

Constant-Current/ Constant-Voltage 1.4MHz Step-Up DC/DC Converter

DESCRIPTION

Demonstration circuit 780B is a Constant-Current Constant-Voltage 1.4MHz Step-up DC/DC Converter featuring the [LT[®]1618](#). DC780B demonstrates a general purpose Boost converter with a 12V, 250mA output from a 3.3V-4.2V source.

The demo board can also be used as an LED driver, where a Luxeon LED (not installed), is driven with a regulated current of 500mA (default current), at a forward voltage of 3.5V. By changing the value of R4 to 2.2M the LED current can be regulated at 250mA.

The LT1618 can be used for wider input voltages, but output voltage level and component selection restrict this demo circuit to Lithium Ion battery input levels.

The LT1618 contains a unique current feedback loop that allows for accurate regulation of either input or output current, whether in Boost, or SEPIC topology.

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 DC780B.

Design files for this circuit board are available at <http://www.linear.com/demo/DC780B>

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 (T_A = 25°C)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input Supply Range		3.3		4.2	V
V _{OUT}	Output Voltage Range	V _{IN} = 3.3V, I _{LOAD} = 250mA	11.64	12	12.36	V
Ripple		V _{IN} = 3.3V, I _{LOAD} = 250mA		100		mV
Efficiency		V _{IN} = 4.2V, I _{LOAD} = 250mA		83		%
Switching Frequency				1.4		MHz

QUICK START PROCEDURE

Demo circuit 780B is easy to set up to evaluate the performance of the LT1618. Refer to Figure 1 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 V_{IN} or V_{OUT} and GND terminals. See Figure 3 for proper scope probe technique.

1. With power off, connect the input power supply to V_{IN} and GND.

2. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 4.2V.

3. Check for the proper output voltage.

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

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.

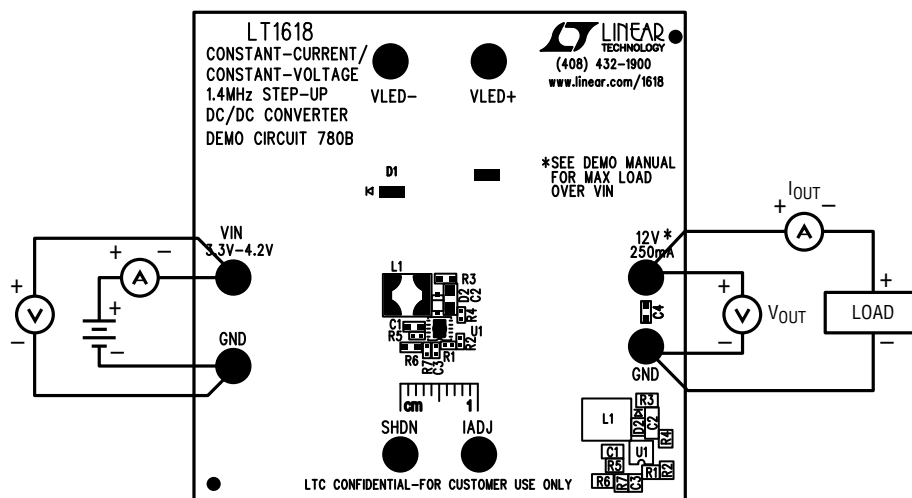


Figure 1. DC780B Proper Equipment Setup

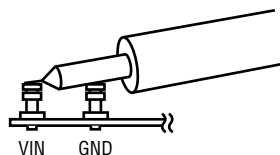


Figure 2. Measuring Input or Output Ripple

OPTIONAL FUNCTIONS

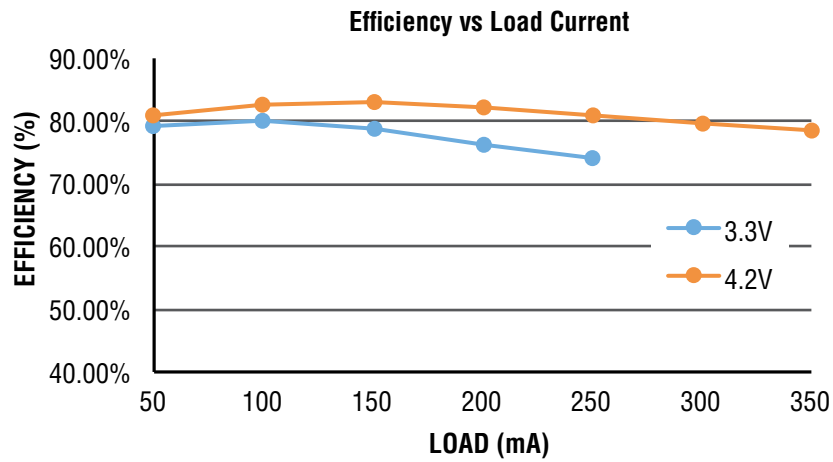


Figure 3. Efficiency vs Load Current

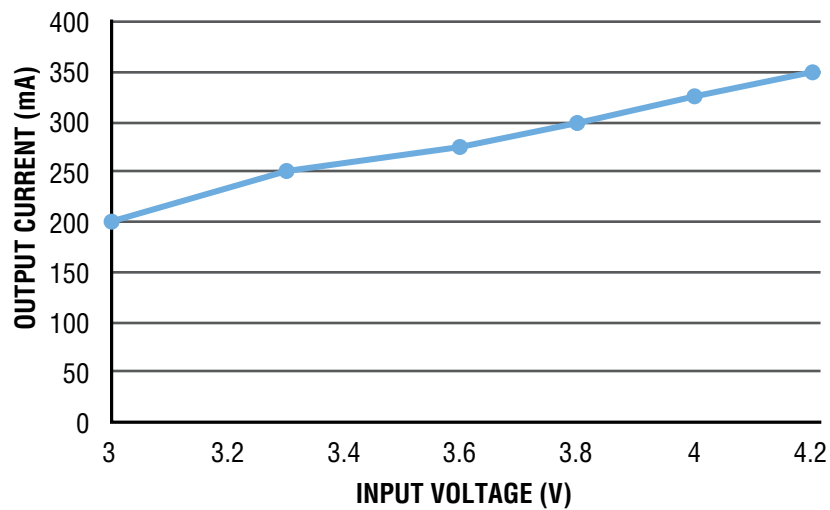


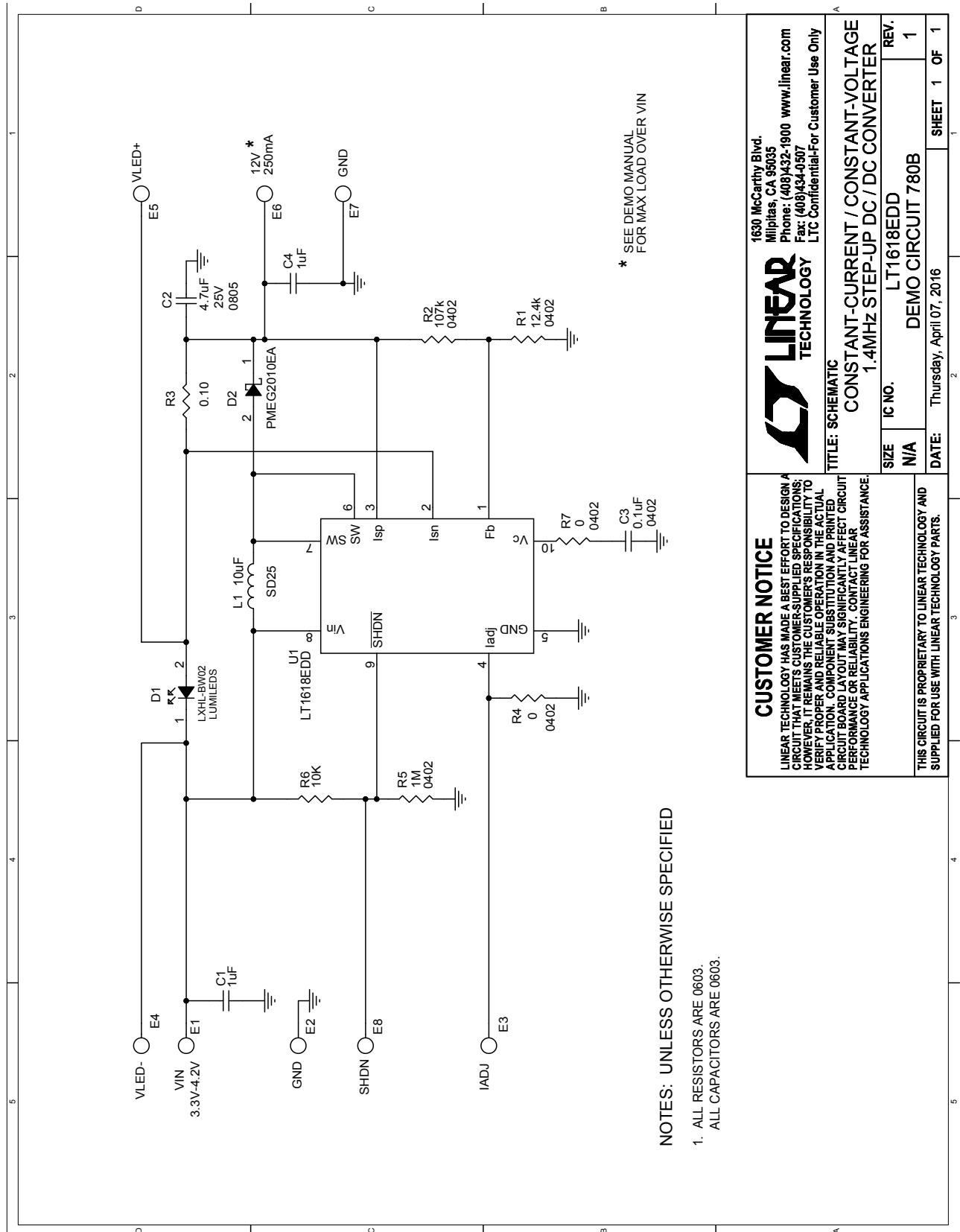
Figure 4. Output Current vs Input Voltage

DEMO MANUAL DC780B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, X5R, 1 μ F, 10V, 20%, 0603	AVX, 0603ZD105MAT2A
2	1	C2	CAP, X7R, 4.7 μ F, 25V, 10%, 0805	MURATA, GRM21BR71E475KA73L
3	1	C3	CAP, X5R, 0.1mF, 10V, 10%, 0402	MURATA, GRM155R61A104KA01D
4	1	C4	CAP, X7R, 1 μ F, 25V, 10%, 0603	MURATA, GRM188R71E105KA12D
5	1	D2	DIODE, SCHOTTKY, 20V, 1A	NXP, PMEG2010EA,115
6	1	L1	IND., 10 μ H	COOPER BUSSMANN, SD25-100-R
7	1	R1	RES, 12.4k, 1%, 1/16W, 0402	VISHAY, CRCW040212K4FKED
8	1	R2	RES, 107k, 1%, 1/16W, 0402	VISHAY, CRCW0402107KFKED
9	1	R3	RES, 0.10, 1%, 1/16W, 0603, SENSE	VISHAY, WSL0603R0100FEA
10	2	R4, R7	RES, 0, 1/16W, 0402	VISHAY, CRCW04020000Z0ED
11	1	R5	RES, 1M, 5%, 1/16W, 0402	VISHAY, CRCW04021M00JNED
12	1	R6	RES, 10k, 1%, 1/16W, 0402	VISHAY, CRCW040210K0FKED
13	1	U1	IC, LT1618EDD	LINEAR TECH. LT1618EDD#PBF
Additional Demo Board Circuit Components				
1	0	D1 (OPT)	LED, OPTION, LXHL-BW02	
Hardware/Components (For Demo Board Only)				
1	8	E1-E8	TURRETS	MILL-MAX-2501-2

SCHEMATIC DIAGRAM



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

CONSTANT-CURRENT / CONSTANT-VOLTAGE
1.4MHz STEP-UP DC / DC CONVERTER

SIZE	IC NO.	REV.
N/A	LT1618EDD	1
DATE:	Thursday, April 07, 2016	SHEET 1 OF 1

DEMO MANUAL DC780B

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