

## DESCRIPTION

Demonstration circuit 1382 is a 40V micropower DFN buck regulator featuring the LT<sup>®</sup>3470A. The board is optimized for 3.3V output at up to 250mA load current for a steady state input voltage range of 4V to 36V. With its wide input voltage range, high efficiency internal power switch, extremely low dropout operation, hysteretic current-mode, integrated boost and catch diodes and tiny DFN package, the LT3470A is a very versatile and powerful IC for DC/DC converters that require extremely compact space, high efficiency and high input voltage.

The LT3470A 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 78% 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.

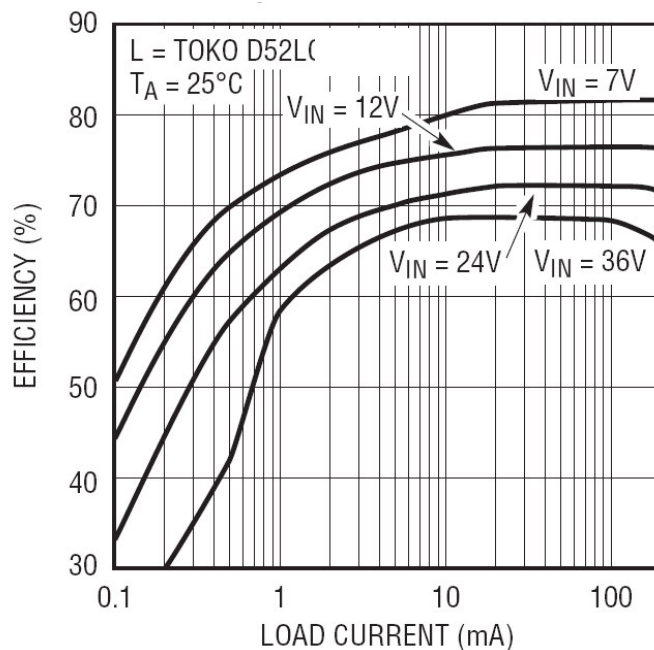


Figure 1. DC1382 Efficiency

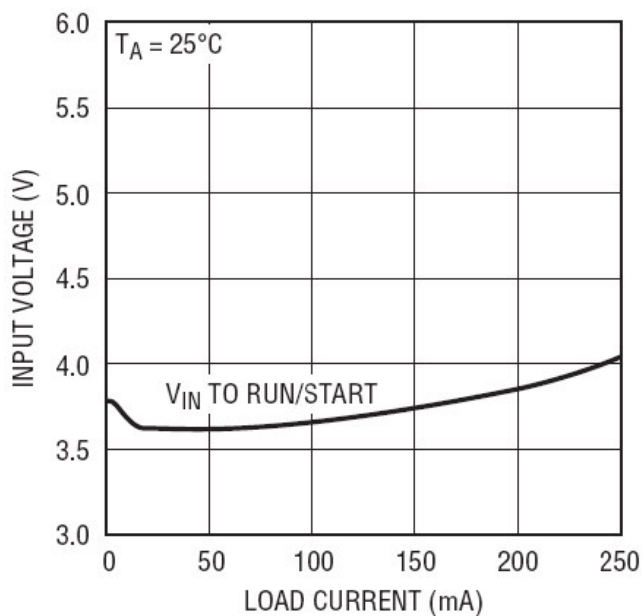


Figure 2. DC1382 Minimum Input Voltage

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1382

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

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The LT3470A 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 1382. 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 LT3470A to exceed its absolute

maximum rated junction temperature. The LT3470AEDDB 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 1382 is easy to set up to evaluate the performance of the LT3470A. Refer to Figure 3 for proper measurement equipment setup and follow the procedure below:

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

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

**NOTE:** Do not hot-plug the input voltage terminal VIN. The absolute maximum voltage on VIN is 36V 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*.

1. Connect the power supply (with power off), load, and meters as shown in Figure 3.
2. After all connections are made, turn on input power and verify that the output voltage is 3.3V.

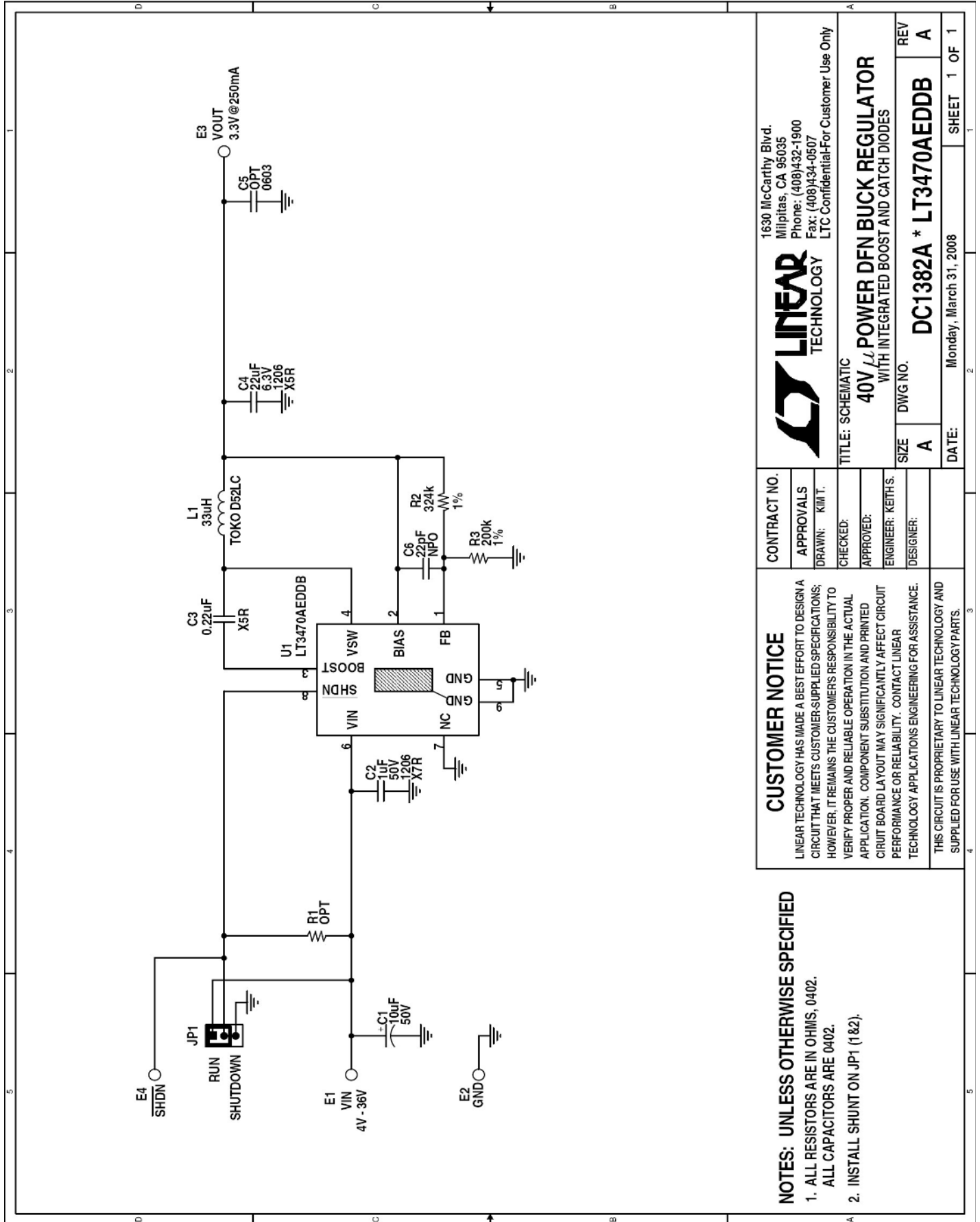
**NOTE:** If the output voltage is too low, temporarily disconnect the load to make sure that the load is not set too high.

3. Once the proper output voltages are established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.



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



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<b>CONTRACT NO.</b>		<b>CUSTOMER NOTICE</b>	
<b>APPROVALS</b>		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.	
DRAWN: KIM T.		THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.	
CHECKED:			
APPROVED:			
ENGINEER: KEITHS.			
DESIGNER:			
TITLE: SCHEMATIC			
40V $\mu$ A POWER DFN BUCK REGULATOR WITH INTEGRATED BOOST AND CATCH DIODES			
SIZE	DWG NO.	REV	
A	DC1382A * LT3470AEDDB	A	
DATE: Monday, March 31, 2008		SHEET 1 OF 1	

- NOTES: UNLESS OTHERWISE SPECIFIED**
1. ALL RESISTORS ARE IN OHMS, 0402.  
ALL CAPACITORS ARE 0402.
  2. INSTALL SHUNT ON JP1 (1&2).