

LTC3787EUFD
4-Phase High Current
Synchronous
Step-Up Converter**DESCRIPTION**

Demonstration circuit 2001A is a step-up DC/DC converter using two **LTC3787EUFD** dual-phase synchronous boost controllers in a parallel configuration for high current, high power 4-phase operation.

The DC2001A has an input supply voltage range from 6V to 24V. The converter provides an output voltage of 24V, with a very high efficiency output of 25A to 30A, as shown in Figure 2.

The **LTC3787** data sheet gives a complete description of the part, operation and application information, and must be read in conjunction with this demo manual for the DC2001A.

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

LT, LT, LTC, LTM, Linear Technology, Burst Mode 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 $T_A = 25^\circ\text{C}$

PARAMETER	CONDITIONS	UNITS
Minimum Input Voltage	$I_{OUT} = 0\text{A to }25\text{A}$	6V
Maximum Input Voltage	$I_{OUT} = 0\text{A to }30\text{A}$	24V
Output Voltage	$V_{IN} = 6\text{V to }24\text{V}$, MODE = FCC	24V $\pm 2\%$
Default Operating Frequency	FREQ = GND	350kHz
Efficiency	$V_{IN} = 18\text{V}$, $V_O = 24\text{V}$, $I_O = 30\text{A}$	98.2%

QUICK START PROCEDURE

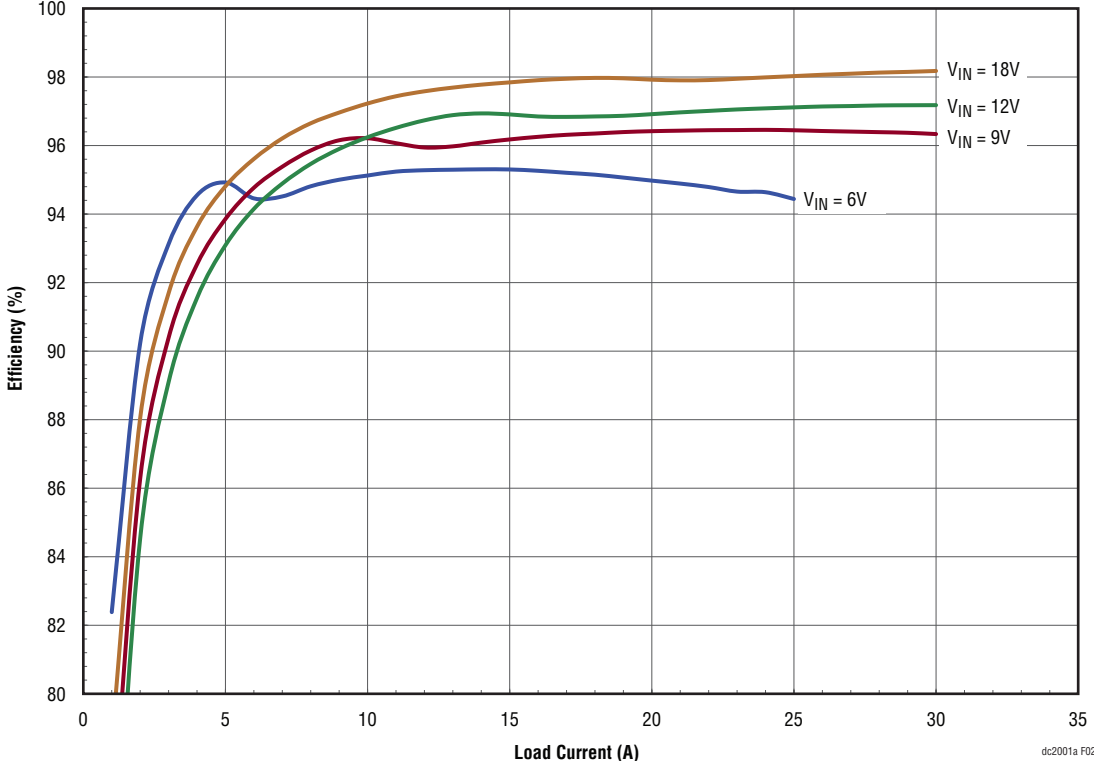


Figure 2. Efficiency Curves, $f_{sw} = 350kHz$, MODE = FCC

DEMO MANUAL DC2001A

PARTS LIST

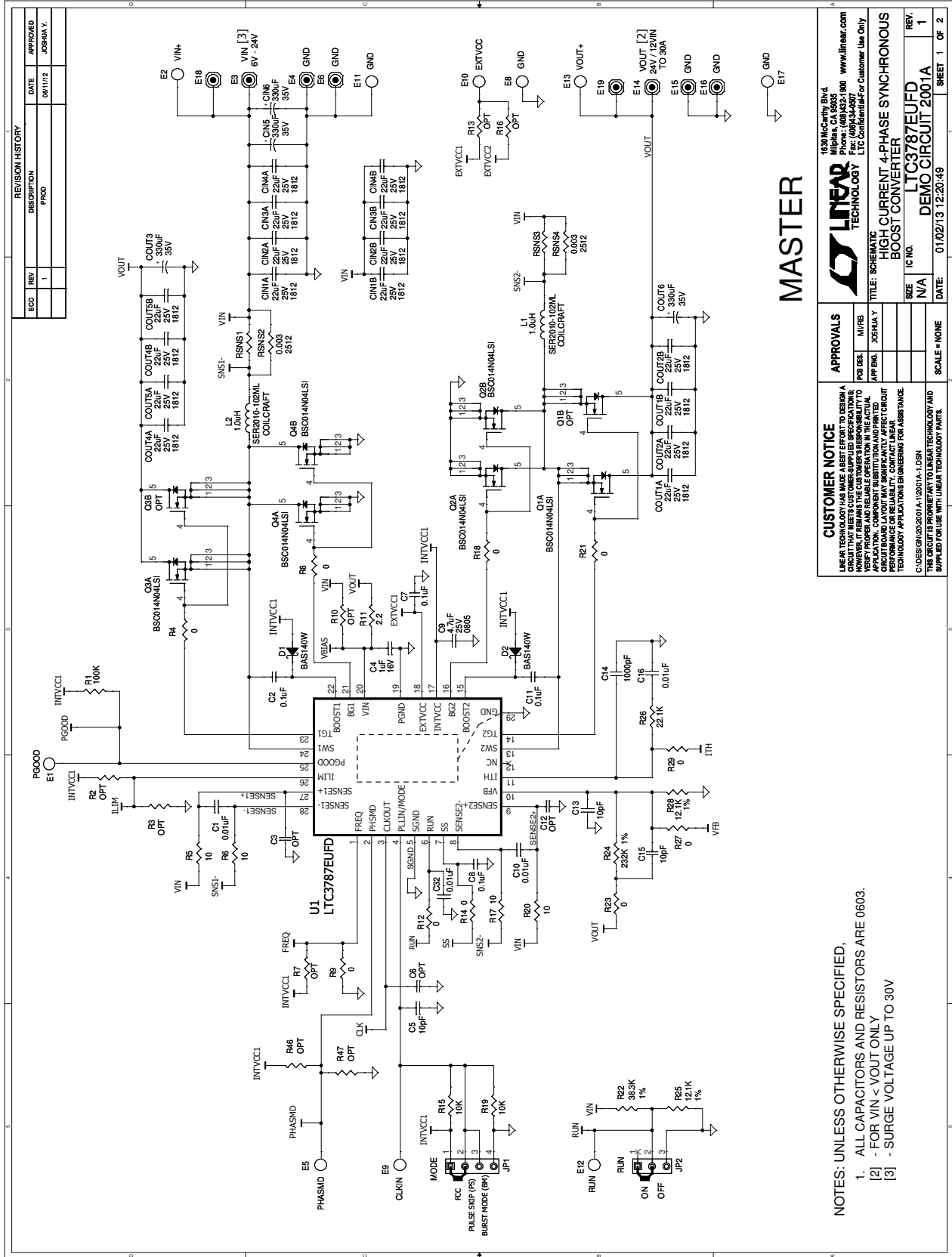
ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	32	CIN1A-CIN4A, CIN1B-CIN4B, CIN7A-CIN10A, CIN7B-CIN10B, COUT1A-COUT2A, COUT1B-COUT2B, COUT4A-COUT5A, COUT4B-COUT5B, COUT7A-COUT8A, COUT7B-COUT8B, COUT10A-COUT11A, COUT10B-COUT11B	CAP, X7R, 22 μ F, 20%, 25V, 1812	TDK, C4532X7R1E226M
2	8	CIN5-CIN6, CIN11-CIN12, COUT3, COUT6, COUT9, COUT12	CAP, 330 μ F, 20%, 35V, ELECT	NIPPON CHEMI-CON, EMZA350ADA331MJA0G
3	8	C1, C10, C16-C17, C26, C31-C33	CAP, X7R, 0.01 μ F, 5%, 25V, 0603	AVX, 06033C103JAT2A
4	8	C2, C7-C8, C11, C19, C23-C24, C27	CAP, X7R, 0.1 μ F, 10%, 25V, 0603	TDK, C1608X7R1E104K
5	2	C4, C21	CAP, X7R, 1 μ F, 10%, 16V, 0603	TAIYO YUDEN, EMK107BJ105KA-T
6	5	C5, C13, C15, C22, C29	CAP, NPO, 10pF, 5%, 25V, 0603	AVX, 06033A100JAT2A
7	2	C9, C25	CAP, X5R, 4.7 μ F, 20%, 25V, 0805	TAIYO YUDEN, TMK212BJ475MG-T
8	2	C14, C30	CAP, NPO, 1000pF, 5%, 25V, 0603	AVX, 06033A102JAT2A
9	4	D1-D4	DIODE, SCHOTTKY, 30V, SOD123	INFINEON, BAS140W
10	4	L1-L4	IND, 1.0 μ H	COILCRAFT, SER2010-102MLB
11	12	Q1A-Q8A, Q2B, Q4B, Q6B, Q8B	XSTR, MOSFET N-CHANNEL	INFINEON, BSC014N04LSI
12	1	R1	RES, 100k, 5%, 1/10W, 0603	VISHAY, CRCW0603100KJNEA
13	8	R5-R6, R17, R20, R31-R32, R39, R41	RES, 10 Ω , 5%, 1/10W, 0603	VISHAY, CRCW060310R0JNEA
14	2	R11, R35	RES, 2.2 Ω , 5%, 1/10W, 0603	VISHAY, CRCW06032R20JNEA
15	2	R15, R19	RES, 10k, 5%, 1/10W, 0603	VISHAY, CRCW060310K0JNEA
16	1	R22	RES, 38.3k, 1%, 1/10W, 0603	VISHAY, CRCW060338K3FKEA
17	1	R24	RES, 232k, 1%, 1/10W, 0603	VISHAY, CRCW0603232KfKEA
18	2	R25, R28	RES, 12.1k, 1%, 1/10W, 0603	VISHAY, CRCW060312K1fKEA
19	2	R26, R45	RES, 22.1k, 1%, 1/10W, 0603	VISHAY, CRCW060322K1fKEA
20	1	R36	RES, 100 Ω , 5%, 1/10W, 0603	VISHAY, CRCW0603100RJNEA
21	8	RSNS1-RSNS8	RES, 0.003 Ω , 1%, 1W, 2512	PANASONIC, ERJM1WSF3M0U
22	2	U1, U2	IC, LTC3787EUFDF#PBF	LINEAR TECHNOLOGY, LTC3787EUFDF#PBF
Additional Demo Board Circuit Components				
1	0	C3, C6, C12, C18, C20, C28	CAP, OPTIONAL, 0603	
2	0	R2, R3, R7, R10, R13, R16, R34, R46-R49	RES, OPTIONAL, 0603	
3	18	R4, R8-R9, R12, R14, R18, R21, R23, R27, R29-R30, R33, R37-R38, R40, R42-R44	RES, 0 Ω , JUMPER, 0603	VISHAY, CRCW06030000Z0EA
4	0	Q1B, Q3B, Q5B, Q7B	XSTR, MOSFET N-CHAN OPTIONAL	

PARTS LIST

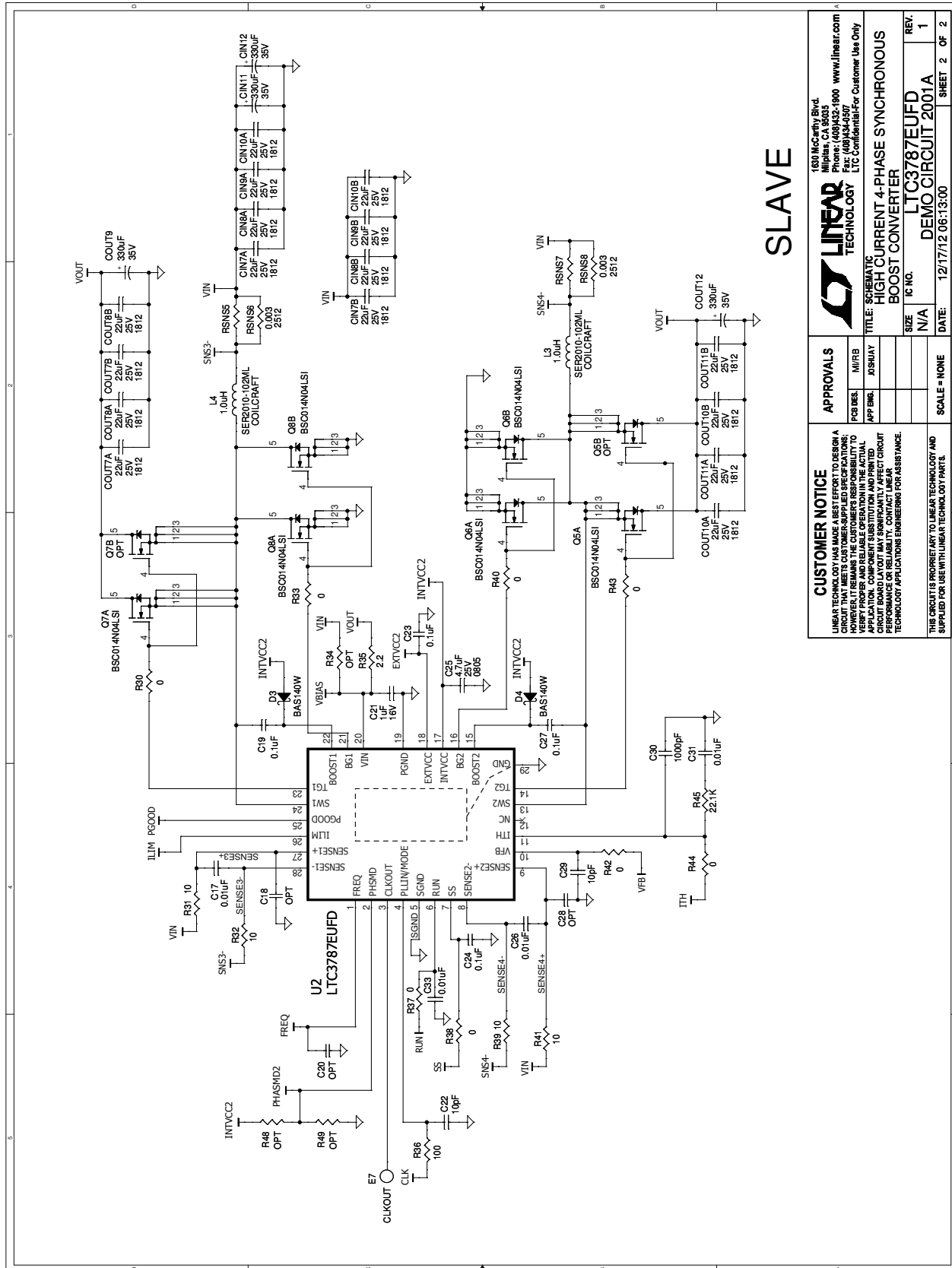
ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Hardware: For Demo Board Only				
2	1	JP1	HEADER, 4-PIN, 2mm	SULLINS, NRPN041PAEN-RC
3	1	JP2	HEADER, 3-PIN, 2mm	SULLINS, NRPN031PAEN-RC
8	2	JP1, JP2	SHUNT	SAMTEC, 2SN-BK-G
1	11	E1-E2, E5, E7-E13, E17	TURRET	MILL-MAX, 2501-2-00-80-00-00-07-0
4	8	E3-E4, E6, E14-E16, E18-E19	STUD, TEST PIN	PEM, KFH-032-10
6	8	E3-E4, E6, E14-E16, E18-E19	LUG RING, #10	KEYSTONE, 8205
7	8	E3-E4, E6, E14-E16, E18-E19	WASHER, #10 TIN PLATED BRASS	ANY #10 EXT BZ TN
5	16	E3-E4, E6, E14-E16, E18-E19 (x2)	NUT, BRASS 10-32	ANY #10-32
9	4	MH1, MH2, MH3, MH4	STANDOFF, SNAP-ON	KEYSTONE, 8834

DEMO MANUAL DC2001A

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



<p>CUSTOMER NOTICE LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-APPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY THAT THE CIRCUIT MEETS ALL APPLICABLE ELECTRICAL APPLICATION REQUIREMENTS. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE AND RELIABILITY. CONTACT YOUR LOCAL LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.</p>		<p>APPROVALS</p> <table border="1"> <tr> <td>PCB DEL.</td> <td>M/RFB</td> </tr> <tr> <td>APP ENG.</td> <td>JOSHUAY</td> </tr> </table>		PCB DEL.	M/RFB	APP ENG.	JOSHUAY
PCB DEL.	M/RFB						
APP ENG.	JOSHUAY						
<p>180 MAC AVE, Bldg. 200 MILWAUKEE, WI 53190 PHONES: (414)332-1800 www.linear.com FAX: (414)332-4507 LTC Confidential For Customer Use Only</p>		<p>TITLE: SCHEMATIC HIGH CURRENT 4-PHASE SYNCHRONOUS BOOST CONVERTER</p>					
<p>SCALE: NONE</p>		<p>REV.: 1</p>					
<p>DATE: 12/17/12 06:13:00</p>		<p>IC NO.: LTC3787EUFD</p>					
<p>DATE: 12/17/12 06:13:00</p>		<p>DEMO CIRCUIT 2001A</p>					
<p>SCALE: NONE</p>		<p>SHEET 2 OF 2</p>					



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.

DEMO MANUAL DC2001A

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

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А