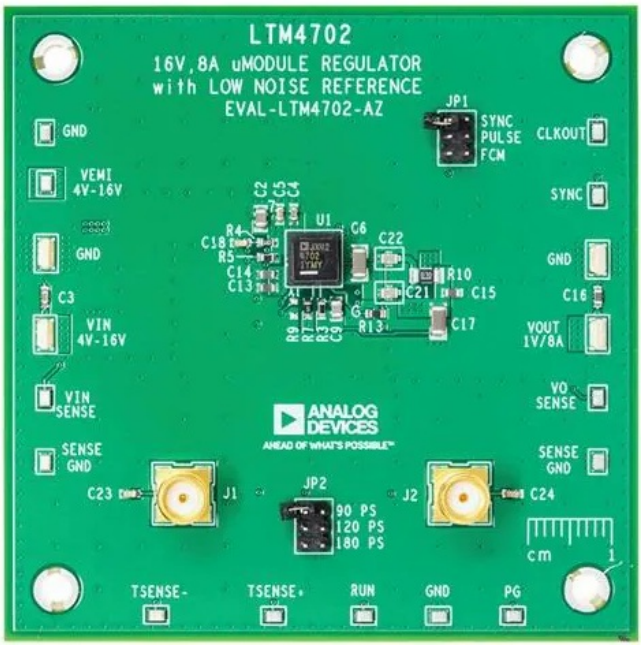
Manuals+ — User Manuals Simplified.

ANALOG DEVICES LTM4702EY Step Down Module Regulator Low Noise Reference Instruction Manual

ANALOG DEVICES LTM4702EY Step Down Module Regulator Low Noise Reference Instruction Manual



Contents

1 DESCRIPTION
2 BOARD PHOTO
3 PERFORMANCE SUMMARY
4 QUICK START PROCEDURE
5 TYPICAL PERFORMANCE CHARACTERISTICS
6 TEST RESULTS
7 PARTS LIST
8 SCHEMATIC DIAGRAM
9 REVISION HISTORY
10 Documents / Resources
10.1 References
11 Related Posts

DESCRIPTION

Evaluation board EVAL-LTM4702-AZ is a step-down DC/DC switching converter featuring the LTM®4702 µModule® regulator. The evaluation board is designed to deliver 8A maximum output current from a 4V to 16V input. The LTM4702 employs Silent Switcher® architecture with internal hot loop bypass capacitors to achieve both low EMI and high efficiency. The LTM4702 contains a current mode regulator IC, 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-LTM4702-AZ evaluation board default switching frequency is 800kHz. An external resistor is placed from RT pin to GND (R7) to set the switching frequency.

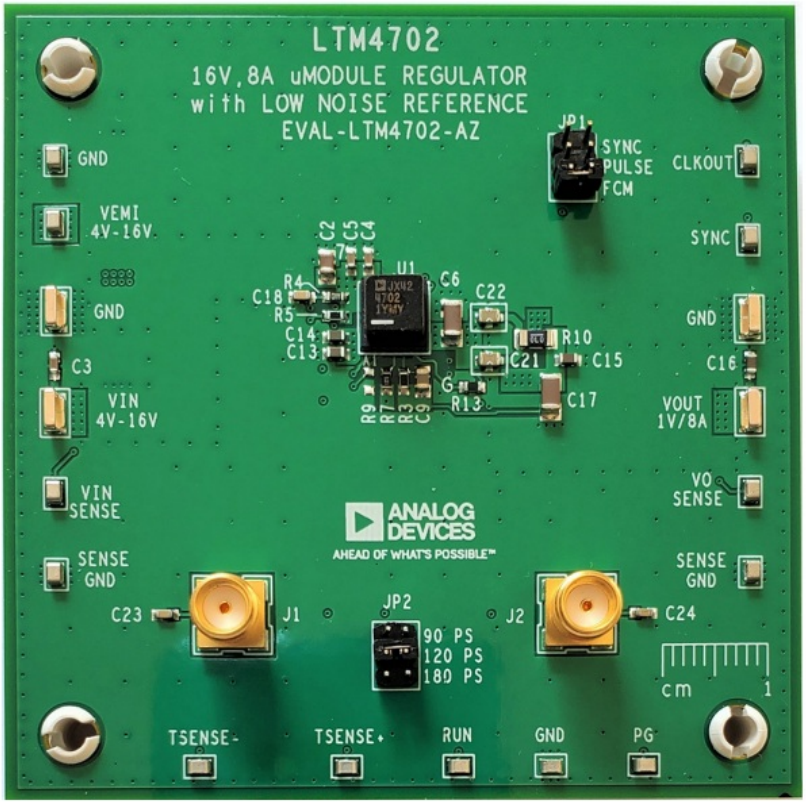
SYNC pin programs three different operating modes (JP1 jumper): select PULSE for pulse-skipping mode with improved efficiency at light loads; select FCM for forced continuous mode operation where fixed frequency operation is more critical than low current efficiency and where the lowest output ripple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

The RUN terminal can be used to set the LTM4702 in shutdown mode. The power good output (PG) will be low when the output voltage is outside of the ±7.5% regulation window. When the power good feature is used, set the PGSET resistor (R1) value according to the regulator output voltage.

The LTM4702 data sheet gives a complete description of the operation and application information. The data sheet must be read in conjunction with this evaluation board.
Design files for this circuit board are available.

BOARD PHOTO

Part marking is either ink mark or laser mark



PERFORMANCE SUMMARY

Specifications are at **TA = 25°C**

PARAMETER	CONDITIONS	MIN TYP MAX	V
Input Voltage Range		4 16	V
Output Voltage	VIN = 4V to 16V, IOUT = 0A to 8A	1 ±2%	A
Maximum Output Current	VIN = 4V to 16V	8	A
Typical Switching Frequency		800	kHz
Typical Efficiency	VIN = 12V, IOUT = 8A	80.5	%

QUICK START PROCEDURE

Evaluation board **EVAL-LTM4702-AZ** is easy to set up to evaluate the performance of the LTM4702. See Figure 1 for the proper measurement equipment setup and follow the procedure below.

1. With power off, connect the input power supply to VIN (4V to 16V) and GND (input return).
2. Connect the 1V output load between VOUT and GND (Initial load: no load).
3. **Connect the DVMs to the input and output. Set default jumper position:**

   JP1: FCM ON

   JP2: 120 PS ON
4. Turn on the input power supply and check for the proper output voltage. **VOUT** should be 1V ±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.

NOTE: When measuring the output or input voltage ripple, do not use the long ground lead on the oscilloscope probe. See Figure 2 for the proper scope probe technique. Short, stiff leads may be soldered to the **(+)** and **(–)** terminals of an output capacitor. The probe's ground ring needs to touch the **(–)** lead, and the probe tip needs to touch the **(+)** lead.

TYPICAL PERFORMANCE CHARACTERISTICS

Figure 1. Proper Measurement Equipment Setup

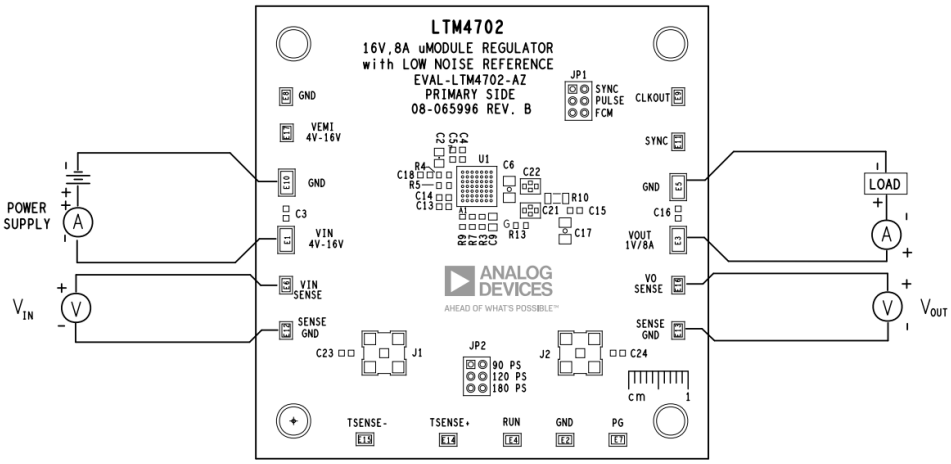
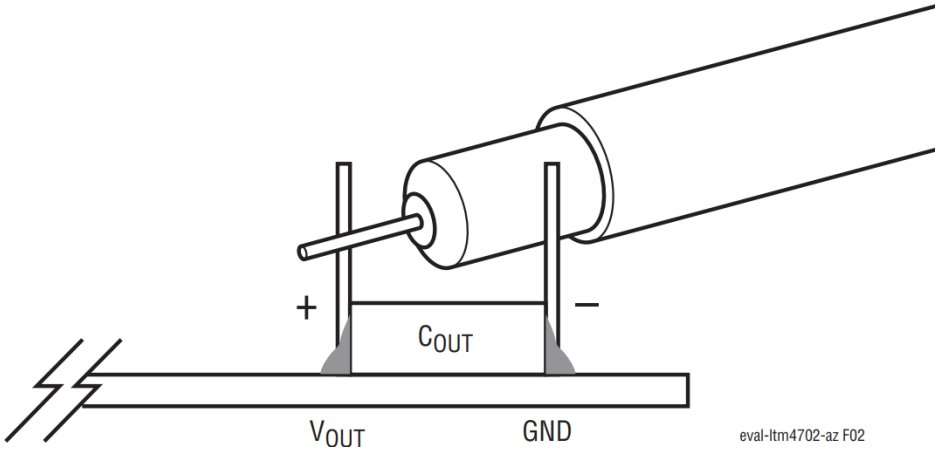


Figure 2. Measuring Output Ripple Voltage



TEST RESULTS

Figure 3. Efficiency vs Load Current, VIN = 12V

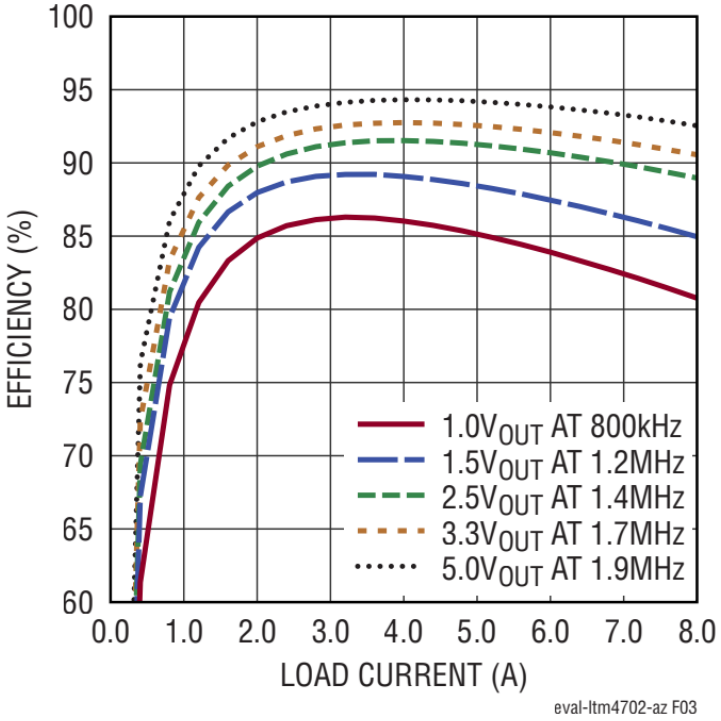


Figure 4. Output Voltage Ripple (12VIN, 1V, 8A Output)

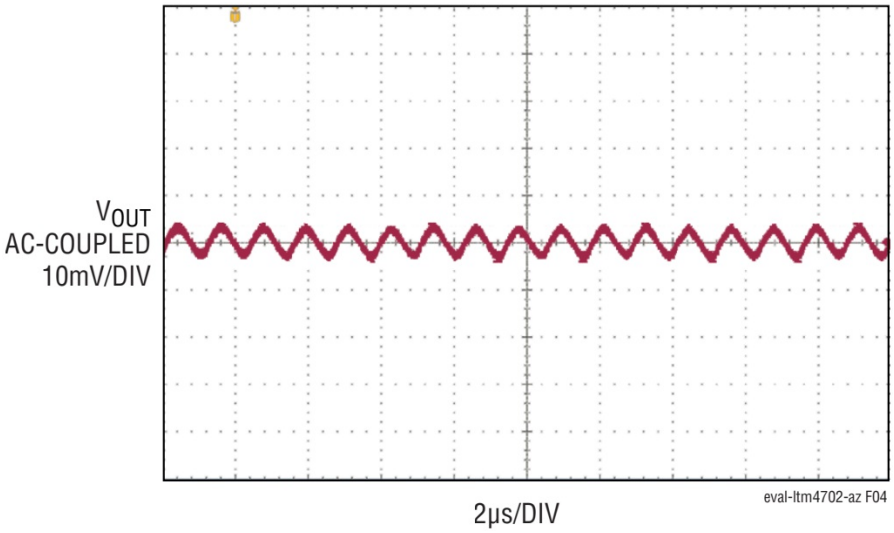


Figure 5. Load Step Transient Test (VIN = 12V, VOUT = 1V)

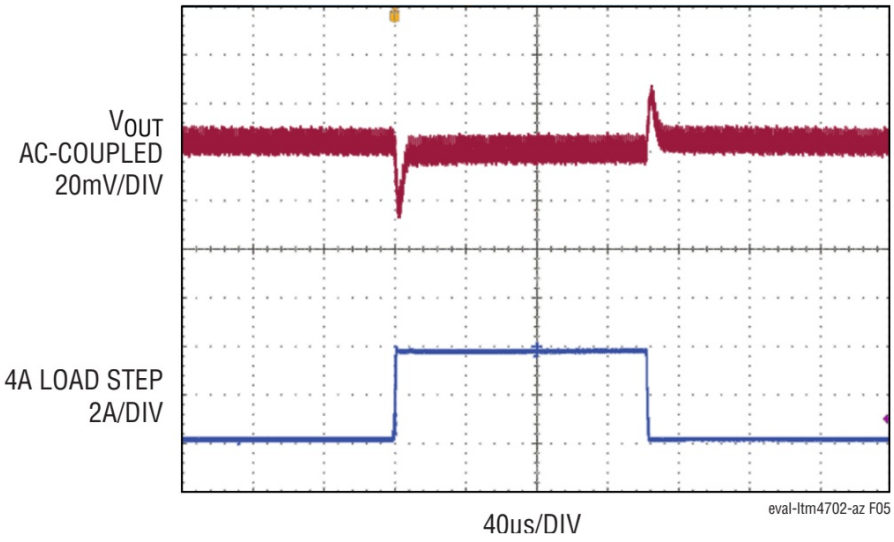
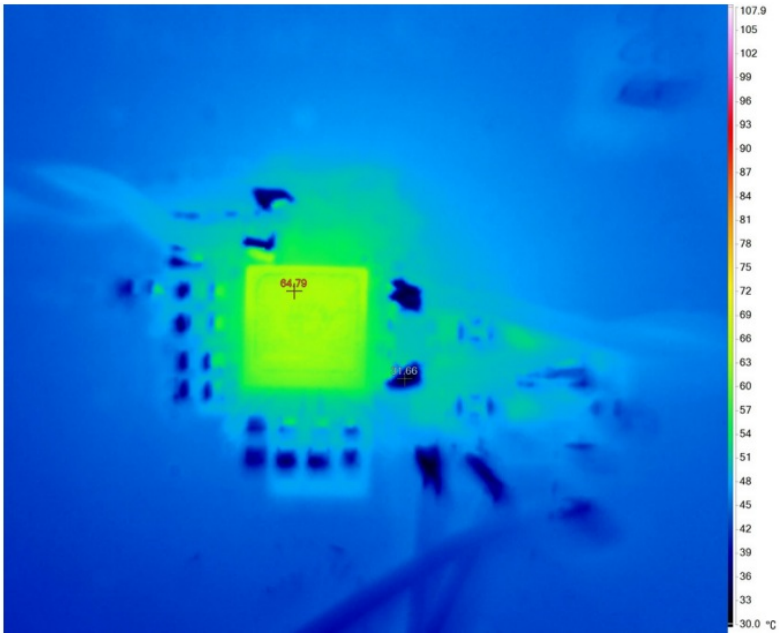


Figure 6. Thermal Image, VIN = 12V, 1V, 8A Output (No Heat Sink, No Forced Airflow)

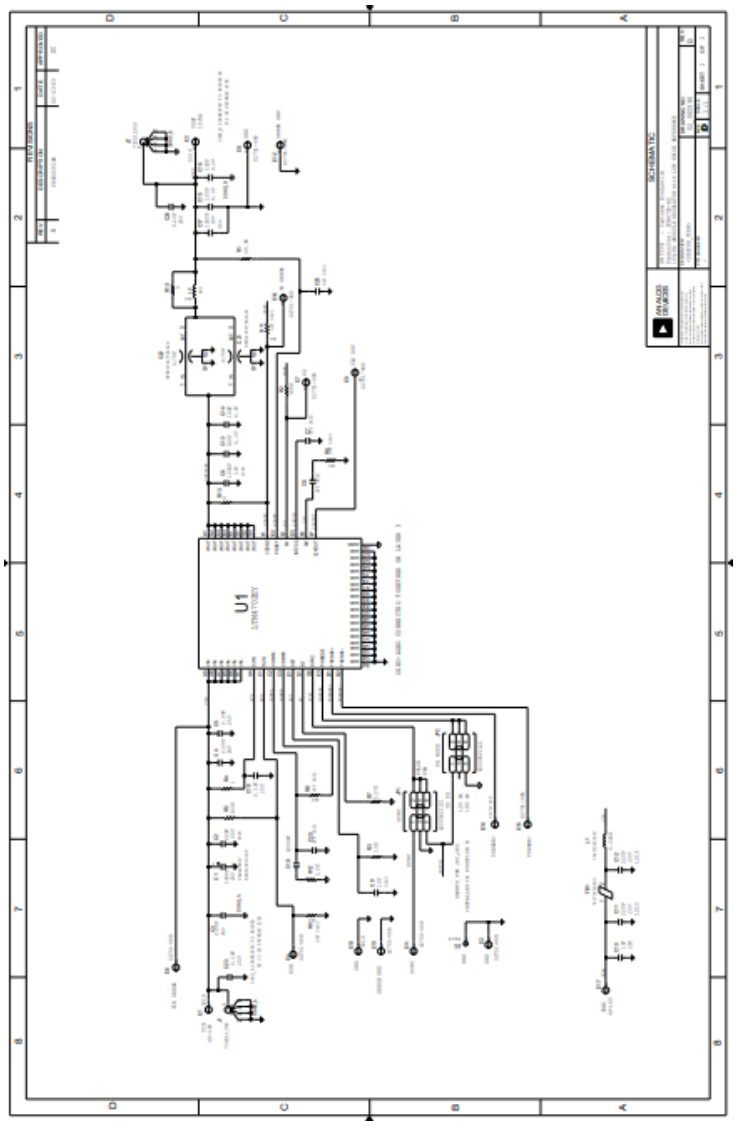


PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
1	1	C1	CAP., ALUM POLY HYBRID, 100µF, 25V, 20%, 6.3mm × 7.7mm, AEC-Q200	PANASONIC, EEHZC1E101XP
2	1	C10	CAP. CER, 1µF, 25V, 10%, X7R, 0603, AEC-Q200	TDK, CGA3E1X7R1E105K080AC
3	2	C11, C12	CAP. CER, 22µF, 25V, 10%, X7R, 1210	MURATA, GRM32ER71E226KE15L
4	4	C13, C14, C15, C16	CAP. CER, 10µF, 6.3V, 20%, X7S, 0603	TDK, C1608X7S0J106M080AC
5	2	C6, C17	CAP. CER, 100µF, 10V, 20%, X5R, 1206, LOW ESR	TDK, C3216X5R1A107M160AC
6	3	C18, C23, C24	CAP. CER, 0.1µF, 25V, 10%, X7R, 0603	SAMSUNG, CL10B104KA8NNNC
7	1	C19	CAP. CER, 2200pF, 16V, 10%, X7R, 0603	VISHAY, VJ0603Y222KXJCW1BC
8	1	C2	CAP. CER, 22µF, 25V, 20%, X5R, 0805, AEC-Q200	MURATA, GRT21BR61E226ME13L
9	2	C21, C22	CAP FEEDTHRU, 4.7µF, 10V, 20%, 0805, 3-TERMINAL	MURATA, NFM21PC475B1A3D
10	3	C3, C4, C5	CAP. CER, 2.2µF, 25V, 10%, X5R, 0603	MURATAGRM188R61E225KA12D
11	1	C9	CAP. CER, 1µF, 10V, 10%, X7R, 0805	AVX, 0805ZC105KAT2A
12	1	FB1	IND., CHIP FERRITE BEAD, 0.015Ω, DCR, 5.1A	WURTH ELEKTRONIK, 74279228600

13	1	L1	IND., POWER SHIELDED WIREWOUND, 0.0073Ω, DCR, 9.5A	WURTH ELEKTRONIK, 744373240022
14	1	R1	RES., SMD, 49.9k, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ-3EKF4992V
15	1	R10	RES., SMD, 0Ω, 1%, 1/4W, 1206	VISHAYWSL, 120600000ZEA9
16	1	R12	RES., 1.2k, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW06031K20FKEA
17	1	R13	RES., SMD, 0Ω, JUMPER, 1/10W, 0603, AEC-Q200,PRECISION POWER	VISHAY, CRCW06030000Z0EA
18	2	R2, R5	RES., SMD, 100k, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ-3EKF1003V
19	1	R3	RES., SMD, 10k 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ-3EKF1002V
20	1	R4	RES., SMD, 1Ω, 1%, 1/10W, 0603	YAGEO, RC0603FR-071RL
21	1	R7	RES., 137k, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW0603137KFKEA
22	1	U1	IC-ADI, 18VIN, 8A, Silent Switcher, µModule REGULATOR	ANALOG DEVICES, LTM4702EY#PBF
18	0	C7, C8, C20, C25	OPTIONAL CAPACITOR	
19	0	R6, R8, R9, R11	OPTIONAL RESISTOR	
20	0	L2	OPTIONAL INDUCTOR	
24	2	J1, J2	CONN., PCB, SMA, FEMALE JACK, RCP, 50Ω	MOLEX, 732511350
26	2	JP1, JP2	CONN., HDR, MALE, 2 × 3, 2mm, VERT, ST, THT	WURTH ELEKTRONIK, 62000621121
27	4		STANDOFF, BRD, SPT, SNAP-FIT, 9.53mm LENGTH, EVAL BOARD MTG	KEYSTONE, 8832
28	2		CONN., SHUNT, FEMALE, 2-POS, 2mm	KEYSTONE, 8831
29	1	PCBs	FAB PRINTED CIRCUIT BOARD	WURTH ELEKTRONIK, 702931000

SCHEMATIC DIAGRAM



REVISION HISTORY

REV	DATE	DESCRIPTION	PAGE NUMBER
0	04/23	Initial Release	—

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the “Evaluation Board”), you are agreeing to be bound by the terms and conditions set forth below (“Agreement”) unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you (“Customer”) and Analog Devices, Inc. (“ADI”), with its principal place of business at

One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI,Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. CONFIDENTIALITY. This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. ADDITIONAL RESTRICTIONS. Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. TERMINATION. ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. **LIMITATION OF LIABILITY. THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NONINFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS ($100.00). EXPORT.** Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.

www.analog.com
ANALOG DEVICES, INC. 2023

Downloaded from **Arrow.com**.

Documents / Resources

	**ANALOG DEVICES LTM4702EY Step Down Module Regulator Low Noise Reference** [pdf] Instruction Manual LTM4702EY Step Down Module Regulator Low Noise Reference, LTM4702EY, Step Down Module Regulator Low Noise Reference, Module Regulator Low Noise Reference, Low Noise Reference, Noise Reference, Reference

References

- **Mixed-signal and digital signal processing ICs | Analog Devices**
- **User Manual**

Manuals+, Privacy Policy