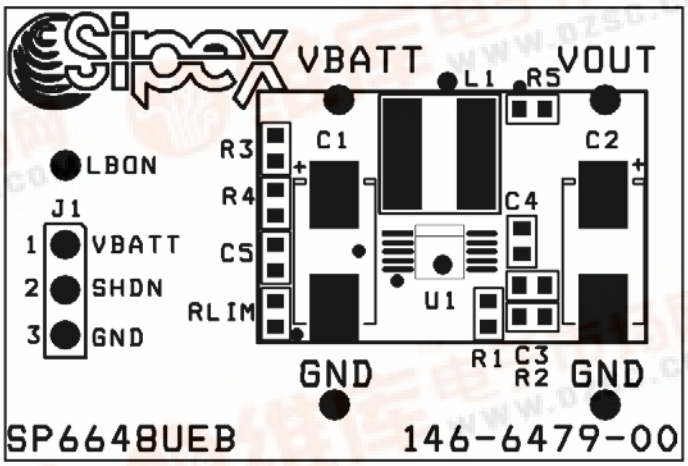
SP6648 Evaluation Board Manual

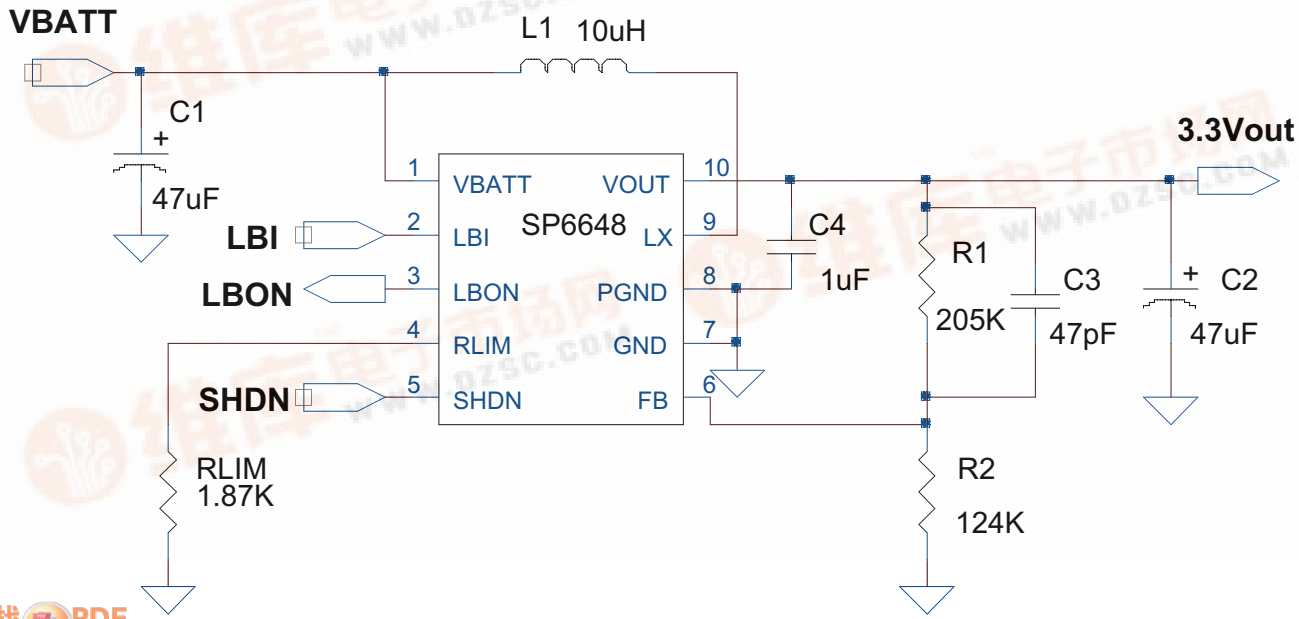
- Easy Evaluation for the SP6648 Single or Dual Cell Alkaline to 2V to 5V Output
- Provides 300mA output at 3.3V output for 2.0V Input
- High Efficiency: 94%
- µSOIC Package & SMT components for small, low profile Power Supply



DESCRIPTION

The **SP6648 Evaluation Board** is designed to help the user evaluate the performance of the SP6648 for use as a single or dual cell input to +3.3V output DC-DC Converter. The output of the SP6648 is preset to +3.3V or can be adjusted from +2V to +5.5V by manipulating two external resistors. The evaluation board is a completely assembled and tested surface mount board which provides easy probe access points to all SP6648 Inputs and Outputs so that the user can quickly connect and measure electrical characteristics and waveforms.

SP6648 EVALUATION BOARD SCHEMATIC



USING THE EVALUATION BOARD

1) Powering Up the SP6648 Circuit

The SP6648 Evaluation Board can be powered from inputs from a +0.95V to +3.3V from 1 or 2 alkaline cells. Connect with short leads directly to the "Vbatt" and "Gnd" posts. Monitor the Output Voltage and connect the Load between the "Vout" post and the 2nd "GND" post.

2) Using the J1 Jumper: Enabling the SP6648 Output and using the Shutdown Mode

The SP6648 output will be Enabled if the J1 Jumper is in the top or pin 1 to 2 position. If J1 is in the pin 2 to 3 position, the Shutdown pin is brought to GND, which puts the SP6648 in the low quiescent Shutdown Mode.

3) Using the Rlim Function

The peak inductor current, I_{PEAK}, is programmed externally by the RLIM resistor connected between the RLIM pin and GND. The peak inductor current is defined by:

$$I_{PEAK} = 1400/R_{LIM}$$

The SP6648 datasheet specifications for RLIM give a range of 1750 to 4000 ohms. Using the IPEAK equation above gives an IPEAK range of

I_{PEAK} range = 350 to 800mA.

The saturation current specified for the inductor needs to be greater then the peak current to avoid saturating the inductor, which would result in a loss in efficiency and could damage the inductor. The SP6648 evaluation board uses a Rlim value of 1.87K for an Ipeak = 750mA to allow the circuit to deliver up to 180mA for 1.3V input and 400mA for 2.6V input. Other values could be selected using the above relationships.

4) Using the LBON - Low Battery Output Function

The Low Battery Output function, LBON, is programmed externally by the R3 and R4 resistor divider connected between Vbatt, the LBI input pin and GND. The LBON is an open drain output, which is active low and is pulled up by a 1M resistor R5 to Vout. When the LBI comparator falling threshold of 0.625V is reached, the LBON output goes low as determined by the relationship:

LBON falling = Vbatt*R4/(R3 +R4)

The SP6648 evaluation board R3 & R4 resistors have been set to trip for a falling battery threshold of about 2.0V. Using this relationship, other low battery threshold values can be set by the user.

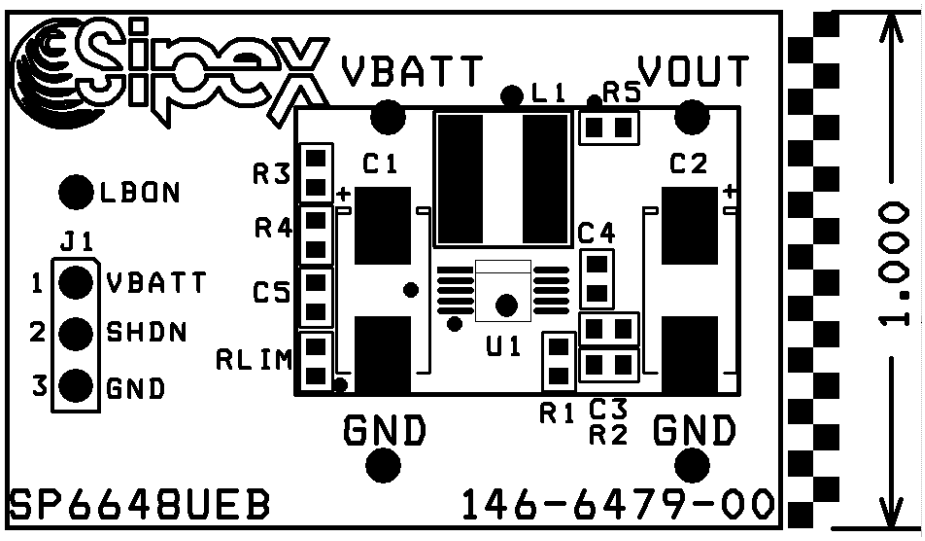


FIGURE 1: SP6648UEB COMPONENT PLACEMENT

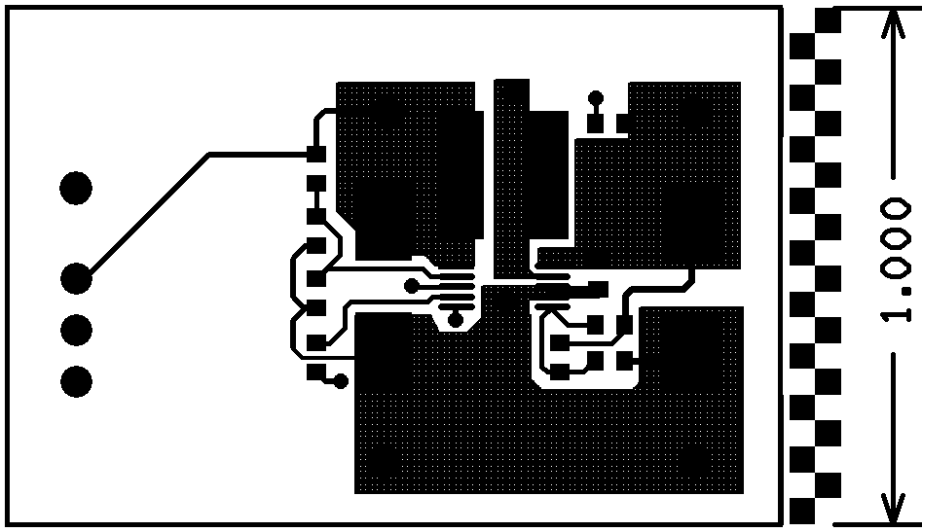


FIGURE 2: SP6648UEB PC LAYOUT TOP SIDE

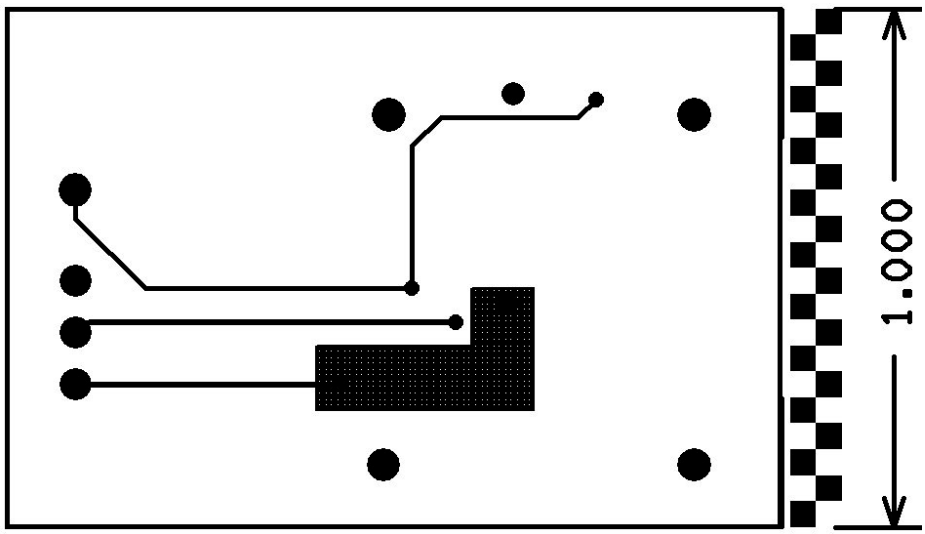


FIGURE 3: SP6648UEB PC LAYOUT BOTTOM SIDE

TABLE1: SP6648EB LIST OF MATERIALS

Ref. Des.	Qty.	Manufacturer	Part Number	Layout Size	Component	Vendor
	1	Sipex Corp.	146-6479-00	1"x1.5"	SP6648UEB Eval PC Board	Sipex 978-667-7800
U1	1	Sipex Corp.	SP6648EU	uSO-8	10-pin uSOIC Step-Up DC/DC Conv	Sipex
C1,2	2	Kemet	T494C476K010AS	"D" size	47uF 10V SM 0.3ohm ESR	Kemet 847-517-1030
C1,2	2	Kemet	T494V476K010AS	"V" size	47uF 10V low profile SM 0.3ohm ESR	Kemet 847-517-1030
C3	1	TDK Corp	C1608SL1H470K	0603	Ceramic 16V 47pF SM	TDK 847-803-6100
C4	1	TDK Corp	C1608X5R1A105M	0603	Ceramic 10V 1uF SM 0.02ohm ESR	TDK 847-803-6100
L1	1	Sumida	CDRH5D28-100	6.7x6.5x3.0mm	10uH, 1.3A, 0.065ohm, SM Inductor	Sumida 847-956-0666
L1	1	TDK Corp	RLF5018-100MR94	5.6x5.2x2.0mm	10uH, 0.94A, 0.067ohm, SM Inductor	TDK 847-803-6100
R1	1	Panasonic	ERJ-3EKF2053	0603	205K ohm 1/8W 1% 0603 SM	Digi-Key 800-344-4539
R2	1	Panasonic	ERJ-3EKF2493	0603	124K ohm 1/8W 1% 0603 SM	800-Digi-Key
R3	1	Panasonic	ERJ-3EKF5493	0603	549K ohm 1/8W 1% 0603 SM	800-Digi-Key
R4	1	Panasonic	ERJ-3EKF2493	0603	249K ohm 1/8W 1% 0603 SM	800-Digi-Key
R5	1	Panasonic	ERJ-3GEYJ105	0603	1M ohm 1/8W 5% 0603 SM	800-Digi-Key
RLIM	1	Panasonic	ERJ-3EKF1871	0603	1.87K ohm 1/8W 1% 0603 SM	800-Digi-Key
TP	5	Mill-Max	0300-115-01-4727100	.042 Dia	Test Point Female Pin	800-Digi-Key
J1	1	Sullins	PTC36SAAN	.23x.12	3-Pin Header	800-Digi-Key
	1	Sullins	STC02SYAN	.2x.1	Shunt	800-Digi-Key

ORDERING INFORMATION

Model	Temperature Range	Package Type
SP6648UEB	-40°C to +85°C	SP6648 Evaluation Board
SP6648EU	-40°C to +85°C	10-pin µSOIC