

DESCRIPTION

Demonstration Circuit 425B is a constant-frequency synchronous Buck-Boost converter using the LTC3440. The input range is from 2.5V to 5.5V, making it ideal for single-cell lithium-ion or three-cell NiCd/NiMH battery applications. This converter provides up to 95% efficiency, much higher than traditional Buck-Boost converters. For 2.5V minimum input voltage, this converter can provide up to 500mA load current.

The output voltage is set at 3.3V. A different output voltage in the range of 2.5V to 5.5V can be obtained by changing one of the feedback resistors. The fre-

quency is set at 1MHz, which is a good trade-off between efficiency and size. The frequency can be modified by changing R6 or by synchronizing to an external clock. In shutdown, the board draws about 2.5 μ A, where 2 μ A goes through the 1M Ω pull up resistor (R4) and the IC itself draws less than 1 μ A.

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

LTC is a trademark of Linear Technology Corporation

QUICK START GUIDE

Refer to Figure 1 for the connection diagram and follow the procedure below:

1. Apply a voltage source to the input of the circuit between the V_{IN} and GND terminals. The circuit will start up at input voltage higher than 2.5V.

NOTE Do not apply more than 5.5V to the input.

2. Attach a voltmeter or oscilloscope probe between the V_{OUT} and GND terminals of the circuit to monitor the output. To start the circuit, the shunt at JP1 needs to be put in RUN position.
3. Attach a load to the output. The available output current depends on the input voltage.

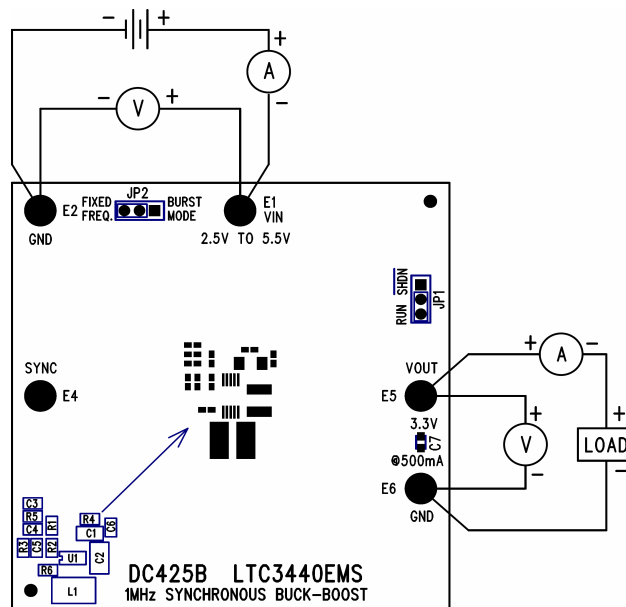


Figure 1. Proper Measurement Equipment Setup

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 425B

1MHz SYNCHRONOUS BUCK-BOOST

PERFORMANCE SUMMARY

PARAMETER	CONDITION	VALUE
Input Voltage Range		2.5V to 5.5V
Maximum Load Current, Min	$V_{OUT} = 3.3V, V_{IN} = 2.5V$	500mA
Typical Output Ripple	$V_{OUT} = 3.3V, I_{OUT} = 500mA$	13mV _{P-P}
Typical Operating Frequency	R6 = 62K	1MHz

TYPICAL PERFORMANCE CHARACTERISTICS

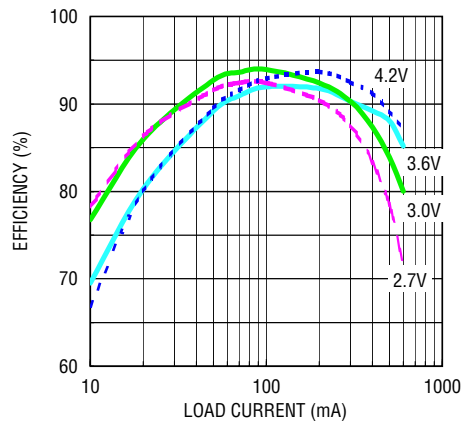
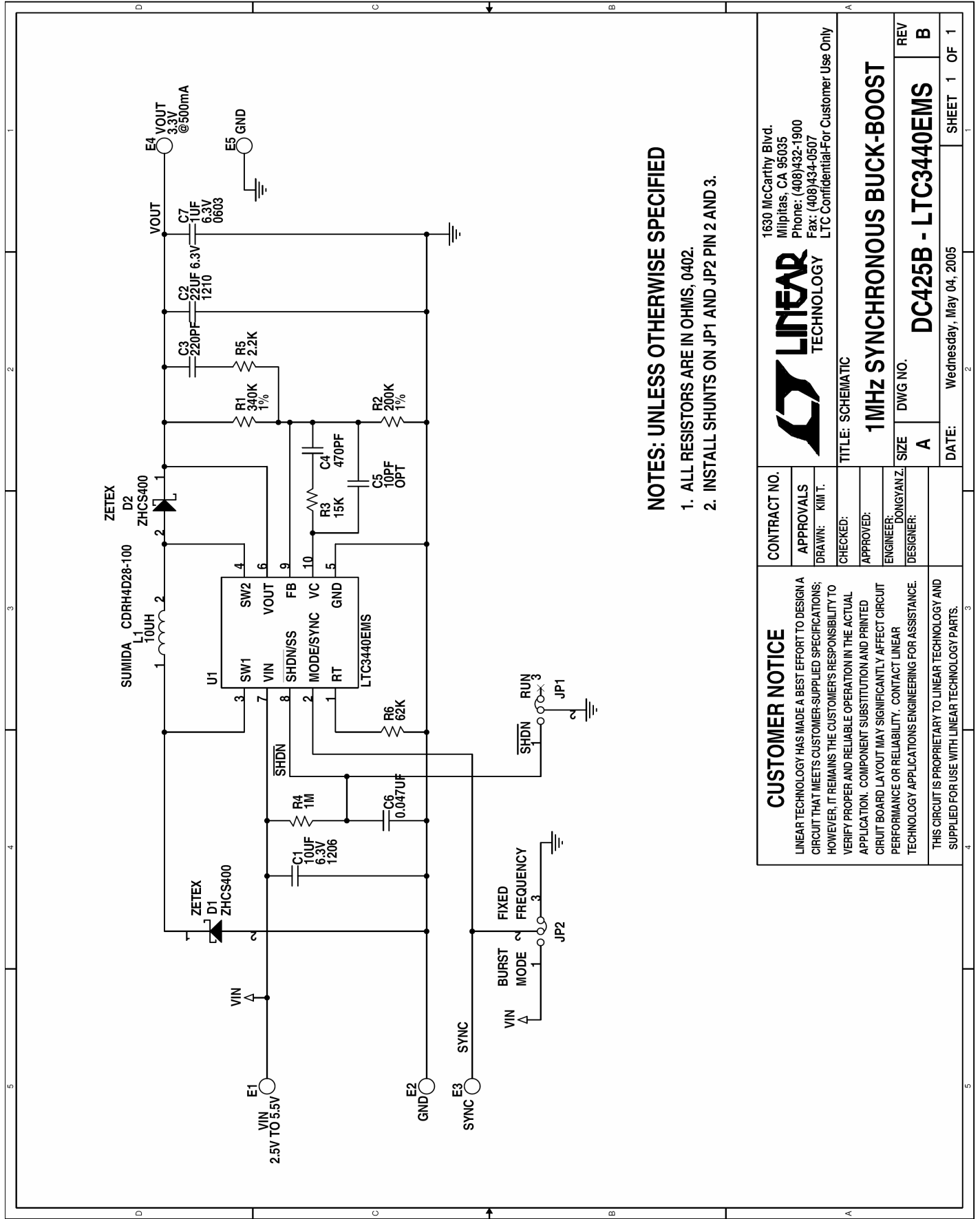


Figure 2. Efficiency vs. Load Current (without External Schottky Diodes)

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1MHz SYNCHRONOUS BUCK-BOOST



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 0402.
2. INSTALL SHUNTS ON JP1 AND JP2 PIN 2 AND 3.

CUSTOMER NOTICE		CONTRACT NO.	
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.		APPROVALS	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		DRAWN: KIM T.	
		CHECKED:	
		APPROVED:	
		ENGINEER: DONGYAN Z.	
		DESIGNER:	
		TITLE: SCHEMATIC	
		1MHz SYNCHRONOUS BUCK-BOOST	
		DWG NO. DC425B - LTC3440EMS	
		REV B	
		DATE: Wednesday, May 04, 2005	
		SHEET 1 OF 1	

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