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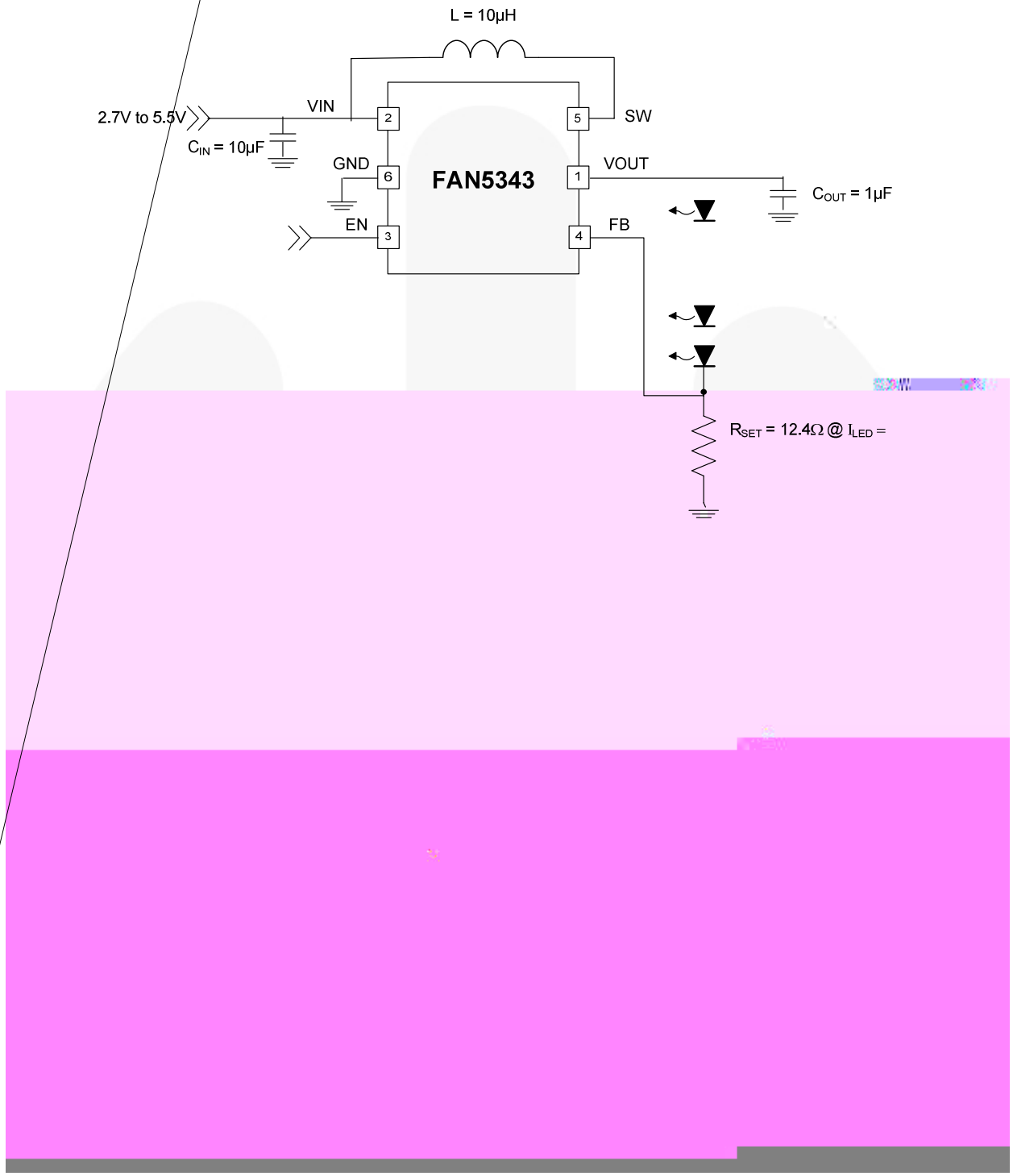
FAN5343
6-LED Series Boost LED Driver with Integrated Schottky

Figure 7. Application Diagram



Pin Configuration

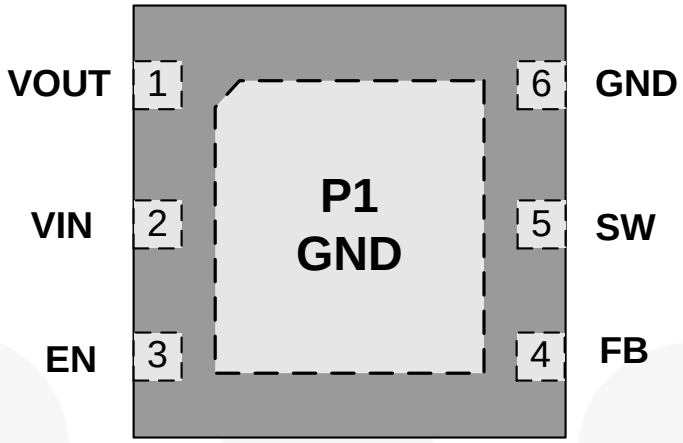


Figure 3. UMLP6 Package (Top View)

Pin Definitions

Pin #	Name	Description
1	VOUT	**Boost Output Voltage**. Output of the boost regulator. Connect the LEDs to this pin. Connect C_{OUT} to GND.
2	VIN	**Input Voltage**. Connect to power source and decouple with CIN to GND.
3	EN	**Enable Brightness Control**. Program dimming levels by driving this pin with digital pulses.
4	FB	**Voltage Feedback**. The boost regulator regulates this pin to 0.25V to control the LED string current. Tie this pin to a current setting resistor (R_{SET}) between GND and the cathode of the LED string.
5	SW	**Switching Node**. Tie inductor L1 from the VIN to SW pin.
6	GND	**Ground**. Tie directly to a GND plane.

Electrical Specifications

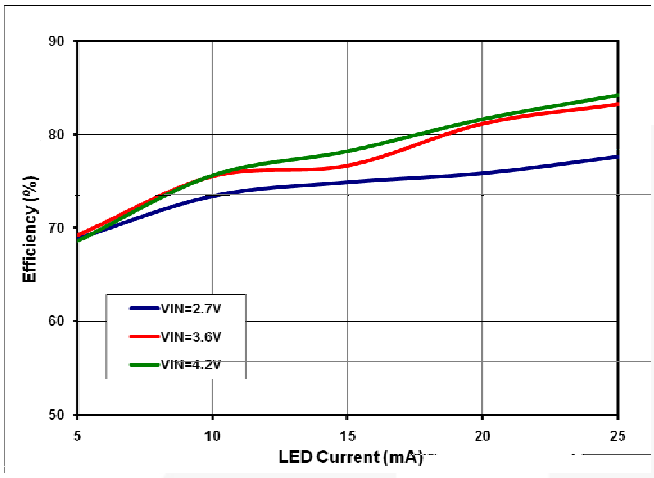
V_{IN} = 2.7V to 5.5V and T_A = -40°C to +85°C unless otherwise noted. Typical values are at T_A = 25°C and V_{IN} = 3.6V.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Power Supplies						
I_{SD}	Shutdown Supply Current	EN = GND, V_{IN} = 3.6V		0.30	0.75	µA
V_{UVLO}	Under-Voltage Lockout Threshold	V_{IN} Rising	2.10	2.35	2.60	V
		V_{IN} Falling	1.90	2.15	2.40	V
V_{UVHYST}	Under-Voltage Lockout Hysteresis			250		mV
EN: Enable Pin						
V_{IH}	HIGH-Level Input Voltage		1.2			V
V_{IL}	LOW-Level Input Voltage				0.4	V
R_{EN}	EN Pull-Down Resistance		200	300	400	kΩ
t_{LO}	EN Low Time for Dimming	V_{IN} = 3.6V; *See Figure 14*	0.5		300.0	µs
t_{HI}	Time Delay Between Steps	V_{IN} = 3.6V; *See Figure 14*	0.5			µs
T_{SD}	EN Low, Shutdown Pulse Width	V_{IN} = 3.6V; from Falling Edge of EN	1			ms
Feedback and Reference						
V_{FB}	Feedback Voltage	I_{LED} = 20mA from -40°C to +85°C, 2.7V ≤ V_{IN} ≤ 5.5V	237	250	263	mV
I_{FB}	Feedback Input Current	V_{FB} = 250mV		0.1	1.0	µA
Power Outputs						
$R_{DS(ON)\_Q1}$	Boost Switch On-Resistance	V_{IN} = 3.6V, I_{SW} = 100mA		600		mΩ
		V_{IN} = 2.7V, I_{SW} = 100mA		650		
$I_{SW(OFF)}$	SW Node Leakage(2)	EN = 0, V_{IN} = V_{SW} = V_{OUT} = 5.5V, V_{LED} = 0		0.1	2.0	µA
I_{LIM-PK}	Boost Switch Peak Current Limit	V_{IN} = 3.6V		750		mA
Oscillator						
f_{SW}	Boost Regulator Switching Frequency		1.0	1.2	1.4	MHz
Output and Protection						
V_{OVP}	Boost Output Over-Voltage Protection		22.5	24.5		V
	OVP Hysteresis			1.0		
V_{TLSC}	V_{OUT} Short Circuit Detection Threshold	V_{OUT} Falling		V_{IN} – 1.4		V
V_{THSC}	V_{OUT} Short Circuit Detection Threshold	V_{OUT} Rising		V_{IN} – 1.2		V
D_{MAX}	Maximum Boost Duty Cycle(3,4)		85			%

D_{MIN}DDDDVc50.851 V(N)8]TJ263.9 .96 BT0 Tc Tj-0.013%

Typical Characteristics

V_{IN} = 3.6V, T_A = 25°C, I_{LED} = 25mA, L = 10µH, C_{OUT} = 1.0µF



Functional Description

Overview

The FAN5343 is an inductive current-mode boost serial LED driver that achieves LED current regulation by maintaining 0.25V across the R_{SET} resistor. The current through the LED string (I_{LED}) is therefore given by:

$$I_{LED} = \frac{0.25}{R_{SET}} \quad (1)$$

The voltage V_{OUT} is determined by the the sum of the forward voltages across each LED, plus the voltage across R_{SET}, which is always 250mV.

UVLO and Soft-Start

If EN has been LOW for more than 1ms, the IC may initiate a “cold start” soft-start cycle when EN rises, provided V_{IN} is above the UVLO threshold.

Digital Interface

The FAN5343 implements a single-wire digital interface to program the LED brightness to one of thirty two (32) levels spaced in linear steps. With this single-wire solution, the FAN5343 does not require the system processor to constantly supply a signal to drive the LEDs.

Digital Dimming Control

The FAN5343 starts driving the LEDs at the maximum brightness level. After startup, the control logic is ready to accept programming pulses to decrease the brightness level by the positive edges applied to the EN pin. Figure 14 illustrates the digital pulse dimming control for the FAN5343.

Over-Current and Short-Circuit Detection

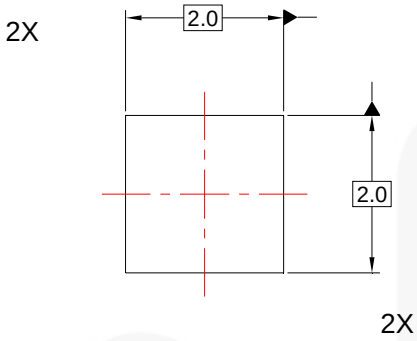
Application Information

Inductor and Output Capacitor Selection

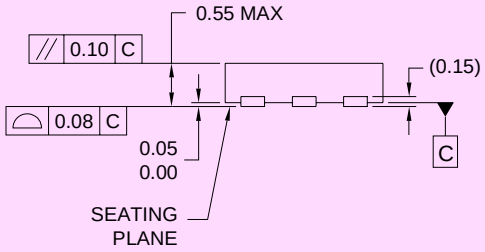
Table 1. Recommended External Components

# of LEDs	L	Part Number	Manufacturer	Min. C_{OUT}	Part Number	Manufacturer
		LQH43MN100K03	Murata			
5, 6	10.0µH	NLCV32T-100K-PFR	TDK	1.00µF	UMK212BJ105KG	Taiyo Yuden

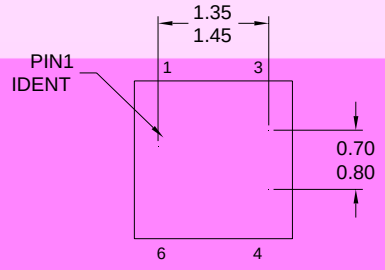
Physical Dimensions



TOP VIEW



SIDE VIEW



BOTTOM VIEW

RECOMMENDED LAND PATTERN

NOTES:

A. PACKAGE CONFORMS TO JEDEC MO-229 EXCEPT WHERE NOTED.

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.

D. LANDPATTERN RECOMMENDATION IS BASED ON FSC DESIGN ONLY.

E. DRAWING FILENAME: MKT-UMLP06Erev2.

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