

LTM8052

36V, 5A, 2-Quadrant CVCC Step-Down μ Module Regulator

DESCRIPTION

Demonstration circuit 1866 is a 36V, 5A, 2-quadrant CVCC step-down μ Module[®] regulator featuring the LTM[®]8052. The demo circuit is designed for a 2.5V output from an input voltage range of 6V to 36V. The output can source 5A or sink 5A. The circuit can be operated in either constant voltage mode or constant current mode.

When the output sinks current, the circuit maintains its output voltage regulation by power conversion, not power dissipation. This means that the energy provided to LTM8052 is in turn delivered to its input power bus.

There must be something on the input power bus to accept or use the energy.

The LTM8052 data sheet gives a complete description of the part, operation and application information. The data-sheet must be read in conjunction with this demo manual for demo circuit 1866.

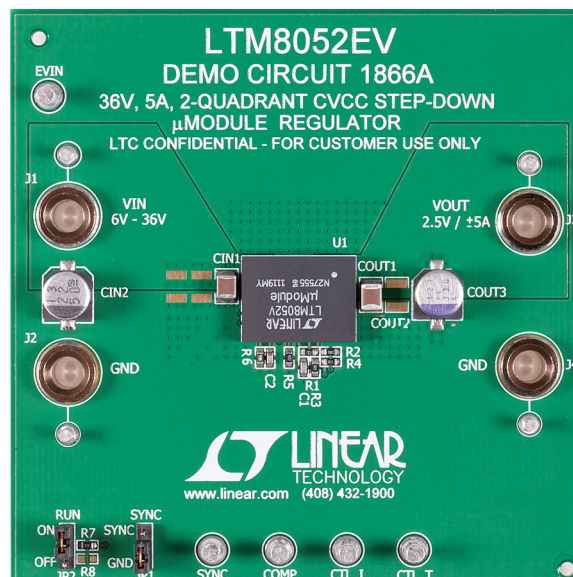
Design files for this circuit board are available at <http://www.linear.com/demo>

LT, LT, LTC, LTM, μ Module, Linear Technology and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.

PERFORMANCE SUMMARY (T_A = 25°C)

PARAMETER	CONDITIONS	VALUE	UNITS
Input Supply Voltage Range		6 to 36	V
Output Voltage	I _{OUT} = 5A to -5A	2.5 $\pm$ 5%	V
Switching Frequency		450	kHz
Maximum Output Current		$\pm$ 5	A
Typical Full-Load Efficiency	V _{IN} = 12V, I _{OUT} = 5A	84	%

BOARD PHOTO



dc1866afa

QUICK START PROCEDURE

Demonstration circuit 1866 is an easy way to evaluate the performance of the LTM8052. Refer to Figure 2 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 GND terminals.

1. With power off, connect the input power supply to V_{IN} and GND.
2. Connect a load to V_{OUT} and GND.
3. Turn on the power at the input.
4. Check for the proper output voltage and current.

Note: If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

5. Once the proper output voltage is established, adjust the load and input within the operating ranges and observe the output voltage regulation, output current regulation, ripple voltage, efficiency and other parameters

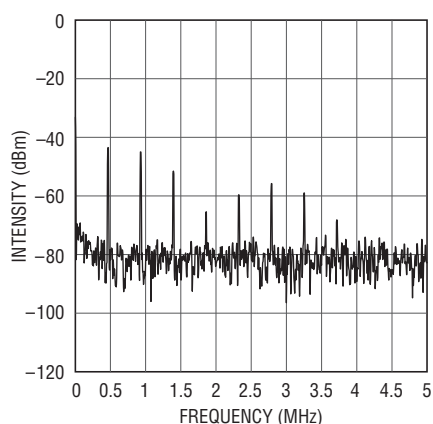


Figure 1. DC1866A Output Noise Spectrum
($V_{IN} = 12V$, $V_{OUT} = 2.5V$, $I_{OUT} = 5A$)

QUICK START PROCEDURE

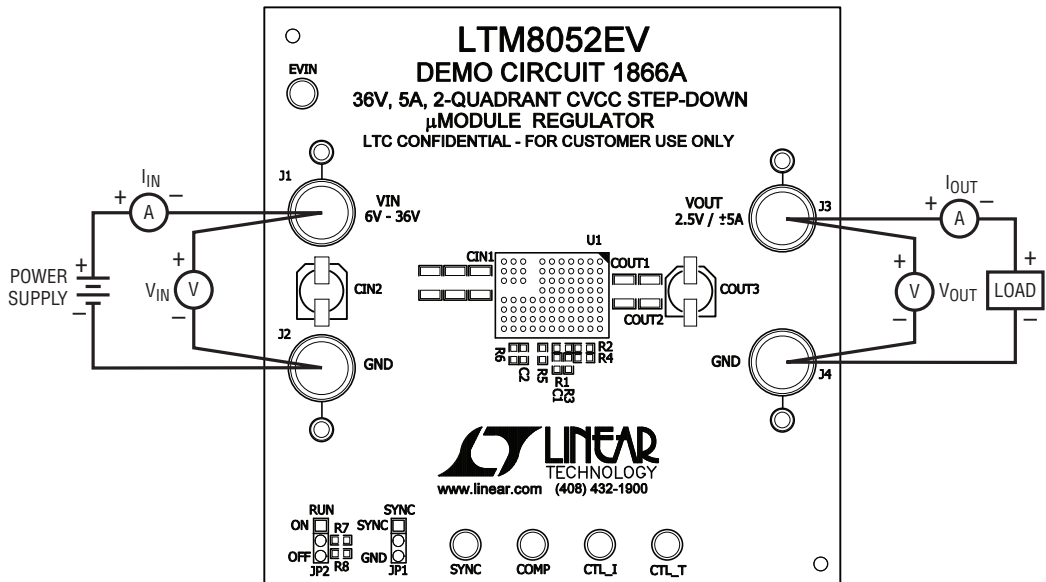


Figure 2. Proper Measurement Equipment Setup. Board Can Sink Current from the Load

DEMO MANUAL DC1866A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	CIN1	Cap., X7R 10 μ F 50V 10% 1210	MURATA GRM32ER71H106KA12L
2	1	CIN2	Cap., ELECTROLYTIC 22 μ F 50V 10%	SUN ELECT. 50CE22BSS
3	1	COUT1	Cap., X5R 100 μ F 6.3V 20% 1210	TDK C3225X5R0J107M
4	1	COUT3	Cap., OSCON 330 μ F 4V 20%	SANYO 4SVPC330M
5	1	C1	Cap., NPO 1000pF 50V 20% 0603	AVX 06035A102MAT1A
6	1	C2	Cap., X7R 1500pF 25V 10% 0603	AVX 06033C152KAT1A
7	1	R1	Res., Chip 10k 0.1W 5% 0603	VISHAY CRCW060310K0JNEA
8	2	R2, R3	Res., Chip 100k 0.1W 5% 0603	VISHAY CRCW0603100KJNEA
9	1	R4	Res., Chip 301k 0.1W 1% 0603	VISHAY CRCW0603301KFKEA
10	1	R5	Res., Chip 90.9k 0.1W 1% 0603	VISHAY CRCW060390K9FKEA
11	1	R6	Res., Chip 9.09k 0.1W 1% 0603	VISHAY CRCW06039K09FKEA
12	1	R7	Res., Chip 510k 0.1W 5% 0603	VISHAY CRCW0603510KJNEA
13	1	U1	I.C., Step-Down Voltage Regulator LGA(81) 15mm x 11.25mm x 2.82mm	LINEAR TECH. CORP. LTM8052EV
Additional Demo Board Circuit Components				
1	0	COUT2 (OPT)	Cap., 1210	
2	0	C3 (OPT)	Cap., 1206	
3	0	C4 (OPT)	Cap., 1210	
4	0	C5 (OPT)	Cap., OSCON	
5	0	FB1 (OPT)	Ferrite Bead, 1206	
6	0	L1 (OPT)	Inductor	
7	0	R8 (OPT)	Res., 0603	
Hardware-For Demo Board Only				
1	5	E1, E2, E3, E8, E9	Turret, Testpoint	MILL-MAX 2501-2-00-80-00-00-07-0
2	4	E4, E5, E6, E7	Turret, Testpoint	MILL-MAX 2308-2-00-80-00-00-07-0
3	2	JP1, JP2	Headers, Single Row 3 Pins 2mm Ctrs.	SAMTEC TMM-103-02-L-S
4	4	J1, J2, J3, J4	Connector, Banana Jack	KEYSTONE 575-4
5	2	XJP1, XJP2	Shunt, 2mm Ctrs.	SAMTEC 2SN-BK-G



5

DEMO MANUAL DC1866A

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

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.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation

dc1866afa