LT8335A
2A, 2MHz Low IQ Boost/ SEPIC/Inverting Converter

DESCRIPTION

Demonstration circuits 2449A-A and 2449A-B feature the LT®8335, in boost and inverting configurations. The demo circuits demonstrate small size and low component count. The boost is designed to convert a 3V–10V source to 12V at 275mA. The inverter converts a 4.5V–13V source to –12V at 350mA. Refer to Figures 4 and 5 for maximum load current at different input voltage levels.

The LT8335 can operate with inputs as high as 25V, but in these demo circuits, the input is limited by the output voltage level in the boost and by the switch voltage rating in the inverter.

The DC2449A includes input UVLO voltage dividers individually tailored for each converter and an EN/UVLO pin for manual ON/OFF control.

The LT8335 includes user configurable undervoltage lockout, frequency foldback, fixed 2MHz switching frequency and it is easily configured as boost, SEPIC or inverting converter.

The data sheet gives a complete description of the device, operation and application information. The data sheet must be read in conjunction with this demo manual for DC2449A.

Design files for this circuit board are available at http://www.linear.com/demo/DC2449A

, LT, LTC, LTM, Linear Technology, µModule and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
DC2449A-A						
V_{IN}	Input Supply Range		3		10	V
V_{OUT}	Output Voltage Range	V_{IN} = 3V, I_{LOAD} = 275mA	11.64	12	12.36	V
Ripple		V_{IN} = 3V, I_{LOAD} = 275mA		50		mV
Efficiency		V_{IN} = 6V, I_{LOAD} = 500mA		92		%
Switching Frequency				2		MHz
DC2449A-B						
V_{IN}	Input Supply Range		4.5		13	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		20		mV
Efficiency		V_{IN} = 12V, I_{LOAD} = 350mA		87		%
Switching Frequency				2		MHz

QUICK START PROCEDURE

Demo circuit 2449A is easy to set up to evaluate the performance of the LT8335. Refer to Figures 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. With power off, connect the input power supply to VIN and GND.
2. Turn on the power at the input.

   NOTE: Make sure that the input voltage does not exceed 10V for DC2449A-A and 13V for DC2449A-B.
3. Check for the proper output voltage.

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

   NOTE:
4. 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.

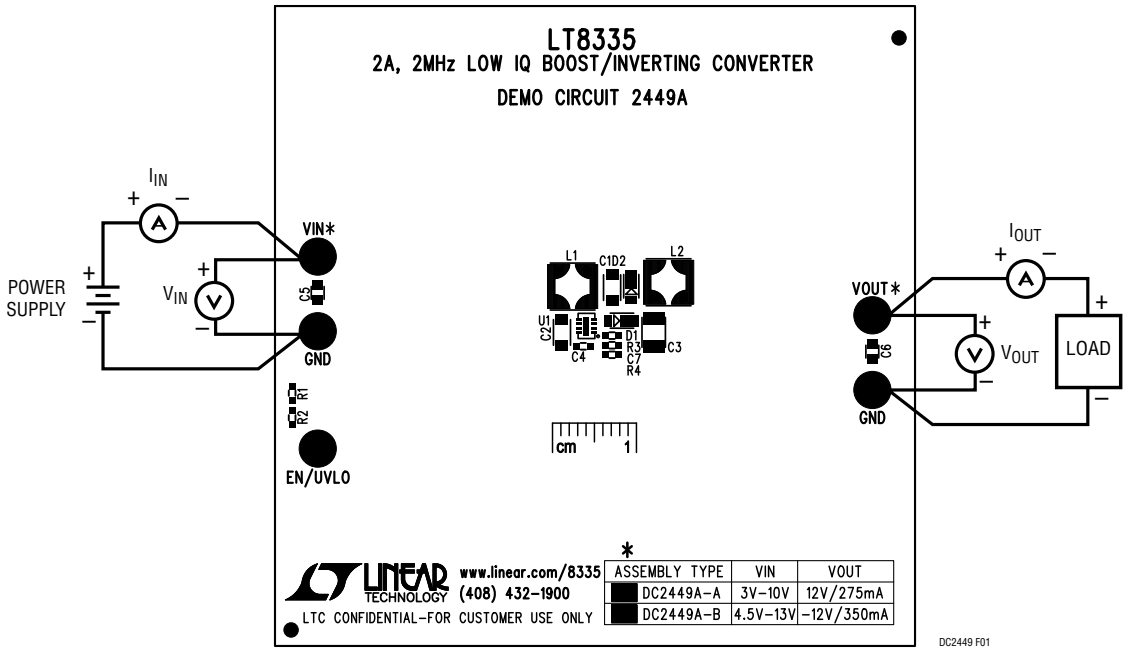


Figure 1. DC2449A-A Proper Equipment Setup

QUICK START PROCEDURE

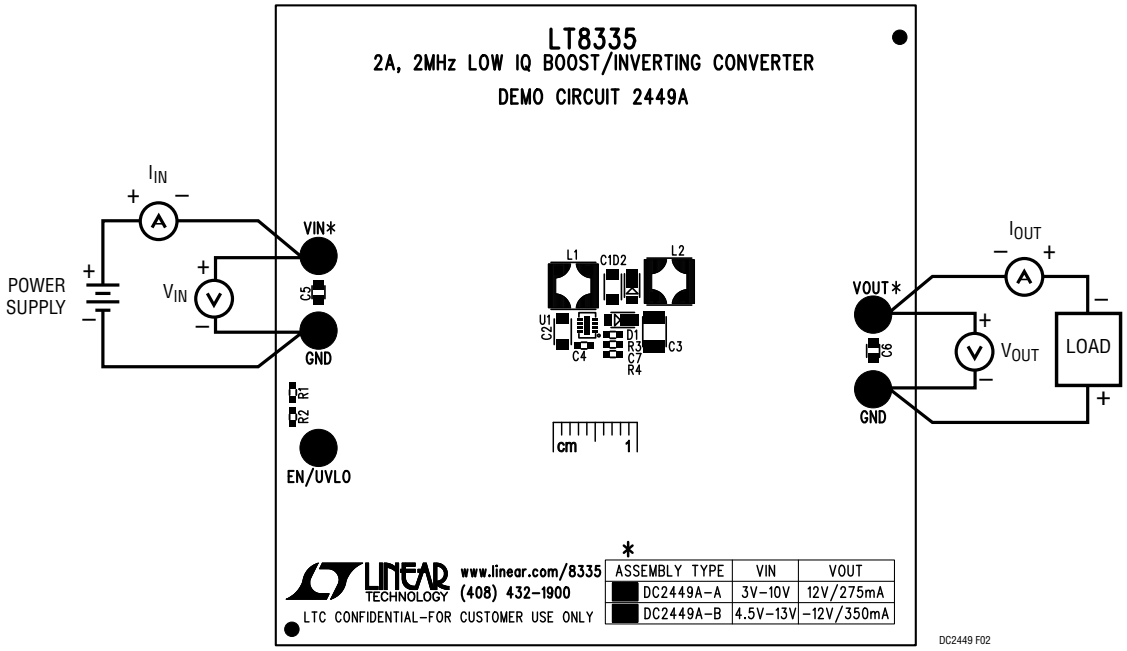


Figure 2. DC2449A-B Proper Equipment Setup

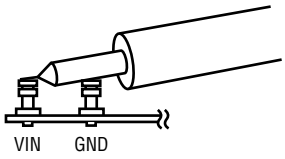


Figure 3. Measuring Input or Output Ripple

QUICK START PROCEDURE

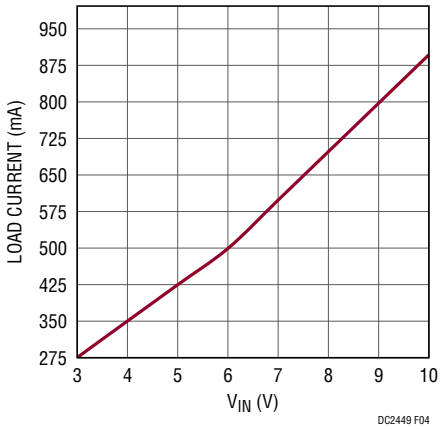


Figure 4. DC2449A-A Maximum Load Current vs Input Voltage

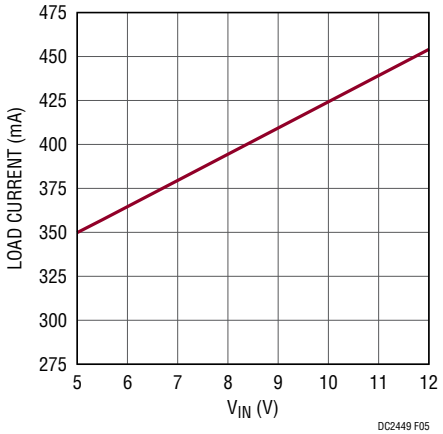


Figure 5. DC2449A-B Maximum Load Current vs Input Voltage

QUICK START PROCEDURE

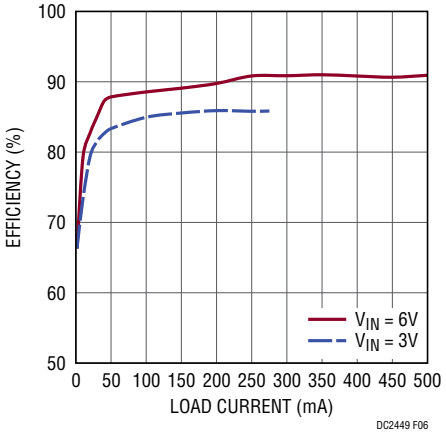


Figure 6. DC2449A-A Efficiency

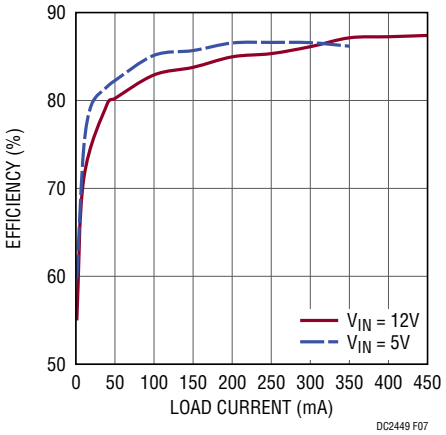
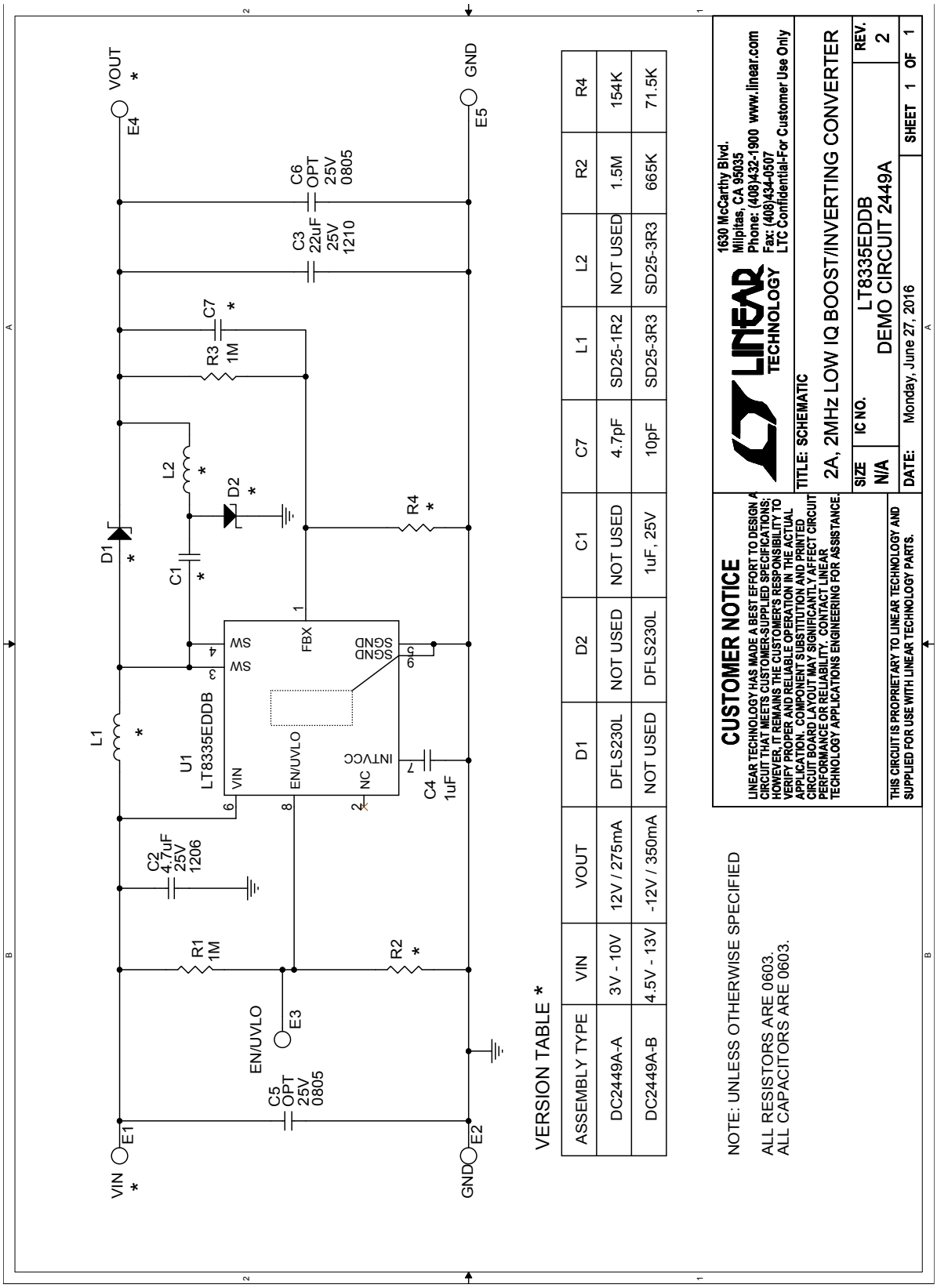


Figure 7. DC2449A-B Efficiency

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC2449A-A Required Circuit Components				
1	1	C2	CAP., 4.7µF, X7R, 25V, 10%, 1206	MURATA,GRM31CR71E475KA88L
2	1	C3	CAP., 22µF, X7R, 25V, 10%, 1210	MURATA, GRM32ER71E226KE15L
3	1	C4	CAP., 1µF, X7R, 25V, 10%, 0603	MURATA, GRM188R71E105KA12D
3	1	C7	CAP., 4.7pF, C0G, 25V, ±0.25pF, 0603	AVX, 06033A4R7CAT4A
4	1	D1	DIODE, 2A, POWER-DI-123	DIODES., DFLS230L-7
5	1	L1	INDUCTOR, 1.2µH, SD25	COOPER, SD25-1R2
6	2	R1,R3	RES., 1M, 1/10W, 1%, 0603	VISHAY, CRCW06031M00FKEA
7	1	R2	RES., 1.5M, 1/10W, 1%, 0603	VISHAY, CRCW06031M50FKEA
8	1	R4	RES., 154k, 1/10W, 1%, 0603	VISHAY, CRCW0603154KFKEA
9	1	U1	IC., LT8335, DPN-8, 3X2MM	LINEAR TECH., LT8335EDDB#PBF
DC2449A-A Additional Demo Board Circuit Components				
1	0	C5,C6(OPT)	CAP., OPT 0805	
2	0	C1(OPT)	CAP., OPT 1206	
3	0	D2(OPT)	DIODE, OPT	
4	0	L2(OPT)	INDUCTOR, OPT	
DC2449A-A Hardware: for Demo Board Only				
1	5	E1-E5	TESTPOINT, TURRET, 0.094" pbf	MILL-MAX, 2501-2-00-80-00-00-07-0
DC2449A-B Required Circuit Components				
1	1	C1	CAP., 1µF, X7R, 25V, 10%, 1206	MURATA, GRM31MR71E105KA01L
2	1	C2	CAP., 4.7µF, X7R, 25V, 10%, 1206	MURATA,GRM31CR71E475KA88L
3	1	C3	CAP., 22µF, X7R, 25V, 10%, 1210	MURATA, GRM32ER71E226KE15L
4	1	C4	CAP., 1µF, X7R, 25V, 10%, 0603	MURATA, GRM188R71E105KA12D
5	1	C7	CAP., 10pF, C0G, 25V, 5%, 0603	AVX, 06033A100JAT2A
6	1	D2	DIODE, 2A, POWER-DI-123	DIODES., DFLS230L-7
7	2	L1,L2	INDUCTOR, 3.3µH, SD25	COOPER, SD25-3R3
8	2	R1,R3	RES., 1M, 1/10W, 1%, 0603	VISHAY, CRCW06031M00FKEA
9	1	R2	RES., 665k, 1/10W, 1%, 0603	VISHAY, CRCW0603665KFKEA
10	1	R4	RES., 71.5k, 1/10W, 1%, 0603	VISHAY, CRCW060371K5FKEA
11	1	U1	IC., LT8335, DPN-8, 3X2MM	LINEAR TECH., LT8335EDDB#PBF
DC2449A-B Additional Demo Board Circuit Components				
1	0	C5,C6(OPT)	CAP., OPT 0805	
2	0	D1(OPT)	DIODE, OPT	
DC2449A-B Hardware: for Demo Board Only				
1	5	E1-E5	TESTPOINT, TURRET, 0.094" pbf	MILL-MAX, 2501-2-00-80-00-00-07-0

SCHEMATIC DIAGRAM



VERSION TABLE *

ASSEMBLY TYPE	VIN	VOUT	D1	D2	C1	C7	L1	L2	R2	R4
DC2449A-A	3V - 10V	12V / 275mA	DFLS230L	NOT USED	NOT USED	4.7pF	SD25-1R2	NOT USED	1.5M	154K
DC2449A-B	4.5V - 13V	-12V / 350mA	NOT USED	DFLS230L	1uF, 25V	10pF	SD25-3R3	SD25-3R3	665K	71.5K

NOTE: UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ARE 0603.
ALL CAPACITORS ARE 0603.

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.

LINEAR TECHNOLOGY

1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900 www.linear.com
Fax: (408)434-0507
LTC Confidential-For Customer Use Only

TITLE: SCHEMATIC

2A, 2MHz LOW IQ BOOST/INVERTING CONVERTER

SIZE	IC NO.	LT8335EDDB	REV.
N/A		DEMO CIRCUIT 2449A	2
DATE:	Monday, June 27, 2016		SHEET 1 OF 1

Information furnished by Linear Technology Corporation is believed to be accurate and reliable. However, no responsibility is assumed for its use. Linear Technology Corporation makes no representation that the interconnection of its circuits as described herein will not infringe on existing patent rights.

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged**.

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation

© LINEAR TECHNOLOGY CORPORATION 2016