

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1037

## 40V MICROPOWER DFN BUCK REGULATOR WITH INTEGRATED BOOST AND CATCH DIODES

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# LT3470

## DESCRIPTION

Demonstration circuit 1037 is a 40V micropower DFN buck regulator featuring the LT<sup>®</sup>3470. The board is optimized for 5V output at up to 200mA load current for a steady state input voltage range of 5.5V to 40V. With its wide input voltage range, high efficiency internal power switch, low dropout operation, hysteretic current-mode, integrated boost and catch diodes and tiny SOT-23 package, the LT3470 is a very versatile and powerful IC for DC/DC converters that require extremely compact space, high efficiency and high input voltage.

The LT3470 hysteretic control scheme allows all of the components to be small, surface mount devices while providing minimum output ripple voltage at all load currents. The current-mode control topology creates fast transient response and good loop stability with a minimum number of external components. The low resistance internal power switch achieves high efficiencies of up to 82% at 12V input. The shutdown jumper can be used to place the part in micropower shutdown, reducing supply current to less

than 1 $\mu$ A by driving the pin low. The internal boost and catch diodes simplify layout and reduce component count, providing the smallest solution possible.

The LT3470 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 1037. In particular, the datasheet section on 'Thermal Calculations' is important for estimating whether a given application's combination of input voltage, load current, ambient temperature and frequency will cause the LT3470 to exceed its absolute maximum rated junction temperature. The LT3470EDDB is assembled in a small low profile DFN package. Proper board layout is essential for maximum thermal performance. See the datasheet section 'Layout Considerations'.

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

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## QUICK START PROCEDURE

Demonstration circuit 1037 is easy to set up to evaluate the performance of the LT3470. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

**NOTE:** Make sure that the input voltage does not exceed 40V.

**NOTE:** The shutdown jumper shunt is required to be placed in the shutdown position or the VOUT ENABLE position for proper operation.

**NOTE:** Do not hot-plug the input voltage terminal VIN. The absolute maximum voltage on VIN is 40V and hot-plugging a power supply through wire leads to the demonstration circuit can cause the voltage on

the extremely low-ESR ceramic input capacitor to ring to twice its DC value. In order to protect the IC, a higher ESR Aluminum Electrolytic capacitor is placed at the input terminals. This may protect against some, but not all, input transients due to hot-plugging with a power supply. *See Application Note 88 for more details.*

**NOTE:** Connect the power supply (with power off), load, and meters as shown in Figure 1.

1. After all connections are made, turn on input power and verify that the output voltage is 5V.

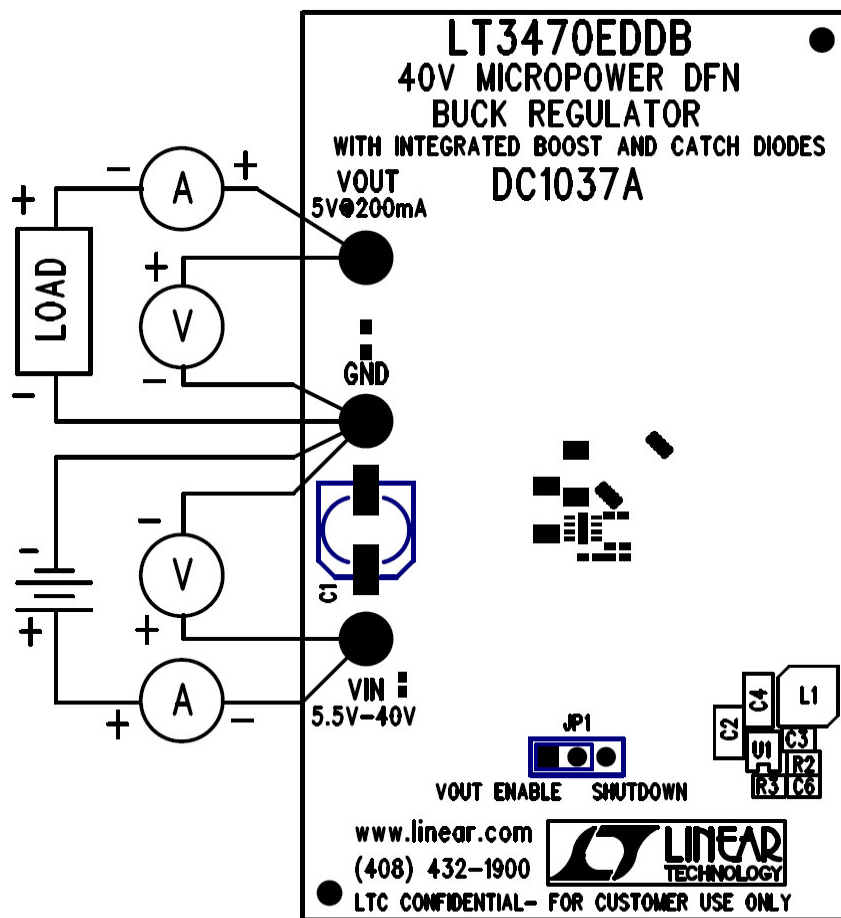
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**NOTE:** If the output voltage is too low, temporarily disconnect the load to make sure that the load is not set too high.

2. Once the proper output voltages are established, adjust the load within the operating range and ob-

serve the output voltage regulation, ripple voltage, efficiency and other parameters.

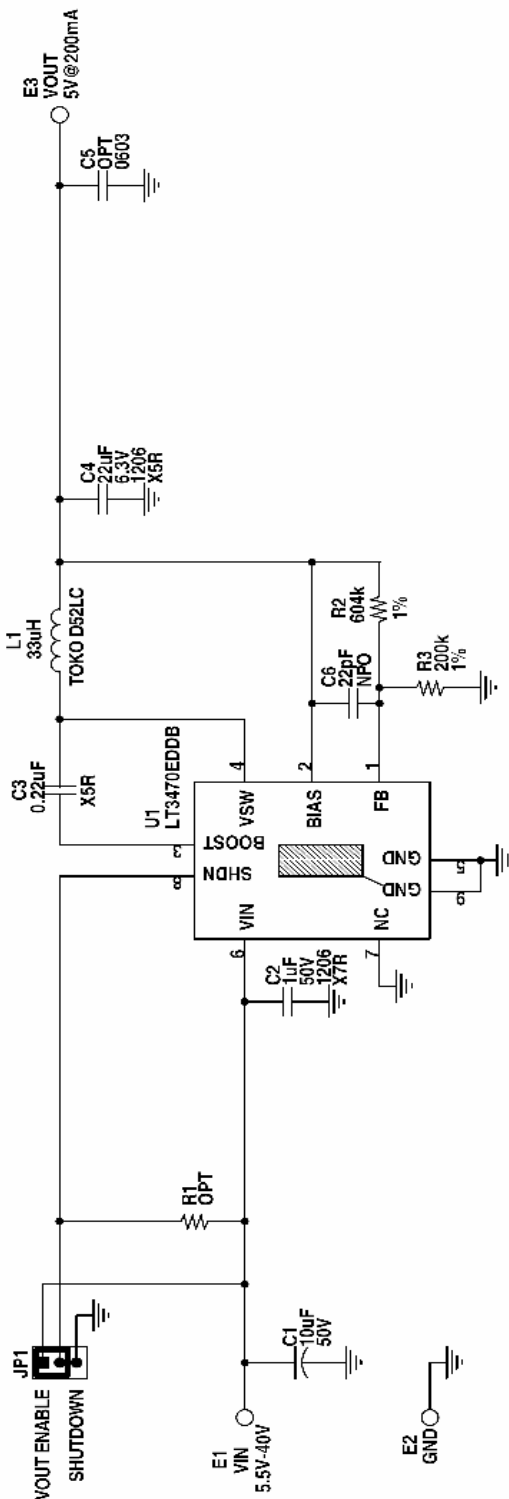


INSTALL SHUNT AT JP1 : PINS 1&2=VOUT ENABLE  
PINS 2&3=SHUT DOWN

Figure 1. Proper Measurement Equipment Setup

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### NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 0402.  
ALL CAPACITORS ARE 0402.
2. INSTALL SHUNT ON JP1 (1&2).

### 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.

APPROVALS

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CHECKED:

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TITLE: SCHEMATIC

**40V MICROPOWER DFN BUCK REGULATOR**  
WITH INTEGRATED BOOST AND CATCH DIODES

SIZE: A

DWG NO. DC1037A-1 \* LT3470EDDB

REV: A-1

DATE: Wednesday, February 01, 2006

SHEET 1 OF 1