DESCRIPTION

Demonstration circuit 1060 features two LT3508 step-down DC/DC switching converters. One circuit uses the LT3508EFE and the other circuit has the LT3508EUF. The LT3508 dual output step-down switching regulator has two internal power switches, a wide input voltage range, adjustable switching frequency synchronizable over the frequency range, programmable soft-start, tracking, power-good, and channel sequencing. The anti-phase switching reduces the input capacitor. The wide V_{IN} range of the LT3508 allows step-down configurations with up to 36V input. The high power internal switches have current limit that allows for up to 1.4A output on each output.

The demonstration circuit has two circuits. The top is optimized for high efficiency, wide input range and maximum output current; the bottom is optimized for the size. The top circuit is rated for 3.3V at 1.4A and 5V at 1.4A output from a 6V–36V input using the FE package. The frequency is set to 700kHz to allow for the high VIN to VOUT ratio and provides high efficiency throughout the range. The bottom circuit generates 1.8V at 1A and 3.3V at 1A from a 5V to 16V DC input using the QFN package and shows off the compact size with 1.6MHz switching frequency. The two channels are sequenced so that the 1.8V channel starts before the 3.3V channel. The two circuits are completely isolated from each other and can be run simultaneously or independently. The shutdown terminals are available on each circuit as are the power good and track terminals in case sequencing or tracking is preferred.

This board is designed for applications that require two step-down converters up to 1.4A load with low cost, small board space, low parts count, and simple circuit design. The high current, on-board, dual monolithic switches eliminate the need for external switches. The current-mode control simplifies the compensation network and gives excellent transient response.

Please read the LT3508 datasheet in addition to this quickstart guide for details regarding LT3508 operation and applications.

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

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TYPICAL PERFORMANCE (T_A = 25°C)

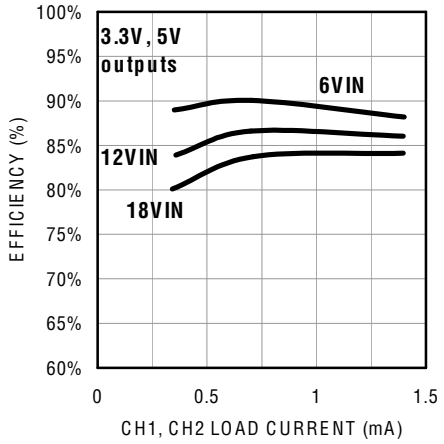


Figure 1. Typical Efficiency of DC1060A LT3508EFE Dual Step-Down VOUT1=3.3V, VOUT2=5V

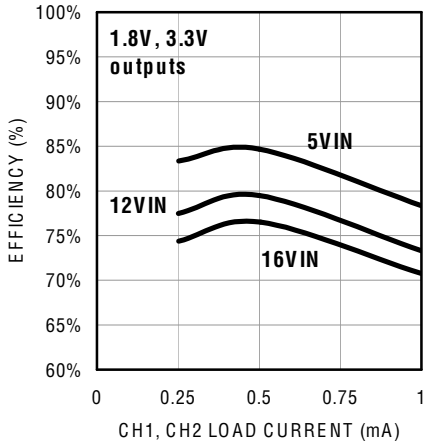


Figure 2. Typical Efficiency of DC1060A LT3508EUF Dual Step-Down VOUT1=1.8V, VOUT2=3.3V

Table 1. FE package Dual Step-Down Converter (VOUT1=3.3V and VOUT2=5V)

Parameter	Value
V_{IN}	6V to 36V
VOUT1	3.3V
$V_{OUT}2$	5V
$V_{OUT}1$ Load Current	1.4A(max)
$V_{OUT}2$ Load Current	1.4A(max)
Switching frequency	700kHz
$V_{OUT}1$ Ripple pk-pk	25mV at 1.4A and 18VIN
$V_{OUT}2$ Ripple pk-pk	18mV at 1.4A and 18VIN
Efficiency	86% at 1.4A load current (VOUT1 and VOUT2) and 12VIN

Table 2. QFN Package Dual Step-Down Converter (VOUT1=1.8V and VOUT2=3.3V)

Parameter	Value
V_{IN}	5V to 16V
VOUT1	1.8V
VOUT2	3.3V
VOUT1 Load Current	1A(max)
VOUT2 Load Current	1A(max)
Switching frequency	1.6MHz
$V_{OUT}1$ Ripple pk-pk	3mV at 1A and 12VIN
$V_{OUT}2$ Ripple pk-pk	5mV at 1A and 12VIN
Efficiency	85% at 500mA load current (VOUT1 and VOUT2) and 5VIN

QUICK START PROCEDURE

DC1060A is easy to set up to evaluate the performance of the LT3508. Refer to Figure 3 for proper measurement equipment setup and follow the procedure below:

LT3508EFE top circuit:

1. Connect a 6V–36V DC input power supply to the VIN and GND terminals on the board with power OFF.
2. Attach the desired load to each channel – up to 1.4A.
3. After all connections are made, turn ON input power and verify that the output voltages are 3.3V and 5V.
4. The Track/SS, power good (PG), and shutdown functions are optional and their terminals can be left floating (disconnected). Connecting the shutdown terminal to the GND terminal shuts down the circuit and drops the output voltages to zero. Shutdown has a pull-up resistor on circuit that may not be necessary with the proper high and low signal applied.

LT3508EUF bottom circuit

1. Use the same testing method for the bottom circuit as used in the top circuit, but with a different input voltage (5V to 16V), load currents (1A per channel maximum), and output voltages (1.8V and 3.3V).
2. Upon startup, sequencing of VOUT1 and VOUT2 can be observed with an oscilloscope.

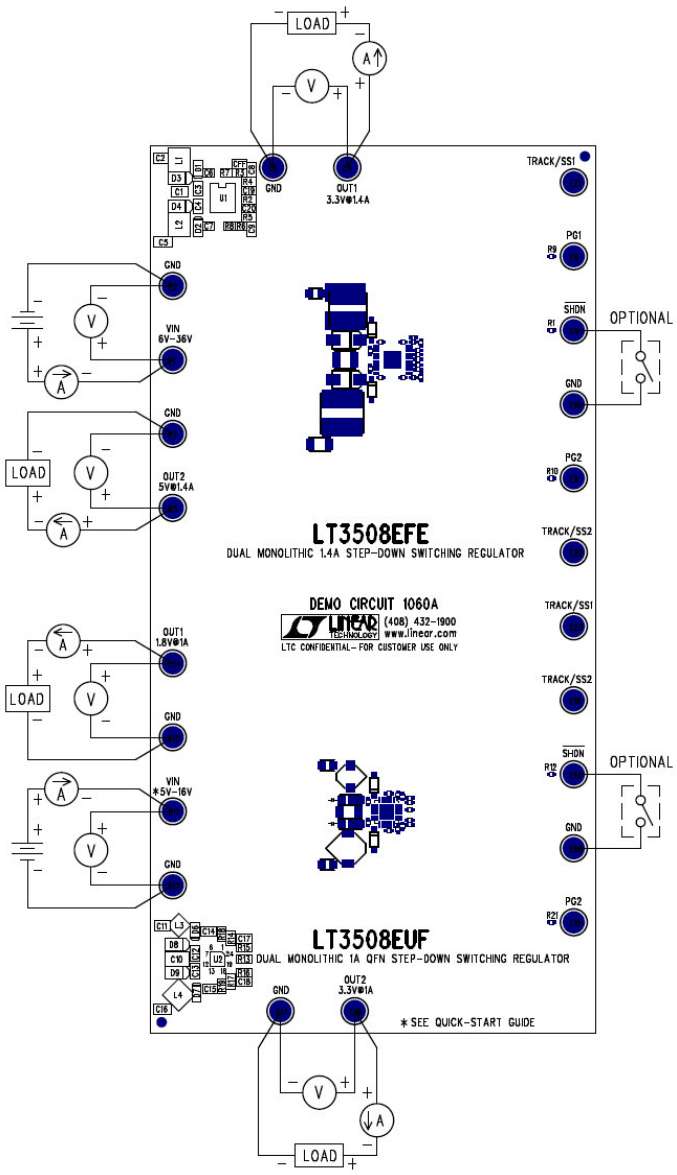
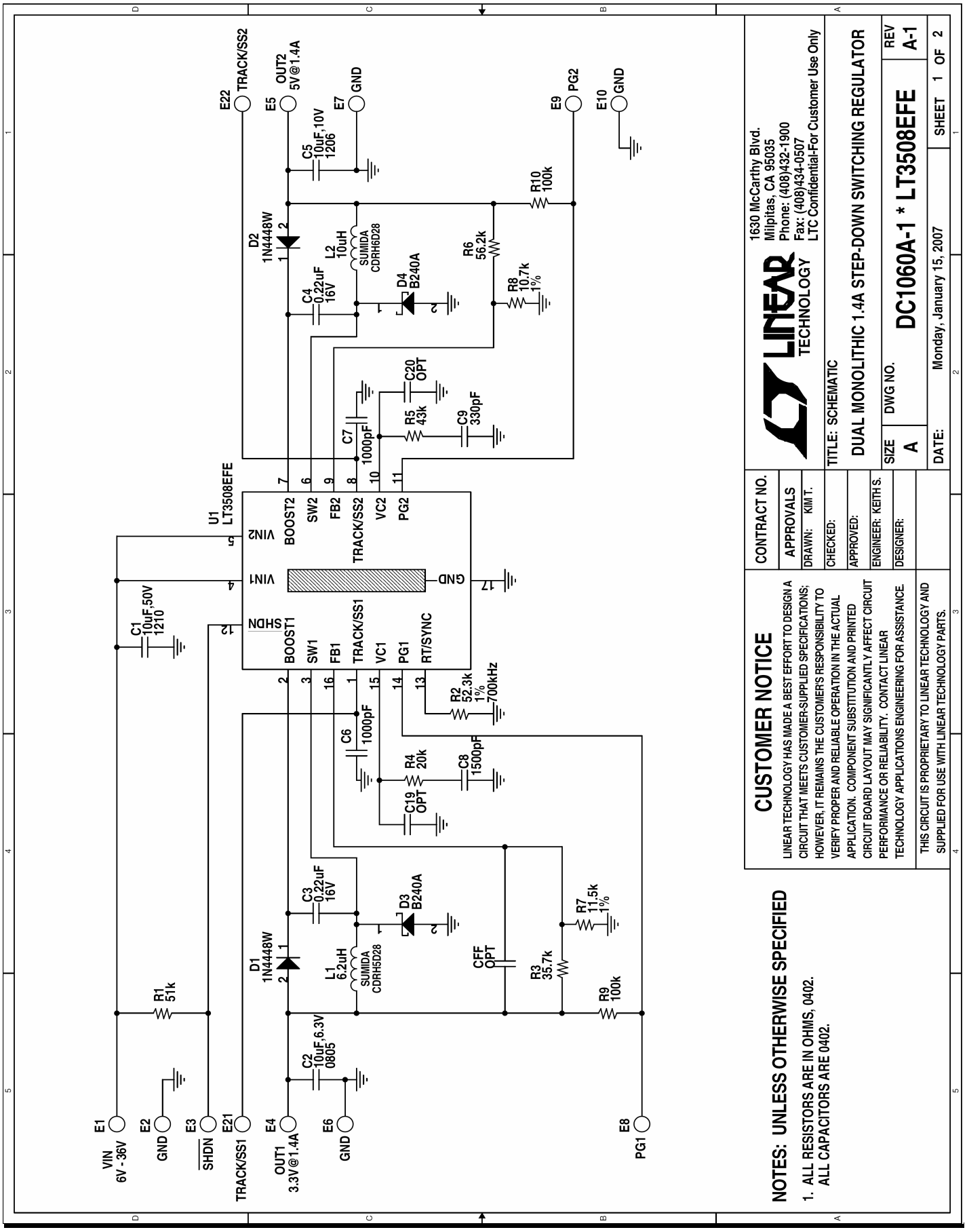


Figure 3. Proper Measurement Equipment Setup

SYNC FUNCTION

The Rt/Sync pin can be used for synchronization of the LT3508 internal oscillator to an external source. To use the sync function, remove R2 (in the top FE circuit) or R13 (in the bottom UF circuit), and attach the external sync signal to the Rt/Sync pin directly or to the now-unstuffed resistor pad tied to the Rt/Sync pin.



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 0402.
   ALL CAPACITORS ARE 0402.

CUSTOMER NOTICE

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

CONTRACT NO.

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TITLE: SCHEMATIC

DUAL MONOLITHIC 1.4A STEP-DOWN SWITCHING REGULATOR

SIZE	DWG NO.	REV
A	DC1060A-1 * LT3508EFE	A-1

DATE: Monday, January 15, 2007

SHEET 1 OF 2