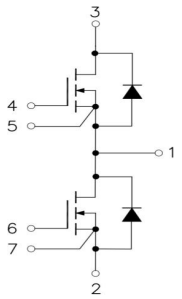
34mm SiC Half Bridge Module

Parameter	Value	Unit
V_{CES}	1200	V
I_C	227	A
$R_{DS(ON)}$	8	mΩ



Features:

- Low switching losses
- Low inductance design
- High current density
- Copper Baseplate

Applications:

- Motor drive
- Inverter
- Power supply
- Wind Turbines

Maximum Ratings (I_GBT T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
VDSS	Drain-Source Voltage	G-S Short	1200	V
VGSS	Gate-Sourse Voltage	D-S Short, AC frequency ≥1Hz, Note1	-10/23	V
VGSOP			-4/18	
IDS	DC Continuous Drain Current	TC =25℃, VGS =18V	227	A
		TC =100°C, VGS =18V	162	A
ISD	Source-Drain Current(diode)	TC =25℃, with ON signal	227	A
		TC =100℃, with ON signal	162	A
IDSM	Pulse Drain Current	TC =25℃, Pulse width =1ms, VGS =18V, Note1	454	A
Ptot	Total Power Dissipation	TC =25℃	1230	W
Tjmax	Max Junction Temperature	-	175	℃
Tstg	Storage Temperature	-	-55 to 175	℃

Note1: Pulse width limited by maximum junction temperature

Module Characteristics

Parameter	Conditions	Value	Unit
Isolation Voltage	RMS, f = 50Hz, t =1min	2.5	kV
Material of module baseplate	-	Cu	-
Creepage distance	terminal to heatsink terminal to terminal	26 21	mm
Clearance	terminal to heatsink terminal to terminal	23.6 10	mm
CTI	-	>200	-
Module lead resistance, terminals – chip	TC =25°C	0.8	m

Mounting torque for module mounting	M5, M6	3 to 6	Nm
Weight	-	170	g

SiC MOSFET Electrical characteristics (Tj =25°C unless otherwise specified, chip)

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=100μA		1200	-	-	V
VGS(th)	Gate-source threshold Voltage	IDS=54mA, VDS=VGS	Tj=25°C	2.0	2.8	3.7	V
			Tj=150°C	-	2.1	-	
			Tj=175°C	-	2.0	-	
IDSS	Zero gate voltage drain Current	VDS=1200V,VGS=0V	Tj=25°C	0	2	100	μA
IGSS+	Gate-Source Leakage Current	VGS=18V, VDS=0V	Tj=25°C	0	2	400	nA
IGSS-		VGS=-4V, VDS=0V	Tj=25°C	-400	-2	0	
RDS(on) (Chip)	Static drain-source On-state resistance	IDS=160A, VGS=+18V	Tj=25°C	-	8	9	m
			Tj=150°C	-	12.5	-	
			Tj=175°C	-	14	-	
VDS(on) (Chip)	Static drain-source On-state Voltage	IDS=160A VGS=+18V	Tj=25°C	-	1.30	1.46	V
			Tj=150°C		2.03		
			Tj=175°C	-	2.27	-	
Ciss	Input Capacitance	VDS=1000V,VGS=0V,f=1MHz, VAC=25mV		-	8.6	-	nF
Coss	Output Capacitance			-	0.428	-	
Crss	Reverse transfer Capacitance			-	0.038	-	
RGint	Internal gate resistor	f=1MHz, IDS=0V		-	0.8	-	Ω
Qg	Total gate charge	VDD=800V,IDS=160A, VGS=+18/-4V		-	444	-	nC
Qgs	Gate-source charge			-	110	-	
Qgd	Gate-drain charge			-	176	-	
Rth(j-c)	FET Thermal Resistance	Junction to Case, Note1		-	0.122	-	℃/W

Note1: Assumes Thermal Conductivity of grease is 2.8 W/m・K and thickness is 50um.

Body Diode Electrical characteristics (Tj =25°C unless otherwise specified, chip: Target)

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
VSD	Body Diode Forward Voltage	VGS =-4V, ISD =80A	Tj =25°C	-	4.1	-	V
			Tj =150°C	-	3.7	-	
			Tj =175°C	-	3.6	-	
IS	Continuous Diode Forward Current	VGS =-4V	Tj =25°C	-	-	175	A

Trr	Reverse recovery time	VDD=800V,IDS =160A VGS=+18/-4V,Rg =1Ω Inductive load switching operation	Tj =25°C	-	21	-	ns
Qrr	Reverse recovery charge		Tj =25°C	-	470	-	nC
Irr	Diode switching power dissipation		Tj =25°C	-	40	-	A

Test Conditions

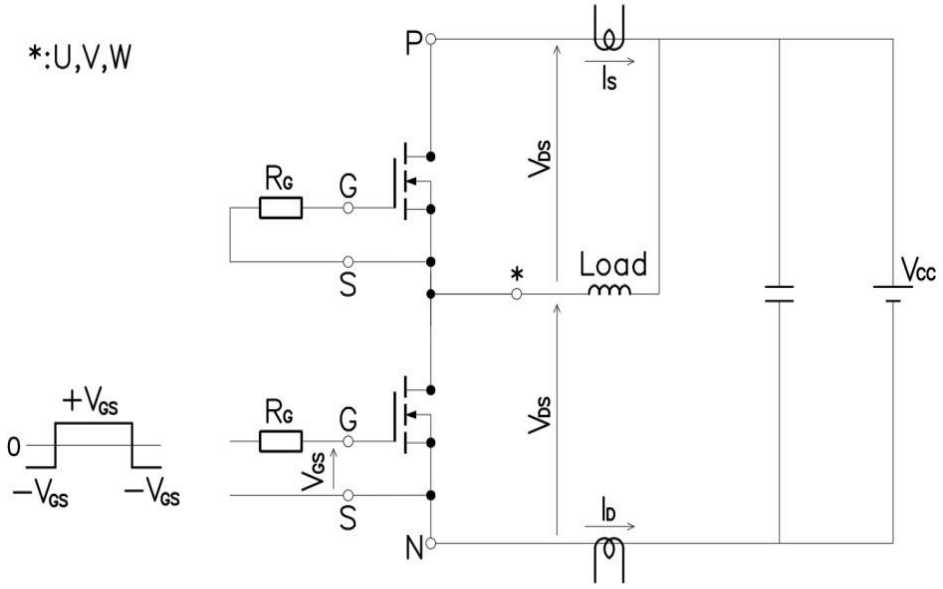


Figure 1. Switching time measure circuit

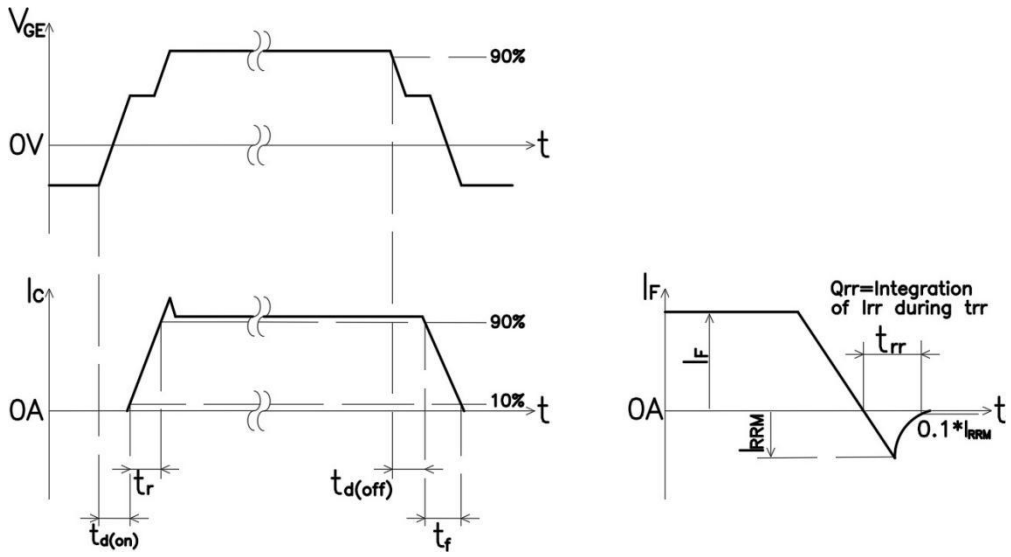


Figure 2. Switching time definition

Characteristics diagrams

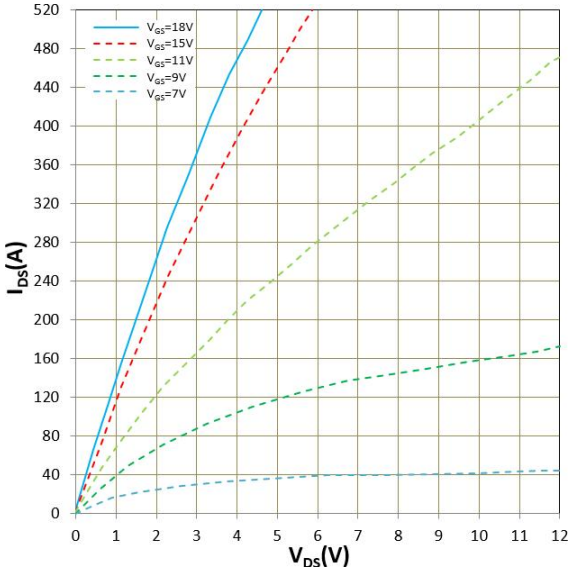


Figure 1. I_{DS} vs V_{DS} T_j =25°C

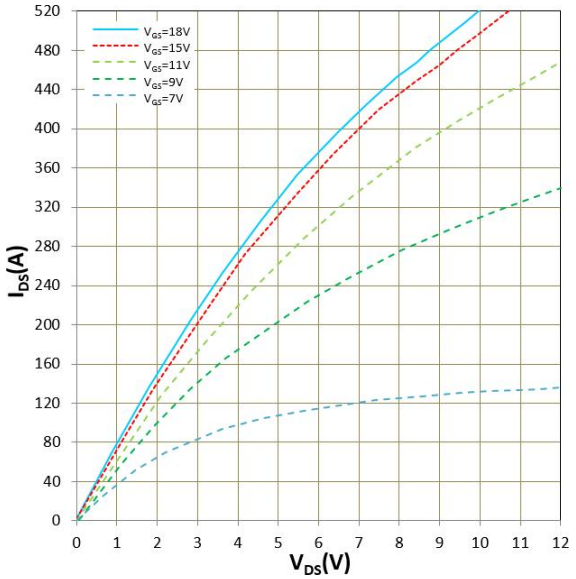


Figure 2. I_{DS} vs V_{DS} T_j =175°C

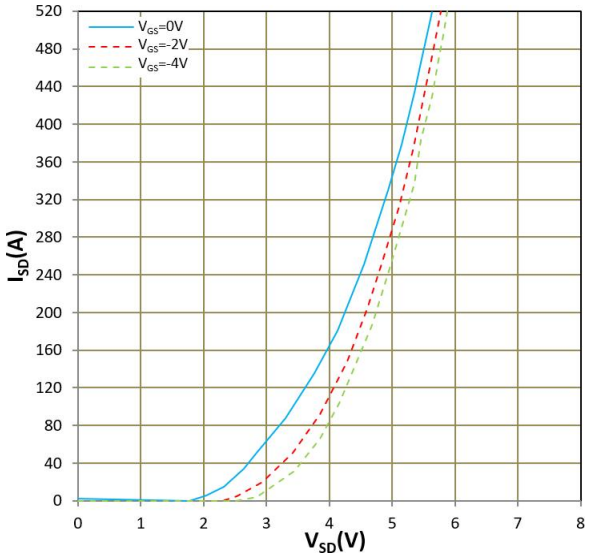


Figure 3. I_{SD} vs V_{SD} T_j =25°C

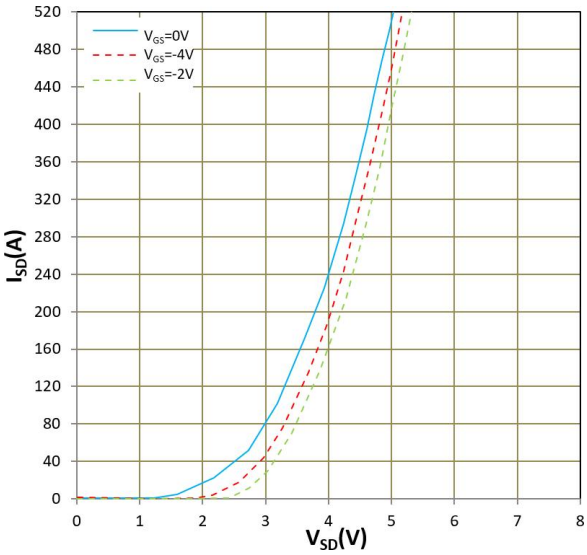


Figure 4. I_{SD} vs V_{SD} T_j =175°C

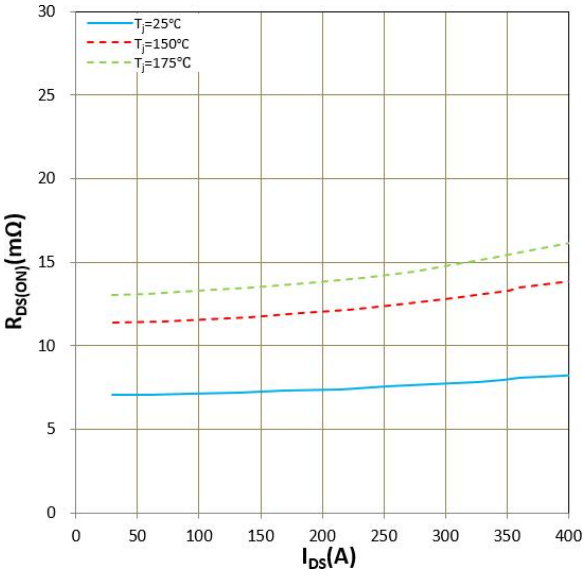


Figure 5.$R_{DS(ON)}$ vs I_{DS}

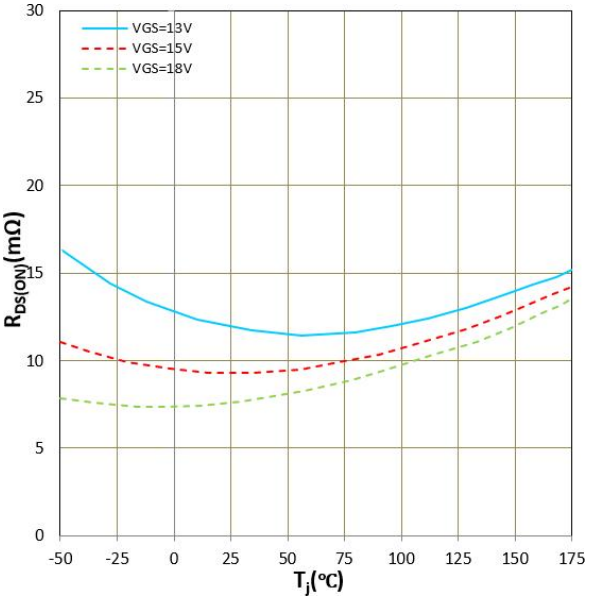


Figure 6.$R_{DS(ON)}$ vs T_j I_{DS}=160A

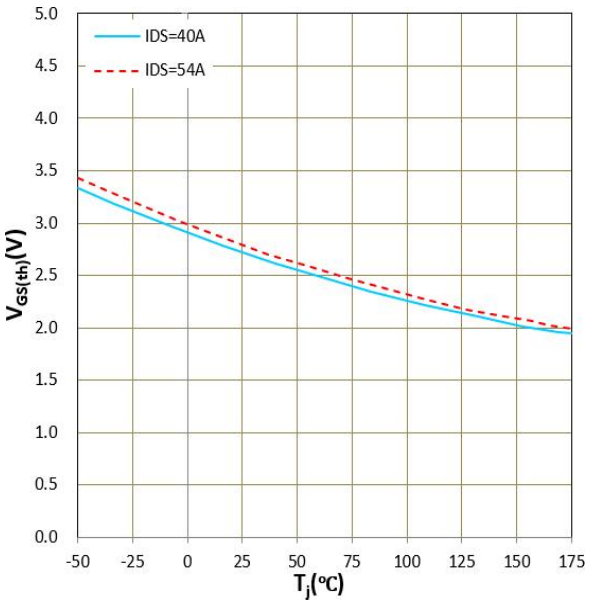


Figure 7. VGS(th) vs Tj VGS=VDS

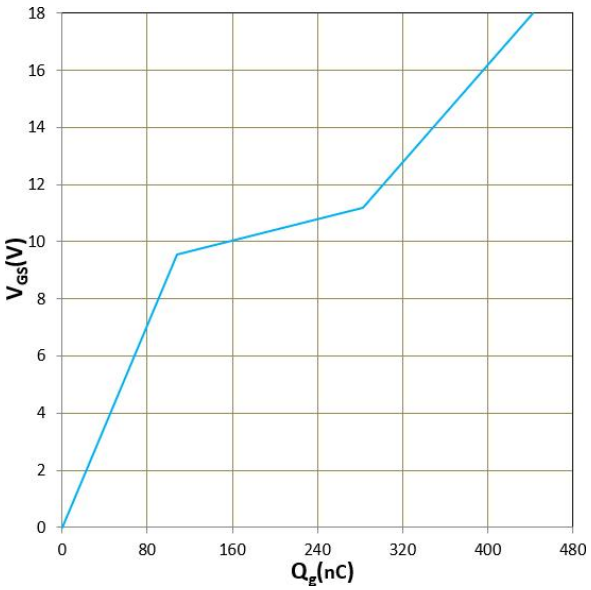
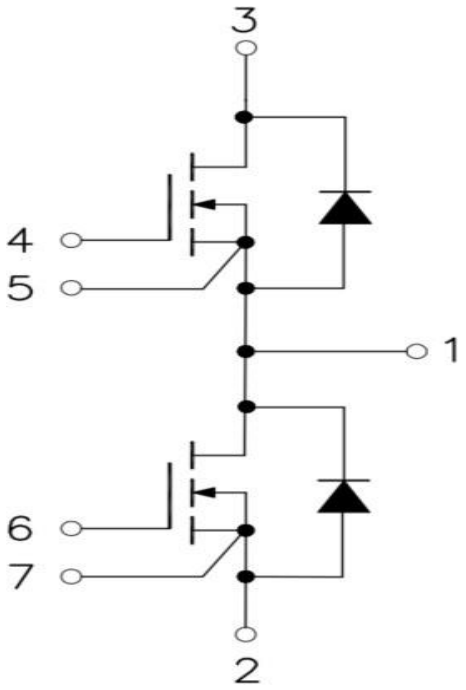
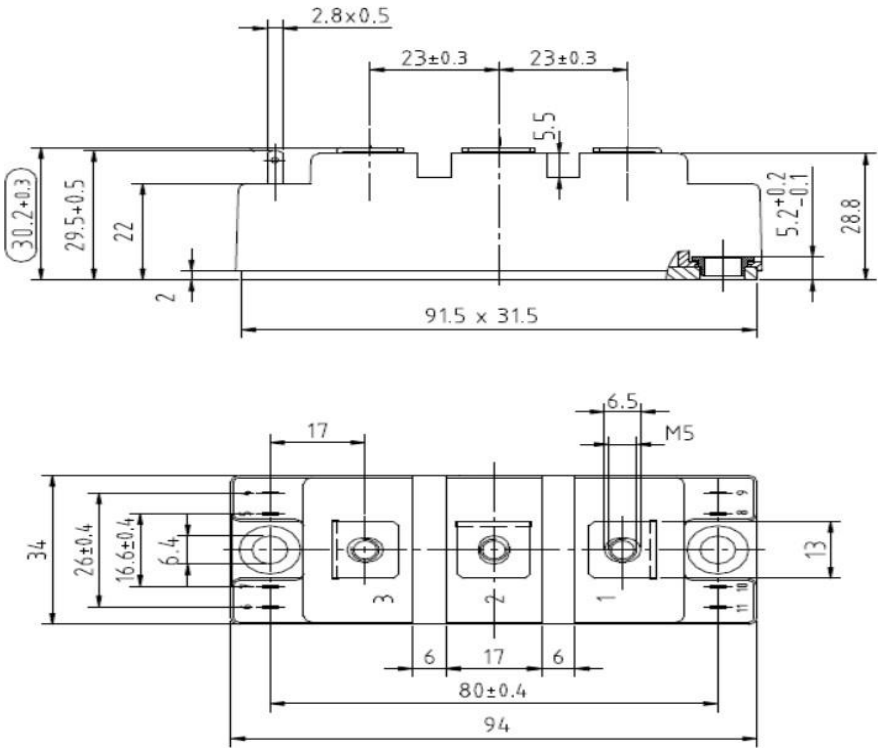


Figure 8. Gate charge
VDS=800V, IDS=160A, IGS=1mA, Tj=25℃

Internal Circuit:



Package Outline (Unit: mm):



*IMPORTANT INFORMATION AND NOTICE

The specifications of Zhuhai Hypersemi Co., Ltd. products may not be considered as a guarantee or assurance of product characteristics. The specifications describe only the usual characteristics of products expected in typical applications, which may still vary depending on the specific application.Therefore, products must be tested for the respective application in advance, and application adjustments may be necessary. The user of our products is responsible for the safety of their applications embedding our products and must take adequate safety measures to prevent the applications from causing physical injury, fire or other problems if any of our products become faulty. The user is responsible for ensuring that the application design complies with all applicable laws, regulations, norms, and standards. Except as otherwise explicitly approved by Zhuhai Hypersemi Co., Ltd. in a written document signed by authorized representatives, our products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

No representation or warranty is given, and no liability is assumed with respect to the accuracy, completeness, and/or use of any information herein, including without limitation, warranties of non-infringement of intellectual property rights of any third party. Zhuhai Hypersemi Co., Ltd. does not assume any liability arising out of the applications or use of any product; neither does it convey any license under its patent rights, copyrights, trade secrets, or other intellectual property rights, nor the rights of others. We make no representation or warranty of non-infringement or alleged non-infringement of intellectual property rights of any third party which may arise from applications. Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact the nearest sales office. This document supersedes and replaces all information previously supplied and may be superseded by updates. We reserve the right to make changes.