DEMO CIRCUIT 1541A
QUICK START GUIDE

LT3694/LT3694-1
36V, 2.6A Monolithic Buck Regulator with Dual LDO

DESCRIPTION

Demonstration circuit 1541A is an adjustable 2.6A Monolithic Buck Regulator with Dual LDO featuring LT3694/LT3694-1. The buck regulator is capable of generating up to 1.7A at its output while the two LDO regulators are capable of 450mA each. Each regulator has independent track/soft-start circuits simplifying power supply sequencing and interfacing with microcontrollers and DSPs.

The switching frequency of the board is set to 800kHz. The high switching frequency permits the use of small inductors and ceramic capacitors leading to very small triple output solutions. The constant switching frequency, combined with low impedance ceramic capacitors, results in low, predictable output ripple. The board is robust against outputs shorting to ground fault.

With its wide input voltage range of 4V to 36V, the LT3694/LT3694-1 regulates a broad array of power sources from 4-cell batteries and 5V logic rails to unregulated wall transformers, lead acid batteries and distributed power supplies. The LT3694 can be synchronized to an external clock with the SYNC pin. The LT3694-1 offers a CLKOUT pin allowing other DC/DC converters to synchronize to the LT3694-1 clock.

The LT3694/LT3694-1 regulator is available in the thermally enhanced low profile 28-lead (4mm × 5mm) UFD and FE packages.

The LT3694/LT3694-1 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1541A.

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

Performance Summary (T_A = 25°C)

PARAMETER	CONDITIONS	VALUE
Input Voltage Range	V_{OUT1} = 3.3V, I_{OUT1} = 1.7A V_{OUT2} = 2.5V, I_{OUT2} = 450mA V_{OUT3} = 1.8V, I_{OUT3} = 450mA	4.5V to 36V
Output Voltage V_{OUT1}	V_{IN} = 12V, I_{OUT1} = 1.7A	3.3V ± 3%
Output Voltage V_{OUT2}	V_{IN} = 12V, I_{OUT2} = 450mA	2.5V ± 3%
Output Voltage V_{OUT3}	V_{IN} = 12V, I_{OUT3} = 450mA	1.8V ± 3%
Output Current I_{OUT1}		0 to 1.7A
Output Current I_{OUT2}		0 to 450mA
Output Current I_{OUT3}		0 to 450mA
Switching Frequency		800kHz ± 10%
V_{OUT1} Buck Efficiency	V_{IN} = 12V, I_{OUT1} = 1.7A, I_{OUT2} = 0A, I_{OUT3} = 0A	85% ± 2%

QUICK START PROCEDURE

Demonstration circuit 1541A is easy to set up to evaluate the performance of the LT3694/LT3694-1. Refer to Figure 1 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 terminals of the input or output capacitors. See Figure 2 for proper scope probe technique.

1. With power off, connect the input power supply to VIN and GND. Connect loads between output terminals (VOUT1, 2 or 3) and GND.

   NOTE. Active loads may overload the outputs due to the initial in-rush current. Change to resistive loads if necessary.

2. Turn on the power at the input.

   NOTE. Make sure that the input voltage does not exceed 36V.

   NOTE. The input capacitor C2 is a 50V ceramic capacitor. When testing 70V transient protection function on the input, this capacitor may need to be replaced with 100V ceramic capacitors.

3. Check for the proper output voltages.

   VOUT1=3.3V, VOUT2=2.5V, VOUT3=1.8V

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

4. Once the proper output voltage is established, adjust the loads within the operating range and observe the output voltage regulation, efficiency and other parameters.

   NOTE. Make sure that the power dissipation is limited.

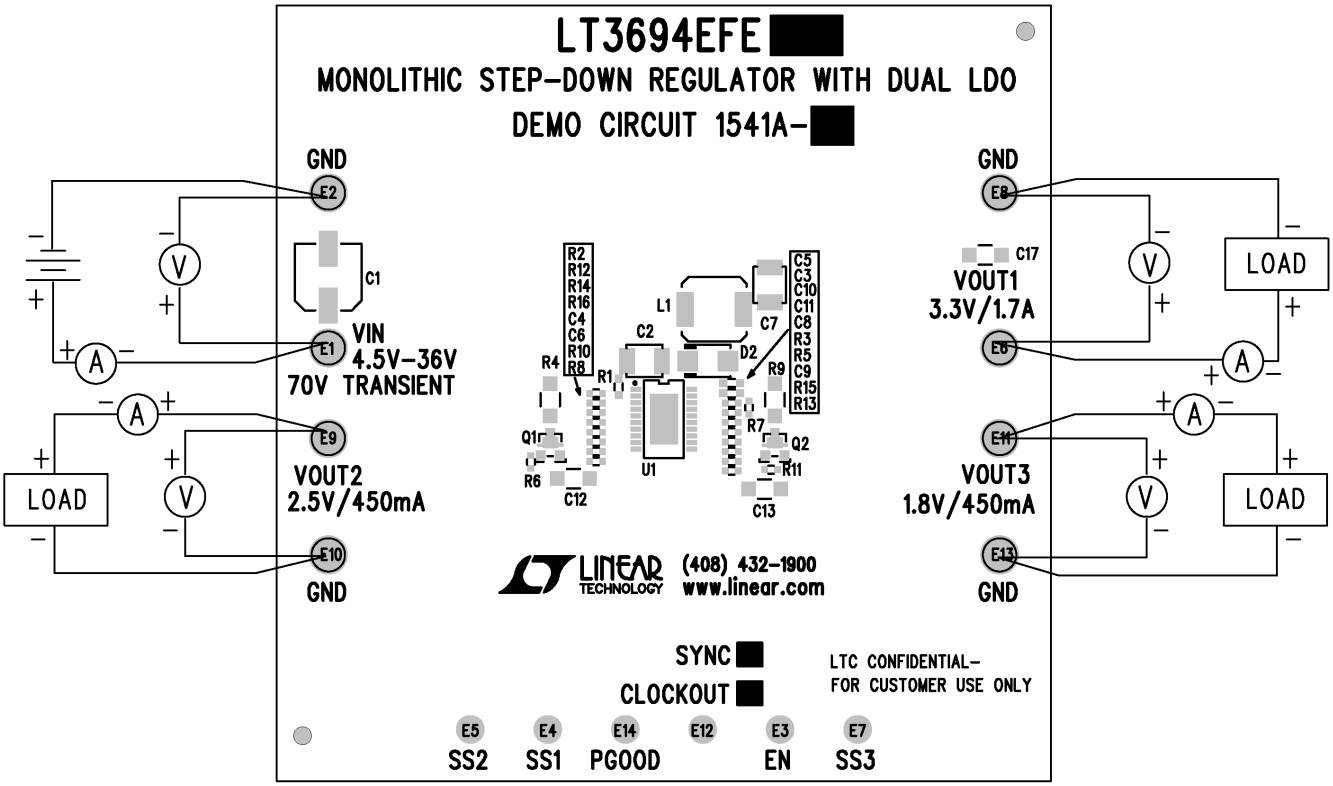


Figure 1. Measurement Equipment Setup

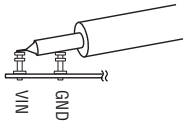
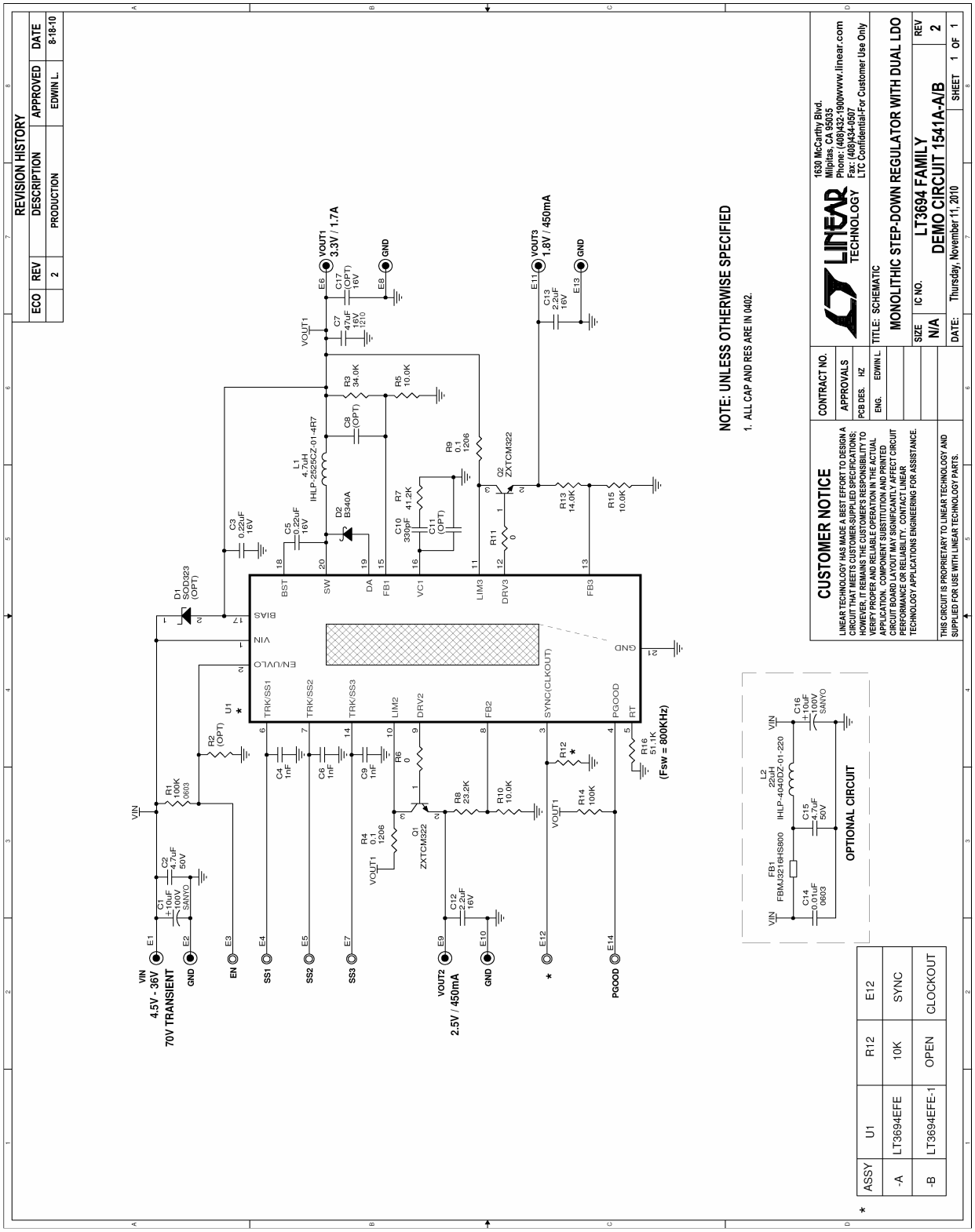


Figure 2. Measuring Input or Output Ripple


REVISION HISTORY
ECO REV DESCRIPTION APPROVED DATE
2 PRODUCTION EDWIN L. 8-18-10
NOTE: UNLESS OTHERWISE SPECIFIED
1. ALL CAP AND RES ARE IN 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.
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TITLE: SCHEMATIC
MONOLITHIC STEP-DOWN REGULATOR WITH DUAL LDO
LT3694 FAMILY
DEMO CIRCUIT 1541A-A/B
SIZE N/A IC NO.
REV 2
DATE: Thursday, November 11, 2010
SHEET 1 OF 1
VIN 4.5V - 36V 70V TRANSIENT
VOUT2 2.5V / 450mA
VOUT1 3.3V / 1.7A
VOUT3 1.8V / 450mA
(Fsw = 800KHz)
OPTIONAL CIRCUIT
ASSY U1 R12 E12
-A LT3694EFE 10K SYNC
-B LT3694EFE-1 OPEN CLOCKOUT

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DC1541A-B DC1541A-A DC1541A