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
56	560	5 × 11	0.60	1.20	180	5 × 15	0.50	1.00	235
		▲6.3 × 7	0.45	1.20	200				
82	820	5 × 15	0.50	1.00	235	6.3 × 11	0.25	0.50	290
100	101	6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290
120	121	6.3 × 11	0.25	0.50	290	6.3 × 15	0.23	0.46	430
150	151	6.3 × 11	0.25	0.50	290	8 × 11.5	0.117	0.234	555
180	181	6.3 × 15	0.23	0.46	430				
220	221	8 × 11.5	0.117	0.234	555	8 × 11.5	0.117	0.234	555
330	331	8 × 11.5	0.117	0.234	555	10 × 12.5	0.090	0.18	755
						▲8 × 15	0.085	0.17	730
470	471	10 × 12.5	0.090	0.18	755	10 × 16	0.068	0.136	1050
		▲8 × 15	0.085	0.17	730	▲8 × 20	0.065	0.13	995
560	561					10 × 20	0.052	0.104	1220
680	681	10 × 16	0.068	0.136	1050	10 × 20	0.052	0.104	1220
		▲8 × 20	0.065	0.13	995				
820	821	10 × 20	0.052	0.104	1220	10 × 25	0.045	0.090	1440
1000	102	10 × 20	0.052	0.104	1220	12.5 × 20	0.038	0.076	1655
						▲10 × 31.5	0.035	0.070	1815
1200	122	10 × 25	0.045	0.090	1440				
1500	152	12.5 × 20	0.038	0.076	1655	16 × 25	0.022	0.044	2555
		▲10 × 31.5	0.035	0.070	1815	▲12.5 × 25	0.030	0.060	1945
1800	182					12.5 × 31.5	0.025	0.050	2310
						▲16 × 20	0.029	0.058	2205
2200	222	12.5 × 25	0.030	0.060	1945	16 × 25	0.022	0.044	2555
						▲18 × 20	0.028	0.056	2490
						※12.5 × 35.5	0.022	0.044	2510
2700	272	12.5 × 31.5	0.025	0.050	2310	16 × 25	0.022	0.044	2555
		▲16 × 20	0.029	0.058	2205				
3300	332	16 × 25	0.022	0.044	2555	16 × 31.5	0.018	0.036	3010
		▲12.5 × 35.5	0.022	0.044	2510	▲18 × 25	0.020	0.040	2740
3900	392	16 × 25	0.022	0.044	2555	16 × 35.5	0.016	0.032	3150
		▲18 × 20	0.028	0.056	2490	▲18 × 31.5	0.016	0.032	3635
4700	472	16 × 31.5	0.018	0.036	3010	18 × 35.5	0.015	0.030	3680
		▲18 × 25	0.020	0.040	2740				
5600	562	16 × 35.5	0.016	0.032	3150				
		▲18 × 31.5	0.016	0.032	3635				
6800	682	18 × 35.5	0.015	0.030	3680	18 × 40	0.014	0.028	3800
8200	822	18 × 35.5	0.015	0.030	3680				
10000	103	18 × 40	0.014	0.028	3800				

▲ : In this case, 6 will be put at 12th digit of type numbering system.
※ : In this case, 3 will be put at 12th digit of type numbering system.

PW series

■Standard ratings

Cap.(μF)	Code	35 (1V) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz	50 (1H) Case size φD × L (mm)	Impedance (Ω MAX.) 20˚C / 100kHz	Impedance (Ω MAX.) −10˚C / 100kHz	Rated ripple (mA rms) 105˚C / 100kHz
0.47	R47					5 × 11	5.00	10.0	25
1	010					5 × 11	3.50	7.00	40
2.2	2R2					5 × 11	3.00	6.00	55
3.3	3R3					5 × 11	2.60	5.20	65
4.7	4R7	5 × 11	0.60	1.20	180	5 × 11	2.30	4.60	90
6.8	6R8	4 × 7	2.00	5.00	65				
10	100	5 × 11	0.60	1.20	180	5 × 11	1.40	2.80	120
		▲5 × 7	0.95	2.40	120	▲ 4 × 11	2.50	5.00	90
12	120	5 × 7	0.95	2.40	120				
18	180	4 × 11	1.30	2.60	120	5 × 11	1.30	2.60	155
22	220	5 × 11	0.60	1.20	180	5 × 11	1.20	2.40	170
27	270	5 × 11	0.60	1.20	180	5 × 15	0.90	1.80	215
		▲6.3 × 7	0.45	1.20	200				
33	330	5 × 11	0.60	1.20	180	6.3 × 11	0.43	0.86	300
39	390	5 × 15	0.50	1.00	235				
47	470	6.3 × 11	0.25	0.50	290	6.3 × 11	0.43	0.86	300
56	560	6.3 × 11	0.25	0.50	290	6.3 × 15	0.40	0.80	360
82	820	6.3 × 15	0.23	0.46	430	8 × 11.5	0.234	0.468	485
100	101	8 × 11.5	0.117	0.234	555	8 × 11.5	0.234	0.468	485
120	121					8 × 15	0.155	0.31	635
						▲10 × 12.5	0.162	0.324	615
150	151	8 × 11.5	0.117	0.234	555	10 × 12.5	0.162	0.324	615
180	181					8 × 20	0.120	0.240	860
						▲10 × 16	0.119	0.238	850
220	221	10 × 12.5	0.090	0.18	755	10 × 16	0.119	0.238	850
		▲8 × 15	0.085	0.17	730	▲10 × 20	0.090	0.18	1030
270	271					10 × 25	0.082	0.164	1200
330	331	10 × 16	0.068	0.136	1050	10 × 20	0.090	0.18	1030
		▲8 × 20	0.065	0.13	995	▲10 × 31.5	0.060	0.12	1610
390	391	10 × 20	0.052	0.104	1220	12.5 × 20	0.063	0.126	1480
470	471	10 × 20	0.052	0.104	1220	12.5 × 20	0.060	0.12	1500
560	561	10 × 25	0.045	0.090	1440	12.5 × 25	0.050	0.10	1832
680	681	12.5 × 20	0.038	0.076	1655	12.5 × 25	0.050	0.10	1832
		▲10 × 31.5	0.035	0.070	1815	▲16 × 20	0.048	0.096	1835
820	821					12.5 × 35.5	0.034	0.068	2285
						▲18 × 20	0.042	0.084	2420
1000	102	12.5 × 25	0.030	0.060	1945	16 × 25	0.034	0.068	2235
1200	122	12.5 × 31.5	0.025	0.050	2310	16 × 31.5	0.028	0.056	2700
		▲16 × 20	0.029	0.058	2205	▲18 × 25	0.029	0.058	2610
1500	152	16 × 25	0.022	0.044	2555	16 × 31.5	0.028	0.056	2700
		▲12.5 × 35.5	0.022	0.044	2510	▲16 × 35.5	0.025	0.050	2790
1800	182	16 × 25	0.022	0.044	2555	18 × 31.5	0.025	0.050	3000
		▲18 × 20	0.028	0.056	2490				
2200	222	16 × 31.5	0.018	0.036	3010	18 × 35.5	0.023	0.046	3100
		▲18 × 25	0.020	0.040	2740				
2700	272	16 × 35.5	0.016	0.032	3150				
		▲18 × 31.5	0.016	0.032	3635				
3300	332	18 × 35.5	0.015	0.030	3680				
4700	472	18 × 40	0.014	0.028	3800				

▲ : In this case, 6 will be put at 12th digit of type numbering system.

PW series

■Standard ratings

Cap.(μF)	Code	63 (1J) Case size φD × L (mm)	63 (1J) Impedance (Ω MAX.) 20˚C / 100kHz	63 (1J) Impedance (Ω MAX.) –10˚C / 100kHz	63 (1J) Rated ripple (mA rms) 105˚C / 100kHz	100 (2A) Case size φD × L (mm)	100 (2A) Impedance (Ω MAX.) 20˚C / 100kHz	100 (2A) Impedance (Ω MAX.) –10˚C / 100kHz	100 (2A) Rated ripple (mA rms) 105˚C / 100kHz
0.47	R47					5 × 11	43.0	86.0	20
1	010					5 × 11	20.0	40.0	30
2.2	2R2					5 × 11	9.80	19.6	44
3.3	3R3					5 × 11	6.60	13.2	58
4.7	4R7	5 × 11	4.70	9.40	68	5 × 11	4.60	9.20	74
6.8	6R8	5 × 11	2.50	5.00	95	5 × 11	3.50	7.00	95
		▲ 4 × 11	3.50	7.00	80				
10	100	5 × 11	2.10	4.20	110	6.3 × 11	1.80	3.60	130
12	120	5 × 11	2.00	4.00	145				
15	150	6.3 × 11	1.20	2.40	160	8 × 11.5	0.83	1.66	180
18	180	5 × 15	1.30	2.60	200	6.3 × 15	0.80	1.60	200
22	220	6.3 × 11	0.71	1.42	250	8 × 11.5	0.68	1.36	230
33	330	6.3 × 11	0.71	1.42	250	10 × 12.5	0.46	0.92	320
						▲ 8 × 15	0.45	0.90	360
39	390	6.3 × 15	0.70	1.40	330				
47	470	8 × 11.5	0.342	0.684	405	10 × 16	0.37	0.74	420
						▲ 8 × 20	0.37	0.74	420
68	680	8 × 11.5	0.342	0.684	405	10 × 20	0.30	0.60	490
82	820					10 × 25	0.25	0.50	540
100	101	10 × 12.5	0.256	0.512	535	12.5 × 20	0.18	0.36	580
		▲ 8 × 15	0.23	0.46	535				
120	121	10 × 16	0.194	0.388	600				
150	151	10 × 16	0.194	0.388	660	12.5 × 25	0.13	0.26	710
180	181	10 × 20	0.147	0.294	885	12.5 × 31.5	0.12	0.24	790
		▲ 12.5 × 15	0.15	0.30	1020	▲ 16 × 20	0.13	0.26	750
220	221	10 × 20	0.147	0.294	885	16 × 25	0.10	0.20	890
		▲ 10 × 25	0.13	0.26	1050	▲ 18 × 20	0.11	0.22	850
270	271	16 × 15	0.090	0.18	1410				
330	331	12.5 × 20	0.085	0.17	1285	16 × 25	0.090	0.18	1080
390	391	12.5 × 25	0.070	0.14	1720	18 × 25	0.083	0.166	1260
		▲ 18 × 15	0.086	0.172	1690				
470	471	12.5 × 25	0.070	0.14	1720	16 × 31.5	0.076	0.152	1310
		▲ 12.5 × 31.5	0.055	0.11	2090				
		※ 16 × 20	0.059	0.118	1765				
560	561					18 × 31.5	0.068	0.136	1370
680	681	16 × 25	0.050	0.10	2160	16 × 35.5	0.064	0.128	1410
		▲ 12.5 × 35.5	0.047	0.094	2265				
		※ 18 × 20	0.055	0.11	2290				
820	821	16 × 31.5	0.043	0.086	2670				
		▲ 18 × 25	0.043	0.086	2585				
1000	102	16 × 31.5	0.043	0.086	2670	18 × 40	0.047	0.094	1520
		▲ 16 × 35.5	0.036	0.072	2770				
1200	122	18 × 31.5	0.032	0.064	2950				
1500	152	18 × 35.5	0.030	0.060	3095				
2200	222	18 × 40	0.028	0.056	3200				

▲ : In this case, 6 will be put at 12th digit of type numbering system.
※ : In this case, 3 will be put at 12th digit of type numbering system.

Cap. (μF)	Code	160 2C		200 2D		250 2E		315 2F		350 2V		400 2G		450 2W	
0.47	R47	6.3 × 11	12	6.3 × 11	12	6.3 × 11	12	8 × 11.5	11	8 × 11.5	11				
1	010	6.3 × 11	17	6.3 × 11	17	6.3 × 11	17	8 × 11.5	16	10 × 12.5	17	10 × 12.5	16	10 × 12.5	18
2.2	2R2	6.3 × 11	25	6.3 × 11	25	8 × 11.5	29	10 × 12.5	28	10 × 16	31	10 × 16	27	10 × 20	29
3.3	3R3	8 × 11.5	36	8 × 11.5	36	10 × 12.5	42	10 × 12.5	34	10 × 16	38	10 × 20	36	12.5 × 20	41
4.7	4R7	8 × 11.5	43	10 × 12.5	50	10 × 12.5	50	10 × 16	45	10 × 20	49	10 × 20	43	12.5 × 20	49
10	100	10 × 12.5	70	10 × 16	80	10 × 20	88	10 × 20	72	12.5 × 20	82	12.5 × 25	72	16 × 25	75
22	220	10 × 20	130	10 × 20	140	12.5 × 25	155	12.5 × 25	120	16 × 25	130	16 × 25	110	16 × 31.5	115
33	330	12.5 × 20	180	12.5 × 25	190	12.5 × 25	190	16 × 25	155	16 × 31.5	160	16 × 31.5	140	●18 × 35.5	145
47	470	12.5 × 25	220	12.5 × 25	220	16 × 25	230	16 × 35.5	190	●18 × 35.5	200	●18 × 35.5	170	20 × 40	175
100	101	16 × 25	330	16 × 31.5	335	●18 × 35.5	340	Δ18 × 40	285	20 × 40	290	22 × 50	350	25 × 50	350
220	221	●18 × 35.5	500	Δ18 × 40	515	20 × 40	525	22 × 50	540	25 × 50	550				
330	331	20 × 40	900	22 × 40	1100	22 × 50	1150								
470	471	22 × 50	1200	22 × 50	1310	25 × 50	1350							Case size	※

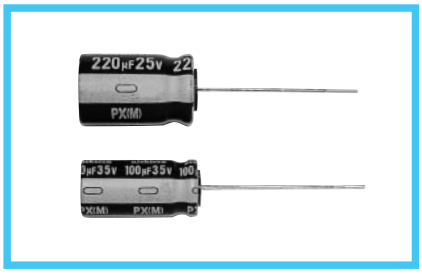
※Rated Ripple (mA rms) at 105˚C 120Hz
Size 20 × 31 is available for capacitors marked " ● "
Size 20 × 35 is available for capacitors marked " Δ "
In this case, 6 will be put at 12th digit of type numbering system.

PX Long Life Assurance series

Long Life | Low Impedance | Anti-Solvent Feature

● Load life of 20000 hours at 105°C.

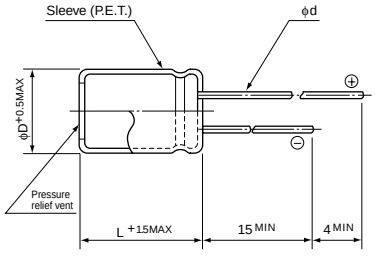
PM Long Life PX

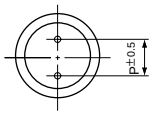


■ Specifications

Item	Performance Characteristics						
Category Temprature Range	–55 ~ +105˚C						
Rated Voltage Range	10 ~ 35V						
Rated Capacitance Range	1 ~ 4700μF						
Capacitance Tolerance	±20% (120Hz, 20˚C)						
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.						
tan δ	Rated voltage (V)	10	16	25	35	Measurement frequency : 120Hz	
	tan δ (MAX)	0.20	0.16	0.14	0.12	Temperature : 20˚C	
	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.						
Stability at Low Temperature	Rated voltage (V)		10	16	25	35	Measurement frequency : 120Hz
	Impedance ratio	Z–25˚C / Z+20˚C	3	2	2	2	
		Z–40˚C / Z+20˚C	4	4	4	4	
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 20000 hours at 105˚C, the peak voltage shall not exceed the rated D.C. voltage, capacitor meet the characteristic requirements listed below.						
	Capacitance change	Within ±30% of initial value					
	tan δ	300% or less of initial specified value					
	Leakage current	Initial specified value or less					
Shelf Life	After leaving capacitors under no load at 105˚C for 1000hours, they meet the specified value for endurance characteristics listed above.						
Marking	Printed with white color letter on dark brown sleeve.						

■ Radial Lead Type





ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6	0.6	0.8	0.8

Type numbering system (Example : 16V 220μF)

1	2	3	4	5	6	7	8	9	10	11
U	P	X	1	C	2	2	1	M	P	D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (220μF)
- Rated voltage (16V)
- Series name
- Type

※Configuration

ϕ D	Pb free lead finishing Pb free PET sleeve
10	PD
12.5 ~ 18	HD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

PX series

■Dimensions

D × L (mm)

Cap. (μF)	V (Code) / Item / Code	10 (1A)		16 (1C)		25 (1E)		35 (1V)	
		Case size φD × L (mm)	Rated Ripple (mA rms) 105°C / 100kHz	Case size φD × L (mm)	Rated Ripple (mA rms) 105°C / 100kHz	Case size φD × L (mm)	Rated Ripple (mA rms) 105°C / 100kHz	Case size φD × L (mm)	Rated Ripple (mA rms) 105°C / 100kHz
1	010							10 × 12.5	59
2.2	2R2							10 × 12.5	84
3.3	3R3							10 × 12.5	101
4.7	4R7							10 × 12.5	143
10	100							10 × 12.5	294
22	220							10 × 12.5	336
33	330							10 × 12.5	378
47	470							10 × 12.5	420
100	101					10 × 12.5	420	10 × 20	672
220	221			10 × 16	504	12.5 × 20	840	12.5 × 25	1008
330	331	10 × 16	504	10 × 20	672	12.5 × 25	1008	16 × 25	1344
470	471	10 × 20	672	12.5 × 20	1008	16 × 25	1344	16 × 31.5	1680
1000	102	12.5 × 25	1008	16 × 25	1344	16 × 31.5	1680	18 × 40	2184
2200	222	16 × 31.5	1680	18 × 35.5	2016				
3300	332	18 × 35.5	2016	18 × 40	2184				
4700	472	18 × 40	2184						

Ripple (mA rms) at 105°C 100kHz

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

PZ

High Voltage, Smaller-sized

series

Smaller

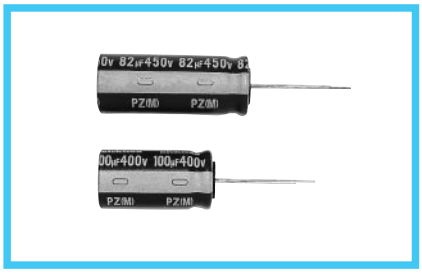
High Ripple Current

- High ripple current.
- Load life of 2000 hours at 105°C.
- Suited for ballast applications.

PT

Smaller

PZ



■Specifications

Item	Performance Characteristics
Category Temperature Range	–25 ~ +105°C
Rated Voltage Range	200 ~ 450V
Rated Capacitance Range	18 ~ 470µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minutes' application of rated voltage, leakage current is not more than 0.04CV+100 (µA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	200	400	420	450
tan δ (MAX.)	0.12	0.15	0.20	0.20

Stability at Low Temperature — Measurement frequency : 120Hz

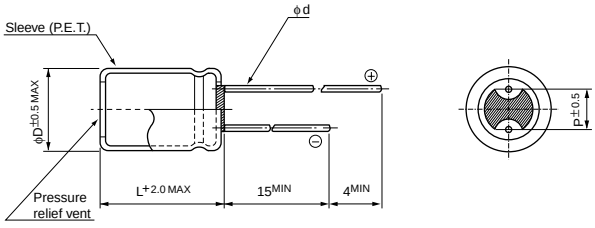
Rated voltage (V)		200	400	420	450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	3	8	8	8

Endurance — After an application of D.C. bias voltage plus the rated ripple current for 2000 hours at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteritics listed above.
Marking	Printed with white color letter on dark brown sleeve.

■Radial Lead Type



φD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
φd	0.6	0.8	0.8	0.8

Type numbering system (Example : 200V 220µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	P	Z	2	D	2	2	1	M	H	D	

- Case Size Code
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (220µF)
- Rated voltage (200V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve
10	PD
12.5 ~ 18	HD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

PZ series

■Dimensions

D × L (mm)

Cap.(µF) \ V	Code	200		400		420		450	
		2D		2G		W6		2W	
18	180							10×31.5	180
22	220					10×31.5	200		
27	270			10×31.5	240				
33	330							12.5×31.5	280
39	390					12.5×31.5	310	12.5×35.5	320
47	470			12.5×31.5	370	12.5×35.5	360	12.5×40	380
56	560			12.5×35.5	420	12.5×40	430	16×31.5	440
68	680			12.5×40	480	16×31.5	510	16×35.5	490
82	820	10×31.5	400			16×35.5	570	16×40 ▲18 ×31.5	550 550
100	101			16×31.5	580	16×40 ▲18×31.5	610 610	18×35.5	650
120	121			16×35.5 ▲18×31.5	670 670	18×35.5	660	18×40	740
150	151	12.5×31.5	620	16×40 ▲18×35.5	770 770	18×40	710		
180	181	12.5×35.5	700	18×40	880				
220	221	12.5×40	800						
270	271	16×31.5	870						
330	331	16×35.5 ▲18×31.5	1010 1010						
390	391	16×40 ▲18×35.5	1130 1120						
470	471	18×40	1270					Case size	※

※Rated Ripple (mA rms) at 105°C 120Hz

▲ : In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated voltage

V	60Hz	120Hz	500Hz	1kHz	10kHz~
200	0.80	1.00	1.20	1.30	1.40
400 ~ 450	0.80	1.00	1.25	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

RS

Compact & Low-profile Sized

series

Smaller

Anti-Solvent Feature (Through 100V only)

● More compact & low profile case sizes than VS series.

RZ

High Temperature

RS

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage Range	6.3 ~ 400V
Rated Capacitance Range	0.1 ~ 10000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 400
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage. I = 0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160	200	250	400
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.20	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160	200	250	400
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	5	4	3	2	2	2	2	2	3	3	3	6
	Z–40˚C / Z+20˚C	12	10	8	5	4	3	3	3	4	4	6	10

Endurance

After 2000 hours' application of rated voltage at 85˚C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

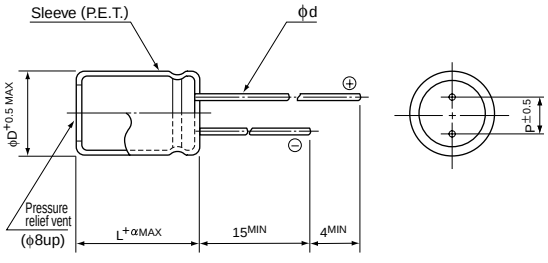
Shelf Life

After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

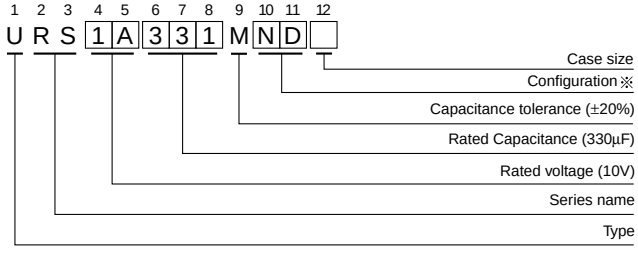
■Radial Lead Type



ϕD	5	6.3	8	10	12.5	16	18	20
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0

α	(ϕD<20) 1.5
	(ϕD≧20) 2.0

Type numbering system (Example : 10V 330µF)



※ Configuration

ϕ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5 · 6.3	CD	CA
8, 10 × 9	ND	NA
10 × 12.5	PD	PA
12.5 ~ 18	HD	HA
20	RD	RA

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

RS series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											5×9	1.1
0.22	R22											5×9	2.3
0.33	R33											5×9	3.5
0.47	R47											5×9	5
1	010											5×9	13
2.2	2R2											5×9	26
3.3	3R3											5×9	35
4.7	4R7							5×9	30	5×9	35	5×9	40
10	100					5×9	40	5×9	50	5×9	55	5×9	65
22	220	5×9	35	5×9	55	5×9	70	5×9	75	5×9	95	5×9	90
33	330	5×9	55	5×9	75	5×9	85	5×9	95	5×9	100	6.3×9	120
47	470	5×9	75	5×9	90	5×9	100	5×9	110	6.3×9	130	6.3×9	140
100	101	5×9	125	5×9	135	6.3×9	160	6.3×9	180	8×9	220	10×9	240
220	221	6.3×9	200	6.3×9	220	8×9	290	10×9	310	10×9	340	10×12.5	420
330	331	6.3×9	250	8×9	300	10×9	360	10×9	380	10×12.5	480	12.5×12.5	530
470	471	8×9	330	8×9	360	10×9	410	10×12.5	530	12.5×12.5	590	16×15	750
1000	102	10×9	510	10×12.5	620	12.5×12.5	720	12.5×15	830	16×15	1010	18×20	1160
2200	222	12.5×15	890	12.5×15	960	16×15	1160	18×15	1360	18×20	1560	20×25	1750
3300	332	16×15	1200	16×15	1300	18×15	1460	18×20	1720	20×25	2000		
4700	472	16×15	1410	18×15	1550	18×20	1770	18×25	2050				
6800	682	18×15	1660	18×20	1850	18×25	2170						Rated ripple
10000	103	18×20	2020	18×25	2350							Case size	

Cap.(μF) \ V	Code	63		100		160		200		250		400	
		1J		2A		2C		2D		2E		2G	
0.1	0R1			5×9	1.9								
0.22	R22			5×9	4.5								
0.33	R33			5×9	6.5								
0.47	R47			5×9	8								
1	010			5×9	17								
2.2	2R2			5×9	26								
3.3	3R3			5×9	35								
4.7	4R7			6.3×9	45								
10	100	5×9	60	6.3×9	70							16×15	140
22	220	6.3×9	100	8×9	130					16×15	280	●18×15	280
33	330	8×9	140	10×9	180			16×15	350	●18×15	350	18×20	350
47	470	8×9	170	10×12.5	230	16×15	420	●18×15	420	Δ18×20	420	★18×25	420
68	680					●18×15	490	Δ18×20	490	18×20	490	20×25	490
100	101	10×9	250	12.5×15	370	Δ18×20	590	★18×25	590	18×25	590		
150	151					★18×25	710	18×25	710				
220	221	12.5×12.5	490	16×15	620	20×25	770						
330	331	12.5×15	710	18×15	760								Rated ripple
470	471	16×15	900									Case size	

Rated Ripple (mA rms) at 85°C 120Hz

Size 16 × 20 is available for capacitors marked" ● "
Size 20 × 15 is available for capacitors marked" Δ "
Size 20 × 20 is available for capacitors marked " ★ "

In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10 kHz ~
6.3 ~ 100	~ 47	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~	0.85	1.00	1.10	1.13	1.15
160 ~ 400	10 ~ 220	0.80	1.00	1.25	1.40	1.60

RU series

12.5mmL MAX.

Smaller

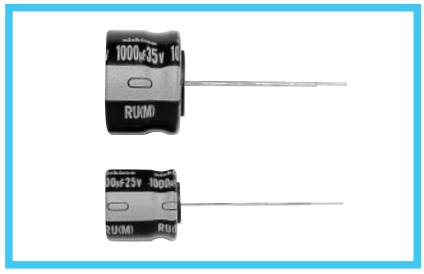
Anti-Solvent Feature (Through 100V only)

● 12.5mmL MAX. height.

RY

High Temperature

RU



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C (6.3V ~ 400V), −25 ~ +85°C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	6.8 ~ 6800µF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated voltage (V)	6.3 ~ 100V	160 ~ 450V
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage, I = 0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 350	400 ~ 450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.12	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50 ~ 100	160 ~ 200	250 ~ 350	400	450
Impedance ratio ZT / Z20 (MAX)	Z−25°C / Z+20°C	5	4	3	2	2	2	3	4	6	15
	Z−40°C / Z+20°C	12	10	8	5	4	3	4	8	10	—

Endurance

After 2000 hours' application of rated voltage at 85°C,capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

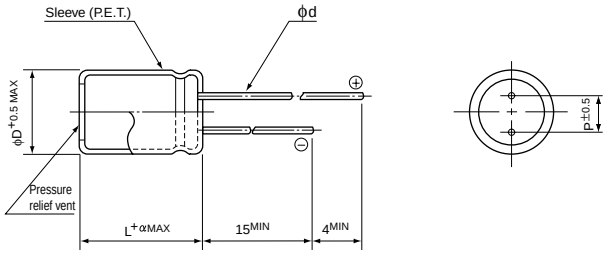
Shelf Life

After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



α	
	(φD < 20) 1.5
	(φD ≧ 20) 2.0

φD	12.5	16	18	20	22	25
P	5.0	7.5	7.5	10	10	12.5
φd	0.6	0.8	0.8	1.0	1.0	1.0

Type numbering system (Example : 10V 2200µF)

1	2	3	4	5	6	7	8	9	10	11
U	R	U	1	A	2	2	2	M	H	D

- 11: Configuration ※
- 9: Capacitance tolerance (±20%)
- 6 7 8: Rated Capacitance (2200µF)
- 4 5: Rated voltage (10V)
- 2 3: Series name
- 1: Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve
12.5 ~ 18	HD
20 ~ 25	RD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

RU series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
330	331											12.5×12.5	530
470	471											16×12.5	600
680	681									12.5×12.5	720	20×12.5	750
1000	102							12.5×12.5	750	18×12.5	850	25×12.5	930
2200	222			12.5×12.5	870	20×12.5	1200	25×12.5	1380				
3300	332	16×12.5	800	18×12.5	1100	25×12.5	1410						
4700	472	20×12.5	1460	25×12.5	1480								Rated
6800	682	25×12.5	1600									Case size	ripple

D × L (mm)

Cap.(μF) \ V	Code	63		100		160		200		250		315	
		1J		2A		2C		2D		2E		2F	
22	220							12.5×12.5	190	16×12.5	190	16×12.5	190
33	330					12.5×12.5	230	16×12.5	230	18×12.5	230	20×12.5	230
47	470					16×12.5	280	18×12.5	280	20×12.5	280	25×12.5	280
68	680					18×12.5	330	22×12.5	330	25×12.5	330		
100	101			12.5×12.5	330	22×12.5	380	25×12.5	380				
220	221	12.5×12.5	490	22×12.5	620								
330	331	18×12.5	710	25×12.5	760								
470	471	22×12.5	900										
680	681	25×12.5	1200										

D × L (mm)

Cap.(μF) \ V	Code	350		400		450	
		2V		2G		2W	
6.8	6R8					12.5×12.5	70
10	100	12.5×12.5	110	16×12.5	110	16×12.5	80
22	220	18×12.5	230	20×12.5	230	22×12.5	160
33	330	20×12.5	230	25×12.5	280		
47	470	25×12.5	280				

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10 kHz ~
6.3 ~ 100	100 ~ 680	0.80	1.00	1.23	1.34	1.50
	1000 ~ 6800	0.85	1.00	1.10	1.13	1.15
160 ~ 450	6.8 ~ 100	0.80	1.00	1.25	1.40	1.60

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

RY

12.5mmL MAX. Wide Temperature Range

series

Smaller

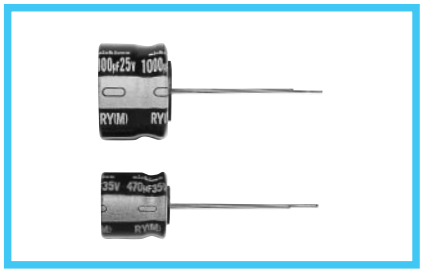
Anti-Solvent Feature (Through 100V only)

● 12.5mmL MAX. height.

RY

High Temperature

RU



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C (6.3 ~ 100V), –40 ~ +105°C (160 ~ 400V), –25 ~ +105°C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	6.8 ~ 4700µF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage, I = 0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 350	400 ~ 450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35 ~ 50	63 ~ 100	160 ~ 200	250 ~ 350	400	450
Impedance ratio ZT / Z20 (MAX)	Z–25°C / Z+20°C	5	4	3	2	2	2	3	4	6	15
	Z–40°C / Z+20°C	10	8	6	4	3	3	4	8	10	—

Endurance

After 2000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

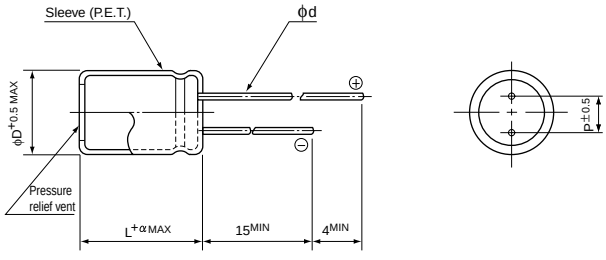
Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



α	
	(φD < 20) 1.5
	(φD ≧ 20) 2.0

φD	12.5	16	18	20	22	25
P	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.6	0.8	0.8	1.0	1.0	1.0

Type numbering system (Example : 10V 2200µF)

1	2	3	4	5	6	7	8	9	10	11
U	R	Y	1	A	2	2	2	M	H	D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (2200µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve
12.5 ~ 18	HD
20 ~ 25	RD

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

RY series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
330	331											12.5×12.5	450
470	471									12.5×12.5	420	20×12.5	540
680	681							12.5×12.5	500	18×12.5	610	25×12.5	700
1000	102					12.5×12.5	520	18×12.5	770	22×12.5	810		
2200	222	12.5×12.5	580	18×12.5	820	25×12.5	1000	25×12.5	1170				
3300	332	18×12.5	730	22×12.5	1030								Rated
4700	472	25×12.5	1200									Case size	ripple

D × L (mm)

Cap.(μF) \ V	Code	63		100		160		200		250		315	
		1J		2A		2C		2D		2E		2F	
10	100											12.5×12.5	70
22	220							12.5×12.5	110	16×12.5	130	16×12.5	85
33	330					12.5×12.5	130	16×12.5	170	18×12.5	170	20×12.5	120
47	470					16×12.5	210	18×12.5	230	22×12.5	190	25×12.5	160
68	680					20×12.5	280	25×12.5	310				
100	101			12.5×12.5	230	25×12.5	360						
220	221	12.5×12.5	400	22×12.5	400								
330	331	18×12.5	550										
470	471	22×12.5	610										

D × L (mm)

Cap.(μF) \ V	Code	350		400		450	
		2V		2G		2W	
6.8	6R8					12.5×12.5	38
10	100	16×12.5	75	16×12.5	65	16×12.5	47
22	220	18×12.5	90	20×12.5	150	25×12.5	85
33	330	25×12.5	140	25×12.5	200		

Rated Ripple (mA rms) at 105°C 120Hz

● Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10 kHz ~
6.3 ~ 100	100 ~ 680	0.80	1.00	1.23	1.34	1.50
	1000 ~ 4700	0.85	1.00	1.10	1.13	1.15
160 ~ 450	6.8 ~ 100	0.80	1.00	1.25	1.40	1.60

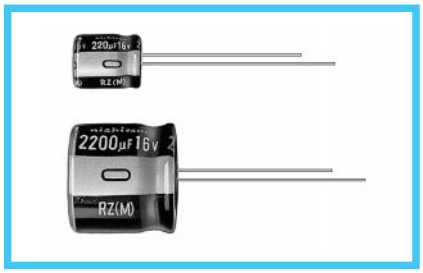
RZ series

Compact & Low-Profile Sized, Wide Temperature Range

Smaller

Anti-Solvent Feature (Through 100V only)

● Very small case sizes same as RS series, but operating over wide temperature range of –55 (–40) ~ +105˚C.



RZ
High Temperature
RS

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105˚C (6.3 ~ 100V) , –40 ~ +105˚C (160 ~ 400V)
Rated Voltage Range	6.3 ~ 400V
Rated Capacitance Range	0.1 ~ 10000μF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 400
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.	After 1 minute's application of rated voltage, I = 0.04CV+100 (μA) or less

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160	200	250	400
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.20	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160	200	250	400
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	5	4	3	2	2	2	2	2	3	3	3	6
	Z–40˚C / Z+20˚C	10	8	6	4	3	3	3	3	4	4	6	10

Endurance

After 1000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

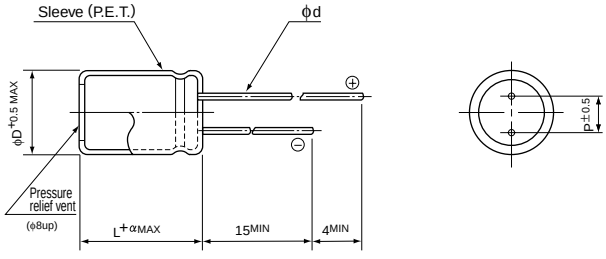
Shelf Life

After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



α	
	(ϕD < 20) 1.5
	(ϕD ≧ 20) 2.0

ϕD	5	6.3	8	10	12.5	16	18	20
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0

Type numbering system (Example : 10V 330μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	R	Z	1	A	3	3	1	M	N	D	

- Case size
- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (330μF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

ϕD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5 · 6.3	CD	CH
8 · 10 × 9	ND	NH
10 × 12.5	PD	PH
12.5 ~ 18	HD	HH
20	RD	RH

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

RZ series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											5×9	1.1
0.22	R22											5×9	2.3
0.33	R33											5×9	3.5
0.47	R47											5×9	5
1	010											5×9	12
2.2	2R2											5×9	18
3.3	3R3											5×9	25
4.7	4R7							5×9	20	5×9	25	5×9	30
10	100					5×9	30	5×9	35	5×9	40	5×9	46
22	220	5×9	25	5×9	40	5×9	50	5×9	55	5×9	60	5×9	65
33	330	5×9	40	5×9	55	5×9	60	5×9	70	5×9	75	6.3×9	85
47	470	5×9	55	5×9	65	5×9	70	5×9	80	6.3×9	95	6.3×9	100
100	101	5×9	90	5×9	95	6.3×9	115	6.3×9	130	8×9	155	10×9	170
220	221	6.3×9	145	6.3×9	155	8×9	205	10×9	220	10×9	235	10×12.5	290
330	331	6.3×9	180	8×9	210	10×9	240	10×9	270	10×12.5	340	12.5×12.5	370
470	471	8×9	235	8×9	275	10×9	290	10×12.5	370	12.5×12.5	420	16×15	540
1000	102	10×9	370	10×12.5	450	12.5×12.5	520	12.5×15	590	16×15	720	18×20	830
2200	222	12.5×15	635	12.5×15	690	16×15	830	18×15	970	18×20	1110	20×25	1250
3300	332	16×15	860	16×15	940	18×15	1050	18×20	1220	20×25	1430		
4700	472	16×15	1010	18×15	1120	18×20	1260	18×25	1470				
6800	682	18×15	1200	18×20	1330	18×25	1560						Rated ripple
10000	103	18×20	1450	18×25	1700							Case size	

Cap.(μF) \ V	Code	63		100		160		200		250		400	
		1J		2A		2C		2D		2E		2G	
0.1	0R1			5×9	1.2								
0.22	R22			5×9	3								
0.33	R33			5×9	4.5								
0.47	R47			5×9	6.5								
1	010			5×9	12								
2.2	2R2			5×9	17								
3.3	3R3			5×9	25								
4.7	4R7			6.3×9	32								
10	100	5×9	42	6.3×9	50							16×15	100
22	220	6.3×9	71	8×9	93					16×15	200	●18×15	200
33	330	8×9	100	10×9	130			16×15	250	●18×15	250	18×20	250
47	470	8×9	120	10×12.5	165	16×15	300	●18×15	300	Δ18×20	300	★18×25	300
68	680					●18×15	350	Δ18×20	350	18×20	350	20×25	350
100	101	10×9	215	12.5×15	265	Δ18×20	420	★18×25	420	18×25	420		
150	151					★18×25	510	18×25	510				
220	221	12.5×12.5	335	16×15	440	20×25	550						
330	331	12.5×15	510	18×15	540								Rated ripple
470	471	16×15	640									Case size	

Rated Ripple (mA rms) at 105˚C 120Hz

Size 16 × 20 is available for capacitors marked " ● "
Size 20 × 15 is available for capacitors marked " Δ "
Size 20 × 20 is available for capacitors marked " ★ "

In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10kHz ~
6.3 ~ 100	~ 47	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~	0.85	1.00	1.10	1.13	1.15
160 ~ 400	10 ~ 220	0.80	1.00	1.25	1.40	1.60

ALUMINUM ELECTROLYTIC CAPACITORS

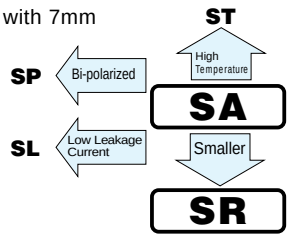
nichicon

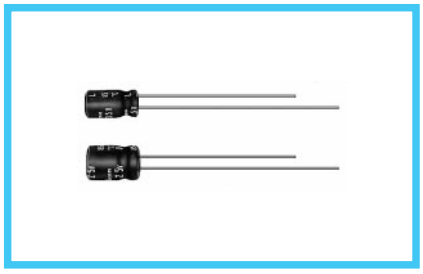
SA 7mmL, For General Purposes series

SR 7mmL, High CV series

Smaller (SR series) | Anti-Solvent Feature

- Standard miniature series with 7mm height.
- Higher CV series with 7mm height.





■Specifications

Item	SA series	SR series
Category Temperature Range	– 40 ~ +85˚C	–40 ~ +85˚C
Rated Voltage Range	6.3 ~ 50V	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF	0.1 ~ 470µF
Capacitance Tolerance	±20% at 120Hz, 20˚C	
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio	Z–25˚C / Z+20˚C	6	4	3	2	2	2	2
ZT / Z20 (MAX.)	Z–40˚C / Z+20˚C	12	8	6	4	4	3	3

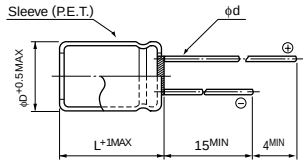
Endurance — After 2000 hours' application of rated voltage at 85˚C, capacitors meet the characteristic requirements listed at right.

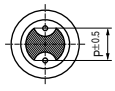
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example : SA series : 10V 33µF)

1 2 3 4 5 6 7 8 9 10 11

U S A 1 A 3 3 0 M D D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DA
8	DD	CA

※ Please contact to us if other configurations are required.

■Dimensions

D×L(mm)

Cap.(µF)	Code	4 (0G) SR	6.3 (0J) SA	6.3 (0J) SR	10 (1A) SA	10 (1A) SR	16 (1C) SA	16 (1C) SR	25 (1E) SA	25 (1E) SR	35 (1V) SA	35 (1V) SR	50 (1H) SA	50 (1H) SR
0.1	0R1												4×7 / 1.0	4×7 / 1.0
0.22	R22												4×7 / 2.3	4×7 / 2.3
0.33	R33												4×7 / 3.5	4×7 / 3.5
0.47	R47												4×7 / 5.0	4×7 / 5.0
1	010												4×7 / 10	4×7 / 10
2.2	2R2												4×7 / 19	4×7 / 19
3.3	3R3												4×7 / 24	4×7 / 24
4.7	4R7										4×7 / 24	4×7 / 24	5×7 / 29	4×7 / 28
10	100						4×7 / 28	4×7 / 28	5×7 / 33	4×7 / 28	5×7 / 36	4×7 / 31	6.3×7 / 44	5×7 / 38
22	220		4×7 / 34	4×7 / 34	5×7 / 38	4×7 / 35	5×7 / 44	4×7 / 39	6.3×7 / 51	5×7 / 48	6.3×7 / 57	5×7 / 52	8×7 / 65	6.3×7 / 58
33	330	4×7 / 33	5×7 / 42	4×7 / 40	5×7 / 47	4×7 / 43	6.3×7 / 57	5×7 / 55	6.3×7 / 63	5×7 / 58	8×7 / 72	6.3×7 / 65		8×7 / 75
47	470	4×7 / 39	5×7 / 50	4×7 / 48	6.3×7 / 59	5×7 / 59	6.3×7 / 68	5×7 / 65	8×7 / 78	6.3×7 / 71		8×7 / 85		
100	101	5×7 / 65	6.3×7 / 77	5×7 / 78	8×7 / 96	6.3×7 / 87	8×7 / 107	6.3×7 / 98		8×7 / 115				
220	221	6.3×7 / 110	8×7 / 130	6.3×7 / 120		8×7 / 145		8×7 / 150						
330	331	8×7 / 165		8×7 / 180										
470	471	8×7 / 240												Case size / Rated ripple

Rated Ripple (mA rms) at 85˚C 120Hz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

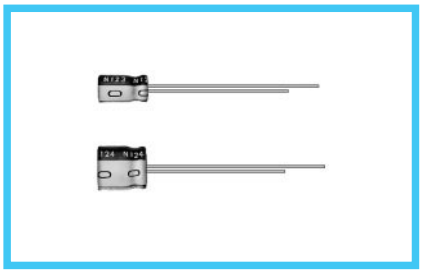
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

SF 7mmL, Low Impedance series

Low Impedance Anti-Solvent Feature

● Low impedance over wide temperature range of −55~+105˚C, with 7mm height.



SF ← Low Impedance ST

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105˚C
Rated Voltage Range	6.3 ~ 35V
Rated Capacitance Range	6.8 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3(µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35
tan δ (MAX.)	0.18	0.16	0.14	0.12	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35
Impedance ratio ZT / Z20 (MAX.)	Z−25˚C / Z+20˚C	2	2	2	2	2
	Z−55˚C / Z+20˚C	3	3	3	3	3

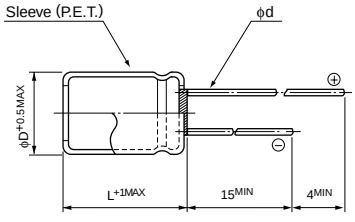
Endurance — After 1000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirements listed at right.

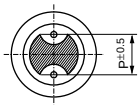
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on dark brown sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example : 10V 33µF)

1	2	3	4	5	6	7	8	9	10	11
U	S	F	1	A	3	3	0	M	D	D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DH
8	DD	CH

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF) \ V	Code	6.3			10			16			25			35		
		0J			1A			1C			1E			1V		
6.8	6R8													4×7	3.3	70
10	100										4×7	3.3	70	5×7	1.7	110
15	150							4×7	3.3	70	5×7	1.7	110	6.3×7	0.8	160
22	220				4×7	3.3	70	5×7	1.7	110	5×7	1.7	110	6.3×7	0.8	160
33	330	5×7	1.7	110	5×7	1.7	110	6.3×7	0.8	160	6.3×7	0.8	160	8×7	0.5	200
47	470	5×7	1.7	110	6.3×7	0.8	160	6.3×7	0.8	160	8×7	0.5	200			
68	680	6.3×7	0.8	160	6.3×7	0.8	160	8×7	0.5	200	8×7	0.5	200			
100	101	6.3×7	0.8	160	8×7	0.5	200	8×7	0.5	200						
150	151	8×7	0.5	200	8×7	0.5	200							Case size	Impe-dance	Rated ripple
220	221	8×7	0.5	200												

Max. Impedance (Ω) at 20˚C 100kHz
Rated Ripple (mA rms) at 105˚C 100kHz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.35	0.50	0.64	0.83	1.00

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

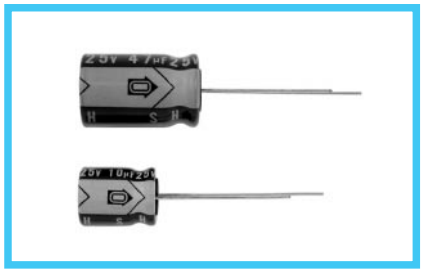
SH

Vertical Time Constant Circuit Use

series

Anti-Solvent Feature

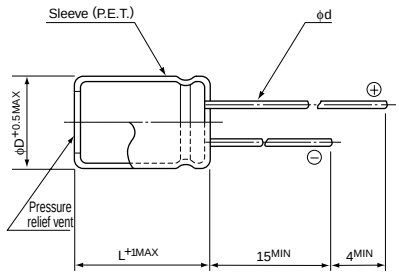
● Designed specifically for vertical time constant circuits of TV's.

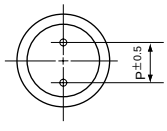


■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	16 ~ 50V
Rated Capacitance Range	0.47 ~ 470μF
Capacitance Tolerance	±20% (M) (±10% (K) semi-standard) at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is 0.01CV + 3 (μA) or less.
tan δ	0.07 or less at 120Hz, 20°C
Stability at Low and High Temperature	Measurement frequency : 120Hz Temperature / Capacitance change / 20°C / tan δ (MAX.) / Impedance ratio ZT / Z+20°C (MAX.) –40°C / within –20% / 0.21 / 2 +85°C / within +20% / 0.07 / ————
Endurance	After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristics requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: 150% or less of initial specified value Leakage Current: Initial specifed value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve. (PVC sleeve product : Printed with black color letter on red sleeve.)

■Radial Lead Type





φD	6.3	8	10	12.5	16
P	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.6	0.6	0.6	0.8

Type numbering system (Example : 16V 47μF)

1 2 3 4 5 6 7 8 9 10 11

U S H 1 C 4 7 0 M P D

- Configuration※
- Capacitance tolerance (M : ±20%, K : ±10%)
- Rated Capacitance (47μF)
- Rated voltage (16V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
6.3	ED	EA
8 · 10	PD	PA
12.5 · 16	HD	HA

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap. (μF) \ V	Code	16	25	50
		1C	1E	1H
0.47	R47			6.3 × 11
1	010			6.3 × 11
2.2	2R2			6.3 × 11
3.3	3R3		6.3 × 11	6.3 × 11
4.7	4R7		6.3 × 11	8 × 11.5
10	100	8 × 11.5	10 × 12.5	10 × 16
22	220	10 × 16	10 × 16	10 × 20
33	330	10 × 16	10 × 20	12.5 × 20
47	470	10 × 20	12.5 × 20	12.5 × 25
100	101	12.5 × 20	12.5 × 25	16 × 25
220	221	12.5 × 25	16 × 25	16 × 35.5
330	331	16 × 25	16 × 31.5	
470	471	16 × 35.5		

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

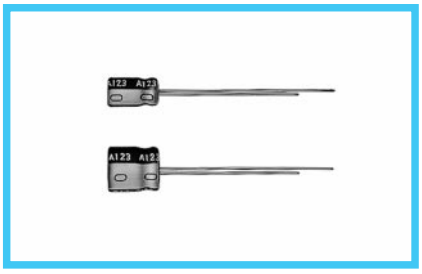
nichicon MUSE **SK** series

7mmL, For Audio Equipment

For Audio Use Anti-Solvent Feature

● "nichicon MUSE" acoustic series, with 7mm height.

FX
Smaller
SK



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA) , whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	4	3	2	2	2	2
	Z–40˚C / Z+20˚C	8	6	4	4	3	3

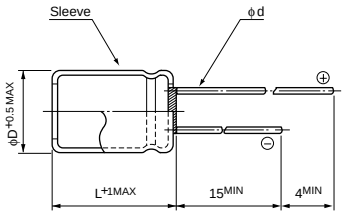
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

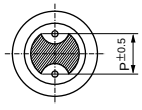
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specifed value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example : 10V 33µF)

1	2	3	4	5	6	7	8	9	10	11
U	S	K	1	A	3	3	0	M	D	J

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

φD	Code
4 ~ 6.3	DJ
8	CJ

※ Please contact to us if Eco-Products are required.

■Dimensions

D × L (mm)

Cap.(µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	19
3.3	3R3											4×7	24
4.7	4R7									4×7	24	5×7	29
10	100					4×7	29	5×7	33	5×7	36	6.3×7	44
22	220	4×7	34	5×7	38	5×7	44	6.3×7	51	6.3×7	57	8×7	65
33	330	5×7	42	5×7	47	6.3×7	57	6.3×7	63	8×7	72		
47	470	5×7	50	6.3×7	59	6.3×7	68	8×7	78				
100	101	6.3×7	77	8×7	96	8×7	107						Rated ripple
220	221	8×7	130									Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

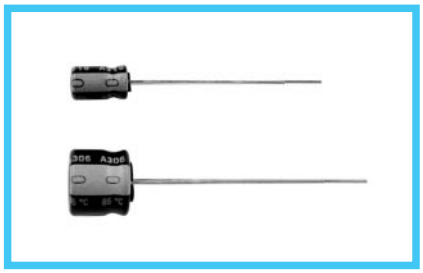
SL

7mmL, Low Leakage Current

series

Low Leakage Current Anti-Solvent Feature

● Low leakage current series with 7mm height.



SL ← Low Leakage Current SA

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.002CV or 0.4 (µA),whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	4	3	2	2	2	2
	Z–40˚C / Z+20˚C	8	6	4	4	3	3

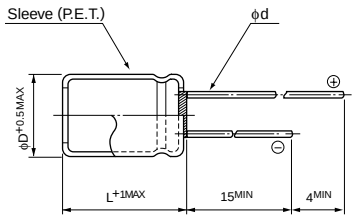
Endurance — After 1000 hours' application of rated voltage at 85˚C, capacitors meet the characteristic requirements listed at right.

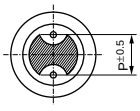
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve. (PVC sleeve product : Printed with black color letter on yellow sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example : 10V 33µF)

1 2 3 4 5 6 7 8 9 10 11

U S L 1 A 3 3 0 M D D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DA
8	DD	CA

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	19
3.3	3R3											4×7	24
4.7	4R7									4×7	24	5×7	29
10	100					4×7	29	5×7	33	5×7	36	6.3×7	44
22	220	4×7	34	5×7	38	5×7	44	6.3×7	51	6.3×7	57	8×7	65
33	330	5×7	42	5×7	47	6.3×7	57	6.3×7	63	8×7	72		
47	470	5×7	50	6.3×7	59	6.3×7	68	8×7	78				
100	101	6.3×7	77	8×7	96	8×7	107						Rated Ripple
220	221	8×7	130									Case size	

Rated Ripple (mA rms) at 85˚C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

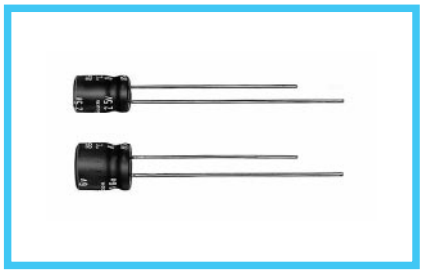
nichicon

SP 7mmL, Bi-Polarized series

BP Bi-polarized | Anti-Solvent Feature

- Bi-polarized series with 7mm height.
- Extended capacitance range by an addition of ϕ8 product.

SP ← Bi-polarized SA



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05CV or 10 (µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.16	0.16	0.14	0.12

Stability at Low Temperature — Measurement frequency : 120 Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio	Z−25˚C / Z+20˚C	4	3	2	2	2	2
ZT / Z20 (MAX.)	Z−40˚C / Z+20˚C	8	6	4	4	3	3

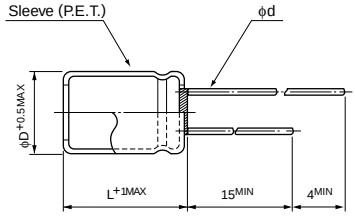
Endurance — After 2000 hours' application of rated voltage at 85˚C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

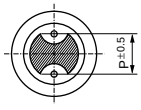
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type





ϕD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
ϕd	0.45	0.45	0.45	0.5

Type numbering system (Example : 10V 33µF)

1 2 3 4 5 6 7 8 9 10 11
U S P 1 A 3 3 0 M D D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

ϕ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DA
8	DD	CA

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	14
3.3	3R3									4×7	16	5×7	20
4.7	4R7					4×7	18	5×7	21	5×7	22	6.3×7	27
10	100			4×7	24	5×7	30	6.3×7	35	6.3×7	37	8×7	44
22	220			5×7	40	6.3×7	51	6.3×7	53	8×7	62	8×7	65
33	330	5×7	42	6.3×7	56	6.3×7	63	8×7	73	8×7	76		
47	470	6.3×7	58	6.3×7	67	6.3×7	75	8×7	87				
100	101	8×7	95	8×7	110	8×7	125						Rated ripple
220	221	8×7	140									Case size	

Rated Ripple (mA rms) at 85˚C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ST

7mmL, Wide Temperature Range

series

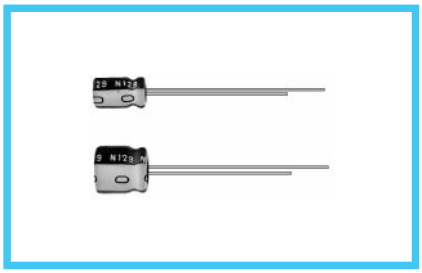
Anti-Solvent Feature

● Wide temperature range of –55 ~ +105˚C, with 7mm height.

ST

High Temperature

SA



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.21	0.18	0.15	0.13	0.12

Stability at Low Temperature — Measurement frequency : 120 Hz

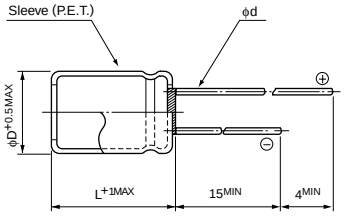
Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	3	2	2	2	2	2
	Z–40˚C / Z+20˚C	6	5	4	3	3	3

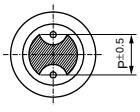
Endurance — After 1000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirement listed at right.

Capacitance change	Within ±25% of initial value (16Vor less) Within ±20% of initial value (5Vor more)
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example : 10V 33µF)

1	2	3	4	5	6	7	8	9	10	11
U	S	T	1	A	3	3	0	M	D	D

- 11: Configuration※
- 9: Capacitance tolerance (±20%)
- 8: Rated Capacitance (33µF)
- 7: Rated voltage (10V)
- 5: Series name
- 1: Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 6.3	DD	DH
8	DD	CH

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF)	Code	6.3		10		16		25		35		50	
V		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	19
3.3	3R3											4×7	24
4.7	4R7									4×7	24	5×7	29
10	100					4×7	29	5×7	33	5×7	36	6.3×7	44
22	220	4×7	34	5×7	38	5×7	44	6.3×7	51	6.3×7	57	8×7	65
33	330	5×7	42	5×7	47	6.3×7	57	6.3×7	63	8×7	72		
47	470	5×7	50	6.3×7	59	6.3×7	68	8×7	78				
100	101	6.3×7	77	8×7	96	8×7	107						Rated ripple
220	221	8×7	130	8×7	140							Case size	

Rated Ripple (mA rms) at 105˚C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

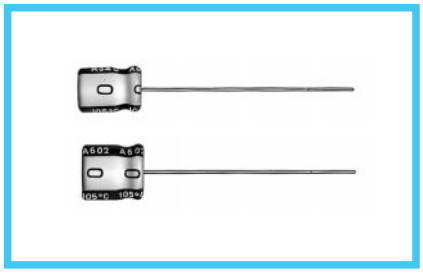
SV

7mmL, Long Life Assurance series

Long Life

● Extended load life of 5000 hours at +105˚C, with 7mm height.

ST → Long Life → SV



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +105˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.21	0.18	0.15	0.13	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z−25˚C / Z+20˚C	4	3	2	2	2	2
	Z−40˚C / Z+20˚C	8	6	4	3	3	3

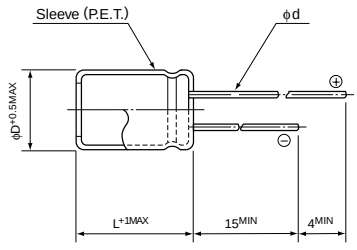
Endurance — After 5000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirements listed at right.

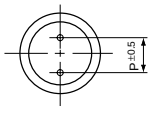
Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking — Printed with silver color letter on dark brown sleeve.

■Radial Lead Type





φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.5

Type numbering system (Example: 10V 33µF)

1 2 3 4 5 6 7 8 9 10 11

U S V 1 A 3 3 0 M F D

- Configuration ※
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4 ~ 8	FD	FH

※ Please contact to us if other configurations are required.

■Dimensions

D×L (mm)

Cap.(µF)	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	19
3.3	3R3											4×7	24
4.7	4R7									4×7	24	5×7	29
10	100					4×7	29	5×7	33	5×7	36	6.3×7	44
22	220	4×7	34	5×7	38	5×7	44	6.3×7	51	6.3×7	57	8×7	65
33	330	5×7	42	5×7	47	6.3×7	57	6.3×7	63	8×7	72		
47	470	5×7	50	6.3×7	59	6.3×7	68	8×7	78				
100	101	6.3×7	77	8×7	96	8×7	107						Rated ripple
220	221	8×7	130									Case size	

Rated Ripple (mA rms) at 105˚C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

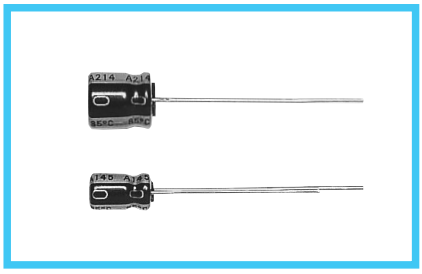
nichicon

nichicon MUSE **SW** series

7mmL, For Audio Equipment

For Audio Use Anti-Solvent Feature

● "nichicon MUSE" acoustic series, with 7mm height.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA) , whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

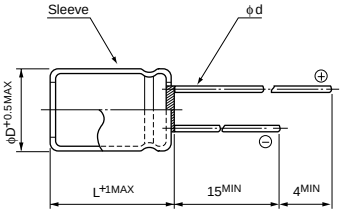
Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	4	3	2	2	2	2
	Z–40˚C / Z+20˚C	8	6	4	4	3	3

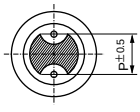
Endurance — After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specifed value or less

Item	Performance Characteristics
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with black color letter on gold sleeve.

■Radial Lead Type





φD	4	5	6.3
P	1.5	2.0	2.5
φd	0.45	0.45	0.45

Type numbering system (Example : 10V 33µF)

1 2 3 4 5 6 7 8 9 10 11

U S W 1 A 3 3 0 M D A

- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

φD	Code
4 ~ 6.3	DA

※ Please contact to us if Eco-Products are required.

■Dimensions

D × L (mm)

Cap.(µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×7	1.0
0.22	R22											4×7	2.3
0.33	R33											4×7	3.5
0.47	R47											4×7	5.0
1	010											4×7	10
2.2	2R2											4×7	19
3.3	3R3											4×7	24
4.7	4R7									4×7	24	4×7	29
10	100					4×7	28	4×7	28	4×7	31	5×7	38
22	220	4×7	34	4×7	35	4×7	39	5×7	48	5×7	52	6.3×7	58
33	330	4×7	40	4×7	43	5×7	55	5×7	58	6.3×7	65		
47	470	4×7	48	5×7	59	5×7	65	6.3×7	71				
100	101	5×7	78	6.3×7	87	6.3×7	98						Rated ripple
220	221	6.3×7	120									Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

SOLID TANTALUM ELECTROLYTIC CAPACITORS

Type		Case code	Bulk	Taping	
				ϕ180 Reel	ϕ330 Reel
Chip Type	**F98**	M	—	4,000	—
	F92	J	—	4,000	—
		P		3,000	8,000
		A, B		2,500	8,000
	F91 **F93** **F97**	A	—	2,000	8,000
		B		2,000	6,000
		C		500	2,500
		N		500	2,500
	F95	P	—	3,000	10,000
		S, A		2,500	10,000
		B		2,000	8,500
	F72	R	—	1,000	—
	F75	C, D, R	—	500	—

Terminal-Shape

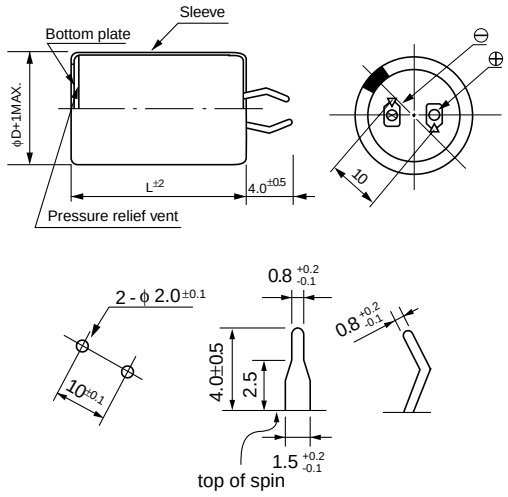
- There is a restriction for capacitors size.
- Please consults us the other terminal-shape.

Standard type ① (terminal length 4.0mm)

Applicable size : φ 20~φ 35, ~ 50mmL

Configuration code [E][L] (10 11) Pb free lead finishing

[H][L] (10 11) Sn-Pb lead finishing



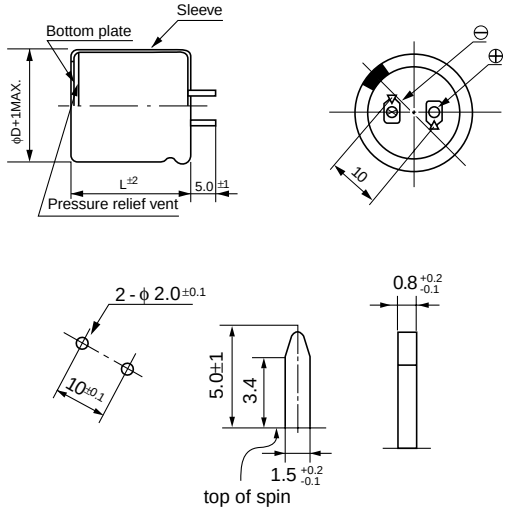
PC board hole dimensions terminal dimensions

Straight type

Applicable size : φ 20 ~ φ 35, ~ 50mmL

Configuration code [E][K] (10 11) Pb free lead finishing

[H][K] (10 11) Sn-Pb lead finishing



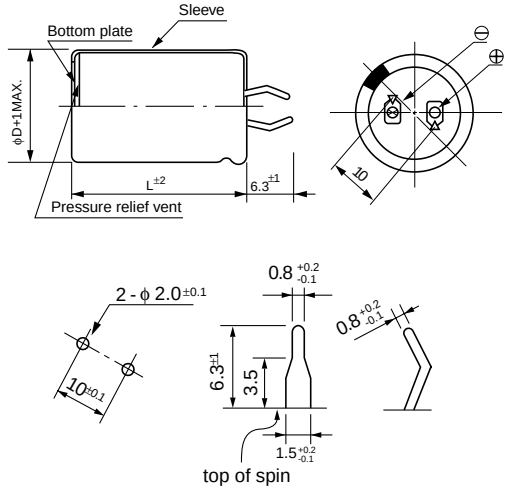
PC board hole dimensions terminal dimensions

Long type ② (terminal length 6.3mm)

Applicable size : φ 20 ~ φ 35, ~ 50mmL

Configuration code [H][S] (10 11) Sn-Pb lead finishing

※ Please select from standard type for the lead-free product.



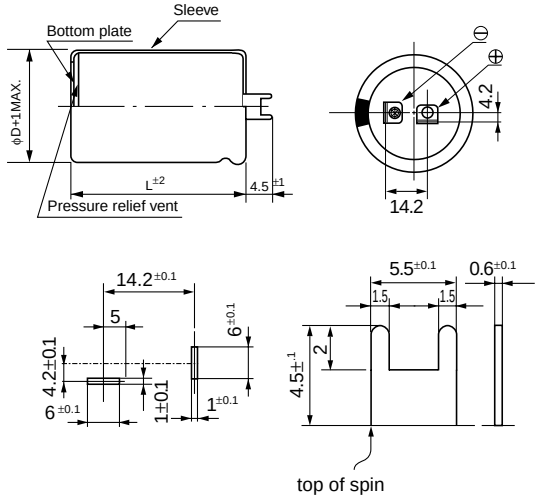
PC board hole dimensions terminal dimensions

Vibration-resistant type

Applicable size : φ 30 ~ φ 40

Configuration code [E][U] (10 11) Pb free lead finishing

[H][U] (10 11) Sn-Pb lead finishing



PC board hole dimensions terminal dimensions

※ Negative terminal : Mesh marking

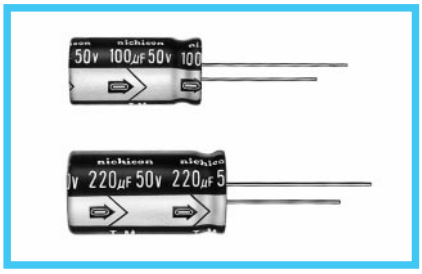
ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

TM Timer Circuit Use series

Low Leakage Current | Anti-Solvent Feature

- Ideally suited for timer circuits.
- Excellent leakage current stability, even subjected to load or no load at high temperature for a long time.



TM ← High Stability KL

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	10 ~ 50V
Rated Capacitance Range	1 ~ 470µF
Capacitance Tolerance	±20% (M) (±10% (K) semi-standard) at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is 0.001CV+1 (µA) or less.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	10	16	25	50
tan δ (MAX.)	0.17	0.13	0.10	0.08

Stability at Low Temperature — Measurement frequency : 120Hz

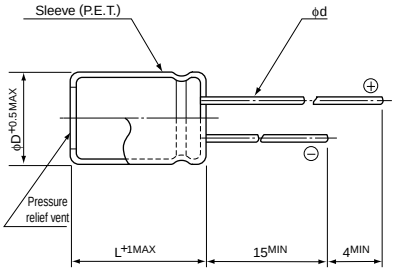
Rated voltage (V)		10	16	25	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	2	2	1.5	1.5
	Z–40°C / Z+20°C	4	3	2	2

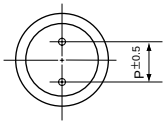
Endurance — After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristics requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	150% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the requirements for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type





φD	6.3	8	10	12.5	16
P	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.6	0.6	0.6	0.8

Type numbering system (Example : 10V 33µF)

1	2	3	4	5	6	7	8	9	10	11
U	T	M	1	A	3	3	0	M	P	D

- Configuration ※
- Capacitance tolerance (M : ±20%, K : ±10%)
- Rated Capacitance (33µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
6.3	ED	EA
8 · 10	PD	PA
12.5 · 16	HD	HA

※ Please contact to us if other configurations are required.

■Dimensions

D × L (mm)

Cap. (µF)	Code	10 (1A)	16 (1C)	25 (1E)	50 (1H)
1	010				6.3×11
2.2	2R2				6.3×11
3.3	3R3			6.3×11	6.3×11
4.7	4R7			6.3×11	8×11.5
10	100		6.3×11	8×11.5	10×12.5
22	220	6.3×11	8×11.5	10×12.5	10×16
33	330	8×11.5	10×12.5	10×16	10×20
47	470	8×11.5	10×12.5	10×16	12.5×20
100	101	10×16	10×20	12.5×20	12.5×25
220	221	10×20	12.5×25	16×25	16×31.5
330	331	12.5×25	16×25	16×25	
470	471	12.5×25	16×25	16×31.5	

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

Eco-Products “GeoCap”

Nichicon promotes environmentally conscious practices.

Nichicon offers “GeoCap”,which has completely lead free terminals and contains no polyvinyl chloride in the sleeve.

■ Solid Tantalum Electrolytic Capacitors

Type・Classification		Series	Lead-Free Compliance	Anti Polyvinyl Chloride Compliance
Surface Mount type	Reisin-Molded type	F91, F92, F93, F97, F98	Complied	No polyvinyl chloride contained
	Conformal Coated type	F95, F72, F75		

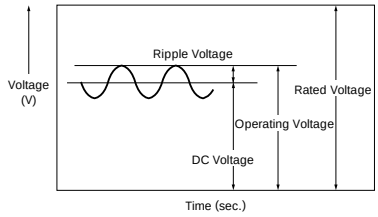
APPLICATION GUIDELINES FOR SOLID TANTALUM ELECTROLYTIC CAPACITORS

The schematics, graphs and numerical values that appear in our catalog are a representative sampling of typical usage. These will differ due to series, ratings and lot variation. Therefore, please contact your local Nichicon sales office to confirm the specific characteristics.

1. Rated Voltage and Operating Voltage

As shown in Fig.1, rated voltage signifies the maximum peak volatge applied to the capacitor at the maximum rated temperature. The rated voltage consists of the sum of both DC voltage and ripple peak voltage. It is recommended that capacitors be used at a voltage less than the rated voltage. (Reduce rated voltage should be applied at higher than 85°ctemperature)

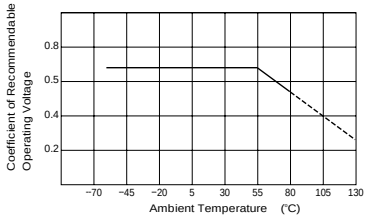
Fig. 1



It is also recommended to properly derate the voltage to improve operating reliability.

The NASA APPLICATION NOTE shown in Fig.2 is commonly used to consider the derated voltage.

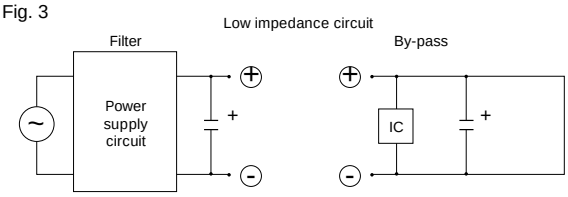
Fig. 2



2. Low Impedance Circuit

In low impedance circuit applications such as power supply circuits, the failure rate may increase due to inrush current. Additionally, if a short occurs within the capacitor, burning may possibly occur. Therefore, sufficient voltage derating (less than 1/2 to rated voltage) is recommended. If you need assistance, please contact your local Nichicon sales office.

Fig. 3



3. Operating Temperature

All parts must be used within the specified category temperature range, since, the temperature has a great effect on reliability. Therefore, when using capacitors, please try to keep the temperature as low as possible. Please take into consideration that the capacitor itself generates heat which affects the atmospheric temperature.

4. Ripple Capability

The ripple capability of solid tantalum electrolytic capacitors is defined by both Equivalent Series Resistance (ESR) and power dissipation due to ripple current.

If the capacitor sees a higher than specified amount of ripple current, heat generation within the capacitor will increase eventually causing a failure.

The capacitors should be used at a voltage less than the rated voltage that consists of the sum of both DC voltage and ripple peak voltage. Also, reverse voltage due to variation of ripple peak voltage should not be applied to the capacitor.

If you need detailed information about permissible ripple voltage and permissible ripple current, please contact your local Nichicon sales office.

5. Reverse Voltage

Solid tantalum electrolytic capacitors are polarized, and therefore, no reverse voltage is acceptable. (Electrical characteristics shall be deteriorated when reverse voltage is applied.) When checking a part using a tester, please make sure the polarity of the tester before the probes touch both capacitor terminals.

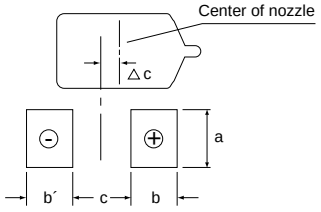
6. Low voltage application or High resistance connected to the capacitor in series
A problem could possibly result if the following application exixts:

Low voltage, high resistance conncected to the capacitor in series, and a circuit sensitive to leakage current. A problem could occur due to the lower recovery of the leakage current characteristic of tantalum capacitor, caused by heat stress during the soldering process.

7. Caution When Mounting

7-1. Recommemded mounting pad dimensions for chip type are as shown in Table 1 and Table –2. Dimensions may vary depending upon reflow conditions, type of solder and/or board size.

Fig. 4



[Cautions when mounting F72, F75 and F95 chip]

Adjustment of ΔC toward anode side is required when mounting, as there is a difference between the center of total length of anode tab (凸 portion) and the center of board land dimension.

Table-1

Case \ Type	F92 • F93 • F97 • F98			
	a	b	b´	c
M	0.65	0.5	0.5	0.6
J	0.8	1.0	1.0	0.8
P	1.1	1.3	1.3	0.8
A	1.4	2.0	2.0	1.2
B	2.7	2.1	2.1	1.4
C	2.6	2.5	2.5	2.8
N	2.8	2.8	2.8	4.3

Table-2 (mm)

Case \ Type	F95				
	a	b	b´	c	△c
P	1.4	0.6	0.5	0.7	+0.2
S	1.7	0.7	0.6	1.1	+0.2
A	1.8	0.7	0.6	1.1	+0.2
B	2.6	0.8	0.7	1.1	+0.2

In the case of F95 chip mounting, make the centering with the dimensions except anode tab (凸 portion) length.

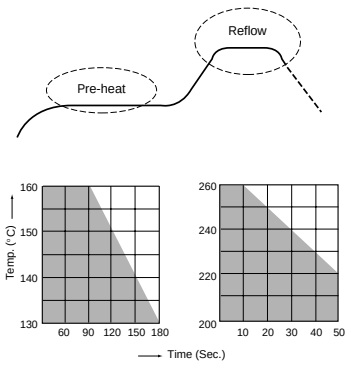
Table-3

Type	F72 • F75				
	a	b	b´	c	Δc
F72 R	5.8	1.2	1.2	3.9	0.5
F75 C	3.0	1.2	1.2	3.3	0.5
F75 D	4.1	1.2	1.2	3.9	0.5
F75 R	5.8	1.2	1.2	3.9	0.5

7-2. Soldering temperature and soldering time for chip type should be within limits as shown below when measured at terminal surface.
In case you repeat soldering process more than 1 time, please contact your local Nichicon sales office to get advice.
Board size, distribution of reflow's temperature and capacitor's
position on the circuit board will influence to reflow conditions. Please check real reflow condition before applying condition shown in Fig. 5.
In case you repeat soldering process more than 1 time, please contact your local Nichicon sales office to get advice.

• Reflow (Infrared Ray, Hot Plate, Hot Air, etc.)

Fig. 5



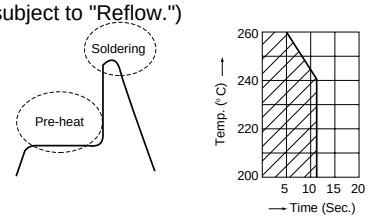
• Vapor Phase Soldering

30 sec. max. at 215˚C (Pre-heat is subject to "Reflow".)

・Flow (Dipping, Wave Soldering, etc.)

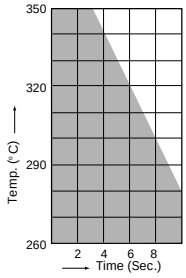
(Pre-heat is subject to "Reflow.")

Fig. 6



・Soldering-iron (30 watts or less)

Fig. 7



NOTE : Preheat is required to reduce heat shock regardless of the method of soldering. Preheat time for F72, F75 and F95 series should be as long as possible.

7-3. Cleaning

Please wash P.C. board as soon as possible after soldering process to eliminate flux, and acid and alkaline material.
In case of ultrasonic cleaning, attention should be paid to the following:

① Cleaning condition : Frequency=25~40kHz,
Power=10~20W/r, Time = within 3 minutes.
② Do not allow a circuit board to touch the agitator.
③ Do not stack circuit boards in the cleaning bath.

8.Cantions on designing

・When tantalum capacitor is used at high frequency circuit, please note that the electrical characteristics may change drastically.
・Leakage current value differs depending on the voltage applied.
Please use higher ratings, especially when it is used in the integration circuit or time-constant circuit.

9. Notes on Storage

・It is desirable to store capacitors at normal temperatures 35°C Max. and normal humidity.
・Keep out of direct sunlight.
・Don't apply force to capacitor's body and especially terminal.
・Don't apply shock and vibration by dropping etc.
・It is preferable to store for no more than 1 year under the above condition.
(when you use part that has been stored more than 1 year, please contact your local sales office to have assistance)

10. Disposal of capacitors

When disposing, scrap it as industrial wastes.

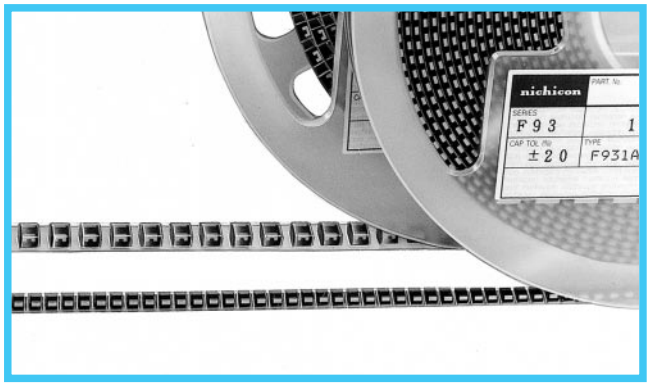
11. Others

① The above mentioned material is according to EIAJ RCR-2368B (revised in March 2002, titled "Guideline of notabilia for fixed tantalum electrolytic capacitors with solid electrolyte for use in electronic equipment"). Please refer to this book for details.
② Please refer to Nichicon individual technical material for further information of q and contents in this catalog.

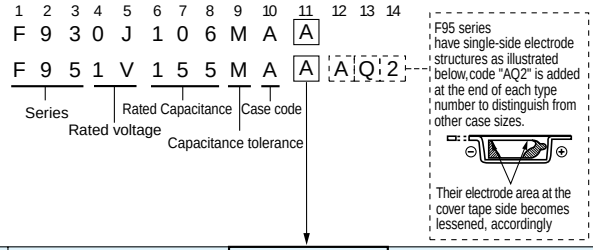
■The corelations among rated voltage, surge voltage at 85°C and derated voltage at 125°C are as shown.

Rated voltage (V)	2.5	4	6.3	10	16	20	25	35
85°C Surge voltage (V)	3.2	5.2	8	13	20	26	32	46
125°C Derated voltage (V)	1.6	2.5	4	6.3	10	13	16	22

Taping Specifications for Automatic Insertion (Chip Type Capacitors)



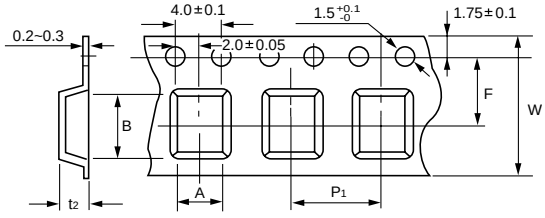
Type numbering system



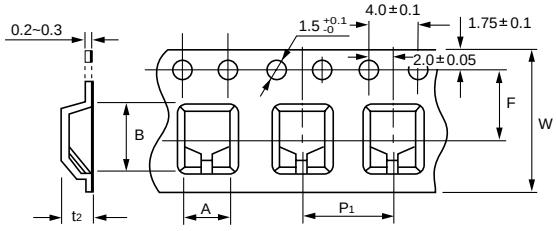
Tape Width (mm)	Polarity	Taping Code		Applicable Case Size		
		Reel Dia ϕ180 mm	Reel Dia ϕ330 mm	F91 F92・F93 F97・F98	F95	F72・F75
8	R (Anode is at opposite side of feeding holes.)	A	E	M・J・P・A・B	P・S・A・B	—
12	R (Anode is at opposite side of feeding holes.)	C	G	C・N	—	C・D・R

Carrier Tape Dimensions (mm)

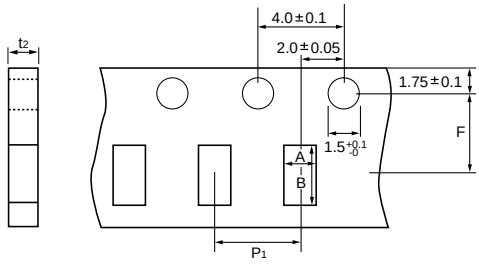
F91・F92・F93・F97



F95・F72・F75



F98



(mm)

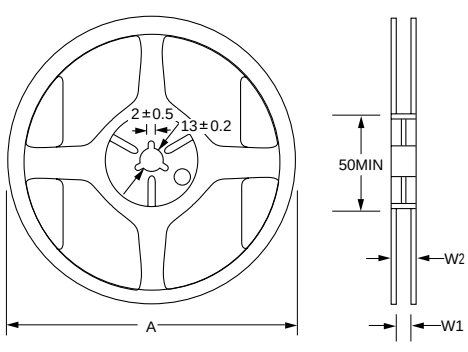
Type	Case code	W	A	B	F	P1	t2
F95	P	8.0±0.3	1.4±0.2	2.6±0.2	3.5±0.05	4.0±0.1	1.5MAX
	S		2.0±0.2	3.6±0.2			1.5MAX
	A		2.1±0.2	3.7±0.2			2.0MAX
	B		3.1±0.2				2.4MAX
F72	R	12.0±0.3	6.5±0.2	7.6±0.2	5.5±0.1	8.0±0.1	2.2MAX
F75	C		3.7±0.2				3.6MAX
	D		4.8±0.2	7.9±0.2			3.9MAX
	R		6.5±0.2	7.6±0.2			4.6MAX

(mm)

Case code	W	A	B	F	P1	t2
M	8.0±0.3	1.08±0.08	1.9±0.05	3.5±0.05	4.0±0.1	1.1MAX
J		1.0±0.1	1.8±0.1			(1.3MAX)
P	8.0±0.3	1.5±0.1	2.3±0.1	3.5±0.05	4.0±0.1	(1.7MAX)
A		1.9±0.1	3.5±0.1			2.1MAX (1.7)
B		3.3±0.1	3.8±0.1			2.4MAX (1.7)
C	12.0±0.3	3.6±0.1	6.0±0.1	5.5±0.05	8.0±0.1	2.9MAX
N		4.8±0.1	7.7±0.1			3.5MAX

Figures in ( ) at t2 are applicable to F92 series.

Reel Dimensions (mm)



(mm)

Item	Reel Diameter	
	ϕ180	ϕ330
A	ϕ180 +0 −3	ϕ330 ± 2

(mm)

Item	Tape width	
	8	12
W1	9.0 ± 0.3	13 ± 0.3
W2	11.4 ± 1.0	15.4 ± 1.0

Note: The above shows the dimensions of ϕ180 reel. In case of ϕ330 reel, the appearance shape is slightly different.

Standard Pakaging Quantity

Series	Case code	Q'ty (pcs./reel)	
		Reel Dia. ϕ180	Reel Dia. ϕ330
F98	M	4000	—
F92	J	4000	—
	P	3000	8000
	A	2500	8000
	B	2500	8000
F91 F93 F97	A	2000	8000
	B	2000	6000
	C	500	2500
	N	500	2500
F95	P	3000	10000
	S・A	2500	10000
	B	2000	8500
F72	R	1000	—
F75	C・D・R	500	—

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

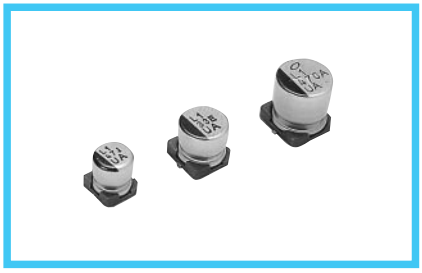
UA series

6mmL Chip Type, Long Life Assurance

For SMD | Long Life | Anti-Solvent Feature

- Chip type with load life of 3000~5000 hours at +105°C.
- Designed for surface mounting on high density PC board.

UT Long Life UA



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 1000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (µA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.13	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–55°C / Z+20°C	10	7	5	3	3	3

Endurance — After 3000 hours' (5000 hours for ϕ8, ϕ10) application of rated voltage at 105°C , capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

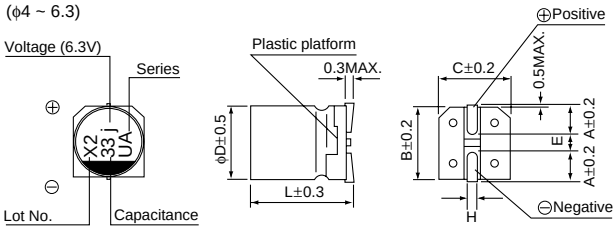
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

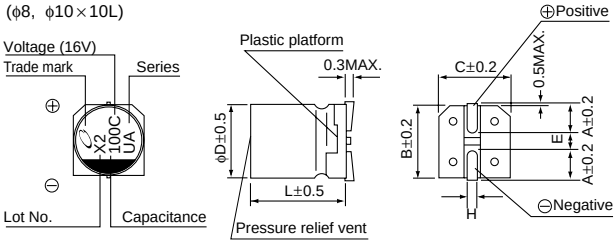
Marking — Black print on the case top.

■Chip Type

(ϕ4 ~ 6.3)



(ϕ8, ϕ10×10L)



Voltage

V	6.3	10	16	25	35	50
Code	j	A	C	E	V	H

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U A 1 C 1 0 0 M C R 1 G S

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (100µF)
- Rated voltage (1.6V)
- Series name
- Type

ϕD	Code
4 ~ 6.3	CR
8・10	NR

- The lead-free product is also available upon request. In this case, L will be put at 11th digit of type numbering system.

(mm)

	4×5.8	5×5.8	6.3×5.8	6.3×7.7	8×10	10×10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.8	5.8	5.8	7.7	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

● Dimension table in next page.

UA series

■Dimensions

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4×5.8	1
0.22	R22											4×5.8	2.6
0.33	R33											4×5.8	3.2
0.47	R47											4×5.8	5
1	010											4×5.8	8
2.2	2R2											4×5.8	12
3.3	3R3											4×5.8	17
4.7	4R7									4×5.8	16	5×5.8	22
10	100					4×5.8	18	5×5.8	27	5×5.8	27	6.3×5.8	32
22	220	4×5.8	22	5×5.8	30	5×5.8	30	6.3×5.8	44	6.3×5.8	44	6.3×7.7	58
33	330	5×5.8	35	5×5.8	35	6.3×5.8	48	6.3×5.8	50	6.3×7.7	57	8×10	140
47	470	5×5.8	38	6.3×5.8	50	6.3×5.8	50	6.3×7.7	63	8×10	92	8×10	170
100	101	6.3×5.8	69	6.3×7.7	81	6.3×7.7	81	8×10	116	10×10	151	10×10	310
220	221	6.3×7.7	120	8×10	141	10×10	216	10×10	320	10×10	375		
330	331	8×10	290	10×10	290	10×10	290	10×10	450				
470	471	10×10	320	10×10	320	10×10	320						Rated ripple
1000	102	10×10	410									Case size	

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UB

Chip Type, High Reliability

series

For SMD

- Chip type, high temperature range, for +125°C use.
- Applicable to automatic mounting machine using carrier tape.

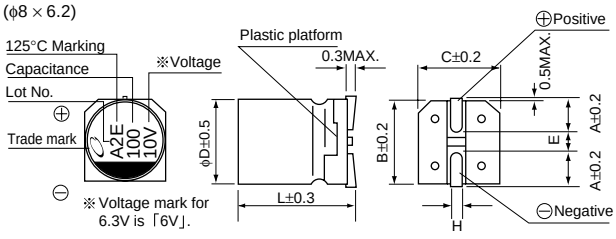
UB ← High Reliability UX

■Specifications

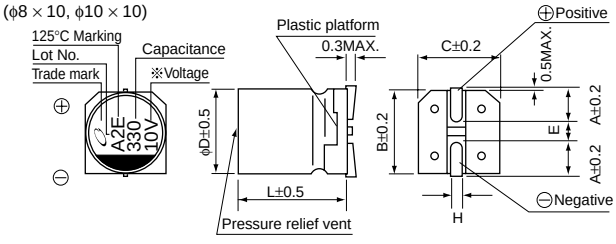
Item	Performance Characteristics
Category Temperature Range	–40 ~ +125°C
Rated Voltage Range	10 ~ 50V
Rated Capacitance Range	10 ~ 330μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4(μA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 10 / 16 / 25 / 35 / 50 tan δ (MAX.): 0.32 / 0.24 / 0.21 / 0.18 / 0.18
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 10 / 16 / 25 / 35 / 50 Impedance ratio ZT / Z20 (MAX.) Z–40°C / Z+20°C: 12 / 8 / 6 / 4 / 4
Endurance	After 2000 hours' (φ8 × 6.2 : 1000 hours) application of rated voltage at 125°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±30% of initial value tan δ: 300% or less of intial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: Initial specified value or less Leakage current: Initial specified value or less
Marking	Black print on the case top.

■Chip Type

(φ8 × 6.2)



(φ8 × 10, φ10 × 10)



(mm)

D×L	8×6.2	8×10	10×10
A	3.3	2.9	3.2
B	8.3	8.3	10.3
C	8.3	8.3	10.3
E	2.3	3.1	4.5
L	6.2	10	10
H	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

Type numbering system (Example : 10V 100μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U B 1 A 1 0 1 M C R 1 G S

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (100μF)
- Rated voltage (10V)
- Series name
- Type

D × L	Code
8 × 6.2	CR
8 × 10	NR
10 × 10	NR

- The lead-free product is also available upon request. In this case, L will be put at 11th digit of type numbering system.

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	10		16		25		35		50	
		1A		1C		1E		1V		1H	
10	100									8×6.2	24
22	220									8×6.2	38
33	330							8×6.2	44	8×10	46
47	470					8×6.2	48	8×10	52	10×10	58
100	101	8×6.2	58	8×10	66	8×10	74	10×10	80		
220	221	8×10	90	10×10	102	10×10	116				Rated ripple
330	331	10×10	112							Case size	

Rated Ripple (mA rms) at 125°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

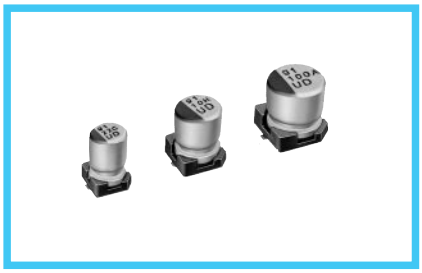
UD

Chip Type, Low Impedance

series

For SMD | Low Impedance | Anti-Solvent Feature

- Chip type, low impedance temperature range up to +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.



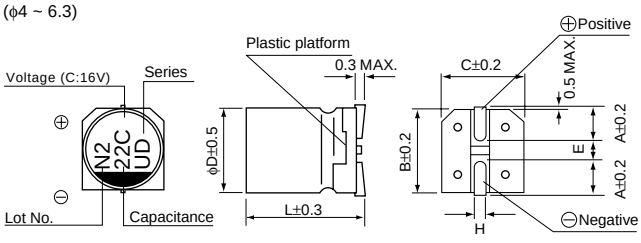
UD ← Low Impedance WG

■Specifications

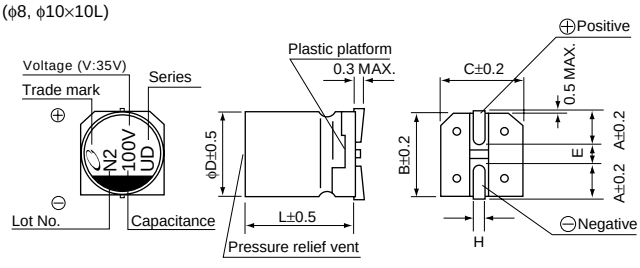
Item	Performance Characteristics
Category Temperature Range	−55 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	1 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 tan δ (MAX.): 0.26 (0.28) / 0.20 (0.24) / 0.16 (0.20) / 0.14 (0.16) / 0.12 (0.14) / 0.12 (0.14) ( ) is φ8 over
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 Impedance ratio ZT / Z20 (MAX.) Z−25°C / Z+20°C: 3 / 2 / 2 / 2 / 2 / 2 Impedance ratio ZT / Z20 (MAX.) Z−55°C / Z+20°C: 5 / 4 / 4 / 3 / 3 / 3
Endurance	After 5000 hours' (2000 hours for φD≦6.3) application of rated voltage at 105°C , capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±30% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: Initial specified value or less Leakage current: Initial specified value or less
Marking	Black print on the case top.

■Chip Type

(φ4 ~ 6.3)



(φ8, φ10×10L)

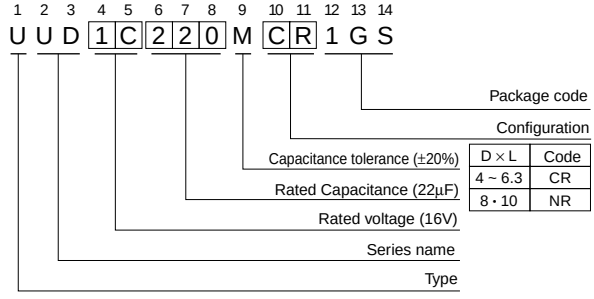


Voltage

V	6.3	10	16	25	35	50
Code	j	A	C	E	V	H

● Dimension table in next page.

Type numbering system (Example : 16V 22μF)



D × L	Code
4 ~ 6.3	CR
8・10	NR

- The lead-free product is also available upon request. In this case, L will be put at 11th digit of type numbering system.

(mm)

	4 × 5.8	5 × 5.8	6.3 × 5.8	6.3 × 7.7	8 × 10	10 × 10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.8	5.8	5.8	7.7	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

UD series

■Dimensions

Cap. (μF) \ V	Code	6.3			10			16			25			35			50		
		0J			1A			1C			1E			1V			1H		
1	010																4×5.8	5.00	30
2.2	2R2																4×5.8	5.00	30
3.3	3R3																4×5.8	5.00	30
4.7	4R7													4×5.8	1.80	80	5×5.8	1.52	85
10	100										4×5.8	1.80	80	5×5.8	0.76	150	6.3×5.8	0.88	165
15	150							4×5.8	1.80	80	5×5.8	0.76	150	5×5.8	0.76	150	6.3×5.8	0.88	165
22	220				4×5.8	1.80	80	5×5.8	0.76	150	5×5.8	0.76	150	5×5.8	0.76	150	6.3×5.8	0.88	165
27	270	4×5.8	1.80	80	5×5.8	0.76	150	5×5.8	0.76	150	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.68	185
33	330	5×5.8	0.76	150	5×5.8	0.76	150	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.68	185
47	470	5×5.8	0.76	150	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.68	185
56	560	5×5.8	0.76	150	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.34	300
68	680	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.34	300
100	101	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.34	300
150	151	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.17	450	10×10	0.18	670
220	221	6.3×5.8	0.44	230	6.3×7.7	0.34	280	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.17	450	10×10	0.18	670
330	331	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.17	450	8×10	0.17	450	10×10	0.09	670			
470	471	8×10	0.17	450	8×10	0.17	450	8×10	0.17	450	10×10	0.09	670						
680	681	8×10	0.17	450	10×10	0.09	670	10×10	0.09	670									
1000	102	8×10	0.17	450	10×10	0.09	670										Case size	Impedance	Rated ripple
1500	152	10×10	0.09	670															

Max. impedance (Ω) at 20°C 100kHz, Rated Ripple (mA rms) at 105°C 100kHz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.35	0.50	0.64	0.83	1.00

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UG series

Chip Type, Higher Capacitance Range

For SMD

Anti-Solvent Feature (Through 100V only)

- Chip Type, higher capacitance in larger case sizes (φ12.5, φ16, φ18, φ20)
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape and tray.

UJ
High Temperature
UG

■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	4.7 ~ 10000μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
—	After 1 minutes' application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	I = 0.04CV+100 (μA) max.(1 minute's)

tan δ

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	400・450	120Hz 20°C
tan δ (MAX)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25	

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.

Stability at Low Temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160 ~ 250	400・450	120Hz
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	5	4	3	2	2	2	2	2	3	6	
	Z−40°C / Z+20°C	12	10	8	5	4	3	3	3	6	10	

Endurance

After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Leakage current	Initial specified value or less
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value

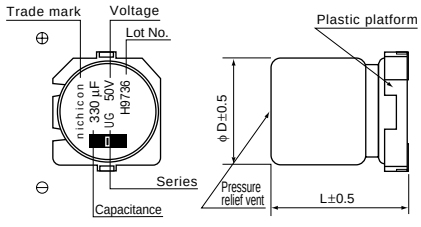
Shelf Life

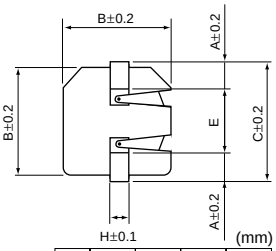
After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Black print on the case top.

■Chip Type





(mm)

φD	12.5	16	18	20
A	4.0	4.5	5.0	5.0
B	13.6	17.1	19.1	21.1
C	16.0	19.5	21.5	23.5
E	8.0	10.5	11.5	13.5
H	2.5	3.75	3.75	3.75

Type numbering system (Example : 50V 330μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	G	1	H	3	3	1	M	N	R	1		

- Package code: Taping MS; Tray ZD
- Configuration: φD 12.5 ~ 18 Code NR; 20 Code RR
- Capacitance Tolerance (±20%)
- Rated Capacitance (330μF)
- Rated voltage (50V)
- Series name
- Type

■Dimensions

D × L (mm)

(μF) Cap. \ V / Code	6.3 0J		10 1A		16 1C		25 1E		35 1V		50 1H	
220 / 221											12.5 × 13.5	450
330 / 331											12.5 × 13.5	520
470 / 471							12.5 × 13.5	550	12.5 × 13.5	580	● 16 × 16.5	740
1000 / 102			12.5 × 13.5	620	12.5 × 13.5	710	12.5 × 16	820	● 16 × 16.5	1000	18 × 21.5	1150
2200 / 222	12.5 × 16	890	12.5 × 16	960	● 16 × 16.5	1150	△ 18 × 16.5	1350	18 × 21.5	1550		
3300 / 332	● 16 × 16.5	1200	16 × 16.5	1300	△ 18 × 16.5	1450	18 × 21.5	1700				
4700 / 472	16 × 16.5	1400	△ 18 × 16.5	1500	18 × 21.5	1750						
6800 / 682	△ 18 × 16.5	1650	18 × 21.5	1850								
10000 / 103	18 × 21.5	2000	20 × 21.5	2200								

(μF) Cap. \ V / Code	63 1J		100 2A		160 2C		200 2D		250 2E		400 2G		450 2W	
4.7 / 4R7											12.5 × 13.5	115	12.5 × 13.5	115
10 / 100									12.5 × 13.5	150	● 16 × 16.5	140	● 16 × 16.5	140
22 / 220							12.5 × 13.5	235	12.5 × 16	240	△ 18 × 16.5	280	16 × 21.5	275
33 / 330							12.5 × 16	310	● 16 × 16.5	340	18 × 21.5	350	18 × 21.5	345
47 / 470					12.5 × 16	370	● 16 × 16.5	415	△ 18 × 16.5	415	20 × 21.5	430		
68 / 680			12.5 × 13.5	350	● 16 × 16.5	500	△ 18 × 16.5	505	★ 18 × 21.5	490				
100 / 101	12.5 × 13.5	370	12.5 × 16	440	△ 18 × 16.5	590	18 × 21.5	590						
220 / 221	12.6 × 16	580	△ 18 × 16.5	665										
330 / 331	● 16 × 16.5	680	18 × 21.5	825									Case size	Rated Ripple
470 / 471	△ 18 × 16.5	850												

Size φ12.5×21 is available for capacitors marked,"●". Size φ16×21.5L is available for capacitors marked,"△". Size φ20×16.5L is available for capacitors marks," ★ ".

※ In this case, 6 will be put at 12th digit of type numbering system.

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
6.3 ~ 100	~ 68	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 10000	0.85	1.00	1.10	1.13	1.15
160 ~ 450	4.7 ~ 100	0.80	1.00	1.25	1.40	1.60

●Taping Specifications are given in page 22.
Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UH series

Chip Type, High Reliability, Higher Capacitance Range

For SMD | Long Life | Anti-Solvent Feature

- Chip Type, higher capacitance in larger case sizes (φ12.5, φ16, φ18, φ20)
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape and tray.

UH ← High Reliability → UJ

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +125°C
Rated Voltage Range	10 ~ 50V
Rated Capacitance Range	100 ~ 3300μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minutes' application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.

tan δ

Rated voltage (V)	10	16	25	35	50	120Hz 20°C
tan δ (MAX)	0.22	0.18	0.16	0.14	0.12	

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.

Stability at Low Temperature

Rated voltage (V)		10	16	25	35	50	120Hz
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	
	Z–40°C / Z+20°C	8	6	4	3	3	

Endurance

After 5000 hours' application of rated voltage at 125°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

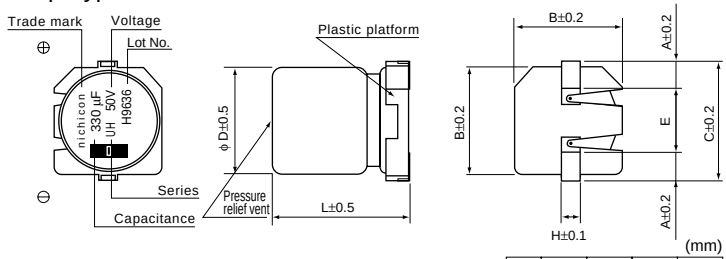
Shelf Life

After leaving capacitors under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Black print on the case top.

■Chip Type



(mm)

φD	12.5	16	18	20
A	4.0	4.5	5.0	5.0
B	13.6	17.1	19.1	21.1
C	16.0	19.5	21.5	23.5
E	8.0	10.5	11.5	13.5
H	2.5	3.75	3.75	3.75

Type numbering system (Example : 50V 330μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U H 1 H 3 3 1 M N R 1 □ □

- Type: U
- Series name: U
- Rated voltage (50V): H
- Rated Capacitance (330μF): 331
- Capacitance Tolerance (± 20%): M
- Configuration: N R
- Package code: 1 □ □

Taping	MS
Tray	ZD

φD	Code
12.5~18	NR
20	RR

■Dimensions

D × L (mm)

(μF) Cap. \ V	Code	10		16		25		35		50	
		1A		1C		1E		1V		1H	
100	101									12.5 × 13.5	170
220	221							12.5 × 13.5	200	16 × 16.5	250
330	331			12.5 × 13.5	210	12.5 × 13.5	230	16 × 16.5	280	16 × 21.5	340
										▲ 18 × 16.5	340
470	471	12.5 × 13.5	230	12.5 × 13.5	250	16 × 16.5	310	18 × 16.5	380	18 × 21.5	430
								▲ 16 × 21.5	380		
1000	102	12.5 × 16	350	16 × 16.5	440	18 × 21.5	540	20 × 21.5	610		
						▲ 20 × 16.5	540				
2200	222	18 × 16.5	620	18 × 21.5	710						
		▲ 16 × 21.5	620								
3300	332	18 × 21.5	770								

Case size | Rated Ripple

※ In this case, 6 will be put at 12th digit of type numbering system, "▲"

Rated Ripple (mA rms) at 125°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 3300	0.85	1.00	1.10	1.13	1.15

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UJ series

Chip Type, Higher Capacitance Range

For SMD | Long Life | Anti-Solvent Feature (Through 100V only)

- Chip Type, higher capacitance in larger case sizes (φ12.5, φ16, φ18, φ20)
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape and tray.

UN ← Bi-Polarized | **UJ** | High Reliability → UH

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105°C (6.3 ~ 100V), −40 ~ +105°C (160 ~ 450V)
Rated Voltage Range	6.3~450V
Rated Capacitance Range	3.3~6800μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160~450
—	After 1 minutes' application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	I = 0.04CV+100 (μA) max.(1 minute's)

tan δ

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	400・450	120Hz 20°C
tan δ (MAX)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.15	0.20	

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.

Stability at Low Temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160 ~ 250	400・450	120Hz
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	5	4	3	2	2	2	2	2	3	6	
	Z−40°C / Z+20°C	10	8	6	4	3	3	3	3	6	10	

Endurance

After 5000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Leakage current	Initial specified value or less
Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value

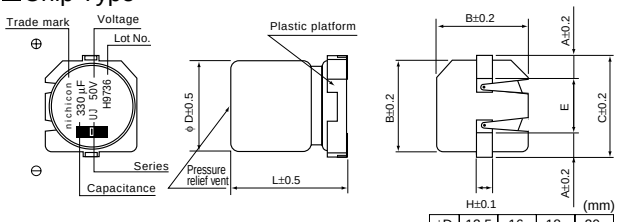
Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Black print on the case top.

■Chip Type



(mm)

φD	12.5	16	18	20
A	4.0	4.5	5.0	5.0
B	13.6	17.1	19.1	21.1
C	16.0	19.5	21.5	23.5
E	8.0	10.5	11.5	13.5
H	2.5	3.75	3.75	3.75

Type numbering system (Example : 50V 330μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U J 1 H 3 3 1 M N R 1 ☐ ☐

- Type
- Series name
- Rated voltage (50V)
- Rated Capacitance (330μF)
- Capacitance Tolerance (±20%)
- Configuration

φD	Code
12.5 ~ 18	NR
20	RR

- Package code

Taping	MS
Tray	ZD

■Dimensions

D × L (mm)

(μF) Cap.	Code	6.3 (0J)		10 (1A)		16 (1C)		25 (1E)		35 (1V)		50 (1H)	
220	221									12.5 × 13.5	280	12.5 × 16	320
330	331							12.5 × 13.5	320	12.5 × 16	360	● 16 × 16.5	440
470	471					12.5 × 13.5	360	12.5 × 16	400	● 16 × 16.5	490	△ 18 × 16.5	550
1000	102	12.5 × 13.5	440	12.5 × 16	500	● 16 × 16.5	630	△ 18 × 16.5	700	△ 18 × 16.5	750	18 × 21.5	820
2200	222	● 16 × 16.5	750	● 16 × 16.5	810	△ 18 × 16.5	930	18 × 21.5	1050	20 × 21.5	1150		
3300	332	△ 18 × 16.5	930	△ 18 × 16.5	1000	18 × 21.5	1150						
4700	472	★ 18 × 21.5	1100	18 × 21.5	1200								
6800	682	20 × 21.5	1350	20 × 21.5	1450								

(μF) Cap.	Code	63 (1J)		100 (2A)		160 (2C)		200 (2D)		250 (2E)		400 (2G)		450 (2W)	
3.3	3R3													12.5 × 13.5	40
4.7	4R7									12.5 × 13.5	65	12.5 × 16	50	12.5 × 16	50
10	100							12.5 × 13.5	80	12.5 × 16	105	16 × 16.5	85	16 × 16.5	85
22	220							12.5 × 16	105	● 16 × 16.5	180	18 × 21.5	130	18 × 21.5	130
33	330					12.5 × 13.5	95	● 16 × 16.5	220	△ 18 × 16.5	230	20 × 21.5	160	20 × 21.5	160
47	470			12.5 × 13.5	160	● 16 × 16.5	260	△ 18 × 16.5	270	★ 18 × 21.5	280				
68	680	12.5 × 13.5	175	12.5 × 16	205	△ 18 × 16.5	320	★ 18 × 21.5	330	20 × 21.5	340				
100	101	12.5 × 16	225	●16 × 16.5	285	★ 16 × 21.5	380	20 × 21.5	410						
220	221	●16 × 16.5	385	△18 × 16.5	440										
330	331	△18 × 16.5	490	20 × 21.5	500									Case size	Rated Ripple
470	471	18 × 21.5	590												

Size φ12.5 × 21 is available for capacitors marked,"●". Size φ16 × 21.5L is available for capacitors marked,"△". Size φ20 × 16.5L is available for capacitors marks," ★ ".

※ In this case, 6 will be put at 12th digit of type numbering system.

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

V	Cap. (μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
6.3 ~ 100	~ 68	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 6800	0.85	1.00	1.10	1.13	1.15
160 ~ 450	3.3 ~ 100	0.80	1.00	1.25	1.40	1.60

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

nichicon MUSE **UK** series

6mmL Chip Type, For Audio Equipment

For SMD | For Audio Use | Anti-Solvent Feature

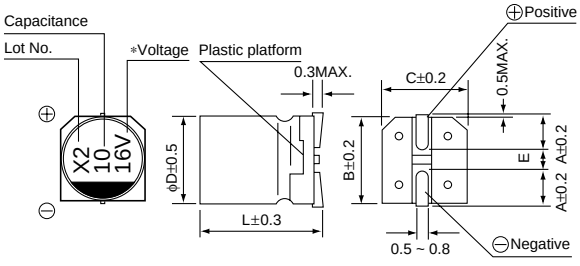
- Chip type "nichicon MUSE" acoustic series.
- Applicable to automatic insertion machine using carrier tape.

MC
Chip
UK

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (µA) ,whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 4 / 6.3 / 10 / 16 / 25 / 35 / 50 tan δ (MAX.): 0.35 / 0.26 / 0.20 / 0.16 / 0.14 / 0.12 / 0.12
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 4 / 6.3 / 10 / 16 / 25 / 35 / 50 Impedance ratio ZT / Z20 (MAX.) Z–25°C / Z+20°C: 7 / 4 / 3 / 2 / 2 / 2 / 2 Impedance ratio ZT / Z20 (MAX.) Z–40°C / Z+20°C: 15 / 8 / 8 / 4 / 4 / 3 / 3
Endurance	After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristics requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 200% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristics requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: Initial specified value or less Leakage current: Initial specified value or less
Marking	Black print on the case top.

■Chip Type



*Voltage mark for 6.3V is 「6V」.

(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2
L	5.8	5.8	5.8

Type numbering system (Example : 16V 10µF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	K	1	C	1	0	0	M	C	U	1	G	S

- Taping code
- Configuration
- Rated Capacitance tolerance (±20%)
- Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

※ Please contact to us if Eco-Products are required.

■Dimensions

Cap.(µF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.0
0.33	R33													4	2.8
0.47	R47													4	4.0
1	010													4	8.4
2.2	2R2													4	13
3.3	3R3													4	17
4.7	4R7									4	16	4	18	5	20
10	100							4	23	5	27	5	29	6.3	33
22	220			4	28	5	33	5	37	6.3	42	6.3	46		
33	330	4	28	5	37	5	41	6.3	49	6.3	52				
47	470	4	33	5	45	6.3	52	6.3	58						
100	101	5	56	6.3	70										
220	221	6.3	96											Case size	Rated ripple

Rated Ripple(mA rms)at 85°C 120Hz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

- Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UN series

Chip Type, Bi-Polarized, Higher Capacitance Range

For SMD | Bi-polarized | Anti-Solvent Feature

- Chip Type, higher capacitance in larger case sizes (φ12.5, φ16, φ18, φ20)
- Designed for surface mounting on high density PC board.
- Bi-polarized series for operations over wide temperature range of –55 ~ +105°C.
- Applicable to automatic mounting machine using carrier tape and tray.

UN ← Bi-polarized UJ

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	22 ~ 3300μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minutes' application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.

tan δ

Rated voltage (V)	6.3	10	16	25	35	50	63	100	120Hz
tan δ (MAX)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.09	20°C

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.

Stability at Low Temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100	120Hz
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	5	4	3	2	2	2	2	2	
	Z–40°C / Z+20°C	10	8	6	4	3	3	3	3	

Endurance

After 2000 hours' application of rated voltage at 105°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

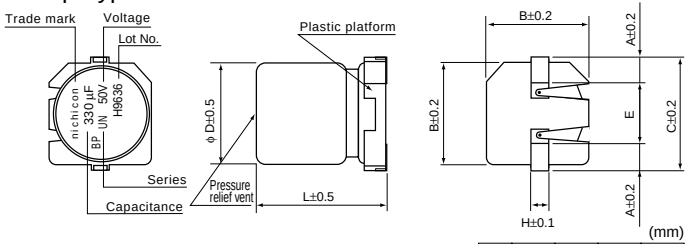
Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Black print on the case top.

■Chip Type



(mm)

φD	12.5	16	18	20
A	4.0	4.5	5.0	5.0
B	13.6	17.1	19.1	21.1
C	16.0	19.5	21.5	23.5
E	8.0	10.5	11.5	13.5
H	2.5	3.75	3.75	3.75

Type numbering system (Example : 50V 330μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U N 1 H 3 3 1 M N R 1 □ □

- Type
- Series name
- Rated voltage (50V)
- Rated Capacitance (330μF)
- Capacitance Tolerance (±20%)
- Configuration

φD	Code
12.5 ~ 18	NR
20	RR

- Package code

Taping	MS
Tray	ZD

■Dimensions

D × L (mm)

(μF) Cap. \ V	Code	6.3	10	16	25	35	50	63	100
		0J	1A	1C	1E	1V	1H	1J	2A
22	220								12.5 × 13.5 100
33	330								12.5 × 16 150
47	470						12.5 × 13.5 130	12.5 × 13.5 140	16 × 16.5 180
100	101					12.5 × 13.5 180	12.5 × 16 230	16 × 16.5 270	18 × 21.5 310
220	221				12.5 × 13.5 270	16 × 16.5 330	18 × 16.5 400 ▲ 16 × 21.5 400	18 × 21.5 440	
330	331			12.5 × 13.5 310	16 × 16.5 370	18 × 16.5 450 ▲ 16 × 21.5 450	18 × 21.5 540	20 × 21.5 590	
470	471	12.5 × 13.5 270	12.5 × 13.5 340	16 × 16.5 420	16 × 16.5 490	18 × 21.5 590	20 × 21.5 640		
1000	102	12.5 × 16 500	16 × 16.5 600	18 × 16.5 670 ▲ 16 × 21.5 670	18 × 21.5 780				
2200	222	18 × 16.5 740 ▲ 16 × 21.5 740	18 × 21.5 830						
3300	332	18 × 21.5 920							Case size / Rated Ripple

※ In this case, 6 will be put at 12th digit of type numbering system, "▲"

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 3300	0.85	1.00	1.10	1.13	1.15

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

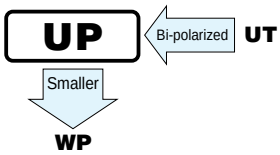
UP

6mmL Chip Type, Bi-Polarized

series

For SMD | Bi-polarized | Anti-Solvent Feature

- Chip type, bi-polarized withstanding high temperature range up to +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 47μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05 CV or 10 (μA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.17	0.17	0.15	0.15

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

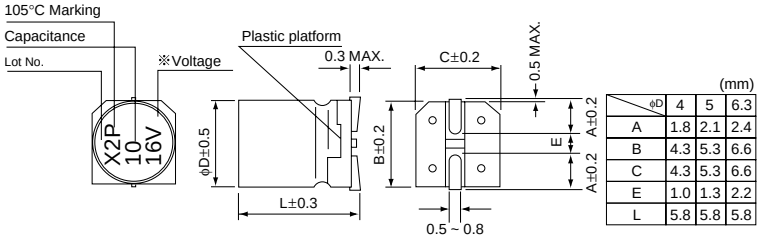
Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2
L	5.8	5.8	5.8

※Voltage mark for 6.3V is「6V」

Type numbering system (Example : 16V 10μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U P 1 C 1 0 0 M C R 1 G S

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10μF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	1.0
0.22	R22											4	2.0
0.33	R33											4	2.8
0.47	R47											4	4.0
1	010											4	8.4
2.2	2R2									4	8.4	5	13
3.3	3R3							5	12	5	16	5	17
4.7	4R7					4	12	5	16	5	18	6.3	20
10	100			4	17	5	23	6.3	27	6.3	29		
22	220	5	28	6.3	33	6.3	37						
33	330	6.3	37	6.3	41	6.3	49						Rated ripple
47	470	6.3	45									Case size	

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UR series

Chip Type, High CV

For SMD | Smaller | Anti-Solvent Feature

- Chip type, higher capacitance in larger case sizes.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

WX
Higher C/V
UR

■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C
Rated Voltage Range	4 ~ 100V
Rated Capacitance Range	3.3 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV (μA) .

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.35	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.12

Stability at Low Temperature — Measurement frequency: 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	7	5	4	3	2	2	2	2	2
	Z−40°C / Z+20°C	15	10	8	6	4	3	3	3	3

Endurance — After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

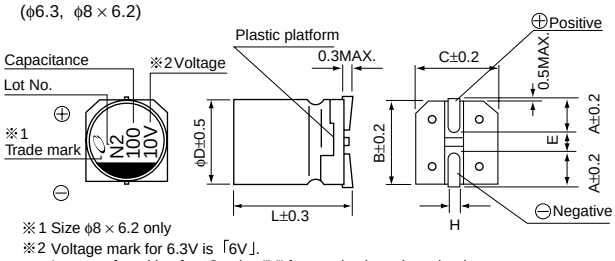
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C, for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

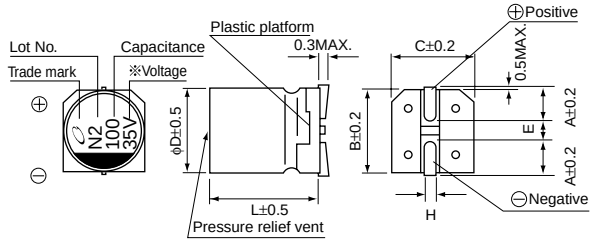
■Chip Type

(φ6.3, φ8 × 6.2)



※1 Size φ8 × 6.2 only
※2 Voltage mark for 6.3V is 「6V」.
In case of marking for φ3 units, "V" for rated voltage is omitted.

(φ8 × 10, φ10 × 10)



Type numbering system (Example : 10V 100μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	R	1	A	1	0	1	M	C	R	1	G	S

- Package code
- Case dia. code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (100μF)
- Rated voltage (10V)
- Series name
- Type

D × L	Code
6.3 × 5.8	CR
6.3 × 7.7	CR
8 × 6.2	BR
8 × 10	NR
10 × 10	NR

- The lead-free product is also available upon request.
  In this case, L will be put at 11th digit of type numbering system.
  Size φ8 × 6.2, CL will be put at 10th and 11th digit of type numbering system.

(mm)

D × L	6.3 × 5.8	6.3 × 7.7	8 × 6.2	8 × 10	10 × 10
A	2.4	2.4	3.3	2.9	3.2
B	6.6	6.6	8.3	8.3	10.3
C	6.6	6.6	8.3	8.3	10.3
E	2.2	2.2	2.3	3.1	4.5
L	5.8	7.7	6.2	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

● Dimension table in next page.

UR series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50		63		100	
		0G		0J		1A		1C		1E		1V		1H		1J		2A	
3.3	3R3																	6.3×5.8	29
4.7	4R7															6.3×5.8	31	● 8×6.2	40 (35)
10	100															8×6.2	46	8×10	77
22	220													6.3×5.8	45	8×10	96	8×10	100
33	330											6.3×5.8	55	○ 8×6.2	95 (94)	8×10	117	10×10	130
47	470									6.3×5.8	65	● 8×6.2	105 (94)	○ 8×10	140 (105)	8×10	140	10×10	155
100	101					6.3×5.8	70	8×6.2	125	○ 8×6.2	145 (143)	○ 8×10	175 (132)	■10×10	195 (181)	10×10	232		
150	151					6.3×5.8	85	6.3×7.7	151	8×10	192	8×10	214	10×10	238				
220	221			● 8×6.2	160 (143)	○ 8×6.2	175 (173)	○ 8×10	215 (162)	■10×10	250 (232)	■10×10	265 (246)	10×10	289				
330	331	6.3×5.8	152	○ 8×6.2	190 (188)	8×10	240	8×10	270	■10×10	305 (284)	10×10	324						
470	471	6.3×7.7	200	8×10	265	8×10	290	■10×10	330 (307)	10×10	393								
680	681	8×10	284	8×10	318	10×10	374	10×10	396										
1000	102	8×10	344	■10×10	400 (372)	10×10	454											Case size	Rated ripple
1500	152	10×10	347	10×10	489														

Rated Ripple (mA rms) at 85°C 120Hz

Size φ6.3 × 5.8 is available for capacitors marked. "●"
Size φ6.3 × 7.7 is available for capacitors marked. "○"
Size φ8 × 10 is available for capacitors marked. "■"
※ In this case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
~ 47	0.80	1.00	1.15	1.40	1.67
100 ~ 1500	0.85	1.00	1.08	1.20	1.30

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UT series

6mmL Chip Type, Wide Temperature Range

For SMD Anti-Solvent Feature

- Chip type with load life 2000 hours at +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 ~ +105°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 100μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA) , whichever is greater.

tan δ — Measurement frequency :120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.37	0.28	0.24	0.20	0.16	0.13	0.12

Stability at Low Temperature — Measurement frequency :120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	6	3	3	2	2	2	2
	Z−40°C / Z+20°C	12	8	5	4	3	3	3

Endurance — After 2000 hours' application of rated voltage at 105°C , capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value (16V or less) Within ±20% of initial value (25V or more)
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

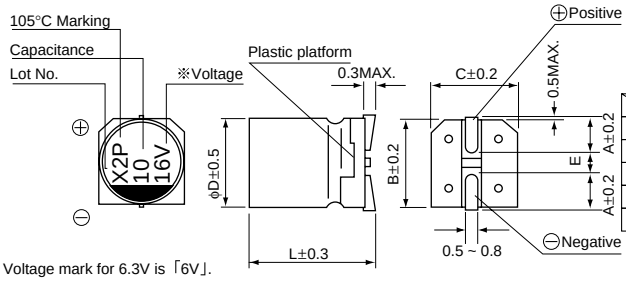
Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2
L	5.8	5.8	5.8

※Voltage mark for 6.3V is「6V」.

Type numbering system (Example : 16V 10μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U T 1 C 1 0 0 M C R 1 G S

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10μF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap.(μF)	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.6
0.33	R33													4	3.2
0.47	R47													4	3.8
1	010													4	6.2
2.2	2R2													4	11
3.3	3R3													4	14
4.7	4R7									4	13	4	15	5	19
10	100							4	18	5	23	5	25	6.3	30
22	220	4	22	4	22	5	27	5	30	6.3	38	6.3	42		
33	330	5	30	5	30	5	35	6.3	40	6.3	48				
47	470	5	36	5	36	6.3	46	6.3	50						
100	101	6.3	60	6.3	60	6.3	60							Case size	Rated ripple

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UU Chip Type, Extremely Low Impedance series

For SMD | Low Impedance | Anti-Solvent Feature

- Chip type, extremely low impedance temperature range up to +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

UU ← Low Impedance UD

■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +105°C
Rated Voltage Range	4 ~ 35V
Rated Capacitance Range	4.7 ~ 470μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35
tan δ (MAX.)	0.18	0.15	0.13	0.12	0.10	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35
Impedance ratio ZT / Z20 (MAX.)	Z−40°C / Z+20°C	3	3	3	3	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C , capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

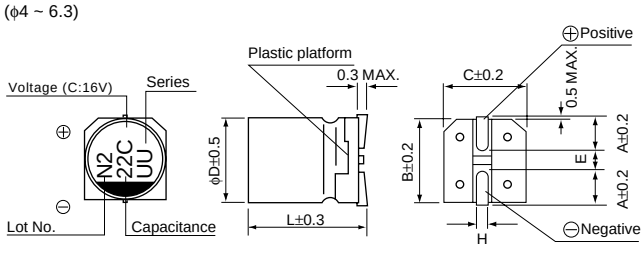
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

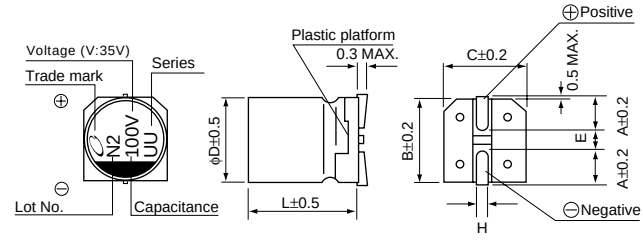
Marking	Black print on the case top.

■Chip Type

(φ4 ~ 6.3)



(φ8)



Voltage

V	4	6.3	10	16	25	35
Code	g	j	A	C	E	V

● Dimension table in next page.

Type numbering system (Example : 16V 22μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	U	1	C	2	2	0	M	C	R	1	G	S

- Package code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (22μF)
- Rated voltage (16V)
- Series name
- Type

D × L	Code
4 ~ 6.3	CR
8	NR

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

(mm)

	4 × 6.8	5 × 6.8	6.3 × 6.8	8 × 12
A	1.8	2.1	2.4	2.9
B	4.3	5.3	6.6	8.3
C	4.3	5.3	6.6	8.3
E	1.0	1.3	2.2	3.1
L	6.8	6.8	6.8	12
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1

UU series

■Dimensions

Cap. (μF) \ V	Code	4			6.3			10			16			25			35		
		0G			0J			1A			1C			1E			1V		
4.7	4R7																4×6.8	0.85	60
6.8	6R8													4×6.8	0.79	60			
8.2	8R2																5×6.8	0.46	95
10	100										4×6.8	0.72	60	4×6.8	0.79	60			
15	150							4×6.8	0.70	60				5×6.8	0.39	95			
18	180																6.3×6.8	0.25	140
22	220				4×6.8	0.68	60	5×6.8	0.36	95	5×6.8	0.38	95	6.3×6.8	0.22	140			
27	270										6.3×6.8	0.21	140	6.3×6.8	0.22	140			
33	330				5×6.8	0.36	95	5×6.8	0.36	95				6.3×6.8	0.22	140			
39	390										6.3×6.8	0.21	140						
47	470				5×6.8	0.36	95	6.3×6.8	0.21	140	6.3×6.8	0.21	140	8×12	0.057	450			
56	560				6.3×6.8	0.20	140	6.3×6.8	0.21	140	8×12	0.055	450	8×12	0.057	450			
68	680													8×12	0.057	450			
82	820	6.3×6.8	0.20	140	6.3×6.8	0.20	140	8×12	0.054	450	8×12	0.055	450	8×12	0.057	450	8×12	0.058	450
100	101	6.3×6.8	0.20	140	6.3×6.8	0.20	140	8×12	0.054	450	8×12	0.055	450						
120	121				8×12	0.053	450	8×12	0.054	450	8×12	0.055	450	8×12	0.057	450			
150	151	8×12	0.053	450	8×12	0.053	450	8×12	0.054	450	8×12	0.055	450						
180	181							8×12	0.054	450									
220	221	8×12	0.053	450	8×12	0.053	450												
270	271							8×12	0.054	450									
330	331	8×12	0.053	450	8×12	0.053	450	8×12	0.054	450									
390	391				8×12	0.053	450										Case size	Impedance	Rated ripple
470	471	8×12	0.053	450	8×12	0.053	450												

Max. impedance (Ω) at 20°C 100kHz
Rated Ripple (mA rms) at 105°C 100kHz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.35	0.50	0.64	0.83	1.00

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UV series

6mmL Chip Type, Long Life Assurance

For SMD Long Life

- Chip type with load life of 5000 hours at +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic insertion machine using carrier tape.

UT → Long Life → UV

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 100μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA) , whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.37	0.28	0.24	0.20	0.16	0.13	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	8	4	3	2	2	2	2
	Z–40°C / Z+20°C	14	10	7	5	3	3	3

Endurance — After 5000 hours' application of rated voltage at 105°C , capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

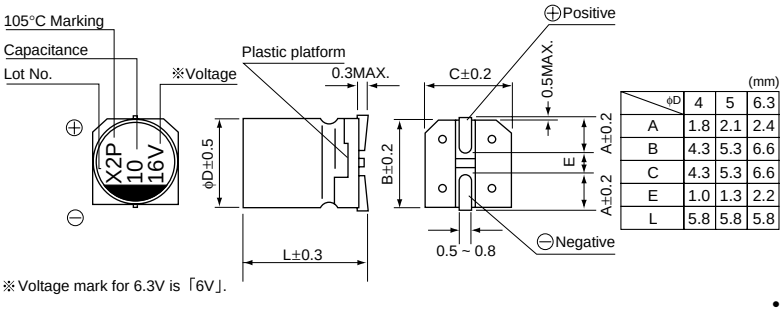
Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2
L	5.8	5.8	5.8

※Voltage mark for 6.3V is「6V」.

Type numbering system (Example : 16V 10μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U U V 1 C 1 0 0 M F R 1 G S

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10μF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, CL will be put at 10th and 11th digit of type numbering system.

■Dimensions

Cap.(μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.6
0.33	R33													4	3.2
0.47	R47													4	3.8
1	010													4	6.2
2.2	2R2													4	11
3.3	3R3													4	14
4.7	4R7									4	13	4	15	5	19
10	100							4	18	5	23	5	25	6.3	30
22	220	4	22	4	22	5	27	5	30	6.3	38	6.3	42		
33	330	5	30	5	30	5	35	6.3	40	6.3	48				
47	470	5	36	5	36	6.3	46	6.3	50						Rated ripple
100	101	6.3	60	6.3	60									Case size	

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

UX series

Chip Type, Higher Capacitance Range

For SMD Anti-Solvent Feature

- Chip type, higher capacitance in larger case sizes.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

UB ← High Reliability | **UX** | Higher Cap. → UT

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	4.7 ~ 1000μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV (μA).

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.08

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z–55°C / Z+20°C	4	4	3	3	3	2	3	4

Endurance — After 2000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of intial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

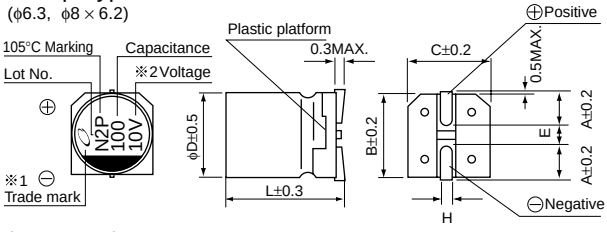
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

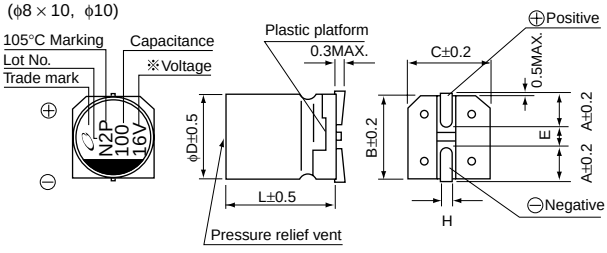
Marking — Black print on the case top.

■Chip Type

(φ6.3, φ8 × 6.2)



(φ8 × 10, φ10)



※1 Size φ8 × 6.2 only
※2 Voltage mark for 6.3V is「6V」.

Type numbering system (Example : 10V 100μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	X	1	A	1	0	1	M	B	R	1	G	S

- Package code
- Case dia. code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (220μF)
- Rated voltage (16V)
- Series name
- Type

D × L	Code
6.3 × 7.7	CR
8 × 6.2	BR
8 × 10	NR
10 × 10	NR

- The lead-free product is also available upon request.
  In this case, L will be put at 11th digit of type numbering system.
  Size φ8 × 6.2, CL will be put at 10th and 11th digit of type numbering system.

(mm)

D × L	6.3 × 7.7	8 × 6.2	8 × 10	10 × 10
A	2.4	3.3	2.9	3.2
B	6.6	8.3	8.3	10.3
C	6.6	8.3	8.3	10.3
E	2.2	2.3	3.1	4.5
L	7.7	6.2	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
4.7	4R7															8 × 6.2	42
10	100													8 × 6.2	51	8 × 10	75
22	220											○ 8 × 6.2	67 (64)	8 × 10	108	■10 × 10	150 (121)
33	330									○ 8 × 6.2	76 (75)	8 × 10	133	■10 × 10	185 (179)	10 × 10	180
47	470							○ 8 × 6.2	79 (78)	8 × 10	124	■10 × 10	180 (167)	10 × 10	220	10 × 10	230
100	101			8 × 6.2	90	○ 8 × 10	148 (111)	8 × 10	181	■10 × 10	304 (283)	10 × 10	310	10 × 10	320		
220	221	○ 8 × 10	161 (121)	8 × 10	173	■10 × 10	330 (307)	■10 × 10	351 (283)	10 × 10	450						
330	331	8 × 10	288	■10 × 10	318 (296)	■10 × 10	441 (410)	10 × 10	372								
470	471	■10 × 10	340 (316)	■10 × 10	351 (326)	10 × 10	489										
680	681	10 × 10	408	10 × 10	392												
1000	102	10 × 10	495													Case size	Rated ripple

Size φ6.3 × 7.7 is available for capacitors marked. "○" / Size φ8 × 10 is available for capacitors marked. "■"
※ In this case, 6 will be put at 12th digit of type numbering system.

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
~ 47	0.80	1.00	1.15	1.40	1.67
100 ~ 1000	0.85	1.00	1.08	1.20	1.30

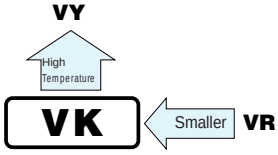
●Taping Specifications are given in page 22.
Please refer to page 3 for the minimum order quantity.

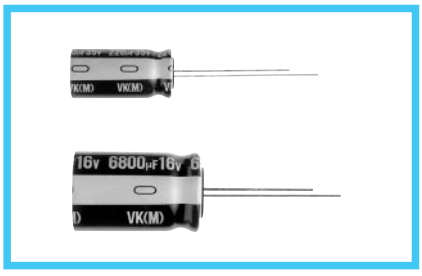
VK Miniature Sized series

Smaller

Anti-Solvent Feature (Through 100V only)

● One rank smaller case sizes than VR series.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C (6.3V ~ 400V), –25˚C ~ +85˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.1 ~ 68000μF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	Rated voltage (V): 6.3 ~ 100V — After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. 160 ~ 450V — After 1 minute's application of rated voltage, CV ≦ 1000 : I = 0.1CV+40μA or less. After 1 minute's application of rated voltage, CV>1000 : I = 0.04CV+100 (μA) or less
tan δ	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160~250	350~450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature — Measurement frequency : 120Hz

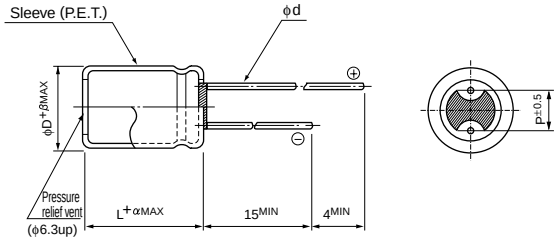
Rated voltage (V)		6.3	10	16	25	35	50~100	160~200	250~350	400	450
Impedance ratio	Z–25˚C / Z+20˚C	5	4	3	2	2	2	3	4	6	15
ZT / Z20 (MAX.)	Z–40˚C / Z+20˚C	12	10	8	5	4	3	4	8	10	—

Endurance — After 2000 hours' application of rated voltage at 85˚C,capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type



φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(L<20) 1.5
	(L≧20) 2.0

Type numbering system (Example : 10V 330μF)

1 2 3 4 5 6 7 8 9 10 11

U V K 1 A 3 3 1 M E D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (330μF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve
5	DD
6.3	ED
8 · 10	PD
12.5 ~ 18	HD
20 ~ 25	RD

※ Please contact to us if other configurations are required.

The laminated case is also available upon request.
Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VK series

■Dimensions

D×L (mm)

Cap.(μF) \ Code \ V		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1											5×11	1.3		
0.22	R22											5×11	2.9		
0.33	R33											5×11	4.3		
0.47	R47											5×11	6.2		
1	010											5×11	17		
2.2	2R2											5×11	28		
3.3	3R3											5×11	35		
4.7	4R7											5×11	40		
10	100											5×11	60		
22	220											5×11	95	5×11	100
33	330											5×11	125	6.3×11	140
47	470									5×11	130	6.3×11	155	6.3×11	170
68	680									6.3×11	160	6.3×11	210	8×11.5	220
100	101							5×11	180	6.3×11	210	8×11.5	260	8×11.5	280
220	221			5×11	220	6.3×11	260	6.3×11	280	8×11.5	350	10×12.5	430	10×16	490
330	331			6.3×11	290	6.3×11	320	8×11.5	390	10×12.5	490	10×16	590	10×20	710
470	471			6.3×11	350	8×11.5	440	10×12.5	550	10×16	650	10×20	760	12.5×20	900
1000	102	8×11.5	540	10×12.5	650	10×12.5	700	10×16	860	12.5×20	1150	12.5×25	1350	16×25	1300
2200	222	10×16	890	10×16	990	10×20	1000	12.5×25	1550	16×25	1800	16×31.5	1980	18×35.5	2300
3300	332	10×20	1190	12.5×20	1450	12.5×25	1700	16×25	1980	16×31.5	2100	18×35.5	2500	20×40	2700
4700	472	12.5×20	1550	12.5×25	1800	16×25	2100	16×25	2200	16×35.5	2500	20×40	2900	22×50	3400
6800	682	12.5×25	1920	16×25	2250	16×25	2250	16×35.5	2600	18×40	2800	22×50	3500	25×50	3900
10000	103	16×25	2350	16×31.5	2550	16×35.5	2710	18×40	2800	22×50	3700	25×50	4000		
15000	153	16×31.5	2550	16×35.5	2880	18×40	3100	22×50	3800	25×50	4300				
22000	223	18×35.5	3200	18×40	3400	22×40	3800	25×50	4500						
33000	333	20×40	3500	22×50	4500	25×50	4800								
47000	473	22×50	3900	25×50	5000										Rated
68000	683	25×50	4300											Case size	ripple

D×L (mm)

Cap.(μF) \ Code \ V		100		160		200		250		350		400		450	
		2A		2C		2D		2E		2V		2G		2W	
0.1	0R1	5×11	2.1			6.3×11	2.1								
0.22	R22	5×11	4.7			6.3×11	4.7								
0.33	R33	5×11	7			6.3×11	7								
0.47	R47	5×11	10			6.3×11	15					6.3×11	12		
1	010	5×11	21			6.3×11	22					6.3×11	20		
2.2	2R2	5×11	30			6.3×11	33			6.3×11	30	8×11.5	38	8×11.5	28
3.3	3R3	5×11	40			6.3×11	40	6.3×11	40	8×11.5	43	8×11.5	48	10×12.5	40
4.7	4R7	5×11	45			6.3×11	50	6.3×11	50	8×11.5	55	10×12.5	60	10×12.5	46
10	100	5×11	70	8×11.5	80	8×11.5	80	10×12.5	100	10×12.5	90	10×16	90	10×20	80
22	220	6.3×11	130	10×12.5	130	10×16	150	10×20	150	12.5×20	150	12.5×25	200	12.5×25	140
33	330	8×11.5	180	10×16	180	10×20	200	10×20	200	12.5×25	240	16×25	240	16×25	180
47	470	8×11.5	200	10×20	210	12.5×20	270	12.5×20	270	16×25	300	16×25	280	16×31.5	220
68	680	10×12.5	270	12.5×20	350	12.5×25	350	16×25	380	16×25	400	16×31.5	340	18×35.5	260
100	101	10×16	340	12.5×25	430	16×25	450	16×25	440	18×35.5	520	18×35.5	440	18×40	280
220	221	12.5×20	550	16×31.5	580	16×35.5	700	18×35.5	680	22×50	760	22×50	650	25×50	350
330	331	12.5×25	760	18×35.5	800	18×40	950	20×40	1000	25×50	1000				
470	471	16×25	1000	18×40	1200	22×40	1300	22×50	1400						
1000	102	18×35.5	1350	25×50	1900										
2200	222	22×50	2400												Rated
3300	332	25×50	2900											Case size	ripple

Rated Ripple (mA rms) at 85°C 120Hz

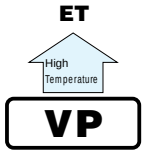
●Frequency coefficient of rated ripple current

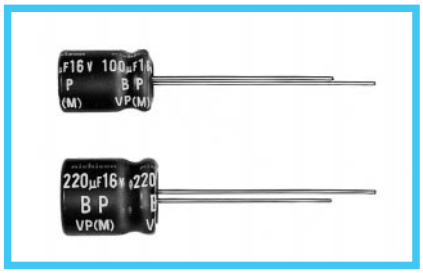
V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10kHz ~
6.3 ~ 100	~ 68	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 68000	0.85	1.00	1.10	1.13	1.15
160 ~ 450	0.1 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 1000	0.90	1.00	1.10	1.13	1.15

VP Bi-Polarized series

BP Bi-polarized | Anti-Solvent Feature

● Standard bi-polarized series for entertainment electronics.





■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85°C
Rated Voltage Range	6.3 ~ 100V
Rated Capacitance Range	0.47 ~ 6800µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 5 minutes' application of rated voltage, leakage current is not more than 0.03CV or 3 (µA), whichever is greater.
tan δ	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.26	0.24	0.22	0.20	0.16	0.14	0.12	0.10

Stability at Low Temperature — Measurement frequency : 120Hz

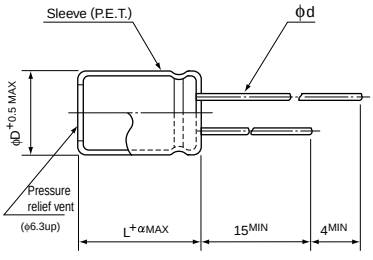
Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX)	Z−25°C / Z+20°C	4	3	2	2	2	2	2	2
	Z−40°C / Z+20°C	10	8	6	5	4	4	3	3

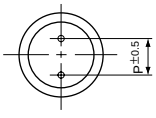
Endurance — After 2000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours,capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

■Radial Lead Type





α	
	(L < 20) 1.5
	(L ≧ 20) 2.0

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8

Type numbering system (Example : 10V 47µF)

1	2	3	4	5	6	7	8	9	10	11
U	V	P	1	A	4	7	0	M	D	D

- 11: Configuration※
- 9: Capacitance tolerance (±20%)
- 6–8: Rated Capacitance (47µF)
- 4–5: Rated voltage (10V)
- 3: Series name
- 1: Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DA
6.3	ED	EA
8 · 10	PD	PA
12.5 ~ 18	HD	HA

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VP series

■Dimensions

D × L (mm)

Cap. (μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.47	R47											5×11	11			5×11	14
1	010											5×11	17			5×11	21
2.2	2R2											5×11	25			6.3×11	34
3.3	3R3											5×11	27	5×11	28	6.3×11	39
4.7	4R7									5×11	34	5×11	34	6.3×11	34	6.3×11	47
10	100					5×11	42	5×11	42	5×11	43	6.3×11	52	6.3×11	57	8×11.5	71
22	220			5×11	57	5×11	57	6.3×11	65	6.3×11	73	8×11.5	89	8×11.5	95	10×16	135
33	330	5×11	64	5×11	64	5×11	70	6.3×11	80	8×11.5	100	8×11.5	105	10×12.5	135	12.5×20	220
47	470	5×11	76	5×11	76	6.3×11	95	6.3×11	95	8×11.5	120	10×12.5	150	10×16	180	12.5×20	240
100	101	6.3×11	125	6.3×11	125	8×11.5	160	8×11.5	160	10×16	230	10×20	265	12.5×20	320	16×25	425
220	221	8×11.5	215	8×11.5	215	10×12.5	275	10×16	305	12.5×20	410	12.5×25	480	16×25	575	18×35.5	720
330	331	8×11.5	265	10×16	345	10×16	375	12.5×20	450	12.5×20	505	16×25	650	16×31.5	655		
470	471	10×12.5	370	10×16	410	10×20	485	12.5×20	540	12.5×25	655	16×31.5	835	18×35.5	965		
1000	102	10×20	650	12.5×20	720	12.5×25	855	16×25	950	16×31.5	1140						
2200	222	12.5×25	1160	16×25	1280	16×31.5	1510	18×35.5	1620								
3300	332	16×25	1570	16×31.5	1690	18×35.5	1980										
4700	472	16×31.5	2020	18×35.5	2160												Rated ripple
6800	682	18×35.5	2600													Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz ~
~ 47	0.75	1.00	1.35	1.57	2.00
100 ~ 470	0.80	1.00	1.23	1.34	1.50
1000 ~ 6800	0.85	1.00	1.10	1.13	1.15

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

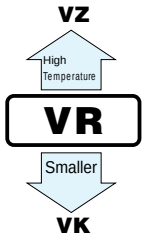
VR Miniature Sized series

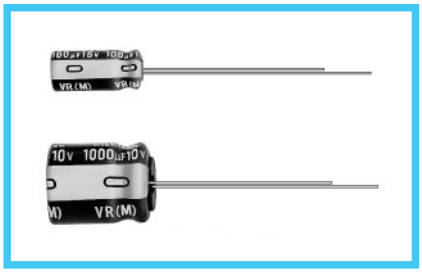
RCJ Approved

Anti-Solvent Feature (Through 100V only)

Approved by Reliability Center for Electronic Component, Japan-Certification No. RCJ-03-22C

● One rank smaller case sizes than VX series.





■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85˚C (6.3V ~ 400V), −25˚C ~ +85˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.1 ~ 33000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100V	160 ~ 450V
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage, CV ≦ 1000 : I = 0.1CV+40µA or less After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 315	350 ~ 450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160 ~ 200	250 ~ 350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z−25˚C / Z+20˚C	5	4	3	2	2	2	2	2	3	4	6	15
	Z−40˚C / Z+20˚C	12	10	8	5	4	3	3	3	4	8	10	—

Endurance

After 2000 hours' application of rated voltage at 85˚C,capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

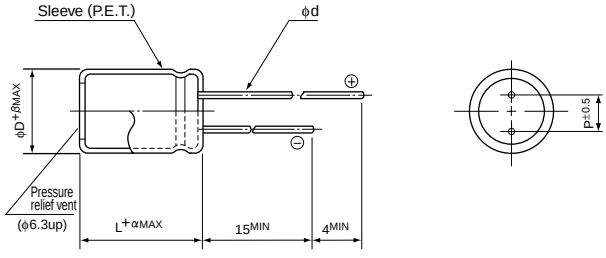
Shelf Life

After leaving capacitors under no load at 85˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



φD	4	5	6.3	8	10	12.5	16	18	20	22	25
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(L<20) 1.5
	(L≧20) 2.0

Type numbering system (Example : 10V 330µF)

1	2	3	4	5	6	7	8	9	10	11	12
U	V	R	1	A	3	3	1	M	E	D	

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (330µF)
- Rated voltage (10V)
- Series name
- Type

※ Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
4	DD6	DA6
5	DD	DA
6.3	ED	EA
8 · 10	PD	PA
12.5 ~ 18	HD	HA
20 ~ 25	RD	RA

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VR series

■Dimensions

D×L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.1	0R1											• 5×11	1.3			5×11	2.1
0.22	R22											• 5×11	2.9			5×11	4.7
0.33	R33											• 5×11	4.3			5×11	7
0.47	R47											• 5×11	6.2			5×11	10
1	010											• 5×11	17			5×11	21
2.2	2R2											• 5×11	28			5×11	30
3.3	3R3											• 5×11	35			5×11	40
4.7	4R7							• 5×11	35	• 5×11	40	• 5×11	40			5×11	45
10	100					• 5×11	50	• 5×11	55	• 5×11	60	• 5×11	60	5×11	65	6.3×11	75
22	220	• 5×11	65	• 5×11	65	• 5×11	75	• 5×11	80	• 5×11	90	5×11	95	5×11	100	6.3×11	130
33	330	• 5×11	80	• 5×11	85	• 5×11	90	• 5×11	95	5×11	105	5×11	125	6.3×11	140	8×11.5	180
47	470	• 5×11	95	• 5×11	100	• 5×11	110	• 5×11	115	5×11	130	6.3×11	155	6.3×11	170	10×12.5	230
100	101	• 5×11	135	• 5×11	145	5×11	160	6.3×11	190	6.3×11	210	8×11.5	260	10×12.5	300	10×20	370
220	221	5×11	200	6.3×11	240	6.3×11	260	8×11.5	330	10×12.5	385	10×12.5	430	10×16	490	12.5×25	620
330	331	6.3×11	270	6.3×11	290	8×11.5	370	10×12.5	440	10×12.5	490	10×16	590	10×20	710	12.5×25	760
470	471	6.3×11	320	6.3×11	350	8×11.5	440	10×12.5	550	10×16	650	12.5×20	760	12.5×20	900	16×25	1000
1000	102	8×11.5	540	10×12.5	650	10×16	790	10×20	960	12.5×20	1150	12.5×25	1350	16×25	1300	18×40	1380
2200	222	10×20	1000	10×20	1100	12.5×20	1300	12.5×25	1550	16×25	1800	16×35.5	2100	18×35.5	2300	22×50 ▲25×40	2400 2400
3300	332	10×20	1190	12.5×20	1450	12.5×25	1700	16×25	1980	16×35.5	2280	18×35.5 ▲22×30	2500 2450	20×40 ▲25×30	2700 2600	25×50	2900
4700	472	12.5×20	1550	12.5×25	1800	16×25	2100	16×31.5	2450	18×35.5 ▲20×31	2700	20×40 ▲25×30	2900 2900	22×50 ▲25×40	3400 3200		
6800	682	12.5×25	1920	16×25	2250	16×35.5	2650	18×35.5 ▲20×31	2900 2700	20×40 ▲25×30	3000 2900	22×50 ▲25×40	3500 3300	25×50	3900		
10000	103	16×25	2350	16×35.5	2700	18×35.5 ▲20×31	2950 3000	20×40 ▲25×30	3000 2900	22×50 ▲25×40	3700 3600	25×50	4000				
15000	153	16×35.5	2850	18×35.5	3100	20×40 ▲25×30	3400 3300	22×50 ▲25×40	3800 3600	25×50	4300						
22000	223	18×40 ▲22×30	3350 3200	20×40 ▲25×30	3700 3300	22×50 ▲25×40	4200 4000	25×50	4500								
33000	333	22×50 ▲25×40	3900 3800	22×50 ▲25×40	4500 4800	25×50	4800									Case size	Rated ripple

Cap.(μF) \ V	Code	160		200		250		315		350		400		450	
		2C		2D		2E		2F		2V		2G		2W	
0.47	R47	6.3×11	15	6.3×11	15	6.3×11	15								
1	010	6.3×11	22	6.3×11	22	6.3×11	22	6.3×11	22	6.3×11	22	8×11.5	25	8×11.5	23
2.2	2R2	6.3×11	33	6.3×11	33	6.3×11	33	8×11.5	33	8×11.5	38	10×12.5	45	10×12.5	35
3.3	3R3	6.3×11	40	6.3×11	40	8×11.5	46	10×12.5	55	10×12.5	55	10×12.5	55	10×16	45
4.7	4R7	6.3×11	50	8×11.5	55	8×11.5	55	10×12.5	65	10×12.5	65	10×16	70	10×20	55
10	100	8×11.5	80	10×12.5	95	10×16	105	10×20	115	10×20	115	12.5×20	130	12.5×20	90
22	220	10×16	155	10×20	170	12.5×20	190	12.5×20	190	12.5×25	200	16×25	240	16×25	165
33	330	10×20	205	12.5×20	230	12.5×20	230	16×25	275	16×25	275	16×31.5	300	16×35.5	230
47	470	12.5×20	270	12.5×20	270	12.5×25	300	16×25	340	16×35.5	380	16×35.5	370	18×40 ▲22×30	300 290
100	101	12.5×25	430	16×31.5	530	16×31.5	520	18×35.5	560	18×40 ▲22×30	590 570	20×40 ▲25×30	550 530	22×40	350
220	221	16×35.5	800	18×35.5	810	20×40 ▲22×30	740 820	22×50 ▲25×30	850 770	22×50 ▲25×40	850 890	25×50	750		
330	331	18×40 ▲22×30	940 900	20×40 ▲25×30	1130 1090	22×50 ▲25×30	1170 970	25×50	1250						
470	471	22×40 ▲25×30	1410 1290	22×50 ▲25×40	1490 1550	25×50	1600							Case size	Rated ripple
1000	102	25×50	1900												

Size 4×11 is available for capacitors marked "● "
In this case, 6 will be put at 12th digit of type numbering system "▲"

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10kHz ~
6.3 ~ 100	~ 47	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 33000	0.85	1.00	1.10	1.13	1.15
160 ~ 450	0.47 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 1000	0.90	1.00	1.10	1.13	1.15

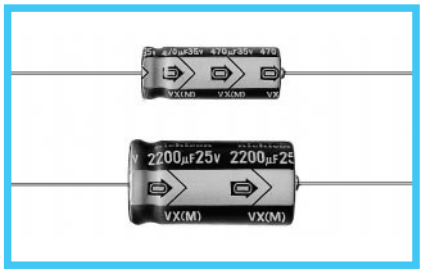
VX

Standard, For General Purposes - Axial Lead Type

(02 type) series

Anti-Solvent Feature
(Through 100V only)

● Axial lead type of standard series for general purposes.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C (6.3 ~ 250V), –25 ~ +85°C (315 ~ 450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 10000μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
Leakage current	After 1 minute's application of rated voltage, not more than 0.03CV or 4 (μA), whichever is greater. After 2 minutes' application of rated voltage, not more than 0.01CV or 3 (μA), whichever is greater.	In case of CV ≦ 1000 After 1 minute's application of rated voltage, not more than 0.1CV+40 (μA). In case of CV > 1000 After 1 minute's application of rated voltage, not more than 0.04CV+100 (μA).

tan δ

For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50	63 ~ 100	160 ~ 315	350 ~ 450
tan δ (MAX.)	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35 ~ 100	160 ~ 250	315 · 350	400 · 450
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	4	6	15
	Z–40°C / Z+20°C	10	8	6	4	3	12	—	—

Endurance

After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life

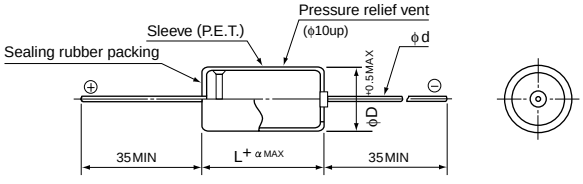
After leaving capacitors under no load at 85°C for 1000 hours, they meet the characteristic requirements at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Marking

Printed with white color letter on black sleeve.

■Axial Lead Type



α	
(φD < 10)	1
(φD ≧ 10)	2

φD	5 ~ 13	16 ~ 18
φd	0.6	0.8

Type numbering system (Example : 10V 330μF)

1	2	3	4	5	6	7	8	9	10	11
T	V	X	1	A	3	3	1	M	A	D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (330μF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φD	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5 ~ 8	AD	AA
10 ~ 18	CD	CA

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VX (02 type) series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.47	R47											5 × 12	5			5 × 12	10
1	010											5 × 12	10			5 × 12	18
2.2	2R2											5 × 12	23			5 × 12	28
3.3	3R3											5 × 12	28			5 × 12	34
4.7	4R7											5 × 12	34			5 × 12	40
10	100											5 × 12	50	5 × 12	55	6.3 × 12	60
22	220									5 × 12	70	6.3 × 12	85	6.3 × 12	90	8 × 16	120
33	330							5 × 12	80	6.3 × 12	90	6.3 × 16	110	6.3 × 16	120	8 × 16	150
47	470					5 × 12	85	6.3 × 12	100	6.3 × 16	120	6.3 × 16	130	8 × 16	160	8 × 20	190
100	101	5 × 12	110	6.3 × 12	130	6.3 × 16	160	6.3 × 16	170	8 × 16	210	8 × 16	220	8 × 20	260	10 × 26	340
220	221	6.3 × 16	200	6.3 × 16	210	8 × 16	260	8 × 16	280	8 × 20	340	10 × 21	410	10 × 26	480	13 × 26	560
330	331	6.3 × 16	250	8 × 16	300	8 × 16	320	8 × 20	380	10 × 21	460	10 × 26	560	13 × 26	650	13 × 31.5	750
470	471	8 × 16	330	8 × 16	350	8 × 20	430	10 × 26	510	10 × 26	610	13 × 26	730	13 × 31.5	840	16 × 31.5	970
1000	102	10 × 21	600	10 × 21	640	10 × 26	770	13 × 26	900	13 × 31.5	1060	16 × 31.5	1260	16 × 31.5	1330		
2200	222	13 × 26	1020	13 × 26	1090	13 × 31.5	1180	16 × 31.5	1480	16 × 31.5	1580	18 × 41	1920				
3300	332	13 × 26	1200	13 × 31.5	1390	16 × 31.5	1620	16 × 41.5	1710	16 × 41.5	2050						
4700	472	16 × 31.5	1500	16 × 31.5	1730	16 × 41.5	1840	18 × 41	2170								
6800	682	16 × 31.5	1840	16 × 41.5	1930	18 × 41	2310										
10000	103	16 × 41.5	2260	18 × 41	2350												

Cap.(μF) \ V	Code	160		200		250		315		350		400		450	
		2C		2D		2E		2F		2V		2G		2W	
1	010	6.3×12	13	6.3×12	13	6.3×16	14	6.3×16	14	6.3×16	12	8×16	14	8×16	14
2.2	2R2	6.3×16	23	6.3×16	23	8×16	27	8×16	27	8×16	24	8×20	28	10×21	31
3.3	3R3	8×16	33	8×16	33	8×16	33	8×20	36	8×20	32	10×21	38	10×21	38
4.7	4R7	8×16	39	8×16	39	8×20	45	8×20	45	10×21	46	10×21	46	10×26	50
10	100	8×20	60	10×21	70	10×21	70	10×26	80	13×26	85	13×26	85	13×26	85
22	220	10×26	120	13×26	140	13×26	140	13×31.5	150	13×31.5	140	16×31.5	150	16×31.5	150
33	330	13×26	170	13×26	170	13×31.5	190	16×31.5	210	16×31.5	190	16×41.5	210	18×41	230
47	470	13×31.5	230	13×31.5	230	16×31.5	260	16×31.5	260	16×41.5	260	18×41	290		Rated ripple
100	101	16×41.5	430	16×41.5	430	16×41.5	430							Case size	

Rated Ripple (mA rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

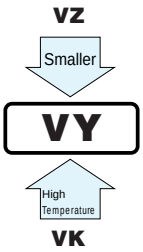
V	Cap.(μF) \ Frequency(Hz)	120	300	1k	10k ~
6.3 ~ 100	~ 47	1.00	1.35	1.57	2.00
	100 ~ 470	1.00	1.23	1.34	1.50
	1000 ~ 10000	1.00	1.10	1.13	1.15
160 ~ 450	1 ~ 100	1.00	1.25	1.40	1.60

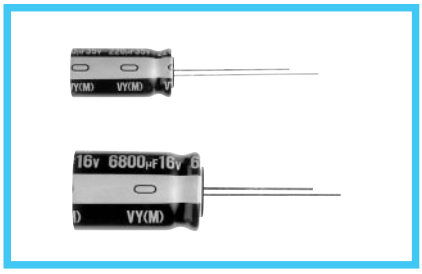
VY Wide Temperature Range series

Smaller

Anti-Solvent Feature (Through 100V only)

● One rank smaller case sizes than VZ series.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105˚C (6.3 ~ 100V), –40 ~ +105˚C (160 ~ 400V), –25 ~ +105˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.1 ~ 68000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage, CV ≦ 1000 : I =0.1CV+40 (µA) or less After 1 minute's application of rated voltage, CV > 1000 : I =0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350 ~ 450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35 ~ 50	63 ~ 100	160 ~ 200	250 ~ 350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	5	4	3	2	2	2	3	4	6	15
	Z–40˚C / Z+20˚C	10	8	6	4	3	3	4	8	10	—

Endurance

After 1000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

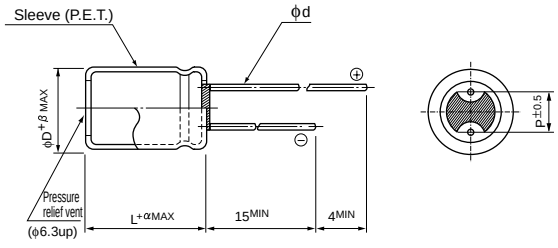
Shelf Life

After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(L < 20) 1.5
	(L ≧ 20) 2.0

Type numbering system (Example : 10V 330µF)

1	2	3	4	5	6	7	8	9	10	11
U	V	Y	1	A	3	3	1	M	E	D

- 11: Configuration ※
- 9: Capacitance tolerance (±20%)
- 6 7 8: Rated Capacitance (330µF)
- 4 5: Rated voltage (10V)
- 3: Series name
- 1: Type

※ Configuration

φD	Pb free lead finishing Pb free PET sleeve
5	DD
6.3	ED
8 · 10	PD
12.5 ~ 18	HD
20 ~ 25	RD

※ Please contact to us if other configurations are required.

The laminated case is also available upon request.
Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VY series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1											5×11	1.3		
0.22	R22											5×11	2.9		
0.33	R33											5×11	4.3		
0.47	R47											5×11	7		
1	010											5×11	13		
2.2	2R2											5×11	20		
3.3	3R3											5×11	25		
4.7	4R7											5×11	30		
10	100											5×11	46		
22	220											5×11	68	5×11	71
33	330											5×11	90	6.3×11	100
47	470									5×11	93	6.3×11	115	6.3×11	120
68	680									6.3×11	110	6.3×11	150	8×11.5	155
100	101							5×11	125	6.3×11	150	8×11.5	190	8×11.5	200
220	221			5×11	155	6.3×11	190	6.3×11	200	8×11.5	250	10×12.5	300	10×16	335
330	331			6.3×11	210	6.3×11	225	8×11.5	275	10×12.5	350	10×16	410	10×20	510
470	471			6.3×11	250	8×11.5	315	10×12.5	380	10×16	460	10×20	540	12.5×20	640
1000	102	8×11.5	390	10×12.5	460	10×12.5	500	10×16	610	12.5×20	810	12.5×25	950	16×25	930
2200	222	10×16	635	10×16	705	10×20	710	12.5×25	1090	16×25	1260	16×31.5	1410	18×35.5	1650
3300	332	10×20	840	12.5×20	1000	12.5×25	1170	16×25	1400	16×31.5	1500	18×35.5	1770	20×40	1950
4700	472	12.5×20	1090	12.5×25	1260	16×25	1500	16×25	1570	16×35.5	1780	20×40	2100	22×50	2450
6800	682	12.5×25	1350	16×25	1570	16×25	1600	16×35.5	1850	18×40	2000	22×50	2500	25×50	2800
10000	103	16×25	1650	16×31.5	1820	16×35.5	1930	18×40	2000	22×50	2650	25×50	2850		
15000	153	16×31.5	1820	16×35.5	2050	18×40	2210	22×50	2750	25×50	3100				
22000	223	18×35.5	2280	18×40	2420	22×40	2710	25×50	3250						
33000	333	20×40	2500	22×50	3210	25×50	3450								
47000	473	22×50	2780	25×50	3570										Rated
68000	683	25×50	3070											Case size	ripple

Cap.(μF) \ V	Code	100		160		200		250		350		400		450	
		2A		2C		2D		2E		2V		2G		2W	
0.1	0R1	5×11	1.5			6.3×11	1.5								
0.22	R22	5×11	3.4			6.3×11	3.3								
0.33	R33	5×11	5.0			6.3×11	5								
0.47	R47	5×11	7.1			6.3×11	11					6.3×11	8.5		
1	010	5×11	15			6.3×11	16					6.3×11	14		
2.2	2R2	5×11	21			6.3×11	25			6.3×11	21	8×11.5	27	8×11.5	20
3.3	3R3	5×11	29			6.3×11	30	6.3×11	28	8×11.5	30	8×11.5	34	10×12.5	28
4.7	4R7	5×11	32			6.3×11	35	6.3×11	35	8×11.5	39	10×12.5	42	10×12.5	32
10	100	5×11	50	8×11.5	41	8×11.5	57	10×12.5	71	10×12.5	64	10×16	64	10×20	27
22	220	6.3×11	93	10×12.5	92	10×16	105	10×20	105	12.5×20	105	12.5×25	140	12.5×25	100
33	330	8×11.5	130	10×16	125	10×20	140	10×20	140	12.5×25	170	16×25	170	16×25	125
47	470	8×11.5	140	10×20	150	12.5×20	195	12.5×20	190	16×25	210	16×25	200	16×31.5	155
68	680	10×12.5	190	12.5×20	250	12.5×25	250	16×25	270	16×25	285	16×31.5	240	18×35.5	185
100	101	10×16	240	12.5×25	310	16×25	320	16×25	310	18×35.5	370	18×35.5	310	18×40	200
220	221	12.5×20	390	16×31.5	410	16×35.5	500	18×35.5	485	22×50	540	22×50	460	25×50	250
330	331	12.5×25	540	18×35.5	570	18×40	675	20×40	710	25×50	710				
470	471	16×25	715	18×40	855	22×40	925	22×50	1000						
1000	102	18×35.5	960	25×50	1350										
2200	222	22×50	1750												Rated
3300	332	25×50	2070											Case size	ripple

Rated Ripple (mA rms) at 105˚C 120Hz

●Frequency coefficient of rated ripple current

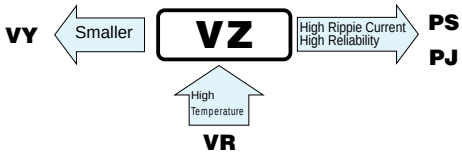
V	Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10 kHz ~
6.3 ~ 100	~ 68	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 68000	0.85	1.00	1.10	1.13	1.15
160 ~ 450	0.1 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 1000	0.90	1.00	1.10	1.13	1.15

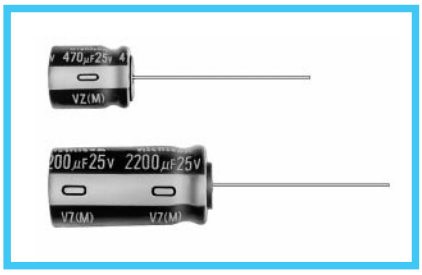
VZ series

Wide Temperature Range

Anti-Solvent Feature (Through 100V only)

● Small case sizes as same as VR series, but operating over wide temperature range of –55 ~ +105˚C.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105˚C (6.3 ~ 100V) , –40 ~ +105˚C (160 ~ 400V), –25 ~ +105˚C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.1 ~ 33000µF
Capacitance Tolerance	±20% at 120Hz, 20˚C

Leakage Current

Rated voltage (V)	6.3 ~ 100	160 ~ 450
———	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.	After 1 minute's application of rated voltage, CV ≦ 1000 : I = 0.1CV+40 (µA) or less After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (µA) or less

tan δ

For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 315	350 ~ 450
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160~ 200	250 ~ 350	400	450
Impedance ratio ZT / Z20 (MAX.)	Z–25˚C / Z+20˚C	5	4	3	2	2	2	2	2	3	4	6	15
	Z–40˚C / Z+20˚C	10	8	6	4	3	3	3	3	4	8	10	—

Endurance

After 1000 hours' application of rated voltage at 105˚C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

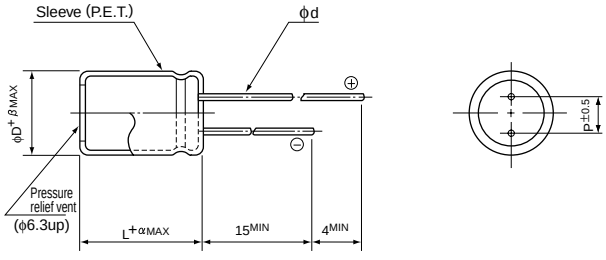
Shelf Life

After leaving capacitors under no load at 105˚C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Marking

Printed with white color letter on black sleeve.

■Radial Lead Type



φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(L<20) 1.5
	(L≧20) 2.0

Type numbering system (Example : 10V 330µF)

1	2	3	4	5	6	7	8	9	10	11
U	V	Z	1	A	3	3	1	M	E	D

- Configuration※
- Capacitance tolerance (±20%)
- Rated Capacitance (330µF)
- Rated voltage (10V)
- Series name
- Type

※Configuration

φ D	Pb free lead finishing Pb free PET sleeve	Sn-Pb lead finishing PVC sleeve contain Pb
5	DD	DH
6.3	ED	EH
8 · 10	PD	PH
12.5 ~ 18	HD	HH
20 ~ 25	RD	RH

※ Please contact to us if other configurations are required.

Please refer to page 19, 20, 21 about the formed or taped product spec.
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.

VZ series

■Dimensions

D × L (mm)

Cap.(μF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											5 × 11	1.3
0.22	R22											5 × 11	2.9
0.33	R33											5 × 11	4.3
0.47	R47											5 × 11	7
1	010											5 × 11	13
2.2	2R2											5 × 11	20
3.3	3R3											5 × 11	25
4.7	4R7							5 × 11	25	5 × 11	28	5 × 11	30
10	100					5 × 11	35	5 × 11	36	5 × 11	41	5 × 11	46
22	220	5 × 11	45	5 × 11	45	5 × 11	54	5 × 11	58	5 × 11	61	5 × 11	68
33	330	5 × 11	55	5 × 11	58	5 × 11	65	5 × 11	68	5 × 11	75	5 × 11	90
47	470	5 × 11	65	5 × 11	68	5 × 11	79	5 × 11	83	5 × 11	93	6.3 × 11	115
100	101	5 × 11	95	5 × 11	105	5 × 11	115	6.3 × 11	140	6.3 × 11	150	8 × 11.5	190
220	221	5 × 11	145	6.3 × 11	175	6.3 × 11	190	8 × 11.5	240	10 × 12.5	275	10 × 12.5	300
330	331	6.3 × 11	195	6.3 × 11	210	8 × 11.5	265	10 × 12.5	315	10 × 12.5	350	10 × 16	410
470	471	6.3 × 11	230	6.3 × 11	250	8 × 11.5	315	10 × 12.5	380	10 × 16	460	12.5 × 20	530
1000	102	8 × 11.5	390	10 × 12.5	460	10 × 16	560	10 × 20	680	12.5 × 20	810	12.5 × 25	950
2200	222	10 × 20	710	10 × 20	760	12.5 × 20	920	12.5 × 25	1090	16 × 25	1260	16 × 35.5	1470
3300	332	10 × 20	840	12.5 × 20	1000	12.5 × 25	1170	16 × 25	1400	16 × 35.5	1610	18 × 35.5	1770
4700	472	12.5 × 20	1090	12.5 × 25	1260	16 × 25	1480	16 × 31.5	1710	18 × 35.5	1910	20 × 40	2100
6800	682	12.5 × 25	1350	16 × 25	1570	16 × 35.5	1780	18 × 35.5	2040	20 × 40	2150	22 × 50	2500
10000	103	16 × 25	1650	16 × 35.5	1890	18 × 35.5	2060	20 × 40	2150	22 × 50	2650	25 × 50	2850
15000	153	16 × 35.5	2010	18 × 35.5	2180	20 × 40	2430	22 × 50	2750	25 × 50	3100		
22000	223	18 × 40	2350	20 × 40	2650	22 × 50	3000	25 × 50	3250				Rated ripple
33000	333	22 × 50	2800	22 × 50	3250	25 × 50	3450					Case size	

Cap.(μF) \ V	Code	63		100		160		200		250		315		350		400		450	
		1J		2A		2C		2D		2E		2F		2V		2G		2W	
0.1	0R1			5 × 11	1.5														
0.22	R22			5 × 11	3.4														
0.33	R33			5 × 11	5.0														
0.47	R47			5 × 11	7.1	6.3 × 11	11	6.3 × 11	11	6.3 × 11	10								
1	010			5 × 11	15	6.3 × 11	16	6.3 × 11	16	6.3 × 11	15	6.3 × 11	15	6.3 × 11	15	8 × 11.5	17	8 × 11.5	13
2.2	2R2			5 × 11	21	6.3 × 11	25	6.3 × 11	25	6.3 × 11	23	8 × 11.5	26	8 × 11.5	26	10 × 12.5	30	10 × 12.5	23
3.3	3R3			5 × 11	29	6.3 × 11	30	6.3 × 11	30	8 × 11.5	32	10 × 12.5	38	10 × 12.5	38	10 × 12.5	38	10 × 16	31
4.7	4R7			5 × 11	32	6.3 × 11	34	8 × 11.5	39	8 × 11.5	39	10 × 12.5	45	10 × 12.5	45	10 × 16	50	10 × 20	40
10	100	5 × 11	46	6.3 × 11	54	8 × 11.5	41	10 × 12.5	65	10 × 16	74	10 × 20	80	10 × 20	80	12.5 × 20	90	12.5 × 20	65
22	220	5 × 11	71	6.3 × 11	93	10 × 16	100	10 × 20	120	12.5 × 20	130	12.5 × 20	115	12.5 × 25	115	16 × 25	165	16 × 25	115
33	330	6.3 × 11	100	8 × 11.5	130	10 × 20	145	12.5 × 20	160	12.5 × 20	160	16 × 25	195	16 × 25	195	16 × 31.5	215	16 × 35.5	165
47	470	6.3 × 11	120	10 × 12.5	165	12.5 × 20	195	12.5 × 20	195	12.5 × 25	210	16 × 25	230	16 × 35.5	270	16 × 35.5	270	18 × 40	185
100	101	10 × 12.5	215	10 × 20	265	12.5 × 25	215	16 × 31.5	375	16 × 31.5	365	18 × 35.5	395	18 × 40	420	20 × 40	450	22 × 40	270
220	221	10 × 16	335	12.5 × 25	440	16 × 35.5	570	18 × 35.5	575	20 × 40	600	22 × 50	620	22 × 50	620	25 × 50	660		
330	331	10 × 20	510	12.5 × 25	540	18 × 40	750	20 × 40	705	22 × 50	730	25 × 50	760						
470	471	12.5 × 20	640	16 × 25	715	22 × 40	900	22 × 50	840	25 × 50	870								
1000	102	16 × 25	930	18 × 40	985	25 × 50	1310												
2200	222	18 × 35.5	1650	22 × 50	1750														
3300	332	20 × 40	1950	25 × 50	2070														
4700	472	22 × 50	2450																Rated ripple
6800	682	25 × 50	2800															Case size	

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

V	Cap. (μF) \ Frequency	50Hz	120Hz	300Hz	1 kHz	10 kHz ~
6.3 ~ 100	~ 47	0.75	1.00	1.35	1.57	2.00
	100 ~ 470	0.80	1.00	1.23	1.34	1.50
	1000 ~ 33000	0.85	1.00	1.10	1.13	1.15
160 ~ 450	0.47 ~ 220	0.80	1.00	1.25	1.40	1.60
	330 ~ 1000	0.90	1.00	1.10	1.13	1.15

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

WF

Chip Type, Low Impedance

series

For SMD | Low Impedance | Anti-Solvent Feature

- Chip type, low impedance temperature range up to +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

WG ← Low Impedance | **WF** | Low Impedance → WT

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 35V
Rated Capacitance Range	1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	2	2	2	2	2
	Z–55°C / Z+20°C	4	4	3	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

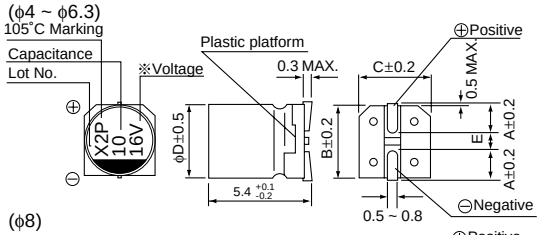
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C, for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

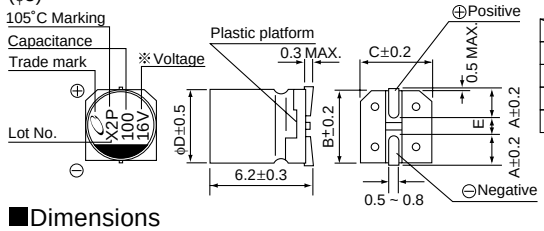
Marking — Black print on the case top.

■Chip Type

(φ4 ~ φ6.3)



(φ8)



(mm)

φD	4	5	6.3	8
A	1.8	2.1	2.4	3.3
B	4.3	5.3	6.6	8.3
C	4.3	5.3	6.6	8.3
E	1.0	1.3	2.2	2.3

※Voltage mark for 6.3V is 6V.

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U W F 1 C 1 0 0 M C R 1 G B

- 14: Taping code
- 12–13: Configuration
- 10–11: Capacitance tolerance (±20%)
- 6–8: Rated Capacitance (10µF)
- 4–5: Rated voltage (16V)
- 3: Series name
- 1–2: Type

φD	Code
4 ~ 6.3	GB
8	GS

φD	Code
4 ~ 6.3	CR
8	BR

- The lead-free product is also available upon request. In this case, L will be put at 11th digit of type numbering system. Size φ8, CL will be put at 10th and 11th digit of type numbering system.

■Dimensions

Cap. (µF)	Code	6.3 (0J)			10 (1A)			16 (1C)			25 (1E)			35 (1V)		
1	010													4	5.0	50
1.5	1R5													4	5.0	50
2.2	2R2													4	5.0	50
3.3	3R3													4	5.0	50
4.7	4R7										4	5.0	50	4	5.0	50
6.8	6R8										4	5.0	50	5	2.6	80
10	100							4	5.0	50	5	2.6	80	5	2.6	80
15	150							5	2.6	80	6.3	1.3	115	6.3	1.3	115
22	220	4	5.0	50	5	2.6	80	5	2.6	80	6.3	1.3	115	6.3	1.3	115
33	330	5	2.6	80	5	2.6	80	6.3	1.3	115	6.3	1.3	115	8	0.8	150
47	470	5	2.6	80	6.3	1.3	115	6.3	1.3	115	8	0.8	150	8	0.8	150
68	680	6.3	1.3	115	6.3	1.3	115	8	0.8	150	8	0.8	150			
100	101	6.3	1.3	115	8	0.8	150	8	0.8	150						
150	151	8	0.8	150	8	0.8	150									
220	221	8	0.8	150												

Case size | Impedance | Rated ripple

Rated Ripple (mA rms) at 105°C 100kHz
Max. Impedance : (Ω) at 20°C 100kHz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.35	0.50	0.64	0.83	1.00

- Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

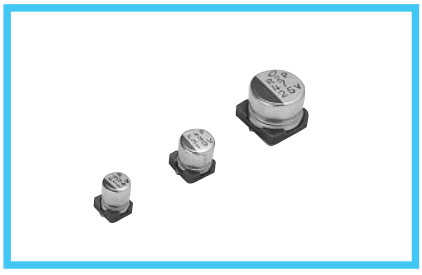
nichicon

WG series

Chip Type, Low Impedance

For SMD | Low Impedance | Anti-Solvent Feature

- Chip type, operating over wide temperature range of to –55 ~ +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.



UD ← Low Impedance | **WG** | Low Impedance → WF

■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	1 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.26	0.19	0.16	0.14	0.12	0.12

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	2	2	2	2	2	2
	Z–40°C / Z+20°C	4	4	3	3	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

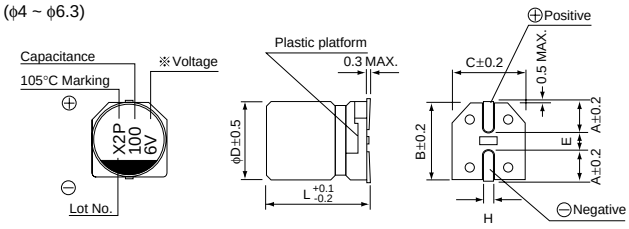
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

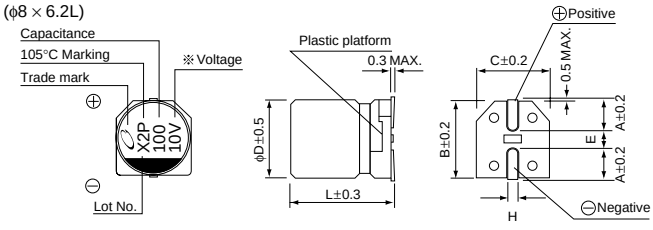
Marking — Black print on the case top.

■Chip Type

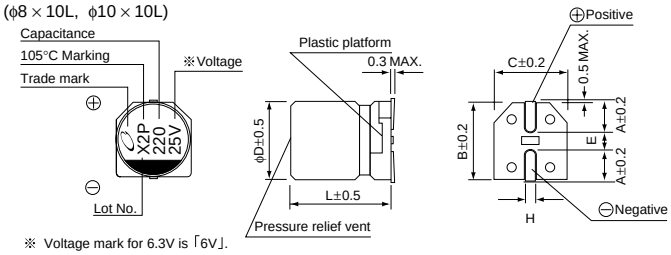
(φ4 ~ φ6.3)



(φ8 × 6.2L)



(φ8 × 10L, φ10 × 10L)



※ Voltage mark for 6.3V is 「6V」.

Type numbering system (Example : 10V 100μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U W G 1 A 1 0 1 M C R 1 G S

- Taping code

φD	code
4 ~ 6.3	GB
8・10	GS

- Configuration

φD	code
4 ~ 6.3	CR
8 (6.2L)	CR
8 (10L)・10	NR

- Capacitance tolerance (±20%)
- Rated Capacitance (100μF)
- Rated voltage (10V)
- Series name
- Type

- The lead-free product is also available upon request.
  In this case, L will be put at 11th digit of type numbering system.
  Size φ8 x 6.2, CL will be put at 10th and 11th digit of type numbering system.

(mm)

φD × L	4 × 5.4	5 × 5.4	6.3 × 5.4	8 × 6.2	8 × 10	10 × 10
A	1.8	2.1	2.4	3.3	2.9	3.2
B	4.3	5.3	6.6	8.3	8.3	10.3
C	4.3	5.3	6.6	8.3	8.3	10.3
E	1.0	1.3	2.2	2.3	3.1	4.5
L	5.4	5.4	5.4	6.2	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

● Dimension table in next page.

WG series

■Dimensions

Cap. (μF) \ V	Code	6.3			10			16		
		0J			1A			1C		
10	100							4×5.4	3.0	60
22	220	4×5.4	3.0	60				5×5.4	1.8	95
33	330				5×5.4	1.8	95			
47	470	5×5.4	1.8	95				6.3×5.4	1.0	140
68	680	6.3×5.4	1.0	140				8×6.2	0.4	230
100	101	6.3×5.4	1.0	140	8×6.2	0.4	230	8×6.2	0.4	230
150	151				8×6.2	0.4	230			
220	221	8×6.2	0.4	230	8×10	0.3	450	10×10	0.15	670
330	331	8×10	0.3	450				10×10	0.15	670
470	471				10×10	0.15	670	10×10	0.15	670
680	681							10×10	0.15	670
1000	102	10×10	0.15	670	10×10	0.15	670			
1500	152	10×10	0.15	670						

Cap. (μF) \ V	Code	25			35			50		
		1E			1V			1H		
1	010				4×5.4	3.0	60	4×5.4	5.0	30
2.2	2R2				4×5.4	3.0	60	4×5.4	5.0	30
3.3	3R3				4×5.4	3.0	60	4×5.4	5.0	30
4.7	4R7				4×5.4	3.0	60	5×5.4	3.0	50
6.8	6R8	4×5.4	3.0	60	5×5.4	1.8	95			
10	100				5×5.4	1.8	95	6.3×5.4	2.0	70
22	220	6.3×5.4	1.0	140	6.3×5.4	1.0	140	8×6.2	0.7	120
33	330	6.3×5.4	1.0	140	8×6.2	0.4	230	8×10	0.6	300
47	470	8×6.2	0.4	230	8×6.2	0.4	230	10×10	0.3	500
68	680	8×10	0.3	450						
100	101	8×10	0.3	450	10×10	0.15	670	10×10	0.3	500
220	221	10×10	0.15	670	10×10	0.15	670	10×10	0.3	500
330	331	10×10	0.15	670	10×10	0.15	670	Case size	Impedance	Rated ripple
470	471	10×10	0.15	670						

Rated Ripple (mA rms) at 105°C 100kHz
Max. Impedance : (Ω) at 20°C 100kHz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.35	0.50	0.64	0.83	1.00

● Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

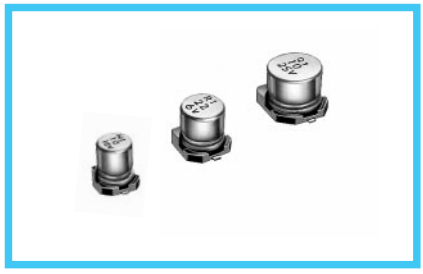
WP series

5.5mmL Chip Type, Bi-Polarized

For SMD | Bi-polarized | Anti-Solvent Feature

- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

ZP ← Low Profile | **WP** | Bi-polarized → WX



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 100µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05CV or 10 (µA) ,whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.24	0.20	0.17	0.17	0.15	0.15

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–40°C / Z+20°C	8	6	4	4	3	3

Endurance — After 1000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

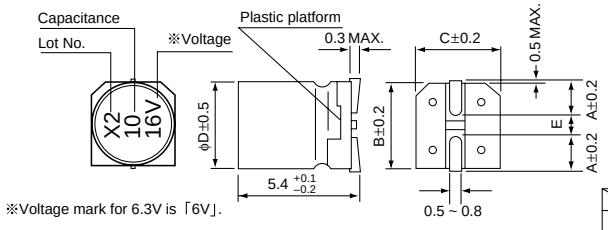
Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



※Voltage mark for 6.3V is「6V」.

(mm)

φD	4	5	6.3	8
A	1.8	2.1	2.4	3.3
B	4.3	5.3	6.6	8.3
C	4.3	5.3	6.6	8.3
E	1.0	1.3	2.2	2.3

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U W P 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap. (µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	1.0
0.22	R22											4	2.0
0.33	R33											4	2.8
0.47	R47											4	4.0
1	010											4	8.4
2.2	2R2									4	8.4	5	13
3.3	3R3							5	12	5	16	5	17
4.7	4R7					4	12	5	16	5	18	6.3	20
10	100			4	17	5	23	6.3	27	6.3	29	8	36
22	220	5	28	6.3	33	6.3	37	8	50	8	54		
33	330	6.3	37	6.3	41	6.3	49	8	61				
47	470	6.3	45	8	61	8	75						Rated ripple
100	101	8	82									Case size	

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

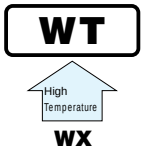
WT

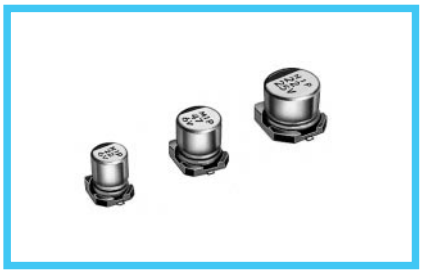
Chip Type, Wide Temperature Range

series

For SMD | Smaller | Anti-Solvent Feature

- Chip type operating over wide temperature range of to –55 ~ +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–55 ~ +105°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.40	0.30	0.24	0.20	0.16	0.14	0.14

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2
	Z–40°C / Z+20°C	15	8	8	4	4	3	3

Endurance — After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value for capacitors of ϕ3mm unit, and 16V or less. Within ±20% of initial value for capacitors of 25V or more.
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

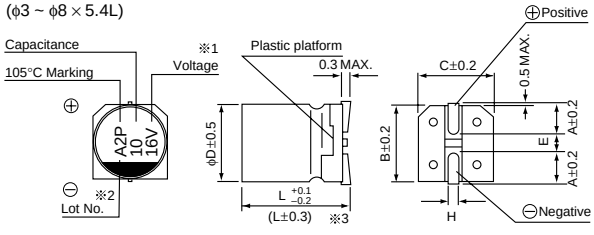
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

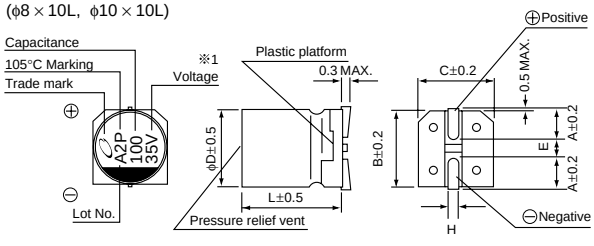
■Chip Type

(ϕ3 ~ ϕ8 × 5.4L)



※3 Apply to ϕ6.3 × 5.8, ϕ6.3 × 7.7

(ϕ8 × 10L, ϕ10 × 10L)



※1. Voltage mark for 6.3V is 「6V」. In case of marking for ϕ3 units, "V" for rated voltage is omitted.
※2. In case of marking for ϕ3 units. Lot No is expressed by a digit (month code).

Type numbering system (Example : 16V 10μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
U W T 1 C 1 0 0 M C R 1 G B

ϕD	code
3 ~ 8 (5.4L)	GB
6.3 ~ 10 (L ≧ 5.8)	GS

Package code

Case dia. code

ϕD	code
3	2
4 ~ 10	1

Configuration

ϕD	code
3 ~ 8 (L≦7.7)	CR
8 ~ 10 (L = 10)	NR

Capacitance tolerance (±20%)

Rated Capacitance (10μF)

Rated voltage (16V)

Series name

Type

- The lead-free product is also available upon request.
  In this case, L will be put at 11th digit of type numbering system.

	3 × 5.4	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 5.8	6.3 × 7.7	8 × 5.4	8 × 10	10 × 10
A	1.5	1.8	2.1	2.4	2.4	2.4	3.3	2.9	3.2
B	3.3	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3
C	3.3	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3
E	0.8	1.0	1.3	2.2	2.2	2.2	2.3	3.1	4.5
L	5.4	5.4	5.4	5.4	5.8	7.7	5.4	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

● Dimension table in next page.

WT series

■Dimensions

Cap. (μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4×5.4 (3)	1.0
0.22	R22													4×5.4 (3)	2.6
0.33	R33													4×5.4 (3)	3.2
0.47	R47													4×5.4 (3)	3.8
1	010													4×5.4 (3)	6.3 (5.9)
2.2	2R2											3×5.4	7.5	4×5.4 (3)	11 (9)
3.3	3R3											3×5.4	9	4×5.4	14
4.7	4R7									4×5.4 (3)	13 (10)	4×5.4	15	5×5.4	19
10	100							4×5.4 (3)	18 (14)	5×5.4	23	5×5.4	25	6.3×5.4	30
22	220	4×5.4	22	4×5.4	22	5×5.4	27	5×5.4	30	6.3×5.4	38	6.3×5.4	42	●8×5.4	51 (45)
33	330	5×5.4	30	5×5.4	30	5×5.4	35	6.3×5.4	40	6.3×5.4	48	●8×5.4	59 (52)	6.3×7.7	60
47	470	5×5.4	36	5×5.4	36	6.3×5.4	46	6.3×5.4	50	●8×5.4	66 (59)	6.3×5.8	63	6.3×7.7	63
100	101	6.3×5.4	60	6.3×5.4	60	6.3×5.4	60	6.3×5.4	60	6.3×7.7	91	6.3×7.7	84	8×10	140
150	151	6.3×5.8	86	6.3×5.8	86	6.3×5.8	86	6.3×7.7	95	8×10	140	8×10	155	10×10	180
220	221	●8×5.4	102 (91)	●8×5.4	102 (91)	6.3×7.7	105	6.3×7.7	105	8×10	155	8×10	190	10×10	220
330	331	6.3×7.7	105	6.3×7.7	105	8×10	195	8×10	195	8×10	190	10×10	300		
470	471	8×10	210	8×10	210	8×10	210	8×10	230	10×10	300				
680	681	8×10	210	8×10	210	10×10	310	10×10	310						
1000	102	8×10	230	8×10	230	10×10	310							Case size	Rated ripple
1500	152	10×10	310	10×10	310										

Rated Ripple (mA rms) at 105°C 120Hz

( ) is also available with ϕ3mm upon request. In such a case, 2 will be put at 12th digit of type numbering system.
Size ϕ6.3×5.8 is available for capacitors marked. "●" In such a case, 6 will be put at 12th digit of type numbering system.

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

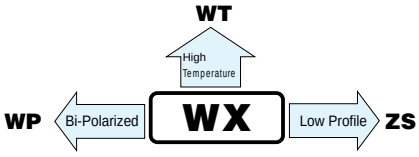
WX series

5.5mmL Chip Type

For SMD

Anti-Solvent Feature

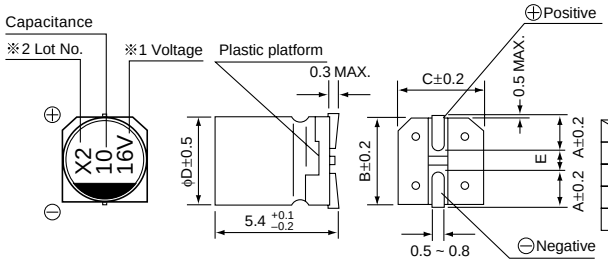
- Chip type with 5.5mm height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.
- Load life of 2000 hours at 85°C.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 330µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA) ,whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 4 / 6.3 / 10 / 16 / 25 / 35 / 50 tan δ (MAX.): 0.35 (0.40) / 0.26 (0.30) / 0.20 (0.24) / 0.16 (0.19) / 0.14 (0.16) / 0.12 (0.14) / 0.12 (0.14) Values in ( ) applicable to WR, φ3 case size.
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 4 / 6.3 / 10 / 16 / 25 / 35 / 50 Impedance ratio ZT / Z20 (MAX.) Z–25°C / Z+20°C: 7 / 4 / 3 / 2 / 2 / 2 / 2 Impedance ratio ZT / Z20 (MAX.) Z–40°C / Z+20°C: 15 / 8 / 8 / 4 / 4 / 3 / 3
Endurance	After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value (Within ±25% for 4 V and φ3,WR series units) tan δ: 200% or less of initial specified value Leakage Current: Initial specifed value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: Initial specified value or less Leakage current: Initial specified value or less
Marking	Black print on the case top.

■Chip Type

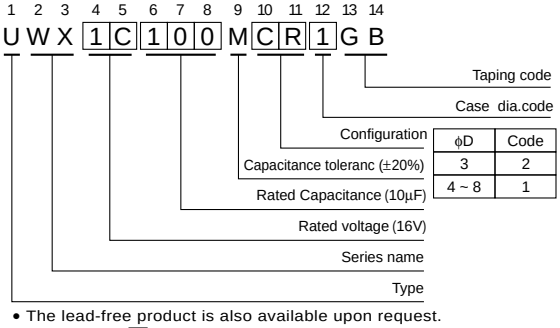


(mm)

φD	3	4	5	6.3	8
A	1.5	1.8	2.1	2.4	3.3
B	3.3	4.3	5.3	6.6	8.3
C	3.3	4.3	5.3	6.6	8.3
E	0.8	1.0	1.3	2.2	2.3

※1. Voltage mark for 6.3V is「6V」.
In case of marking for φ3 units, "V" for rated voltage is omitted.
※2. In case of marking for φ3 units, Lot No.is expressed by a digit (month code).

Type numbering system (Example : 16V 10µF)



φD	Code
3	2
4 ~ 8	1

- The lead-free product is also available upon request. In this case, L will be put at 11th digit of type numbering system.
- In the case of size φ3 in ( ),parentheses, use WX in the 2nd and 3rd digit and put a 2 in the 12th digit of type numbering system.

● Dimension table in next page.

WX series

■Dimensions

Cap. (μF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4 (3)	1.0
0.22	R22													4 (3)	2.0
0.33	R33													4 (3)	2.8
0.47	R47													4 (3)	4.0
1	010													4 (3)	8.4 (8.0)
2.2	2R2											3	8.4	4 (3)	13 (10)
3.3	3R3											3	10	4	17
4.7	4R7									4 (3)	16 (12)	4	18	● 5	20 (18)
10	100							4 (3)	23 (18)	● 5	27 (24)	● 5	29 (24)	○ 6.3	33 (30)
22	220	3	19	4 (3)	28 (21)	● 5	33 (30)	● 5	37 (30)	○ 6.3	42 (38)	○ 6.3	46 (39)	□ 8	52 (43)
33	330	4	28	● 5	37 (34)	● 5	41 (34)	○ 6.3	49 (44)	○ 6.3	52 (46)	□ 8	62 (53)	8	71
47	470	4	33	● 5	45 (40)	○ 6.3	52 (47)	○ 6.3	58 (52)	□ 8	70 (60)	8	80		
56	560	5	42	○ 6.3	52 (46)	○ 6.3	57 (50)	○ 6.3	63 (57)	□ 8	76 (65)				
100	101	5	56	○ 6.3	70 (47)	○ 6.3	76 (54)	6.3	86	8	110				
150	151	6.3	79	6.3	71	□ 8	111 (76)								
220	221	6.3	96	□ 8	110 (74)	8	135							Case size	Rated ripple
330	331	8	145	8	170										

( ) is also available with ϕ3mm upon request.

Rated Ripple (mA rms) at 85°C 120Hz

( ) = ϕ3 units and WR Series

• In the case of size ϕ3 in ( ),parentheses, use WX at 2nd and 3rd digit and put 2 at the 12th digit of type numbering system.

Size ϕ4 is available for capacitors marked. " ● "
Size ϕ5 is available for capacitors marked. " ○ "
Size ϕ6.3 is available for capacitors marked. " □ "
} In such a case, WR will be put at 2nd and 3rd digit of type numbering system.

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

PLASTIC FILM CAPACITORS

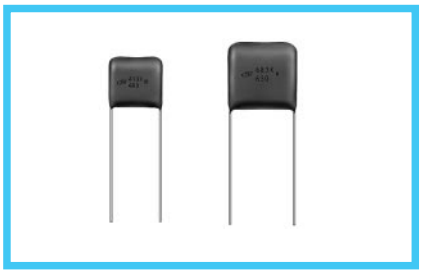
nichicon

XD

Metallized Polypropylene Film Capacitor

series (For High Frequency and Large Current Applications)

For High Frequency



- Ideal for high frequency applications due to a metallized polypropylene film dielectric which exhibits superior operative characteristics with minimal loss at high frequency.
- Electrode has minimal inductance because of non-inductive construction.
- Finished by inner dipping with liquid epoxy resin and outer coating with flame-retardant epoxy resin, those double coating gives superior characteristics against moisture.

Applications

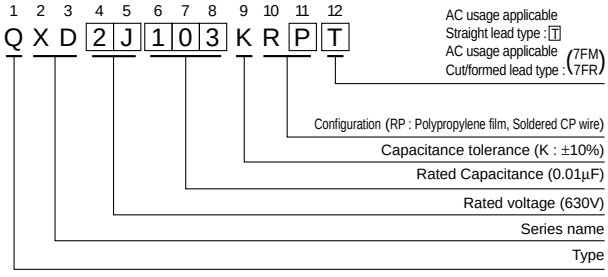
- High frequency & large current circuit applications (resonant circuit, change & discharge circuit & etc.)

Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105˚C (Rated temperature : 85˚C)
Rated Voltage (U_R)	400, 630V.D.C
Rated Capacitance Range	0.0068 ~ 0.1µF
Capacitance Tolerance	±10% (K)
Directric Loss Tangent	0.1% or less (at 1kHz)
Insulation Resistance	C ≦ 0.33µF 30000 MΩ or more C > 0.33µF 10000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals
Encapsulation	Flame retardant epoxy resin

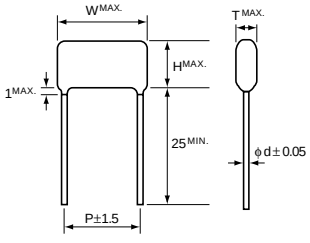
Category voltage = U_R × 0.7

Type numbering system (Example : 630V 0.01µF)

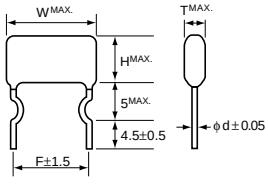


Drawing

Straight lead type



Cut/formed lead type



F Size	Code
15.0	7FM
20.0	7FR

Maximum allowable voltage to high frequency range

Maximum allowable voltage differs by frequency and it is reguested to refer the graphs shown in next page. Effective values for 200 kHz sine wave is indicated in the list below.

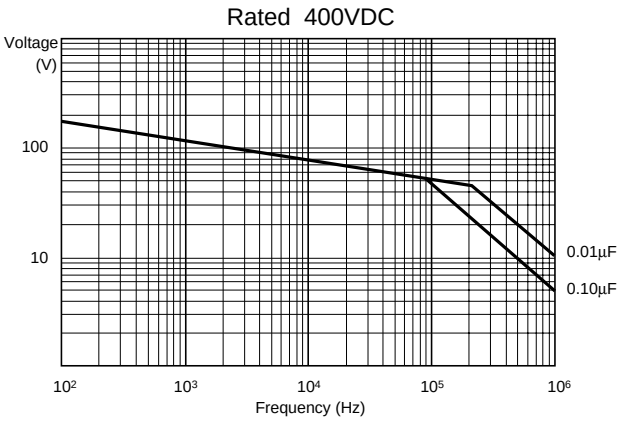
Dimensions

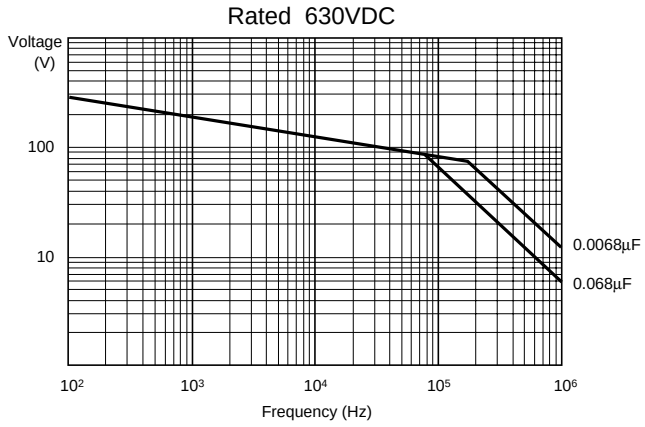
(µF) Cap.	V(Code) / Size / Code	400VDC (200VAC) (2G)						Permissible Effective Value (200kHz)		630VDC (300VAC) (2J)						Permissible Effective Value (200kHz)	
		T	W	H	d	P	F	Ve	Ie	T	W	H	d	P	F	Ve	Ie
0.0068	682									6.0	19	13.5	0.8	15	15	66	0.57
0.01	103	5.4	19	12.9	0.8	15	15	52	0.66	6.8	19	14.3	0.8	15	15	58	0.74
0.015	153	6.1	19	13.6	0.8	15	15	45	0.85	7.9	19	15.4	0.8	15	15	51	0.87
0.022	223	7.0	19	14.5	0.8	15	15	39	1.10	9.3	19	16.8	0.8	15	15	45	1.26
0.033	333	8.2	19	15.7	0.8	15	15	35	1.46	7.7	24	17.6	0.8	20	20	41	1.71
0.047	473	9.6	19	17.1	0.8	15	15	31	1.86	10.5	24	20.3	0.8	20	20	38	2.29
0.068	683	7.8	24	17.7	0.8	20	20	27	2.38	12.5	24	22.3	0.8	20	20	34	2.94
0.1	104	9.3	24	19.1	0.8	20	20	24	3.10								

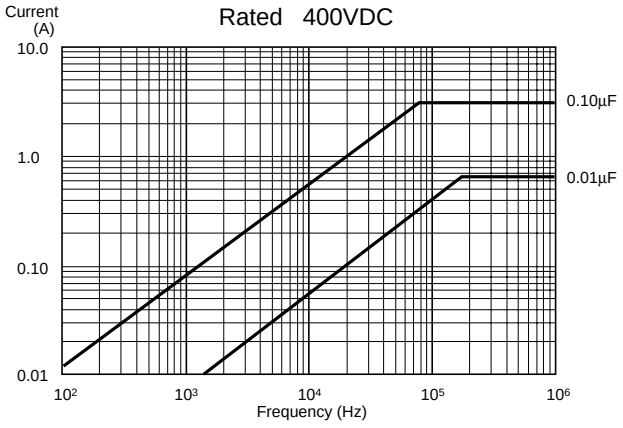
F : lead pitch for cut / formed lead wires

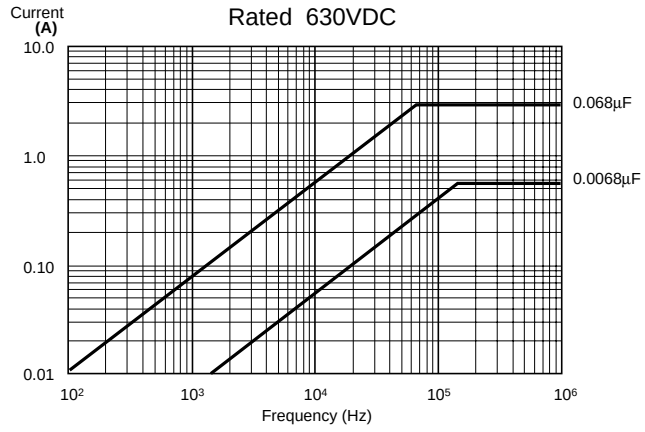
XD series

Maximum permissible voltage used at higher frequency range (Sine Wave)





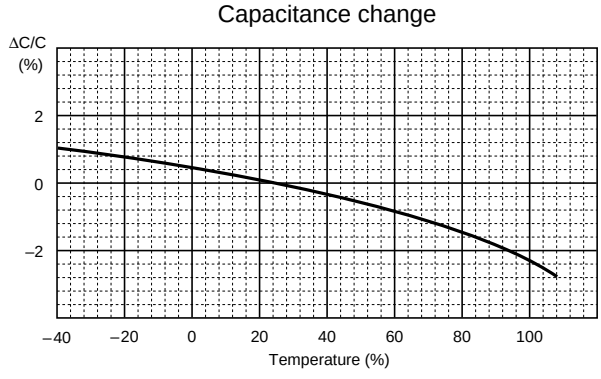


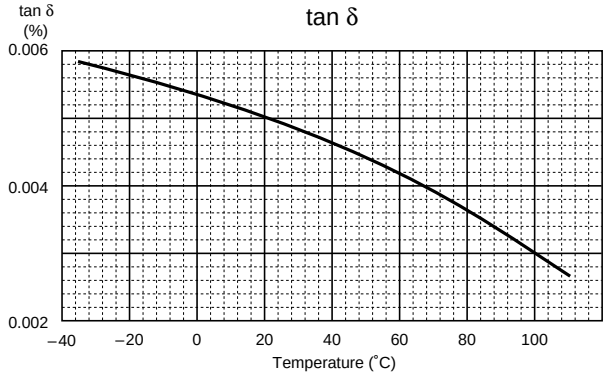


Typical Characteristic Curves

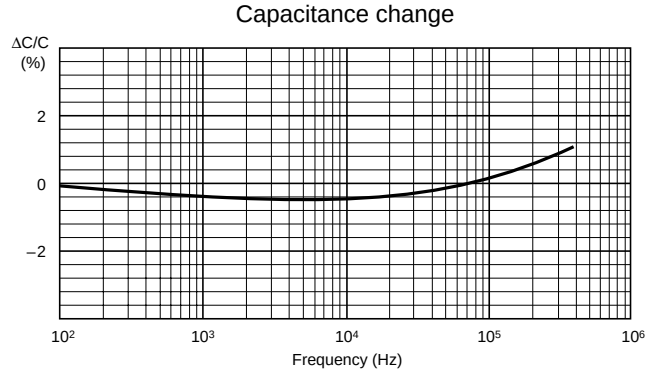
Remarks : Typical curves are as shown below.(Slightly different depending on individual rating.)

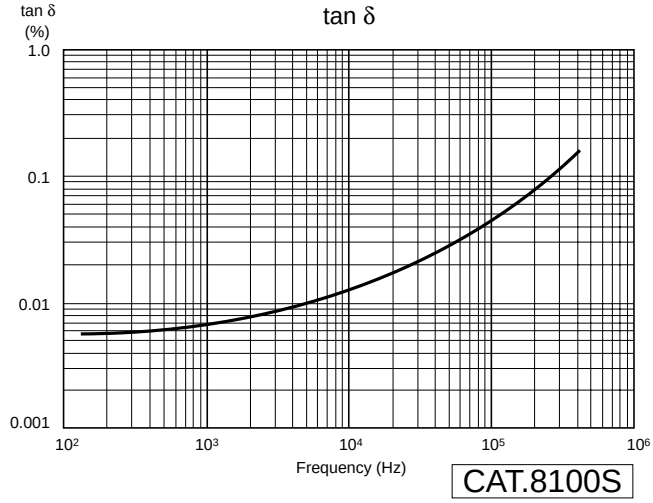
■ Temperature Characteristics





■ Frequency Characteristics





PLASTIC FILM CAPACITORS

nichicon

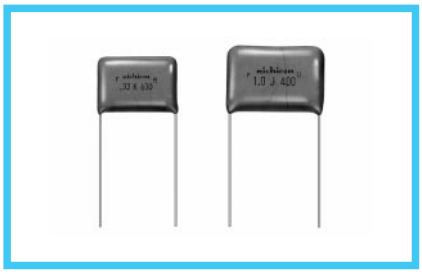
XF

Metallized Polypropylene Film Capacitor

series (For High Frequency Applications)

For High Frequency

- Ideal for high frequency applications due to a metallized polypropylene film dielectric which exhibits superior operative characteristics with minimal loss at high frequency.
- Self-healing electrode and non-inductive construction provide excellent characteristics in minimal inductance having better with standing voltage capability.
- Finished by inner dipping with liquid epoxy resin and outer coating with flame-retardant epoxy resin, those double coating gives superior characteristics against moisture.



Application

- High frequency circuit, general electronic circuit and etc.

Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +105˚C (Rated temperature : 85˚C)
Rated Voltage (U_R)	250, 400, 630, 800V.D.C.
Rated Capacitance Range	0.01 ~ 3.3μF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.1% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.33μF : 30000 MΩ or more C > 0.33μF : 10000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Flame retardant epoxy resin

Category voltage = U_R × 0.7

Type numbering system (Example : 630V 0.01μF)

1	2	3	4	5	6	7	8	9	10	11	12
Q	X	F	2	J	1	0	3	K	R	P	T

- 12: AC usage applicable / Straight lead type : T / AC usage applicable / Cut / formed lead type :
- 11: Configuration (RP : Polypropylene, Soldered CP wire)
- 9: Capacitance tolerance (J : ±5% K : ±10%)
- 7–8: Rated Capacitance (0.01μF)
- 4–5: Rated voltage (630V)
- 3: Series name
- 1–2: Type

F size	Code
12.5	7FL
17.5	7FP
22.5	7FT
27.5	7FX

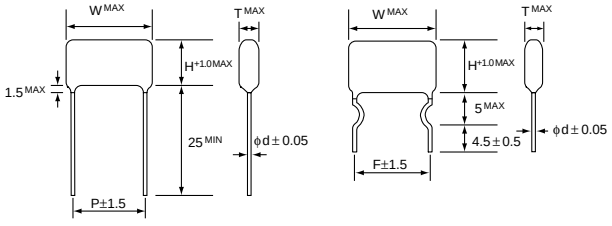
AC Rated Voltage

- AC rated voltage (Operating at 50 / 60Hz AC circuit) shall be as follows However, do not use this product for across-the-line applications.

DC Rated Voltage	250VDC	400VDC	630VDC	800VDC
AC Rated Voltage	125VAC	160VAC	200VAC	250VAC

- When used in high frequency circuit, refer to Table 2 and 4 for the values of effective voltage, current and effective VA, shown in pages 227, 230.

Drawing



Straight lead type. Cut / formed lead type.

Dimensions

Unit : mm

Cap.(μF)	Code (V (Code) / Size)	250VDC (2E)						400VDC (2G)						630VDC (2J)						800VDC (2K)					
		T	W	H	d	P	F	T	W	H	d	P	F	T	W	H	d	P	F	T	W	H	d	P	F
0.01	103													5.5	16.0	9.6	0.6	12.5	12.5	6.2	16.0	10.3	0.6	12.5	12.5
0.015	153													6.1	16.0	10.1	0.6	12.5	12.5	7.0	16.0	11.1	0.6	12.5	12.5
0.022	223							5.8	16.0	9.4	0.6	12.5	12.5	6.8	16.0	10.8	0.6	12.5	12.5	8.0	16.0	12.1	0.6	12.5	12.5
0.033	333							6.5	16.0	10.6	0.6	12.5	12.5	7.5	16.0	11.2	0.6	12.5	12.5	7.1	21.0	11.8	0.6	17.5	17.5
0.047	473	5.6	16.0	9.6	0.6	12.5	12.5	7.2	16.0	11.3	0.6	12.5	12.5	6.7	21.0	11.4	0.6	17.5	17.5	7.5	21.0	13.8	0.6	17.5	17.5
0.068	683	6.1	16.0	10.2	0.6	12.5	12.5	8.2	16.0	12.3	0.6	12.5	12.5	7.1	21.0	13.4	0.6	17.5	17.5	8.7	21.0	14.9	0.6	17.5	17.5
0.1	104	6.8	16.0	10.9	0.6	12.5	12.5	7.6	21.0	11.7	0.6	17.5	17.5	8.2	21.0	14.4	0.6	17.5	17.5	9.6	21.0	17.5	0.6	17.5	17.5
0.15	154	7.7	16.0	11.8	0.6	12.5	12.5	8.6	21.0	13.3	0.6	17.5	17.5	9.6	21.0	15.9	0.6	17.5	17.5	9.6	26.5	18.0	0.8	22.5	22.5
0.22	224	7.4	21.0	11.4	0.6	17.5	17.5	9.2	21.0	15.5	0.6	17.5	17.5	9.0	26.5	17.3	0.8	22.5	22.5	11.5	26.5	19.8	0.8	22.5	22.5
0.33	334	8.5	21.0	12.6	0.6	17.5	17.5	11.1	21.0	17.3	0.6	17.5	17.5	10.7	26.5	19.1	0.8	22.5	22.5	12.1	31.5	20.5	0.8	27.5	27.5
0.47	474	9.4	21.0	14.1	0.6	17.5	17.5	10.4	26.5	18.7	0.8	22.5	22.5	11.1	31.5	19.4	0.8	27.5	27.5	13.7	31.5	23.7	0.8	27.5	27.5
0.68	684	10.3	21.0	16.5	0.6	17.5	17.5	12.3	26.5	20.6	0.8	22.5	22.5	13.2	31.5	21.5	0.8	27.5	27.5						
1.0	105	9.9	26.5	18.2	0.8	22.5	22.5	13.0	31.5	21.3	0.8	27.5	27.5												
1.5	155	11.8	26.5	20.2	0.8	22.5	22.5	14.9	31.5	24.9	0.8	27.5	27.5												
2.2	225	12.6	31.5	20.9	0.8	27.5	27.5																		
3.3	335	14.5	31.5	24.4	0.8	27.5	27.5																		

F : lead pitch for cut / formed lead wires

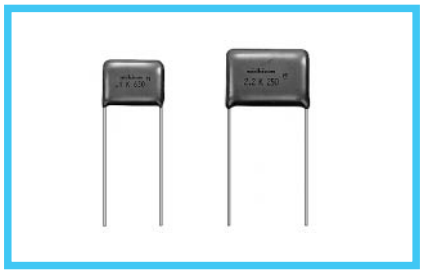
PLASTIC FILM CAPACITORS

nichicon

XJ

Metallized Polyester Film Capacitor

series (Extended Standard Type)



- Highly reliable and superior performance in high frequency applications, self-healing and non-inductive construction, using a dielectric made of polyethylene terephthalate film covered with vacuum-evaporated metal.
- Finished by inner dipping with liquid epoxy resin and outer coating with flame-retardant epoxy resin, those double coating provides excellent humidity resistance.
- Designed to be compact and to cover larger capacitance range having advantage of tolerating to A.C.voltage and large current flow.
- Designed 1mm max. of epoxy on lead wire for best performance at soldering process on P.C. board assemblies.
- Taping type (capacitor width (W) must be 20.0mm or less.) for automatic insertion system is also available.

Applications

- Filtering, DC-blocking, coupling and so on of general communications equipment and use in AC circuits for motor starting, charging / discharging, lighting, noise suppression and etc. Contact us for details for use in AC circuits.
- However, do not use this product for across-the-line applications.

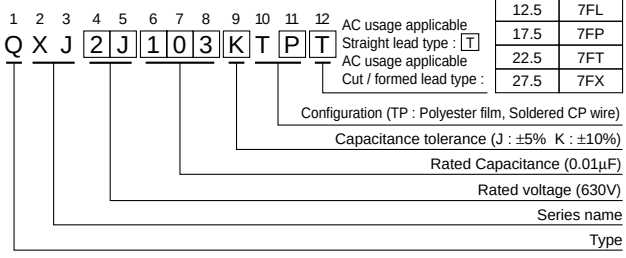
■ Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +105˚C (Rated temperature : 85˚C)
Rated Voltage (U_R)	250, 400, 630V.D.C.
Rated Capacitance Range	0.01 ~ 3.3μF
Rated Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.8% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.33μF : 9000 MΩ or more C > 0.33μF : 3000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Flame-retardant epoxy resin

Category voltage = U_R × 0.7

Type numbering system (Example : 630V 0.01μF)

F size	Code
10.0	7FJ
12.5	7FL
17.5	7FP
22.5	7FT
27.5	7FX



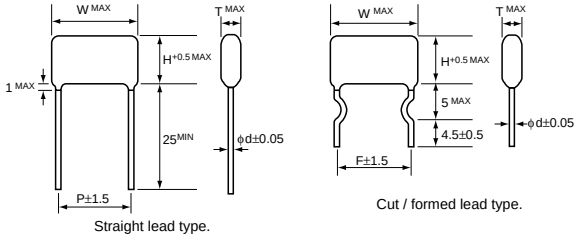
AC Rated Voltage

- AC rated voltage (Operating at 50 / 60Hz AC circuit) shall be as follows. However, do not use this product for across-the-line applications.

DC Rated Voltage	250VDC	400VDC	630VDC
AC Rated Voltage	125VAC	200VAC	250VAC

- When used in high frequency circuit, refer to Table 2 and 3 in pages 227, 230 for the values of effective voltage, current and effective VA.

■ Drawing



■ Dimensions

Unit : mm

Cap.(μF)	Code \ Size \ V(Code)	250VDC (2E)						400VDC (2G)						630VDC (2J)					
		T	W	H	d	P	F	T	W	H	d	P	F	T	W	H	d	P	F
0.01	103													4.8	15.5	8.9	0.6	12.5	12.5
0.015	153													5.5	15.5	9.5	0.6	12.5	12.5
0.022	223							4.9	13.5	9.0	0.6	10.5	10.0	6.3	15.5	10.3	0.6	12.5	12.5
0.033	333							5.6	13.5	9.7	0.6	10.5	10.0	7.1	15.5	11.8	0.6	12.5	12.5
0.047	473	4.7	13.5	8.8	0.6	10.5	10.0	5.5	15.5	9.6	0.6	12.5	12.5	6.2	20.5	11.0	0.6	17.5	17.5
0.068	683	4.7	13.5	8.8	0.6	10.5	10.0	6.3	15.5	10.4	0.6	12.5	12.5	6.7	20.5	13.0	0.6	17.5	17.5
0.1	104	5.3	13.5	9.4	0.6	10.5	10.0	7.3	15.5	11.4	0.6	12.5	12.5	7.8	20.5	14.1	0.6	17.5	17.5
0.15	154	5.5	15.5	9.6	0.6	12.5	12.5	6.6	20.5	11.3	0.6	17.5	17.5	8.0	26.0	14.8	0.8	22.5	22.5
0.22	224	6.3	15.5	10.4	0.6	12.5	12.5	7.7	20.5	12.4	0.6	17.5	17.5	8.9	26.0	17.1	0.8	22.5	22.5
0.33	334	7.4	15.5	11.5	0.6	12.5	12.5	8.6	20.5	14.8	0.6	17.5	17.5	10.9	26.0	19.3	0.8	22.5	22.5
0.47	474	6.7	20.5	11.4	0.6	17.5	17.5	10.1	20.5	16.4	0.6	17.5	17.5	11.3	31.0	19.7	0.8	27.5	27.5
0.68	684	7.2	20.5	13.5	0.6	17.5	17.5	9.5	26.0	17.9	0.8	22.5	22.5						
1.0	105	8.6	20.5	14.8	0.6	17.5	17.5	11.5	26.0	19.9	0.8	22.5	22.5						
1.5	155	8.3	26.0	16.6	0.8	22.5	22.5	12.3	31.0	20.6	0.8	27.5	27.5						
2.2	225	10.0	26.0	18.3	0.8	22.5	22.5												
3.3	335	10.7	31.0	19.1	0.8	27.5	27.5												

F : lead pitch for cut / formed lead wires

PLASTIC FILM CAPACITORS

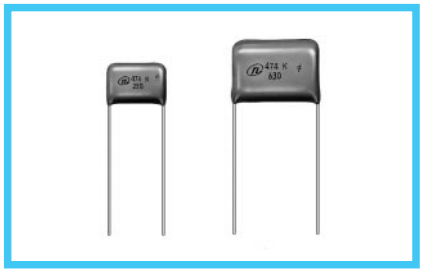
nichicon

XN

Metallized Polyester Film Capacitor

series (Extended Standard Type)

Smaller



- Highly reliable and superior performance in high frequency applications, self-healing and non-inductive construction, using a dielectric made of polyethylene terephthalate film covered with vacuum-evaporated metal.
- Large capacitance in small dimensions.
- Finished by inner dipping with liquid epoxy resin and outer coating with flame-retardant epoxy resin, those double coating provides excellent humidity resistance.
- Designed 1mm max. of epoxy on lead wire for best performance at soldering process on P.C. board assemblies.

Applications

- General electronic and communications equipment. Contact us for details for use in AC circuits.
- However, do not use this product for across-the-line applications.

Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105˚C (Rated temperature : 85˚C)
Rated Voltage (U_R)	100, 250, 400, 630V.D.C.
RatedCapacitance Range	0.01 ~ 10μF
Capacitance Tolerance	±5% (J)※, ±10% (K)
Dielectric Loss Tangent	0.8% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.33μF : 9000 MΩ or more C > 0.33μF : 3000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 175%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Flame retardant epoxy resin

※Except for 250VDC 0.01 ~ 0.15μF
400VDC 0.01 ~ 0.033μF

Category voltage = U_R × 0.7

Type numbering system (Example : 630V 0.01μF)

1 2 3 4 5 6 7 8 9 10 11
Q X N 2 J 1 0 3 K T P

F size	Code
7.5	7FG
10.0	7FJ
15.0	7FM
22.5	7FT
27.5	7FX

- Cut / formed lead type
- Configuration (TP : Polyester film, Soldered CP wire)
- Capacitance tolerance (J : ±5% K : ±10%)
- Rated Capacitance (0.01μF)
- Rated voltage (630V)
- Series name
- Type

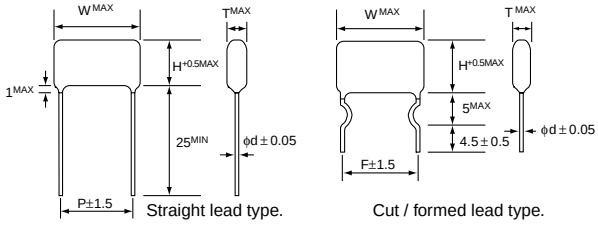
AC Rated Voltage

- AC rated voltage (Operating at 50 / 60Hz AC circuit) shall be as follows.However, do not use this product for across-the-line applications.

DC Rated Voltage	250VDC	400VDC	630VDC
AC Rated Voltage	125VAC	200VAC	250VAC

※When operating capacitors in the high frequency circuit, maximum permissible value (VAC) can be calculated from table 2, provided that the effective current (Ie) and the effective VA (Ve x Ve) shall not exceed the values specified in table 5.

Drawing



Dimensions

Unit : mm

Cap.(μF)	V(Code) / Size / Code	250VDC (2E)						400VDC (2G)						630VDC (2J)					
		T	W	H	d	P	F	T	W	H	d	P	F	T	W	H	d	P	F
0.01	103	4.4	11.0	7.6	0.6	7.5	7.5	4.4	11.0	7.6	0.6	7.5	7.5	4.4	13.5	9.0	0.6	10.0	10.0
0.015	153	5.0	11.0	8.2	0.6	7.5	7.5	5.0	11.0	8.2	0.6	7.5	7.5	4.7	13.5	9.3	0.6	10.0	10.0
0.022	223	4.4	11.0	8.0	0.6	7.5	7.5	4.3	11.0	7.9	0.6	7.5	7.5	5.1	13.5	10.3	0.6	10.0	10.0
0.033	333	4.4	11.0	8.0	0.6	7.5	7.5	4.9	11.0	8.6	0.6	7.5	7.5	5.9	13.5	11.1	0.6	10.0	10.0
0.047	473	4.0	11.0	7.6	0.6	7.5	7.5	4.7	13.5	9.3	0.6	10.0	10.0	6.4	13.5	13.2	0.6	10.0	10.0
0.068	683	4.7	11.0	8.2	0.6	7.5	7.5	5.4	13.5	10.0	0.6	10.0	10.0	5.8	18.5	11.0	0.6	15.0	15.0
0.1	104	5.2	11.0	8.9	0.6	7.5	7.5	6.1	13.5	11.2	0.6	10.0	10.0	6.4	18.5	13.2	0.6	15.0	15.0
0.15	154	6.1	11.0	9.8	0.6	7.5	7.5	5.1	18.5	11.9	0.6	15.0	15.0	7.1	18.5	15.4	0.6	15.0	15.0
0.22	224	5.9	13.5	10.5	0.6	10.0	10.0	5.9	18.5	12.7	0.6	15.0	15.0	9.6	18.5	14.8	0.6	15.0	15.0
0.33	334	6.7	13.5	11.9	0.6	10.0	10.0	7.6	18.5	12.8	0.6	15.0	15.0	7.9	25.5	16.2	0.8	22.5	22.5
0.47	474	5.5	18.5	12.3	0.6	15.0	15.0	8.3	18.5	15.1	0.6	15.0	15.0	9.4	25.5	17.7	0.8	22.5	22.5
0.68	684	6.0	18.5	14.3	0.6	15.0	15.0	7.2	25.5	15.6	0.8	22.5	22.5	11.3	25.5	19.6	0.8	22.5	22.5
1.0	105	7.1	18.5	15.5	0.6	15.0	15.0	8.7	25.5	17.1	0.8	22.5	22.5	12.0	30.5	20.5	0.8	27.5	27.5
1.5	155	9.9	18.5	15.1	0.6	15.0	15.0	9.4	30.5	18.0	0.8	27.5	27.5	14.8	30.5	23.3	0.8	27.5	27.5
2.2	225	8.1	25.5	16.5	0.8	22.5	22.5	11.5	30.5	20.0	0.8	27.5	27.5	18.5	30.5	27.5	0.8	27.5	27.5
3.3	335	10.0	25.5	18.3	0.8	22.5	22.5												
4.7	475	12.0	25.5	20.3	0.8	22.5	22.5												
6.8	685	12.7	30.5	21.3	0.8	27.5	27.5												
10.0	106	15.6	30.5	24.2	0.8	27.5	27.5												

F : lead pitch for cut / formed lead wires

PLASTIC FILM CAPACITORS

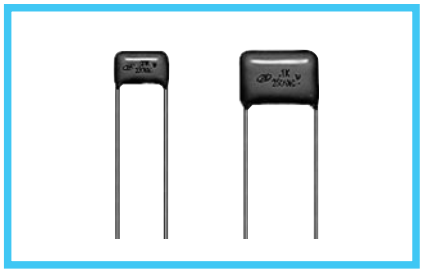
nichicon

XU

Metallized Polyester Film Capacitor

series for 105˚C (Electrical Appliance and Material Control Law (Japan) approved for AC power source)

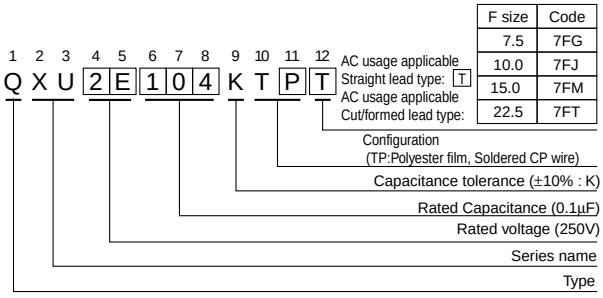
- Highly reliable and superior in high frequency applications, self-healing and non-inductive construction, using a dielectric of metallized polyester film.
- Finished by inner dipping, with liquid epoxy resin and outer coating with flame-retardant epoxy resin, those double coatings provide excellent humidity resistance.
- Designed in a small and compact size, but yet with higher capacitance, for high density mounting.



Specifications

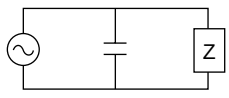
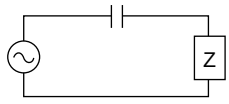
Item	Performance Characteristics
Category Temperature Range	−40 ~ +105˚C
Rated Voltage	125, 250VAC
Rated Capacitance Range	Safety performance A1 0.01 ~ 0.47µF Safety performance C1 0.01 ~ 1.0µF
Capacitance Tolerance	±10% (K)
Dielectric Loss Tangent	1.0% or less (at 1kHz 20˚C)
Insulation Resistance	C ≦ 0.47µF 2000 MΩ or more C > 0.47µF 1000 ΩF or more
Withstand Voltage	Between Terminals : Rated Voltage × 2.3VAC 1min. (Safety performance : A1) Rated Voltage × 1.75VAC 1 min. (Safety performance : C1) Between Terminals Coverage : (Rated Voltage 125VAC) 1000VAC 1 min. (Rated Voltage 250VAC) 1500VAC 1 min.
Encapsulation	Flame-retardant epoxy resin

Type numbering system (Example : 250VAC 0.1µF)



F size	Code
7.5	7FG
10.0	7FJ
15.0	7FM
22.5	7FT

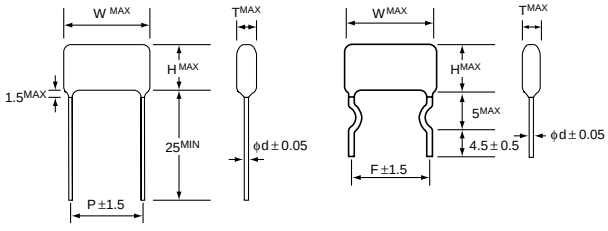
Safety performance

Symbol	A1	C1
	Connected with load in parallel	Connected with load in series
Connecting Condition		
Capacitance	0.01 ~ 0.47µF	0.1 ~ 1.0µF

Note : When using capacitors as an across-the-line capacitor, at least either one of the conditions shown below has to be fulfilled:

1) A varistor of 2 times or below of rated voltage shall be connected with a capacitor in parallel.
2) Pulse of higher than rated voltage × 2 shall not be applied to both terminals of capacitor.

Drawing



Straight lead type. Cut / formed lead type.

Dimensions

Unit : mm

Cap.(µF)	V(Code) / Code / Size	125VAC (2B) T	W	H	d	P	F	250VAC (2E) T	W	H	d	P	F
0.01	103							4.4	13.5	9.5	0.6	10.0	10.0
0.015	153							4.7	13.5	9.8	0.6	10.0	10.0
0.022	223	4.3	11.0	7.9	0.6	7.5	7.5	5.1	13.5	10.8	0.6	10.0	10.0
0.033	333	4.6	11.0	8.2	0.6	7.5	7.5	5.9	13.5	11.6	0.6	10.0	10.0
0.047	473	5.1	11.0	8.8	0.6	7.5	7.5	6.4	13.5	13.7	0.6	10.0	10.0
0.068	683	5.8	11.0	9.5	0.6	7.5	7.5	5.8	18.5	11.5	0.6	15.0	15.0
0.1	104	6.8	11.0	10.4	0.6	7.5	7.5	6.4	18.5	13.7	0.6	15.0	15.0
0.15	154	6.5	13.5	11.1	0.6	10.0	10.0	7.1	18.5	15.9	0.6	15.0	15.0
0.22	224	7.6	13.5	12.2	0.6	10.0	10.0	9.6	18.5	15.3	0.6	15.0	15.0
0.33	334	6.7	18.5	11.9	0.6	15.0	15.0	7.9	25.5	16.7	0.8	22.5	22.5
0.47	474	7.7	18.5	12.9	0.6	15.0	15.0	9.4	25.5	18.2	0.8	22.5	22.5
0.68	684	9.1	18.5	14.3	0.6	15.0	15.0						
1.0	105	8.0	25.5	15.3	0.8	22.5	22.5						

F : lead pitch for cut / formed lead wires.

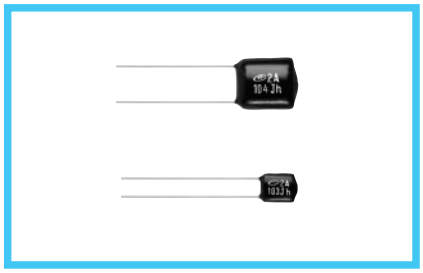
PLASTIC FILM CAPACITORS

nichicon

YK

Foil Type Polyester & Polypropylene Film Capacitor

series (Timing Circuit Use)

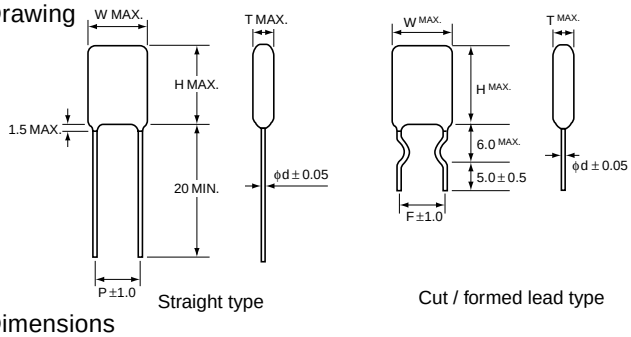


- Since both polyester and polypropylene film are combined and utilized as the dielectric, the dielectric dissipation factor and capacitance change over the category temperature of this series is minimial. Therefore, this series is the most suitable for audio equalizers and Dolby circuits.
- Coated with epoxy resin (Darkish gray colored) for superior heat resistance, humidity resistance and solvent resistance.

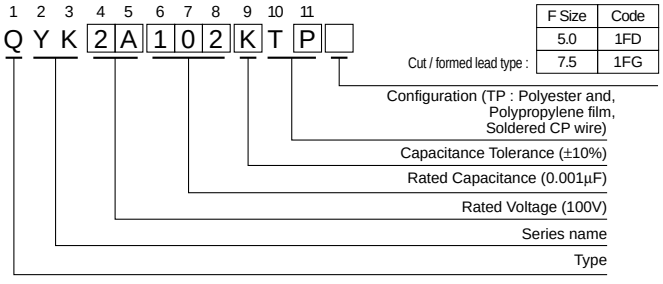
Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85˚C
Rated Voltage	100V.D.C.
Rated Capacitance Range	0.001 ~ 0.47μF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.5% or less (at 1kHz 20˚C)
Insulation Resistance	30,000 MΩ or more
Withstand Voltage	Between Terminals : Rated Voltage × 250%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Epoxy resin

Drawing



Type numbering system (Example : 100V 0.001μF)



Dimensions

Straght lead type

Rated voltage (VDC)	Cap. (μF)	Code	Size (mm)				
			T	W	H	d	P
100 (2A)	**0.001**	102	4.0	6.5	8.0	0.5	3.5
	0.0012	122	4.0	6.5	8.0	0.5	3.5
	0.0015	152	4.5	6.5	8.0	0.5	3.5
	0.0018	182	4.5	6.5	8.0	0.5	3.5
	0.0022	222	4.5	6.5	8.0	0.5	3.5
	0.0027	272	4.5	6.5	8.0	0.5	3.5
	0.0033	332	4.5	7.0	8.0	0.5	3.5
	0.0039	392	5.0	7.0	8.0	0.5	3.5
	0.0047	472	5.0	7.0	8.0	0.5	3.5
	0.0056	562	5.0	7.5	8.0	0.5	3.5
	0.0068	682	5.0	7.5	8.5	0.5	3.5
	0.0082	822	5.0	7.5	8.5	0.5	3.5
	0.01	103	5.5	8.0	9.5	0.5	3.5
	0.012	123	5.5	8.0	9.5	0.5	3.5
	0.015	153	6.0	8.5	11.5	0.5	3.5
	0.018	183	6.0	9.0	11.5	0.5	3.5
	0.022	223	6.0	9.5	11.5	0.5	5.0
	0.027	273	6.5	10.0	11.5	0.5	5.0
	0.033	333	7.0	10.5	11.5	0.5	5.0
	0.039	393	7.0	10.5	12.5	0.5	5.0
	0.047	473	7.5	10.5	12.5	0.5	5.0
	0.056	563	8.0	11.0	12.5	0.5	5.0
	0.068	683	8.5	12.0	12.5	0.5	5.0
	0.082	823	8.0	12.0	14.0	0.5	7.5
	0.1	104	8.0	12.5	14.0	0.5	7.5
	0.12	124	9.0	12.5	14.0	0.5	7.5
	0.15	154	10.0	14.0	14.0	0.5	7.5
	0.18	184	10.0	15.0	17.0	0.5	10.0
	0.22	224	11.0	16.0	17.0	0.5	10.0
	0.33	334	11.0	16.5	22.0	0.6	10.0
	0.47	474	12.5	18.0	22.0	0.6	10.0

Cut / formed lead type

Rated voltage (VDC)	Cap. (μF)	Code	Size (mm)				
			T	W	H	d	F
100 (2A)	**0.001**	102	4.0	6.5	8.0	0.5	5.0
	0.0012	122	4.0	6.5	8.0	0.5	5.0
	0.0015	152	4.5	6.5	8.0	0.5	5.0
	0.0018	182	4.5	6.5	8.0	0.5	5.0
	0.0022	222	4.5	6.5	8.0	0.5	5.0
	0.0027	272	4.5	6.5	8.0	0.5	5.0
	0.0033	332	4.5	7.0	8.0	0.5	5.0
	0.0039	392	5.0	7.0	8.0	0.5	5.0
	0.0047	472	5.0	7.0	8.0	0.5	5.0
	0.0056	562	5.0	7.5	8.0	0.5	5.0
	0.0068	682	5.0	7.5	8.5	0.5	5.0
	0.0082	822	5.0	7.5	8.5	0.5	5.0
	0.01	103	5.5	8.0	9.5	0.5	5.0
	0.012	123	5.5	8.0	9.5	0.5	5.0
	0.015	153	6.0	8.5	11.5	0.5	5.0
	0.018	183	6.0	9.0	11.5	0.5	5.0
	0.022	223	6.0	9.5	11.5	0.5	5.0
	0.027	273	6.5	10.0	11.5	0.5	5.0
	0.033	333	7.0	10.5	11.5	0.5	5.0
	0.039	393	7.0	10.5	12.5	0.5	5.0
	0.047	473	7.5	10.5	12.5	0.5	5.0
	0.056	563	8.0	11.0	12.5	0.5	7.5
	0.068	683	8.5	12.0	12.5	0.5	7.5
	0.082	823	8.0	12.0	14.0	0.5	7.5
	0.1	104	8.0	12.5	14.0	0.5	7.5
	0.12	124	9.0	12.5	14.0	0.5	7.5
	0.15	154	10.0	14.0	14.0	0.5	7.5
	0.18	184	10.0	15.0	17.0	0.5	7.5
	0.22	224	11.0	16.0	17.0	0.5	7.5
	0.33	334	11.0	16.5	22.0	0.6	7.5
	0.47	474	12.5	18.0	22.0	0.6	7.5

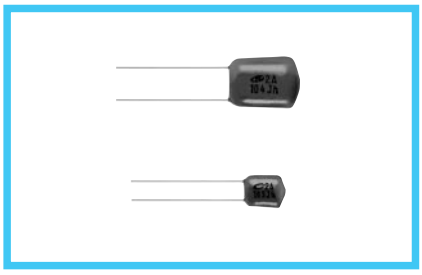
PLASTIC FILM CAPACITORS

nichicon

YR

Foil Type Polypropylene Film Capacitor

series (For High frequency Applications)

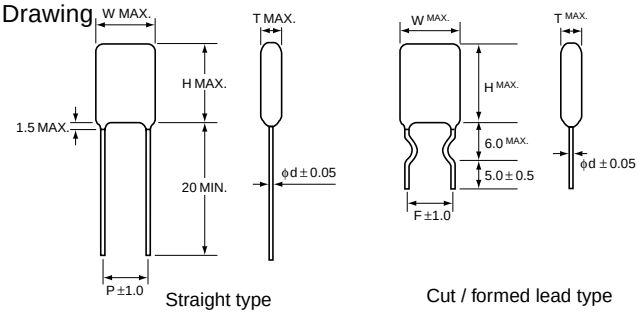


- Since polypropylene film is utilized as the dielectric, the dielectric dissipation factor of this series is extremely low and the frequency characteristics are excellent. Thus, the series is suitable for frequency circuits like those used in communication equipment and audio applications.
- Coated with epoxy resin (orange colored) for superior heat resistance, humidity resistance and solvent resistance.

Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage	100V.D.C.
Rated Capacitance Range	0.001 ~ 0.22μF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.1% or less (at 1kHz 20˚C)
Insulation Resistance	30,000 MΩ or more
Withstand Voltage	Between Terminals : Rated Voltage × 250%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Epoxy resin

Drawing



Straight type

Cut / formed lead type

Type numbering system (Example : 100V 0.001μF)

1 2 3 4 5 6 7 8 9 10 11

Q Y R 2 A 1 0 2 K R P

F Size	Code
5.0	1FD
7.5	1FG

Cut/formed lead-type :

Configuration (RP : Polypropylene film, Soldered CP wire)

Capacitance tolerance (±10%)

Rated Capacitance (0.001μF)

Rated Voltage (100V)

Series name

Type

Dimensions

Straight lead type

Rated voltage (VDC)	Cap. (μF)	Code	Size (mm)				
			T	W	H	d	P
100 (2A)	**0.001**	102	4.0	6.0	8.5	0.5	3.5
	0.0012	122	4.0	7.0	8.5	0.5	3.5
	0.0015	152	4.0	7.0	8.5	0.5	3.5
	0.0018	182	4.0	7.0	8.5	0.5	3.5
	0.0022	222	4.0	7.0	8.5	0.5	3.5
	0.0027	272	4.0	7.0	8.5	0.5	3.5
	0.0033	332	4.0	7.0	8.5	0.5	3.5
	0.0039	392	4.0	7.0	8.5	0.5	3.5
	0.0047	472	4.0	7.0	8.5	0.5	3.5
	0.0056	562	4.0	7.0	8.5	0.5	3.5
	0.0068	682	4.0	7.0	8.5	0.5	3.5
	0.0082	822	4.0	7.0	8.5	0.5	3.5
	0.01	103	5.0	7.5	9.5	0.5	3.5
	0.012	123	5.0	8.0	9.5	0.5	3.5
	0.015	153	5.5	8.0	10.5	0.5	5.0
	0.018	183	6.0	8.5	10.5	0.5	5.0
	0.022	223	6.0	9.0	13.0	0.5	5.0
	0.027	273	6.5	9.0	13.0	0.5	5.0
	0.033	333	7.0	9.5	13.5	0.5	5.0
	0.039	393	7.0	10.0	14.0	0.5	5.0
	0.047	473	7.0	11.0	15.5	0.5	7.5
	0.056	563	7.0	11.5	16.0	0.5	7.5
	0.068	683	8.0	11.5	16.0	0.5	7.5
	0.082	823	8.5	12.0	16.5	0.5	7.5
	0.1	104	9.5	12.5	16.5	0.5	7.5
	0.12	124	10.0	13.5	17.0	0.5	7.5
	0.15	154	9.5	14.0	21.5	0.5	10.0
	0.18	184	10.0	14.5	21.5	0.5	10.0
	0.22	224	10.0	15.0	21.5	0.5	10.0

Cut / formed lead type

Rated voltage (VDC)	Cap. (μF)	Code	Size (mm)				
			T	W	H	d	F
100 (2A)	**0.001**	102	4.0	6.0	8.5	0.5	5.0
	0.0012	122	4.0	7.0	8.5	0.5	5.0
	0.0015	152	4.0	7.0	8.5	0.5	5.0
	0.0018	182	4.0	7.0	8.5	0.5	5.0
	0.0022	222	4.0	7.0	8.5	0.5	5.0
	0.0027	272	4.0	7.0	8.5	0.5	5.0
	0.0033	332	4.0	7.0	8.5	0.5	5.0
	0.0039	392	4.0	7.0	8.5	0.5	5.0
	0.0047	472	4.0	7.0	8.5	0.5	5.0
	0.0056	562	4.0	7.0	8.5	0.5	5.0
	0.0068	682	4.0	7.0	8.5	0.5	5.0
	0.0082	822	4.0	7.0	8.5	0.5	5.0
	0.01	103	5.0	7.5	9.5	0.5	5.0
	0.012	123	5.0	8.0	9.5	0.5	5.0
	0.015	153	5.5	8.0	10.5	0.5	5.0
	0.018	183	6.0	8.5	10.5	0.5	5.0
	0.022	223	6.0	9.0	13.0	0.5	5.0
	0.027	273	6.5	9.0	13.0	0.5	5.0
	0.033	333	7.0	9.5	13.5	0.5	5.0
	0.039	393	7.0	10.0	14.0	0.5	5.0
	0.047	473	7.0	11.0	15.5	0.5	7.5
	0.056	563	7.0	11.5	16.0	0.5	7.5
	0.068	683	8.0	11.5	16.0	0.5	7.5
	0.082	823	8.5	12.0	16.5	0.5	7.5
	0.1	104	9.5	12.5	16.5	0.5	7.5
	0.12	124	10.0	13.5	17.0	0.5	7.5
	0.15	154	9.5	14.0	21.5	0.5	7.5
	0.18	184	10.0	14.5	21.5	0.5	7.5
	0.22	224	10.0	15.0	21.5	0.5	7.5

nichicon

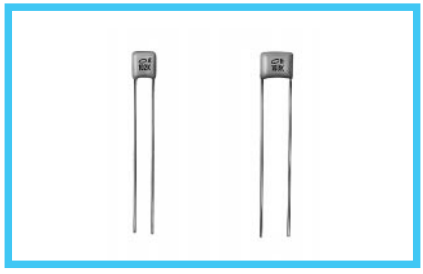
YS.YP

Foil Type Polyester Film Capacitor

series (Low Profile Super Miniature Type, Coating with Clear-yellow Resin)

Smaller

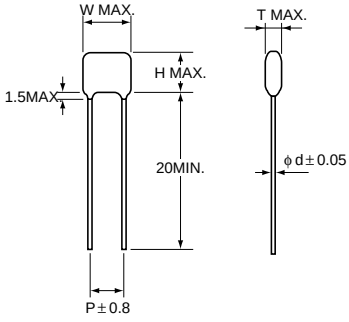
- YS—Extremely small in dimensions both of height and body width, and light in weight compared with YX series.
  Superior performance in high density assemblies, reducing total thickness of electronic devices.
  Applicable to automatic insertion machine.
- YP—Unified 5mm lead spacing for all ratings, low-profile size.
  Optimum for high density assemblies on PC board, due to 5mm straight lead spacing.
  Applicable to automatic insertion machine.



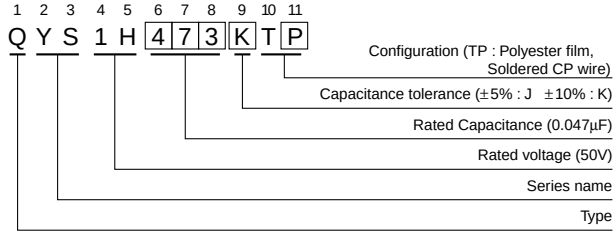
Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85˚C
Rated Voltage	50V.D.C.
Rated Capacitance Range	0.001 ~ 0.47µF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.8% or less (at 1kHz 20˚C)
Insulation Resistance	30,000 MΩ or more
Withstand Voltage	Between Terminals : Rated Voltage × 250%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Epoxy resin

Drawing



Type numbering system (Example : 50V 0.047µF)



Dimensions

Unit : mm

Series		YS					YP				
V (Code)		50VDC (1H)					50VDC (1H)				
Cap.(µF)	Code / Size	T	W	H	d	P	T	W	H	d	P
0.001	102	3.0	5.0	5.5	0.5	3.5	3.0	6.5	5.5	0.5	5.0
0.0015	152	3.0	5.0	5.5	0.5	3.5	3.0	6.5	5.5	0.5	5.0
0.0022	222	3.0	5.5	5.5	0.5	3.5	3.0	6.5	5.5	0.5	5.0
0.0033	332	3.0	5.5	5.5	0.5	3.5	3.0	6.5	5.5	0.5	5.0
0.0047	472	3.0	6.0	5.5	0.5	3.5	3.0	6.5	5.5	0.5	5.0
0.0068	682	3.0	6.0	5.5	0.5	3.5	3.5	6.5	5.5	0.5	5.0
0.01	103	3.5	6.5	5.5	0.5	3.5	3.5	6.5	5.5	0.5	5.0
0.015	153	3.5	6.5	5.5	0.5	3.5	3.5	7.0	5.5	0.5	5.0
0.022	223	4.0	7.0	5.5	0.5	3.5	4.0	7.5	5.5	0.5	5.0
0.033	333	5.0	7.5	6.0	0.5	3.5	5.0	8.0	6.0	0.5	5.0
0.047	473	5.5	8.5	6.0	0.5	5.0	5.5	8.5	6.0	0.5	5.0
0.068	683	5.5	8.5	7.0	0.5	5.0	5.5	8.5	7.0	0.5	5.0
0.1	104	6.5	9.5	7.5	0.5	5.0	6.5	9.5	7.5	0.5	5.0
0.15	154	6.0	9.5	10.0	0.5	5.0					
0.22	224	6.5	10.5	11.0	0.5	7.5					
0.33	334	7.0	11.0	13.0	0.6	7.5					
0.47	474	8.5	12.5	13.0	0.6	7.5					

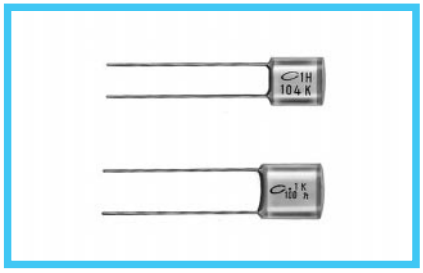
PLASTIC FILM CAPACITORS

nichicon

YX

Foil Type Polyester Film Capacitor

series (Standard type, Coating with Clear-yellow Resin)

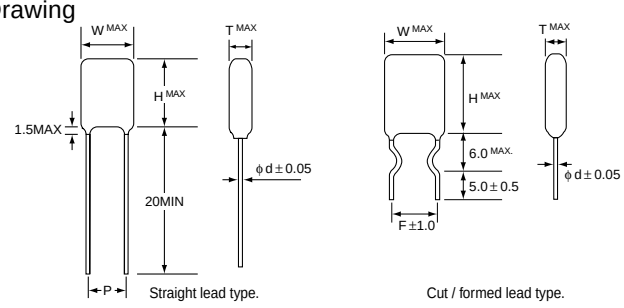


- Inductive construction, using a dielectric of polyester film together with aluminum foil.
- Coated with epoxy resin for superior heat resistance, humidity resistance and solvent resistance.
- Suited for use in commercial and industrial applications.
- Available for automatic insertion systems.

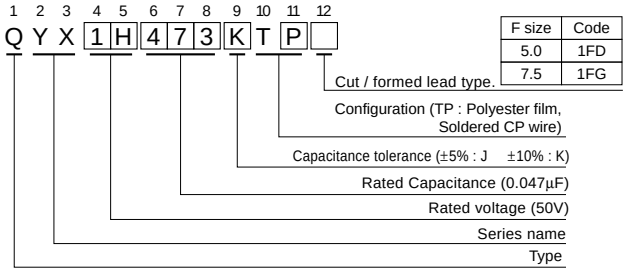
Specifications

Item	Performance Characteristics
Category Temperature Range	−40 ~ +85˚C
Rated Voltage	50, 100V.D.C.
Rated Capacitance Range	0.001~ 0.47µF
Capacitance Tolerance	±5% (J), ±10% (K)
Dielectric Loss Tangent	0.8% or less (at 1kHz 20˚C)
Insulation Resistance	30,000 MΩ or more
Withstand Voltage	Between Terminals : Rated Voltage × 250%, 1 ~ 5 secs. Between Terminals and Coverage : Rated Voltage × 200%, 1 ~ 5 secs.
Encapsulation	Epoxy resin

Drawing



Type numbering system (Example : 50V 0.047µF)



F size	Code
5.0	1FD
7.5	1FG

Dimensions

Unit : mm

Cap.(µF) \ Code \ V (Code) Size		50VDC (1H)						100VDC (2A)					
		T	W	H	d	P	F	T	W	H	d	P	F
0.001	102	2.5	5.0	7.0	0.5	3.5 ± 0.75	5.0	2.8	5.5	10.0	0.5	$3.5^{+1.0}_{-0.8}$	5.0
0.0012	122	2.5	5.0	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0015	152	2.5	5.0	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0018	182	2.5	5.5	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0022	222	3.0	5.5	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0027	272	3.0	5.5	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0033	332	3.0	5.5	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0039	392	3.0	5.5	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0047	472	3.0	6.0	7.0	0.5	3.5	5.0	2.8	5.5	10.5	0.5	3.5	5.0
0.0056	562	3.0	6.0	7.0	0.5	3.5	5.0	2.8	6.0	10.5	0.5	5.0 ± 1.0	5.0
0.0068	682	3.0	6.0	7.0	0.5	3.5	5.0	2.8	6.0	10.5	0.5	5.0	5.0
0.0082	822	3.0	6.0	7.0	0.5	3.5	5.0	3.0	6.5	10.5	0.5	5.0	5.0
0.01	103	3.0	6.0	7.0	0.5	3.5	5.0	3.0	6.5	10.5	0.5	5.0	5.0
0.012	123	3.5	6.0	7.0	0.5	3.5	5.0	3.0	6.5	11.5	0.5	5.0	5.0
0.015	153	3.5	6.0	8.5	0.5	3.5	5.0	3.0	6.5	11.5	0.5	5.0	5.0
0.018	183	3.5	6.5	8.5	0.5	3.5	5.0	3.5	6.5	11.5	0.5	5.0	5.0
0.022	223	3.5	6.5	9.0	0.5	3.5	5.0	3.5	7.0	11.5	0.5	5.0	5.0
0.027	273	3.5	6.5	9.0	0.5	3.5	5.0	3.5	7.5	11.5	0.5	5.0	5.0
0.033	333	4.0	7.0	9.0	0.5	3.5	5.0	3.5	7.5	11.5	0.5	5.0	5.0
0.039	393	4.0	7.0	9.0	0.5	3.5	5.0	4.5	8.5	12.5	0.5	5.0	5.0
0.047	473	4.5	7.5	9.5	0.5	5.0 ± 1.0	5.0	4.5	8.5	12.5	0.5	5.0	5.0
0.056	563	4.5	7.5	9.5	0.5	5.0	5.0	4.5	9.5	12.5	0.5	$7.5^{+1.0}_{-1.2}$	7.5
0.068	683	4.5	8.0	9.5	0.5	5.0	5.0	4.5	9.5	12.5	0.5	7.5	7.5
0.082	823	5.5	8.0	9.5	0.5	5.0	5.0	5.5	11.0	12.5	0.5	7.5	7.5
0.1	104	5.5	9.0	10.5	0.5	5.0	5.0	5.5	11.0	12.5	0.5	7.5	7.5
0.12	124	5.5	9.0	10.5	0.5	5.0	5.0	6.0	12.5	14.0	0.5	$10.0^{+1.0}_{-1.2}$	7.5
0.15	154	6.5	10.0	12.0	0.5	5.0	5.0	6.0	12.5	14.0	0.5	10.0	7.5
0.18	184	6.5	10.5	12.0	0.5	5.0	5.0	7.0	14.0	14.0	0.5	10.0	7.5
0.22	224	6.5	11.0	12.0	0.5	$7.5^{+1.0}_{-1.2}$	7.5	7.0	14.0	14.0	0.5	10.0	7.5
0.27	274	8.0	12.5	14.5	0.6	7.5	7.5	8.0	14.5	17.0	0.6	10.0	7.5
0.33	334	8.0	12.5	14.5	0.6	7.5	7.5	8.0	14.5	17.0	0.6	10.0	7.5
0.39	394	9.5	14.0	15.0	0.6	7.5	7.5	9.5	16.5	17.0	0.6	10.0	7.5
0.47	474	9.5	14.0	15.0	0.6	7.5	7.5	9.5	16.5	17.0	0.6	10.0	7.5

F : lead pitch for cut / formed lead wires.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ZD

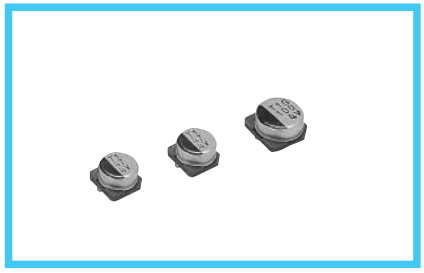
3.0mmL Chip Type

series

For SMD | Smaller | Anti-Solvent Feature

- Chip type with 3.0mmL height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

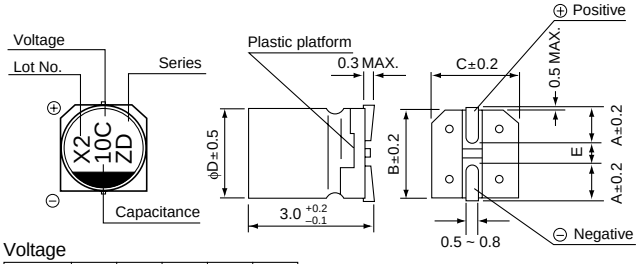
ZR → Smaller → ZD



■Specifications

Item	Performance Characteristics							
Category Temperature Range	–40 ~ +85°C							
Rated Voltage Range	4 ~ 25V							
Rated Capacitance Range	2.2 ~ 100μF							
Capacitance Tolerance	±20% at 120Hz, 20°C							
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA) , whichever is greater.							
tan δ	Rated voltage (V)		4	6.3	10	16	25	120Hz 20°C
	tan δ (MAX.)		0.50	0.40	0.30	0.24	0.19	
Stability at Low Temperature	Rated voltage (V)		4	6.3	10	16	25	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	
		Z–40°C / Z+20°C	15	8	8	4	4	
Endurance	After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.	Capacitance change: Within ±30% of initial value; tan δ: 300% or less of initial specified value; Leakage current: Initial specified value or less						
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.							
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.	Capacitance change: Within ±10% of initial value; tan δ: Initial specified value or less; Leakage current: Initial specified value or less						
Marking	Black print on the case top.							

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Voltage

V	4	6.3	10	16	25
Code	g	j	A	C	E

Type numbering system (Example : 16V 10μF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U Z D 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10μF)
- Rated voltage (16V)
- Series name
- Type

■Dimensions

Cap. (μF) \ V	Code	4		6.3		10		16		25	
		0G		0J		1A		1C		1E	
2.2	2R2									4	7
3.3	3R3									4	11
4.7	4R7									4	16
5.6	5R6									5	18
6.8	6R8									5	20
10	100							5	23	6.3	27
22	220	4	20	5	28	5	33	6.3	37		
33	330	5	28	5	37	6.3	41				
47	470	5	33	6.3	45					Case Size	Rated ripple
100	101	6.3	56	6.3	70						

Rated Ripple (mA rms) at 85°C 120Hz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

● Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ZE series

3.95mmL MAX. Chip Type, Bi-polarized

For SMD | Smaller | Bi-polarized | Anti-Solvent Feature

- Chip type with 3.95mmL MAX, height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

ZP → Smaller → ZE

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 47µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05 CV or 10 (µA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.30	0.24	0.20	0.18	0.16	0.16

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	4	3	2	2	2	2
	Z–40°C / Z+20°C	8	8	4	4	3	3

Eudurance — After 1000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±30% of initial value
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

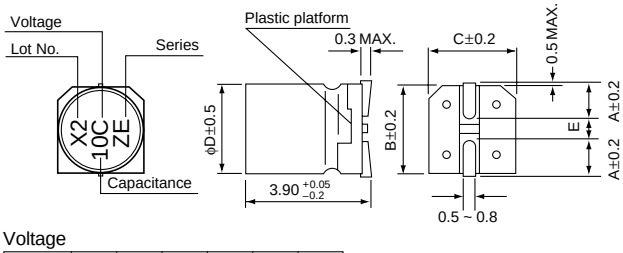
Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours,they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature,they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Voltage

V	6.3	10	16	25	35	50
Code	j	A	C	E	V	H

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
U Z E 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

■Dimensions

Cap. (µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	1.0
0.22	R22											4	2.0
0.33	R33											4	2.8
0.47	R47											4	4.0
1	010											4	8.4
2.2	2R2									4	8.4	5	13
3.3	3R3							5	12	5	16	5	17
4.7	4R7					4	12	5	16	5	18	6.3	20
10	100			4	17	5	23	6.3	27	6.3	29		
22	220	5	28	6.3	33	6.3	37						
33	330	6.3	37	6.3	41	6.3	49						
47	470	6.3	45									Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

● Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ZG

3.95mmL MAX. Chip Type, Wide Temperature Range series

For SMD | Smaller | Anti-Solvent Feature

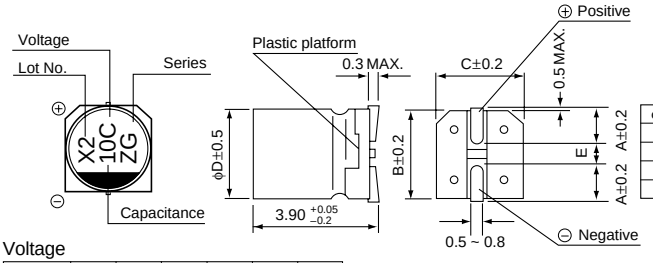
- Chip type with 3.95mmLMAX height. Operating over wide temperature range of –40 ~ +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

ZT → Smaller → ZG

■Specifications

Item	Performance Characteristics								
Category Temperature Range	–40 ~ +105°C								
Rated Voltage Range	6.3 ~ 50V								
Rated Capacitance Range	0.1 ~ 100μF								
Capacitance Tolerance	±20% at 120Hz, 20°C								
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA) , whichever is greater.								
tan δ	Rated voltage (V)		6.3	10	16	25	35	50	120Hz 20°C
	tan δ (MAX.)		0.38	0.32	0.20	0.16	0.14	0.14	
Stability at Low Temperature	Rated voltage (V)		6.3	10	16	25	35	50	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	6	5	3	3	3	3	
		Z–40°C / Z+20°C	10	10	6	6	4	4	
Endurance	After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.								
	Capacitance change	Within ±30% of initial value							
	tan δ	300% or less of initial specified value							
	Leakage current	Initial specified value or less							
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.								
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.								
	Capacitance change	Within ±10% of initial value							
	tan δ	Initial specified value or less							
	Leakage current	Initial specified value or less							
Marking	Black print on the case top.								

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Voltage

V	6.3	10	16	25	35	50
Code	j	A	C	E	V	H

Type numbering system (Example : 16V 10μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Z	G	1	C	1	0	0	M	C	R	1	G	B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10μF)
- Rated voltage (16V)
- Series name
- Type

■Dimensions

Cap. (μF)	V / Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	0.9
0.22	R22											4	2.2
0.33	R33											4	2.8
0.47	R47											4	3.3
1	010											4	5.4
2.2	2R2											4	9.6
3.3	3R3											4	12
4.7	4R7							4	11	4	13	5	16
10	100					4	16	5	20	5	22	6.3	26
22	220	4	19	5	24	5	26	6.3	33	6.3	36		
33	330	5	26	5	30	6.3	35	6.3	42				
47	470	5	32	6.3	40	6.3	44						
100	101	6.3	52									Case size	Rated ripple

Rated Ripple (mA rms) at 105°C 120Hz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

- Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ZP series

4.5mmL Chip Type, Bi-Polarized

For SMD | Smaller | Bi-polarized | Anti-Solvent Feature

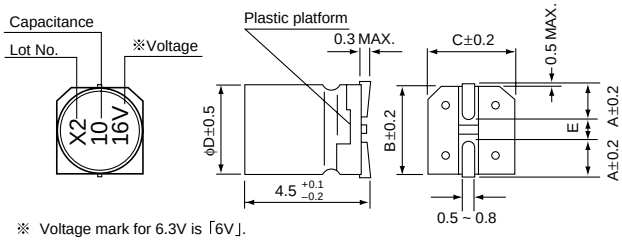
- Chip type with 4.5mm height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

ZP ← Bi-polarized ZS

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 47µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.05 CV or 10 (µA) , whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 tan δ (MAX.): 0.30 / 0.24 / 0.20 / 0.18 / 0.16 / 0.16
Stability at Low Temperature	Measurement frequency : 120Hz Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 Impedance ratio ZT / Z20 (MAX.) Z–25°C / Z+20°C: 4 / 3 / 2 / 2 / 2 / 2 Impedance ratio ZT / Z20 (MAX.) Z–40°C / Z+20°C: 8 / 8 / 4 / 4 / 3 / 3
Endurance	After 2000 hours' application of rated voltage at 85°C with the polarity inverted every 250 hours, capacitors meet the characteristic requirements listed at right. Capacitance change: Within ±20% of initial value tan δ: 300% or less of initial specified value Leakage current: Initial specified value or less
Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours,they meet the specified value for endurance characteristics listed above.
Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature,they meet the characteristic requirements listed at right. Capacitance change: Within ±10% of initial value tan δ: Initial specified value or less Leakage current: Initial specified value or less
Marking	Black print on the case top.

■Chip Type



※ Voltage mark for 6.3V is「6V」.

(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
U Z P 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap. (µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	1.0
0.22	R22											4	2.0
0.33	R33											4	2.8
0.47	R47											4	4.0
1	010											4	8.4
2.2	2R2									4	8.4	5	13
3.3	3R3							5	12	5	16	5	17
4.7	4R7					4	12	5	16	5	18	6.3	20
10	100			4	17	5	23	6.3	27	6.3	29		
22	220	5	28	6.3	33	6.3	37						
33	330	6.3	37	6.3	41	6.3	49						
47	470	6.3	45									Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

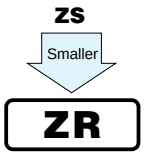
nichicon

ZR series

3.95mmL MAX. Chip Type

For SMD | Smaller | Anti-Solvent Feature

- Chip type with 3.95mmLMAX height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (µA) , whichever is greater.

tan δ	Rated voltage (V)	4	6.3	10	16	25	35	50	120Hz 20°C
	tan δ (MAX.)	0.50	0.30	0.24	0.19	0.16	0.14	0.14	

Stability at Low Temperature	Rated voltage (V)		4	6.3	10	16	25	35	50	120Hz
	Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2	
		Z–40°C / Z+20°C	15	8	8	4	4	3	3	

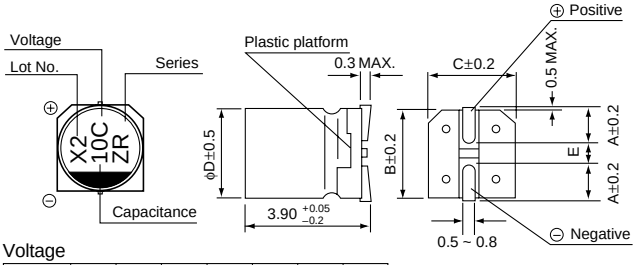
Endurance	After 1000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.	Capacitance change	Within ±30% of initial value
		tan δ	300% or less of initial specified value
		Leakage current	Initial specified value or less

Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.	Capacitance change	Within ±10% of initial value
		tan δ	Initial specified value or less
		Leakage current	Initial specified value or less

Marking	Black print on the case top.

■Chip Type



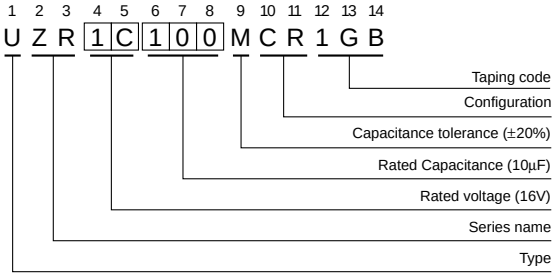
(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Voltage

V	4	6.3	10	16	25	35	50
Code	g	j	A	C	E	V	H

Type numbering system (Example : 16V 10µF)



■Dimensions

Cap. (µF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.0
0.33	R33													4	2.8
0.47	R47													4	4.0
1	010													4	8.4
2.2	2R2													4	13
3.3	3R3													4	17
4.7	4R7									4	16	4	18	5	20
10	100							4	23	5	27	5	29	6.3	33
22	220			4	28	5	33	5	37	6.3	42	6.3	46		
33	330	4	28	5	37	5	41	6.3	49	6.3	52				
47	470	4	33	5	45	6.3	52	6.3	58						
100	101	5	56	6.3	70										
220	221	6.3	96											Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

- Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

- Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

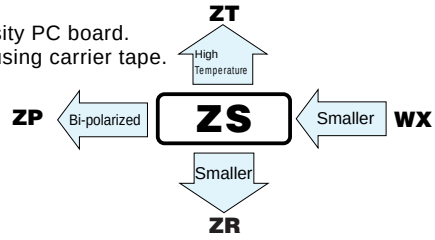
nichicon

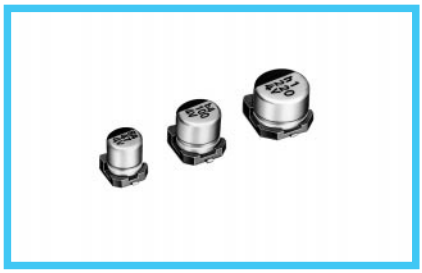
ZS series

4.5mmL Chip Type

For SMD | Smaller | Anti-Solvent Feature

- Chip type with 4.5mm height.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.





■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ + 85°C
Rated Voltage Range	4 ~ 50V
Rated Capacitance Range	0.1 ~ 220µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (µA) ,whichever is greater.
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50
tan δ (MAX.)	0.50	0.30	0.24	0.19	0.16	0.14	0.14

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	4	3	2	2	2	2
	Z–40°C / Z+20°C	15	8	8	4	4	3	3

Endurance — After 2000 hours' application of rated voltage at 85°C,capacitors meet the characteristics requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

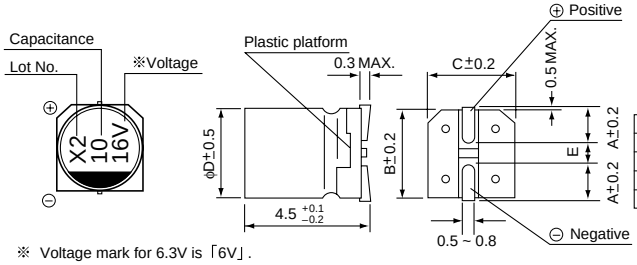
Shelf Life — After leaving capacitors under no load at 85°C for 1000 hours,they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature,they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

※ Voltage mark for 6.3V is「6V」.

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U Z S 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap. (µF) \ V	Code	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4	1.0
0.22	R22													4	2.0
0.33	R33													4	2.8
0.47	R47													4	4.0
1	010													4	8.4
2.2	2R2													4	13
3.3	3R3													4	17
4.7	4R7									4	16	4	18	5	20
10	100							4	23	5	27	5	29	6.3	33
22	220			4	28	5	33	5	37	6.3	42	6.3	46		
33	330	4	28	5	37	5	41	6.3	49	6.3	52				
47	470	4	33	5	45	6.3	52	6.3	58						
100	101	5	56	6.3	70										
220	221	6.3	96											Case size	Rated ripple

Rated Ripple (mA rms) at 85°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.

ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

ZT series

4.5mmL Chip Type, Wide Temperature Range

For SMD Smaller

- Chip type with 4.5mm height, operating over wide temperature range of –40 ~ +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.

ZT ← High Temperature ZS

■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +105°C
Rated Voltage Range	6.3 ~ 50V
Rated Capacitance Range	0.1 ~ 100µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA) , whichever is greater.

tan δ — Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	6.3	10	16	25	35	50
tan δ (MAX.)	0.38	0.32	0.20	0.16	0.14	0.14

Stability at Low Temperature — Measurement frequency : 120Hz

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	6	5	3	3	3	3
	Z–40°C / Z+20°C	10	10	6	6	4	4

Endurance — After 1000 hours' application of rated voltage at 105°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±25% of initial value (16V or less) Within ±20% of initial value (25V or more)
tan δ	300% or less of initial specified value
Leakage current	Initial specified value or less

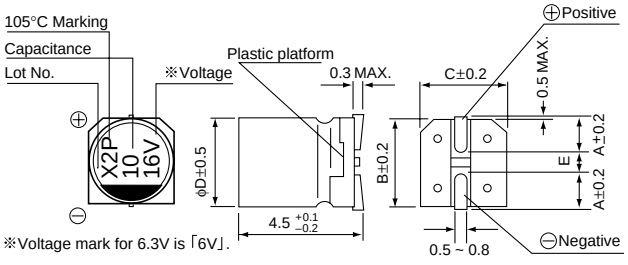
Shelf Life — After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.

Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

■Chip Type



(mm)

φD	4	5	6.3
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Type numbering system (Example : 16V 10µF)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

U Z T 1 C 1 0 0 M C R 1 G B

- Taping code
- Configuration
- Capacitance tolerance (±20%)
- Rated Capacitance (10µF)
- Rated voltage (16V)
- Series name
- Type

• The lead-free product is also available upon request.
In this case, L will be put at 11th digit of type numbering system.

■Dimensions

Cap. (µF) \ V	Code	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4	0.9
0.22	R22											4	2.2
0.33	R33											4	2.8
0.47	R47											4	3.3
1	010											4	5.4
2.2	2R2											4	9.6
3.3	3R3											4	12
4.7	4R7							4	11	4	13	5	16
10	100					4	16	5	20	5	22	6.3	26
22	220	4	19	5	24	5	26	6.3	33	6.3	36		
33	330	5	26	5	30	6.3	35	6.3	42				
47	470	5	32	6.3	40	6.3	44						
100	101	6.3	52									Case size	Rated ripple

Rated Ripple (mA rms) at 105°C 120Hz

●Frequency coefficient of rated ripple current

Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
Coefficient	0.70	1.00	1.17	1.36	1.50

●Taping Specifications are given in page 22.

Please refer to page 3 for the minimum order quantity.