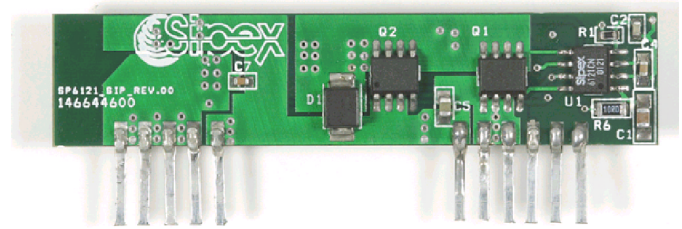




## SP6121 Demo Board Manual

### FEATURES

- DC/DC Synchronous Buck Converter for Distributed Power Systems.
- SIP design provides complete, ready to use solutions for :
  - $V_{in}=3.0 - 7.0V$
  - $V_{out}=1.25 - 5.0V$
  - $I_{out}=8.0A$  (*no air flow required*).
- High Efficiency: 86 to 95%
- Excellent Transient Response
- Small Size: 550X2500mils, vertical mounting
- Power Good output



### DESCRIPTION

The **SP6121 DEMO Board** is designed to help the user evaluate the performance of the SP6121 for use in a distributed power system. The SP6121 operates over an input voltage range of 3.0V to 7.0V, and can deliver efficiencies as high as 95%. The SP6121 Demo Board is a complete Power Supply ready for use in applications where high stability, excellent transient response, high efficiency and power density are critical concerns.

The Demo Board, a completely assembled and tested PCB with surface mount components, has been designed as a SIP board that can be vertically mounted in an existing application.

## BOARD SCHEMATIC and LAYOUT

The **SP6121 Demo Board** is configured as a highly efficient, synchronous DC/DC buck converter. It has been optimized to deliver excellent thermal and EMI performance.

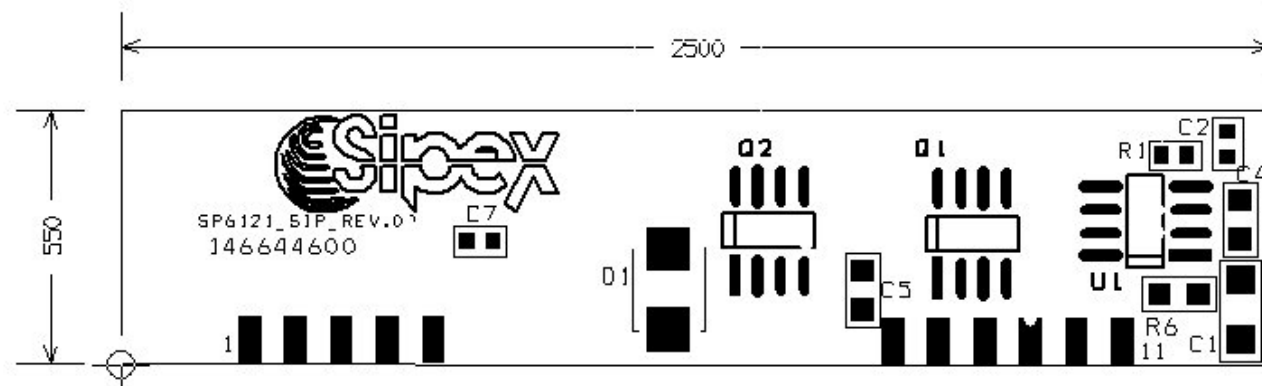


FIGURE 1. SP6121 Demo Board – layer 1, top view.

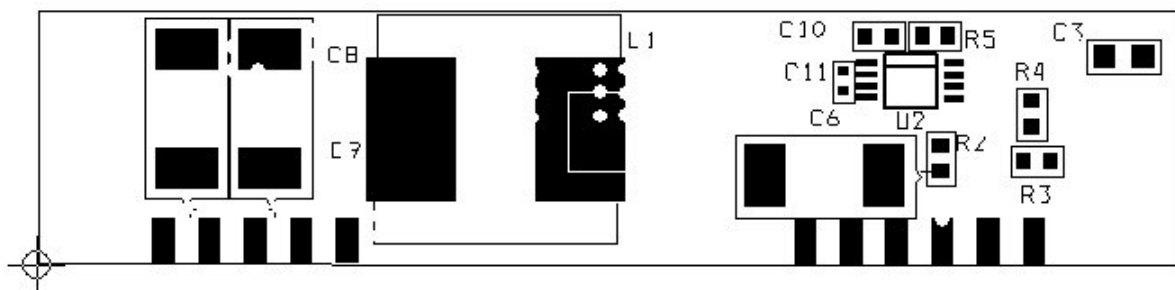


FIGURE 2. SP6121 Demo Board, layer 4, top view.

The SP6121 Demo Board has four, 2 oz copper layers that provide improved noise immunity and minimize power losses. Components are placed on the top and bottom sides of the PCB as shown on Figures 1 and 2. The row of pads (1 to 11) at the edge of the board is designed for solderable pins such as the NAS Interplex forked pins (17 x 42 mil cross section). Pin connections to the demo board circuit are indicated in Figure 3. (Pad 11 is a no connect.)



respectively), and the current set resistor ( $R_2$ ), are discussed in detail in the SP6121 data sheet.

## USING THE DEMO BOARD

To use the Demo Board, connect the input voltage,  $V_{IN}$  to pins **7** and **8** and a ground, GND, to pins **5** and **6**. Connect the load to pins **1**, **2**, **3**, and **4**. Pin **9** provides a logic level “power good” signal and Pin **10** is used for trimming the output voltage.

When measuring efficiency, care must be taken to keep leads between measuring devices, the power supply ( $V_{IN}$ ) and the demo board as short as possible and the measurement probes should be connected to pins 4 ( $V_{OUT}$ ) and 7 ( $V_{IN}$ ).

The SP708 power management controller IC ( $U_2$ ) on the demo board is used to generate a Power Good signal. On this demo board, when the voltage on the pin 6 (PFI) of  $U_2$  is 1.25V or less,  $U_2$ 's pin 7 (PFO) goes LOW. Pin 6 can be connected directly, or through a resistor divider, to  $V_{OUT}$  or  $V_{IN}$ .

## DEMO BOARD CHARACTERISTICS

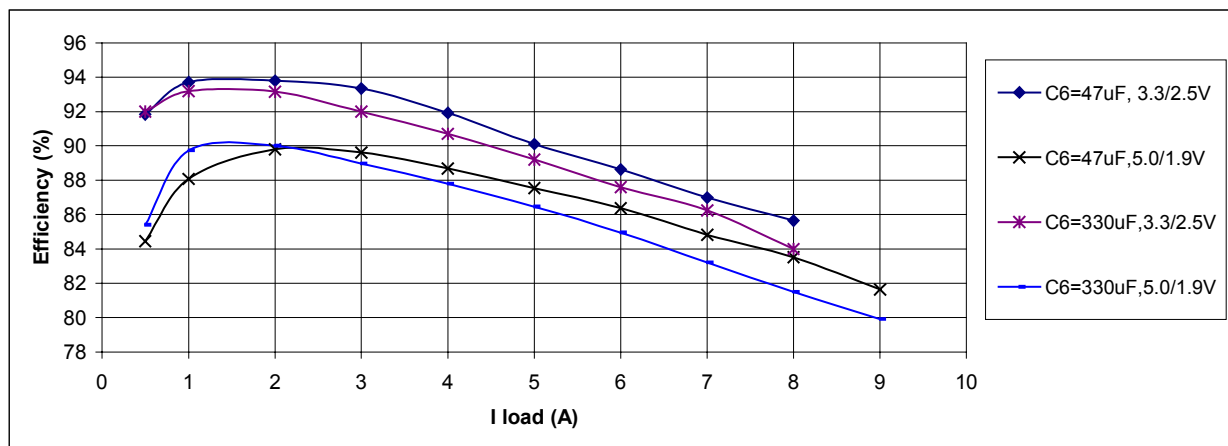


FIGURE 4. EFFICIENCY vs. I load.  $V_{out}=2.5V$

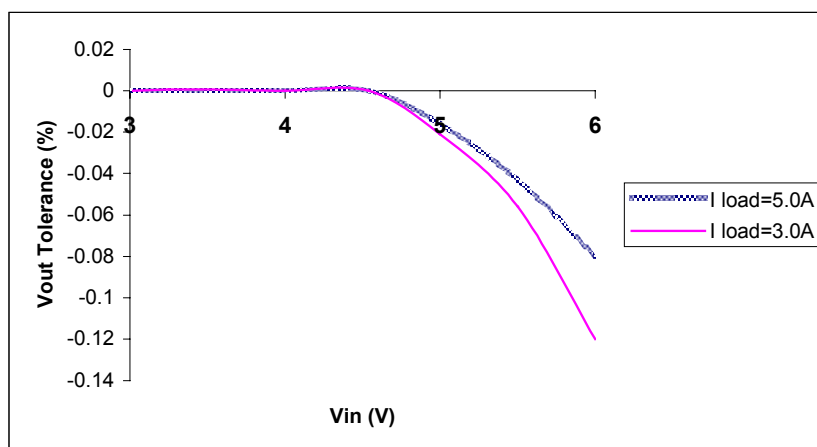


FIGURE 5. Line Regulation.  $V_{out}=2.5V$

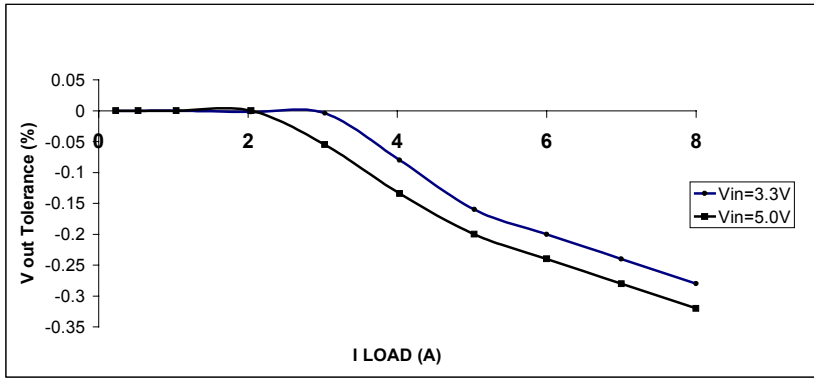


FIGURE 6. Load Regulation.  $V_{out}=2.5V$

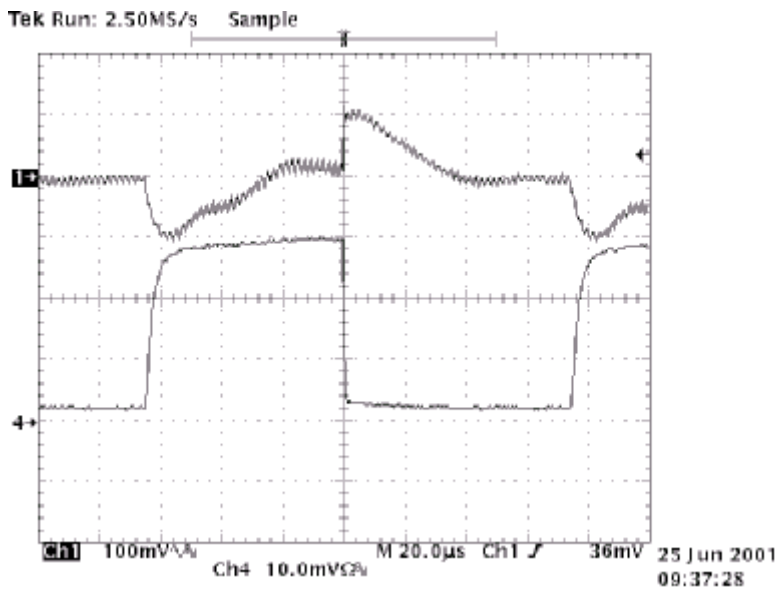


FIGURE 7. Load Step Response.  $I$  load step 0.4A to 6.0A. CH1-Vout; CH4-I load.  $V_{in}=5.0V$ ,  $V_{out}=2.5V$

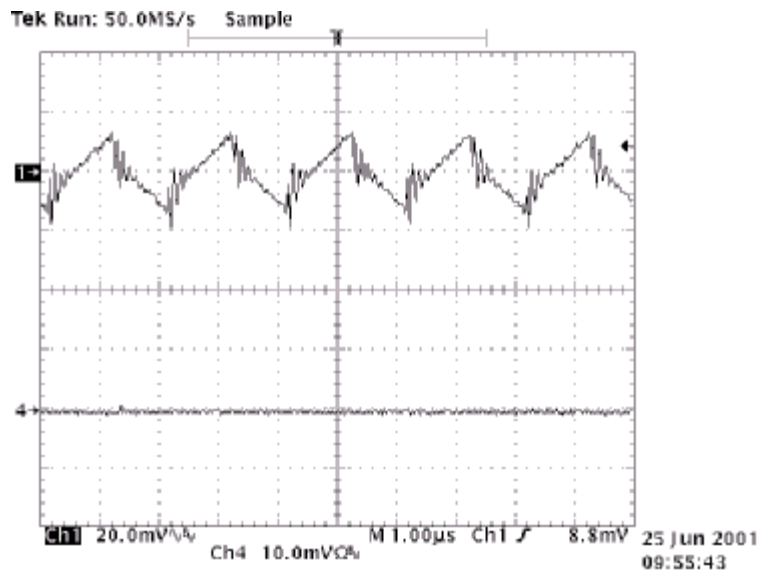


FIGURE 8. Output Ripple.  $V_{in}=5.0V$ ,  $V_{out}=2.5V$ ,  $I_{load}=6.0A$

## DEMO BOARD RECOMMENDED PARTS:

---

No.	Qty	Part	Manuf.	Manuf. P/N / PACKAGE
1	1	C1	Capacitor Ceramic 2.2uF/16V/X7R/10%	Any Approved Package 1206
2	2	C2,C11	Capacitor Ceramic 56pF/50V/X7R/10%	"_" 603
3	1	C3	Capacitor Ceramic 3.9nF/50V/X7R/10%	"_" 805
4	1	C5	Capacitor Ceramic 1uF/16V/X7R/10%	"_" 603
5	1	C6	Capacitor Tantalum 220uF/10V/10%	"_" 7343
		or	Capacitor Tantalum 330uF/10V/20%	"_" 1812
		or	Capacitor Ceramic 47uF/X7R/10V/10%	"_" 7343
6	2	C7,C10	Capacitor Ceramic 0.1uF/16V/X7R/10%	"_" 603
7	2	C8,C9	Capacitor Tantalum 470uF/10V/10%	"_" 7343
8	1	D1	Diode Schottky 30V/2.0A	"_" Package DO-214AA
9	1	L1	Inductor 1.6uH/15A/3.3 mOhm	PANASONIC ETQ-P6F1R6SFA
10	1	Q1	P-MOSFET 20V/8.0A/32mOhm	FAIRCHILD FDS6375/ SO-8
11	1	Q2	N_MOSFET 30V/13A/10mOhm	FAIRCHILD FDS6690A/ SO-8
12	2	R1,R5	Resistor 10K/63mW/5%	Any Approved Package 603
13	1	R2	Resistor 2.1K/63mW/5%	"_" 603
14	2	R4,R3	Resistor 10K/63mW/1%	"_" 603
15	1	R6	Resistor 10 Ohm/0.63mW/5%	"_" 603
16	1	U1	SYNCH. BUCK CONTROLLER	SIPEX SP6121/SO-8
17	1	U2	Low Power Microprocessor Supervisory Circuits	SIPEX SP708/ uSOIC-8
18	11	Pins	17X42 mils Cross Section	NAS Interplex