Ultralow Power Boost Converter with Dual Half-Bridge Switches

DESCRIPTION

Demonstration circuit 1449A is an Ultralow Power Boost Converter with Dual Half-Bridge Switches featuring the LT8415. It converts a 3V-10V source to 16V supplying 1.6mA at 3Vin and 10mA at 10Vin. The 16V output is used to bias the Dual Half-Bridges which are activated by IN1 and IN2 and are pinned out at VOUT1 and VOUT2. IN1 controls VOUT1 with the same polarity and IN2 controls VOUT2. Each Half-Bridge drives a 200pF on-board capacitor.

The LT8415 features a low noise control scheme, integrated power switch, dual half-bridge switches, schottky diode and output disconnect function, ultra-low quiescent current, built in soft-start and overvoltage protection. The LT8415 datasheet gives a complete description of the part, its operation and application information. The datasheet must be read in conjunction with this quick start guide for working on or modifying the demo circuit 1449.

This circuit is intended for space-conscious applications such as Sensor Power, RF Mems, Low Power Actuator Bias/Control, Liquid Lens Drivers and General Purpose Bias Supplies.

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

PERFORMANCE SUMMARY FOR DC1387A-A/LT8410 Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		3		10	V
V_{OUT}	Output Voltage Range	V_{IN} = 3V, I_{LOAD} = 1.6mA	15.54	16	16.48	V
V_{OUT}	Output Voltage Range	V_{IN} = 10V, I_{LOAD} = 10mA	15.54	16	16.48	V
RIPPLE		V_{IN} = 10V, I_{LOAD} = 10mA		20		mV
EFFICIENCY		V_{IN} = 3V, I_{LOAD} = 1.6mA		73		%
EFFICIENCY		V_{IN} = 10V, I_{LOAD} = 10mA		83		%

QUICK START PROCEDURE

Demonstration circuit 1449 is easy to set up to evaluate the performance of the LT8415. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions:

  JP1 Run

2. With power off, connect the input power supply to Vin and GND.

3. Turn on the power at the input.

Check for the proper output voltages. Vout = 15.52V to 16.48V.

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

4. 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.

5. To test the VOUT1 and VOUT2 outputs, apply a logic level square wave signal (typically 0V to 2V) at IN1 and/or IN2 and observe the amplitude levels and associated delays at VOUT1 and VOUT2. See datasheet for response driving external capacitors.
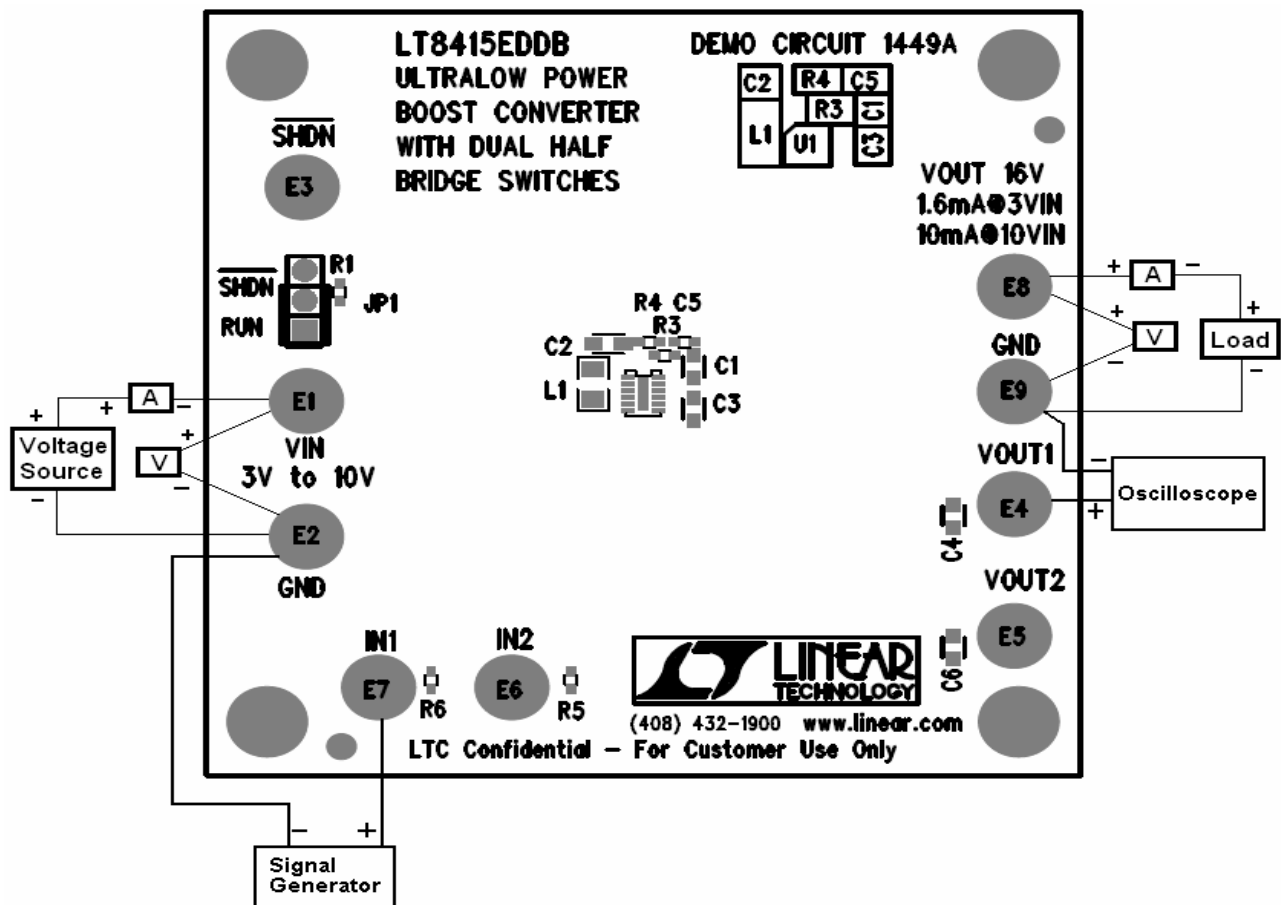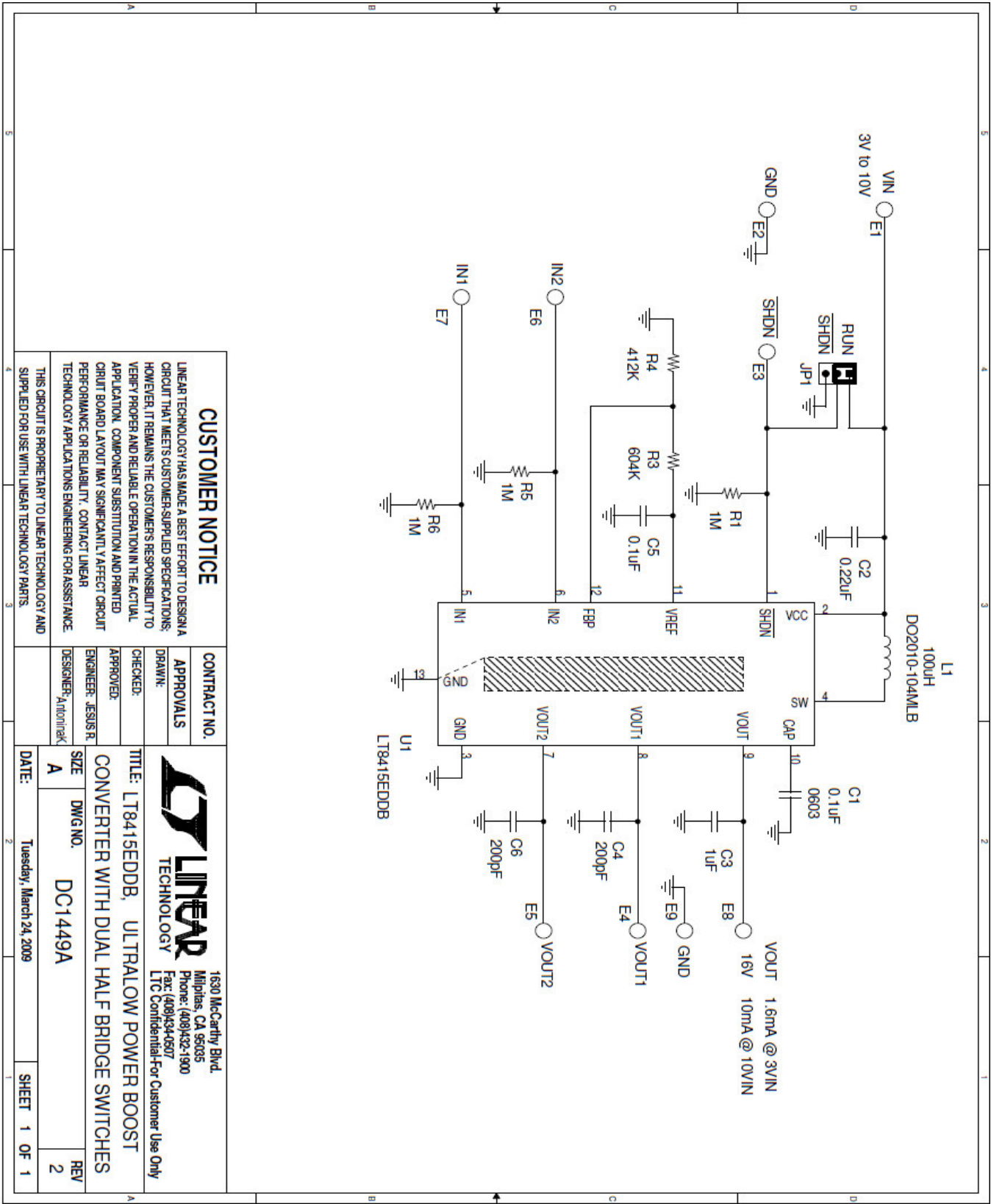

Figure 1. Proper Measurement Equipment Setup

VIN
3V to 10V
E1

GND
E2

IN1
E7

IN2
E6

SHDN
E3
SHDN

RUN
SHDN
JP1

R4
412K

R3
604K

R5
1M

R6
1M

R1
1M

C5
0.1uF

C2
0.22uF

L1
100uH
DO2010-104MLB

C1
0.1uF
0603

U1
LT8415EDDB

5 IN1
6 IN2
12 FBP
11 VREF
1 SHDN
VCC
13 GND
SW 4
CAP
VOUT 9
VOUT1 8
VOUT2 7
GND 3

C6
200pF

C4
200pF

C3
1uF

E5 VOUT2
E4 VOUT1
E9 GND
E8
VOUT 1.6mA @ 3VIN
16V 10mA @ 10VIN

APPROVALS
CONTRACT NO.
DRAWN:
CHECKED:
APPROVED:
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DESIGNER: Antonina K.
DATE: Tuesday, March 24, 2009

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TITLE: LT8415EDDB, ULTRALOW POWER BOOST
CONVERTER WITH DUAL HALF BRIDGE SWITCHES

SIZE A
DWG NO. DC1449A
REV 2
SHEET 1 OF 1

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