LTM8068
Isolated µModule DC/DC Converter with LDO Regulator

DESCRIPTION

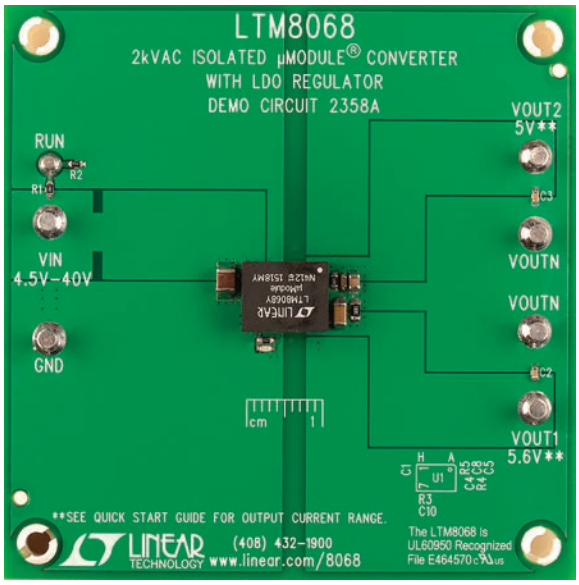
The Demo Circuit 2358A is a 2kV AC isolated flyback µModule® DC/DC converter with LDO post regulator featuring the LTM8068. The demo circuit is designed for a 5.6V flyback output and a 5V post regulator output from a 4.5V to 40V input. The current capability of the 5.6V flyback output varies with input voltage from about 200mA at $4.5V_{IN}$ to about 460mA at $40V_{IN}$. The current capability of the 5V LDO output is limited by either the current capability of V_{OUT1} minus V_{OUT1} loading or the 300mA current limit on the LDO post regulator itself. Figure 1 shows the maximum output current on V_{OUT1} when V_{OUT2} is not loaded, and V_{OUT2} when V_{OUT1} is unloaded. V_{OUT2} is the LDO post regulator from V_{OUT1}.

The two-stage converter provides an isolated flyback output as well as a low-noise LDO output. Figure 2 shows the output noise spectrum on the flyback output and Figure 3 shows the output noise spectrum on the LDO output.

The LTM8068 data sheet gives complete description of the device, operation and application information. The data sheet must be read in conjunction with this quick start guide for demo circuit 2358A.

Design files for this circuit board are available at http://www.linear.com/demo/DC2358A

BOARD PHOTO



PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Minimum Input Voltage				4.5	V
Maximum Input Voltage		40			V
Output Voltage V_{OUT1}	V_{IN} = 4.5V to 40V	5.3	5.6	5.9	V
Output Voltage V_{OUT2}	V_{IN} = 4.5V to 40V	4.85	5	5.15	V
Voltage Ripple V_{OUT1}	V_{IN} = 12V, I_{OUT1} = 200mA, I_{OUT2} = 0mA		25		mV
Voltage Ripple V_{OUT2}	V_{IN} = 12V, I_{OUT1} = 0mA, I_{OUT2} = 200mA		1		mV

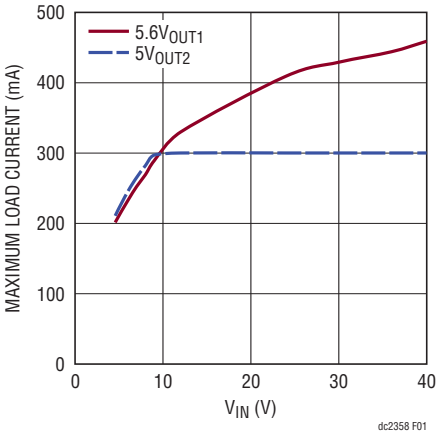


Figure 1. Maximum Output Current vs V_{IN}: 5.6V_{OUT1} Flyback Output with V_{OUT2} Unloaded; 5V_{OUT2} LDO output with V_{OUT1} Unloaded

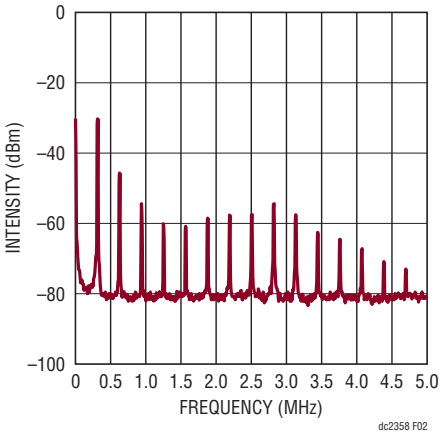


Figure 2. V_{OUT1} Output Noise Spectrum with I_{OUT1} at 200mA and V_{IN} at 12V (V_{OUT2} Has No Extra Load)

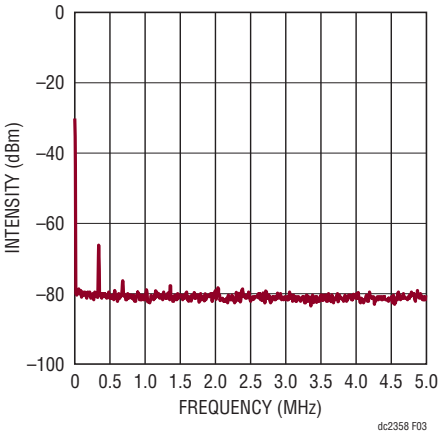


Figure 3. V_{OUT2} Output Noise Spectrum with I_{OUT2} at 200mA and V_{IN} at 12V (V_{OUT1} Has No Extra Load)

QUICK START PROCEDURE

Demo circuit 2358A is easy to set up to evaluate the performance of the LTM8068. Refer to Figure 4 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} and GND or V_{OUT} and V_{OUTN} terminals. See Figure 5 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 40V.
3. Check for the proper output voltages. (For OUT1, check the voltage between V_{OUT1} and V_{OUTN}. For OUT2, check the voltage between V_{OUT2} and V_{OUTN}.)

   NOTE: 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.

QUICK START PROCEDURE

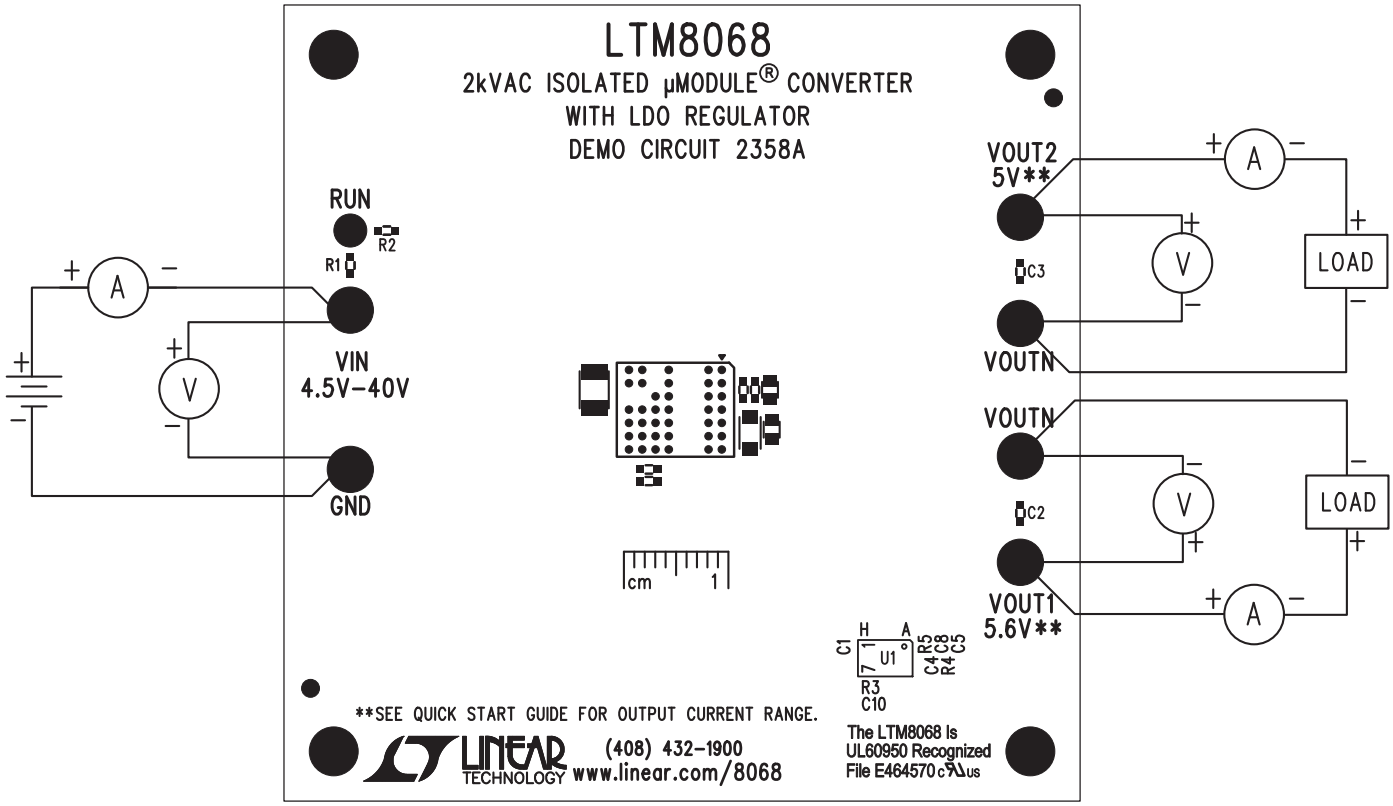


Figure 4. DC2358A Proper Equipment Setup

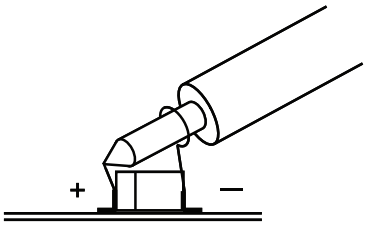
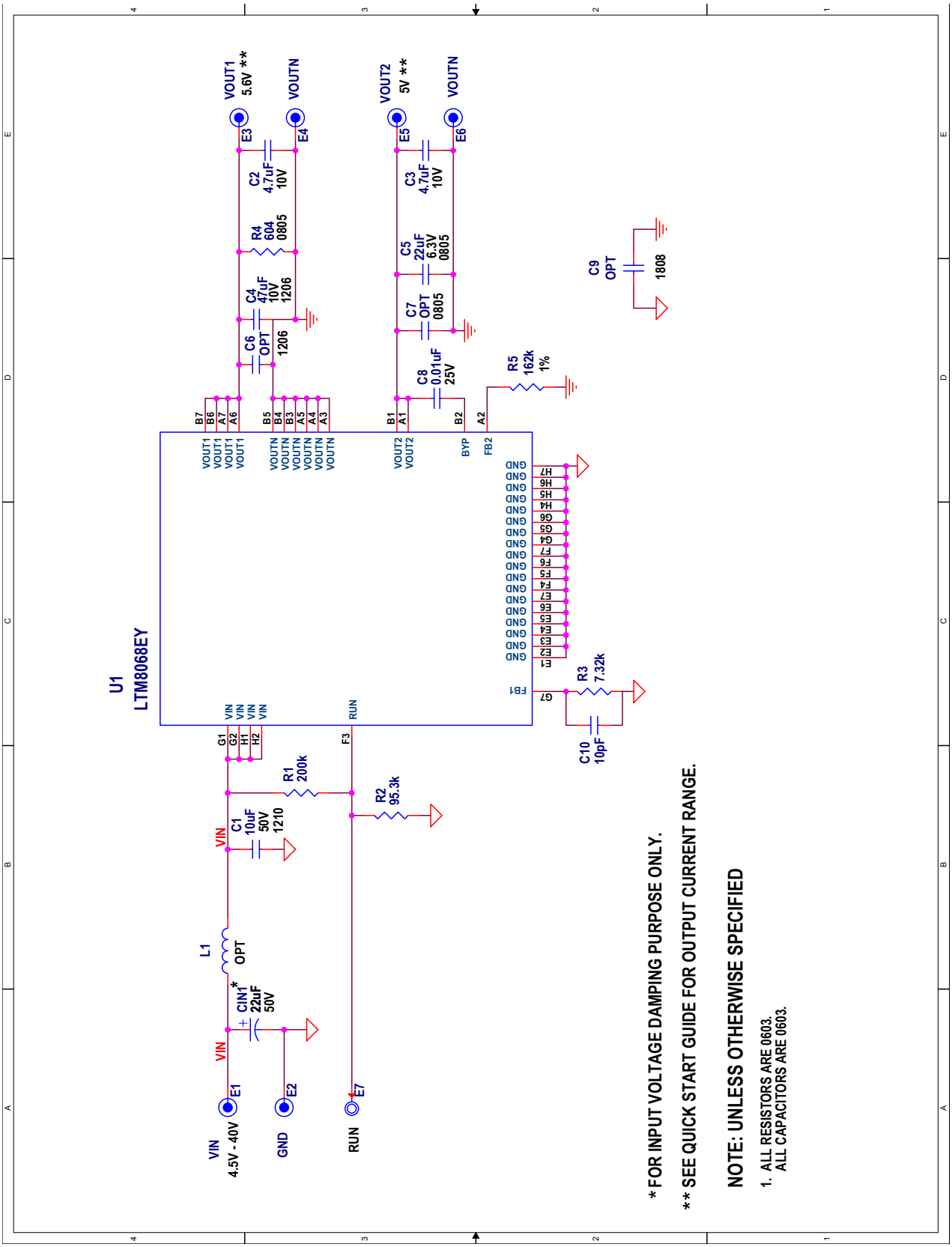


Figure 5. Measuring Input or Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	CIN1	CAP., ALUM, 22µF, 50V, 6.6x6.6mm	NICHICON, UUD1H220MCL1GS
2	1	C1	CAP., CER., 10µF, X7R, 50V, 10%, 1210	MURATA, GRM32ER71H106KA12L
3	2	C2, C3	CAP., CER., 4.7µF, X5R, 10V, 10%, 0603	MURATA, GRM188R61A475KE15D
4	1	C4	CAP., CER., 47µF, X5R, 10V, 10%, 1206	MURATA, GRM31CR61A476KE15L
5	1	C5	CAP., CER., 22µF, X5R, 6.3V, 20%, 0805	MURATA, GRM21BR60J226ME39L
6	1	C8	CAP., CER., 0.01µF, X7R, 25V, 10%, 0603	MURATA, GRM188R71E103KA01D
7	1	C10	CAP., CER., 10pF, NP0, 50V, 5%, 0603	MURATA, GRM1885C1H100JA01D
8	1	R1	RES, 200k, 1/10W, 1%, 0603	VISHAY, CRCW0603200KFKEA
9	1	R2	RES, 95.3k, 1/10W, 1%, 0603	VISHAY, CRCW060395K3FKEA
10	1	R3	RES, 7.32k, 1/10W, 1%, 0603	VISHAY, CRCW06037K32FKEA
11	1	R4	RES, 604Ω, 1/8W, 1%, 0805	VISHAY, CRCW0805604RFKEA
12	1	R5	RES, 162k, 1/10W, 1%, 0603	VISHAY, CRCW0603162KFKEA
13	1	U1	I.C., LTM8068EY#PBF 9 × 11.25 × 4.92 BGA	LINEAR TECH., LTM8068EY#PBF
Additional Demo Board Circuit Components				
1	0	C6 (OPT)	CAP., 1210 (OPT)	
2	0	C7 (OPT)	CAP., 0805 (OPT)	
3	0	C9 (OPT)	CAP., 1808 (OPT)	
4	0	L1 (OPT)	IND., 10µH, XFL3012 (OPT)	
Hardware: For Demo Board Only				
1	6	E1-E6	TESTPOINT, TURRET, 0.094" pbf	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	E7	TEST POINT, TURRET, 0.064" MTH HOLE	MILL-MAX, 2308-2-00-80-00-00-07-0
3	4	MH1-MH4	STAND-OFF, NYLON 0.375" SNAP ON	KEYSTONE, 8832

SCHEMATIC DIAGRAM



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