

Lighting Management Solutions for Ultra-Portable Applications



Building Blocks

- LED Drivers
- LEDs
- IGBTs
- Integrated Controllers

Target Applications

- Cellular Phones
- Digital Still Cameras
- PDAs
- Camera Flashes
- Camcorders

Ultra-Portable Lighting Management Solutions

As the trend in portable device displays moves from monochrome to full-color, the demand for compact, easy-to-use LED backlight solutions also grows dramatically. Fairchild Semiconductor is addressing these trends by offering combinations of low V_F LEDs and LED driver ICs for the most complete choice of backlighting options.

Fairchild, a leader in power management solutions, recently added eight white LED drivers to its product portfolio for handhelds. These drivers provide a complete backlighting solution that covers all possible needs for cell phones, PDAs, pagers and other portable devices. With expertise in both LEDs and LED driver ICs, Fairchild offers designers the freedom to match an array of LED products in a variety of popular backlighting colors, including white, pink, blue, amber, and RGB to their driver ICs. This combination of parts assures precise brightness matching and enables the use of a range of LEDs from matched, binned LEDs to unmatched LEDs.

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Across the board. Around the world.™

FAIRCHILD
SEMICONDUCTOR®

Fairchild's Ultra-Portable Lighting Management Sol

Cellular Phones

Communication, Consumer and Instrumentation

Building Blocks

LED Drivers

- Broadest offering in the industry
- Serial, parallel and matrix configurations
 - Parallel Configuration for highest efficiency, reliability and minimum EMI
 - Serial configuration for simplicity of LED connections
- Choice of brightness control methods

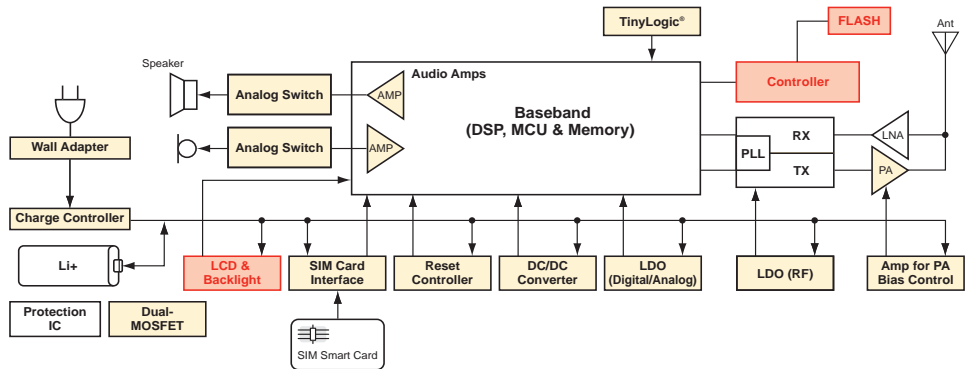
Camera Flash Controller

- Greatly simplified architecture that minimizes software overhead
- Simple, effective and elegant solution

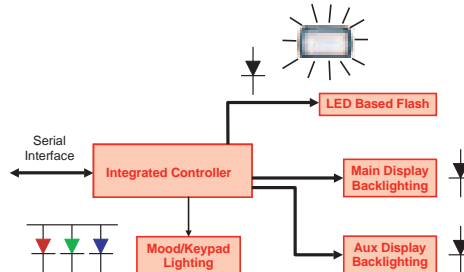
LEDs

- Backlighting LEDs
 - Choice of colors – red, pink, blue, amber and white
 - Wide range of V_f choices enable architectures ranging from low V_f direct battery connect devices to high intensity devices driven by boost converters
- Flash LEDs
 - Special configurations to provide very high intensity and reliability
 - Long life and high reliability

Cellular Phones



Block Diagram of Lighting Sub-System



- See parametric selection charts for product offerings
- Visit www.fairchildsemi.com for product offerings

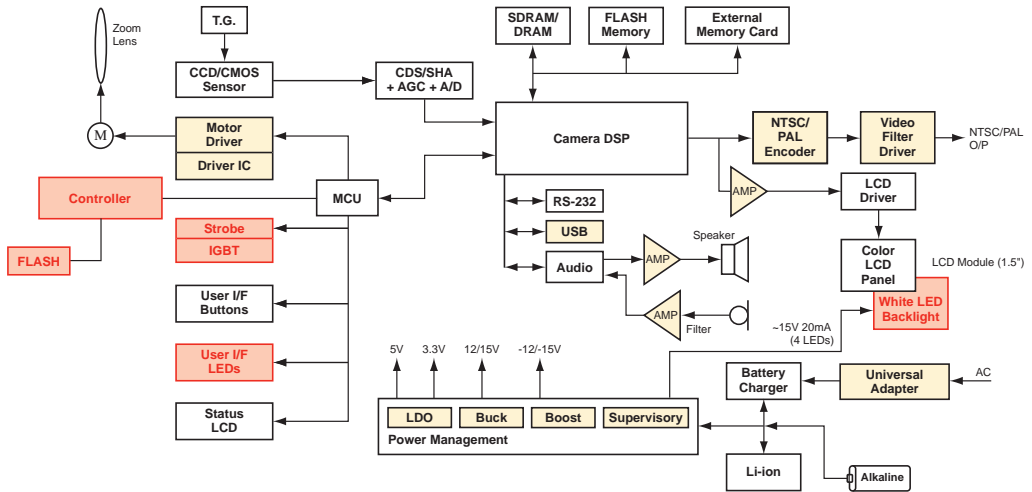
LED Drivers for Backlighting Applications

Part Number	No. of Channels	LEDs Channel	Max Current Channel (mA)	Brightness Control Method ⁽¹⁾	Boost/Method	Max Shutdown Current (μA)	Packages	Maximum Efficiency
FAN5606	1	6	20	D, A, P	Yes, Inductor, Built-in Diode	1	MLP (3x3)	85%
FAN5608	2	6	20	D, A, P	Yes, Inductor, Built-in Diode	1	MLP (3x3 and 4x4)	85%
FAN5609	4	1	20	D,P	Yes, Adaptive Charge Pump	2	TSSOP-14, MLP (4x4)	86%
FAN5610	4	1	21	A,P	Not Required	1	SC70-6, TSOT-6	91%
FAN5612	3	1	40	A,P	Not Required	1	SC70-6, TSOT-6	90%
FAN5613	4	1	40	A,P	Not Required	1	MLP2x2	90%
FAN5614	2	1	80	A,P	Not Required	1	SC70-6	90%

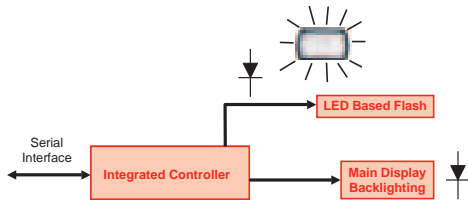
* (1) D = Digital, A = Analog, P = PWM

Digital Still Cameras

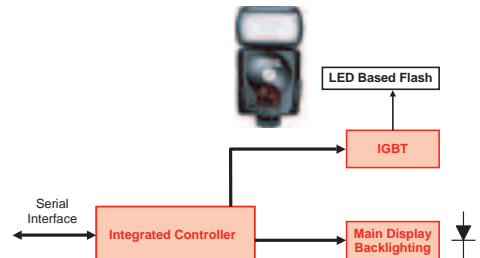
Digital Still Camera



Digital Still Camera Flash - LED Based



Digital Still Camera Flash - Lamp Based



Camera Flash/Lighting Management LCD Controllers

Part Number	Functions	Attributes and Functions	Packages
FMS2000*	Flash only	Programmable control of flash brightness/duration, red eye reduction, movie mode, white balance and battery voltage compensation, serial communication based simple command structure	TSSOP-14
FMS2004*	Flash and backlighting	All flash features of FMS2004, independent backlighting drivers for main and auxiliary display and RGB LED driver for programmable color generation	MLP5x5

* Under development

Strobe IGBT Switch for Camera Flash

Part Number	Packages	V _{CES} (V)	V _{gs} (V) Max.	Peak Collector (Amps)	V _{ce} (V) Typ. at Peak Collector Current
FGS15N40L	SO-8	400	± 6	130 @ 4.0 V _{ge}	4.5
FDS17N40L	SO-8	400	± 6	175 @ 4.0 V _{ge}	4
FDR40L17N	SSOT-8	400	± 6	175 @ 4.0 V _{ge}	4
FDC11N40L	SSOT-6 FLMP	400	± 6	110 @ 4.0 V _{ge}	4

LEDs

Part Number	Color	Packages	Package Height (mm)	Configuration	Attributes
Backlighting and General Purpose Lighting					
QTL600CEB	Blue	0603	0.8	Top Emitting	
QTL601CEB	Blue	0603	0.6	Top Emitting	
QTL603CEB	Blue	0603	2.0	Side Emitting	
QTL610CEB	Blue	0603	2.0	Side Emitting	
QTL611CEB	Blue	0603	1.0	Side Emitting	
QTL613CEB	Blue	0603	1.1	Side Emitting	
QTL600CIW	White	0603	0.8	Top Emitting	
QTL601CIW	White	0603	0.6	Top Emitting	
QTL603CIW	White	0603	0.4	Top Emitting	
FOL215CIW	White	0603	1.0	Side Emitting	High Brightness
QTL610CIW	Blue	0603	2.0	Side Emitting	
QTL611CIW	Blue	0603	1.0	Side Emitting	
QTL613CIW	Blue	0603	1.1	Side Emitting	
QTL601CP	Pink	0603	0.6	Top Emitting	
QTL650CRGB	RGB	1212	1.1	Top Emitting	Clear
QTL650DRGB	RGB	1212	1.1	Top Emitting	Diffused
QTL614CRGB	RGB	1208	1.5	Side Emitting	Clear
QTL614DRGB	RGB	1208	1.5	Side Emitting	Diffused
FOL1313RGB	RGB		1.35	Side Emitting	ESD protection
Flash Applications					
FOL625CIW	White		2.3	Top	6-pin package
FOL625RGB	RGB		2.3	Top	6-pin package

LED Drivers

Product	Package	Driver Only	Driver with Boost	Current Matching Accuracy	# of LEDs	Max LED Driving Current	Input Voltage	Ground Current	Ground Current /Off	Serial Driver	Brightness Control	Parallel Driver
UOM:				%		mA	V	mA	µA			
FAN5606	MLP	No	Inductor Based	N/A	6	20	2.7-5	0.1	1	Yes	Analog, PWM, Digital	No
FAN5608	MLP	No	Inductor Based	N/A	12	20	2.7-5	0.1	1	Yes	Analog, PWM, Digital	Yes
FAN5609	TSSOP	No	Switched Capacitor	5	4	20	2.7-5.5	2	1.5	No	PWM, Digital	Yes
FAN5610	MLP	Yes	-	7.5	4	20	2.7-5.5	0.02	<1	No	PWM, Digital	Yes
FAN5611	SC70	Yes	-	3	4	40	3.3-5.5	0.1	<1	No	Analog, PWM	Yes
FAN5612	SC70	Yes	-	3	3	40	3.3-5.5	0.1	<1	No	Analog, PWM	Yes
FAN5613	MLP	Yes	-	3	4	40	3.3-5.5	0.1	<1	No	Analog, PWM	Yes
FAN5614	SC70	Yes	-	3	2	80	3.3-5.5	0.1	<1	No	Analog, PWM	Yes

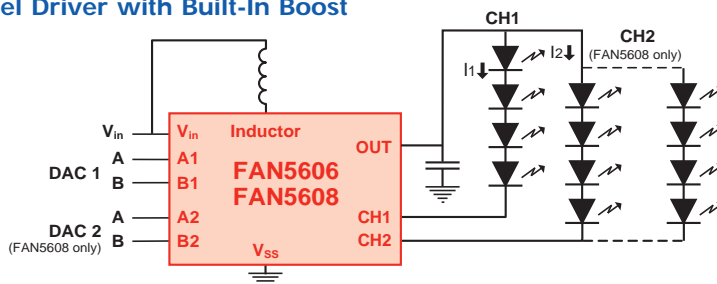
Fairchild's Ultra-Portable Lighting Management Solutions

FAN5606/FAN5608 – MLP-8/MLP-14

Constant Current, Serial and Parallel Driver with Built-In Boost

Key Features

- High Efficiency – Boost V_{OUT} to the minimum level to guarantee the nominal current selected on any of the channels
- Drives white, blue or any multicolor LEDs up to 6 in serial from Li-Ion
- Independent brightness control for each channel
- Brightness control: override DAC – analog/digital/PWM in one
- Low EMI, ultra-low ripple
- Soft start

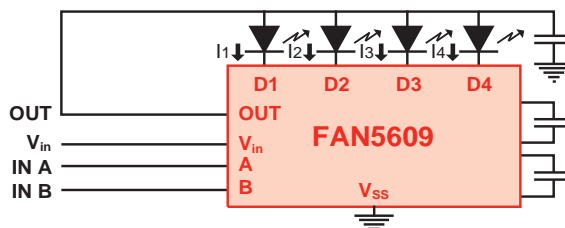


FAN5609 – TSSOP-14/MLP-14

Constant Current Parallel LED Driver with Built-In Boost

Key Features

- Drives white, blue or any multicolor LEDs with uniform brightness
- Built-in V_f compensation circuitry - No LED pre-selection needed
- Drives LEDs with low or high V_f – not sensitive to LED V_f mismatch
- Ultra low EMI, ultra low ripple
- $V_{in} = 2.7V$ to $5.5V$
- True digital brightness control with true PWM control
- Built-in DAC provides high performance

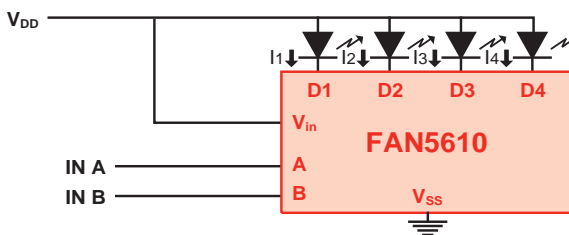


FAN5610 – MLP-8

Constant Current, Parallel Driver

Key Features

- Drives ANY multicolor LEDs with uniform brightness at $V_{DD} = 3.3V$ to $5.5V$
- Built-in V_f compensation circuitry - no LED pre-selection needed
- Insensitive to LED electrical mismatch – proprietary content
- Zero EMI, zero ripple
- 91% efficiency
- Digital brightness control (7 to 21mA) with PWM
- Built-in DAC provides high performance

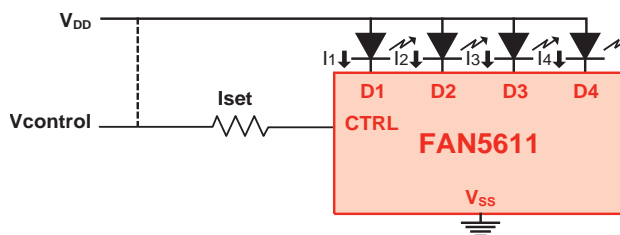


FAN5611, FAN5612, FAN5613, FAN5614 – SC70/SOT23/MLP-8

Parallel Drivers

Key Features

- LED drivers for parallel connected LEDs
- Internally matched current sources with 3% accuracy
- LEDs current programmed with external resistor
- Zero EMI and ripple
- $I_q < 1\mu A$ – shutdown
- V_{DD} and $V_{control}$ can be connected together if V_{DD} is stable and regulated
- 90% efficiency



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For datasheets, application
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