LTM8058
Isolated µModule DC/DC Converter with LDO Post Regulator

DESCRIPTION

Demonstration circuit 1988A is a 2kV AC (3kVDC) isolated flyback µModule® DC/DC converter with LDO post regulator featuring the LTM®8058. The demo circuit is designed for a 6V flyback output and a 5V post regulator output from a 4.5V to 30V input. The current capability of the 6V flyback output varies with input voltage from about 100mA at $4.5V_{IN}$ to about 320mA at $30V_{IN}$. Figure 1 shows the typical maximum output current on V_{OUT1} when V_{OUT2} is not loaded. V_{OUT2} is the LDO post regulator from V_{OUT1}. The current capability of V_{OUT2} 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. R1 provides the necessary minimum load current to keep the V_{OUT1} in regulation throughout the entire input voltage range. Please see the typical performance characteristic curves in the LTM8058 data sheet to determine the minimum load current for other input/output configurations.

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 V_{OUT1} and Figure 3 shows the output noise spectrum on V_{OUT2}.

The LTM8058 data sheet gives a 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 1988A.

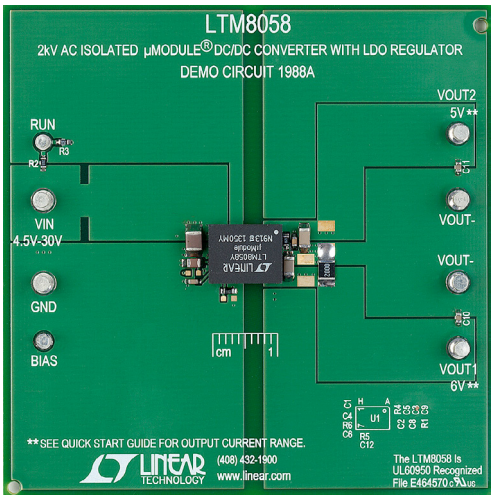
Design files for this circuit board are available at http://www.linear.com/demo/DC1988A

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

PARAMETER	CONDITIONS	VALUE
Minimum Input Voltage		4.5V
Maximum Input Voltage		30V
Output Voltage V_{OUT1}	V_{IN} = 7V to 30V	6V ±5%
Output Voltage V_{OUT2}	V_{IN} = 7V to 30V	5.0V ±3%
Voltage Ripple V_{OUT1}	V_{IN} = 12V, I_{OUT2} = 0mA, I_{OUT2} = 100mA	10mV
Voltage Ripple V_{OUT2}	V_{IN} = 12V, I_{OUT2} = 0mA, I_{OUT2} = 100mA	5mV

BOARD PHOTO



QUICK START PROCEDURE

Demo circuit 1988A is easy to set up to evaluate the performance of the LTM8058. 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} or V_{OUT} and GND 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 30V.

3. Check for the proper output voltages. (For V_{OUT1}, check the voltage between V_{OUT1} and V_{OUT}^-. For V_{OUT2}, check the voltage between V_{OUT2} and V_{OUT}^-.)

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.

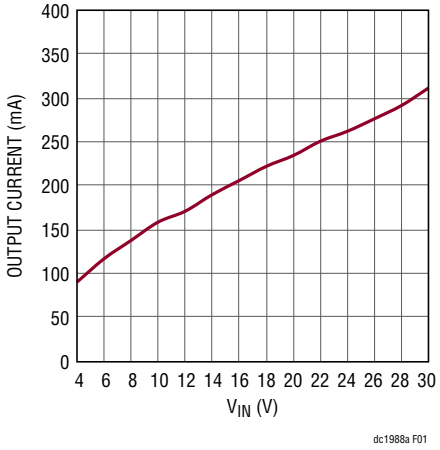


Figure 1. V_{OUT1} Typical Maximum Output Current vs V_{IN} with V_{OUT2} Unloaded

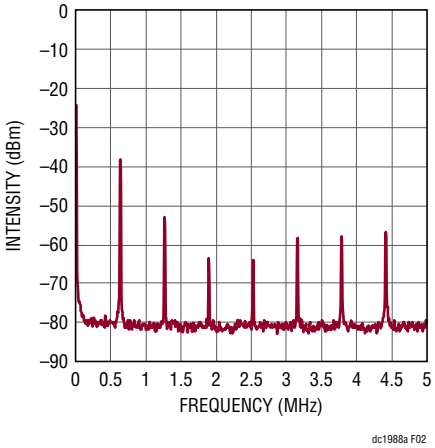


Figure 2. V_{OUT1} Output Noise Spectrum with I_{OUT1} at 100mA and V_{IN} at 12V (V_{OUT2} Has No Extra Load)

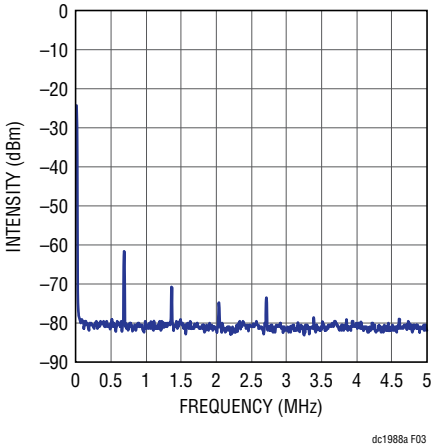


Figure 3. V_{OUT2} Output Noise Spectrum with I_{OUT2} at 100mA and V_{IN} at 12V (V_{OUT1} Has No Extra Load)

QUICK START PROCEDURE

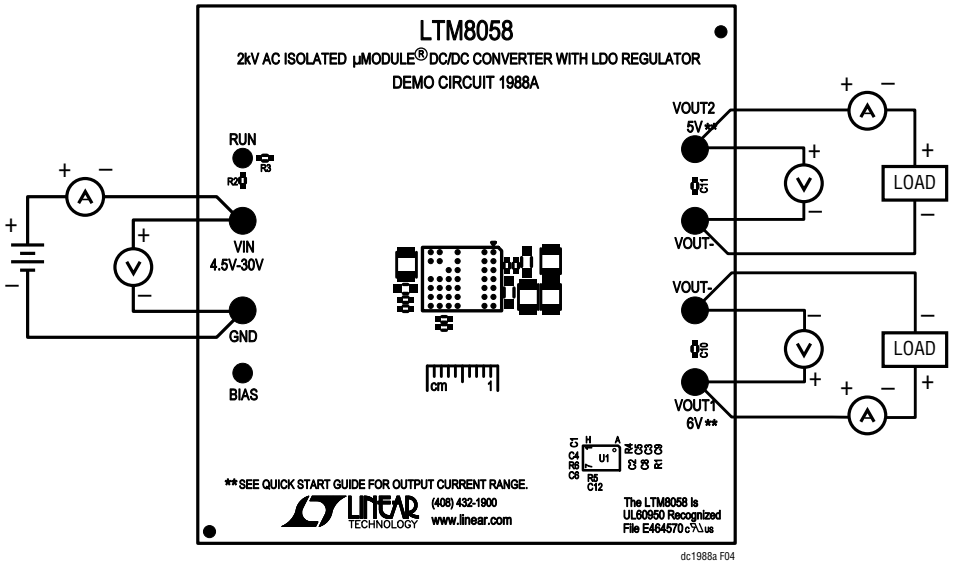


Figure 4. DC1988A Proper Equipment Setup

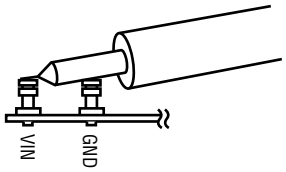
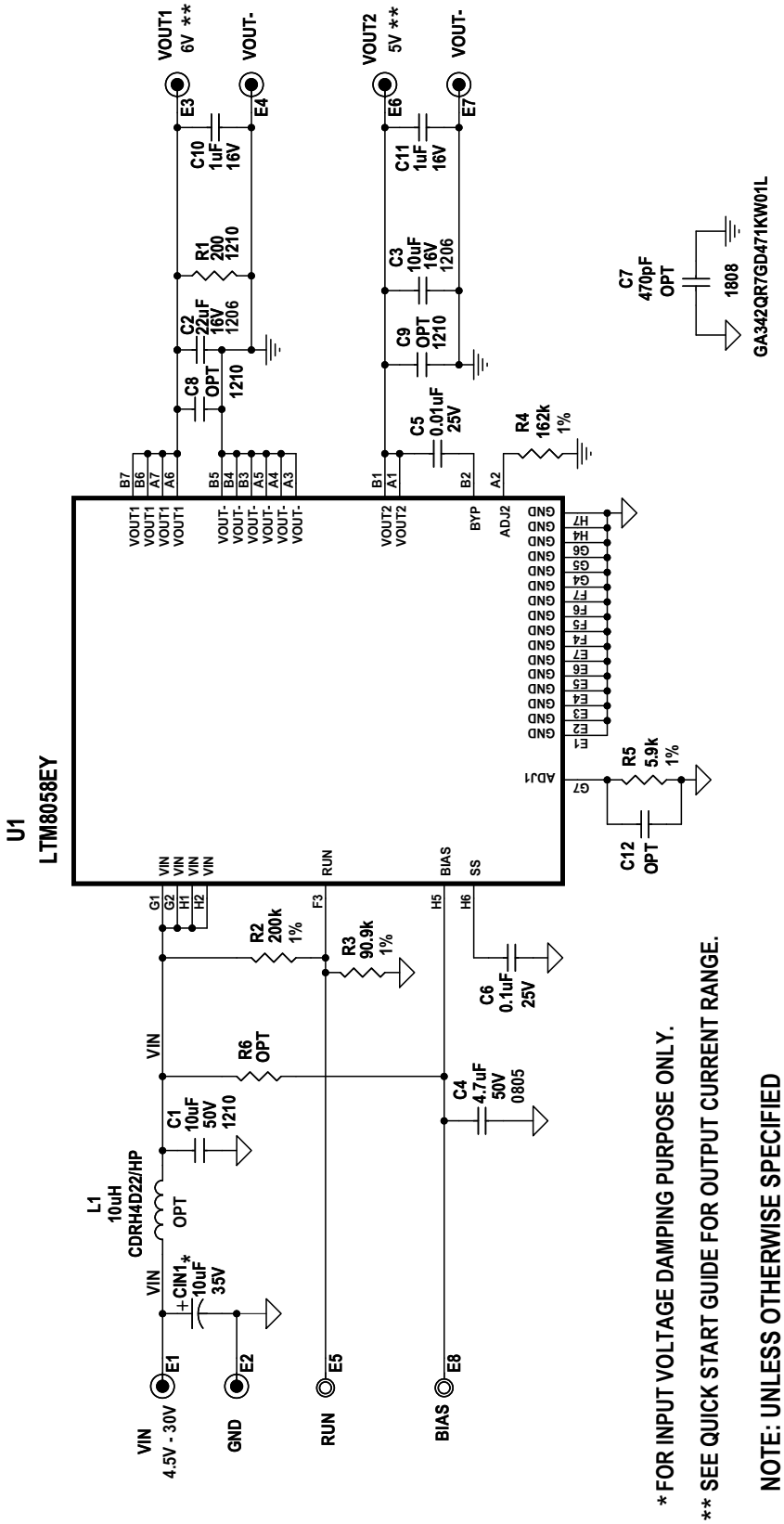


Figure 5. Measuring Input or Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., CHIP, X5R, 10µF, 50V, 10% 1210	MÜRATA, GRM32ER71H106KA12L
2	1	C2	CAP., CHIP, X5R, 22µF, 16V, 10% 1206	AVX, 1206YD226KAT2A
3	1	C3	CAP., CHIP, X5R, 10µF, 16V, 10% 1206	AVX, 1206YD106KAT2A
4	1	C4	CAP., CHIP, X5R, 4.7µF, 50V, 20% 0805	TDK, C2012X5R1H475M
5	1	C5	CAP., CHIP, X7R, 0.01µF, 25V, 10% 0603	AVX, 06033C103kAT2A
6	1	C6	CAP., CHIP, X7R, 0.1µF, 25V, 10% 0603	AVX, 06033C104KAT2A
7	1	R1	RES., CHIP, 200k, 1/4W, 1% 1210	VISHAY, CRCW1210200RFKEA
8	1	R2	RES., CHIP, 200k, 1/10W, 1% 0603	VISHAY, CRCW0603200KFKEA
9	1	R3	RES., CHIP, 90.9k, 1/10W, 1% 0603	VISHAY, CRCW060390K9FKEA
10	1	R4	RES., CHIP, 162k, 1/10W, 1% 0603	VISHAY, CRCW0603162KFKEA
11	1	R5	RES., CHIP, 5.9k, 1/10W, 1% 0603	VISHAY, CRCW06035k90FKEA
12	1	U1	IC., LINEAR TECH., LTM8058EY#PBF	LINEAR TECH., LTM8058EY#PBF
Additional Demo Board Circuit Components				
1	0	C7 (OPT)	CAP., 1808	
2	0	C8, C9 (OPT)	Cap., 1210	
3	2	C10, C11	CAP., CHIP, X7R, 1µF, 16V, 10% 0603	AVX, 0603YC105KAT2A
4	0	C12 (OPT)	CAP., 0603	
5	1	CIN1	CAP., TANT., 10µF, 35V CASE-C	AVX, TAJC106K035RNJ
6	0	L1	OPT.	
7	0	R6	OPT. 0603	
Hardware: For Demo Board Only				
1	6	E1-E4, E6, E7	Testpoint, Turret, .094"	Mill-Max, 2501-2-00-80-00-00-07-0
2	2	E5, E8	Testpoint, Turret, .064"	Mill-Max, 2308-2-00-80-00-00-07-0

SCHEMATIC DIAGRAM



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