DEMO CIRCUIT 1144
QUICK START GUIDE

LT3580EDD
Boost/Inverting Regulator

DESCRIPTION

Demonstration circuits 1144A-A and 1144A-B feature the LT3580EDD in Boost/Inverting Regulator configurations. The demo circuits demonstrate small size and low component count. The Boost is designed to convert a 3V-10V source to 12V at 300mA while the inverter converts a 5V-12V source to -12V at 350mA. Both converters use only one feedback resistor to set the output voltage.

The LT3580 operates with inputs as high as 32V but in these demo boards the input is limited by the voltage rating of the input capacitors and the magnitude of the Boost output. In a Boost converter the input needs to be less than the output.

Care must be taken when operating the LT3580 at high input voltages as the junction temperature increases due to higher internal dissipation. Higher switching frequencies also increase the internal dissipation.

The LT3580 gets powered from the main input in both, DC1144A-A and DC1144A-B, but there is an option for a linear regulator built into the board that will allow the IC to be powered from a lower voltage. If this option is used, just cut the trace as shown in Figure 6 and install the optional emitter follower regulator on the back of the board.

The DC1144A-B can easily be configured into a SEPIC converter, just switch the positions of L2 and D2 as shown in Figure 6.

The LT3580 includes many other features such as Synchronization to external clock, User Configurable Undervoltage Lockout, Soft-start, Frequency Foldback, and it is easily configured as Boost or Inverting Converter.

These circuits are intended for space-conscious applications such as Local Bias Supplies, TFT-LCD Bias Supplies, GPS Receivers, VFD Bias Supplies and DSL Modems.

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

PERFORMANCE SUMMARY DC1144A-A 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} = 300mA	11.64	12	12.36	V
RIPPLE		V_{IN} = 3.6V, I_{LOAD} = 300mA		40		mV
EFFICIENCY		V_{IN} = 4.2V, I_{LOAD} = 350mA		88		%
SWITCHING FREQUENCY				1		MHz

PERFORMANCE SUMMARY DC1144A-B Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		5		12	V
V_{OUT}	Output Voltage Range	V_{IN} = 5V, I_{LOAD} = 350mA	-11.64	-12	-12.36	V
RIPPLE		V_{IN} = 5V, I_{LOAD} = 350mA		10		mV
EFFICIENCY		V_{IN} = 5V, I_{LOAD} = 350mA		80		%
SWITCHING FREQUENCY				2		MHz

QUICK START PROCEDURE

Demonstration circuit 1144 is easy to set up to evaluate the performance of the LT3580EDD. Refer to Figure 1 and 2 for proper measurement equipment setup and follow the procedure below:

NOTE. 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 3 for proper scope probe technique.

1. Place jumpers in the following positions:

JP1 ON

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

3. Turn on the power at the input.

4. 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.

5. 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.

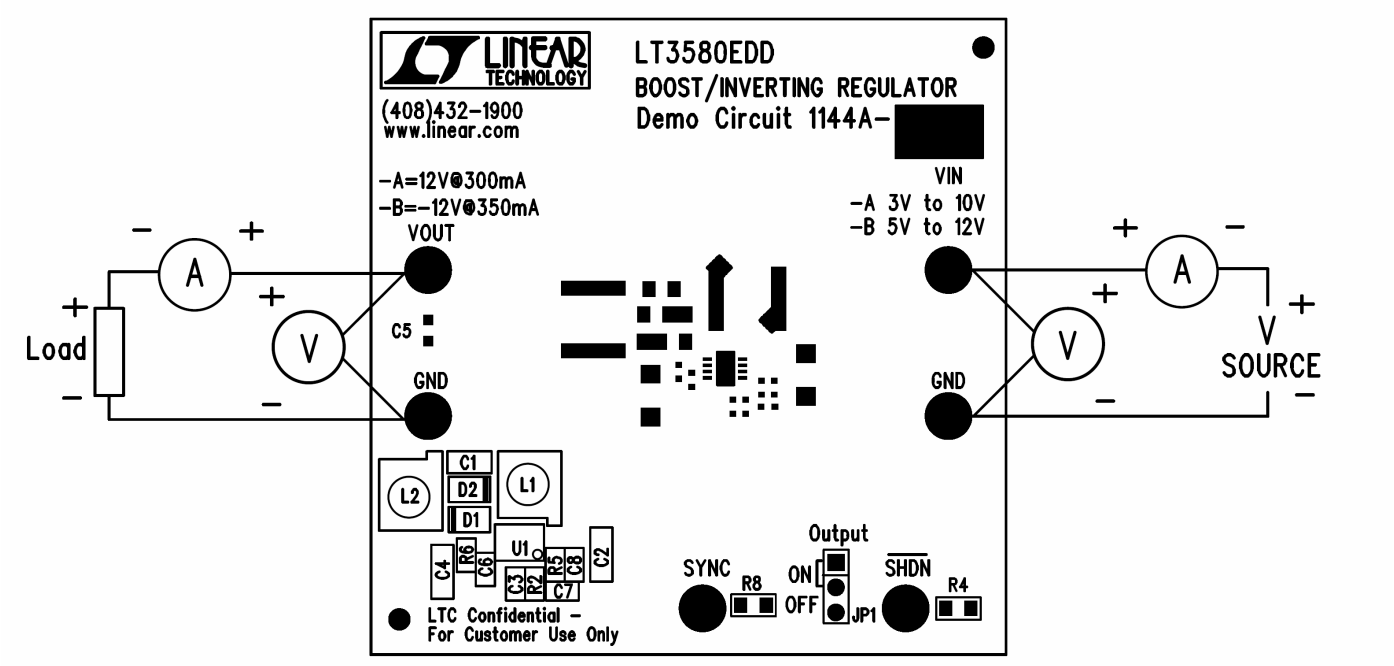


Figure 1. Proper Measurement Equipment Setup for DC1144A-A

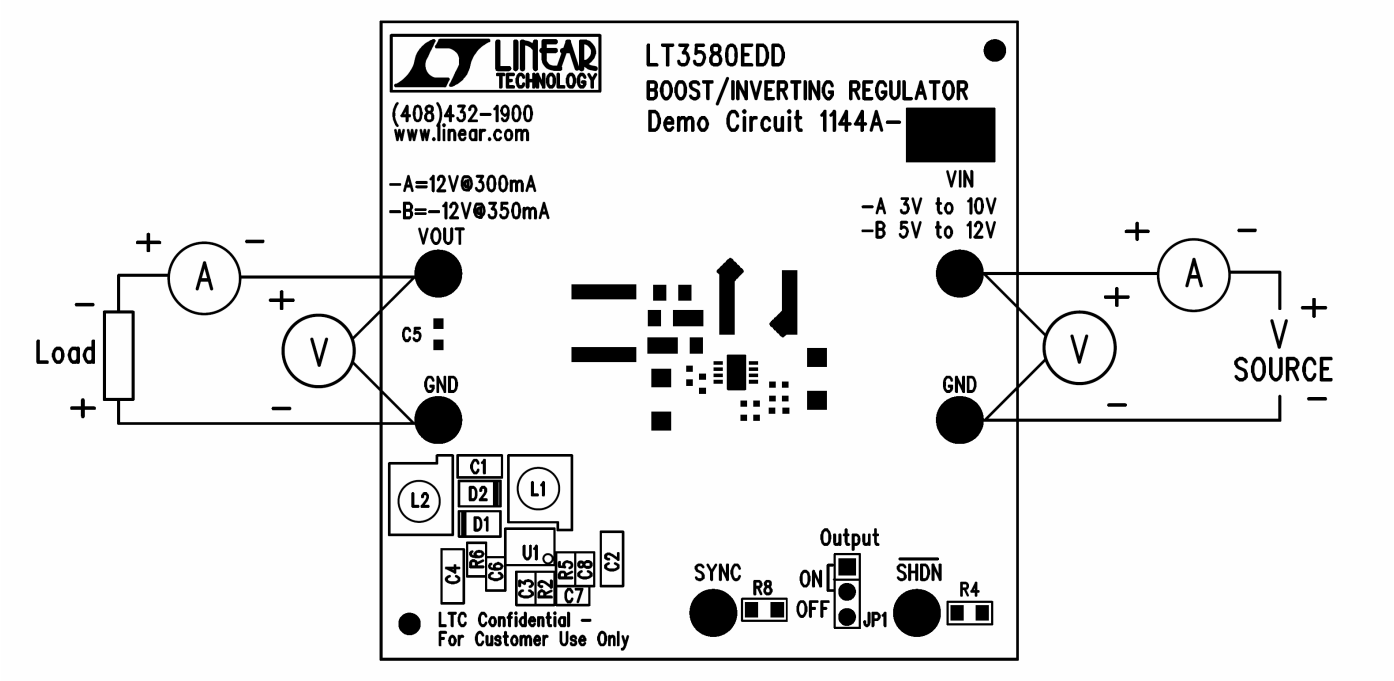


Figure 2. Proper Measurement Equipment Setup for DC1144A-B

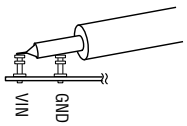


Figure 3. Measuring Input or output Ripple

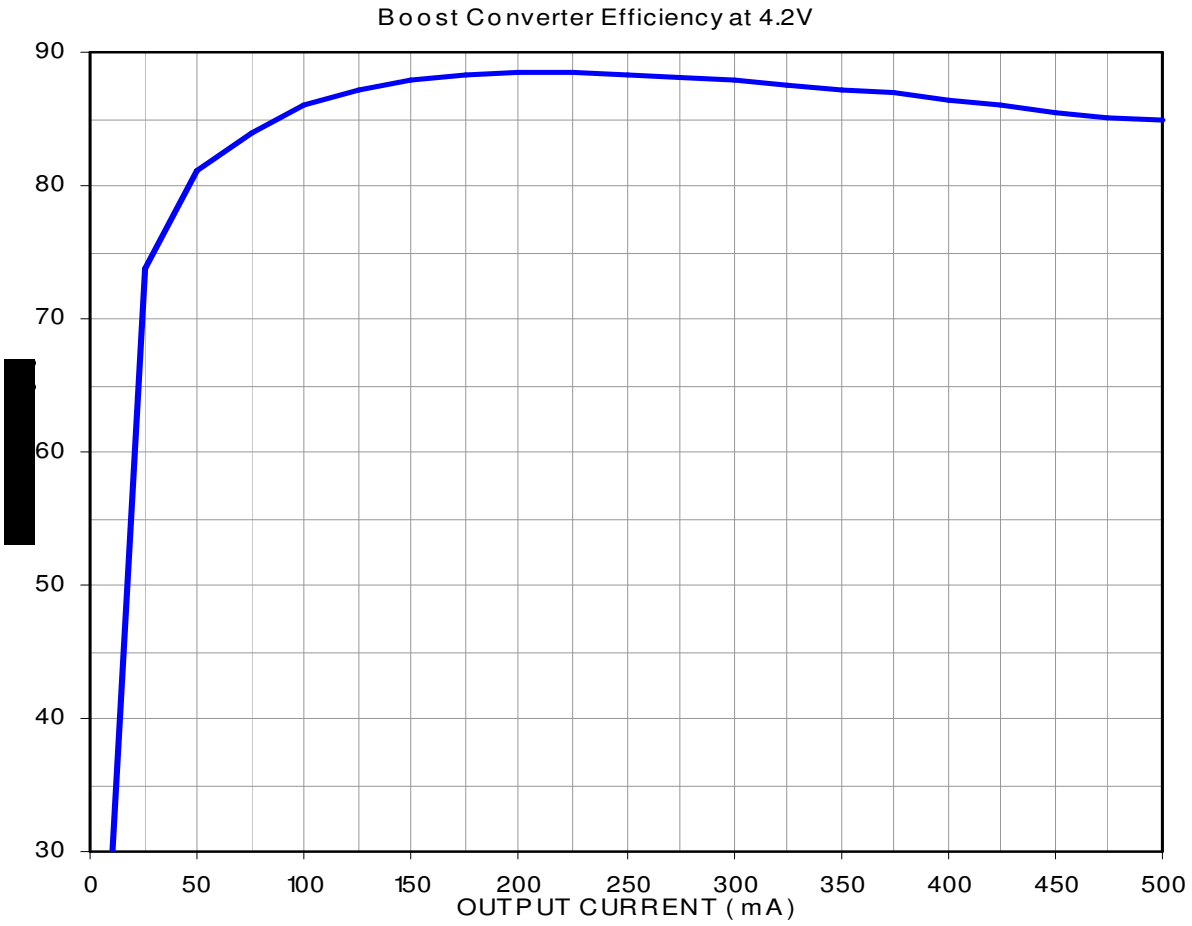


Figure 4. Boost Converter Efficiency at 4.2Vin

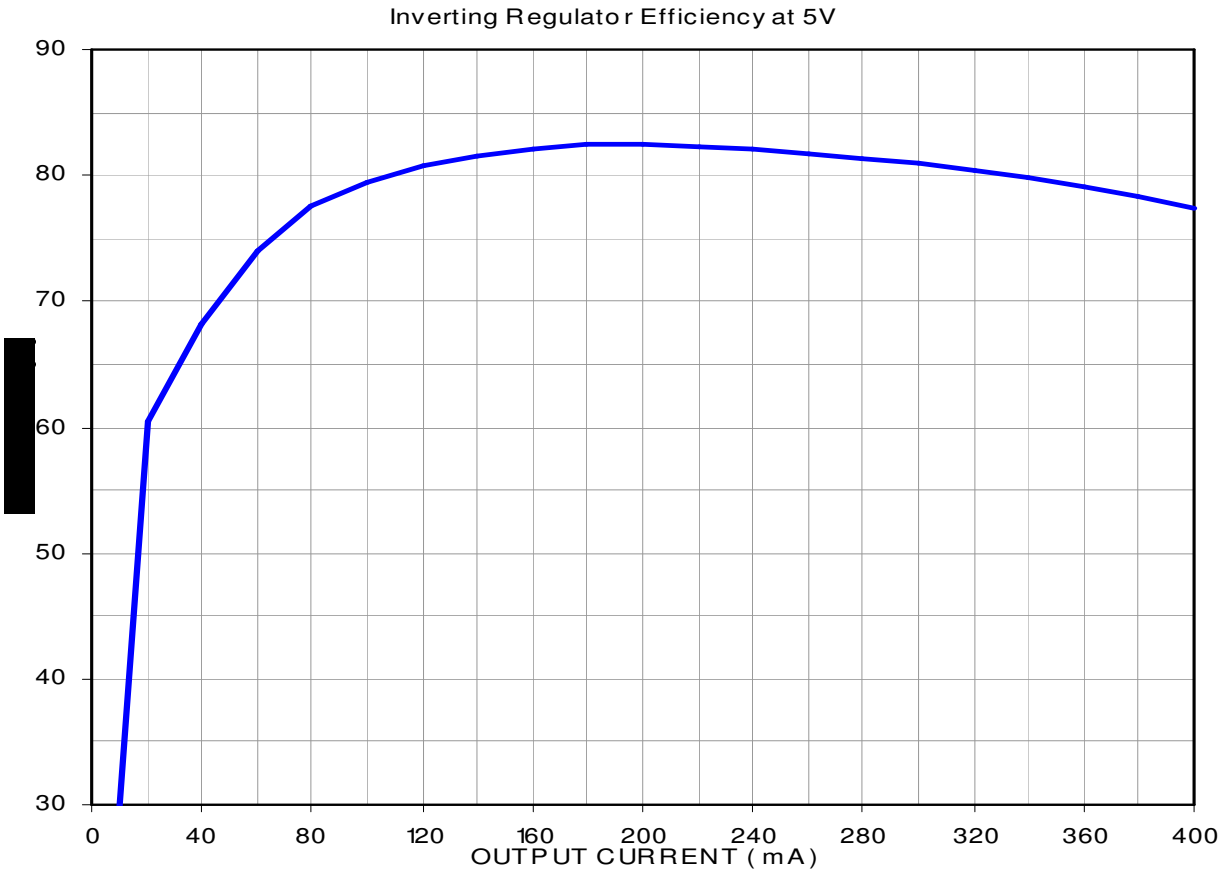


Figure 5. Inverting Regulator Efficiency at 5Vin

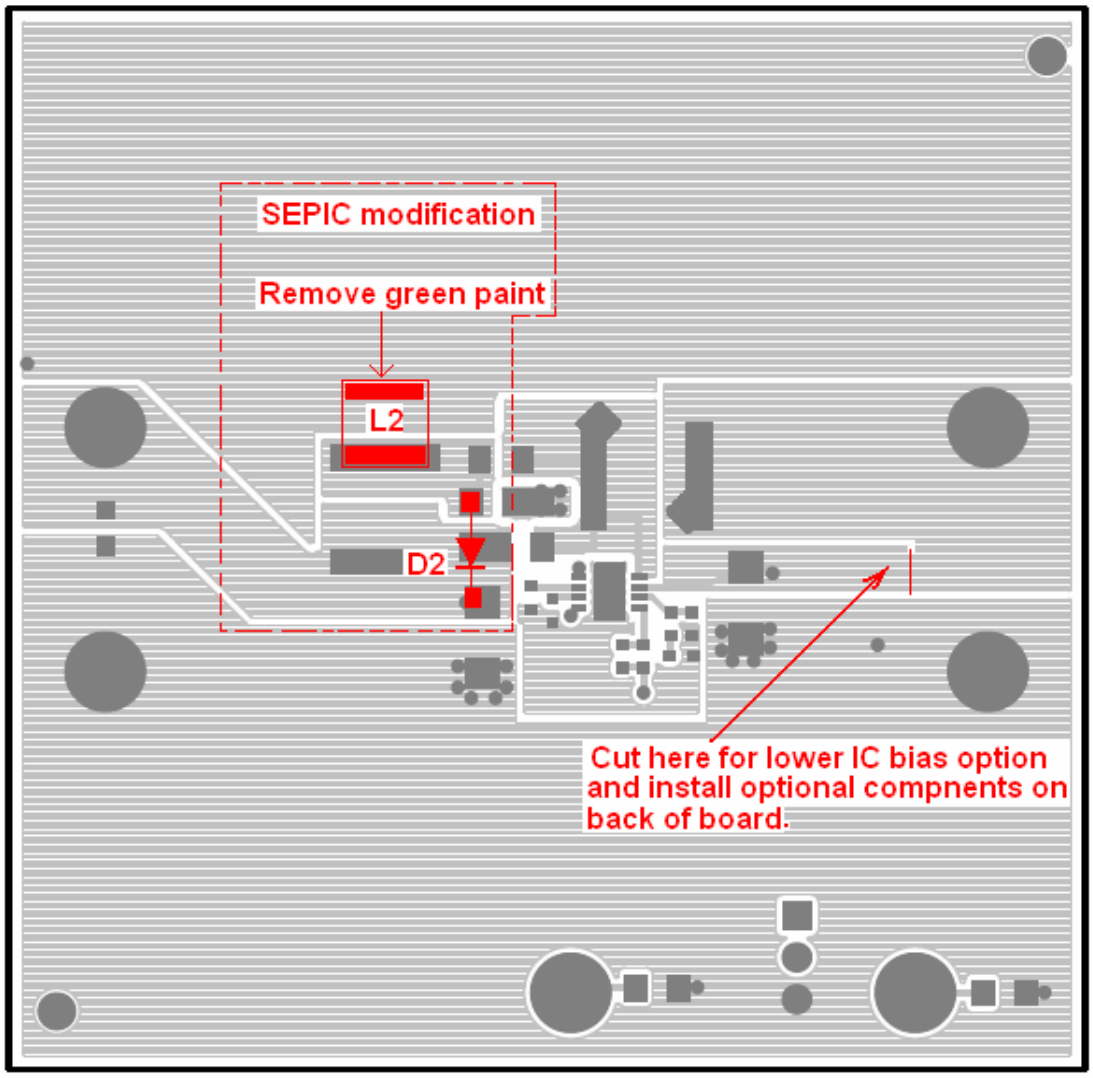
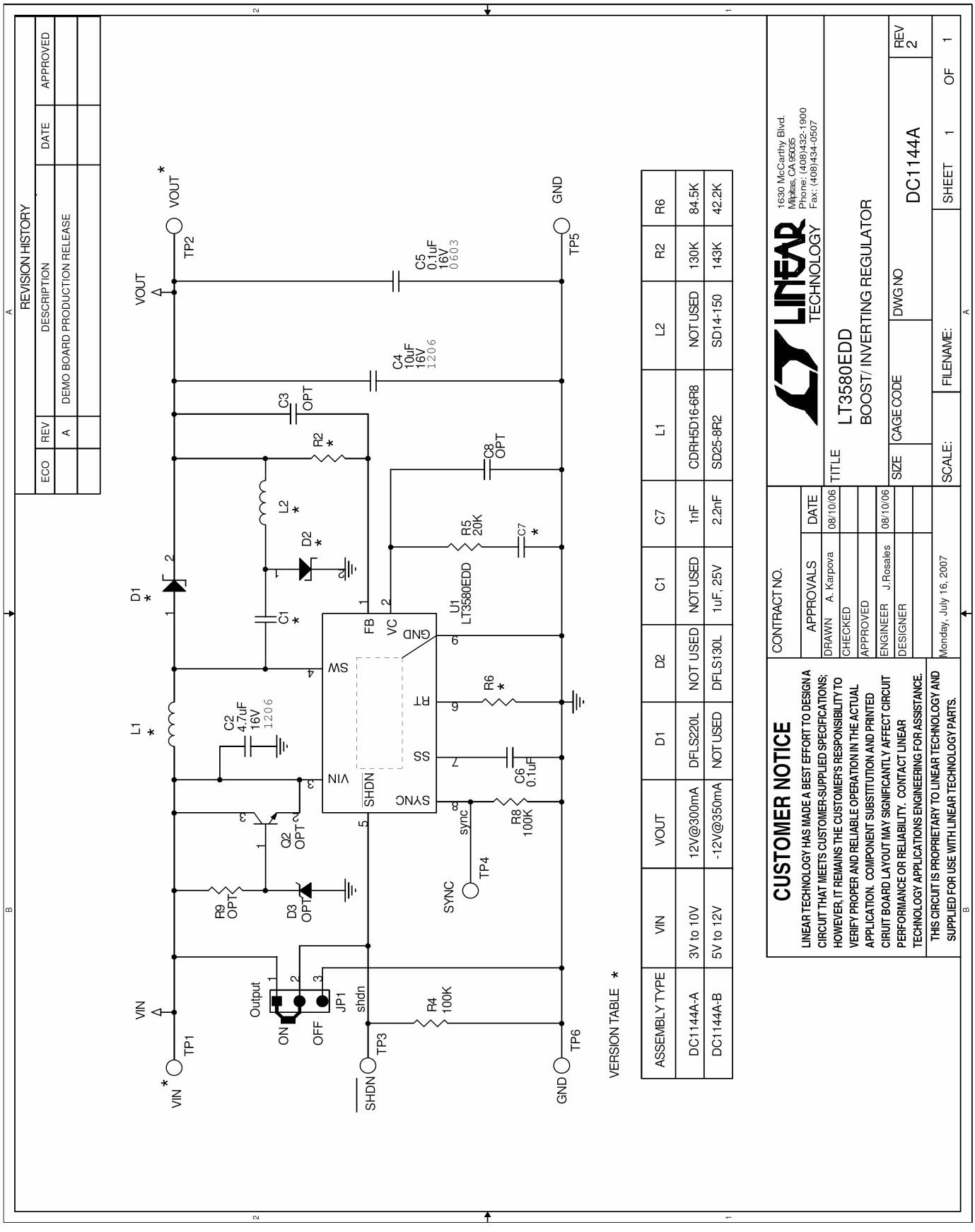


Figure 6. Optional Modifications to Convert DC1144A-B to SEPIC Converter and/or Use Separate Regulator to Bias IC


REVISION HISTORY
ECO
REV
DESCRIPTION
DATE
APPROVED
A
DEMO BOARD PRODUCTION RELEASE
VIN
VOUT
GND
SHDN
SYNC
Output
ON
OFF
JP1
shdn
sync
U1
LT3580EDD
VIN
SW
SHDN
SYNC
FB
VC
GND
RT
SS
L1
L2
D1
D2
D3
C1
C2
C3
C4
C5
C6
C7
C8
R1
R2
R3
R4
R5
R6
R7
R8
R9
Q1
Q2
TP1
TP2
TP3
TP4
TP5
TP6
VERSION TABLE *
ASSEMBLY TYPE | VIN | VOUT | D1 | D2 | C1 | C7 | L1 | L2 | R2 | R6
DC1144A-A | 3V to 10V | 12V@300mA | DFLS220L | NOT USED | NOT USED | 1nF | CDRH5D16-6R8 | NOT USED | 130K | 84.5K
DC1144A-B | 5V to 12V | -12V@350mA | NOT USED | DFLS130L | 1uF, 25V | 2.2nF | SD25-8R2 | SD14-150 | 143K | 42.2K
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 CIRUIT 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
DATE
DRAWN A. Karpova 08/10/06
CHECKED
APPROVED
ENGINEER J.Rosales 08/10/06
DESIGNER
Monday, July 16, 2007
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TITLE
LT3580EDD
BOOST/ INVERTING REGULATOR
SIZE
CAGE CODE
DWG NO
DC1144A
REV 2
SCALE:
FILENAME:
SHEET 1 OF 1