LT8365
Low IQ Boost/SEPIC/Inverting Regulator With 150V, 1.5A Switch

DESCRIPTION

Demonstration circuit 2840A features the LT®8365 in a Boost inverting configuration. It operates with a switching frequency of 400kHz and is designed to convert a 9V to 30V source to –250V, with 10mA output current.

The demo board contains an optional third charge pump stage for applications requiring higher output voltages. If needed, remove R14 and install optional components. Output voltage sensing connections remain the same.

The LT8365 can be used for different topologies with input voltages up to 60V. However, component selection in this demo circuit restrict the input voltage to 30V.

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 are necessary for CISPR 25 Class 5 emissions. 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.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		9		30	V
V_{OUT}	Output Voltage Range	V_{IN} = 12V, I_{LOAD} = 10mA	–245	–250	–255	V
RIPPLE		V_{IN} = 12V, I_{LOAD} = 10mA		1		V
EFFICIENCY		V_{IN} = 12V, I_{LOAD} = 10mA		80		%
LOAD CURRENT	Max Load Current	V_{IN} = 9V			10	mA
SWITCHING FREQUENCY				400		kHz

QUICK START PROCEDURE

Demo circuit 2840A is easy to set up to evaluate the performance of the LT8365. 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 30V.

3. Check for the proper output voltage.

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

NOTE.

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.

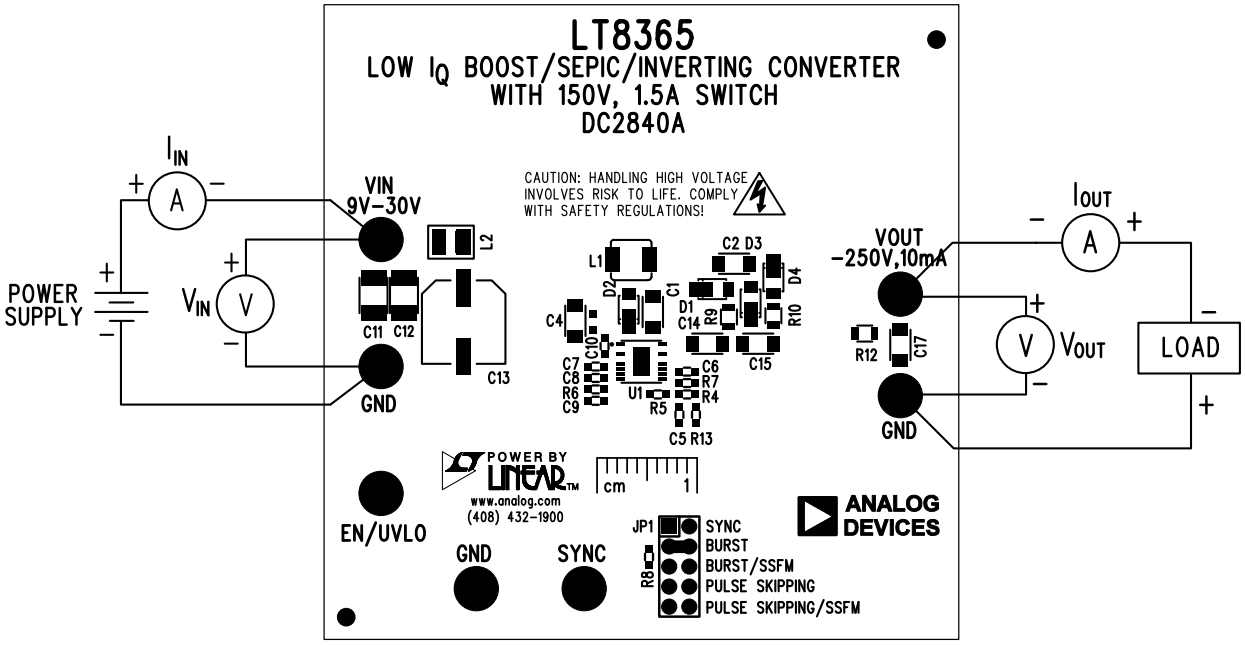


Figure 1. DC2840A Proper Equipment Setup

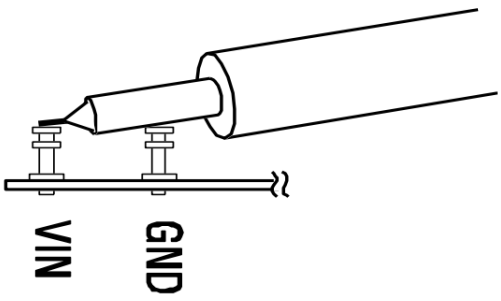


Figure 2. Measuring Input or Output Ripple

QUICK START PROCEDURE

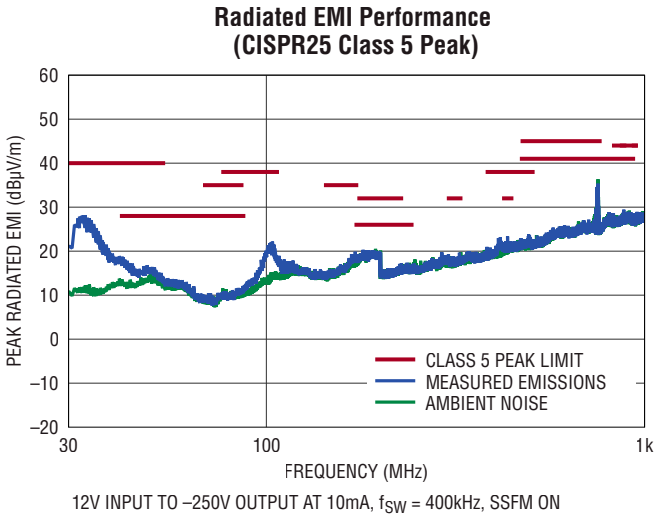


Figure 3. CISPR25 Radiated Emissions Test, Peak Detection

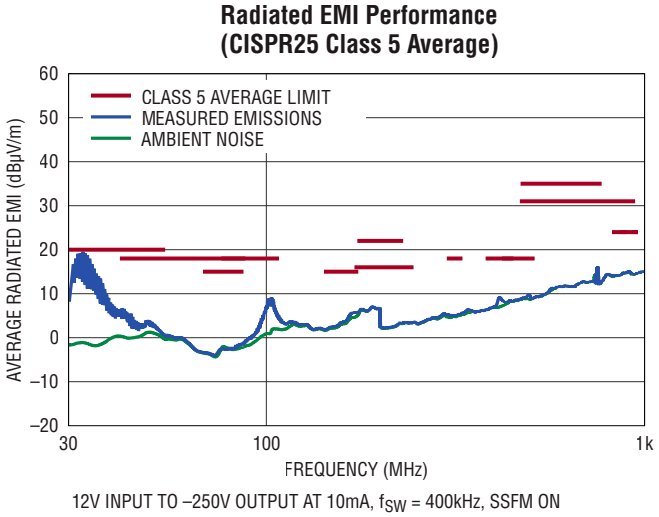
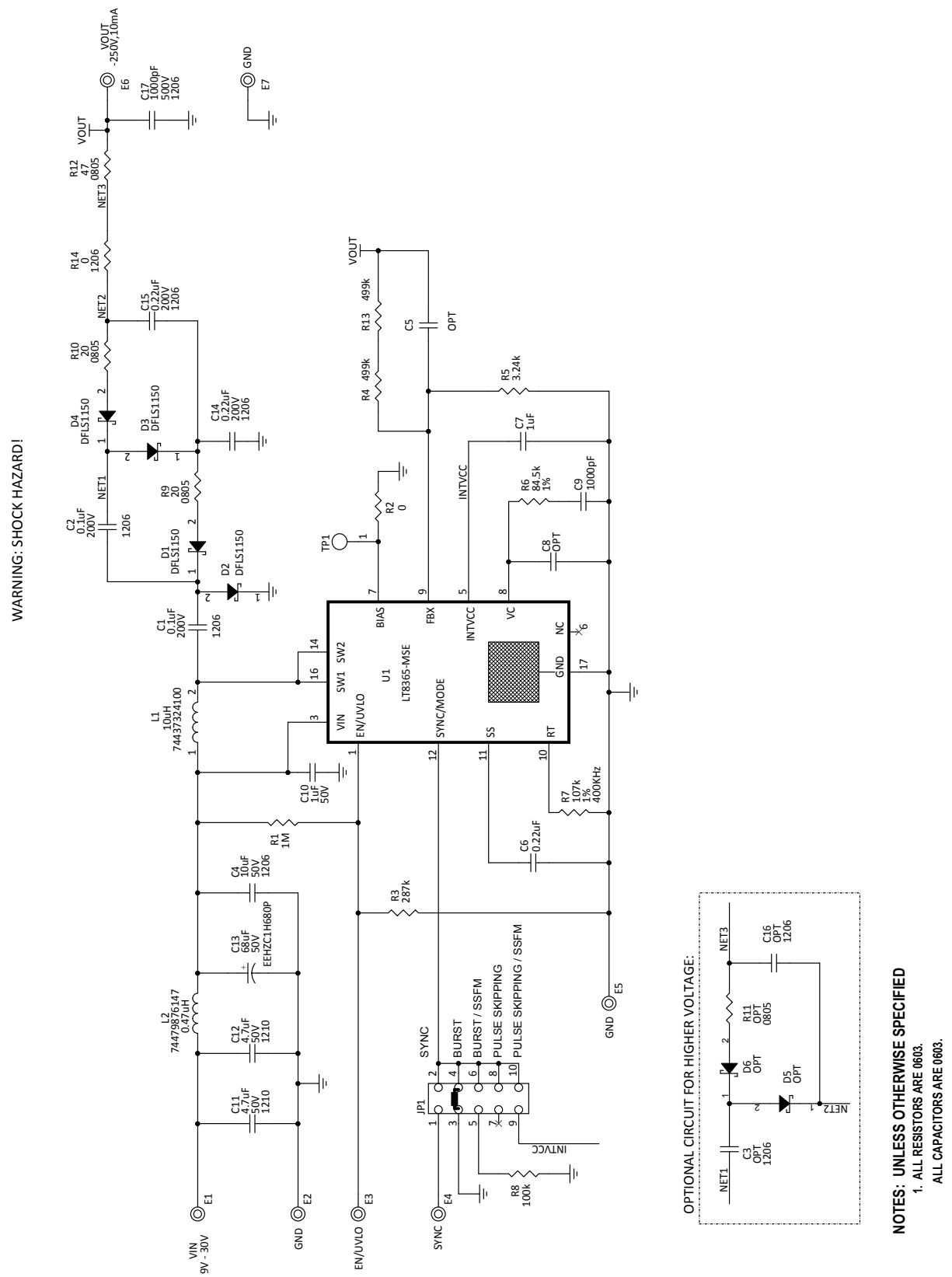


Figure 4. CISPR25 Radiated Emissions Test, Average Detection

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	2	R4, R13	RES., 499k OHMS, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F4993TRF
2	1	R14	RES., 0 OHM, 1/4W, 1206, AEC-Q200	NIC, NRC12ZOTRF
3	1	R1	RES., 1M OHM, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F1004TRF
4	1	R8	RES., 100k OHMS, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F1003TRF
5	1	R5	RES., 3.24k OHMS, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F3241TRF
6	1	R3	RES., 287K OHMS, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ3EKF2873V
7	1	R7	RES., 107k OHMS, 1%, 1/10W, 0603	NIC, NRC06F1073TRF
8	1	R12	RES., 47 OHMS, 5%, 1/8W, 0805, AEC-Q200	CRCW080547R0JNEA
9	1	R6	RES., 84.5k OHMS, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F8452TRF
10	2	R9, R10	RES., 20 OHMS, 5%, 1/8W, 0805	NIC, NRC10J200TRF
11	1	C7	CAP., 1uF, X5R, 25V, 10%, 0603	AVX, 06033D105KAT2A
12	1	C6	CAP., 0.22uF, X7R, 25V, 10%, 0603	MURATA, GRM188R71E224KA88D
13	1	C4	CAP., 10uF, X5R, 50V, 10%, 1206	MURATA, GRM31CR61H106KA12L
14	1	C9	CAP., 1000pF, C0G, 100V, 5%, 0603, AEC-Q200	KEMET, C0603C102J1GACAUTO
15	2	C1, C2	CAP., 0.1uF, X7R, 200V, 10%, 1206	12062C104KAT2A
16	1	C13	CAP., 68uF, ALUM. ELECT., 50V, 20%, 8x10.2mm SMD	EEHZC1H680P
17	2	C14, C15	CAP., 0.22uF, X7T, 200V, 10%, 1206, AEC-Q200	CGJ5L3X7T2D224K160AA
18	1	C17	CAP., 1000pF, X7R, 500V, 10%, 1206	C1206C102KCRACTU
19	2	C11, C12	CAP., 4.7uF, X7R, 50V, 10%, 1210	AVX, 12105C475KAT2A
20	1	C10	CAP., 1uF, X5R, 50V, 10%, 0603	GRM188R61H105KAALD
21	1	L1	IND., 10uH, PWR., 20%, 1.5A, 4020	74437324100
22	1	L2	IND., 0.47uH, PWR, 20%, 2.1A, 0806	74479876147
23	4	D1, D2, D3, D4	DIODE, SCHOTTKY, 150V, 1A, PowerDI123	DFLS1150-7
24	1	U1	IC, BOOST/SEPIC/INVERTG CONVERTER, MSOP-16	LT8365MSE#PBFLT8365MSE#TRPBF
Additional Demo Board Circuit Components				
1	1	R2	RES., 0 OHM, 1/10W, 0603, AEC-Q200	NIC, NRC06ZOTRF
2	0	R11	RES., OPTION, 0805	
3	0	C5, C8	CAP., OPTION, 0603	
4	0	C3, C16	CAP., OPTION, 1206	
5	0	D5, D6	DIODE, OPTION, SCHOTTKY, PowerDI-123	
Hardware: For Demo Board Only				
1	1	XJP1	CONN., SHUNT, FEMALE, 2 POS, 2mm	WURTH, 60800213421
2	1	JP1	CONN., HDR, MALE, 2x5, 2mm, STR, THT	WURTH, 62001021121
3	7	E1, E2, E3, E4, E5, E6, E7	TEST POINT, TURRET, 0.094 MTG. HOLE, PCB 0.062 THICK	MILL-MAX, 2501-2-00-80-00-00-07-0

SCHEMATIC DIAGRAM



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 0603.
   ALL CAPACITORS ARE 0603.

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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