



IX4351 Evaluation Board
IX4351-EVAL

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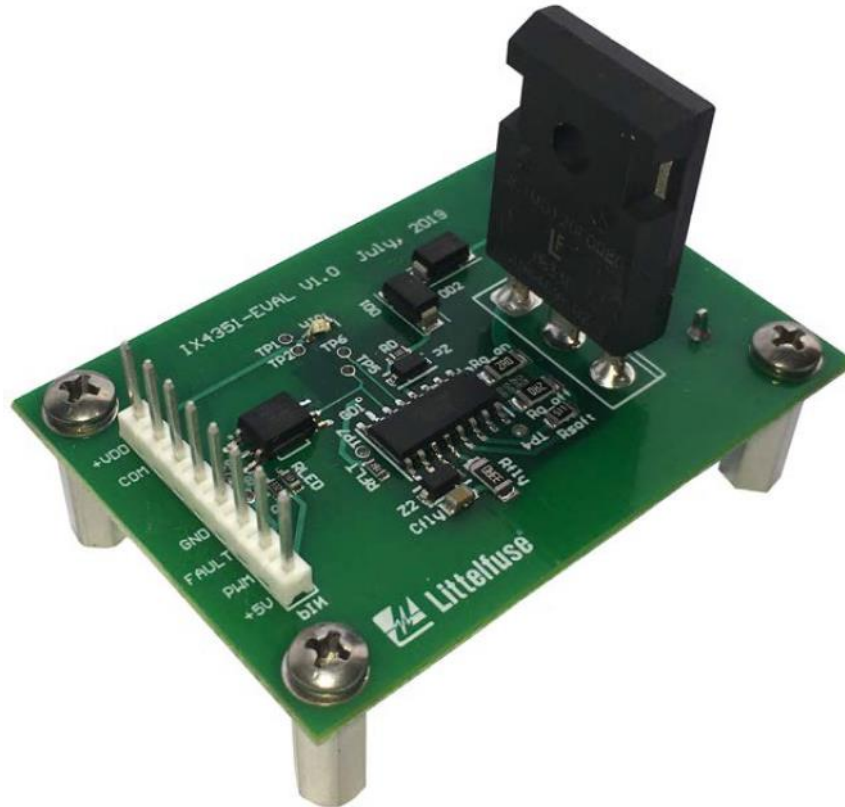
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1. Introduction



IXYS Integrated Circuits Division's IX4351 Evaluation Board contains all the necessary circuitry to demonstrate the features of a high power SiC MOSFET gate driver and SiC MOSFET. The board includes an LSIC1MO120E0080 1200V SiC MOSFET from Littelfuse with an $R_{DS(ON)}$ of 80m Ω typical and an I_D of 25A. The board has an optically isolated interface for the input drive and FAULT output indication pin.

1.1. Features

- 9A source and sink outputs on gate driver
- Output capable of switching 25A
- Gate drive supply range: from 13V to 25V
- 3.3V/5V CMOS/TTL logic compatibility enables seamless interfacing with microcontrollers
- Independent under-voltage lockout (UVLO)
- Input pin includes schmitt trigger for better noise immunity
- Desaturation detection with soft shutdown
- Negative charge pump regulator
- FAULT indication pin

Figure 1. Evaluation Board, Top & Bottom

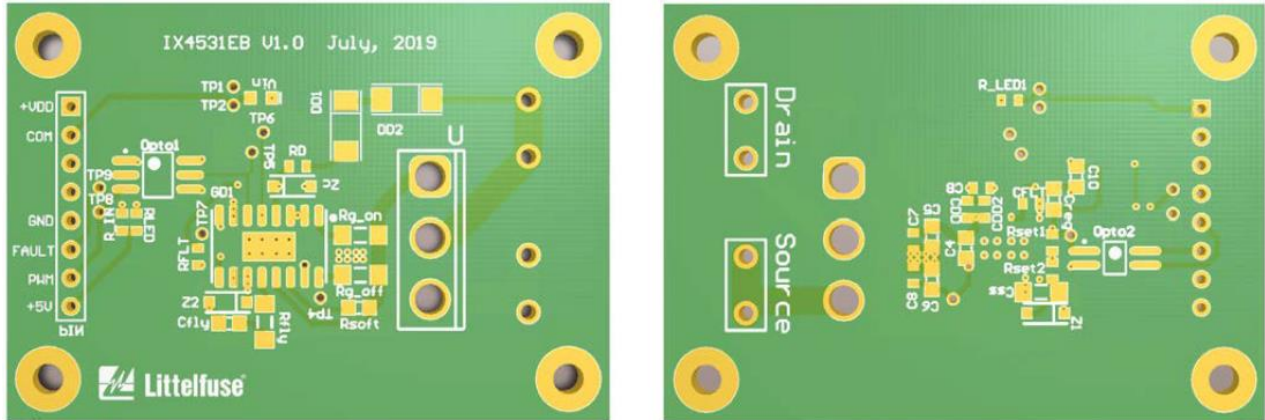


Figure 2. Evaluation Board, Top Layer & Inner Layer 2

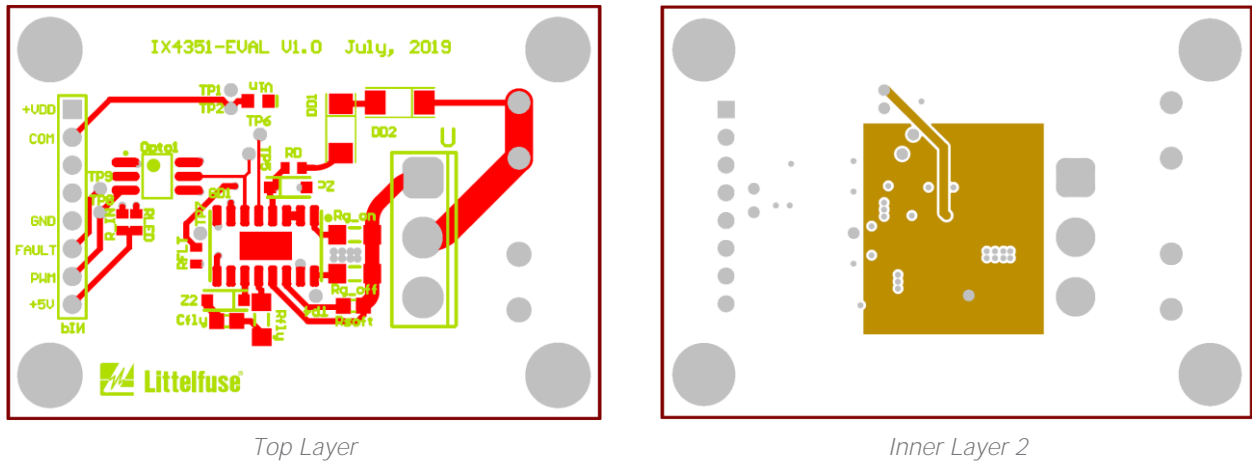


Figure 3. Evaluation Board, Inner Layer 3 & Bottom Layer

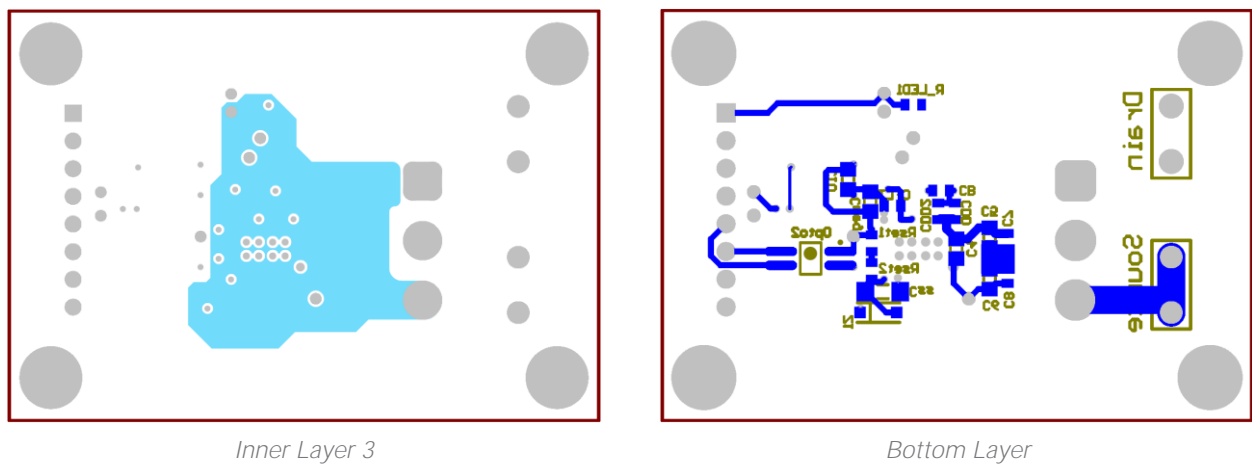


Table 1. Evaluation Board Pin Descriptions

Pin Number	Pin Name	Description
1	V _{DD}	Positive supply voltage for gate driver outputs
2	COM	Return for driver circuitry. Note that COM is isolated electrically from GND pin
3	N/C	Make no connection
4	N/C	Make no connection
5	GND	Logic Ground. This ground is isolated from COM pin
6	FAULT	A low signal indicates a FAULT was detected. Phototransistor collector is pulled up to +5V with a 1K Ω resistor for this isolated output referred to GND
7	PWM	Isolated logic input to gate driver referred to GND
8	+5V	Logic supply voltage. The evaluation board can be connected to either a +5V or +3.3V power supply

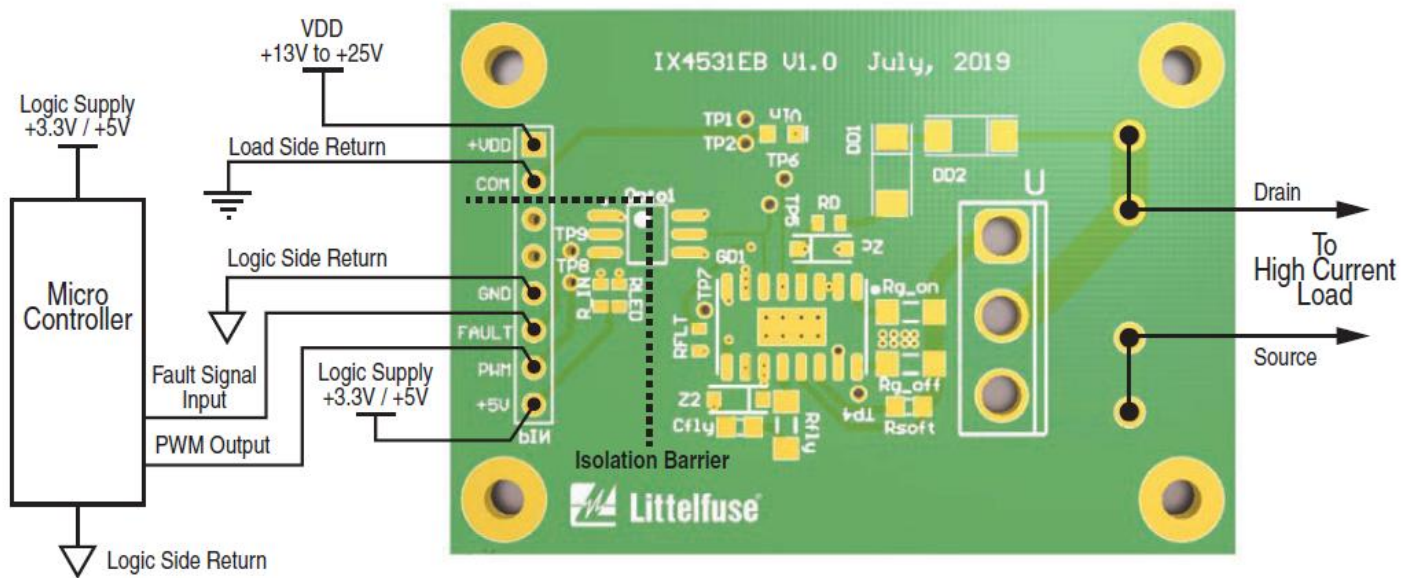
Table 2. Evaluation Board Bill of Materials

Ref. Des.	Qty.	Description	Manufacturer	Mfr. P/N
C4, C5, C6, Creg	3	Cap 4.7 μ F, 50V	Kemet	C0805X475K3RACAUTO
C7, C8	2	Cap 2.2 μ F, 50V	Yageo	CC0603KRX5R9BB225
C10	1	Cap, 1 μ F, 50V	Yageo	603-CC0603KRX5R9BB225
CB	1	Cap, 33 pF, 50V	Yageo	603-CC805KKX7R9BB105
CDD	1	Cap, 1 μ F, 50V	Yageo	CC0603KRX7R9BB105
CDD2	1	Cap, 0.01 μ F, 50V	Yageo	CC0603KRX7R9BB103
CFLT	1	Cap, 100pF, 50V	Yageo	CC0603KPX7R9BB101
Cfly	1	Cap, 68nF, 50V	Yageo	CC0805KRX7R9BB683
Css	1	Cap, 4.7 μ F, 50V	AVX	12065C475KAT4A
DD1, DD2	2	Rectifier, 1A, 1200V	STmicro	STTH112A
Drain, Source	2	Drain and Source Connector	Keystone	1287-ST
U	1	MOSFET 1200V 80m Ω SiC	Littelfuse	LSIC1M0120E0080
Opto1	1	High Speed Optocoupler	Toshiba	TLP2361E
Opto2	1	Transistor Output Optocoupler	On Semiconductor	FODM217D
PIN	1	Header 1x8	TE Connectivity	3-644456-8
RD	1	Resistor, 100 Ω	Vishay / Dale	CRCW0603100RJNEAC
RFLT	1	Resistor, 1.8K Ω	Yageo	RC0603FR-071K8L
Rfly	1	Resistor, 33 Ω	Yageo	RC1206FR-7W33RL
Rg_off, Rg_on	2	Resistor, 2 Ω	Yageo	RC1206JR-072RL
RLED	1	Resistor, 430 Ω	KOA Speer	RK73B1JTTDD431J
Rset1	1	Resistor, 40.2K Ω	Yageo	RC0603FR-0740K2L
Rset2	1	Resistor, 44.2K Ω	Yageo	RC0603FR-0744K2L
Rsoft	1	Resistor, 510 Ω	Yageo	RC0805JR-07510RL
R_IN	1	Resistor, 3.3K Ω	Yageo	RC0603JR-073K3L
R_LED1	1	Resistor, 1.5K Ω	Vishay / Dale	CRCW06031K50FKEAC
TP1-TP9	9	Test Points Not populated		
LED1	1	Red LED	Dialight	599-0010-007F
Zc	1	Zener Diode 7.5V 500mW	Diodes Inc.	MMSZ5236B-7-F
Z1, Z2	2	Schottky Diode	On Semiconductor	MBR0540

2. Connections to Evaluation Board

To start the Evaluation Board, provide necessary voltages to $+V_{DD}$ and $+5V/+3.3V$ logic supply as shown in Figure 4. Note that the PWM pin is active low and sinks approximately 5mA (see Note 1). Connect the PWM pin to the output of the microcontroller and the FAULT signal to an input, if this option is desired. For more details on the gate driver, please refer to the IX4351NE data sheet. The IX4351 Evaluation Board provides galvanic isolation between the logic side and load side of the circuit. Referring to Figure 4, the barrier is denoted by a dashed black line.

Figure 4. Connections To/From Evaluation Board



Note 1: Current depends on Optocoupler LED V_F , V_{OL} of the Microcontroller, and power supply voltage. For 5V supply assuming 0V V_{OL} , $V_F = 1.35V$, LED current can be as high as 8.4mA. User can modify RLED as necessary provided optocoupler drive requirements are met.