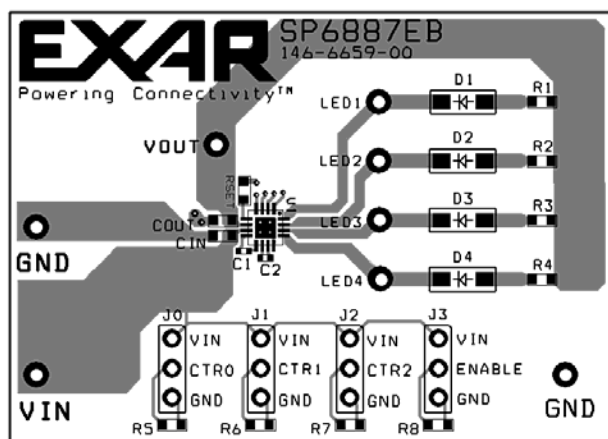


## Evaluation Board Manual

### FEATURES

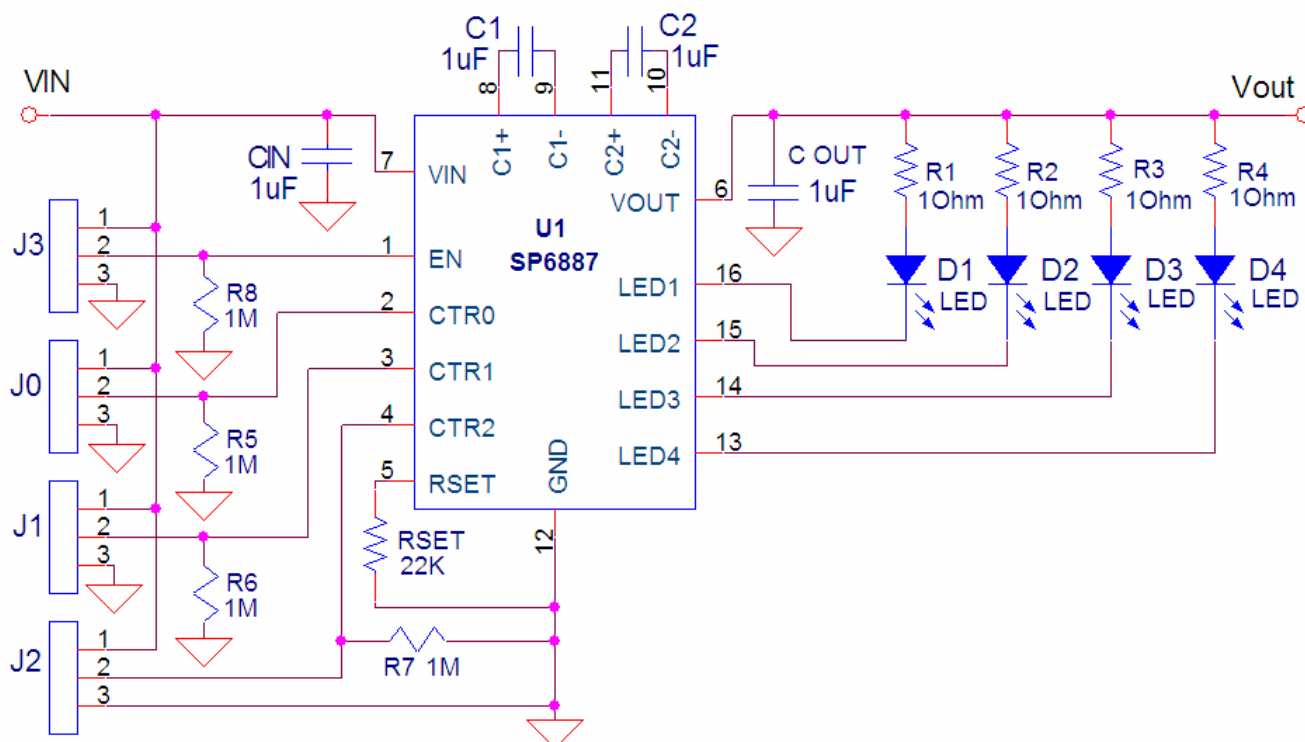
- Peak Efficiency: 90%
- Individual Current Regulation
- Drives up to 4 LEDs @ 20 to 30mA
- 3-Bit Digital Output Control
- 1x and 1.5x Modes of Operation
- Fast 1.0MHz Switching Frequency
- Open LED protection
- Current Matching of 3%
- PWM Dimming Capable
- Small Thin 3x3mm QFN Package
- Lead Free, RoHS Compliant Package



### DESCRIPTION

The **SP6887 Evaluation Board** is designed to help the user evaluate the performance of the SP6887 for use as a LED Driver. The evaluation board is a completely assembled and tested surface mount board which provides easy probe access points to all SP6887 inputs and outputs so that the user can quickly connect and measure electrical characteristics and waveforms. The Evaluation Board schematic diagram is shown in Figure 1.

### BOARD SCHEMATIC



**Figure 1. The SP6887 Evaluation Board Schematic Diagram**

### 1) Powering Up the SP6887 Circuit

The SP6887 Evaluation Board can be powered from a 2.7V to 5.5V power supply. Connect the power supply with short leads directly to the “VIN” and “GND” posts. The control lines CTR0, CR1, CTR2 are set by jumpers J0, J1, J2 respectively, as shown in Table 1 below. For logic high set the Jumper to the 1-2 position, for logic Low set the jumper to the 2-3 position. To enable the part, set Enable jumper J3 to the 1-2 position. For the example of all 4 LEDs on, set jumpers: J0 to the 2-3 position, J1 and J2 to 1-2 position, and J3 to the 1-2 position.

Table 1: LED Enable Logic

Control Lines			LED Outputs			
CTR2	CTR1	CTR0	LED4	LED3	LED2	LED1
0	0	0	-	-	-	ON
0	0	1	-	-	ON	-
0	1	0	-	ON	-	-
0	1	1	ON	-	-	-
1	0	0	-	-	ON	ON
1	0	1	-	ON	ON	ON
1	1	0	ON	ON	ON	ON
1	1	1	-	-	-	-

1 = Logic high (or VIN), 0 = Logic low (or GND), - = LED output off

### 2) Setting the output current

The typical SP6887EB configuration is for 4 WLEDs mounted in parallel and with the output current set for 20mA. The total output current of the SP6887 is controlled by the value of the Rset resistor. Use a resistor at RSET to set the output current by the following table:

I <sub>LED</sub> (mA)	R <sub>SET</sub> (kΩ)
30	14.7
20	21.8
15	29.3
10	44.1
9	49.4
8	55.7
7	64.2
6	75.0
5	90.0
4	114.2
3	156.5
2	238.0
1	540.0

Table2. Rset resistor selection

### 3) Dimming

Users can control the white LED on/off via the enable EN pin or through the three programming bits: CTRL0, CTRL1 and CTRL2. When an external PWM signal is connected to the control pin, brightness of white LED is adjusted by the duty cycle. Each channel can support up to 30mA of current. Characteristic curves and more information on various methods of controlling LED current is contained in the datasheet.

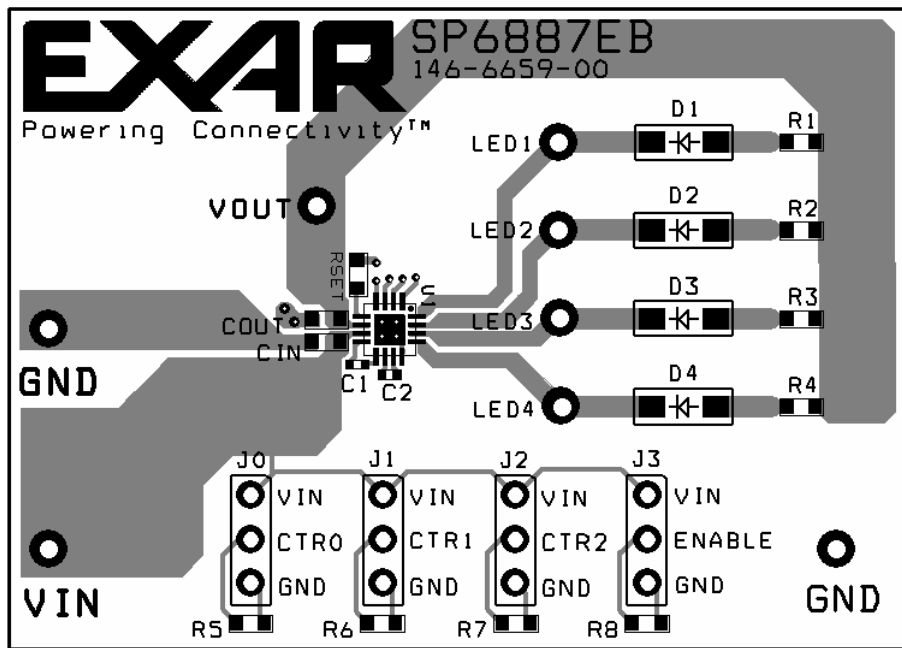


Figure 7. SP6887 Evaluation Board Layout top

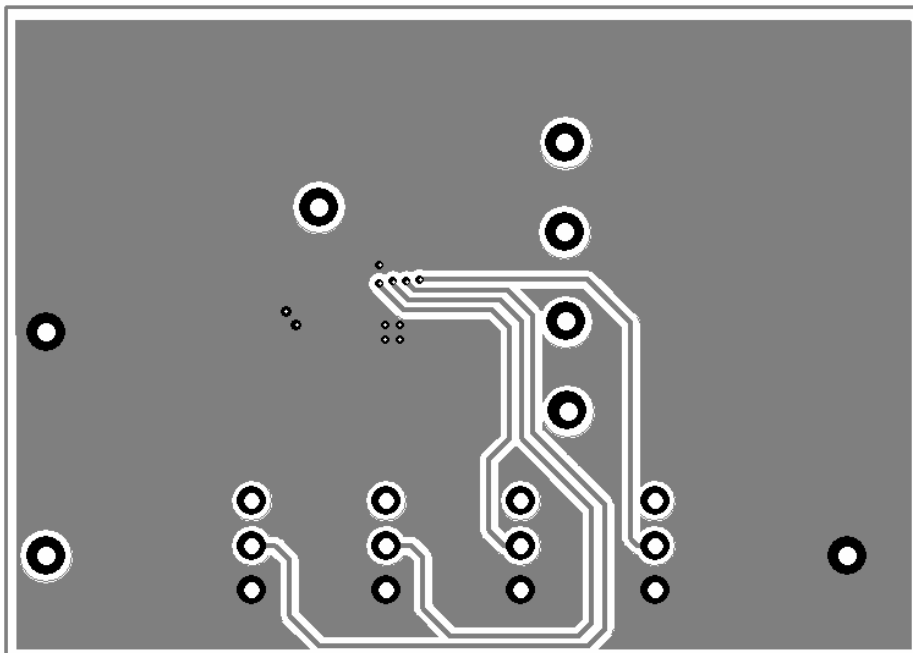


Figure 8. SP6887 Evaluation Board Layout bottom

Part Ref.	Qty.	Part Number	Part Description	Layout Size	Manufacturer
U1	1	SP6887ER-L	LED driver	QFN 3X3mm	www.exar.com
PCB	1	146-6659-00	Eval bd PCB		www.exar.com
C1,C2	2	GRM155R60J105K	1 $\mu$ F/6.3V, X5R SM capacitor	0402	www.murata.com
Cn,Cout	2	GRM188R61A105K	1 $\mu$ F/10V, X5R SM capacitor	0603	www.murata.com
R1,R2,R3,R4	4	CRCW06031R00F	1 $\Omega$ , 1% SM resistor	0603	www.vishay.com
R5,R6,R7,R8	4	CRCW06031M00J	1M $\Omega$ , 5% SM resistor	0603	www.vishay.com
RSET	1	CRCW060310K0F	10K $\Omega$ , 1% SM resistor	0603	www.vishay.com
D1,D2,D3,D4	4	any	SM WLED	1206	any
J0,J1,J2,J3	4	61303611121	3 pin header	6x2.54mm pitch	www.we-online.com
	4	60900213421	Shunt	5x2.54mm pitch	www.we-online.com
Vin,Vout,GND, LED1,LED2, LED3,LED4	8	0300-1-15-01-47-01-10-0	Test Point female pin	0.042" dia	Mil-Max Mfg. Corp. www.digikey.com

**Table1. SP6887EB List of Materials**


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**ORDERING INFORMATION**

Model	Temperature Range	Package Type
SP6887EB.....	-40°C to +85°C.....	SP6887 Evaluation Board
SP6887ER-L.....	-40°C to +85°C.....	Lead Free 6 pin SOT23-6

For further assistance:

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EXAR Technical Documentation: <http://www.exar.com/TechDoc/default.aspx?>



**Exar Corporation**  
**Headquarters and**  
**Sales Office**  
48720 Kato Road  
Fremont, CA 94538  
main: 510-668-7000  
fax: 510-668-7000

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