

LTM8048

Isolated μ Module DC/DC Converter with LDO Post Regulator

DESCRIPTION

Demo circuit 1560A is an isolated flyback μ Module[®] DC/DC converter with LDO post regulator featuring LTM[®]8048. The demo circuit is designed for a 6V flyback output and a 5V post regulator output from a 4.5V to 30V input. The typical current capability of the 6V flyback output varies with input voltage from about 110mA at $V_{IN} = 4.5V$ to about 370mA at $V_{IN} = 30V$. 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.

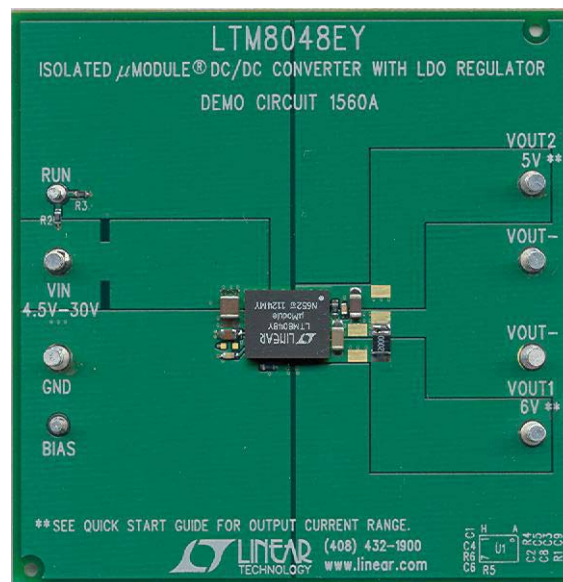
The two-stage converter provides an isolated flyback output as well as a low noise LDO output. Figure 2 shows the output noise spectrum on V_{OUT1} and Figure 3 shows the output noise spectrum on V_{OUT2} .

The LTM8048 data sheet gives complete description of the device, operation and application information. The data sheet must be read in conjunction with this demo manual prior to working on or modifying demo circuit 1560A.

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

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BOARD PHOTO



DEMO MANUAL DC1560A

DESCRIPTION

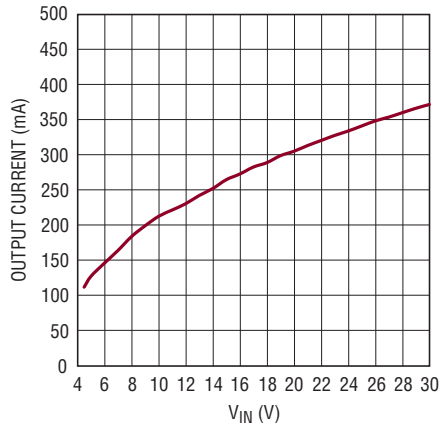


Figure 1. V_{OUT1} Typical Maximum Output Current vs V_{IN} When V_{OUT2} is not Loaded

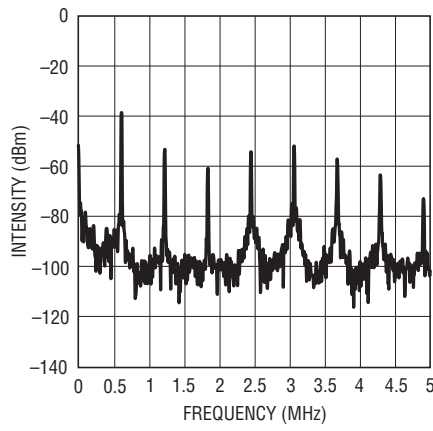


Figure 2. V_{OUT1} Output Noise Spectrum with I_{OUT2} at 100mA and V_{IN} at 12V (V_{OUT1} Has no Extra Load)

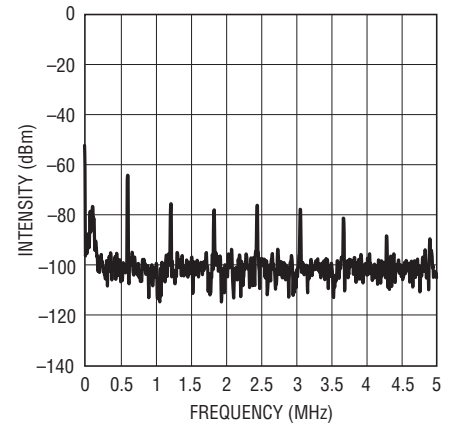


Figure 3. V_{OUT2} Output Noise Spectrum with I_{OUT2} at 100mA and V_{IN} at 12V (V_{OUT1} Has no Extra Load)

PERFORMANCE SUMMARY ($T_A = 25^\circ\text{C}$)

| PARAMETER | CONDITION | VALUE |
|---------------------------|--|----------------|
| Minimum Input Voltage | | 4.5V |
| Maximum Input Voltage | | 30V |
| Output Voltage V_{OUT1} | $V_{IN} = 7V$ to 30V | 6.0V $\pm 5\%$ |
| Output Voltage V_{OUT2} | $V_{IN} = 7V$ to 30V | 5.0V $\pm 3\%$ |
| Voltage Ripple V_{OUT1} | $V_{IN} = 12V$, $I_{OUT2} = 0mA$, $I_{OUT1} = 100mA$ | <20mV |
| Voltage Ripple V_{OUT2} | $V_{IN} = 12V$, $I_{OUT2} = 0mA$, $I_{OUT1} = 100mA$ | <10mV |

QUICK START PROCEDURE

Demo circuit 1560A is easy to set up to evaluate the performance of the LTM8048. 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.

dc1560af

QUICK START PROCEDURE

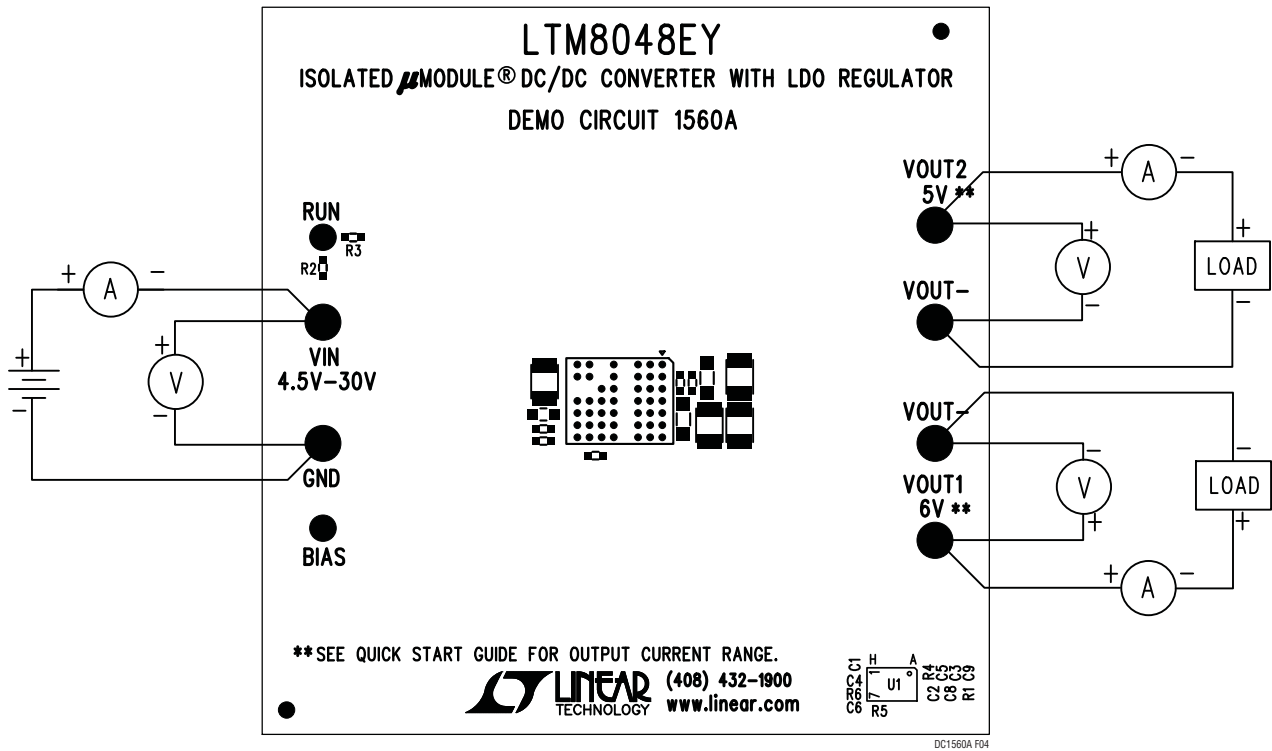


Figure 4. DC1560A Proper Equipment Setup

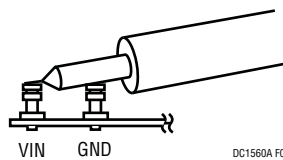


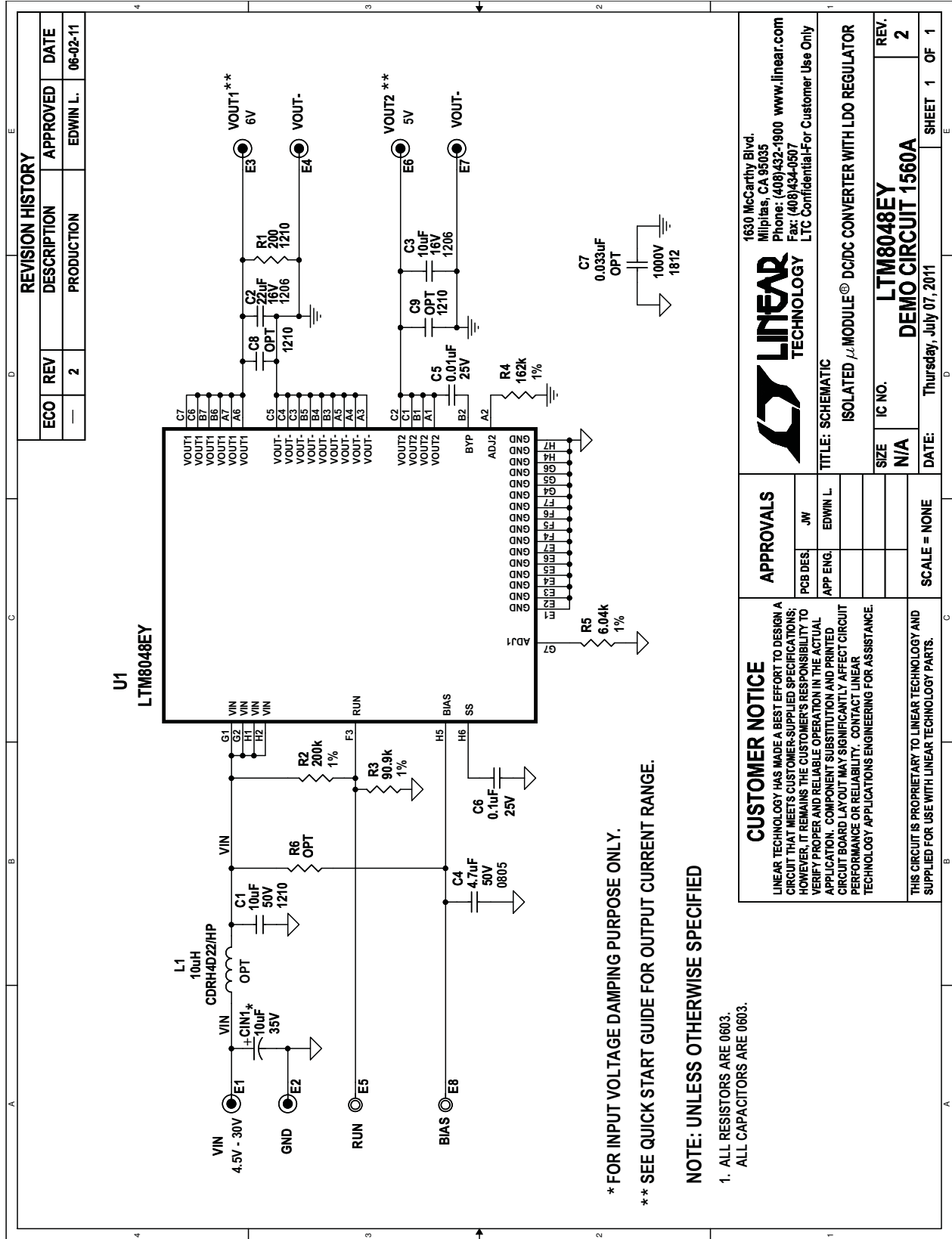
Figure 5. Measuring Input or Output Ripple

DEMO MANUAL DC1560A

PARTS LIST

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|--|-----|------------------|--|----------------------------------|
| Required Circuit Components | | | | |
| 1 | 1 | C5 | CAP, CHIP X7R, 0.01 μ F, 25V, 5%, 0603 | AVX 06033C103JAT |
| 2 | 1 | C6 | CAP, CHIP X7R, 0.1 μ F, 25V, 10%, 0603 | AVX 06033C104KAT |
| 3 | 1 | C4 | CAP, CHIP X5R, 4.7 μ F, 50V, 10%, 0805 | TDK C2012X5R1H475K |
| 4 | 1 | C2 | CAP, CHIP X5R, 22 μ F, 16V, 10%, 1206 | AVX 1206YD226KAT2A |
| 5 | 1 | C3 | CAP, CHIP X5R, 10 μ F, 16V, 10%, 1206 | AVX 1206YD106KAT2A |
| 6 | 1 | C1 | CAP, CHIP X5R, 10 μ F, 50V, 10%, 1210 | MURATA GRM32ER71H106KA12L |
| 7 | 1 | R1 | RES, CHIP 200, 1%, 1210 | VISHAY CRCW1210200RFKEA |
| 8 | 1 | R2 | RES, CHIP 200k, 1%, 0603 | VISHAY CRCW0603200KFKEA |
| 9 | 1 | R3 | RES, CHIP 90.9k, 1%, 0603 | VISHAY CRCW060390K9FKED |
| 10 | 1 | R4 | RES, CHIP 162k, 1%, 0603 | VISHAY CRCW0603162KFKED |
| 11 | 1 | R5 | RES, CHIP 6.04k, 1%, 0603 | VISHAY CRCW06036K04FKEA |
| 12 | 1 | U1 | IC, LINEAR LTM8048EY#PBF | LINEAR TECHNOLOGY LTM8048EY#PBF |
| Additional Demo Board Circuit Components | | | | |
| 1 | 0 | C8, C9 | CAP, 1210, OPTION | |
| 2 | 1 | CIN1 | CAP, TANT, 10 μ F, 35V, CASE-C | AVX TAJC106K035R |
| 3 | 0 | C7 | CAP, 1812, OPTION | |
| 4 | 0 | L1 | OPTION | |
| 5 | 0 | R6 | RES, 0603, OPTION | |
| Hardware/Components (For Demo Board Only) | | | | |
| 1 | 6 | E1 to E4, E6, E7 | TESTPOINT, TURRET, 0.094" | Mill-Max 2501-2-00-80-00-00-07-0 |
| 2 | 2 | E5, E8 | TESTPOINT, TURRET, 0.064" | Mill-Max 2308-2-00-80-00-00-07-0 |

SCHEMATIC DIAGRAM



DEMO MANUAL DC1560A

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Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

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

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