

# LTM8052A

## 36V, 5A, 2-Quadrant CVCC Step-Down $\mu$ Module Regulator

### DESCRIPTION

Demonstration circuit 1939 is a 36V, 5A, 2-quadrant CVCC step-down  $\mu$ Module<sup>®</sup> regulator featuring the LTM<sup>®</sup>8052A. 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 LTM8052A 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 LTM8052A 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 prior to working on or modifying demo circuit 1939.

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

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### PERFORMANCE SUMMARY (T<sub>A</sub> = 25°C)

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

### BOARD PHOTO



## QUICK START PROCEDURE

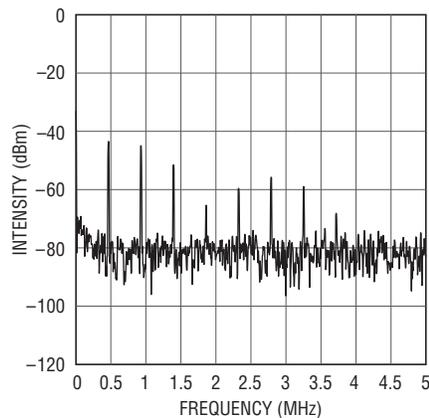
Demonstration circuit 1939 is an easy way to evaluate the performance of the LTM8052A. Refer to Figure 2 for proper measurement equipment setup and follow the procedure below:

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. DC1939A Output Noise Spectrum**  
( $V_{IN} = 12V$ ,  $V_{OUT} = 2.5V$ ,  $I_{OUT} = 5A$ )

**QUICK START PROCEDURE**

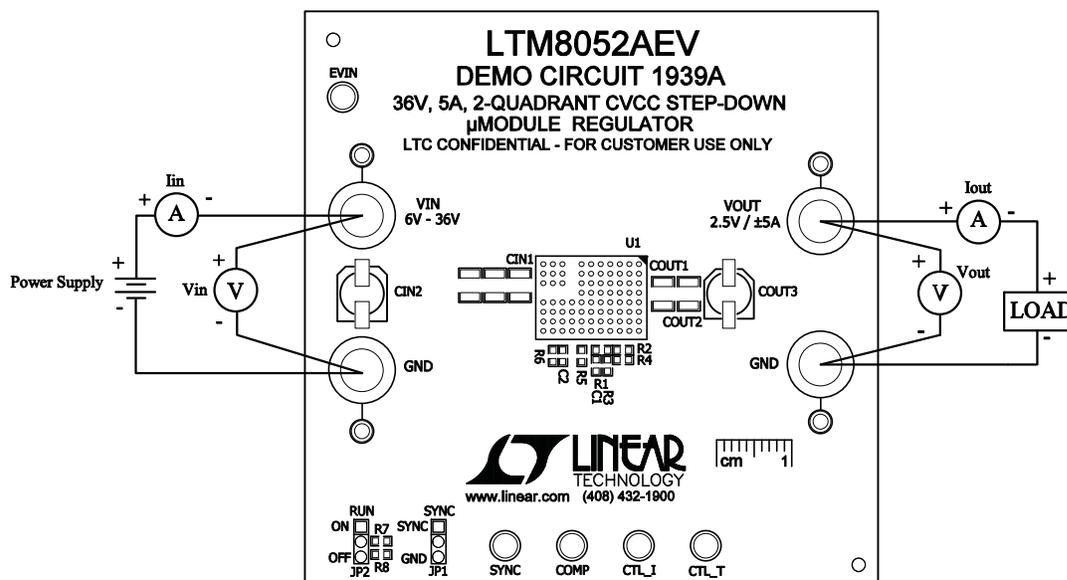


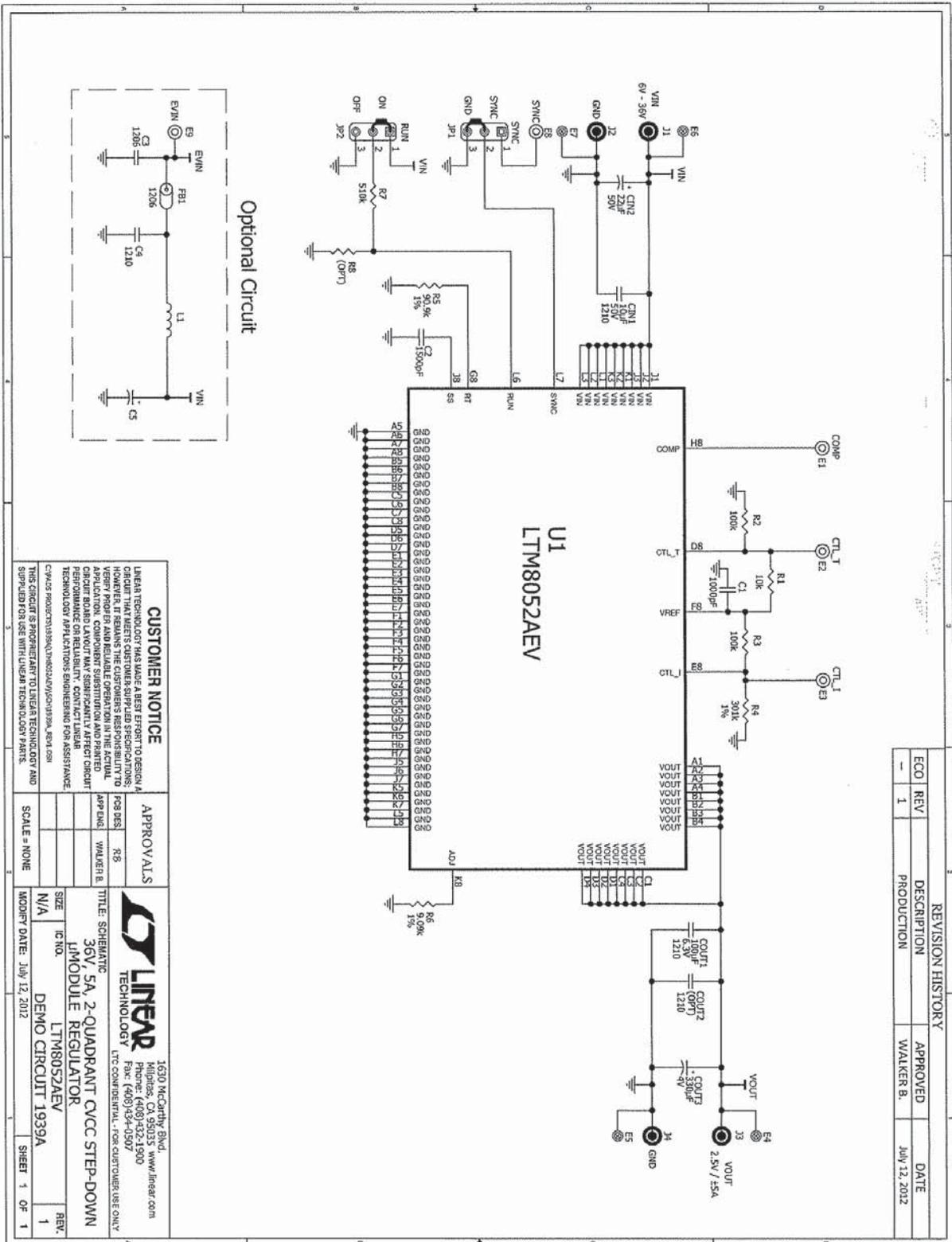
Figure 2. Proper Measurement Equipment Setup. Board Can Sink Current from the Load

# DEMO MANUAL DC1939A

## PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
<b>Required Circuit Components</b>				
1	1	CIN1	Cap., X7R 10µF 50V 10% 1210	MURATA GRM32ER71H106KA12L
2	1	CIN2	Cap., ELECTROLYTIC 22µF 50V 10%	SUN ELECT. 50CE22BSS
3	1	COUT1	Cap., X5R 100µF 6.3V 20% 1210	TDK C3225X5R0J107M
4	1	COUT3	Cap., OSCON 330µF 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. LTM8052AEV
<b>Additional Demo Board Circuit Components</b>				
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	
<b>Hardware-For Demo Board Only</b>				
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

**SCHEMATIC DIAGRAM**



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