

## 36V, 700mA Dual Monolithic Buck Regulator

### DESCRIPTION

Demonstration circuit 1248 is a dual monolithic buck regulator featuring the LT3509. The demo circuit is designed for 5V and 3.3V output from a 6.5V to 36V input. The input voltage can go up to 60V without damaging the part. The wide input range of the LT3509 allows a variety of input sources including automotive batteries and 24V industrial supplies. The switching frequency can be set from 300kHz to 2.2MHz by a single external resistor, and it is synchronizable over the full range. The power switches, the compensation components and the boost diodes are all integrated into the silicon. The shutdown and soft start function is independent for each channel. The current mode control scheme creates

fast transient response and good loop stability. The part has overvoltage lockout, cycle by cycle current limit and thermal shutdown. DA pin can further protect the silicon under fault conditions by sensing the diode current.

The LT3509 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 1248.

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

 , LTC and LT are registered trademarks of Linear Technology Corporation.

### Performance Summary ( $T_A = 25^\circ\text{C}$ )

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		6.5V
Maximum Input Voltage		36V (60V transient)
Output Voltage $V_{OUT1}$		4.98V $\pm 4\%$
Output Voltage $V_{OUT2}$		3.33V $\pm 4\%$
Maximum Output Current 1		700mA
Maximum Output Current 2		700mA
Switching Frequency		700kHz
Efficiency	$V_{IN}=24\text{V}$ , $I_{out1}=700\text{mA}$ , $I_{out2}=700\text{mA}$	83.74%
Voltage Ripple 1 pk-pk	$V_{IN}=24\text{V}$ , $I_{out1}=700\text{mA}$ , $V_{out1}=5\text{V}$	20mV
Voltage Ripple 2 pk-pk	$V_{IN}=24\text{V}$ , $I_{out2}=700\text{mA}$ , $V_{out2}=3.3\text{V}$	18mV

### QUICK START PROCEDURE

Demonstration circuit 1248 is easy to set up to evaluate the performance of the LT3509. 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  $V_{in}$  or  $V_{out}$  and GND terminals. See Figure 2 for proper scope probe technique.

1. With power off, connect the input power supply to  $V_{in}$  and GND.
2. Turn on the power at the input.

- NOTE.** Make sure that the input voltage does not exceed 36V.
- Check for the proper output voltages. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
  - Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

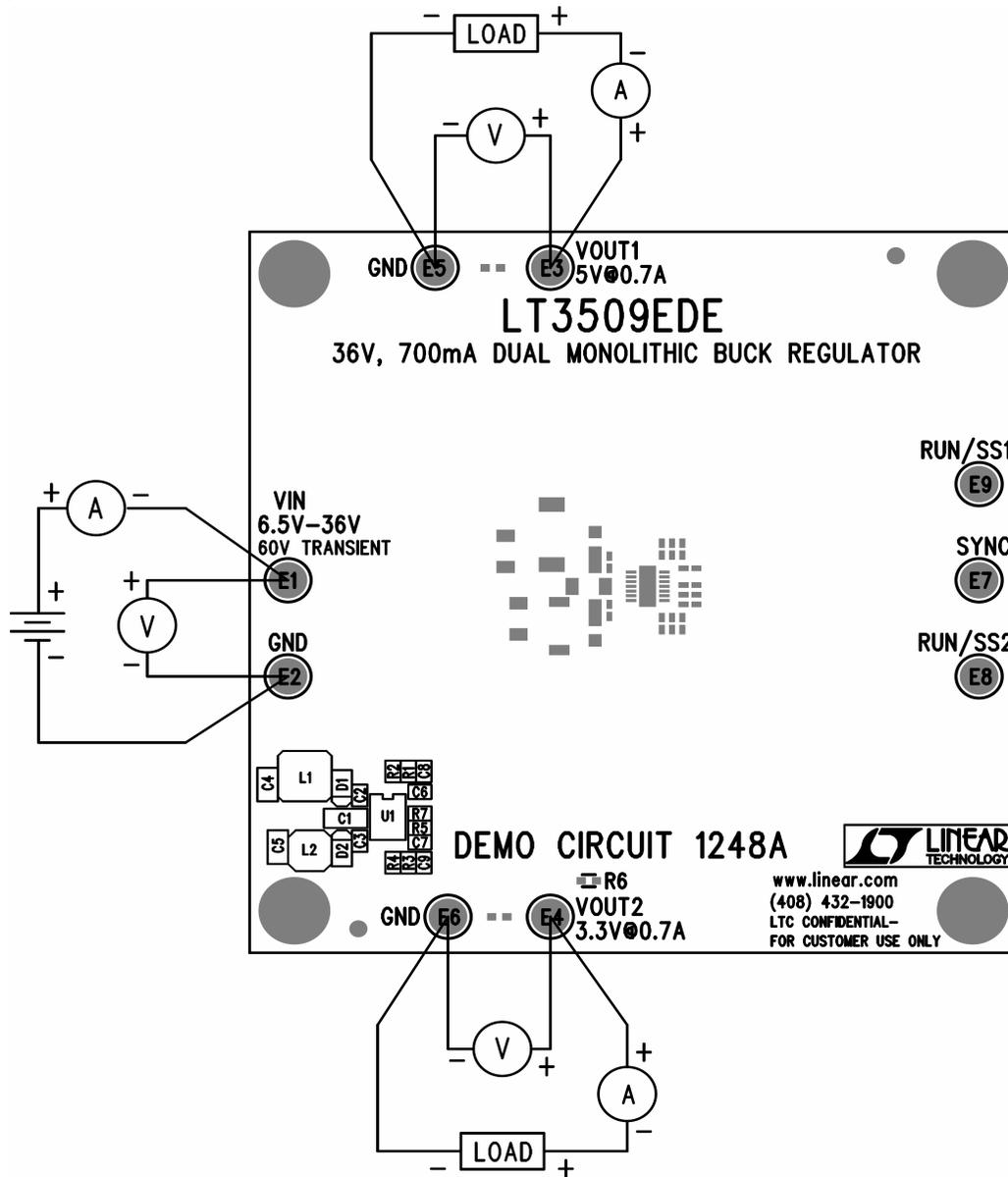


Figure 1. Proper Measurement Equipment Setup

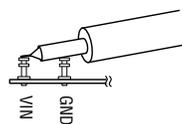
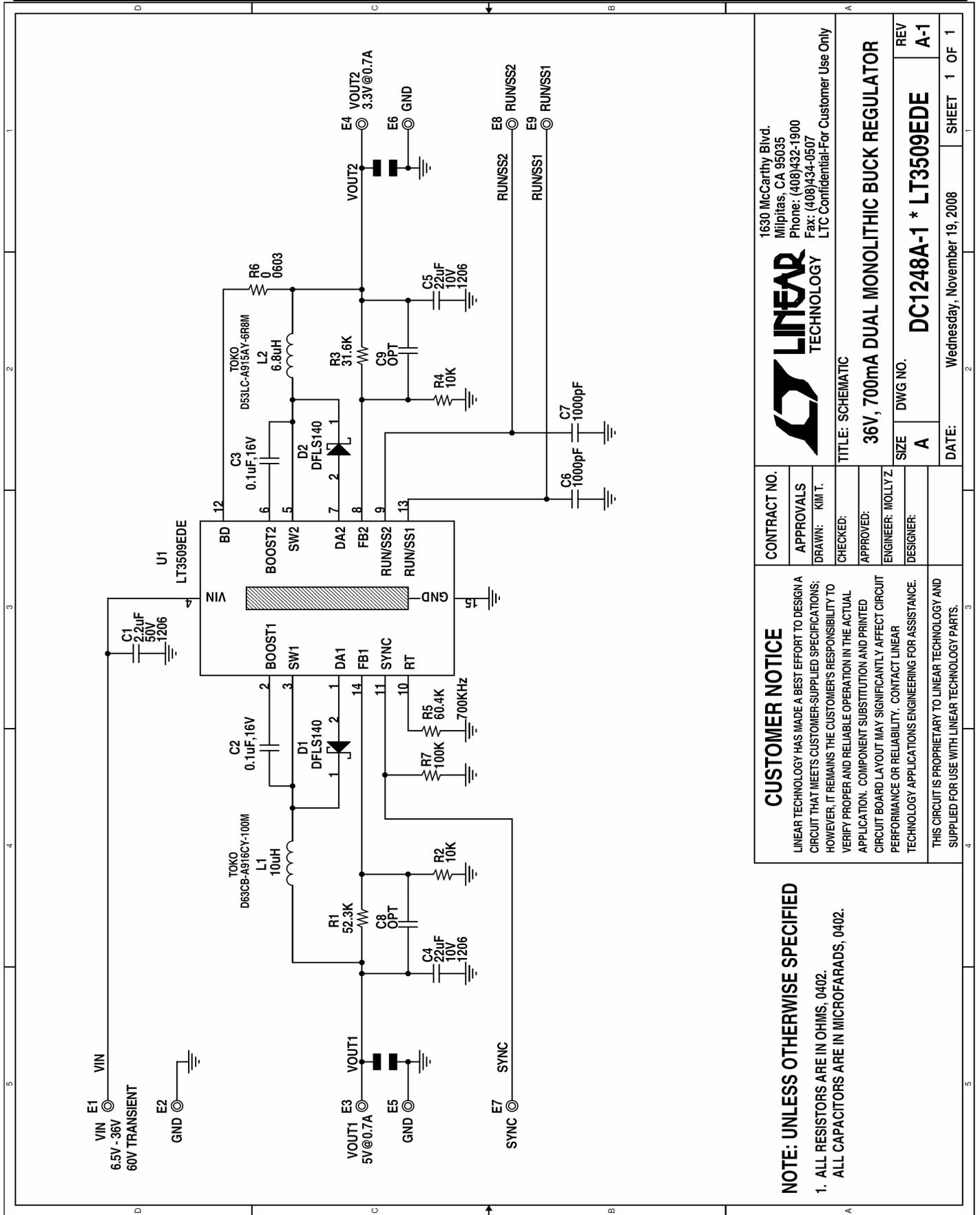


Figure 2. Measuring Input or Output Ripple



<b>CONTRACT NO.</b>		1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507 LTC Confidential-For Customer Use Only	
<b>APPROVALS</b>		<b>LINEAR TECHNOLOGY</b>	
DRAWN: KIM T.		<b>36V, 700mA DUAL MONOLITHIC BUCK REGULATOR</b>	
CHECKED:		TITLE: SCHEMATIC	
APPROVED:		SIZE DWG NO. <b>DC1248A-1 * LT3509EDE</b>	
ENGINEER: MOLLY Z		REV <b>A-1</b>	
DESIGNER:		DATE: Wednesday, November 19, 2008	
		SHEET 1 OF 1	

**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.

**NOTE: UNLESS OTHERWISE SPECIFIED**

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

