

LT8672 Active Rectifier Controller with Reverse Protection

DESCRIPTION

Demonstration circuit 2548A is an active rectifier with reverse protection featuring the [LT[®]8672](#). The demo board is designed for 5A load current. The input voltage range of the LT8672 is -40V to $+42\text{V}$. Two clamping diodes, D1 and D2, are used on the board to protect the IC from overvoltage spikes at the input, thus limiting the application's DC input voltage range to -15V and $+35\text{V}$.

The voltage drop on the MOSFET is 20mV in regulation. The LT8672 can rectify input ripple with an amplitude of $6\text{V}_{\text{P-P}}$ and a frequency of up to 50kHz, or with an amplitude of $2\text{V}_{\text{P-P}}$ and a frequency of up to 100kHz. High frequency ripple should not be applied at full load current for more than a few minutes, otherwise C5 may overheat.

JP1 can be used to set the LT8672 in shutdown mode. It can be turned on by connecting the EN/UVLO to V_{IN} or V_{OUT} . A digital signal can also be applied at the EN/UVLO turret to control the part. Due to the presence of the external MOSFET's body diode, the load is not disconnected from the input if the part is shut down.

The PG pin on the demo board can be easily by applying a voltage source between VEXT and GND. VEXT must not exceed 5V.

The demo board allows installation of an EMI filter at the output. To use the EMI filter, install L2, C7, and remove C5 on the board. In addition, multiple MOSFET footprints are provided on the backside of the board, making it convenient to use other MOSFETs.

The LT8672 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 2548A. The LT8672 is assembled in a 10-lead MSOP package. Proper board layout is essential for maximum thermal and electrical performance. See the data sheet sections for details.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2548A>

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	DC Operating Input Voltage Range		-15		35	V
f (AC)	Maximum Frequency of AC Input Signal to Be Rectified	$V_{\text{P-P}} < 6\text{V}$, $C_{\text{GATE-SOURCE}} = 10\text{nF}$	50			kHz
		$V_{\text{P-P}} < 2\text{V}$, $C_{\text{GATE-SOURCE}} = 10\text{nF}$	100			kHz
I_{OUT}	Max Output Current	$V_{\text{IN}} = 12\text{V}$	5			A

PERFORMANCE SUMMARY

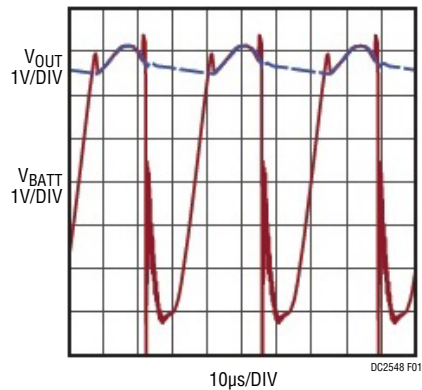


Figure 1. Rectification of Input Ripple ($f = 30\text{kHz}$, Load = 5A)

QUICK START PROCEDURE

Demonstration circuit 2548A is easy to set up to evaluate the performance of the LT8672. Refer to Figure 2 for proper measurement equipment setup and follow the procedure below:

1. Place JP1 on V_{OUT} or V_{IN} position.
2. Connect the input power supply to V_{IN} and GND.
3. Connect a load from V_{OUT} to GND.
4. Turn on the power at the input.
5. Check for the proper output voltages ($V_{OUT} = V_{IN} - 20mV$). The demo board provides test points TP1 and TP3 to accurately measure the voltage across the external MOSFET.

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not shorted.

6. Once the proper output voltage is established, adjust the load within the operating ranges and observe the output voltage.
7. To use the PG pin, connect a power source at VEXT that is not higher than 5V.
8. Test point TP5 allows easy access to the voltage at the AUX pin. The gate-source voltage can be observed between TP2 and TP4.

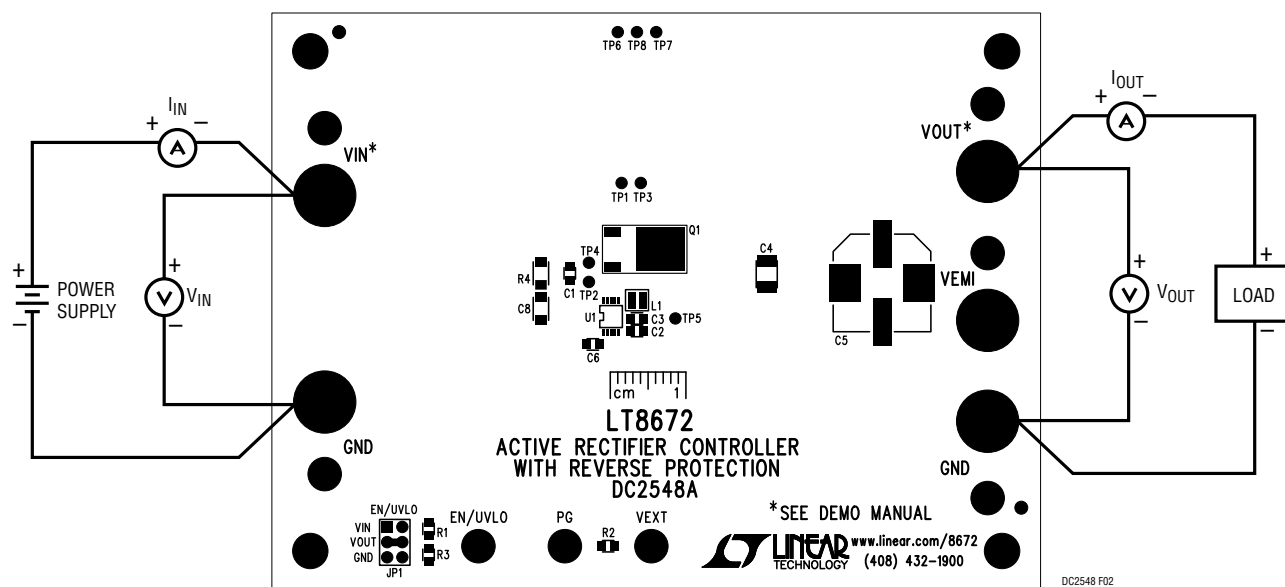


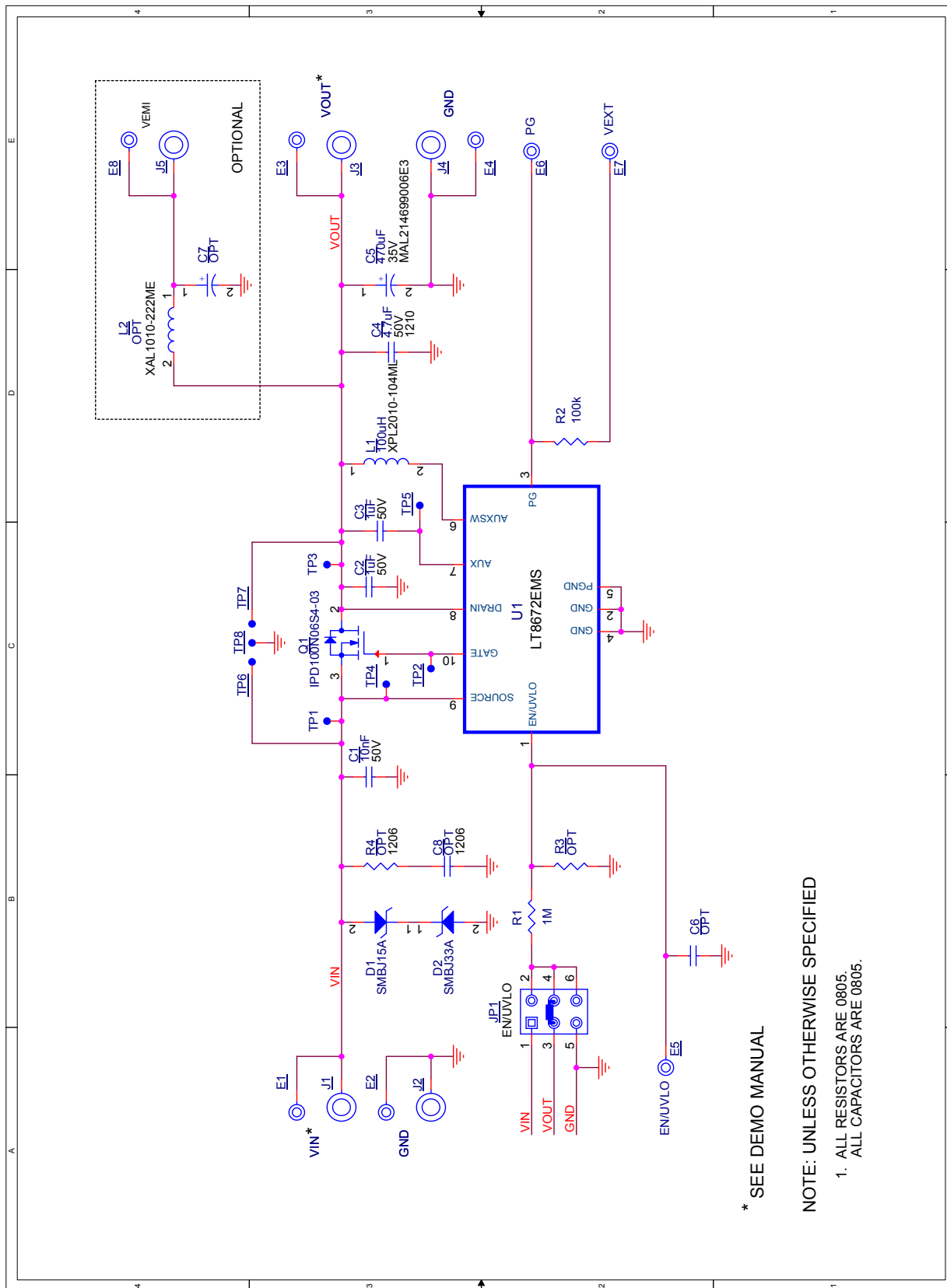
Figure 2. Proper Measurement Equipment Setup

DEMO MANUAL DC2548A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, CER., 0.01 μ F, X7R, 50V, 10%, 0805	MURATA, GRM216R71H103KA01D
2	2	C2, C3	CAP, CER., 1 μ F, X7R, 50V, 10%, 0805	MURATA, GRM21BR71H105KA12L
3	1	C4	CAP, CER., 4.7 μ F, X7R, 50V, 10%, 1210	MURATA, GRM32ER71H475KA88L
4	1	C5	CAP, ALUM., 470 μ F, 35V, 20%	VISHAY, MAL214699006E3
8	1	D1	DIODE, TVS, 15VWWM, SMB	DIODES INC., SMBJ15A-13-F
9	1	D2	DIODE, TVS, 33VWWM, SMB	DIODES INC., SMBJ33A-13-F
16	1	L1	IND., 100 μ H, XPL2010	COILCRAFT, XPL2010-104MLB
18	1	Q1	XSTR., N-CH, 60V, MOSFET, TO252	INFINEON, IPD100N06S403ATMA2
19	1	R1	RES., 1M, 1%, 1/8W, 0805	VISHAY, CRCW08051M00FKEA
20	1	R2	RES., 100k, 1%, 1/8W, 0805	VISHAY, CRCW0805100KFKEA
23	1	U1	I.C., CONTROLLER, 10-MSOP	LINEAR TECH., LT8672EMS#PBF
Additional Demo Board Circuit Components				
5	0	C6 (OPT)	CAP, OPTION, 0805	
6	0	C7 (OPT)	CAP, ALUM, OPTION, 12.5X16mm	
7	0	C8 (OPT)	CAP, OPTION, 1206	
17	0	L2 (OPT)	IND., OPTION, XAL1010	
21	0	R3 (OPT)	RES., OPTION, 0805	
22	0	R4 (OPT)	CAP, OPTION, 1206	
Hardware: For Demo Board Only				
10	7	E1-E7	TEST POINT, TURRET, 0.094" MTG. HOLE	MILL-MAX, 2501-2-00-80-00-00-07-0
11	0	E8 (OPT)	TEST POINT, OPTION, TURRET	
12	1	JP1	HEADER 3 PIN 0.079 DOUBLE ROW	WURTH ELEKTRONIK, 62000621121
13	1	XJP1	SHUNT, 0.079" CENTER	WURTH ELEKTRONIK, 60800213421
14	4	J1-J4	CONN., BANANA JACK	KEYSTONE, 575-4
15	0	J5 (OPT)	CONN., OPTION, BANANA JACK	

SCHEMATIC DIAGRAM



* SEE DEMO MANUAL

NOTE: UNLESS OTHERWISE SPECIFIED

- 1. ALL RESISTORS ARE 0805.
- ALL CAPACITORS ARE 0805.

DEMO MANUAL DC2548A

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