

## General Description

The EVAL-LTM4707-AZ evaluation board is a step-down DC-to-DC switching converter featuring the [LTM<sup>®</sup>4707](#) power  $\mu$ Module<sup>®</sup> (micromodule) regulator. The EVAL-LTM4707-AZ is designed to deliver 16A maximum output current from a 4V to 16V input. The LTM4707 employs [Silent Switcher<sup>®</sup>3](#) architecture with internal hot loop bypass capacitors to achieve both low electromagnetic interference (EMI) and high efficiency. The LTM4707 contains a current mode regulator IC, a power inductor, and a modest amount of input and output capacitance. A single resistor (R3) sets the output voltage, providing unity gain operation over the output range, resulting in virtually constant output noise independent of output voltage.

The EVAL-LTM4707-AZ evaluation board's default switching frequency is 400kHz. An external resistor is placed from the RT pin to GND (R7) to set the switching frequency.

The SYNC pin programs three different operating modes (JP1 jumper): select PULSE for pulse-skipping mode (PSM) with improved efficiency at light loads; select FCM for forced continuous mode operation where fixed frequency operation is more critical than low current efficiency, and where the lowest output ripple is desired;

select SYNC to synchronize to an external clock signal. The RUN terminal can be used to set the LTM4707 in shutdown mode. The power good output (PG) will be low when the output voltage exceeds the  $\pm 7.5\%$  regulation window. When the power good feature is used, set the PGSET resistor (R1) value according to the regulator output voltage.

The LTM4707 data sheet provides a complete description of the operation and application information. The data sheet must be read in conjunction with this user guide.

## Features and Benefits

- Parallel for High-Power Applications
- External or Internal Compensation
- With Optional Input EMI Filter

## EVAL-LTM4707-AZ Evaluation Board Files

FILE	DESCRIPTION
<a href="#">EVAL-LTM4707-AZ</a>	Design files

[Ordering Information](#) appears at end of this user guide.

## Evaluation Board Photo

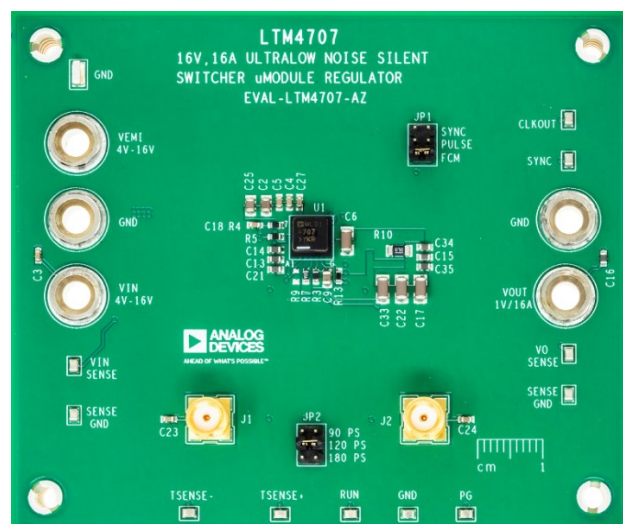


Figure 1. EVAL-LTM4707-AZ Evaluation Board (Part Marking is either Ink Mark or Laser Mark)

## Performance Summary

Specifications are at  $T_A = 25^\circ\text{C}$ .

PARAMETER	CONDITIONS	MIN	TYP	MAX	VALUE
Input voltage range		4		16	V
Output voltage	$V_{IN} = 4\text{V to }16\text{V}$ , $I_{OUT} = 0\text{A to }16\text{A}$			$1 \pm 2\%$	V
Maximum output current	$V_{IN} = 4\text{V to }16\text{V}$		16		A
Typical switching frequency	$R_T = 287\text{k}\Omega$		400		kHz
Typical efficiency	$V_{IN} = 12\text{V}$ , $I_{OUT} = 16\text{A}$		84.7		%

## Quick Start

### Required Equipment

- One power supply: 16V, 5A
- One load: 1V, 16A
- Two digital voltmeters (DVMs) for  $V_{IN}$ , and  $V_{OUT}$

### Quick Start Procedure

The EVAL-LTM4707-AZ evaluation board is easy to set up to evaluate the performance of the LTM4707. See [Figure 2](#) for the proper measurement equipment setup and use the following procedure.

1. With power off, connect the input power supply to  $V_{IN}$  (4V to 16V) and GND (input return).
2. Connect the 1V output load between  $V_{OUT}$  and GND (initial load: no load).
3. Connect the DVMs to the input and output. Set the default jumper in the following position.

JP1	JP2
FCM	120 PS

4. Turn on the input power supply and check for the proper output voltage. The  $V_{OUT}$  should be  $1\text{V} \pm 2\%$ .
5. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, efficiency, and other parameters.

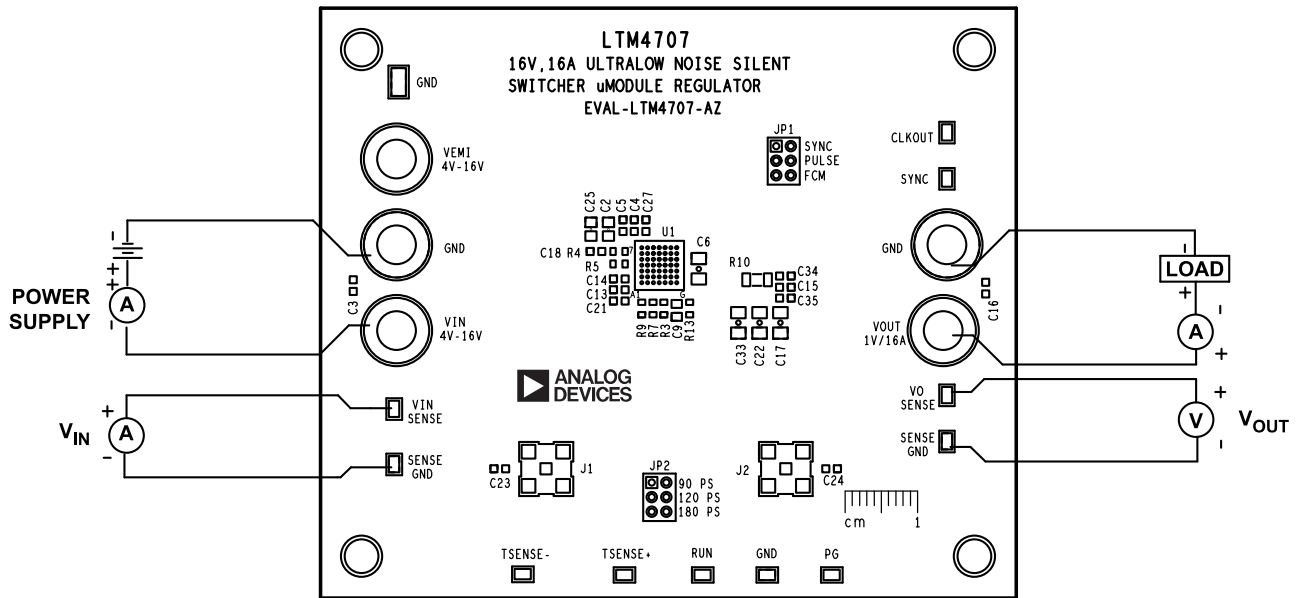


Figure 2. Proper Measurement Equipment Setup

**Note:** When measuring the output or the input voltage ripple, do not use the long ground lead on the oscilloscope probe. See [Figure 3](#) for the proper scope probe technique. Short, stiff leads may be soldered to an output capacitor's (+) and (-) terminals. The probe's ground ring needs to touch the (-) lead, and the probe tip needs to touch the (+) lead.

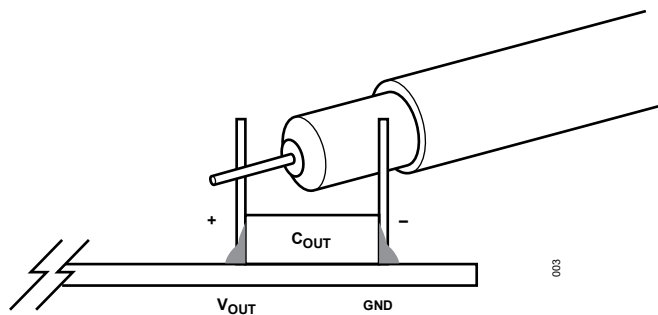


Figure 3. Measuring Output Ripple Voltage

Typical Performance Characteristics

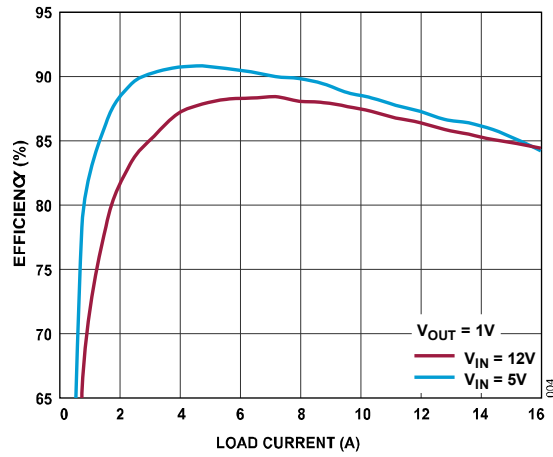


Figure 4. Efficiency vs. Load Current, Forced Continuous Mode

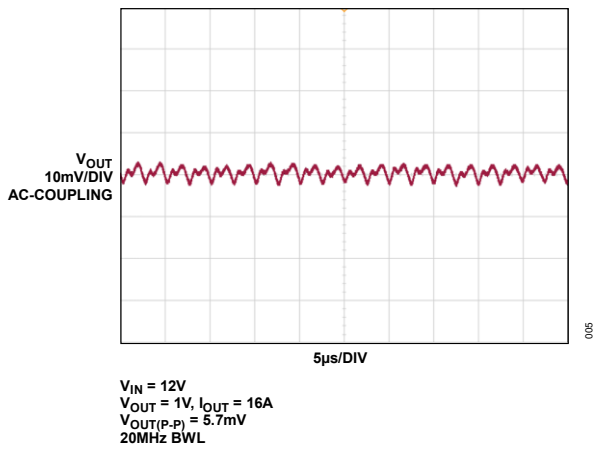


Figure 5. Output Voltage Ripple

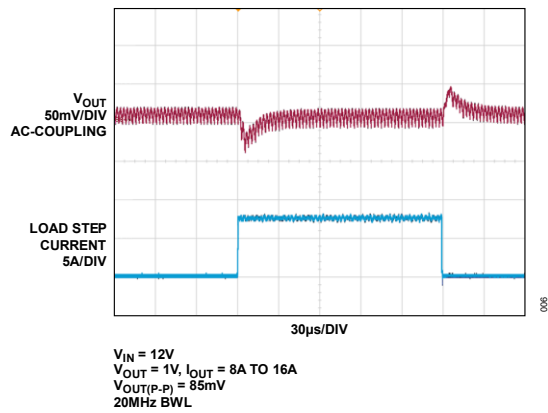


Figure 6. Load Step Transient Test

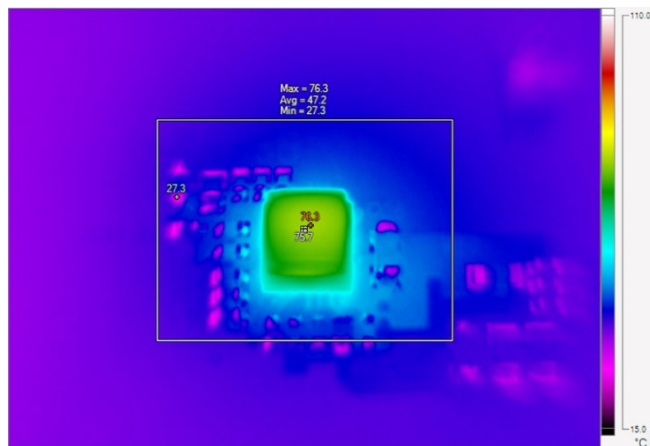


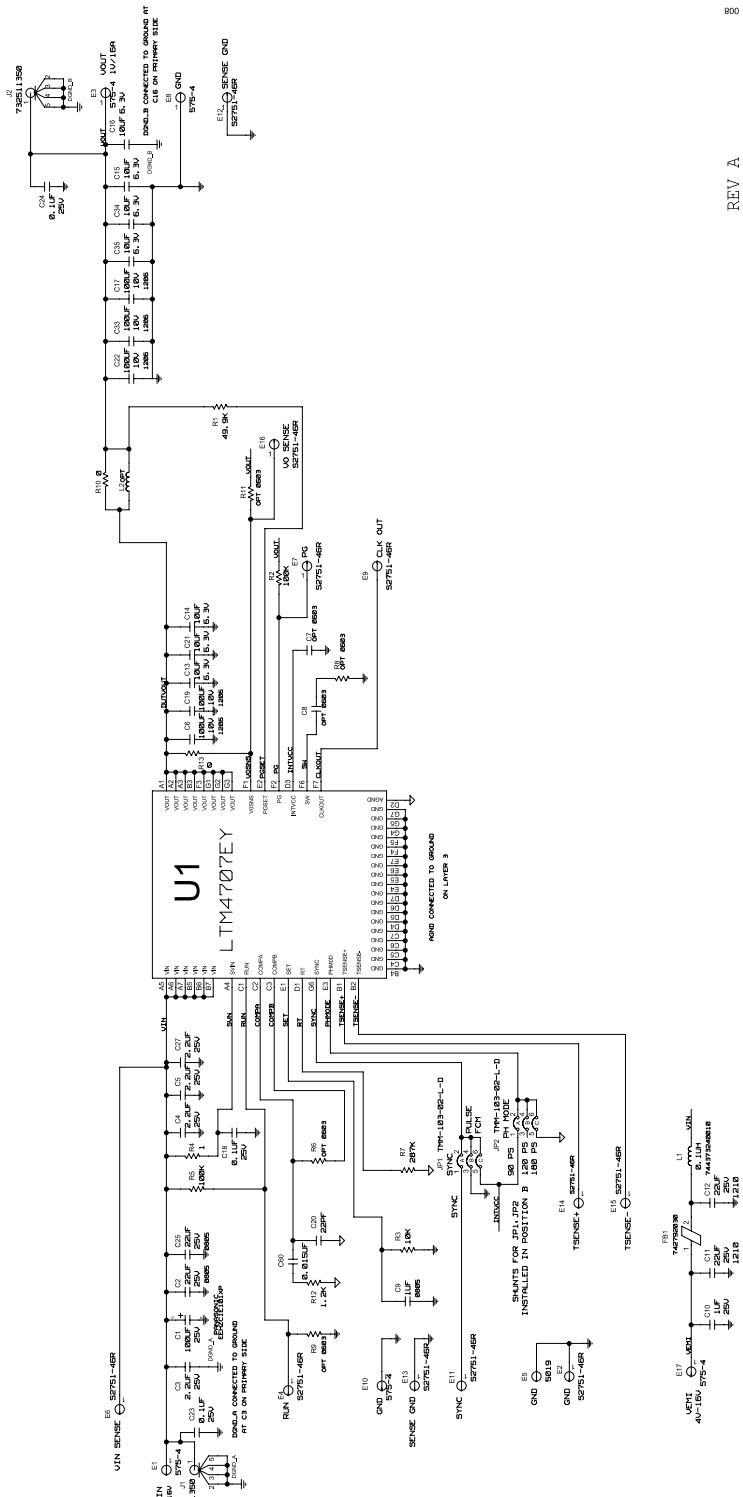
Figure 7. Thermal Image,  $12V_{IN}, 1V_{OUT}, I_{OUT} = 16A$ , No Heat Sink, No Forced Airflow

## EVAL-LTM4707-AZ Evaluation Board Bill of Materials

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
<b>Required Circuit Components</b>				
1	1	C1	CAP. ALUM POLY HYBRID 100 $\mu$ F 25V 20% 6.3mm $\times$ 7.7mm AEC-Q200	PANASONIC, EEHZC1E101XP
2	1	C10	CAP. CER 1 $\mu$ F 25V 10% X7R 0603 AEC-Q200	TDK, CGA3E1X7R1E105K080AC
3	2	C11, C12	CAP. CER 22 $\mu$ F 25V 10% X7R 1210	MURATA, GRM32ER71E226KE15L
4	7	C13-C16, C21, C34, C35	CAP. CER 10 $\mu$ F 6.3V 20% X7R 0603	TDK, C1608X7S0J106M080AC
5	5	C6, C17, C19, C22, C33	CAP. CER 100 $\mu$ F 10V 20% X5R 1206 LOW ESR	TDK, C3216X5R1A107M160AC
6	3	C18, C23, C24	CAP. CER 0.1 $\mu$ F 25V 10% X7R 0603	SAMSUNG, CL10B104KA8NNNC
7	2	C2, C26	CAP. CER 22 $\mu$ F 25V 20% X5R 0805 AEC-Q200	MURATA, GRM21BR61E226ME44L
8	4	C3-C5, C27	CAP. CER 2.2 $\mu$ F 25V 10% X5R 0603	MURATA, GRM188R61E225KA12D
9	1	C60	CAP. CER 0.015 $\mu$ F 25V 1% C0G 0603 EXTREME LOW ESR	MURATA, GCM188R72A153KA37D
10	1	C9	CAP. CER 1 $\mu$ F 10V 10% X7R 0805	TAIYO YUDEN, MSASL219SB7105KTNA01
11	1	C20	CAP. CER 22pF 50V 5% C0G, NP0 0603	
12	1	FB1	IND. CHIP FERRITE 30 $\Omega$ 10A 25% 0.003 $\Omega$ DCR 0805	WÜRTH ELEKTRONIK, 742792030
13	1	R1	RES. SMD 49.9k $\Omega$ 1% 1/10W 0603 AEC-Q200	PANASONIC, ERJ-3EKF4992V
14	1	R10	RES. SMD 0 $\Omega$ 1% 1/4W 1206	VISHAY, WSL120600000ZEA9
15	1	R12	RES. SMD 1.2k $\Omega$ 1% 1/16W 0603	MULTI-COMP, MC0063W060311K2
16	1	R13	RES. SMD 0 $\Omega$ JUMPER 1/10W 0603 AEC-Q200 PRECISION POWER	VISHAY, CRCW06030000Z0EA
17	2	R2, R5	RES. SMD 100k $\Omega$ 1% 1/10W 0603 AEC-Q200	VISHAY, CRCW0603100KFKEA
18	1	R3	RES. SMD 10k $\Omega$ 1% 1/10W 0603 AEC-Q200	PANASONIC, ERJ-3EKF1002V
19	1	R4	RES. SMD 1 $\Omega$ 1% 1/10W 0603	YAGEO, RC0603FR-071RL
20	1	R7	RES. SMD 287k $\Omega$ 1% 1/10W 0603	YAGEO, RC0603FR-07287KL
21	1	U1	IC-ADI 16V <sub>IN</sub> , 16A Silent Switcher 3 $\mu$ Module REGULATOR	ANALOG DEVICES, LTM4707EY#PBF

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
<b>Additional Evaluation Board Circuit Components</b>				
1	0	C7, C8		
2	0	R6, R8, R9, R11		
3	0	L2		
<b>Hardware: For Evaluation Board Only</b>				
1	5	E1, E3, E8, E10, E17	CONN-PCB BANANA JACK	KEYSTONE ELECTRONICS, 575-4
2	11	E2, E4, E6, E7, E9, E11-E16	CONN-PCB SMD TEST POINT TIN 2.00mm × 1.20mm	HARWIN, S2751-46R
3	1	E5	CONN-PCB TEST POINT COMPACT MINI	KEYSTONE ELECTRONICS, 5019
4	2	J1, J2	CONN-PCB SMA FEMALE JACK RCP, 50Ω	MOLEX, 732511350
5	2	JP1, JP2	CONN., HDR, MALE, 2 × 3, 2mm, VERT, ST, THT	WÜRTH ELEKTRONIK, 62000621121
6	3		SHUNT, 2mm JUMPER WITH TEST POINT	WÜRTH ELEKTRONIK, 60800213421
7	4		STANDOFF, NYLON, SNAP-ON, 0.50"	WÜRTH ELEKTRONIK, 702935000

EVAL-LTM4707-AZ Evaluation Board Schematic



800

REV A

## Ordering Information

PART	TYPE
EVAL-LTM4707-AZ	16V, 16A Ultralow Noise Silent Switcher 3 $\mu$ Module Regulator.

## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	11/24	Initial release.	—



## Notes

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