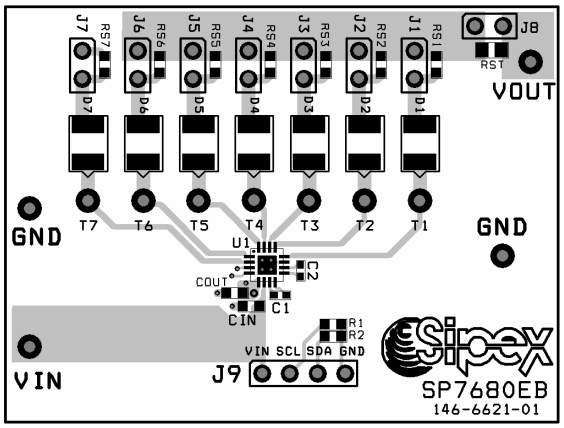
# SP7680

# Evaluation Board Manual

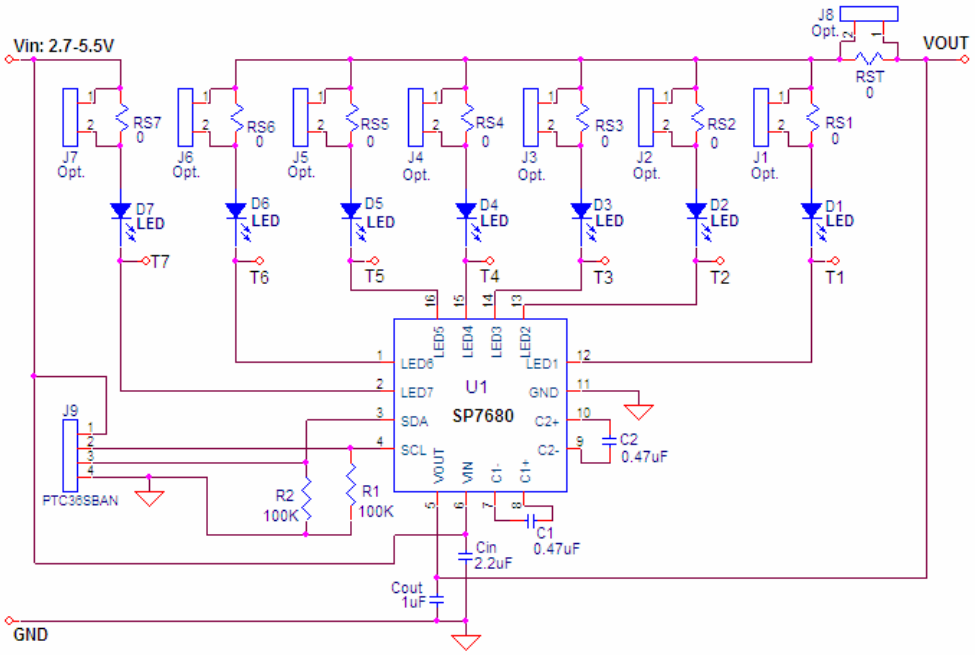
- Complete Backlight Solution
- Separate control for 4 main, 2 sub, and keypad LEDs
- Built-in 6-bit DAC for precise current setting
- $I^2C$ serial interface
- Data is stored in shutdown
- 1x and 1.5x mode operation with automatic switchover
- Very low dropout current sources: 200mV typ
- 2MHz switching frequency reduces external components
- Small 16-pin 3x3 QFN




## DESCRIPTION

The **SP7680EB Evaluation Board** is a compact circuit including the SP7680 in 3x3mm QFN and 4 small 0402 or 0603 capacitors. This circuit can provide a stable drive current for backlight white LEDs and with $I^2C$ serial interface independently control LEDs for main and auxiliary displays as well as the keypad. The evaluation board is a completely assembled and tested surface mount board which provides easy probe access points to all SP7680 inputs and outputs so that the user can quickly connect LEDs and measure electrical characteristics and waveforms.

## BOARD SCHEMATIC



**TO GET STARTED:**

1. Connect VIN from VIN to GND (VIN range 2.7V to 5.5V).
2. Apply $I^2C$ connections of SDA, SCL and GND to J9.
3. Connect LED Displays with cathodes to T1 to T7 for LED1 to LED7. Or, connect surface mount LEDs with solder to the board at D1 to D7.
4. Use $I^2C$ serial connection and software to control LED1 to LED7.
5. To measure current through LED1 to LED7 remove zero ohm resistor at RS1 to RS7 and add SM 0603 1 ohm resistors to RS1 to RS7. Then measure current with DVM across RS1 to RS7 with test points at J1 to J7. Note: 1mV across J1 to J7 equals 1mA of current through LED1 to LED7.

## POWER SUPPLY DATA

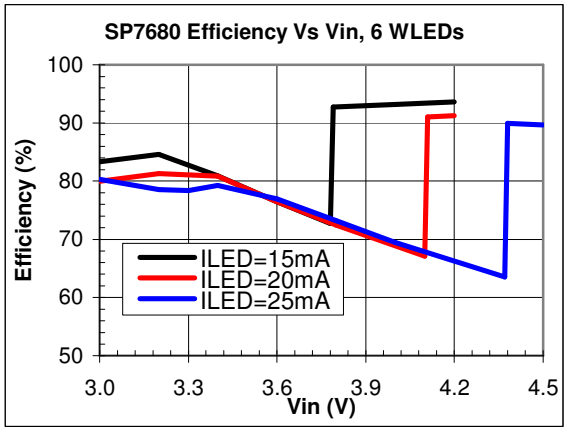



Figure 1. VOUT Efficiency 6 LEDs

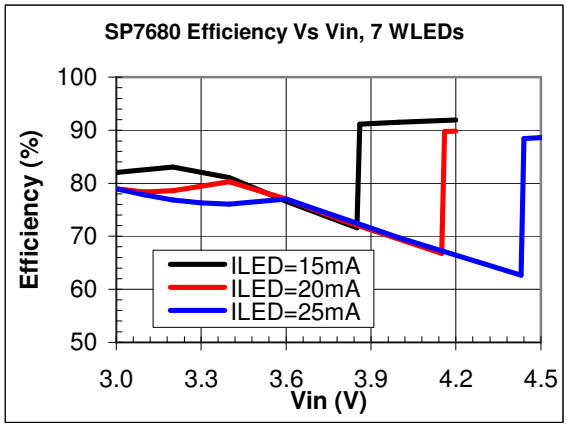



Figure 2. VOUT Efficiency 7 LEDs

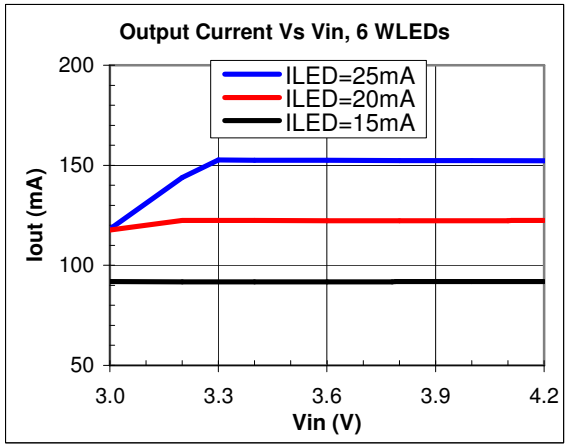



Figure 3.Output Current 6 LEDs

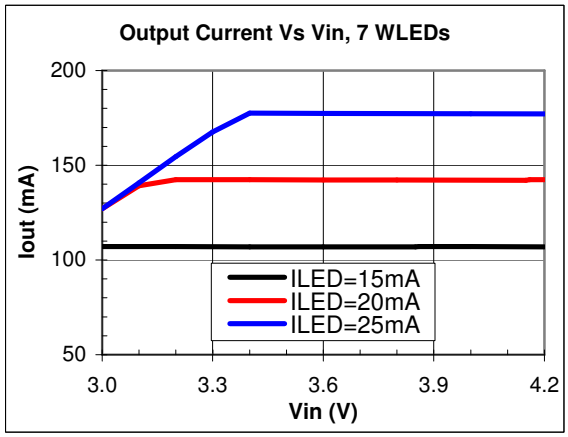



Figure 4. Output Current 7 LEDs

## POWER SUPPLY DATA

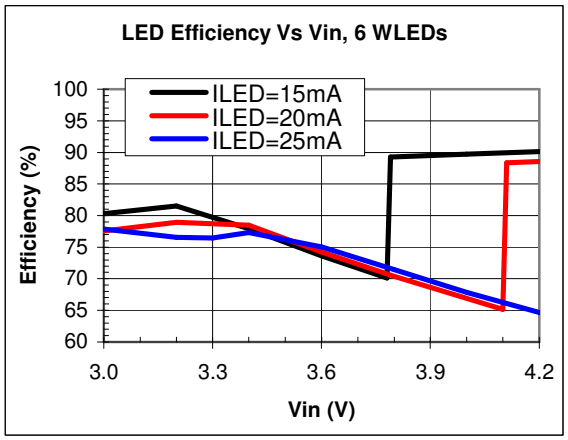



Figure 5. LED Efficiency 6 LEDs

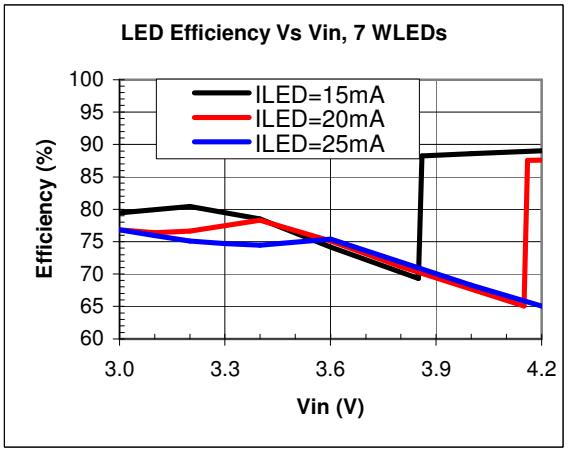



Figure 6. LED Efficiency 7 LEDs

## EVALUATION BOARD LAYOUT

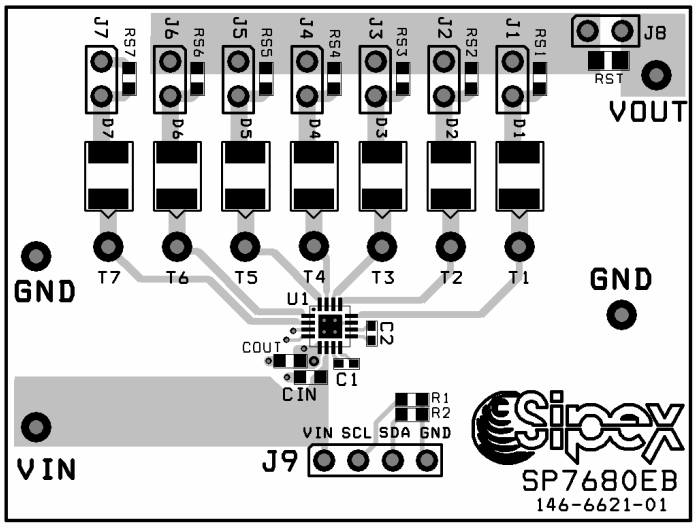



Figure 7: SP7680EB component Placement & LAYOUT TOP SIDE

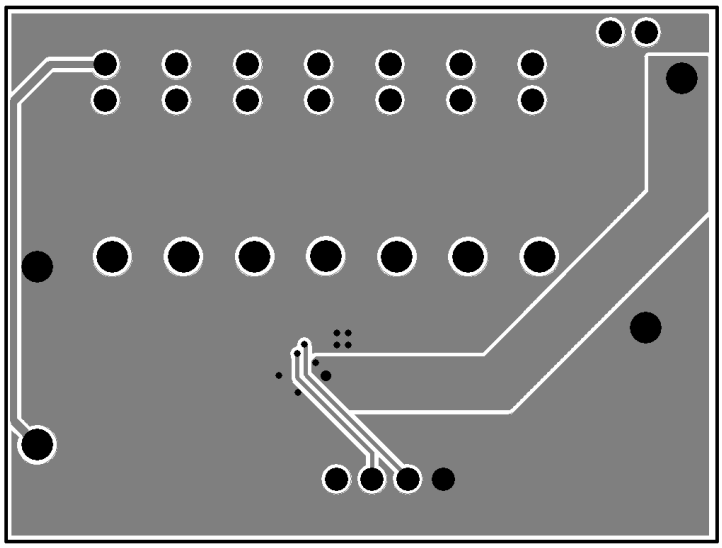


Figure 8: SP7680EB PC LAYOUT BOTTOM SIDE

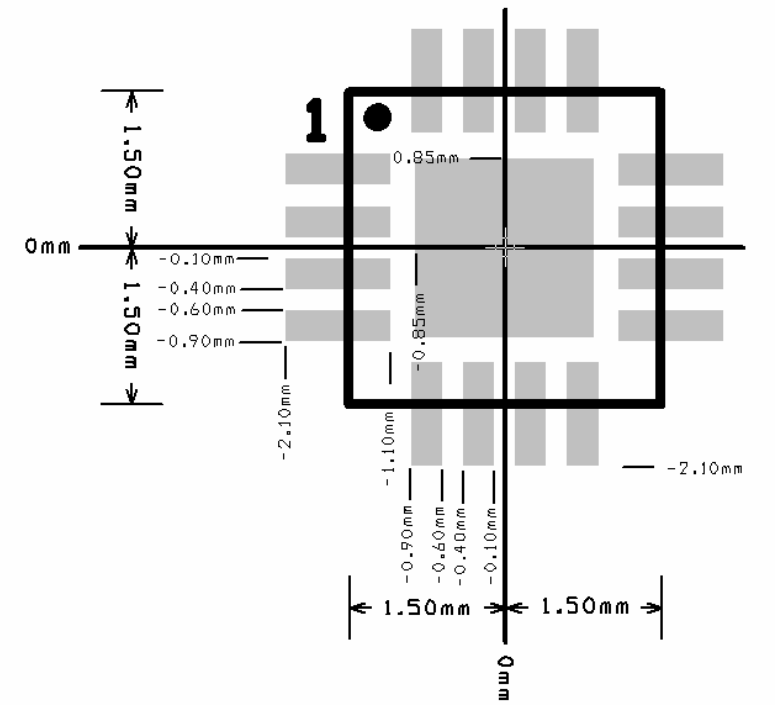



FIGURE 9: SP7680EB 16 Pin 3x3 DFN Foot Print Dimension

**TABLE1: SP7680EB LIST OF MATERIALS**

| Part Reference | Qty | Part Number | Value | Size | Manufacturers/ Website |
|---|---|---|---|---|---|
| U1 | 1 | SP7680ER | | 3x3mm DFN - 10 pin | www.sipex.cpm |
| PCB | 1 | 146-6621-01 | Eval bd PCB | 3x3mm DFN - 10 pin | www.sipex.cpm |
| CIN | 2 | GRM188R61A105K | 1uF/10V | 0603/X5R/0.9 mm ht | www.murata.com |
| COUT | 2 | GRM188R61A225K | 2.2uF/10V | 0603/X5R/0.9 mm ht | www.murata.com |
| C1,C2 | 2 | GRM155R60J474K | 0.47uF/6.3V | 0402 | www.murata.com |
| R1,R2 | 2 | CRCW0603100KFKEA | 100K | 0603 | www.vishay.com |
| RS1,RS2,RS3, RS4, RS5, RS6,RS7,RST | 8 | CRCW06030000Z0EA | 0 Ohm | 0603 | www.vishay.com |
| R1,R2 | 2 | CRCW0603100KFKEA | 100K | 0603 | www.vishay.com |
| J1,J2,J3,J4, J5,J6,J7 J8 | Opt | PTC36SAAN | 2-Pin Header | 0.23x0.12" | Sullins |
| | Opt | STC02SYAN | Shunt | 0.2x0.1" | Sullins |
| J9 | 1 | PTC36SBAN | 4-Pin Right Angle Header | 0.23x0.12" | Sullins |
| TP: VIN, GND, VOUT,T1,T2,T3, T4,T5, T6 and T7 | 11 | 0300-11501-4727100 | Test point female pin | .042" Dia | Mil-Max (digi-key) |

## ORDERING INFORMATION

| Model | Temperature Range | Package Type |
|---|---|---|
| SP7680EB | -40°C to +85°C | SP7680EB Evaluation Board |
| SP7680ER1 | -40°C to +85°C | 16-pin 3x3mm QFN |

For further assistance:

Email: Sipexsupport@sipex.com
WWW Support page: http://www.sipex.com/content.aspx?p=support
Sipex Application Notes: http://www.sipex.com/applicationNotes.aspx

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