

4-Channel Current Source White LED Driver

General Description

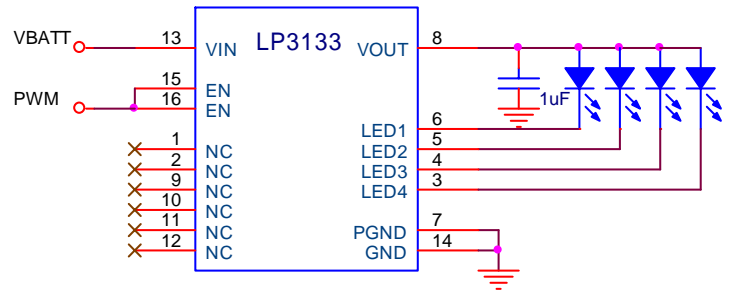
The LP3133 is a low-dropout bias supply for white LEDs is a high-performance alternative to the simple ballast resistors used in conventional white LED designs. It supports 4 white LEDs with regulated constant current for uniform intensity. The LP3133 maintains low dropout current regulators. The LP3133 requires a 50mV dropout at a 20mA load on each output to match the LED brightness. The brightness of LEDs can be tuned through a pulse width modulated signal at the PWM pin.

The LP3133 is available in a QFN-16 package.

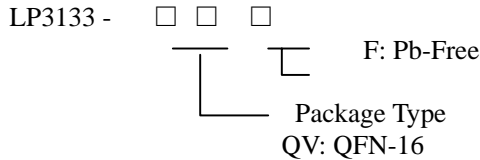
Features

- ✧ 2.7V to 6V Input Voltage
- ✧ 20mA maxim sink current
- ✧ PWM tuned LED brightness through PWM pin(200Hz-10KHz)
- ✧ Soft Start Function
- ✧ Built-in Thermal Protection
- ✧ $I_Q < 1\mu A$ in Shutdown
- ✧ QFN-16 Package
- ✧ RoHS Compliant and 100% Lead (Pb)-Free

Typical Application Circuit



Order Information



Marking Information

Please see website.

Applications

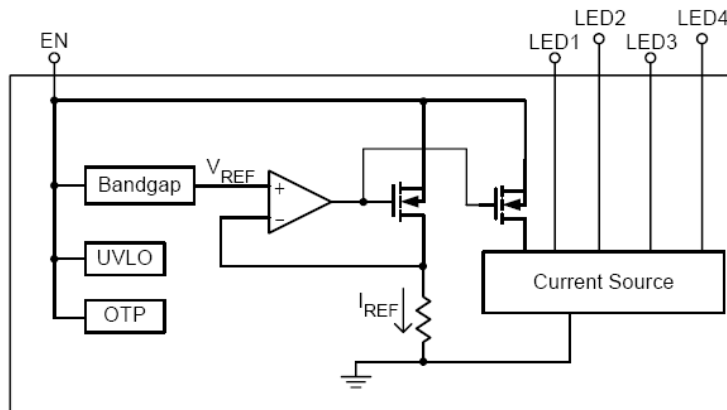
- ✧ LCD Panel
- ✧ Cellular and Smart mobile phone
- ✧ PDA/DSC
- ✧ PMP

Functional Pin Description

Part No.	Package Type	Pin Configurations
LP3133	QFN-16	

PIN	NAME	DESCRIPTION
QFN-16		
1,2,9,10,11,12	NC	No Internal Connection.
3	LED4	LED4 cathode terminal.
4	LED3	LED3 cathode terminal.
5	LED2	LED2 cathode terminal.
6	LED1	LED1 cathode terminal
7/14	PGND/GND	Ground.
8	Vout	Output Voltage Source for connection to the LED anodes.
13	VIN	Power Supply.
15/16	EN/PWM	Chip Enable(active High).and connects to a GPIO of MCU,the GPIO supply a PWM singal dimming method to control the brightness(0-20mA) of white LEDs and the PWM frequency from 200Hz to 10KHz,the duty from 0% to 100%.the typical frequency is 2KHz.

Function Block Diagram



Absolute Maximum Ratings

- ✧ Input Voltage to GND (V_{INA} , V_{INB}) ----- 6V
- ✧ EN/ISET to GND Voltage ($V_{en/set}$) ----- 0.3V to $V_{in}+0.3V$
- ✧ Maximum DC Output Current(I_{out}) ----- 150mA
- ✧ Operating Junction Temperature Range (T_J) -----40°C to 150°C
- ✧ Maximum Soldering Temperature (at leads, 10sec) ----- 300°C

Thermal Information

- ✧ Maximum Power Dissipation (P_D) QFN-16 ----- 1.5W
- ✧ Thermal Resistance (J_A) -----50°C/W

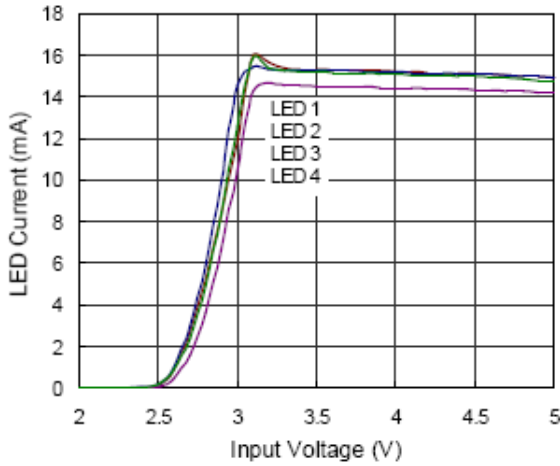
Electrical Characteristics

(Over recommended operating conditions unless specified otherwise) $V_{INA}=3.6V, EN=High, T_A=25^\circ C$)

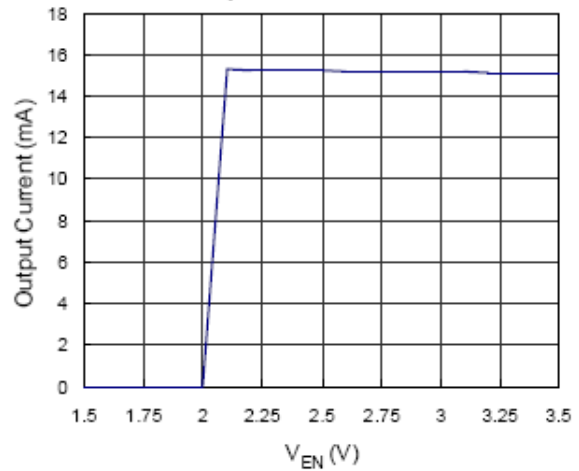
Symbol	Parameter	Conditions	LP3133			Unit
			Min.	Typ.	Max.	
V_{IN}	Input Voltage		3		5.5	V
V_{OUT}	Output Voltage Range		0.6		V_{INB}	V
I_Q	Quiescent Current	No Load, 1X mode		260	350	uA
I_{SHDN}	Shutdown Current	ENB = GND		0.1	1	μA
$I_{LED-ERR}$	LED Current Accuracy	$3mA < I_{LED} < 30mA$	19	20	21	mA
$I_{LED-LED-ERR}$	LED Channel Matching	Any two channel mismatch	-3		3	%
$V_{EN(L)}$	Enable Threshold Low				0.5	V
$V_{EN(H)}$	Enable Threshold High		2			V

Typical Operating Characteristics

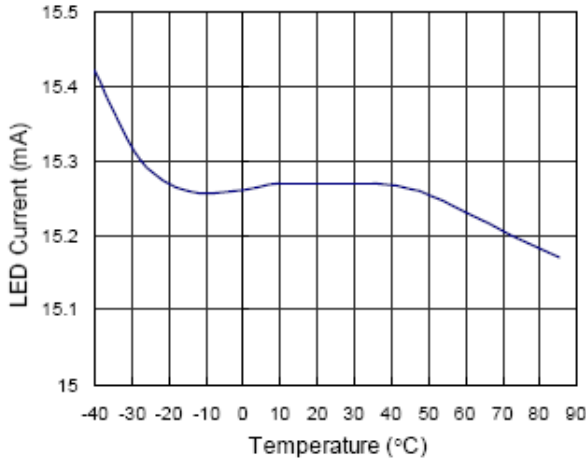
LED Current vs. Input Voltage



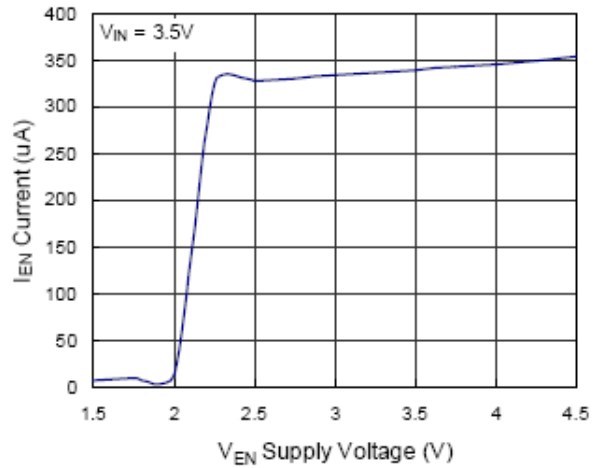
Output Current vs. V_{EN}



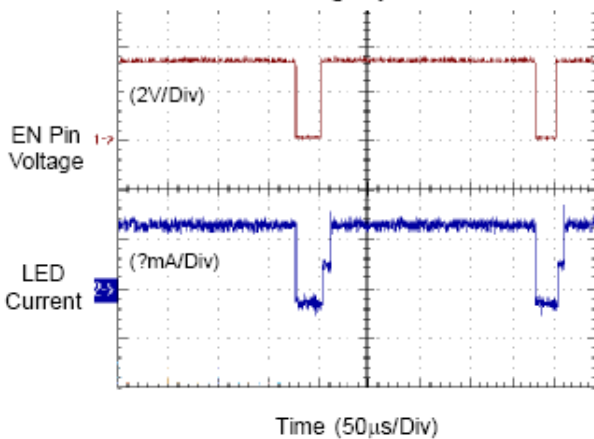
LED Current vs. Temperature



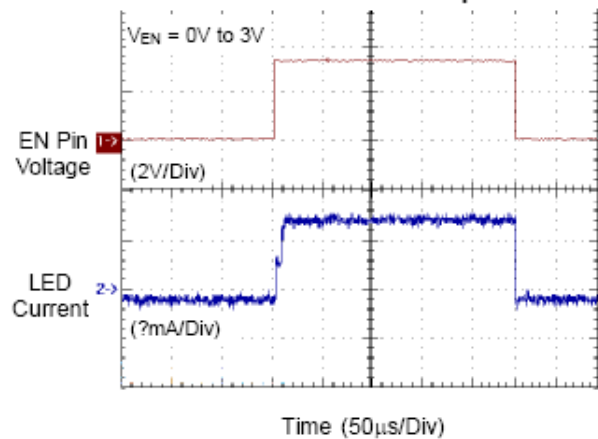
I_{EN} Current vs. V_{EN} Supply Voltage



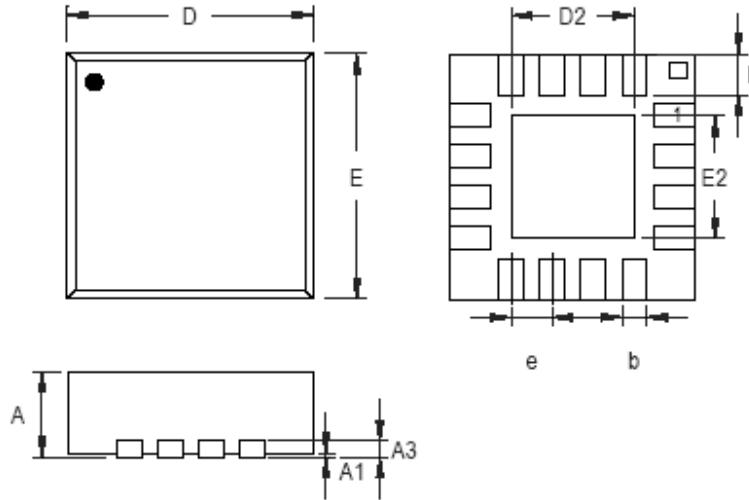
Dimming Operation



EN Pin Shutdown Response



Packaging Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.031	0.039
A1	0.000	0.050	0.000	0.002
A3	0.200 Ref.		0.008 Ref.	
b	0.180	0.300	0.007	0.012
D	3.000		0.118	
D2	1.250	1.900	0.049	0.075
E	3.000		0.118	
E2	1.250	1.900	0.049	0.075
e	0.500		0.020	
L	0.300	0.500	0.012	0.020