

LT8364 Low I_Q Boost/SEPIC/Inverting Regulator

DESCRIPTION

Demo circuit 2716A features the [LT8364](#) in boost configuration. It is designed to convert a 4.5V to 20V source to 24V, with up to 1.6A, depending on input voltage, with a switching frequency of 2MHz. The LT8364 can operate with inputs as high as 60V, however, in this demo circuit, the input is limited by the level of the output voltage. Refer to Figure 4 for load current versus input voltage.

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 solution size. Input and output filters and an optimized

hot 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/DC2716A>

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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		4.5		20	V
V_{OUT}	Output Voltage Range	$V_{IN} = 12\text{V}$, $I_{LOAD} = 1.2\text{A}$	23.25	24	24.75	V
RIPPLE		$V_{IN} = 12\text{V}$, $I_{LOAD} = 1.2\text{A}$		50		mV
EFFICIENCY		$V_{IN} = 12\text{V}$, $I_{LOAD} = 1\text{A}$		93		%
f_{SW}				2		MHz

QUICK START PROCEDURE

Demo circuit 2716A is easy to set up to evaluate the performance of the LT8364. 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 20V.

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.

NOTE:

4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

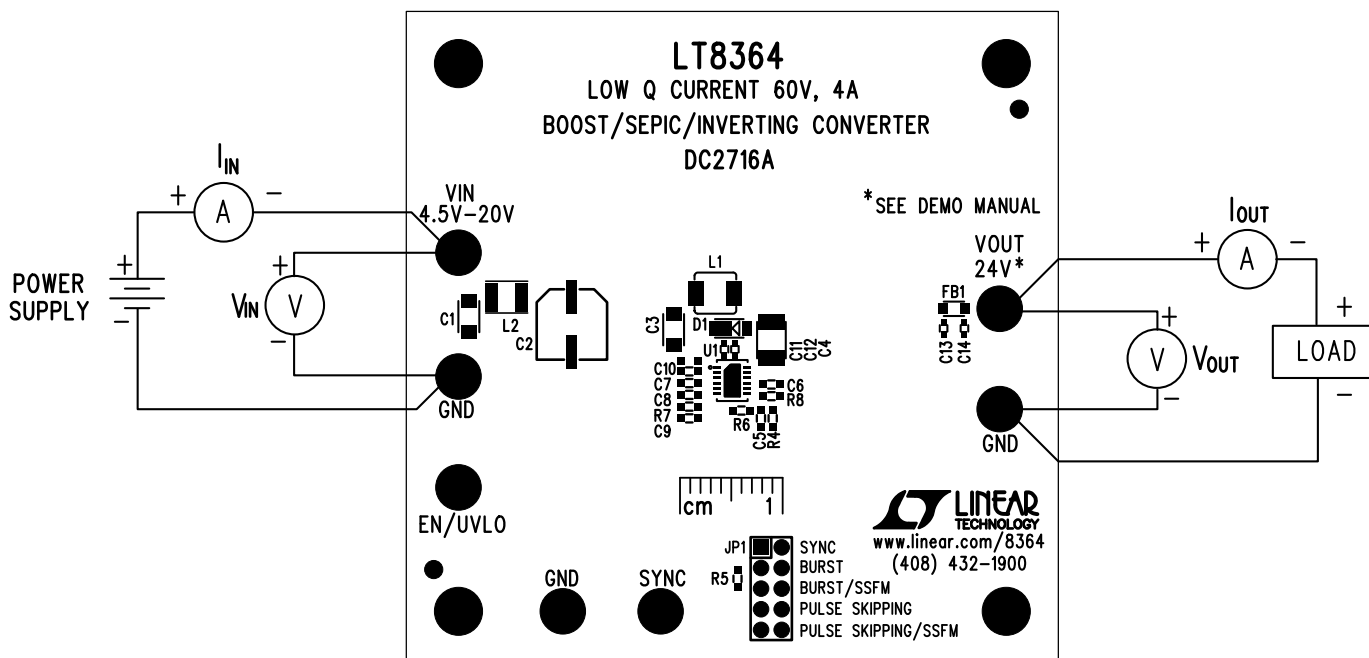


Figure 1. DC2716A Proper Equipment Setup

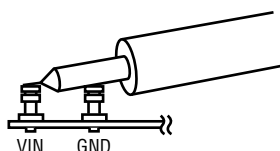


Figure 2. Measure Output Ripple

QUICK START PROCEDURE

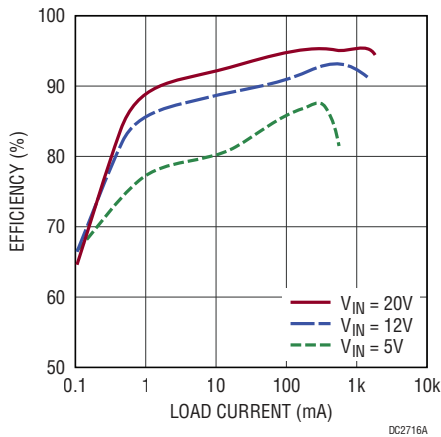


Figure 3. Efficiency Versus Load Current

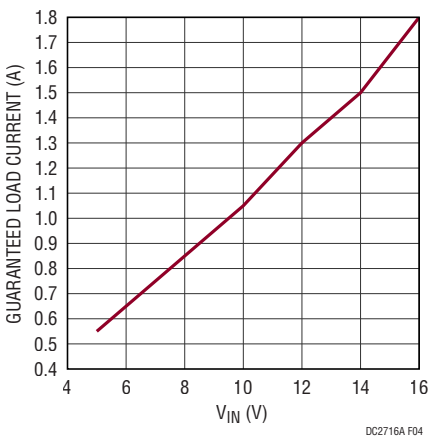


Figure 4. Guaranteed Load Current Versus Input Voltage

TYPICAL PERFORMANCE CHARACTERISTICS

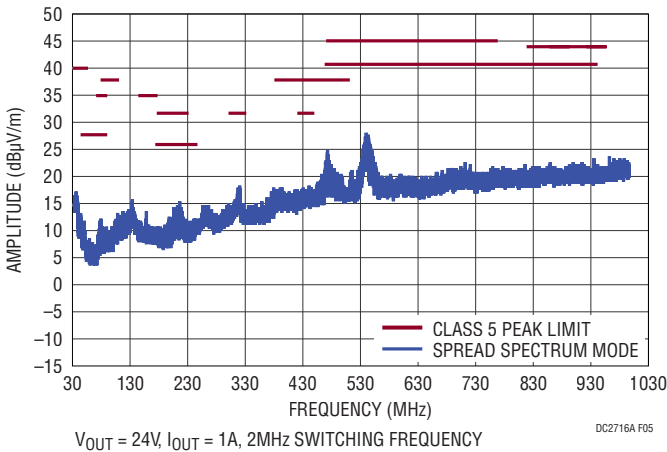


Figure 5. CISPR 25 Radiated Emission Test Peak Detection, Vertical Polarization) $V_{IN} = 12V$

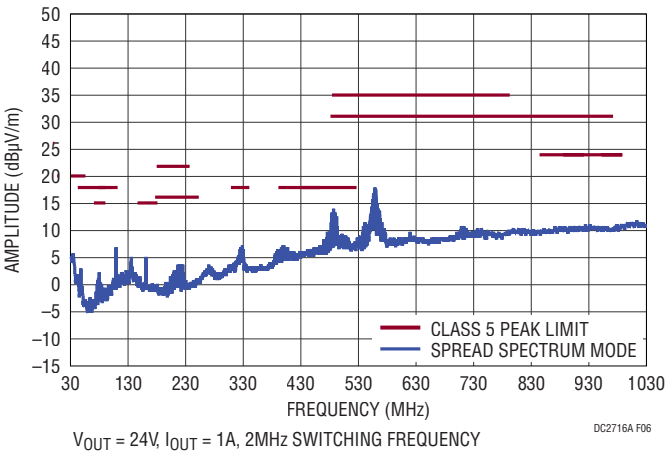


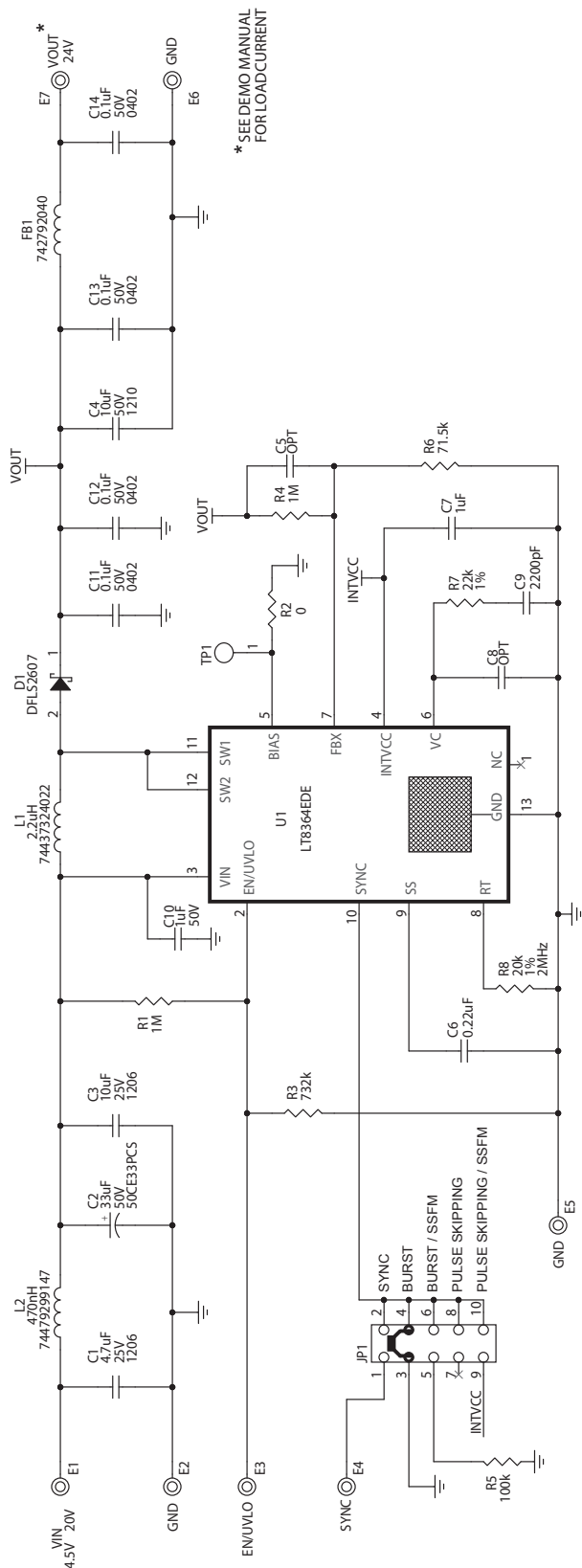
Figure 6. CISPR 25 Radiated Emission Test (Average Detection, Vertical Polarization) $V_{IN} = 12V$

DEMO MANUAL DC2716A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., 4.7 μ F, X7R, 25V, 10%, 1206	MURATA, GRM31CR71E475KA88L
2	1	C2	CAP., 33 μ F, ALUM. ELECT., 50V, 20%	SUN ELECTRONIC INDUSTRIES CORP., 50CE33PCS
3	1	C3	CAP., 10 μ F, X7R, 25V, 10%, 1206	MURATA, GRM31CR71E106KA12L
4	1	C4	CAP., 10 μ F, X7S, 50V, 10%, 1210	MURATA, GCM32EC71H106KA03L
5	1	C6	CAP., 0.22 μ F, X7R, 25V, 10%, 0603	MURATA, GRM188R71E224KA88D
6	1	C7	CAP., 1 μ F, X5R, 25V, 10%, 0603	MURATA, GRM188R61E105KA12D
7	1	C9	CAP., 2200pF, X7R, 25V, 10%, 0603	MURATA, GRM188R71E222KA01D
8	1	C10	CAP., 1 μ F, X5R, 50V, 10%, 0603	MURATA, GRM188R61H105KAALD
9	4	C11, C12, C13, C14	CAP., 0.1 μ F, X7R, 50V, 10%, 0402, AEC-Q200	MURATA, GCM155R71H104KE02D
10	1	D1	DIODE, SCHOTTKY, 60V, 2.0A, POWERDI 123	DIODES INC., DFLS260-7
11	1	FB1	IND., 600 Ω , FERRITE BEAD, 25%, 2A, 0805	WURTH ELEKTRONIK, 742792040
12	1	L1	IND., 2.2 μ H, 3.25A, 61m Ω , SMD	WURTH ELECTRONICS INC., 74437324022
13	1	L2	IND., 470nH, 3.6A, 31m Ω , SMD	WURTH ELEKTRONIK, 74479299147
14	2	R1, R4	RES., 1M Ω , 1%, 1/10W, 0603	VISHAY, CRCW06031M00FKEA
15	1	R3	RES., 732k, 1%, 1/10W, 0603	VISHAY, CRCW0603732KFKEA
16	1	R5	RES., 100k, 1%, 1/10W, 0603	VISHAY, CRCW0603100KFKEA
17	1	R6	RES., 71.5k, 1%, 1/10W, 0603	VISHAY, CRCW060371K5FKEA
18	1	R7	RES., 22k, 1%, 1/10W, 0603	VISHAY, CRCW060322K0FKEA
19	1	R8	RES., 20k, 1%, 1/10W, 0603	VISHAY, CRCW060320K0FKEA
20	1	U1	IC, BOOST/SEPIC/INVERTING CONVERTER	LINEAR TECH., LT8364EDE
Additional Demo Board Circuit Components				
1	1	R2	RES., 0 Ω , 1/10W, 0603	VISHAY, CRCW06030000Z0EA
2	1	C5 (OPT)	CAP., OPT, 0603	
3	0	C8	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., HEADER, MALE, 2 $\times$ 5.2mm, ST, THT	WURTH ELEKTRONIK, 62001021121
3	1	XJP1	CONN., SHUNT, FEMALE, 2 POS, 2mm	WURTH ELEKTRONIK, 60800213421
4	4	MP1, MP2, MP3, MP4	STANDOFF, NYLON, 0.50"	KEYSTONE, 8833

SCHEMATIC DIAGRAM



NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 0603.
ALL CAPACITORS ARE 0603.

DEMO MANUAL DC2716A

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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