ZXGD3108EV1 USER GUIDE

Introduction

The purpose of this board is to demonstrate the driving of an OR'ing MOSFET as a Schottky replacement in n+1redundant power supplies. The circuit is ideal for use on +/-12V lines in telecom redundant supplies. When used to drive a low on-resistance MOSFET with a Drain breakdown voltage rating of up to 40V, the board increases power efficiency and system reliability whilst still maintaining simplicity of design. Tightly controlled (+/-2mV) low turn off threshold,-3mV typical, ensures stable operation even under light load conditions.

Performance

- Circuit supply voltage range: 4V to 20V
- Low quiescent current: 200uA typical
- -3mV Typical Turn-Off Threshold with ±2mV Tolerance
- Suitable for driving up to 40V OR'ing MOSFETs

Ordering Information

Order Number
ZXGD3108EV1

Caution: Do not connect the evaluation board to a supply voltage, VIN, greater than 20V!

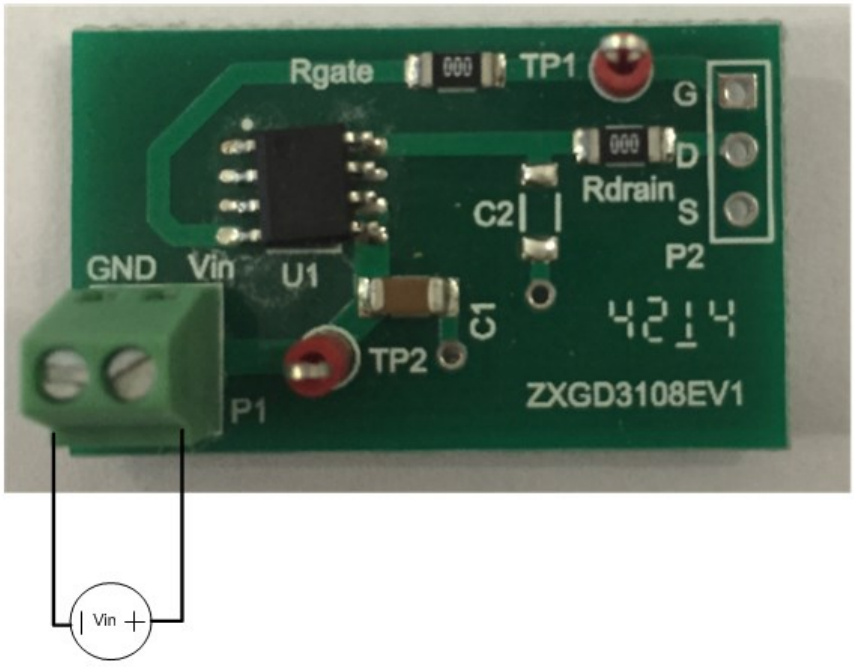


Figure 1: Evaluation board layout.

Evaluation guide

There are two possible test setups for the evaluation board. The preferred setup is to work on the low side line of an n+1 redundant supply (see Figure 2a), due to the ease of acquiring the supply voltage to the board directly from the output of the power supply. The other option is shown in Figure 2b, which shows the board driving a MOSFET on the high side with an additional power supply.

Low side operation

1. Remove the original OR'ing Schottky from the power supply.
2. Apply a short across the Schottky's K and A terminals.
3. Cut the track on the negative lines.
4. Insert a low on-resistance MOSFETs between the cut tracks.

Caution: The MOSFET breakdown must be higher than the maximum drain-source voltage spike, plus a 10% to 30% margin.

5. Connect the ZXGD3108 evaluation board to the added MOSFET as shown in Figure 2a.
6. Turn on the power supply and measure the efficiency.

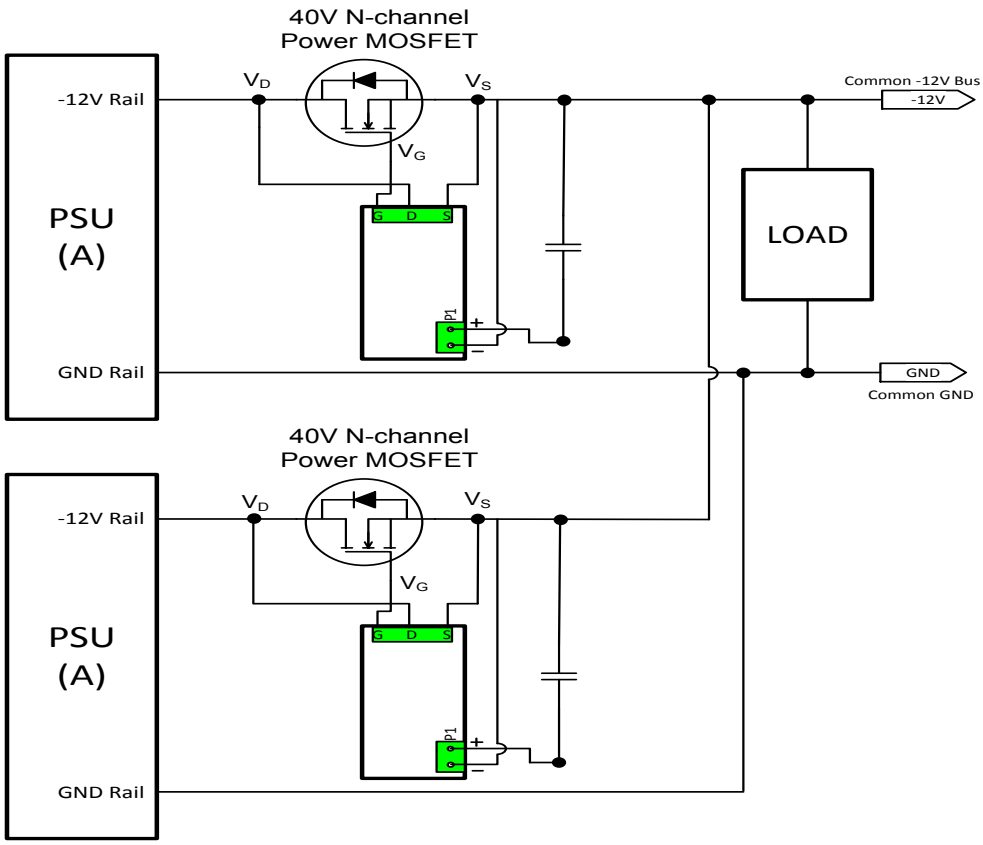


Figure 2 (a): Test options for ZXGD3111EV1, low side operation.

High side operation

1. Remove the original Schottky from the power supply
2. Insert a low on-resistance MOSFET to replace the Schottky.
3. Connect the ZXGD31108 evaluation board to the added MOSFET as shown in Figure 2b.
4. Connect a 10V auxiliary supply to the evaluation board terminal block P1 (see Figure 2b).
5. Turn on the power supply and measure the efficiency.

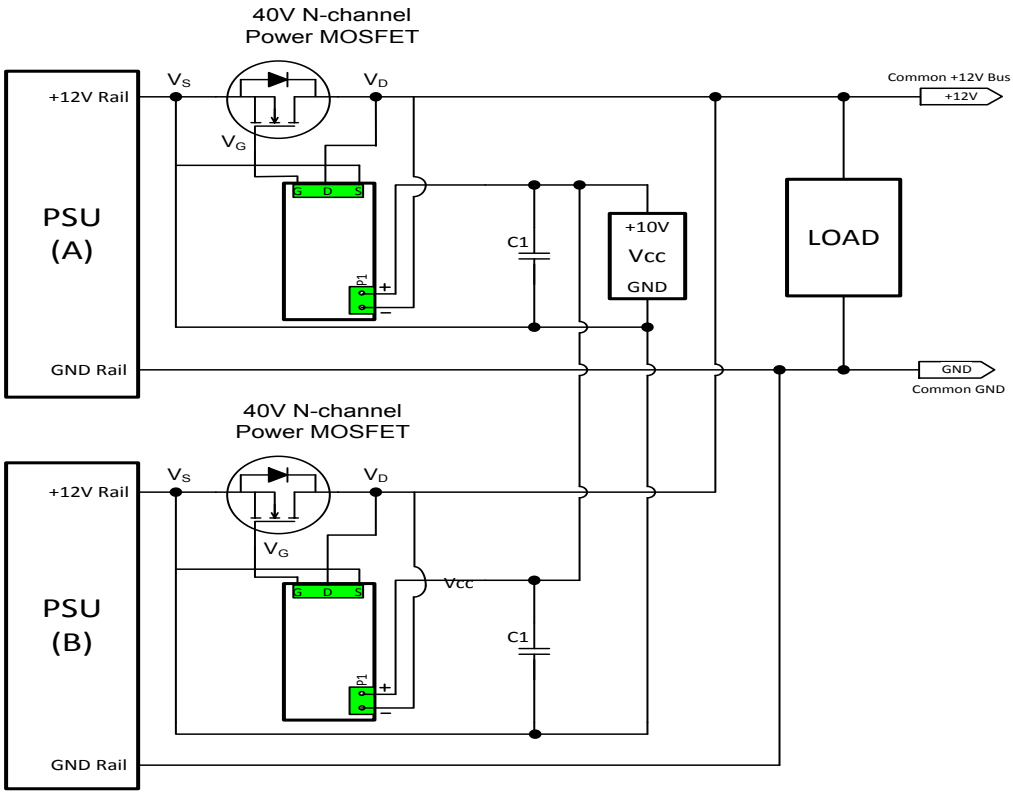


Figure 2 (a): Test options for ZXGD3108EV1, high side operation.

Conditioning the power supply to maximize efficiency

Any high frequency ripple on the power supply lines can cause false triggering of the ZXGD3108, to prevent this from happening, an RC filter can be added to the drain pin of the ZXGD3108 (refer to figure 3, section1), this can be achieved by choosing suitable Rdrain and C2 on the evaluation board, a default of Rdrain of 0ohms is fitted on the board and C2 is left open. Turn on and turn-off speeds of the OR'ing MOSFET can be controlled individually, a controlled turn on and fast turn off can be achieved (refer to section 2 of Figure 3) with a combination of external diode and resistor.

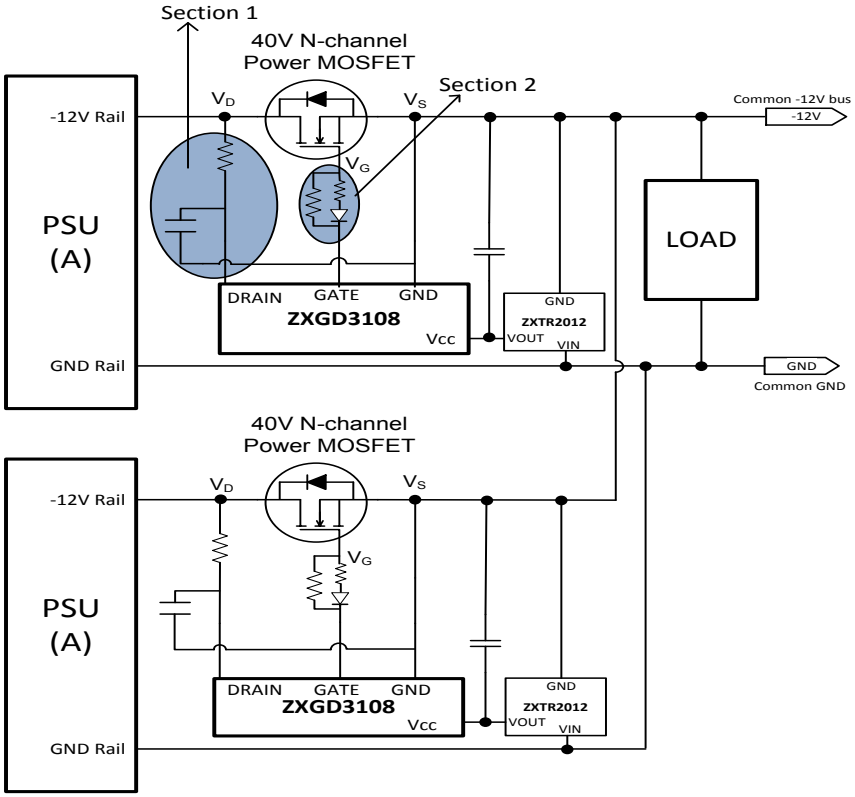


Figure 3: Techniques to prevent or reduce gate voltage oscillations

Waveform measurement

In order to demonstrate the operation of the OR'ing controller in an N+1 redundant system, under normal and fault conditions, voltage at the drain pin was pulsed and the gate voltage is monitored. The waveform is shown in figure 4.

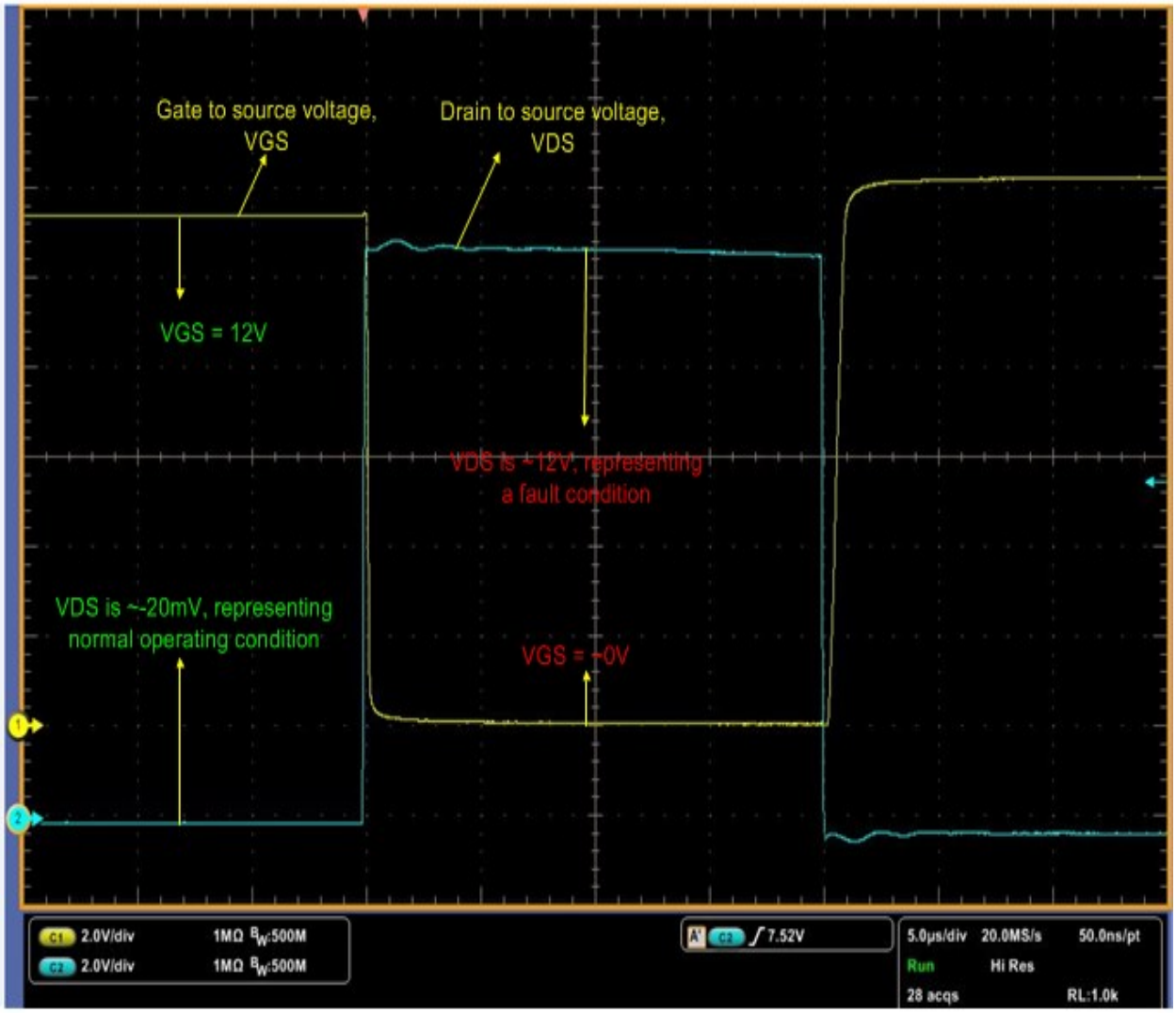


Figure 4: Operating waveform

When VDS (blue trace) is negative representing the normal operating condition, VGS (yellow trace) is high at 12V. When VDS is increased beyond the turn-off threshold of the controller, representing a fault condition, gate is pulled close to zero.

Board schematic

Figure 5 shows the circuit schematic of the ZXGD3108EV1. Power for the controller is applied to the terminal block P1. A three way header, P2, is located at the other end of the board. The header allows the board to be soldered directly across an OR'ing MOSFET in a TO-220 package. The board can also be used with an SMD MOSFET by connecting the pin-outs accordingly.

Please refer to the ZXGD3108N8 datasheet for more information regarding the max operating conditions for the controller.

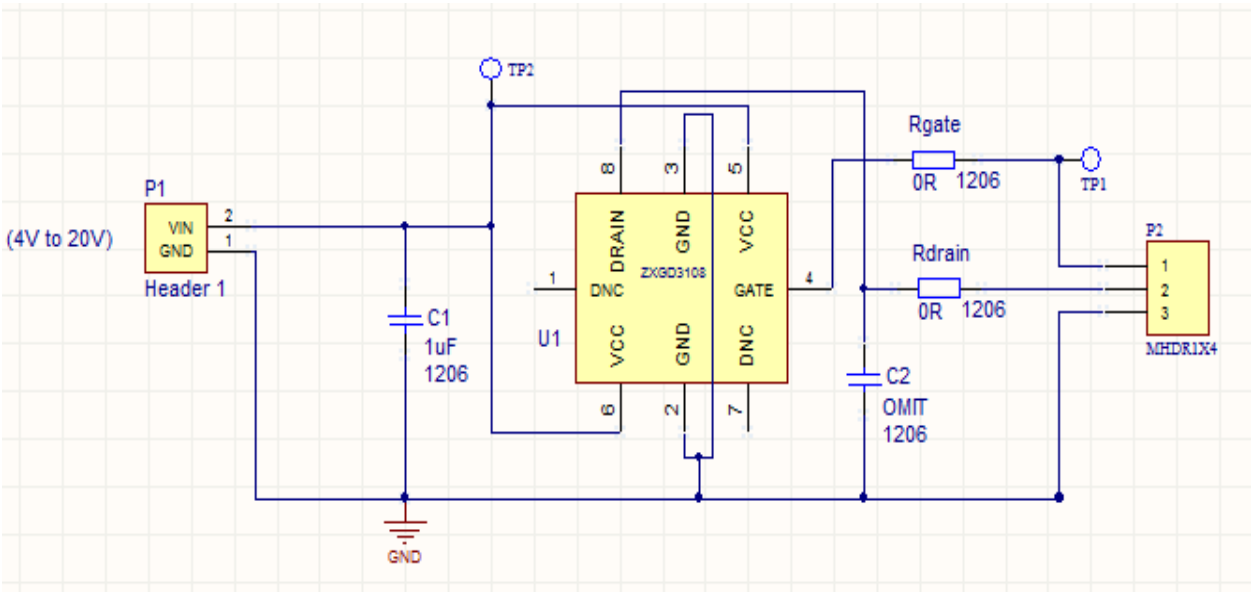
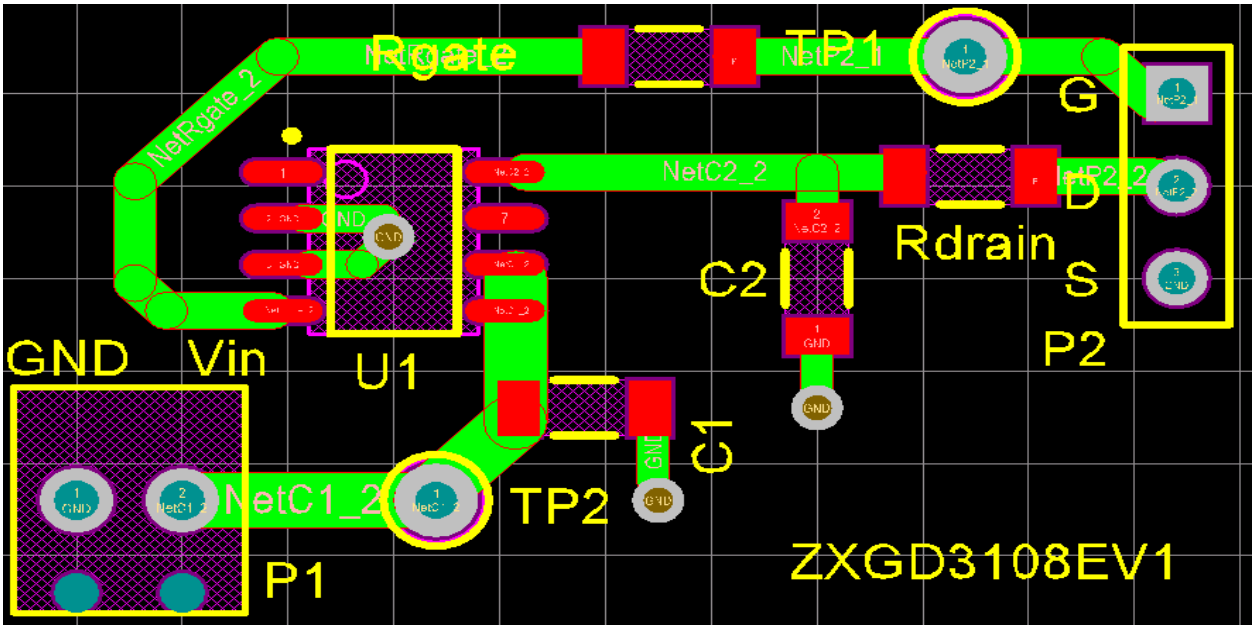


Figure 5: Circuit diagram

PCB Layout



TOP SIDE

BOTTOM SIDE

Please note that the component values and part numbers are given as a guide only. Due to continual component development, all parts quoted should be checked for suitability and availability with their respective manufacturers.

Table 1: Parts list

Ref.	Value	Package	Part number	Manufacturer	Notes
U1	OR'ing controller	SO8	ZXGD3108N8	Diodes Inc.	
C1	1uF 50V capacitor	1206	C1206X105K5R		X7R
P1	2-way terminal				
P2	3-way header				
Rdrain	0R	1206	Generic	Rdrain	0R
Rgate	0R	1206	Generic	Rgate	0R
TP1	20-313137	Vero loop	20-313137	TP1	20-313137
TP2	20-313137	Vero loop	20-313137	TP2	20-313137

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