DEMO CIRCUIT 1544
QUICK START GUIDE

LT3957

Boost, SEPIC, Flyback and Inverting Converter with 5A, 40V Switch

DESCRIPTION

Demonstration circuit 1544 is a Boost, SEPIC, Flyback and Inverting Converter with 5A, 40V Switch featuring the LT3957. The LT3957 can be configured as a boost, flyback, SEPIC, and inverting converter, but the demonstration circuit is assembled as a boost. The input voltage range is 4.5V to 20V and the output voltage is 24V with 600mA over the entire input voltage range.

The LT3957 has an internal n-channel 5A, 40V power switch for high voltage, power, and efficiency. The dual paddle package provides excellent heat dissipation for the internal power switch. The LT3957 current-mode dc/dc converter features adjustable switching frequency, soft-start, compensation, shutdown and undervoltage lockout with hysteresis, and a feedback pin (FBX) that can be used in both positive and negative applications. A SYNC input can be used to synchronize the switching at a frequency higher than the IC is programmed.

The demonstration circuit features small 1210 case size ceramic input and output capacitors. The internal n-channel power switch provides efficiency as high as 95% in typical boost applications with 14.4W output.

The LT3957 datasheet gives a complete description of the part, operation and applications information. The datasheet must be read in conjunction with this Quick Start Guide for demonstration circuit 1544A. The LT3957 is assembled in a 36-lead plastic UHE package with two thermally enhanced pads for SW and GND. Proper board layout is essential for both proper operation and maximum thermal performance. See the datasheet section 'Layout Considerations'.

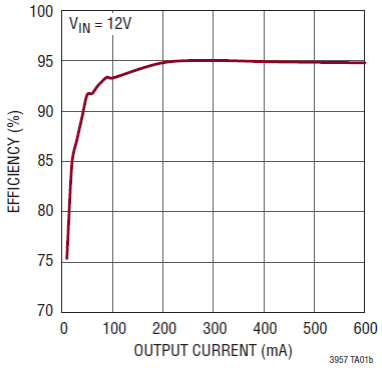


Figure 1. DC1544A 12VIN Efficiency

Design files for this circuit board are available. Call the LTC factory.

PARAMETER	CONDITIONS		UNITS
Minimum Input Supply Voltage		4.5	V
Maximum Input Supply Voltage		20	V
Output Voltage Programmed	V_{IN} = 4.5V-20V, $I_{LOAD} \leq$ 600mA	24	V
Switching Frequency	R_T = 41.2k	300	kHz
Guaranteed Maximum Output current	V_{IN} = 4.5V-20V	600	mA
Input Undervoltage Lockout (falling)	R1=200k, R2=95.3k	3.8	V
Input Turn-on Voltage (rising)	R1=200k, R2=95.3k	4.2	v
Efficiency	V_{IN} = 12V, I_{LOAD} = 600mA	95	%

QUICK START PROCEDURE

Demonstration circuit 1544 is easy to set up to evaluate the performance of the LT3957. Refer to Figure 2 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the Vin or Vout and GND terminals.

1. Place jumpers in the following positions:

   JP1 NO SYNC

2. With power off, connect the input power supply to VIN and GND.

   NOTE. Connect power to GND, not SGND.

3. Connect a load of 600mA or less to VOUT and GND terminals (not SGND).

4. Turn on the power at the input.

   NOTE. Make sure that the input voltage does not exceed 20V.

5. Check for the proper output voltage (24V).

   NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

6. Once the proper output voltage is established, adjust the load and input within the operating ranges and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

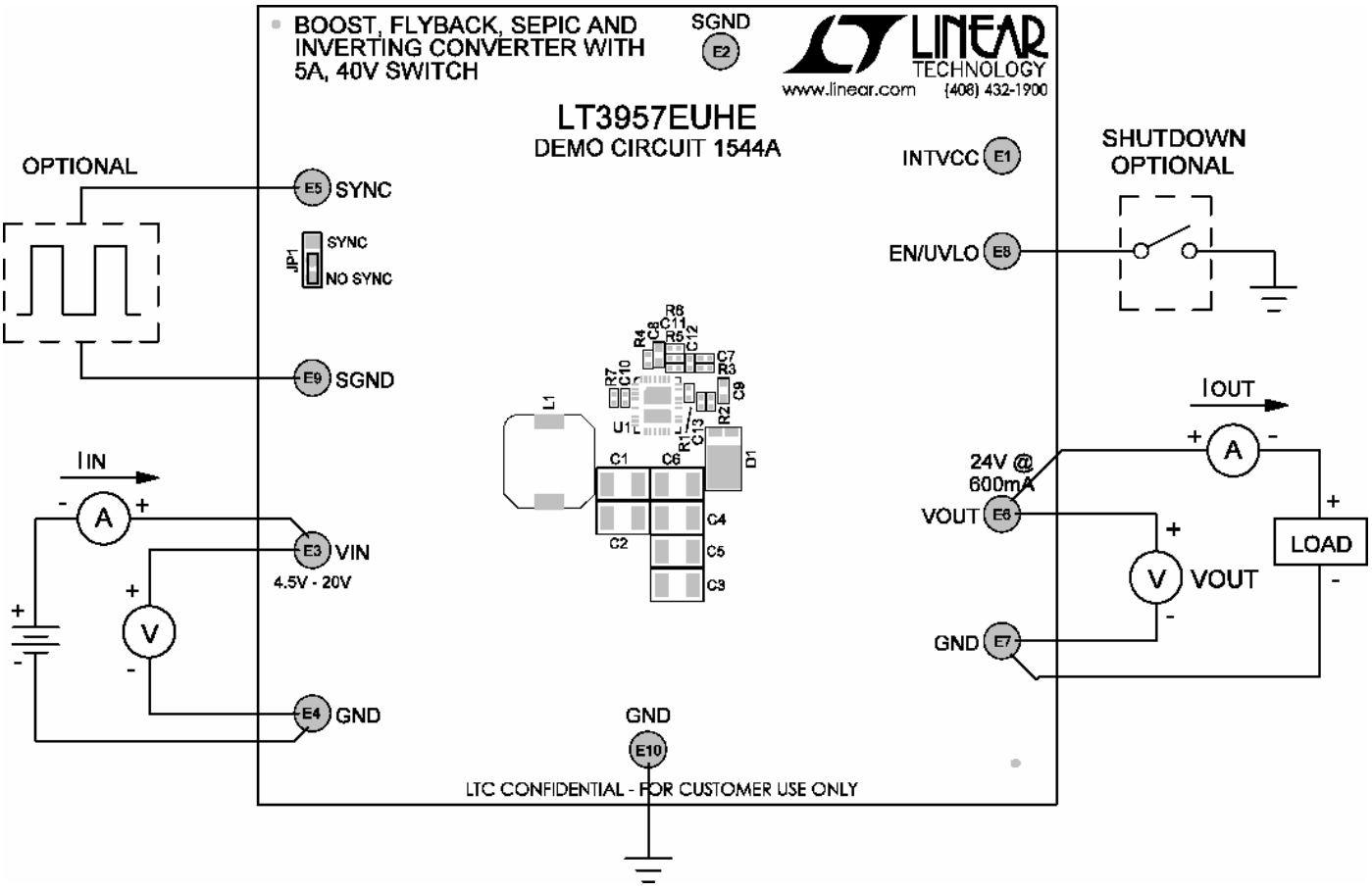


Figure 2. Proper Measurement Equipment Setup

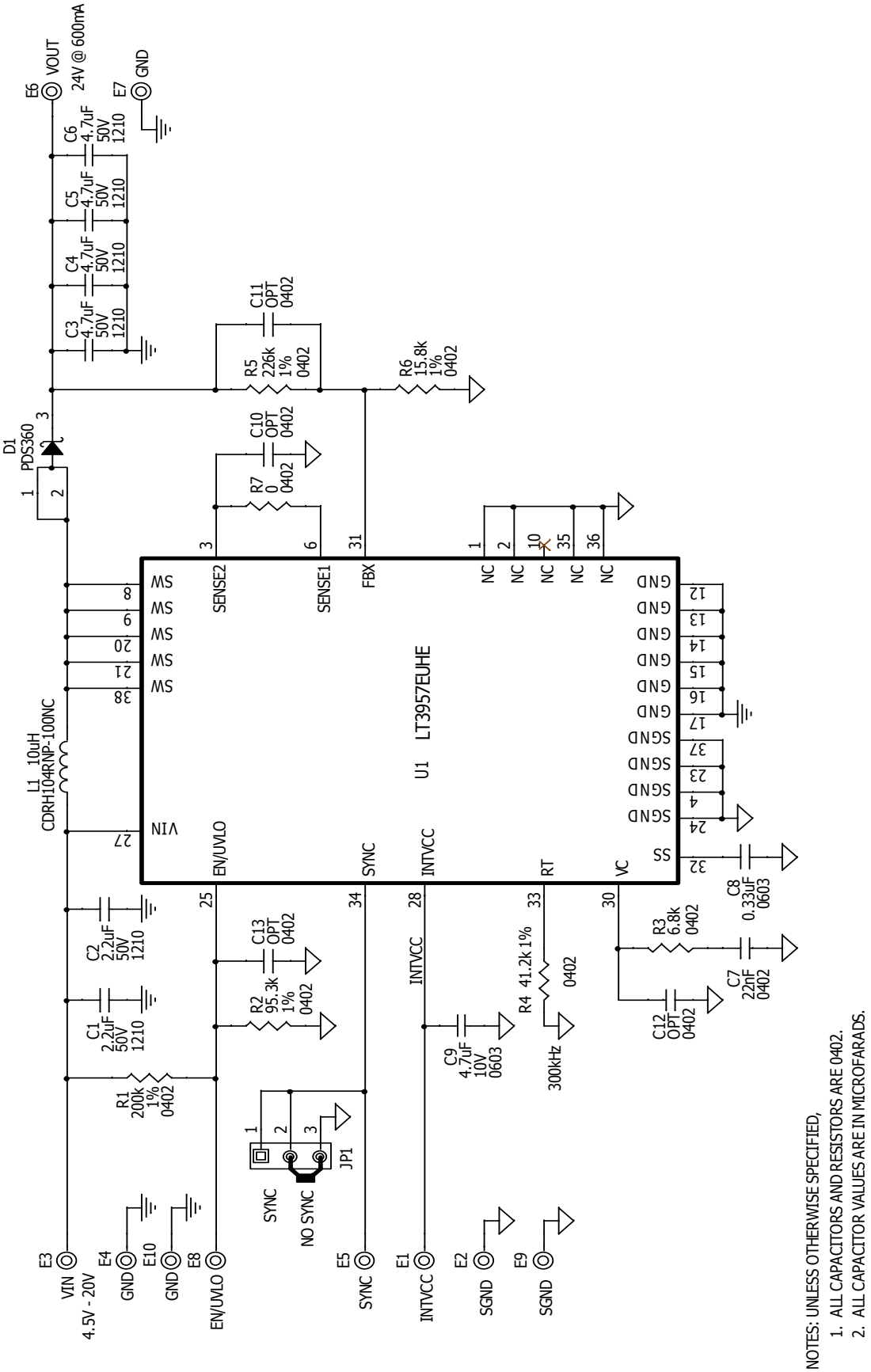
TERMINAL OPTIONS

DC1544A has both **GND** and **SGND** terminals. The schematic shows that the GND and SGND pins of the IC are not tied together outside the IC. They are internally connected. It is important that power ground currents do not run on the SGND components. SGND is used to terminate the signal ground components such as compensation and feedback. Input and output power as well as input and output caps, catch diodes, etc. should all connect to the GND plane. The SGND terminals are provided in case the customer would like to make signal ground measurements, but they do not need to be used. Improperly connecting input power to the SGND terminal results in noisy behavior of the IC.

EN/UVLO (enable / undervoltage lockout) is provided as a terminal so that the part can quickly be placed in shutdown by tying EN/UVLO to GND. The EN/UVLO pin is already being used as an undervoltage lockout threshold for the VIN with resistors R1 and R2. Undervoltage lockout stops the IC from switching when VIN is too low, but shutdown further reduces the VIN pin quiescent current when EN/UVLO is tied directly to GND. It is okay to leave the EN/UVLO terminal floating.

INTVCC is provided as a terminal to be able to power INTVCC externally or to tie INTVCC directly to VIN when VIN remains below 8V. It is okay to leave the INTVCC terminal floating.

SYNC is provided as a terminal to be able to externally synchronize the internal power switching frequency. If SYNC is not used, the terminal should be left floating and the JP1 position should be set at 'NO SYNC'. If SYNC is used, the switching frequency of SYNC should be 20% higher than the programmed switching frequency of the IC and the JP1 position must be set at 'SYNC'. Please see the datasheet for details regarding the use of SYNC and the switching frequency range.



NOTES: UNLESS OTHERWISE SPECIFIED,

1. ALL CAPACITORS AND RESISTORS ARE 0402.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL RESISTOR VALUES ARE IN OHMS.