DEMO MANUAL DC1342B

LT3758AEMSE
High Efficiency SEPIC Converter

DESCRIPTION

Demonstration circuit 1342B features the LT®3758AEMSE in a 300kHz SEPIC converter circuit, designed for a 24V output from a 18V to 72V input.

The LT3758A operates over an input range of 5.5V to 100V, suitable for automotive, telecom and industrial applications. It also exhibits a low shutdown current of 1µA, making it ideal for battery-operated systems. Thanks to a novel FBX pin architecture, the LT3758A can be connected directly to a resistor divider from either a positive output voltage or a negative output voltage to ground. It also packs many popular features such as soft-start, input undervoltage lockout, adjustable frequency and clock synchronization in a small 10-lead MSOP package or a 3mm × 3mm QFN package.

The LT3758A 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 demo circuit 1342B.

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

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PERFORMANCE SUMMARY

300kHz SEPIC Regulator. Specifications are at T_A = 25°C

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Supply Range		18		72	V
Output Voltage		23.28	24	24.72	V
Maximum Output Current				1	A
Switching Frequency			300		kHz

QUICK START PROCEDURE

Demonstration circuit 1342B is easy to set up to evaluate the performance of the LT3758AEMSE. 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

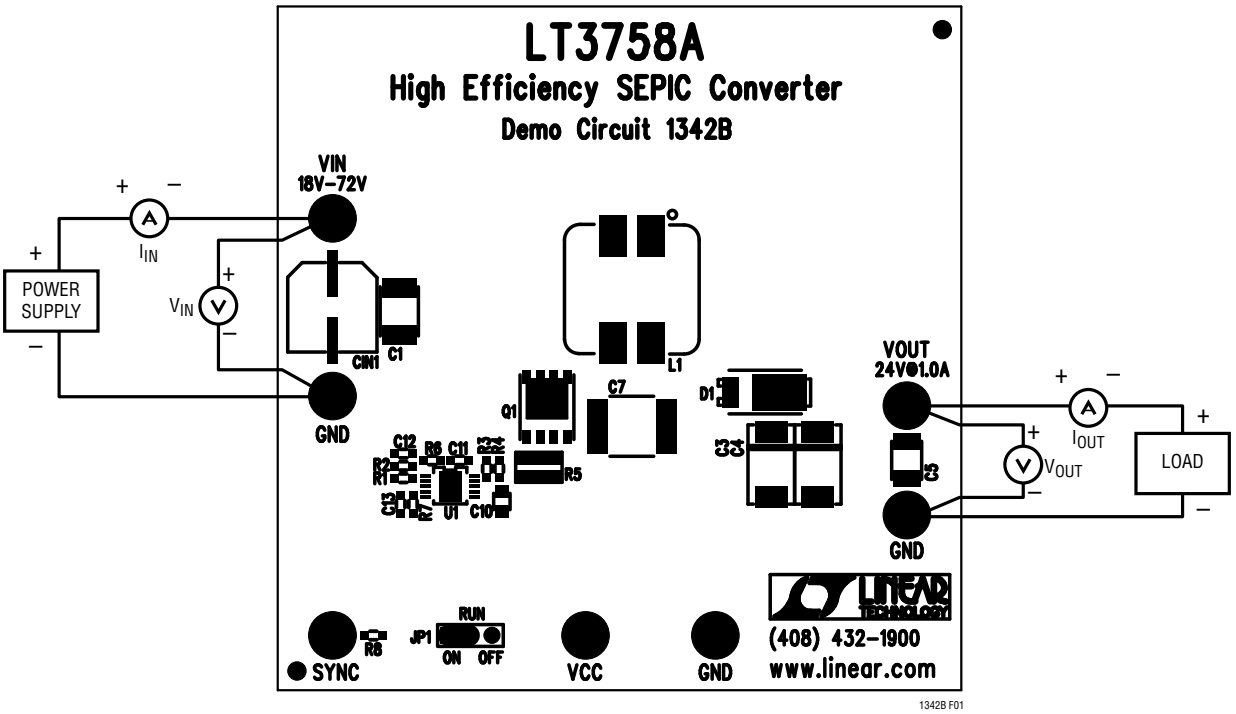


Figure 1. Proper Measurement Equipment Setup

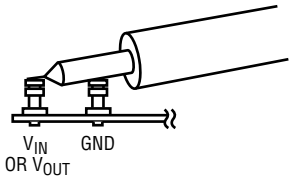
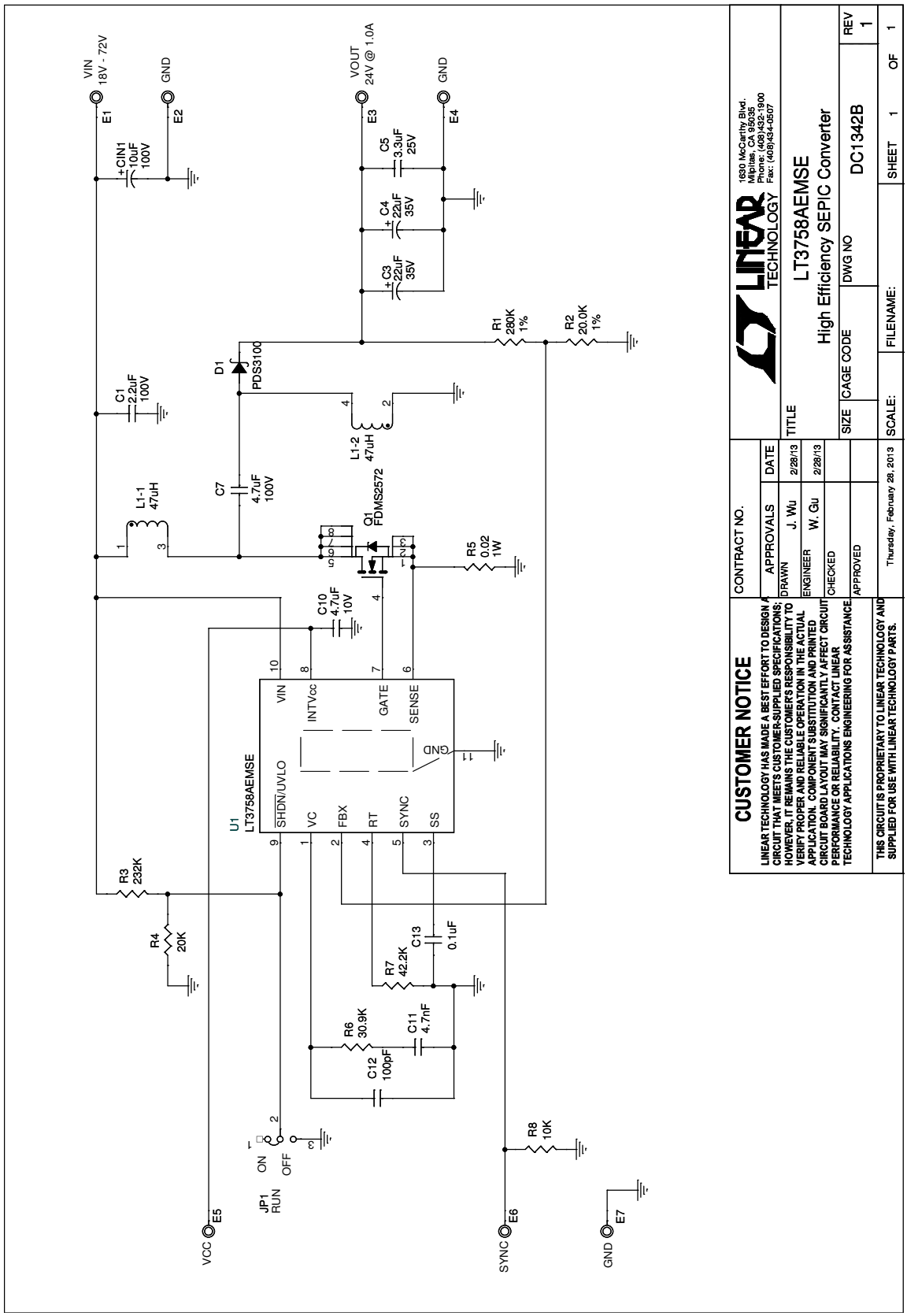


Figure 2. Measuring Input or Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., X7R, 2.2µF, 100V, 10% 1812	TDK, C4532X7R2A225K
2	2	C3, C4	CAP., TANT, 22µF, 35V, 20% 7343	AVX, TPSD226M035R0125
3	1	C5	CAP., X7R, 3.3µF, 25V, 20% 1210	Taiyo Yuden, TMK325BJ335MN
4	1	C7	CAP., X7R, 4.7µF, 100V, 20% 2220	TDK, C5750X7R2A475M
5	1	C10	CAP., X5R, 4.7µF, 10V, 20% 0805	Taiyo Yuden, LMK212BJ475MG-T
6	1	C11	CAP., X7R, 4.7nF, 50V, 10% 0603	TDK, C1608X7R1H472K
7	1	C12	CAP., C0G, 100pF, 50V, 5% 0603	TDK, C1608C0G1H101J
8	1	C13	CAP., X7R, 0.1µF, 25V, 10% 0603	TDK, C1608X7R1E104K
9	1	D1	Diodes Inc., PDS3100-13	Diodes Inc., PDS3100-13
10	1	L1	IND., Dual, 47µH	Würth Elektronik, 744870470
11	1	Q1	N-MOSFET, FDMS2572, Power 56	FAIRCHILD, FDMS2572
12	1	R1	RES., CHIP, 280k, 1/10W, 1% 0603	VISHAY, CRCW0603280KFKEA
13	2	R2, R4	RES., CHIP, 20.0k, 1/10W, 1% 0603	VISHAY, CRCW060320K0FKEA
14	1	R3	RES., CHIP, 232k, 1/10W, 1% 0603	VISHAY, CRCW0603232KFKEA
15	1	R5	RES., CHIP, 0.02, 1W, 1%, 0815	THIN FILM, RL3720WTR02F-C
16	1	R6	RES., CHIP, 30.9k, 1/10W, 1% 0603	VISHAY, CRCW060330K9FKEA
17	1	R7	RES., CHIP, 42.2k, 1/10W, 1% 0603	VISHAY, CRCW060342K2FKEA
18	1	R8	RES., CHIP, 10k, 1/10W, 5% 0603	VISHAY, CRCW060310K0JNEA
19	1	U1	I.C. LT3758AEMSE, MSOP10/Exposed Pad	LINEAR TECH.,LT3758AEMSE#TRPBF
Additional Demo Board Circuit Components				
1	1	CIN1	CAP., Alum., 10µF, 100V, E Size Code	
Hardware: For Demo Board Only				
1	7	E1, E2, E3, E4, E5, E6, 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



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