

LTC3630AEMSE/LTC3630EMSE

High Efficiency High Voltage 500mA Synchronous Step-Down Converter

DESCRIPTION

Demonstration circuit 2105A is a 500mA output DC/DC power supply. There are two versions: DC2105A-A is a board featuring [LTC®3630A](#), with 4V to 76V input range; DC2105A-B is a board featuring LTC3630, with 4V to 65V input range. The LTC3630A/LTC3630 operates in a high efficiency Burst Mode® operation and includes internal high and low side switches. The board provides jumper selected output voltages of 1.8V, 3.3V, 5V and an option for additional voltages. LTC3630A/LTC3630 has internal soft-start and a provision for increasing soft-start time.

Included on the board is an ON/OFF jumper that can also be configured as a precision undervoltage lockout. Additional PC pads are included for programming current limit to optimize efficiency and for reducing output voltage

ripple and reducing component size. A terminal (FBO) is available to allow multiple boards to be paralleled for increasing output current.

Output voltage between 800mV and V_{IN} can be programmed using optional resistors, although higher voltage output capacitors will be required.

The LTC3630A/LTC3630 data sheet gives a complete description of the operation and application information. The data sheet must be read in conjunction with this demo manual.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2105A>

LT, LT, LTC, LTM, Linear Technology 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	CONDITION	VALUE
Input Voltage Range for DC2105A-A	LTC3630A	4V to 76V
Input Voltage Range for DC2105A-B	LTC3630	4V to 65V
1.8V Output	$V_{IN} = 20\text{V}$, V_{OUT} Load = 100mA	1.8V $\pm 2\%$
3.3V Output	$V_{IN} = 20\text{V}$, V_{OUT} Load = 100mA	3.3 V $\pm 2\%$
5V Output	$V_{IN} = 20\text{V}$, V_{OUT} Load = 100mA	5V $\pm 2\%$
Maximum Output Current	$V_{IN} = 20\text{V}$, $V_{OUT} = 5\text{V}$	500mA
Typical Output Voltage Ripple	$V_{IN} = 20\text{V}$, $V_{OUT} = 5\text{V}$	75mV _{p-p}

QUICK START PROCEDURE

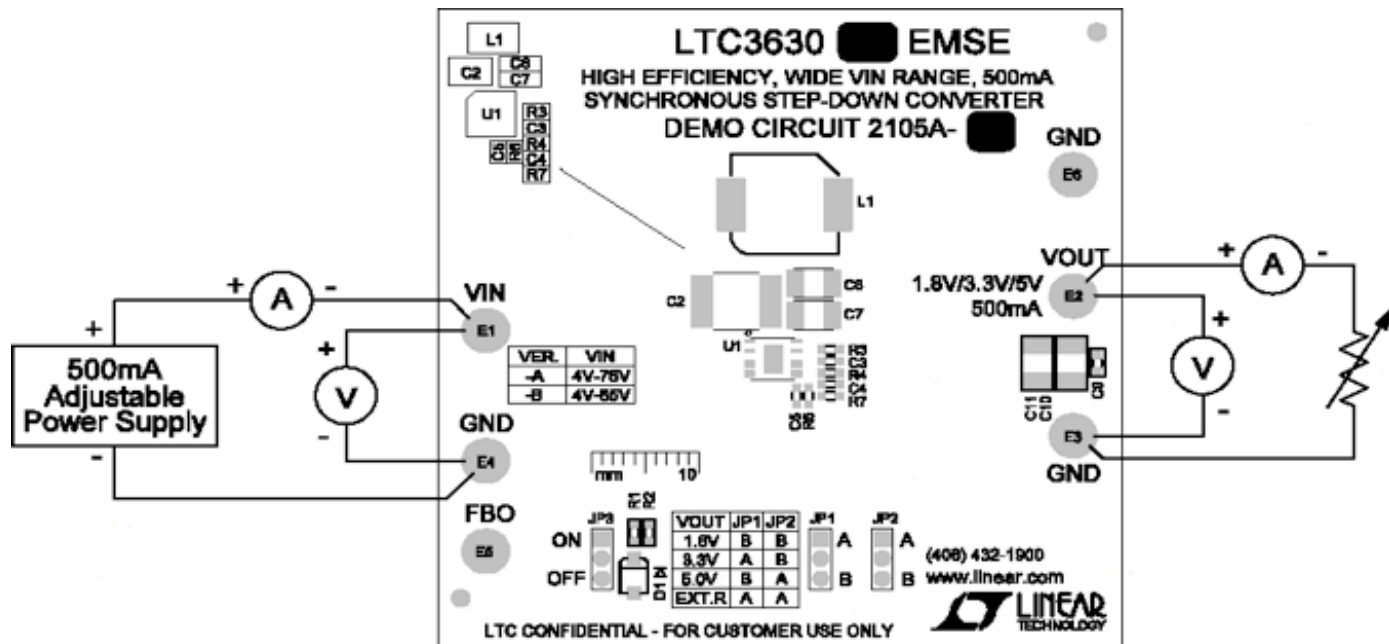
This DC2105A can be evaluated using the setup shown in Figure 1.

1. Connect the DVMs to the input and output. Select 5V setting using jumper JP1 (lower position) and JP2 (upper position), select ON position for JP3.
2. With input power supply set for 0V, connect the supply to V_{IN} and GND terminals using short (less than 10 inches) leads, preferably twisted leads. Connect a suitable load to V_{OUT} and GND terminals.
3. Slowly increase the input power supply to 10V. Observe output voltage and verify that it meets the specifications in the Performance Summary. Measure output voltage with and without the load.
4. Move jumpers JP1 and JP2 to the other two fixed voltage settings and verify that each output voltage meets the values as shown in the Performance Summary.

5. Once the proper output voltages are established, adjust the load and input voltage within the operating range and observe the output voltage regulation, ripple voltage and other parameters.

NOTES:

1. **IMPORTANT: 60V or higher voltage can result in an electric shock if care is not taken. Also, hot plugging the circuit to a power supply that has more than 40V present at its output can produce a high voltage transient exceeding the absolute maximum input voltage which can damage the LTC3630A/LTC3630.**
2. 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 V_{IN} or V_{OUT} and GND terminals. See Figure 3 for proper scope probe technique.



NOTE: A 10 μ F, 100V electrolytic capacitor is necessary when evaluating circuit with input voltages greater than 40V, using long input wires and hot plugging circuit into a powered input supply. See Figure 2.

Figure 1. Proper Measurement Equipment Setup

QUICK START PROCEDURE

Circuit Options

Detailed information is contained in the data sheet.

Optional Output Voltage: Additional output voltages can be programmed by selecting proper resistors for the R6 and R7 feedback network. C5 is a feed-forward capacitor to optimize transient response and increase stability. JP1 and JP2 must be in the lower position if R6 and R7 are used. The 10V rated output capacitors must be replaced with suitable voltage ratings.

ISET Components: C3, R3 and R4 are used to provide a number of features and circuit enhancements such as, output current limit, input current limit, optimizing output ripple voltage reduction and efficiency improvement. R4 sets maximum output current, see Figure 2 in the

LTC3630A/LTC3630 data sheet, leave open for maximum load current. R3 and R4 can be used to set input current limit. C3 is used to reduce output voltage ripple and optimize efficiency. See data sheet for details.

RUN Pin Components: The converter is enabled when the RUN pin voltage exceeds 1.21V and is disabled when dropping below 0.7V. Moving JP3 to the ON position allows an internal current to pull the RUN pin up to 5V. R1 and R2 are used to program input undervoltage lockout. Select suitable resistors to divide the input voltage down to the precision threshold voltage levels that enable and disable the converter. Note that the maximum voltage on the RUN pin is 6V, therefore a nominal 5V Zener diode (D1) is required to limit the RUN pin voltage when high input voltages are used.

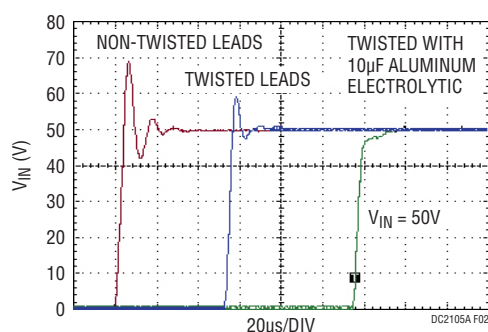


Figure 2. Hot Plugging Input Voltage Transient Using 12" Leads

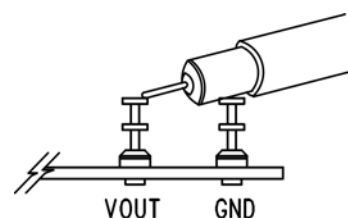
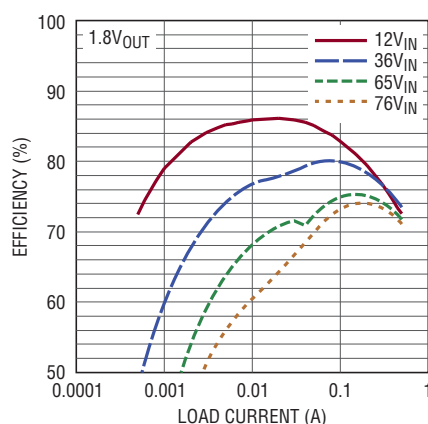
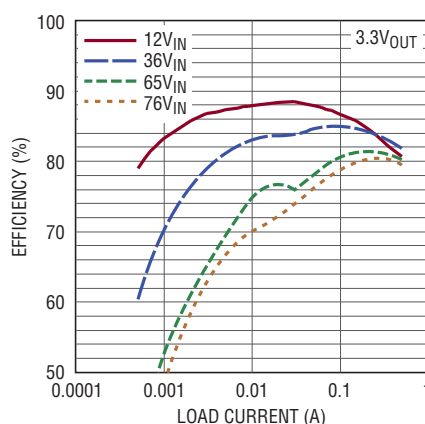


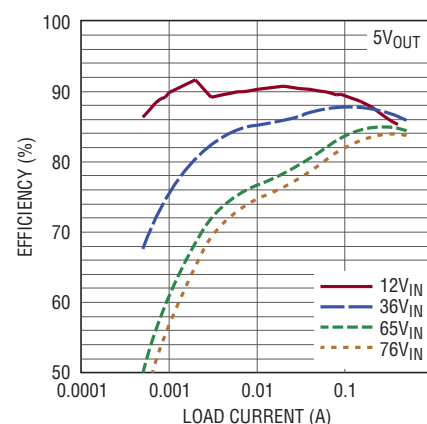
Figure 3. Measuring Input or Output Voltage Ripple



DC2105A F04a



DC2105A F04b



DC2105A F04c

Figure 4. Efficiency vs Load Current Curves

DEMO MANUAL DC2105A

PARTS LIST

DC2105A-A

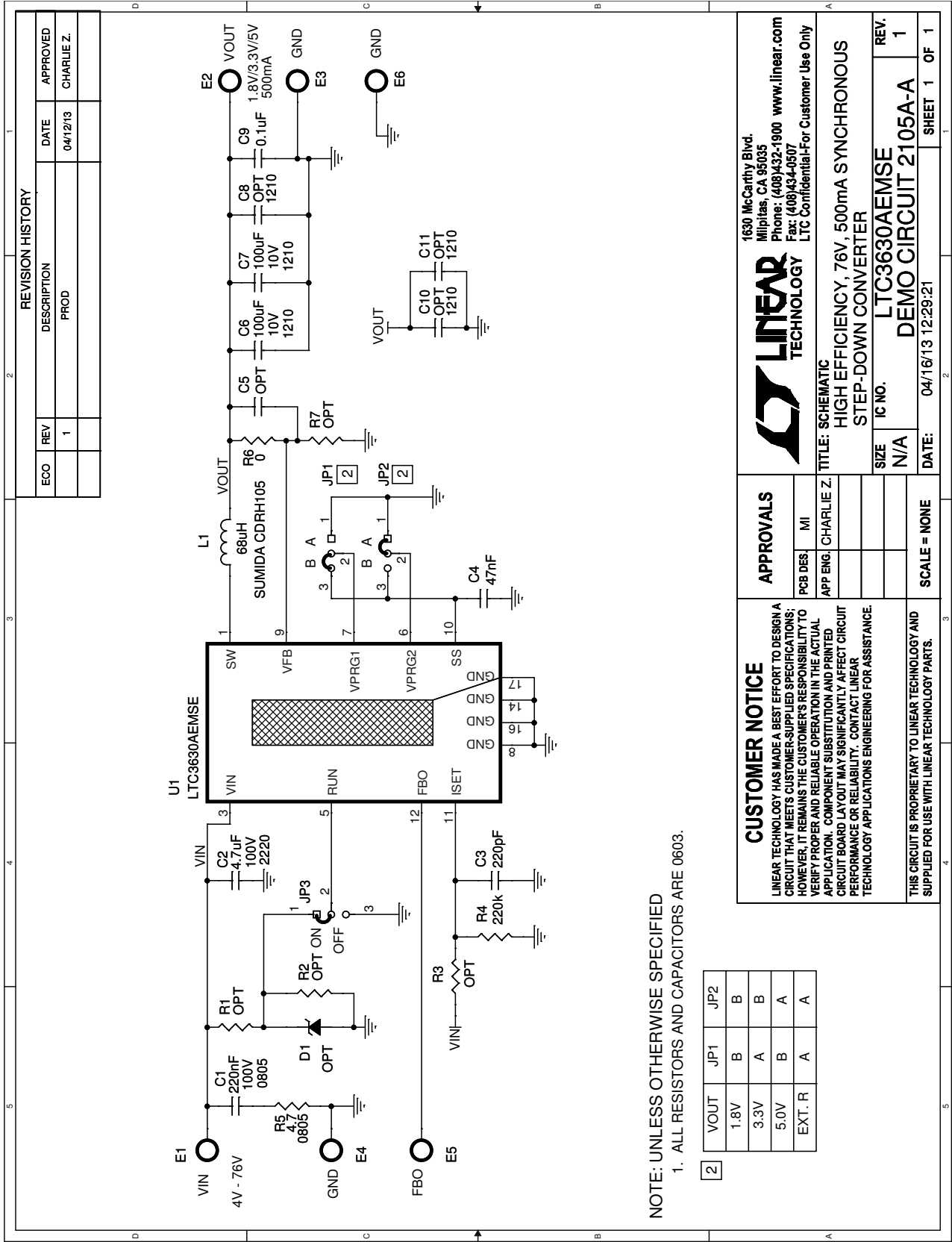
ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, 0805 220nF 10% 100V X7R	MURATA GRM21AR72A224KAC5L
2	1	C2	CAP, 2220 4.7 μ F 20% 100V X7R	TDK C5750X7R2A475M
3	1	C3	CAP, 0603 220pF 10% 50V X7R	AVX 06035C221KAT2A
4	1	C4	CAP, 0603 47nF 10% 25V X7R	AVX 06033C473KAT
5	2	C6, C7	CAP, 1210 100 μ F 20% 10V X5R	TAIYO YUDEN LMK325ABJ107MM-T
6	1	C9	CAP, 0603 0.1 μ F 10% 25V X7R	AVX 06033C104KAT2A
7	1	L1	IND, 68 μ H	SUMIDA CDRH105RNP-680N
8	1	R4	RES, 0603 220k Ω 5% 1/10W	VISHAY CRCW0603220KJNEA
9	1	R5	RES, 0805 4.7 Ω 5% 1/8W	VISHAY CRCW08054R70JNEA
10	1	R6	RES, 0603 0 Ω JUMPER	VISHAY CRCW06030000Z0EA
11	1	U1	IC, SYNCHRONOUS STEP-DOWN CONVERTER	LINEAR TECH. LTC3630AEMSE
Additional Demo Board Circuit Components				
1	0	C5	CAP, 0603 OPTION	OPTION
2	0	C8, C10, C11	CAP, 1210 OPTION	OPTION
3	0	D1	DIODE, OPTION	OPTION
4	0	R1, R2, R3, R7	RES, 0603 OPTION	OPTION
Hardware				
1	6	E1, E2, E3, E4, E5, E6	TURRET	MILL MAX 2501-2-00-80-00-00-07-0
2	3	JP1, JP2, JP3	HEADER, 3 PIN, 2mm	SAMTEC TMM-103-02-L-S
3	3	JP1, JP2, JP3	SHUNT, 2mm	SAMTEC 2SN-BK-G

PARTS LIST

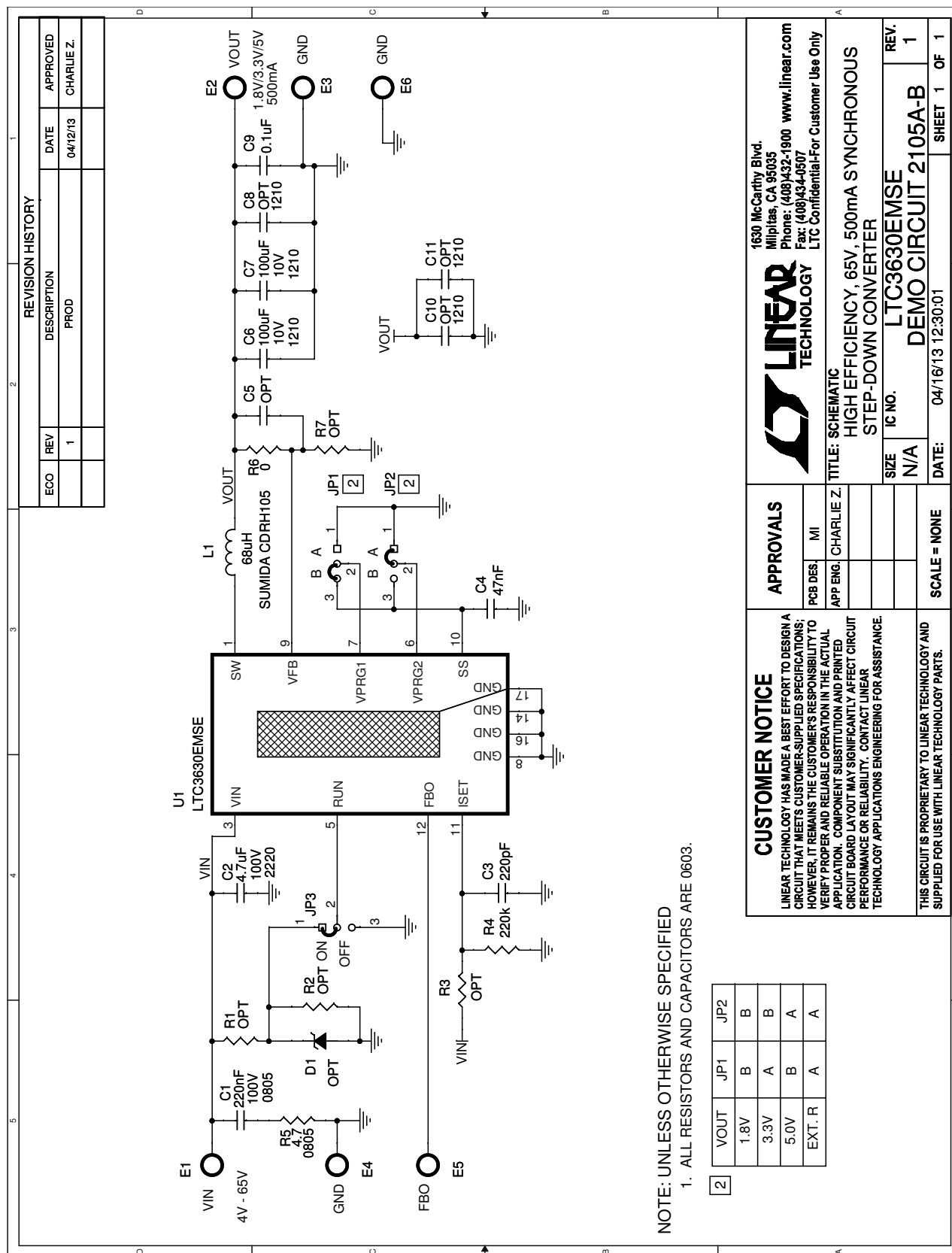
DC2105A-B

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, 0805 220nF 10% 100V X7R	MURATA GRM21AR72A224KAC5L
2	1	C2	CAP, 2220 4.7μF 20% 100V X7R	TDK C5750X7R2A475M
3	1	C3	CAP, 0603 220pF 10% 50V X7R	AVX 06035C221KAT2A
4	1	C4	CAP, 0603 47nF 10% 25V X7R	AVX 06033C473KAT
5	2	C6, C7	CAP, 1210 100μF 20% 10V X5R	TAIYO YUDEN LMK325ABJ107MM-T
6	1	C9	CAP, 0603 0.1μF 10% 25V X7R	AVX 06033C104KAT2A
7	1	L1	IND, 68μH	SUMIDA CDRH105RNP-680N
8	1	R4	RES, 0603 220kΩ 5% 1/10W	VISHAY CRCW0603220KJNEA
9	1	R5	RES, 0805 4.7Ω 5% 1/8W	VISHAY CRCW08054R70JNEA
10	1	R6	RES, 0603 0Ω JUMPER	VISHAY CRCW06030000Z0EA
11	1	U1	IC, SYNCHRONOUS STEP-DOWN CONVERTER	LINEAR TECH. LTC3630EMSE
Additional Demo Board Circuit Components				
1	0	C5	CAP, 0603 OPTION	OPTION
2	0	C8, C10, C11	CAP, 1210 OPTION	OPTION
3	0	D1	DIODE, OPTION	OPTION
4	0	R1, R2, R3, R7	RES, 0603 OPTION	OPTION
Hardware				
1	6	E1, E2, E3, E4, E5, E6	TURRET	MILL MAX 2501-2-00-80-00-00-07-0
2	3	JP1, JP2, JP3	HEADER, 3 PIN, 2mm	SAMTEC TMM-103-02-L-S
3	3	JP1, JP2, JP3	SHUNT, 2mm	SAMTEC 2SN-BK-G

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



DEMO MANUAL DC2105A

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



**Стандарт
Электрон
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331