LT8362
Low I_Q, Inverting Regulator with 2A, 60V Switch

DESCRIPTION

Demonstration circuit 2517A features the LT®8362 in a CUK configuration. It operates with a switching frequency of 2MHz and is designed to convert a 4.5V to 42V source to –12V, with up to 1A output current (depending on input voltage). Refer to Figure 4 for load current versus input voltage. The LT8362 can operate with inputs as high as 60V, however, in this demo circuit, the input is limited by the maximum voltage across the switch ($|V_{OUT}| + V_{IN} < 60V$).

The demo board contains a selectable jumper, JP1, to aid in the selection of the desired Sync pin mode of operation. The default setting is Burst Mode® operation.

This layout is optimized for good EMI performance and small solution size. Input and output filters and an optimized power switching loop, comprised of C11 and C12 are necessary to pass CISPR 25 Class 5 emissions, and are added by default. These components can be excluded in applications not requiring noise immunity. Radiated emissions plots are included in this manual.

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.

Design files for this circuit board are available at http://www.linear.com/demo/DC2517A

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		4.5		42	V
V_{OUT}	Output Voltage Range	V_{IN} = 12V, I_{LOAD} = 750A	–11.64	–12	–12.36	V
Ripple		V_{IN} = 12V, I_{LOAD} =750m A		20		mV
Efficiency		V_{IN} = 12V, I_{LOAD} = 750 mA		85		%
Switching Frequency				2		MHz

QUICK START PROCEDURE

Demo circuit 2517A is easy to set up to evaluate the performance of the LT8362. 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. 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 42V.

3. Check for the proper output voltage. 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.

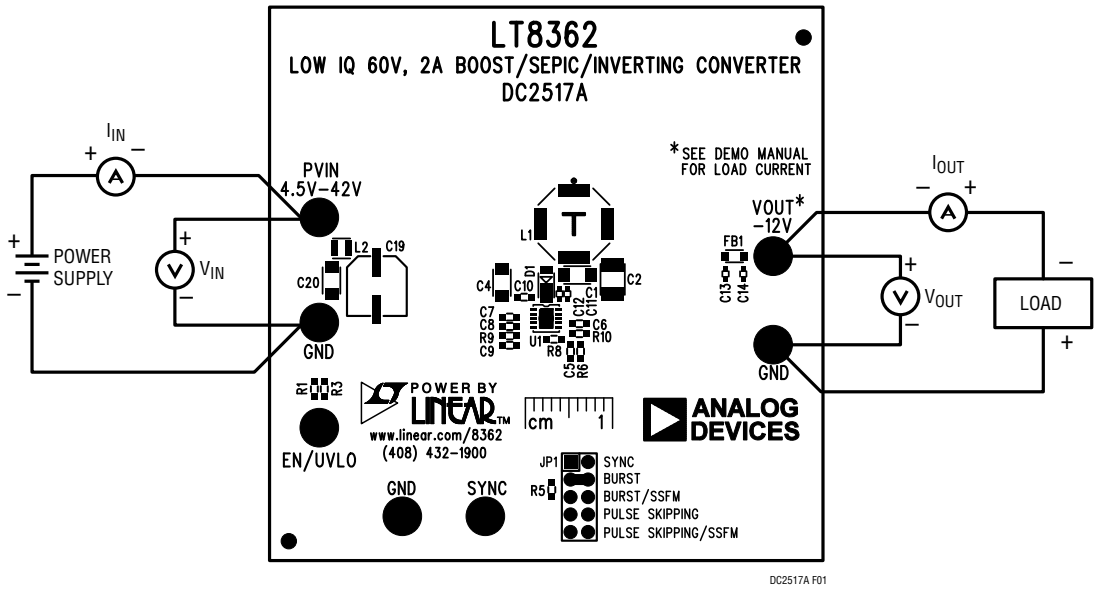


Figure 1. DC2716A Proper Equipment Setup

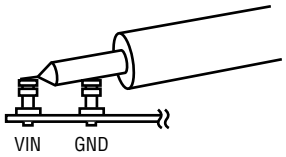


Figure 2. Proper Scope Probe Positioning for Output Ripple Measurement

QUICK START PROCEDURE

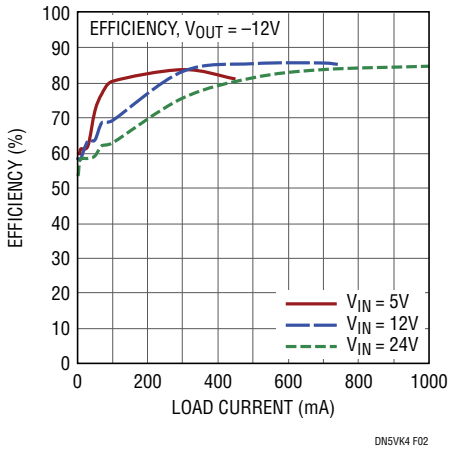


Figure 3. Efficiency vs Load Current

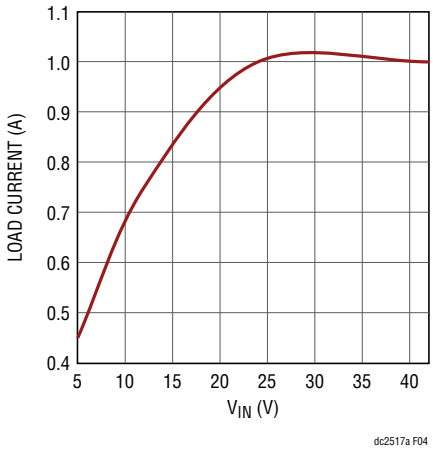


Figure 4. Load Current vs Input Voltage

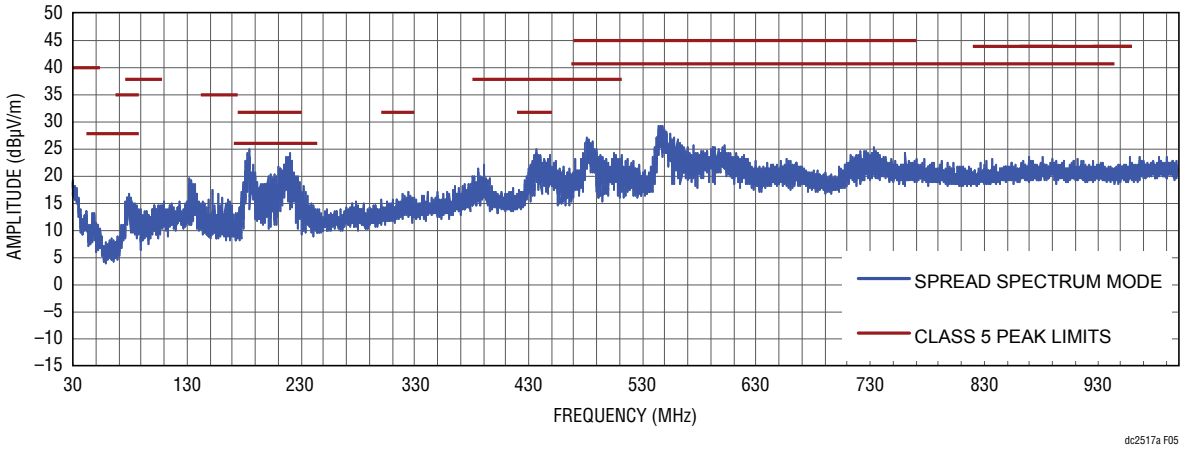


Figure 5. CISPR25 Radiated Emission Test (Peak Detection, Vertical Polarization) V_{IN} = 12V

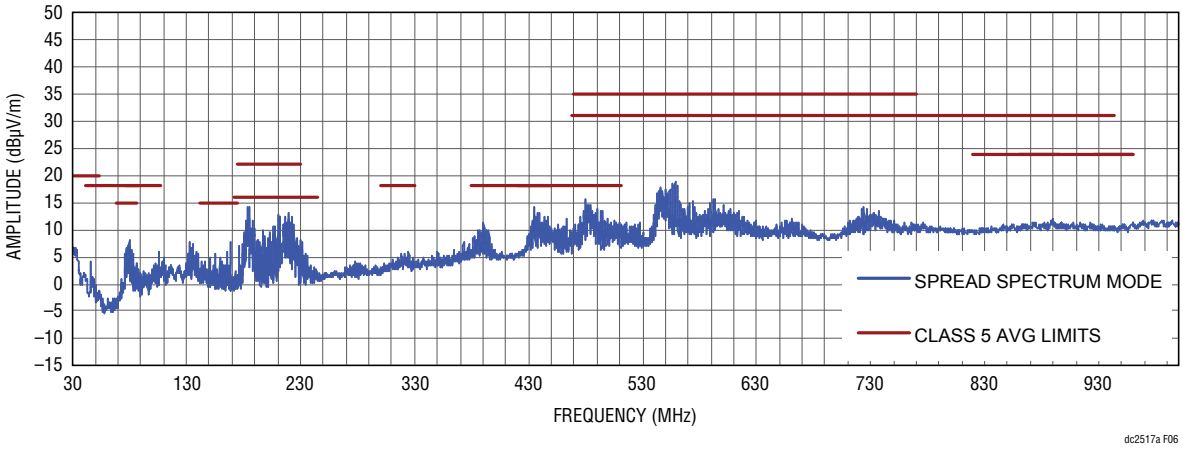
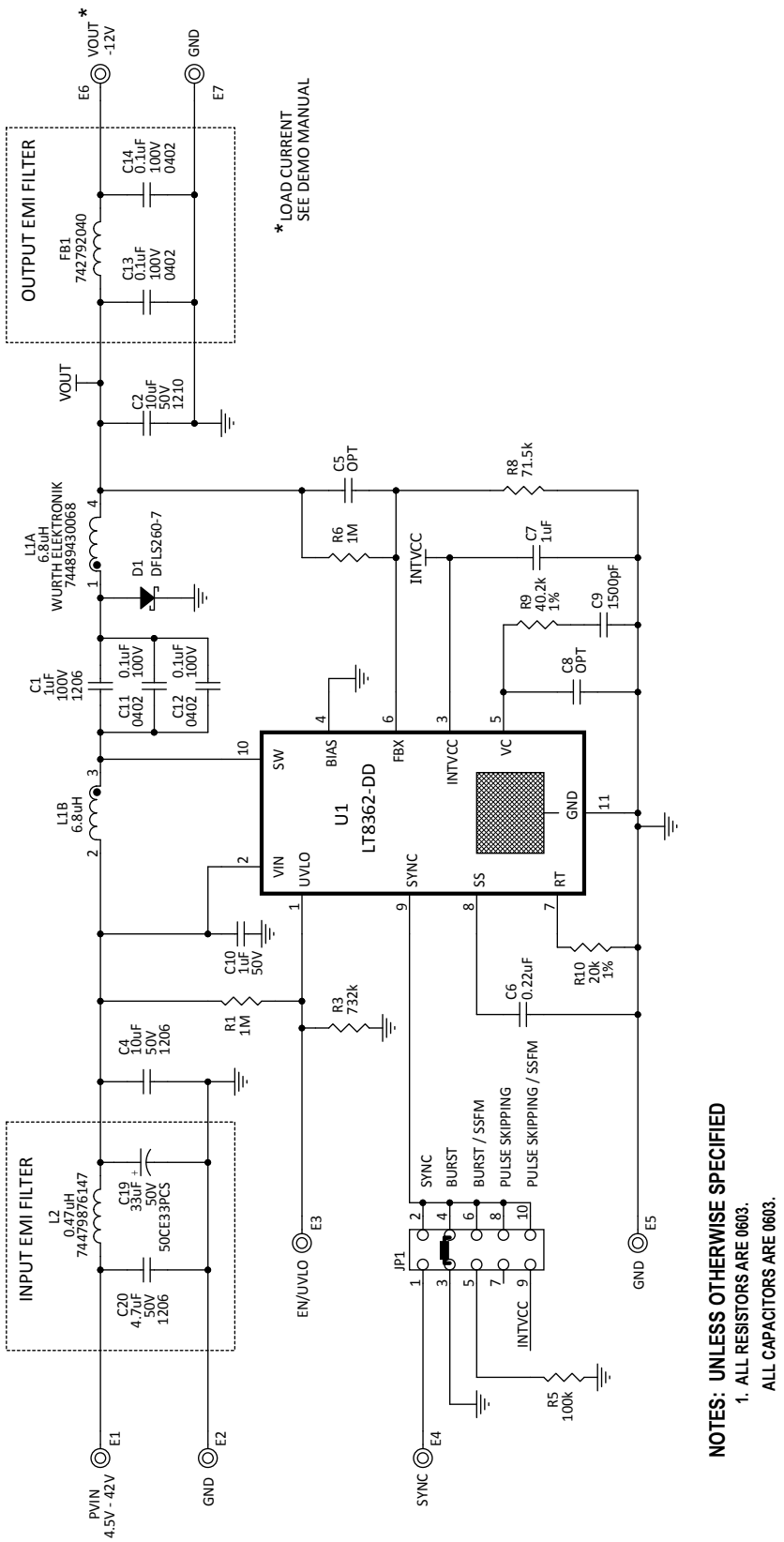


Figure 6. CISPR25 Radiated Emission Test (Average Detection, Vertical Polarization) V_{IN} = 12V

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., 1µF, X7R, 100V, 10%, 1206	MURATA, GRM31CR72A105KA01L
2	1	C2	CAP., 10µF, X7R, 50V, 10%, 1210	MURATA, GRM32ER71H106KA12L
3	1	C4	CAP., 10µF, X5R, 50V, 10%, 1206	MURATA, GRM31CR61H106KA12L
5	1	C6	CAP., 0.22µF, X7R, 25V,10%, 0603	MURATA, GRM188R71E224KA88D
6	1	C7	CAP., 1µF, X5R, 25V, 10%, 0603	MURATA, GRM188R61E105KA12D
7	1	C9	CAP., 1500pF, X7R, 25V, 10%, 0603	AVX, 06033C152KAT2A
8	1	C10	CAP., 1µF, X5R, 50V, 10%, 0603	MURATA, GRM188R61H105KAALD
9	4	C11, C12, C13, C14	CAP.,0.1µF, X5R,100V,10%,0402	MURATA, GRM155R62A104KE14D
10	1	C19	CAP., 33µF, ALUM. ELECT., 50V, 20%, 6.3mm×7.7mm	SUN ELECTRONIC INDUSTRIES CORP, 50CE33PCS
11	1	C20	CAP., 4.7µF, X7R, 50V, 10%, 1206	AVX, 12065C475KAT2A
12	1	D1	DIODE, SCHOTTKY, 60V, 2.0A, PowerDI 123	DIODES INC., DFLS260-7
13	1	FB1	IND., 600Ω, FERRITE BEAD, 25%, 2A, 0805	WURTH ELEKTRONIK, 742792040
14	1	L1	IND., 6.8µH, PWR, 30%, 1.25A	WURTH ELECTRONIK, 74489430068
15	1	L2	IND., 0.47µH, PWR, 20%, 2.1A, 0.04Ω, 0806	WURTH ELEKTRONIK, 74479876147
16	2	R1, R6	RES., 1MΩ, 1%, 1/10W, 0603	VISHAY, CRCW06031M00FKEA
17	1	R3	RES., 732kΩ, 1%, 1/10W, 0603	VISHAY, CRCW0603732KFKEA
18	1	R5	RES., 100kΩ, 1%, 1/10W, 0603	VISHAY, CRCW0603100KFKEA
19	1	R8	RES., 71.5kΩ, 1%, 1/10W, 0603	VISHAY, CRCW060371K5FKEA
20	1	R9	RES., 40.2kΩ, 1%, 1/10W, 0603	VISHAY,
21	1	R10	RES., 20kΩ, 1%, 1/10W, 0603	VISHAY, CRCW060320K0FKEA
22	1	U1	IC, BOOST/SEPIC/INVERTG CONVERTER, 3×3mm, DFN	LINEAR TECH., LT8362EDD#PBF
23	1	PCB1	PCB, 600-DC2517A	MAO BANG, 600-DC2517A
Optional Demo Board Circuit Components				
1	0	C5, C8(OPT)	CAP., OPTION, 0603	
Hardware: For Demo Board Only				
1	7	E1, E2, E3, E4, E5, E6, E7	TEST POINT, TURRET, 0.094", MTG. HOLE	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	CONN., HDR, MALE, 2×5, 2mm, STR, THT	WURTH ELEKTRONIK, 62001021121
3	1	XJP1	CONN., SHUNT, FEMALE, 2 POS, 2mm	WURTH ELEKTRONIK, 60800213421

SCHEMATIC DIAGRAM



ESD Caution
ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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