LT3581

BOOST/INVERTING DC/DC CONVERTERS

DESCRIPTION

Demonstration circuits 1424A-A and 1424A-B feature the LT3581 in Boost/Inverting Regulator configurations. The Boost is designed to convert a 5V to 10V input source to 12V at 900mA, and the Inverter a 5V to 12V to -12V at 750mA. DC1424A-A is designed to survive output short circuit events with the external MOSFET installed at the output as default. The demo board includes an option to install the MOSFET at the input side. Install Q1 and R1 on the back of the board and refer to Figure 4 for other instructions. DC1424A-B can easily be converted into a SEPIC Converter by swapping L2 and D2 from their respective locations as shown in Figure 5. The LT3581 includes a 42V Master and Slave switch combination with 3.3A total current and can be used in many configurations such as Boost, SEPIC, CUK and Flyback. It has a 2.5V to 22V operating input range, UVLO, soft-start, programmable switching frequency and many other popular features. The LT3581 is suitable for many applications, such as Local Bias Supplies, VFD, TFT-LCD Supplies and Automotive Engine Control Power. The LT3581 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 1424A.

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

PERFORMANCE SUMMARY DC1424A-A Specifications are at TA = 25°C

SYMBOL	PARAMETER FOR BOOST CONVERTER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		5		10	V
V_{OUT}	Output Voltage Accuracy	V_{IN} = 5V to 10V, I_{LOAD} = 900mA	11.60	12	12.30	V
Efficiency		V_{IN} = 5V, I_{LOAD} = 900mA		88		%
Ripple		V_{IN} = 5V, I_{LOAD} = 900mA		100		mV
Fs	Switching Frequency			1.2		MHz

PERFORMANCE SUMMARY 1424A-B Specifications are at TA = 25°C

SYMBOL	PARAMETER FOR CUK CONVERTER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		5		12	V
V_{OUT}	Output Voltage Accuracy	V_{IN} = 5V to -12V, I_{LOAD} = 750mA	-11.60	-11.9	-12.30	V
Efficiency		V_{IN} = 5V, I_{LOAD} = 750mA		81		%
Ripple		V_{IN} = 5V, I_{LOAD} = 750mA		20		mV
Fs	Switching Frequency			1.2		MHz

QUICK START PROCEDURE

Demonstration circuit 1424A-A and 1424A-B is easy to set up to evaluate the performance of the LT3581. Refer to Figures 1 and 2 for proper measurement equipment setup and follow the procedure below:

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 Vin or Vout and GND terminals. See Figure 2 for proper scope probe technique.

1. Place jumper in the following position:

   JP1 On

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

Apply 5V to input.

Check for the proper output voltages.

NOTE. 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.

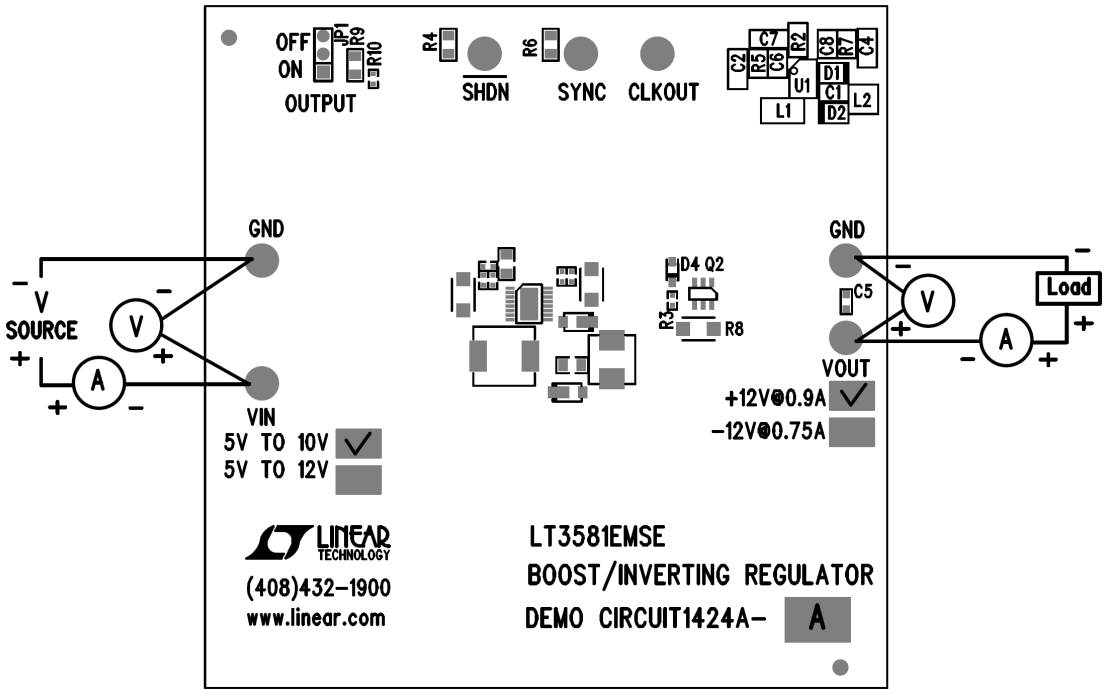


Figure 1. DC1424A-A Proper Equipment Setup

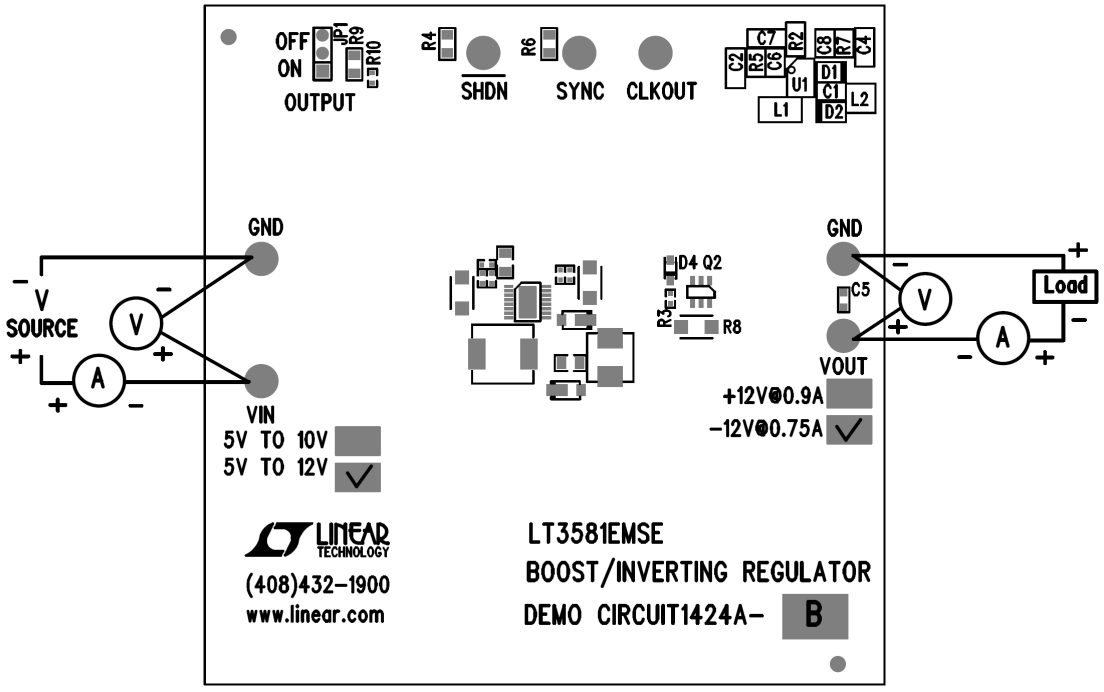


Figure 2. DC1424A-B Proper Equipment Setup

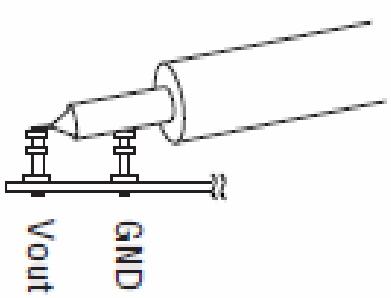


Figure 3. Proper Input/Output Ripple Measurement Technique

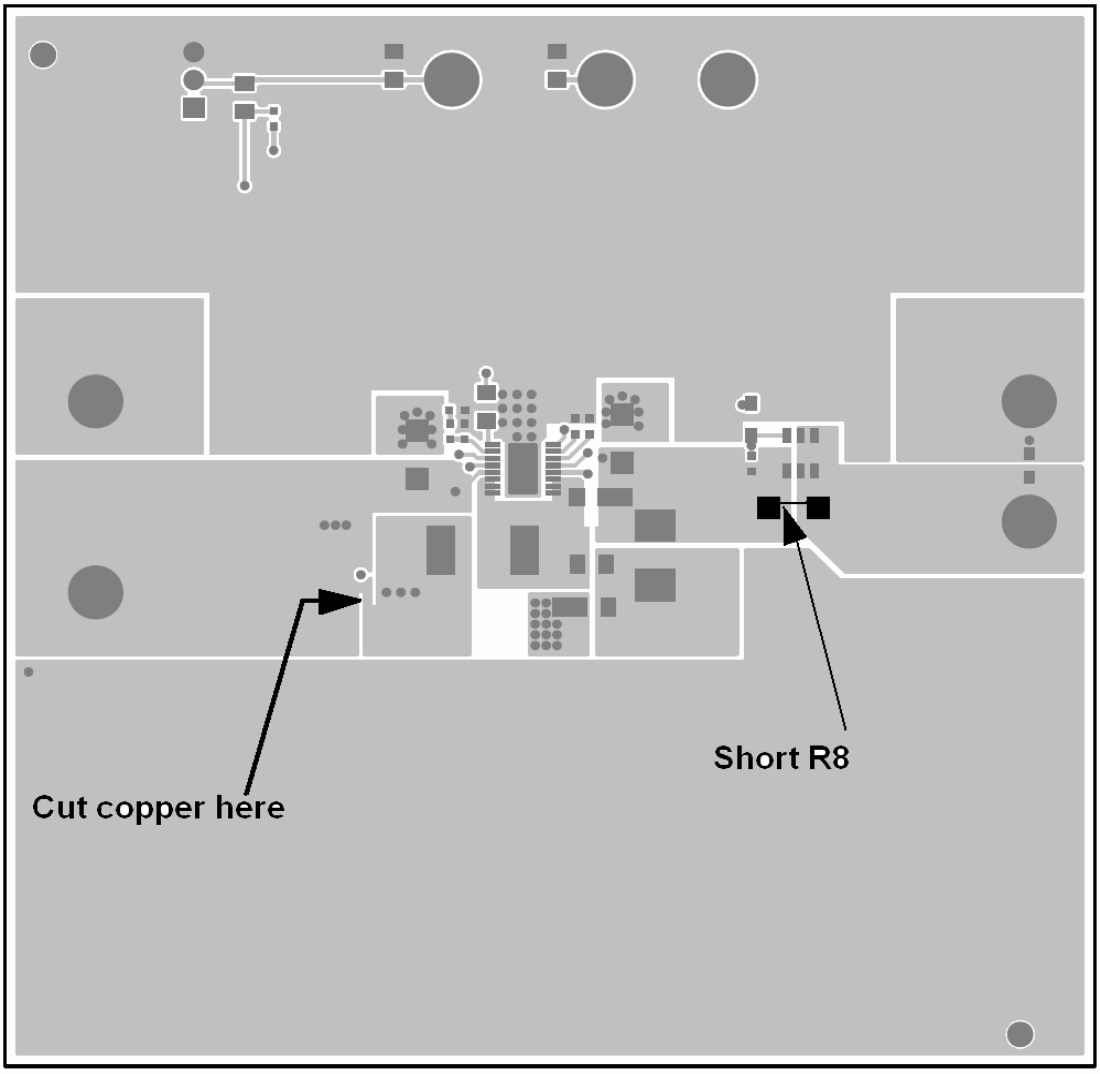


Figure 4. Using Disconnect MOSFET at the Input Side

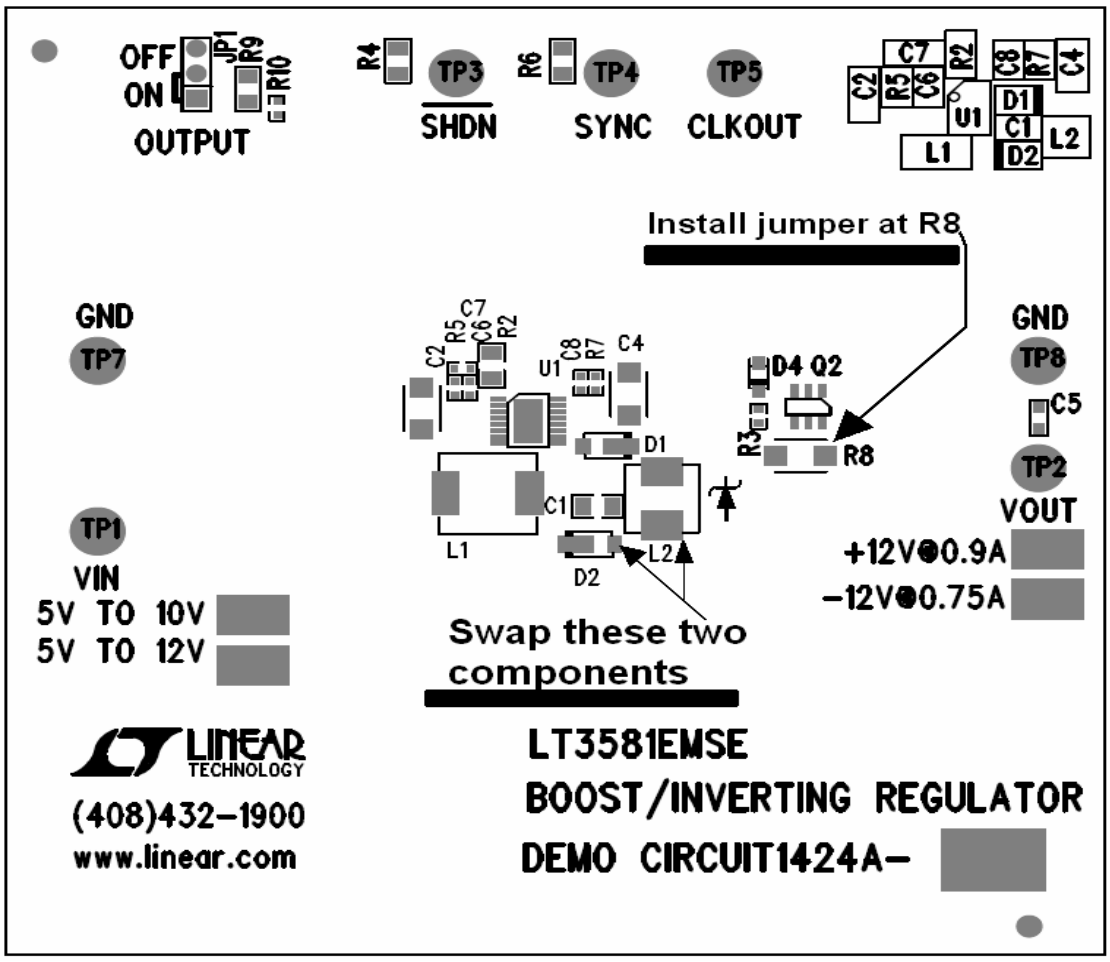
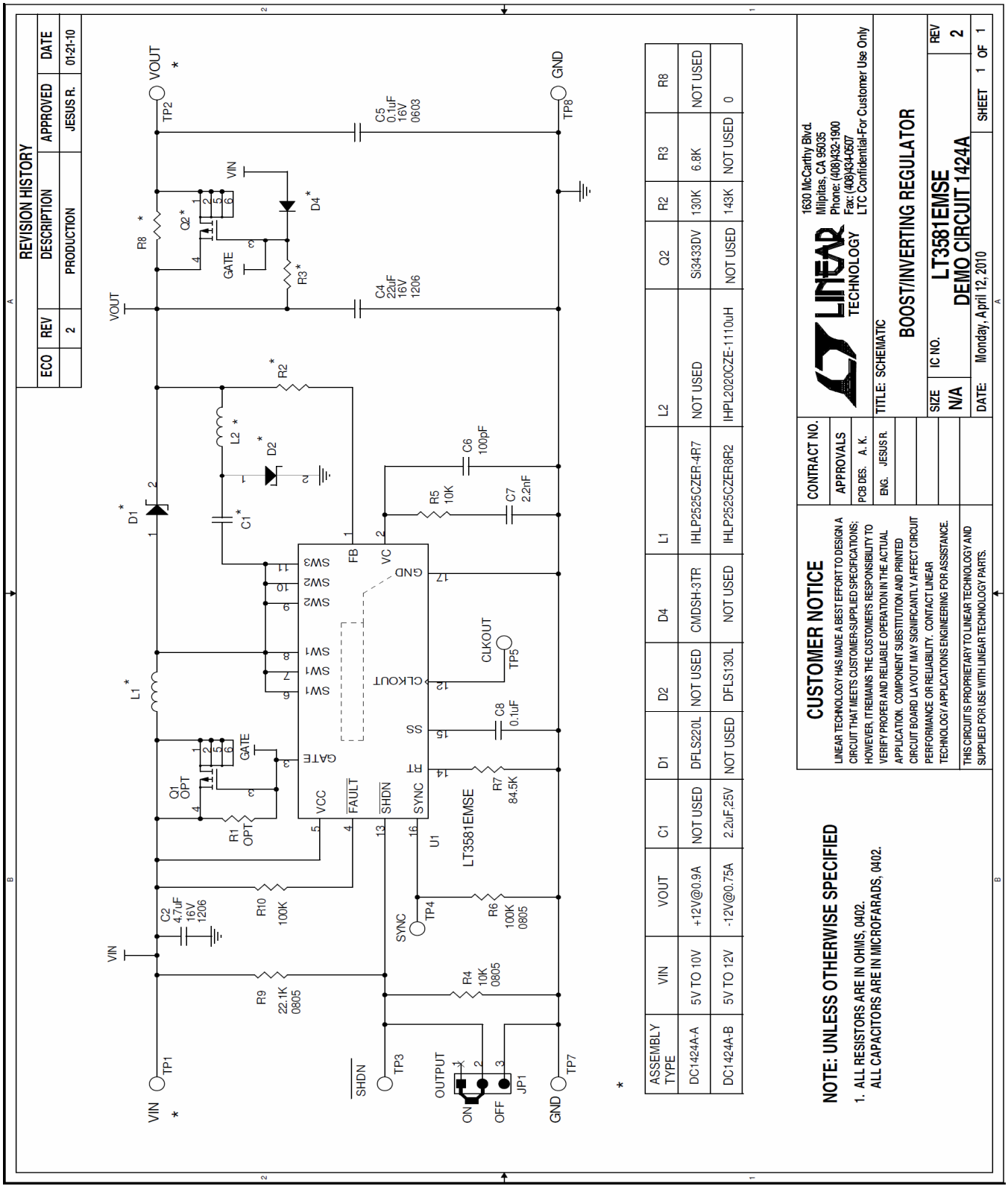


Figure 5. SEPIC Conversion Instructions


REVISION HISTORY
ECO REV DESCRIPTION APPROVED DATE
2 PRODUCTION JESUS R. 01-21-10
VIN
VOUT
GND
SHDN
OUTPUT
ON
OFF
SYNC
CLKOUT
GATE
LT3581EMSE
U1
Q1 OPT
Q2*
R1 OPT
R2*
R3*
R4 10K 0805
R5 10K
R6 100K 0805
R7 84.5K
R8 *
R9 22.1K 0805
R10 100K
C1*
C2 4.7uF 16V 1206
C4 22uF 16V 1206
C5 0.1uF 16V 0603
C6 100pF
C7 2.2nF
C8 0.1uF
L1*
L2*
D1*
D2*
D4*
JP1
TP1
TP2
TP3
TP4
TP5
TP7
TP8
ASSEMBLY TYPE | VIN | VOUT | C1 | D1 | D2 | D4 | L1 | L2 | Q2 | R2 | R3 | R8
DC1424A-A | 5V TO 10V | +12V@0.9A | NOT USED | DFLS220L | NOT USED | CMDSH-3TR | IHLP2525CZER-4R7 | NOT USED | SI3433DV | 130K | 6.8K | NOT USED
DC1424A-B | 5V TO 12V | -12V@0.75A | 2.2uF,25V | NOT USED | DFLS130L | NOT USED | IHLP2525CZER8R2 | IHPL2020CZE-1110uH | NOT USED | 143K | NOT USED | 0
NOTE: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS, 0402.
ALL CAPACITORS ARE IN MICROFARADS, 0402.
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.
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LTC Confidential-For Customer Use Only
TITLE: SCHEMATIC
BOOST/INVERTING REGULATOR
SIZE N/A
IC NO. LT3581EMSE
DEMO CIRCUIT 1424A
REV 2
DATE: Monday, April 12, 2010
SHEET 1 OF 1