AN005 –SiC MOSFET Gate Drive Module

碳化硅 MOSFET 门级驱动模块

AZ-SiC-EVB-GD

About this document

Scope and purpose

This application note provides an overview of the evaluation board AZ-SiC-EVB-GD including its main features, key specification, pin assignments and mechanical dimensions.

AZ-SiC-EVB-GD is a complete SiC gate drive board including one optocoupler, one isolated power supply, one ultra-fast gate driver IC and EMI filter. In combination with control boards or equipment that are capable of output pulse width modulation (PWM) signal, the gate drive module features and demonstrates AZ Power's SiC MOSFETs for most power electronic applications.

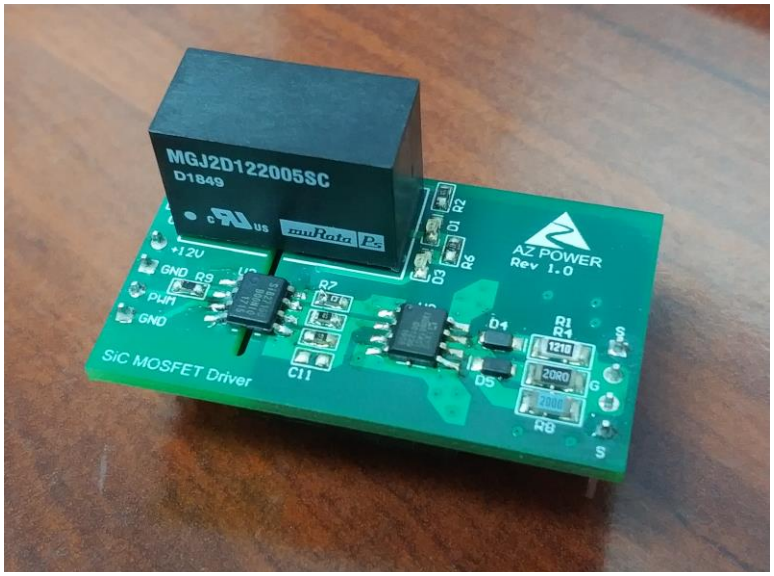
The evaluation board AZ-SiC-EVB-GD was developed to support customers to speed up their product development during their initial hardware design with the isolated gate driving circuits of SiC power devices. The gate drive module is designed to support very high switching frequency operation of the SiC power device.

Intended audience

This application note is intended for power electronic engineers who wants to:

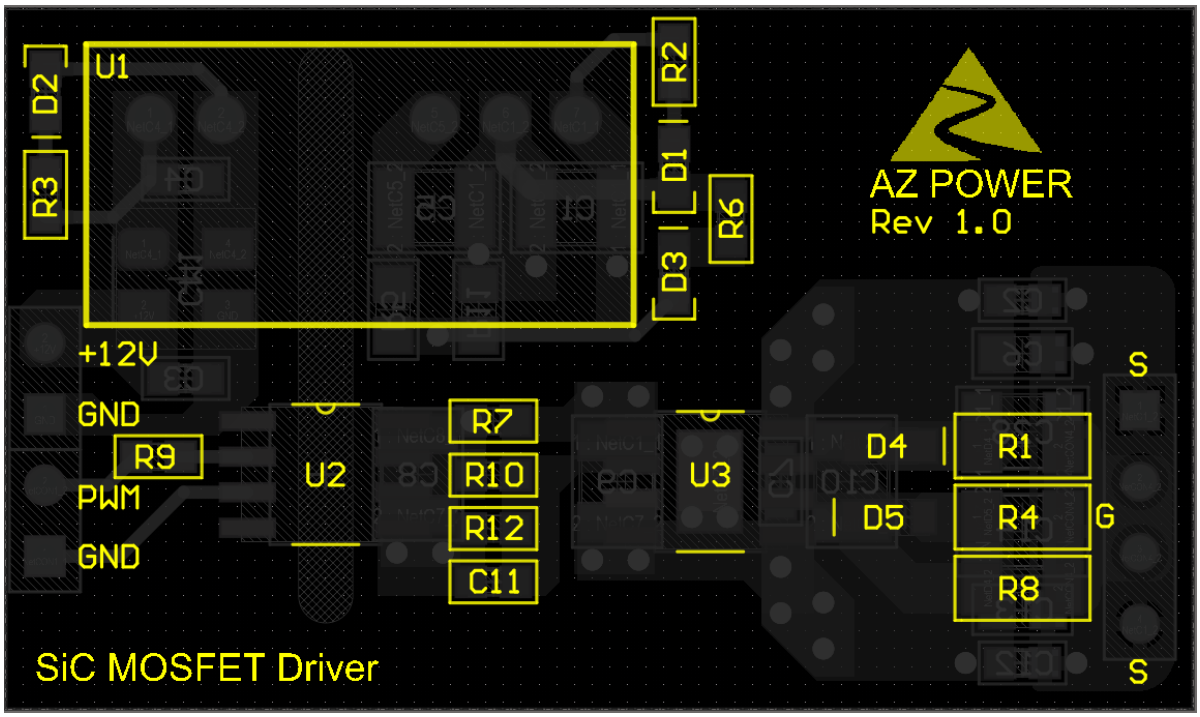
1, evaluate the performance of AZ Power's SiC power devices.

2, speed up product development during initial design with existing plug and play gate driving circuits.

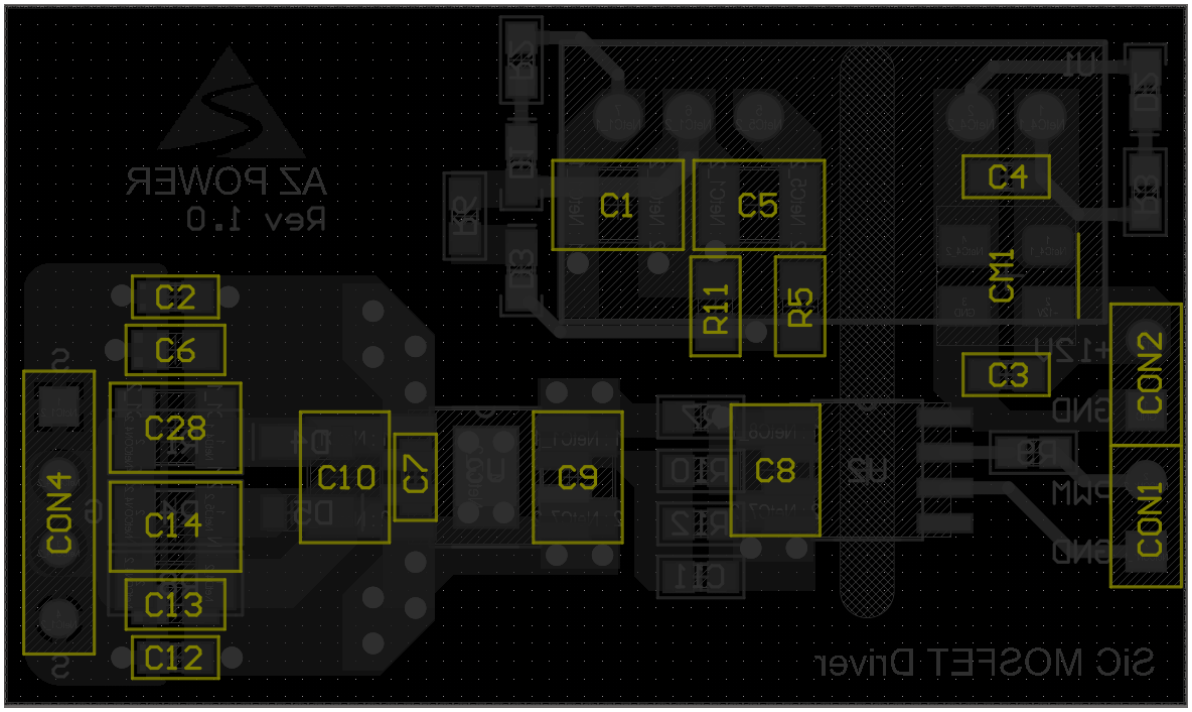


Part Locations

PCB Front



PCB Back



Assembly Chart

Designator	Location	Type	Part	Description	Function	SMD?
C1	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C2	Back	Capacitor	0603 10nF 100V	SMD 0603 Footprint		X
C3	Back	Capacitor	0603 1uF 50V	SMD 0603 Footprint		X
C4	Back	Capacitor	0603 1uF 50V	SMD 0603 Footprint		X
C5	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C6	Back	Capacitor	0805 10nF 100V	SMD 0805 Footprint		X
C7	Back	Capacitor	0603 100nF 100V	SMD 0603 Footprint		X
C8	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C9	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C10	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C11	Front	Capacitor	0603 47pF 50V	SMD 0603 Footprint	Skip, LP Filter	X
C12	Back	Capacitor	0603 10nF 100V	SMD 0603 Footprint		X
C13	Back	Capacitor	0805 10nF 100V	SMD 0805 Footprint		X
C14	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
C28	Back	Capacitor	1210 4.7uF 50V	SMD 1210 Footprint		X
CM1	Back	CM Choke	DLW5BTM142TQ2L	1.4kOhms @ 100MHz		X
CON1	Back	Pin out	2 pin 100mil single	2 pin 100mil		
CON2	Back	Pin out	2 pin 100mil single	2 pin 100mil		
CON4	Back	Pin out	4 pin 100mil single	4 pin 100mil		
D1	Front	LED	LED 0603	SMD 0603 Footprint	Positive Supply	X
D2	Front	LED	LED 0603	SMD 0603 Footprint	DC In Supply	X
D3	Front	LED	LED 0603	SMD 0603 Footprint	Negative Supply	X
D4	Front	Diode	MSS1P6-M3/89A	DO-219AD, 60V 1A SBD	Turn-On Route	X
D5	Front	Diode	MSS1P6-M3/89A	DO-219AD, 60V 1A SBD	Turn-Off Route	X
R1	Front	Resistor	1206 2 Ohm	SMD 1206 Footprint	Turn-On resistor	X
R2	Front	Resistor	0603 2k Ohm	SMD 0603 Footprint		X
R3	Front	Resistor	0603 1k Ohm	SMD 0603 Footprint		X
R4	Front	Resistor	1206 2 Ohm	SMD 1206 Footprint	Turn-Off resistor	X
R5	Back	Resistor	0805 0 Ohm	SMD 0805 Footprint	Selection, -5V Out	X
R6	Front	Resistor	0603 470 Ohm	SMD 0603 Footprint		X

Assembly Chart (Continued)

Designator	Location	Type	Part	Description	Function	SMD?
R7	Front	Resistor	0603 0 Ohm	SMD 0603 Footprint		X
R8	Front	Resistor	1206 200 Ohm	SMD 1206 Footprint		X
R9	Front	Resistor	0603 316 Ohm	SMD 0603 Footprint		X
R10	Front	Resistor	0603 10 Ohm	SMD 0603 Footprint		X
R11	Back	Resistor	0805 0 Ohm	SMD 0805 Footprint	Selection, 0V Out	X
R12	Front	Resistor	0603 2k Ohm	SMD 0603 Footprint		X
U1	Front	IC	MGJ2D122005SC	7-SIP, Isolated 5.2kV DC/DC Converter, Input 12V, Output +20V/-5V, 2W		
U2	Front	IC	Si8261BAC-IS	8-SOIC, 4A Gate Driver 3.75kV isolation opto-driver		X
U3	Front	IC	IXDN614SI	8-SOIC, 14-Ampere Low-Side MOSFET Drivers		X

BOM Estimate

Designator	Comment	Description	Quantity
C1, C5, C8, C9, C10, C14, C28	CAP 1210 4.7uF 50V		7
C2, C12	CAP 0603 10nF 100V		2
C3, C4	CAP 0603 1uF 50V		2
C6, C13	CAP 0805 10nF 100V		2
C7	CAP 0603 100nF 100V		1
C11	CAP 0603 47pF 50V **DNP**		1
CM1	DLW5BTM142TQ2L	Common Mode Chokes, 1.4kOhms @ 100MHz	1
CON1, CON2	2 pin 100mil single		2
CON4	4 pin 100mil single		1
D1, D2, D3	LED 0603	D2=Input, D1=Positive, D3=Negative supply	3
D4, D5	MSS1P6-M3/89A		2
R1, R4	RES 1206 2Ohm	R1=Gate turn-on, R4=Gate turn-off	2
R2, R12	RES 0603 2kOhm		2
R3	RES 0603 1kOhm		1
R5	RES 0805 0Ohm		1
R6	RES 0603 470Ohm		1
R7	RES 0603 0Ohm		1
R8	RES 1206 200Ohm		1
R9	RES 0603 316Ohm		1
R10	RES 0603 10Ohm		1
R11	RES 0805 0Ohm DNP		1
U1	MGJ2D122005SC	Isolated 5.2kV DC/DC Converter, Input 12V, Output +20V/-5V, 2W	1
U2	Si8261BAC-IS	4A Gate Driver 3.75kV isolation opto-driver	1
U3	IXDN614SI	14-Ampere Low-Side Ultrafast MOSFET Drivers	1

Assembly Request Form,

Designator	Function	Baseline	Additional Selection
C11	LP Filter	Skip	
D1	Positive Supply	LED 0603, Any	
D2	DC In Supply	LED 0603, Any	
D3	Negative Supply	LED 0603, Any	
R1	Turn-On resistor	1206 2 Ohm	
R4	Turn-Off resistor	1206 2 Ohm	
R5	Selection, -5V Out	0805 0 Ohm	
R11	Selection, 0V Out	Skip	
U1	DC/DC Driver	MGJ2D122005SC	
Purpose:			

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