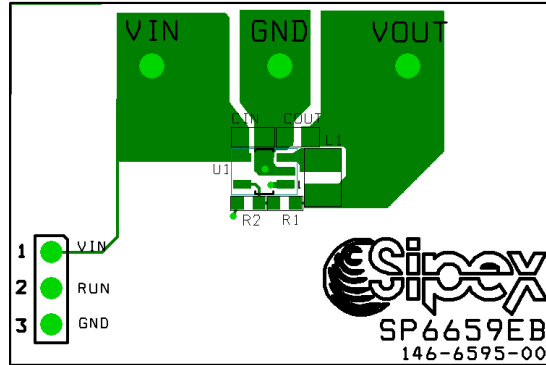




# SP6659EB Evaluation Board Manual

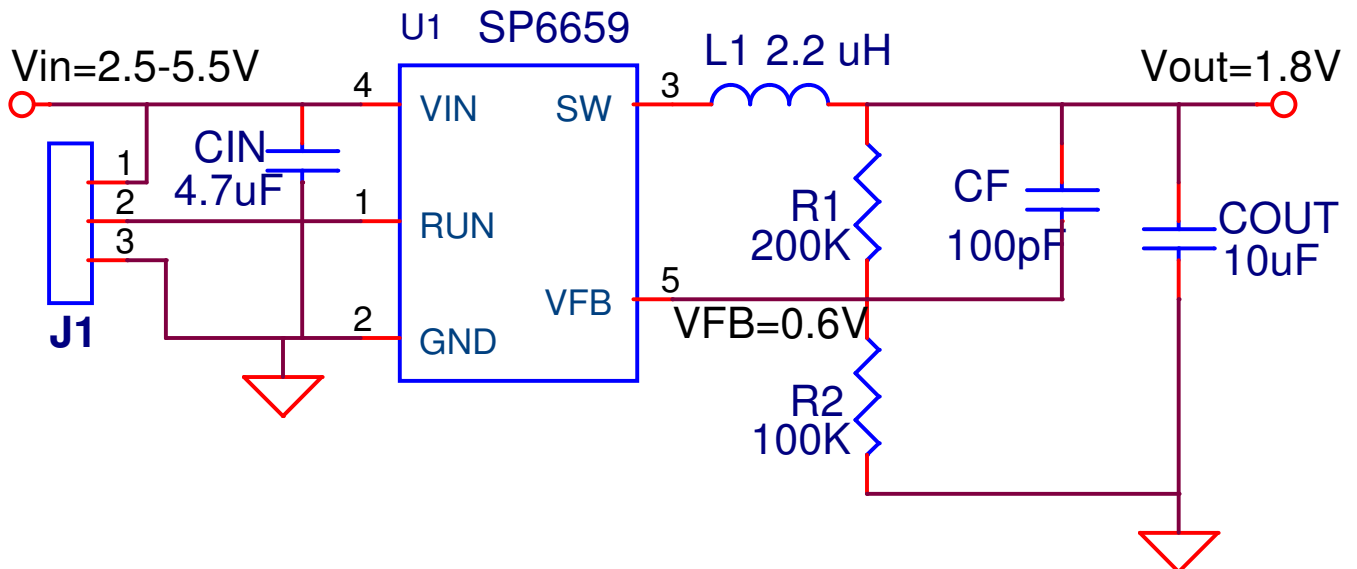
- Synchronous Buck regulator with up to 94% efficiency
- 1.5MHz Constant frequency operation
- 600mA Output Current
- 2.5V-5.5V Input Voltage range,
- 0.6V reference allow low output voltage
- No Schottky diode required
- Current mode operation
- Over-temperature protected
- Low profile SOT23-5 Package & Ceramic Capacitors for small, low profile Power Supply
- Ideal for PDAs, Digital Cameras, Wireless Modems, Cellular Telephones



## DESCRIPTION

The **SP6659 Evaluation Board** is designed to help the user evaluate the performance of the SP6659 for use as a single Li-Ion battery Step-Down DC-DC Converter. The SP6659 operates from 2.5V to 5.5V input, with the highest efficiency in the range 3.0V to 4.2V where the Li-Ion battery has the most energy. The SP6659EB evaluation board is a complete power supply circuit to provide ease of evaluation for the DC/DC Converter performance.

**FIGURE 1. SP6659 1.8V OUTPUT EVALUATION BOARD SCHEMATIC**



## USING THE EVALUATION BOARD

### 1) Powering up the SP6659 Circuit

The SP6659 Evaluation Board can be powered from a single Li-Ion battery or a +2.5 to +5.5V power supply. Connect with short leads directly to the “Vin” and “Gnd” posts. Note the SP6659 will remain in “shutdown” until the “RUN” Jumper J1 is applied to the Vin or position 1 to 2.

### 2) VOUT PROGRAMMING

The SP6659 has a dynamically programmable output voltage using 2 feedback resistors to control the output voltage:

$$R1 = \left( \frac{V_{out}}{0.6} - 1 \right) \cdot R2$$

OR

$$V_{out} = 0.6 \left( 1 + \frac{R1}{R2} \right)$$

**Table 1. SP6659EB BILL OF MATERIALS**

Ref.Des.	Qty	Manufacturer	Part Number	Size	Component	Vendor
Eval bd	1	Sipex Corp	146-6595-00	1"x1.5"	SP6659 Eval board	Sipex 408-937-7500
U1	1	Sipex Corp	SP6659	SOT23-5	5 pins SOT23 DC/DC Conv	Sipex 408-937-7500
Cin	1	Murata	GRM188R60J475KE19D	0603	Ceramic 4.7uF 6.3V X5R	murata.com
Cout	1	Murata	GRM21BR60J106KE19	0805	Ceramic 10uF 6.3V X5R	murata.com
Cf	1	Murata	GRM1885C1H101JA01B	603	Ceramic 100pF 50V COG	murata.com
L1	1	Murata	LQH32CN2R2M53K	1210	2.2uH 790mA 97mΩ 1.5mm thick	murata.com
R1	1	Vishay	CRCW06032003F	0603	200KΩ, 1/10W, 1%	vishay.com
R2	1	Vishay	CRCW06031003F	0603	100KΩ, 1/10W, 1%	vishay.com
J1	1	Sullins	PTC36SAAN	.23x.12	3 Pin Header	800-digi-key
	1	Sullins	STC02SYAN	.2x.1	Shunt	800-digi-key
TP	3	Mill-Max	0300-115-01-4727100	.042" dia	Test Point Female Pin	800-digi-key

**Table 2. SP6659 PIN ASSIGNMENT**

Pin Name	Pin Description	Pin #
<b>RUN</b>	Power down control pin. Forcing this pin above 1.5V enables the device. Forcing this pin below 0.3V shuts down the device.	<b>1</b>
<b>GND</b>	Ground pin	<b>2</b>
<b>SW</b>	Switching node	<b>3</b>
<b>V<sub>in</sub></b>	Power supply pin	<b>4</b>
<b>V<sub>FB</sub></b>	Feedback. Receives the feedback voltage from an external resistive divider across output.	<b>5</b>

## EVALUATION BOARD LAYOUT

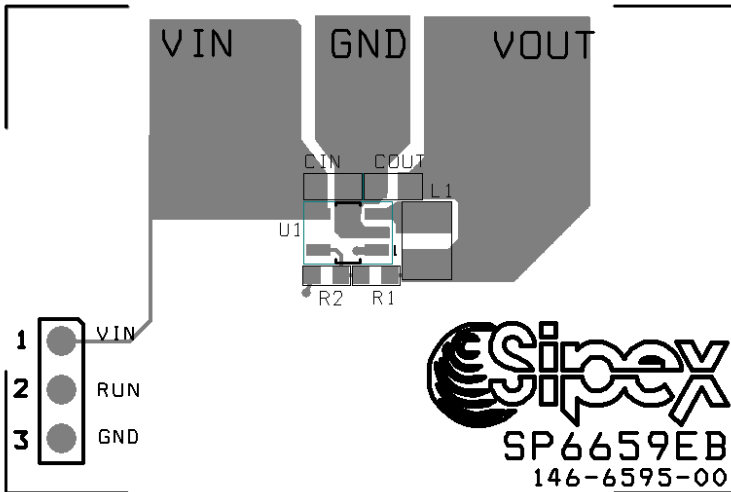


FIGURE 2: SP6659EB COMPONENT PLACEMENT

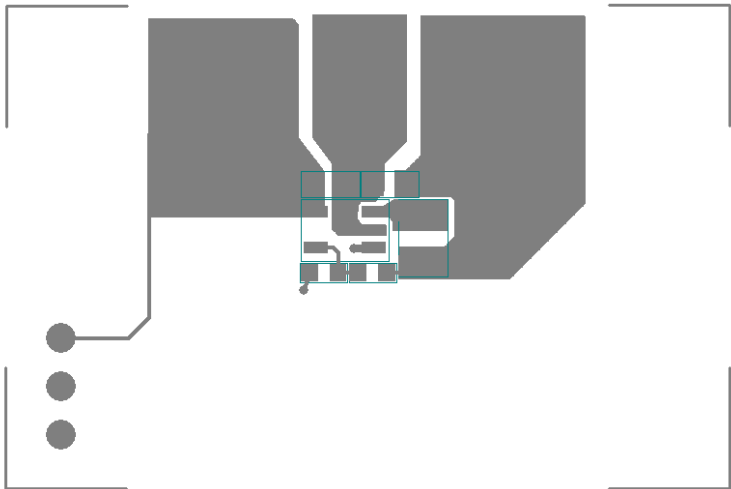


FIGURE 3: SP6659EB PC LAYOUT TOP SIDE

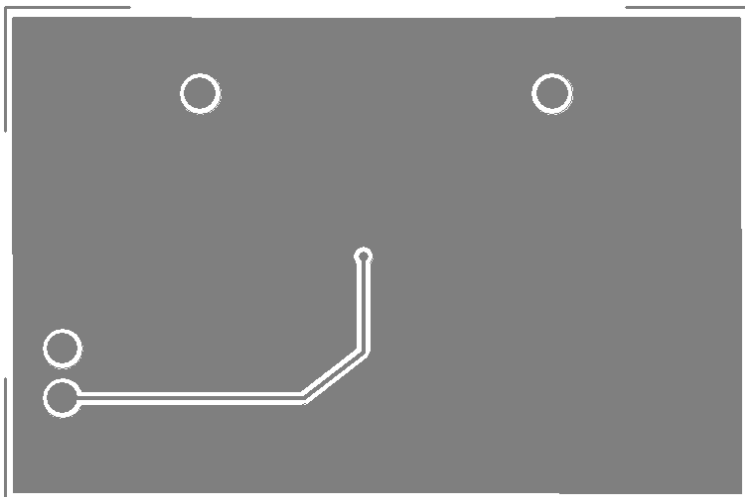


FIGURE 4: SP6659EB PC LAYOUT BOTTOM SIDE