Evaluation Board User Guide

EVAL-LT4422-AZ

28V, 4A Ideal Diode

General Description

The EVAL-LT4422-AZ evaluation circuit showcases the LT4422, an ideal diode with integrated P-channel MOSFETs. The LT442 is designed to minimize power dissipation by regulating a 15mV forward voltage when enabled. Its fast OUT to IN reverse bias detection minimizes reverse current to prevent unwanted charging of the input source.

The board features two independent LT4422 ideal diodes that share a common ground and operate over a 1.9V to 28V range.

In shutdown mode, the LT4422 exhibits less than 500nA (typical) quiescent current to extend battery life.

Design files for this circuit board are available.

Performance Summary (T_A = 25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Voltage	V_{IN}	Operating voltage	1.9		28	V
Input to Output Voltage	V_{IN} - V_{OUT}		-30		+0.3	V
Output Voltage	V_{OUT}		-0.3		+30	V
Output Current	I_{OUT}				4	A

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Quick Start Procedure

The EVAL-LT4422-AZ evaluation circuit features two independent LT4422s that share a common ground. Each LT4422 is equipped with integrated P-channel MOSFETs in an ideal diode. A diode-or arrangement is used to evaluate the LT4422's performance. See Figure 1 and use the following procedure for proper measurement equipment setup:

1. With the power off, set jumpers JP1 and JP2 to ON. Connect the input power supply to the board through the VIN and GND terminals of both channel A and B. Connect the load to the VOUTA and GND terminal. Tie VOUTB to VOUTA.
2. Set Load = 2A and turn ON.
3. Set the power supply of VINA = 12V, VINB = 5V, and turn ON.
4. Observe VOUT = 12V.
5. Slowly increase VINB's voltage to 24V.
    a. When VINB goes above 12V, observe VOUT rises with VINB.
    b. When VINB = 24V, VOUT = 24V.
6. Slowly decrease VINB to 5V.
    a. Observe VOUT follows VINB until VINB reaches 12V.
    b. When VINB goes below 12V, VOUT = 12V.

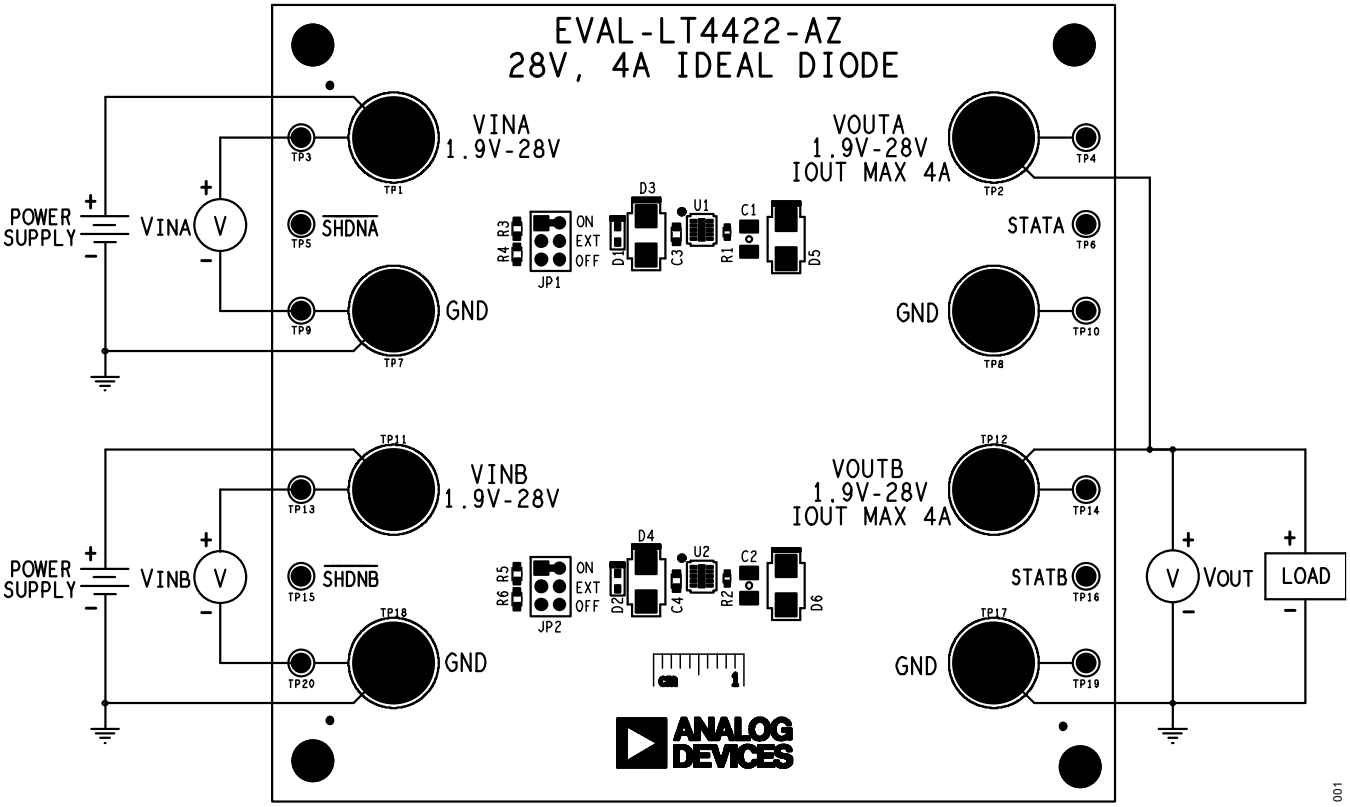

Figure 1. EVAL-LT4422-AZ Board Connection in Diode-Or Configuration

ON/OFF Control

The LT4422 can be turned on and off by placing the $\overline{\text{SHDN}}$ jumper in the ON or OFF position. In the OFF position, the $\overline{\text{SHDN}}$ pin is tied to GND, placing the LT4422 in shutdown mode. In shutdown, the quiescent current consumption of the LT4422 is reduced to ≈500nA (typical). Note that the load is not disconnected from the input due to the internal MOSFET's body diode. In the ON position, $\overline{\text{SHDN}}$ is shorted to VIN to enable the LT4422 when the input voltage supply is within operational range.

In the EXT position, the $\overline{\text{SHDN}}$ pin is connected through a resistive divider from VIN or a voltage applied by an external source on the $\overline{\text{SHDN}}$ turret. By adding a resistive divider from VIN to GND, the EVAL-LT4422-AZ can be programmed to be enabled/disabled at a specified VIN voltage.

STATUS Detection

STATUS is an open-drain output intended to indicate power-path conditions. STATUS is designed for connection to a power supply through pull-up resistors. The open-drain STATUS output pulls low when the LT4422 is in shutdown or reverse bias. Note that the STATUS function is optional and can easily be removed for simplicity by leaving STATUS open.

Bill of Materials

ITEM	QTY	DESIGNATOR	DESCRIPTION	MANUFACTURER PART NUMBER
REQUIRED CIRCUIT COMPONENTS				
1	2	C1, C2	CAP CER 10uF 50V 10% X7R 1206	SAMSUNG, CL31B106KBHNNNE
2	2	C3, C4	CAP CER 0.1uF 50V 10% X7R 0603	AVX, 06035C104KAT2A
3	2	R1, R2	RES SMD 100K Ohm 1% 1/10W 0402 AEC-Q200 100K R1	PANASONIC, ERJ-2RKF1003X
4	2	U1, U2	IC-ADI 28V, IDEAL DIODE	ANALOG DEVICES, LT4422AV#TRPBF
OPTIONAL CIRCUIT COMPONENTS				
1	2	D1, D2	IO SCHOTTKY 30V 1A 2LD SOD-523	NEXPERIA, PMEG3010EB, 115
2	4	D3–D6	DIO TVS UNI-DIRECTIONAL 28V 600W DO-214AA	DIODES INCORPORATED, SMBJ28A-13-F
3	4	R3–R6	DO NOT INSTALL (R0603)	TBD0603
HARDWARE – FOR EVALUATION CIRCUIT ONLY				
1	2		SHUNT, 2POS, 2MM PITCH, BLACK	SAMTEC INC., 2SN-BK-G
2	4		STANDOFF, BRD SPT SNAP FIT 15.9MM LENGTH	KEYSTONE, 8834
3	2	JP1, JP2	CONN-PCB 6POS UNSHROUDED HEADER VERT 2MM PITCH	SAMTEC INC., TMM-103-02-L-D
4	8	TP1, TP2, TP7, TP8, TP11, TP12, TP17, TP18	ONN-PCB, BANANA JACK, FEMALE, NON-INSULATED, THT, SWAGE, 0.218 INCHES LENGTH	KEYSTONE ELECTRONICS, 575-4
5	12	TP3–TP6, TP9, TP10, TP13–TP16, TP19	CONN-PCB SOLDER TERMINAL TURRETS FOR CLIP LEADS	MILL-MAX, 2308-2-00-80-00-00-07-0

Schematic

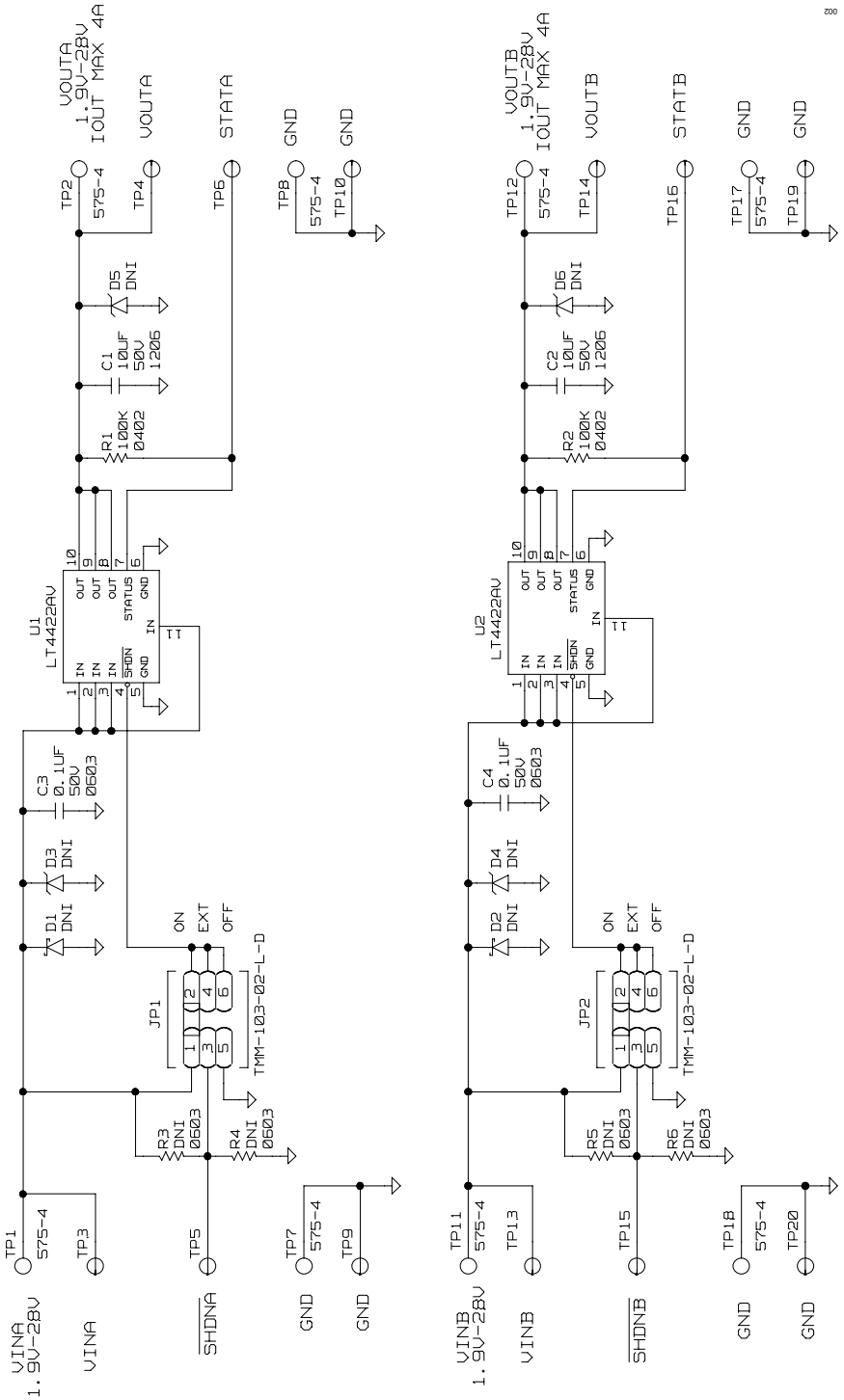

Figure 2. EVAL-LT4422-AZ Schematic

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/24	Initial release	—

Notes

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