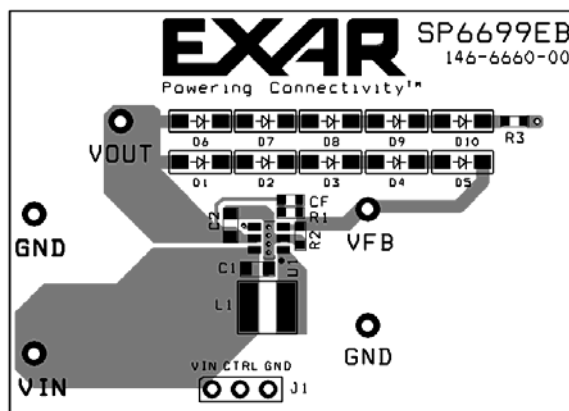


# Evaluation Board Manual

## FEATURES

- High Output Voltage: up to 27V
- Drives up to 5 LEDs @ 20mA
- High Efficiency: up to 84%
- Integrated schottky diode
- Fast 1.0MHz Switching Frequency
- Low 0.2V Reference Voltage
- Output setpoint accuracy of 6%
- PWM Dimming Capable
- Small SOT23-6 Package
- Lead Free, RoHS Compliant Package



## DESCRIPTION

The **SP6699 Evaluation Board** is designed to help the user evaluate the performance of the SP6699 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 SP6699 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

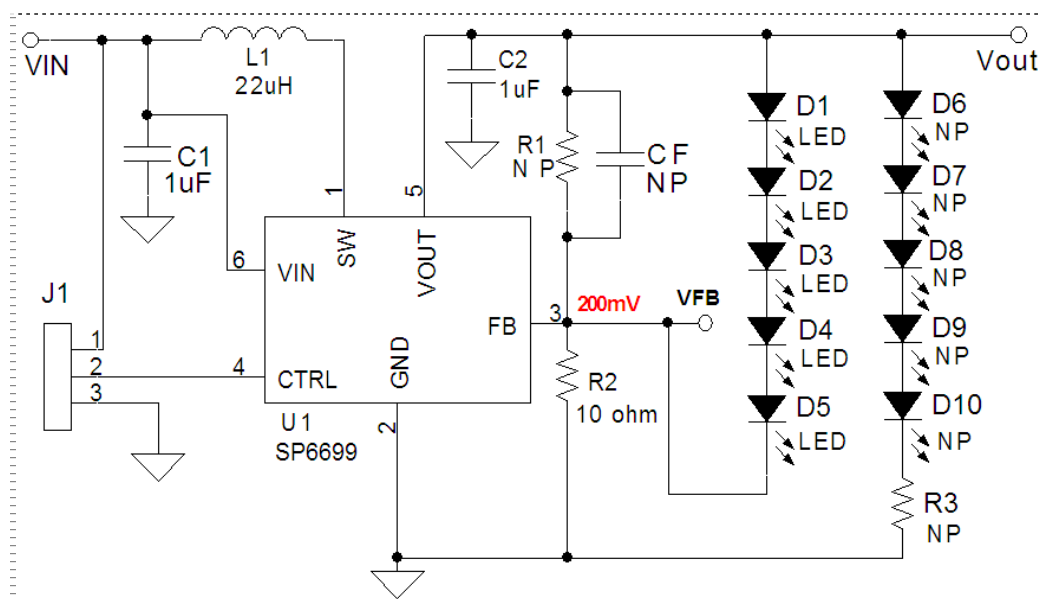


Figure 1. The SP6699 Evaluation Board Schematic Diagram

### **1) Powering Up the SP6699 Circuit**

The SP6699 Evaluation Board can be powered from a 2.5V to 16V power supply. Connect the power supply with short leads directly to the “VIN” and “GND” posts.

### **2) Setting the output current**

The typical SP6699EB configuration is for 5 WLEDs mounted in series and with the output current set for 20mA. Other LEDs could be externally connected but need to be connected anode to the VOUT pin and cathode to the Vfb pin. As many as 5 series connected LEDs may be used, depending on the input voltage range available. The total output current of the SP6699 is controlled by the VFB pin voltage setpoint of 200mV. Use a resistor at R2 to set the output current by the formula:

$$I_{out} = V_{fb}/R2$$

#### **Standard SP6699EB Evaluation Board Example:**

$$I_{out} = V_{fb}/R2 = 200mV/10ohm = 20mA$$

### **3) Dimming**

The SP6699 can be pulse width modulated using a signal applied to the CTRL post. The CTRL signal will turn on the SP6699 when CTRL = H and turn-off the SP6699 when CTRL = L. The CTRL signal needs to be greater than 1.8V minimum to turn-on the SP6699 and less than 50mV to fully turn-off the SP6699. It is recommended to use a signal with CTRL = 1.8V or more for ON and 0V for OFF. Recommended modulation frequencies are from 100Hz to 200Hz.

### **4) Efficiency and Output Current**

The SP6699 evaluation board efficiency is shown in figure 2 for 5 WLEDs at 20mA and 25mA. The efficiency is as high as 82% for 4.2V input which is very good for a high voltage boost regulator. The output current curves are shown in figure 3 and show that the output current remains very stable for a range of input voltage from 3V to 5V input.

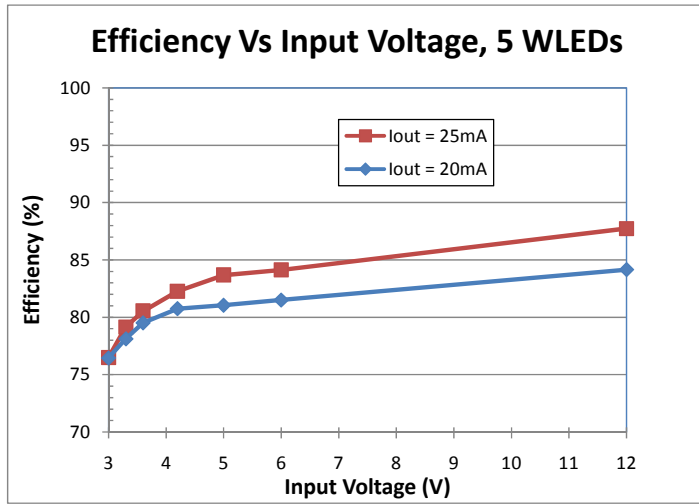


Figure 2. L1 = 22uH Efficiency Vs Input Voltage for 5 WLEDs at 20mA & 25mA

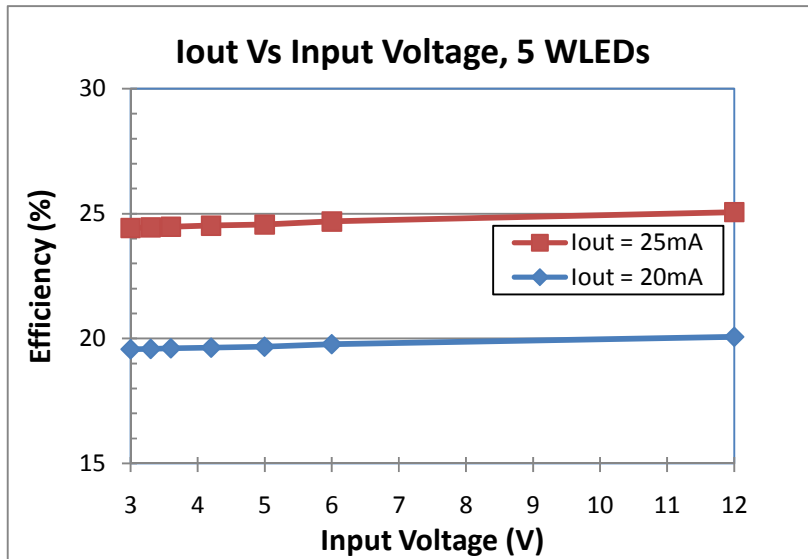


Figure 3. L1 = 22uH Output Current Vs Input Voltage for 5 WLEDs at 20mA & 25mA

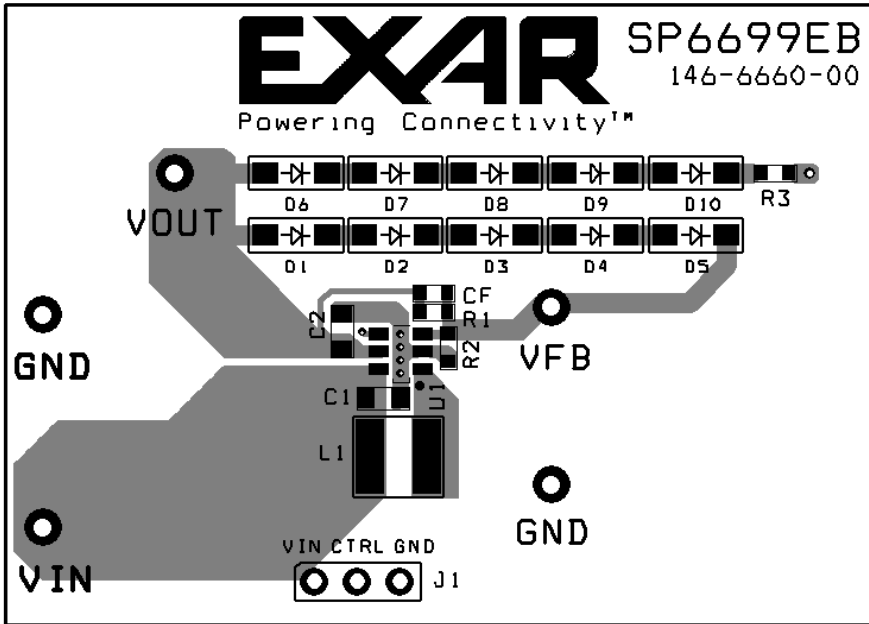


Figure 4. SP6699 Evaluation Board Layout top

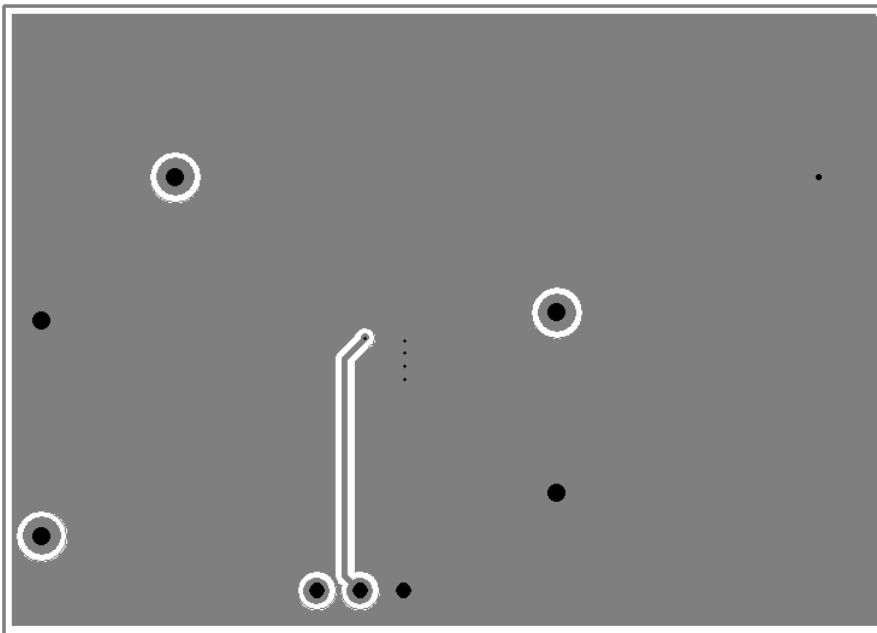


Figure 5. SP6699 Evaluation Board Layout bottom

Part Ref.	Qty.	Part Number	Part Description	Layout Size	Manufacturer
U1	1	SP6699ER-L	Boost LED driver	SOT23-6	www.exar.com
PCB	1	146-6660-00	Eval bd PCB		www.exar.com
C1,C2	2	GRM216R61E105K	1μF/25V, X5R SM capacitor	0805, 0.9mm ht.	
CF,R1,R3,D6,D7,D8,D9,D10	8	Not Populated			
L1	1	LQH32CN220K53	22μH,250mA,0.71Ω DCR,10%		www.murata.com
R2	1	CRCW060310R0F	10Ω, 1% SM resistor	0603	www.vishay.com
D1,D2,D3,D4,D5	5	any	SM WLED	1206	any
J1	1	61303611121	3 pin header	6x2.54mm pitch	www.we-online.com
	1	60900213421	Shunt	5x2.54mm pitch	www.we-online.com
Vin,Vout GND,VFB	4	0300-1-15-01-47-01-10-0	Test Point female pin	0.042" dia	Mil-Max Mfg. Corp. www.digikey.com

**Table1. SP6699EB List of Materials**

**ORDERING INFORMATION**

Model	Temperature Range	Package Type
SP6699EB.....	-40°C to +85°C.....	SP6699 Evaluation Board
SP6699ER-L.....	-40°C to +85°C.....	Lead Free 6 pin SOT23-6

For further assistance:

Email: [customersupport@exar.com](mailto:customersupport@exar.com)  
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**Exar Corporation**  
**Headquarters and**  
**Sales Office**  
 48720 Kato Road  
 Fremont, CA 94538  
 main: 510-668-7000  
 fax: 510-668-7000

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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)