

LT3757A High Efficiency SEPIC Converter

DESCRIPTION

Demonstration circuit 1341B features **LT[®]3757A** in a 300kHz SEPIC converter circuit, designed for a 5V at 3A output from a 4.5V to 36V input voltage range.

The LT3757A operates over an input range of 2.9V to 40V, suitable for applications from single-cell lithium-ion battery portable electronics up to high voltage automotive and industrial power supplies. It also exhibits low shut-down quiescent current of 1 μ A, making them an ideal fit for battery-operated systems. Thanks to a novel FBX pin architecture, the LT3757A can be connected directly to a divider from either the positive output or the negative output to ground. It also packs many popular features

such as soft-start, input undervoltage lockout, adjustable frequency and synchronization in a small 10-lead MSOP package or a 3mm $\times$ 3mm QFN package.

The LT3757A data sheet gives a complete description of the part, operation and application information. The data sheet must be read in conjunction with this quick start guide for DC1341B.

Design files for this circuit board are available at <http://www.linear.com/demo/DC1341B>

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

PERFORMANCE SUMMARY **300kHz SEPIC Regulator ($T_A = 25^\circ\text{C}$)**

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		4.5V
Maximum Input Voltage		36V
Output Voltage V_{OUT}		5V $\pm$ 3%
Maximum Output Current		3A
Typical Switching Frequency		300kHz

QUICK START PROCEDURE

Demonstration circuit 1341B is easy to set up to evaluate the performance of the LT3757A. 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 2 for proper scope probe technique.

1. Place JP1 on the ON position.
2. With power off, connect the input power supply to V_{IN} and GND.

3. Turn on the power at the input.

NOTE: Make sure that the input voltage does not exceed the maximum input voltage.

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.

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

QUICK START PROCEDURE

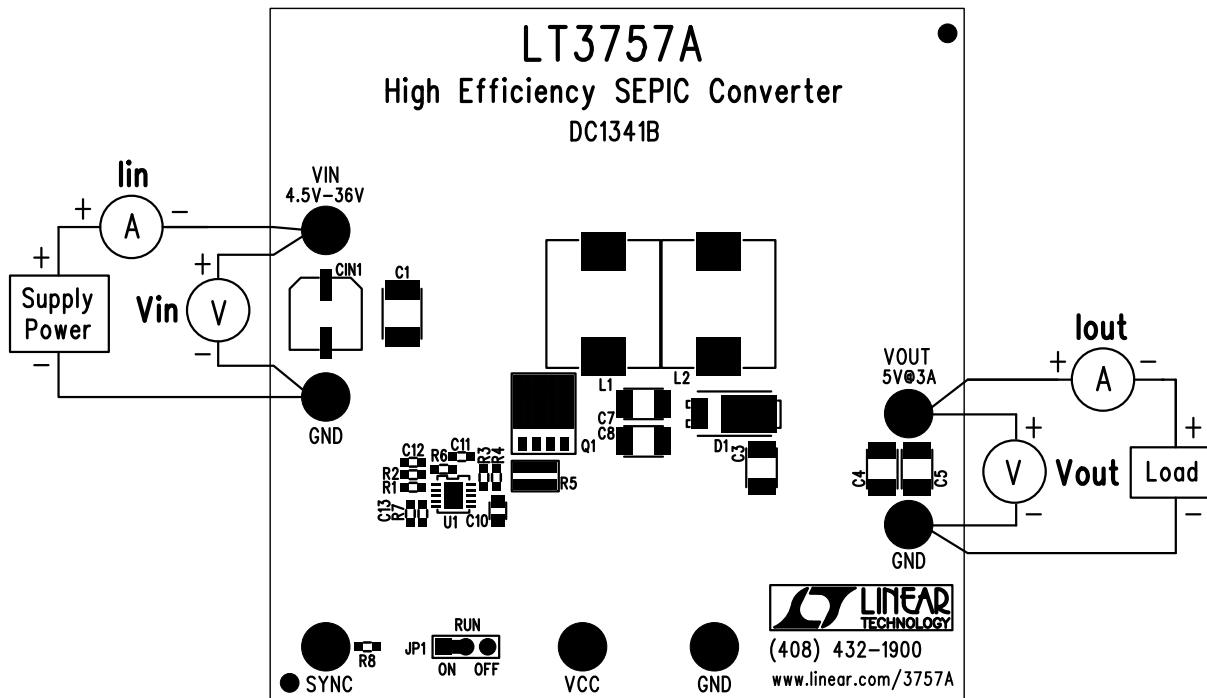


Figure 1. Proper Measurement Equipment Setup

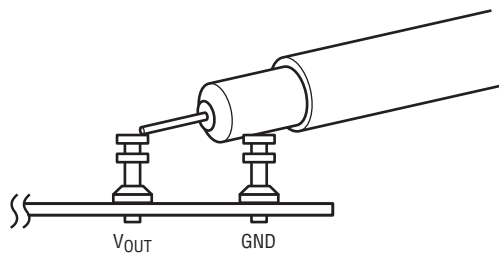


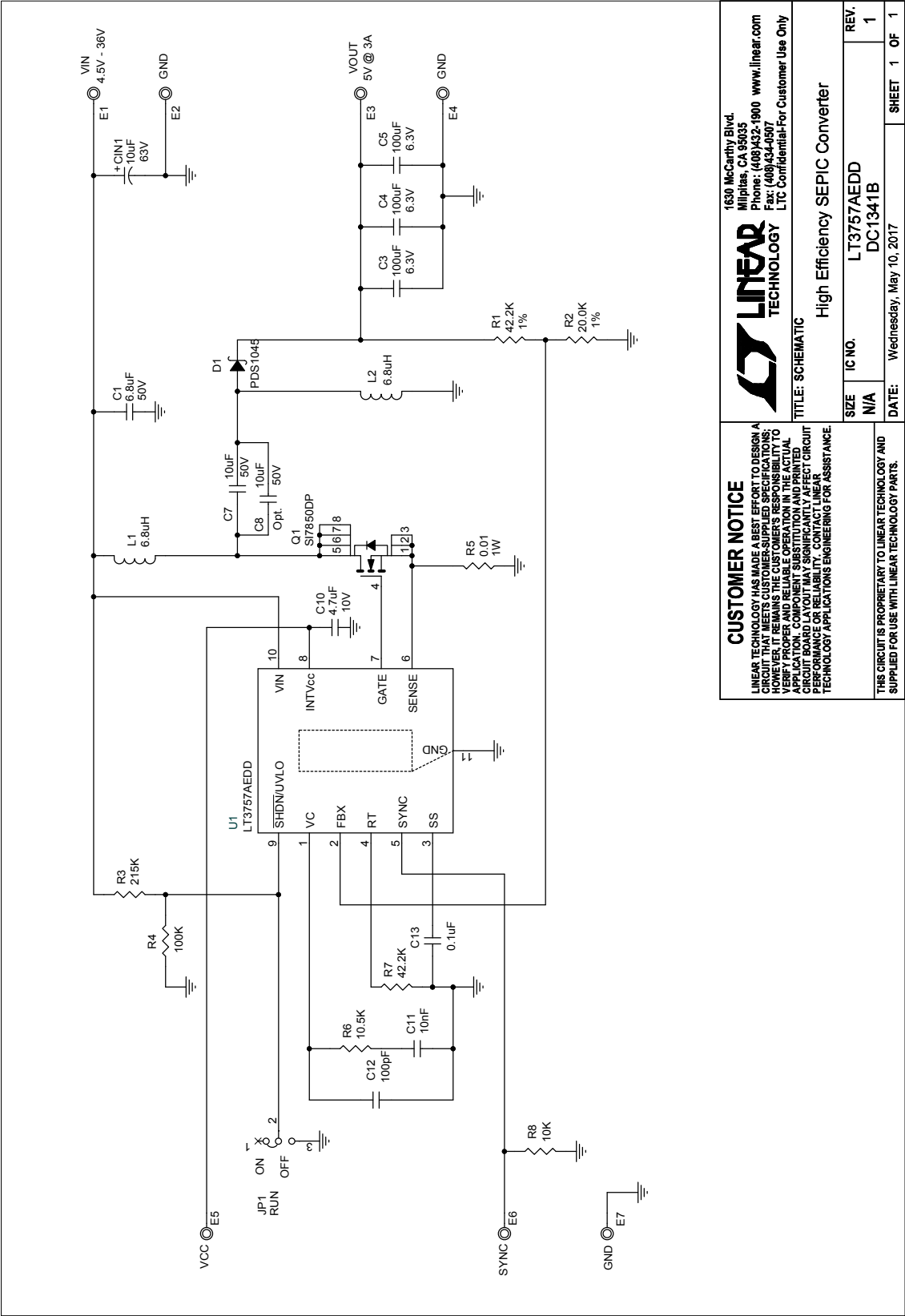
Figure 2. Measuring Input or Output Ripple

DEMO MANUAL DC1341B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, X7R, 6.8 μ F, 50V, 20% 1812	TDK, C4532X7R1H685M
2	3	C3, C4, C5	CAP, X5R, 100 μ F, 6.3V, 20% 1210	Murata, GRM32ER60J107ME20L
3	1	C7	CAP, X7S, 10 μ F, 50V, 20% 1210	TAIYO YUDEN, UMK325BJ106MM-T
4	1	C10	CAP, X5R, 4.7 μ F, 10V, 20% 0805	TAIYO YUDEN, LMK212BJ475MG-T
5	1	C11	CAP, X7R, 10nF, 50V, 10% 0603	TDK, C1608X7R1H103K
6	1	C12	CAP, C0G, 100pF, 50V, 5% 0603	TDK, C1608C0G1H101J
7	1	C13	CAP, X7R, 0.1 μ F, 25V, 10% 0603	TDK, C1608X7R1E104K
8	1	D1	DIODE, PDS1045, PowerDI-5	DIODES INC., PDS1045-13
9	2	L1, L2	INDUCTOR, 6.8 μ H 20%	VISHAY, IHLP4040DZER6R8M11
10	1	Q1	N-MOSFET, Si7850DP POWER-PAK SO-8	VISHAY, Si7850DP-T1-E3
11	2	R1, R7	RES., CHIP, 42.2k, 1/10W, 1% 0603	VISHAY, CRCW060342K2FKEA
12	1	R2	RES., CHIP, 20.0k, 1/10W, 1% 0603	VISHAY, CRCW060320K0FKEA
13	1	R3	RES., CHIP, 215k, 1/10W, 1% 0603	VISHAY, CRCW0603215KFKEA
14	1	R4	RES., CHIP, 100k, 1/10W, 1% 0603	VISHAY, CRCW0603100KFKEA
15	1	R5	RES., CHIP, 0.01 Ω , 1W, 1%, 0815	THIN FILM, RL3720WT-R010-F
16	1	R6	RES., CHIP, 10.5k, 1/10W, 1% 0603	VISHAY, CRCW060310K5FKEA
17	1	R8	RES., CHIP, 10k, 1/10W, 5% 0603	VISHAY, CRCW060310K0JNEA
18	1	U1	I.C., LT3757AEDD, DFN 10 (3 $\times$ 3)	LINEAR TECH., LT3757AEDD#PBF
Additional Demo Board Circuit Components				
1	1	CIN1	CAP, CE-FS, 10 μ F, 63V, 6.3 $\times$ 5.4 SIZE	SANYO, 63CE10FS
2	0	C8 (OPT.)	CAP, 1210	
Hardware: For Demo Board Only				
1	7	E1-E7	TESTPOINT, TURRET, .094" PBF	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	3 PIN 0.079 SINGLE ROW HEADER	SAMTEC, TMM103-02-L-S
3	1	XJP1	SHUNT, .079" CENTER	SAMTEC, 2SN-BK-G

SCHEMATIC DIAGRAM



DEMO MANUAL DC1341B

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