LT8365
Low I_Q Boost/SEPIC/Inverting Regulator with 150V, 1.5A Switch

DESCRIPTION

Demonstration circuit 2838A features the LT®8365 in a boost 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 restricts 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		77		%
LOAD CURRENT	Max Load Current	V_{IN} = 9V			10	mA
SWITCHING FREQUENCY				400		kHz

QUICK START PROCEDURE

Demo circuit 2838A 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 VIN or VOUT and GND terminals. See Figure 2 for proper scope probe technique.

1. With power off, connect the input power supply to VIN 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.
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.

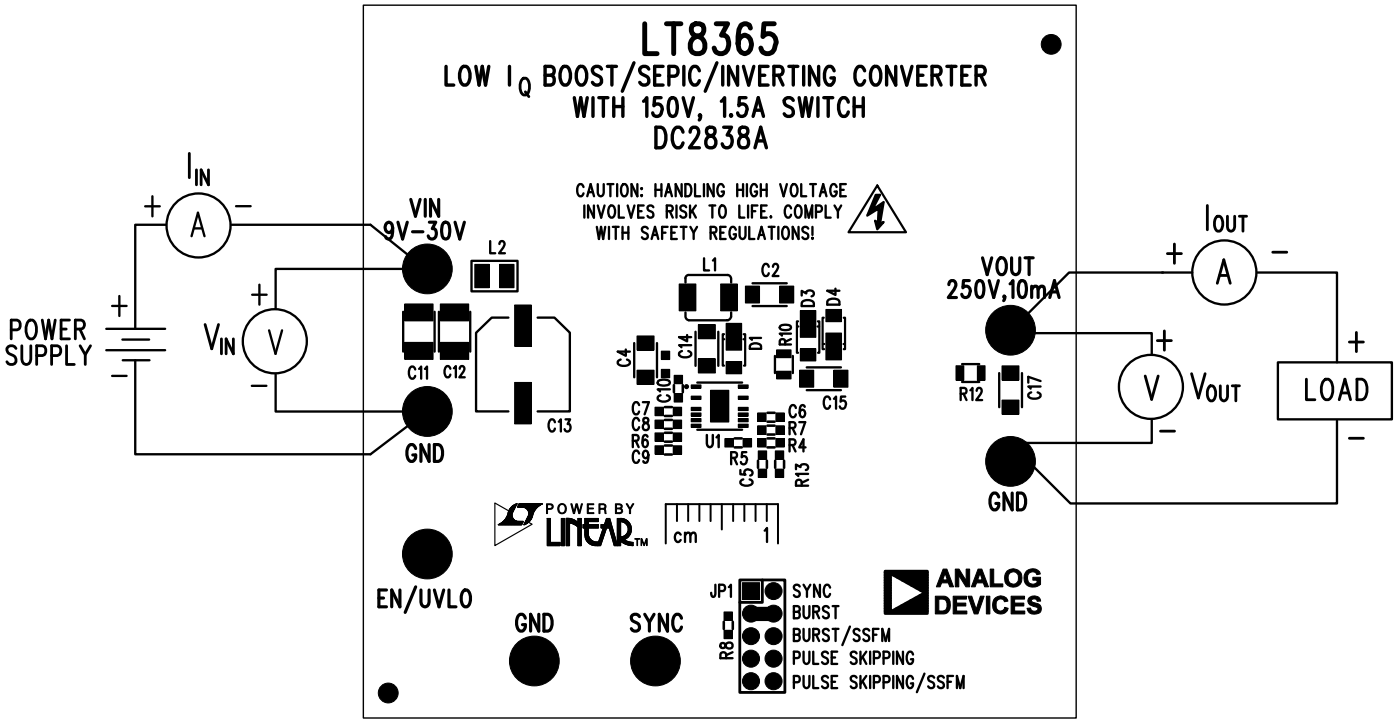


Figure 1. Proper Equipment Setup

QUICK START PROCEDURE

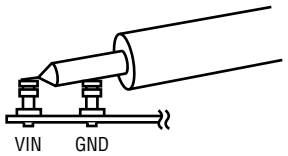


Figure 2. Measuring Input or Output Ripple

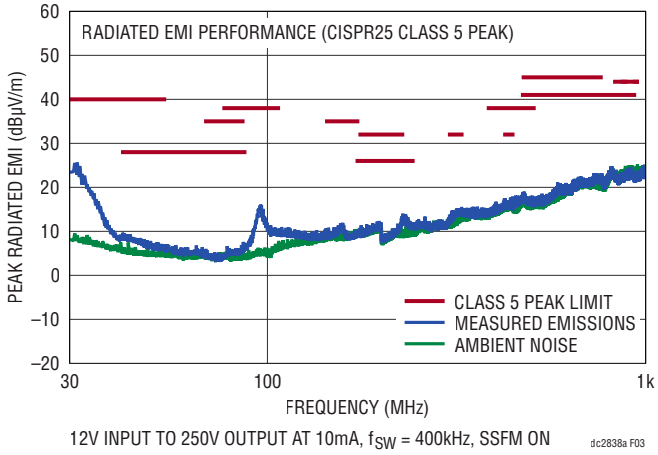


Figure 3. CISPR25 Radiated Emissions Test, Peak Detection

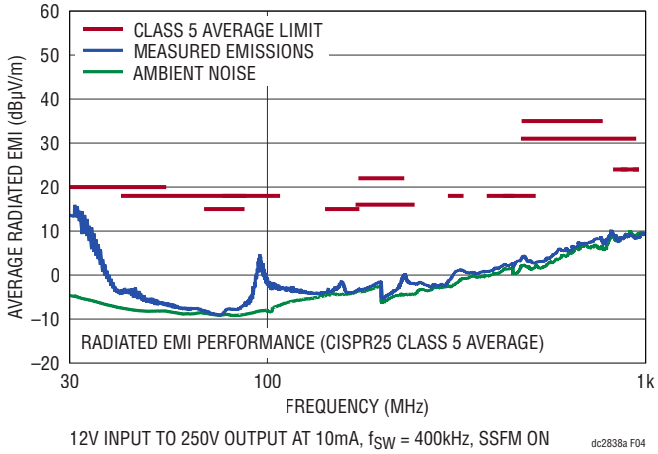
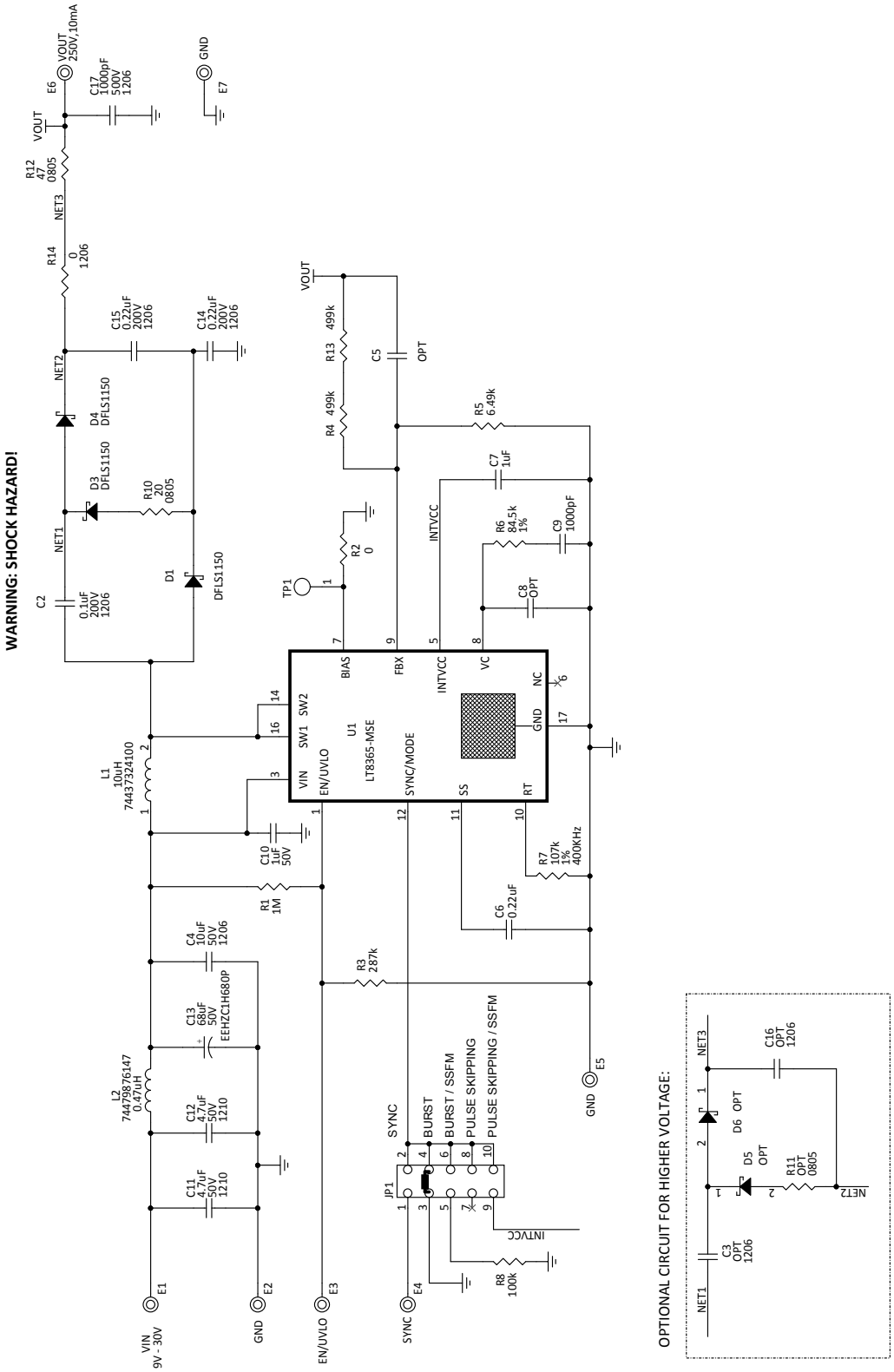


Figure 4. CISPR25 Radiated Emissions Test, Average Detection

PARTS LIST

ITEM	QTY	REFERENCE	DESCRIPTION	SUGGESTED MANUFACTURER, P/N
Required Circuit Components				
1	1	C2	CAP., 0.1µF, X7R, 200V, 10%, 1206	AVX, 12062C104KAT2A
2	1	C4	CAP., 10µF, JB, 50V, 10%, 1206	TDK, C3216JB1H106K160AB
3	1	C6	CAP., 0.22µF, X7R, 25V, 10%, 0603	AVX, 06033C224KAT2A
4	1	C7	CAP., 1µF, X5R, 25V, 10%, 0603	AVX, 06033D105KAT2A
5	1	C9	CAP., 1000pF, C0G, 100V, 5%, 0603, AEC-Q200	TDK, CGA3E2C0G2A102J080AA
6	1	C10	CAP., 1µF, X5R, 50V, 10%, 0603, AEC-Q200	TAIYO YUDEN, UMK107ABJ105KAHT
7	2	C11, C12	CAP., 4.7µF, X7R, 50V, 10%, 1210	AVX, 12105C475KAT2A
8	1	C13	CAP., 68µF, ALUM. ELECT., 50V, 20%, 8x10.2mm SMD, AEC-Q200	PANASONIC, EEHZC1H680P
9	2	C14, C15	CAP., 0.22µF, X7T, 200V, 10%, 1206, AEC-Q200	TDK, CGJ5L3X7T2D224K160AA
10	1	C17	CAP., 1000pF, X7R, 500V, 10%, 1206	KEMET, C1206C102KCRACTU
11	3	D1, D3, D4	DIODE, SCHOTTKY, 150V, 1A, PowerDI123	DIODES INC., DFLS1150-7
12	1	L1	IND., 10µH, PWR., 20%, 1.5A, 4020	WURTH ELEKTRONIK, 74437324100
13	1	L2	IND., 0.47µH, PWR, 20%, 2.1A, 0806	WURTH ELEKTRONIK, 74479876147
14	1	R1	RES., 1M, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW06031M00FKEA
15	1	R2	RES., 0Ω, 1/10W, 0603, AEC-Q200	VISHAY, CRCW06030000Z0EA
16	1	R3	RES., 287k, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ3EKF2873V
17	2	R4, R13	RES., 499k, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW0603499KFKEA
18	1	R5	RES., 6.49k, 1%, 1/10W, 0603	VISHAY, CRCW06036K49FKEA
19	1	R6	RES., 84.5k, 1%, 1/10W, 0603, AEC-Q200	NIC, NRC06F8452TRF
20	1	R7	RES., 107k, 1%, 1/10W, 0603	NIC, NRC06F1073TRF
21	1	R8	RES., 100k, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW0603100KFKEA
22	1	R10	RES., 20Ω, 5%, 1/8W, 0805	YAGEO, RC0805JR-0720RL
23	1	R12	RES., 47Ω, 5%, 1/8W, 0805, AEC-Q200	VISHAY, CRCW080547R0JNEA
24	1	R14	RES., 0Ω, 1/4W, 1206, AEC-Q200	VISHAY, CRCW12060000Z0EA
25	1	U1	IC, BOOST/SEPIC/INVERTG CONVERTER, MSOP-16	LINEAR TECH., LT8365EMSE#PBF
Additional Demo Board Circuit Components				
1	0	C3, C16	CAP., OPTION, 1206	
2	0	C5, C8	CAP., OPTION, 0603	
3	0	D5, D6	DIODE, OPTION, SCHOTTKY, POWERDI 123	
4	0	R11	RES., OPTION, 0805	
Hardware: For Demo Board Only				
1	7	E1-E7	TEST POINT, TURRET, 0.094" MTG. HOLE, PCB 0.062" THK	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	CONN., HDR, MALE, 2x5, 2mm, VERT, STR, THT	WURTH ELEKTRONIK, 62001021121
3	1	XJP1	CONN., SHUNT, FEMALE, 2 POS, 2mm	WURTH ELEKTRONIK, 60800213421

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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