

LTM8071
60V_{IN}, 5A Step-Down
µModule Regulator

DESCRIPTION

Demonstration circuit 2387A features the LTM®8071 µModule® regulator, a high performance, high efficiency Silent Switcher® step-down regulator. The LTM8071 is a complete DC/DC point-of-load regulator in a thermally enhanced 11.25mm × 9mm × 3.32mm BGA package. The demo board has an input voltage range of 7V to 60V and provides an output current up to 5A. The output voltage is set to 5V on DC2387A. The Silent Switcher design minimizes EMI while delivering high efficiency. Input EMI filtering is available by applying the input voltage to the

VEMI turret. Spread spectrum mode can be enabled using the SYNC jumper (JP1) to further reduce EMI emissions. External clock synchronization is available through the SYNC/MODE pin. For high efficiency at low load currents, burst or pulse-skipping modes can be selected with the SYNC jumper (JP1). The LTM8071 data sheet must be read in conjunction with this demo manual for working on or modifying DC2387A.

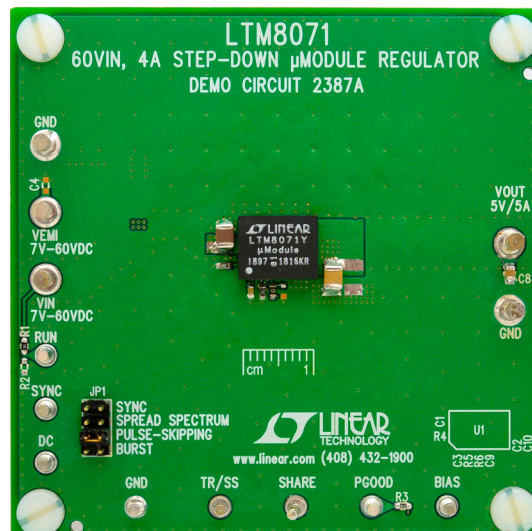
Design files for this circuit board are available.

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PERFORMANCE SUMMARY Specifications are at T_A = 25°C

PARAMETER	CONDITIONS/NOTES	VALUE
Input Voltage Range		7V to 60V
Output Voltage V _{OUT}		5V _{DC}
Maximum Continuous Output Current	Derating Is Necessary for Certain Operating Conditions. See Data Sheet for Details	5A _{DC}
Default Operating Frequency		1MHz
Efficiency	V _{IN} = 12V, V _{OUT} = 5V, I _{OUT} = 5A V _{IN} = 48V, V _{OUT} = 5V, I _{OUT} = 5A	92.4% 85.9%

BOARD PHOTO



QUICK START PROCEDURE

Demonstration circuit 2387A provides an easy way to evaluate the performance of the LTM8071EY. Please refer to Figure 1 for test setup connections and follow the procedure below.

1. With power off, set the SYNC pin jumper (JP1) to burst.
2. Before connecting input supply, load and meters, preset the input voltage supply to be between 7V to 60V. Preset the load currents to 0A.
3. With power off, connect the load, input voltage supply and meters as shown in Figure 1.
4. Turn on input power supply. The output voltage meters for each phase should display the programmed output voltage $\pm 2\%$.
5. Once the proper output voltage is established, adjust the load current within the 0A to 4.5A range and observe the load regulation, efficiency, and other parameters.

Output voltage ripple should be measured across the output turrets as shown in Figure 1.

6. To observe pulse-skipping mode, place the SYNC pin jumper (JP1) in the pulse-skipping position.
7. To observe spread spectrum mode, place the SYNC pin jumper (JP1) in the spread spectrum position and apply a load.
8. An external clock can be applied to the SYNC terminal with the SYNC jumper (JP1) in the SYNC position. Ensure that the frequency resistor R_T (R4) sets the frequency below or equal to the lowest SYNC frequency.

NOTE: Demonstration circuit 2387A is designed to exhibit the wide input voltage range of the LTM8071. At high input voltages and high output currents, airflow may be required to keep the junction temperature in a safe operating region. Refer to the LTM8071 derating curves for more details

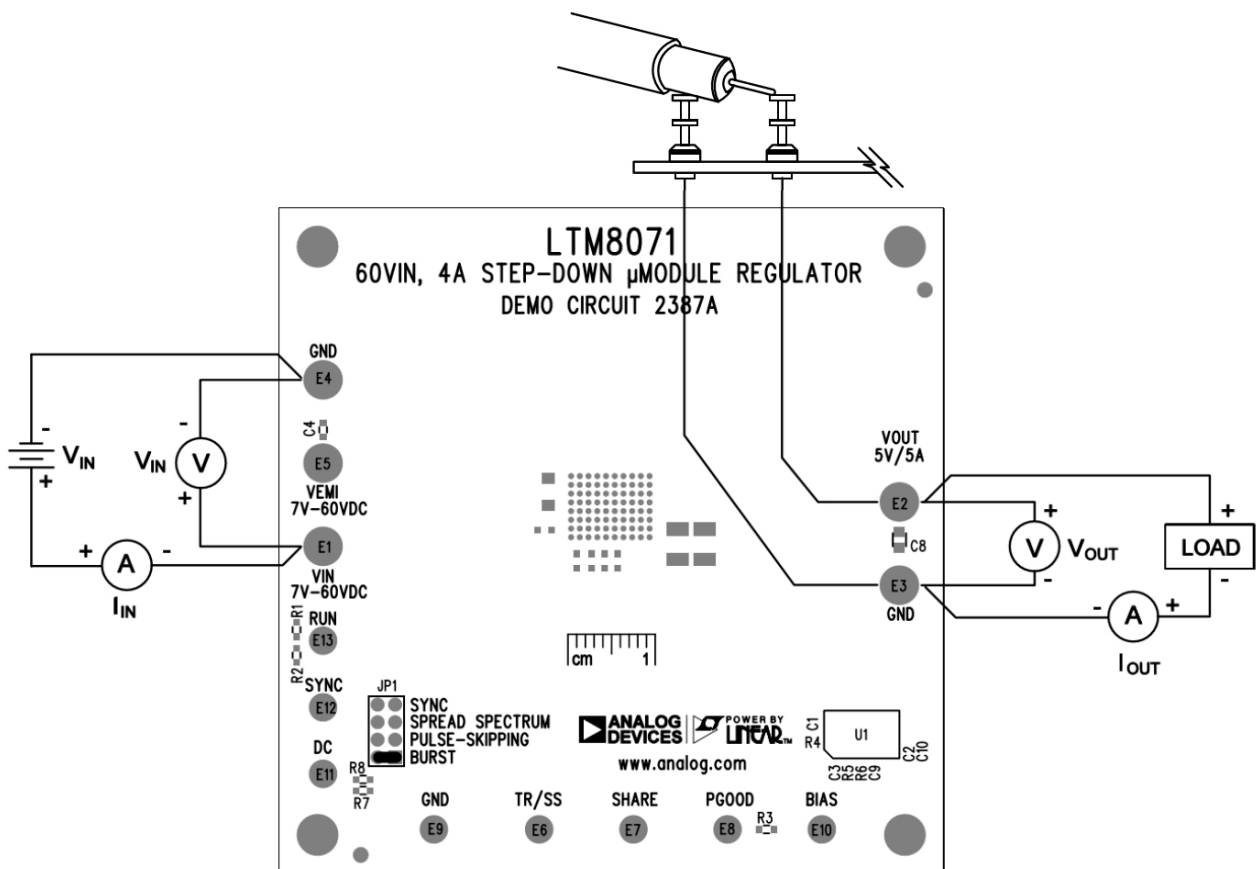


Figure 1. Test Setup of DC2387A

QUICK START PROCEDURE

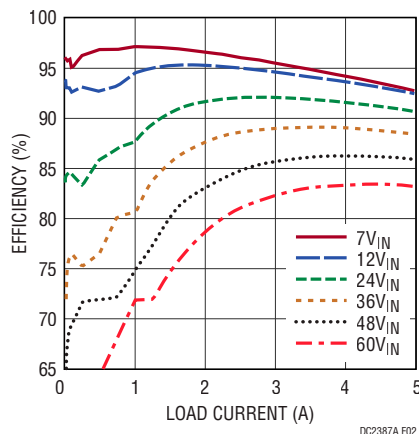


Figure 2. 5V_{OUT} Efficiency Curves at Various V_{IN} at 1MHz

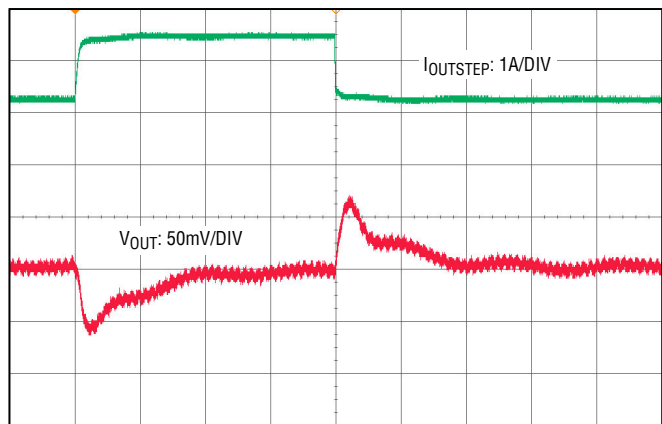


Figure 3. Load Transient (2.5A to 5A) Response Waveform at 12V_{IN}, 10µs/DIV

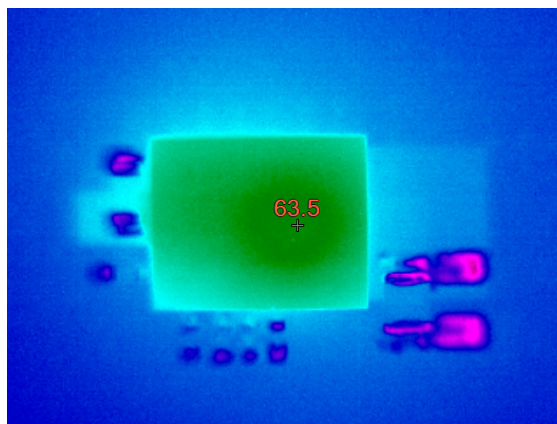


Figure 4. Measured Thermal Capture at 12V_{IN}, 5A_{OUT} at 25°C Ambient with No Airflow

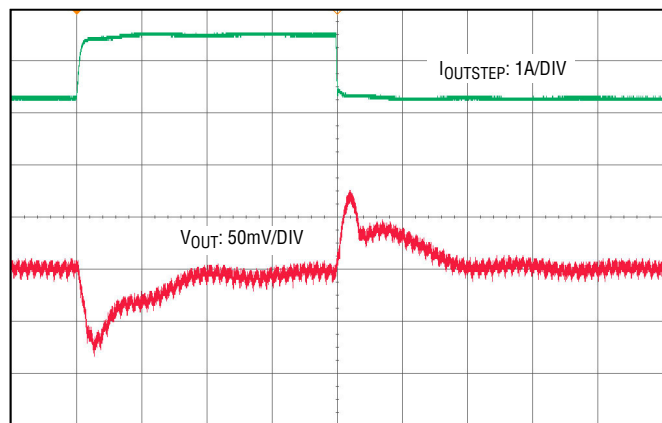


Figure 5. Load Transient (2.5A to 5A) Response Waveform at 48V_{IN}, 10µs/DIV

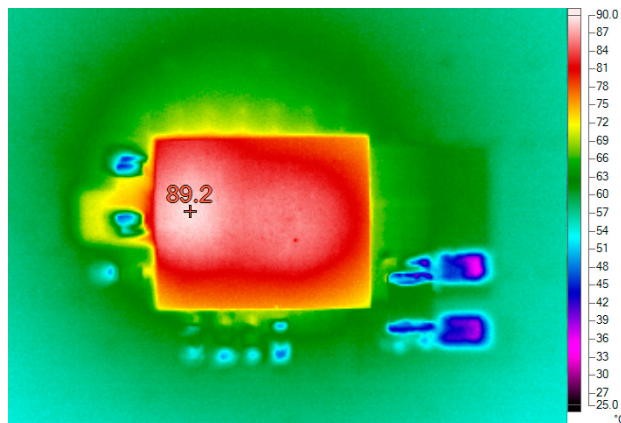


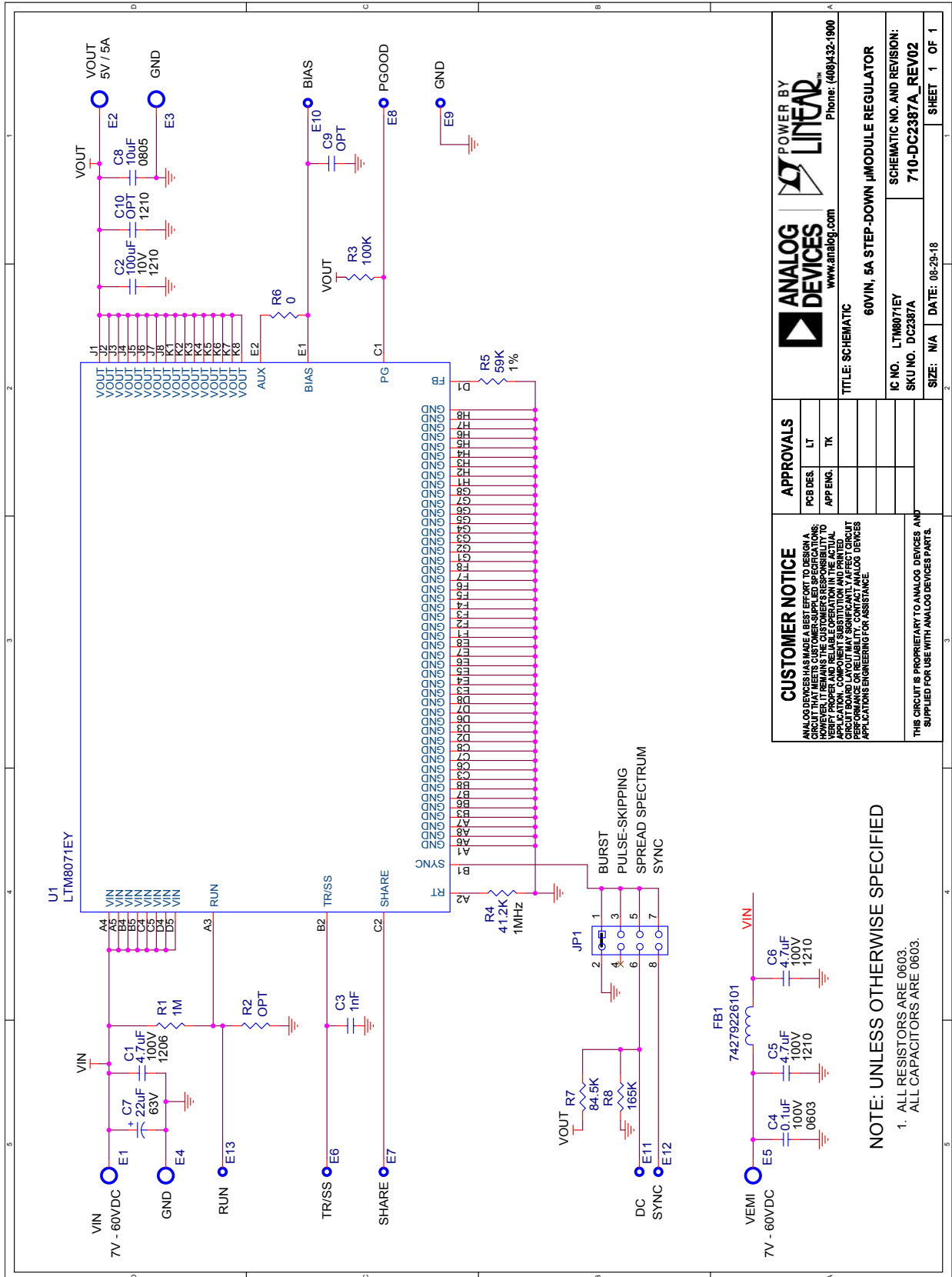
Figure 6. Measured Thermal Capture at 48V_{IN}, 5A_{OUT} at 25°C Ambient with No Airflow

DEMO MANUAL DC2387A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, 4.7 μ F, X7S, 100V, 10% 1206	AVX, 12061Z475KAT2A
2	1	C2	CAP, 100 μ F, X5R, 10V, 10% 1210	MURATA, GRM32ER61A107ME20L
3	1	C3	CAP, 1nF, C0G, 25V, 5% 0603	MURATA, GRM1885C1E102JA01D
4	1	C4	CAP, 0.1 μ F, X7R, 100V, 10% 0603	MURATA, GRM188R72A104KA35D
5	2	C5, C6	CAP, 4.7 μ F, X7S, 100V, 10% 1210	TDK, C3225X7S2A475K200AB
6	1	C7	CAP, 22 μ F, 63V	SUN ELEC, 63CE22BS
7	1	C8	CAP, 10 μ F, X7R, 10V, 10% 0805	MURATA, GRM21BR71A106KE51K
8	1	R1	RES, 1M, 1/10W, 1% 0603	VISHAY, CRCW06031M00FKEA
9	1	R3	RES, 100k, 1/10W, 1% 0603	VISHAY, CRCW0603100KFKEA
10	1	R4	RES, 41.2k, 1/10W, 1% 0603	VISHAY, CRCW060341K2FKEA
11	1	R5	RES, 59k, 1/10W, 1% 0603	VISHAY, CRCW060359K0FKEA
12	1	R6	RES, 0 Ω , 1/10W, 0603	VISHAY, CRCW06030000Z0EA
13	1	R7	RES, 84.5k, 1/10W, 1% 0603	VISHAY, CRCW060384K5FKEA
14	1	R8	RES, 165k, 1/10W, 1% 0603	VISHAY, CRCW0603165KFKEA
15	1	FB1	CHIP BEAD	WURTH ELEKTRONIK, 74279226101
16	1	U1	IC, 60V, 4.5A STEP-DOWN μ MODULE REG	ANALOG DEVICES, LTM8071EY#PBF
Additional Demo Board Circuit Components				
17	0	C9	CAP, OPTION, 0603	OPTION
18	0	C10	CAP, OPTION, 1210	OPTION
19	0	R2	RES, OPTION, 0603	OPTION
Hardware: For Demo Board Only				
20	2	E1, E2, E3, E4, E5	TESTPOINT, TURRET 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
21	7	E6, E7, E8, E9, E10, E11, E12, E13	TESTPOINT, TURRET 0.064"	MILL-MAX, 2308-2-00-80-00-00-07-0
22	6	JP1	HEADER, 2x4, 2mm	SULLINS, NRPN021PAEN-RC
23	3	XJP1	SHUNT, 2mm	SAMTEC, 2SN-BK-G
24	4	MP1, MP2, MP3, MP4	STAND-OFF, NYLON 0.50" TALL	KEYSTONE, 8833 (SNAP ON)

SCHEMATIC DIAGRAM



www.analog.com		Phone: (408)432-1900	
TITLE: SCHEMATIC			
60VIN, 5A STEP-DOWN μMODULE REGULATOR			
IC NO. LTM8071EY		SCHEMATIC NO. AND REVISION:	
SKU NO. DC2387A		710-DC2387A_REV02	
SIZE: N/A		DATE: 08-29-18	
SHEET 1 OF 1		1	

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NOTE: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 0603.
 ALL CAPACITORS ARE 0603.

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