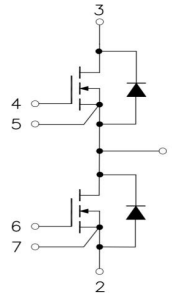


34mm Half Bridge SiC Module

Parameter	Value	Unit
V_{DS}	1200	V
I_D	227	A
$R_{DS(ON)}$	8	m Ω



Features:

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

Applications:

- Motor drive
- Inverter
- Power supply
- Wind Turbines

Maximum Ratings (IGBT $T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{DSS}	Drain-Source Voltage	G-S Short	1200	V
V_{GSS}	Gate-Source Voltage	D-S Short, AC frequency $\geq 1\text{Hz}$, Note1	-10/23	V
V_{GSOP}			-4/18	
I_{DS}	DC Continuous Drain Current	$TC = 25^\circ\text{C}$, $V_{GS} = 18\text{V}$	227	A
		$TC = 100^\circ\text{C}$, $V_{GS} = 18\text{V}$	162	A
I_{SD}	Source-Drain Current(diode)	$TC = 25^\circ\text{C}$, with ON signal	227	A
		$TC = 100^\circ\text{C}$, with ON signal	162	A
I_{DSM}	Pulse Drain Current	$TC = 25^\circ\text{C}$, Pulse width = 1ms, $V_{GS} = 18\text{V}$, Note1	454	A
P_{tot}	Total Power Dissipation	$TC = 25^\circ\text{C}$	1230	W
T_{jmax}	Max Junction Temperature	-	175	$^\circ\text{C}$
T_{stg}	Storage Temperature	-	-55 to 175	$^\circ\text{C}$

Note 1: Pulse width limited by maximum junction temperature

Module Characteristics

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

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

SiC MOSFET Electrical characteristics ($T_j = 25^\circ\text{C}$ unless otherwise specified, chip)

Symbol	Item	Condition	Value			Unit	
			Min.	Typ.	Max		
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=100 μ A	1200	-	-	V	
VGS(th)	Gate-source threshold Voltage	IDS=54mA, VDS=VGS	Tj=25 $^\circ\text{C}$	2.0	2.8	3.7	V
			Tj=150 $^\circ\text{C}$	-	2.1	-	
			Tj=175 $^\circ\text{C}$	-	2.0	-	
IDSS	Zero gate voltage drain Current	VDS=1200V, VGS=0V	Tj=25 $^\circ\text{C}$	0	2	100	μ A
IGSS+	Gate-Source Leakage Current	VGS=18V, VDS=0V	Tj=25 $^\circ\text{C}$	0	2	400	nA
IGSS-		VGS=-4V, VDS=0V	Tj=25 $^\circ\text{C}$	-400	-2	0	
RDS(on) (Chip)	Static drain-source On-state resistance	IDS=160A, VGS=+18V	Tj=25 $^\circ\text{C}$	-	8	9	m
			Tj=150 $^\circ\text{C}$	-	12.5	-	
			Tj=175 $^\circ\text{C}$	-	14	-	
VDS(on) (Chip)	Static drain-source On-state Voltage	IDS=160A, VGS=+18V	Tj=25 $^\circ\text{C}$	-	1.30	1.46	V
			Tj=150 $^\circ\text{C}$	-	2.03	-	
			Tj=175 $^\circ\text{C}$	-	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	-	$^\circ\text{C}/\text{W}$	

Note 1: Assumes Thermal Conductivity of grease is 2.8 W/m · K and thickness is 50 μ m.

Body Diode Electrical characteristics ($T_j = 25^\circ\text{C}$ unless otherwise specified, chip: Target)

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

T_{rr}	Reverse recovery time	VDD=800V, $I_{DS} = 160A$ VGS=+18/-4V, $R_g = 1\Omega$ Inductive load switching operation	$T_j = 25^\circ C$	-	21	-	ns
Q_{rr}	Reverse recovery charge		$T_j = 25^\circ C$	-	470	-	nC
I_{rr}	Diode switching power dissipation		$T_j = 25^\circ C$	-	40	-	A

Test Conditions

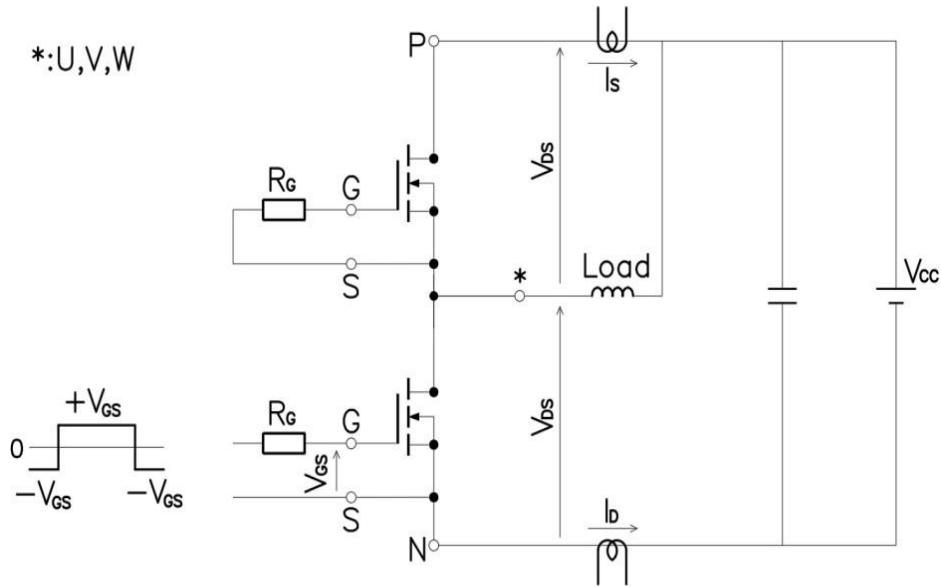


Figure 1. Switching time measure circuit

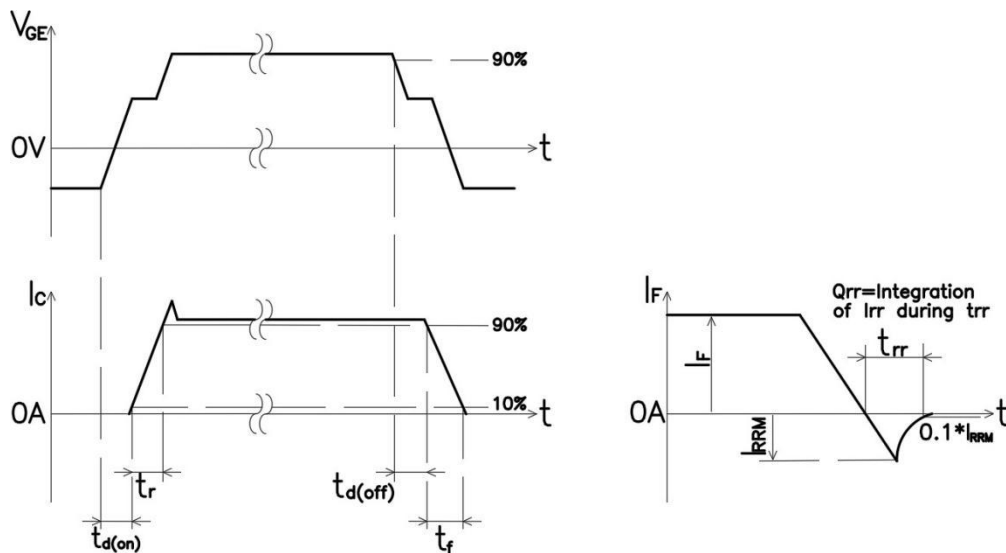


Figure 2. Switching time definition

Characteristics diagrams

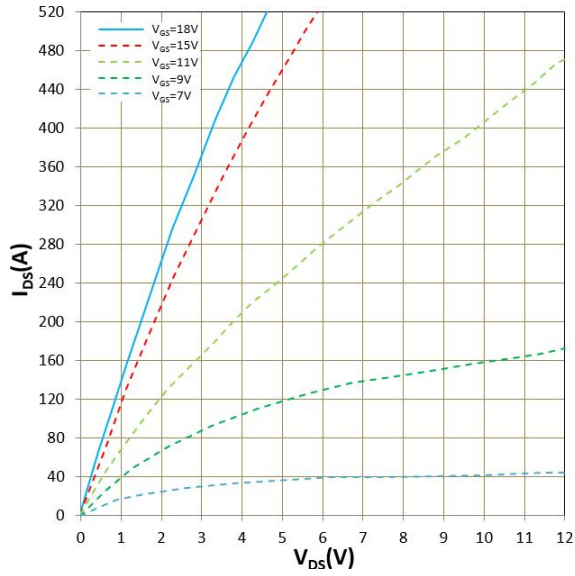


Figure 1. IDS vs VDS Tj =25°C

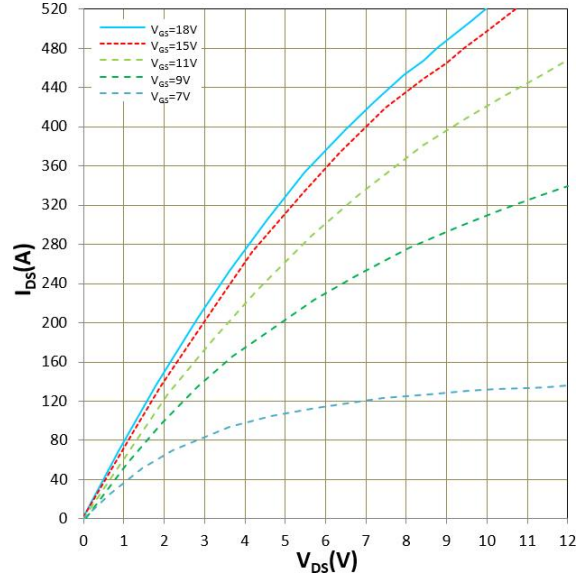


Figure 2. IDS vs VDS Tj =175°C

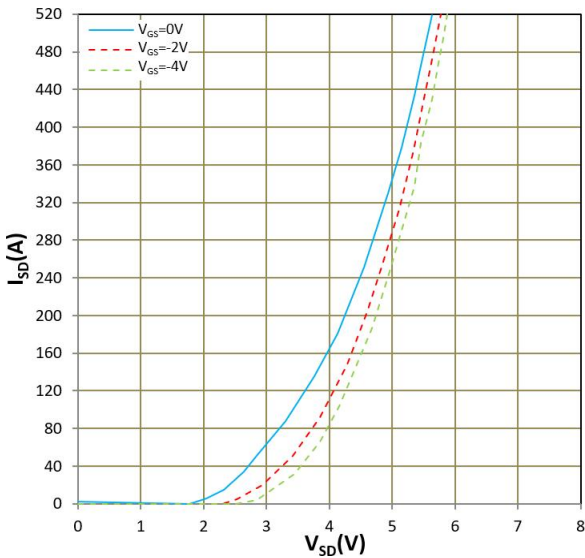


Figure 3. ISD vs VSD Tj =25°C

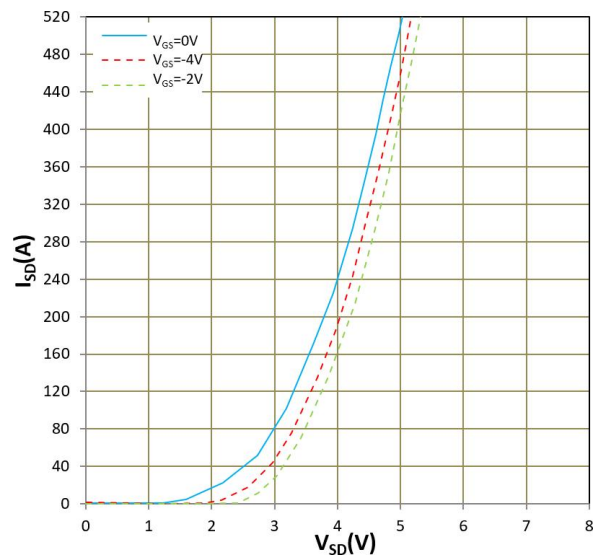


Figure 4. ISD vs VSD Tj =175°C

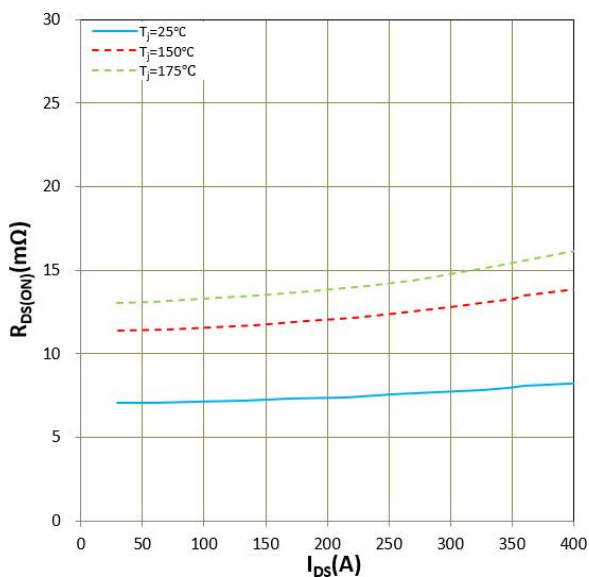


Figure 5. RDS(ON) vs IDS

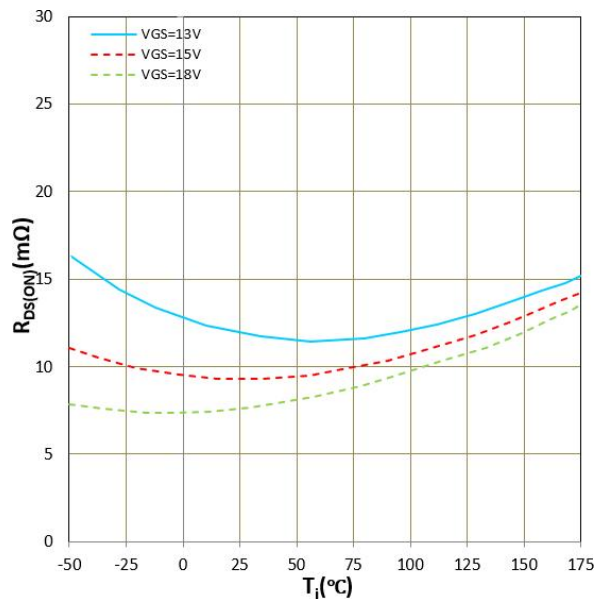


Figure 6. RDS(ON) vs Tj IDS=160A

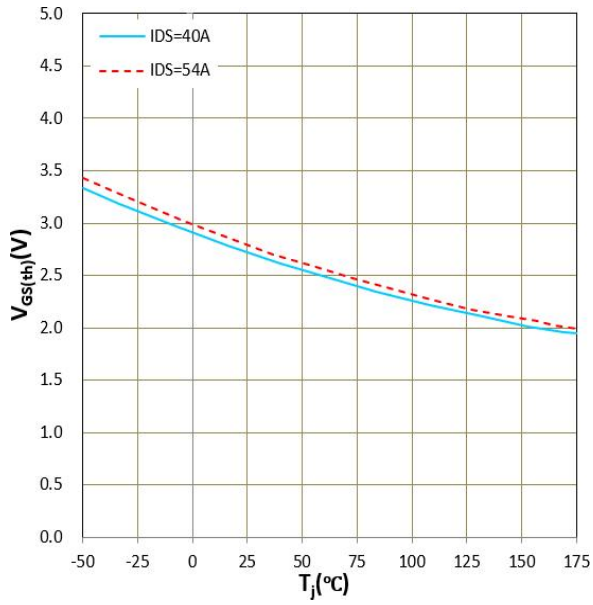


Figure 7. VGS(th) vs Tj VGS=VDS

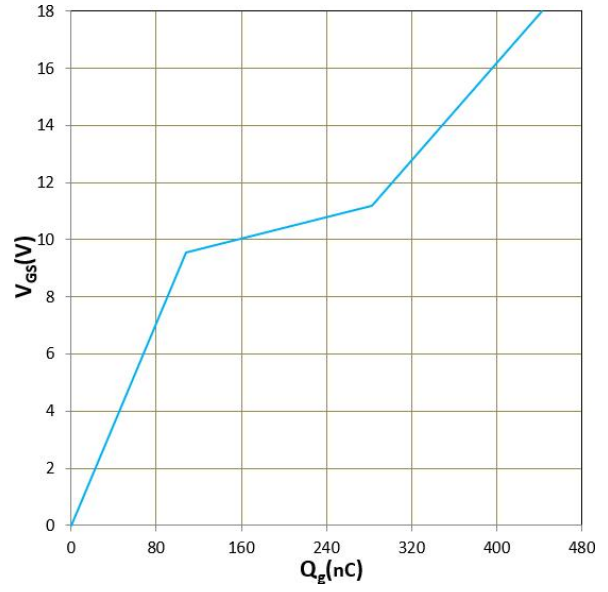
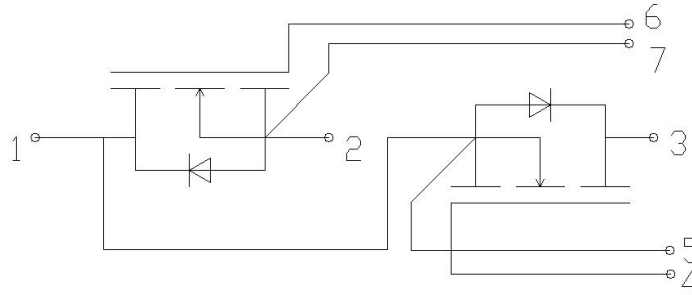
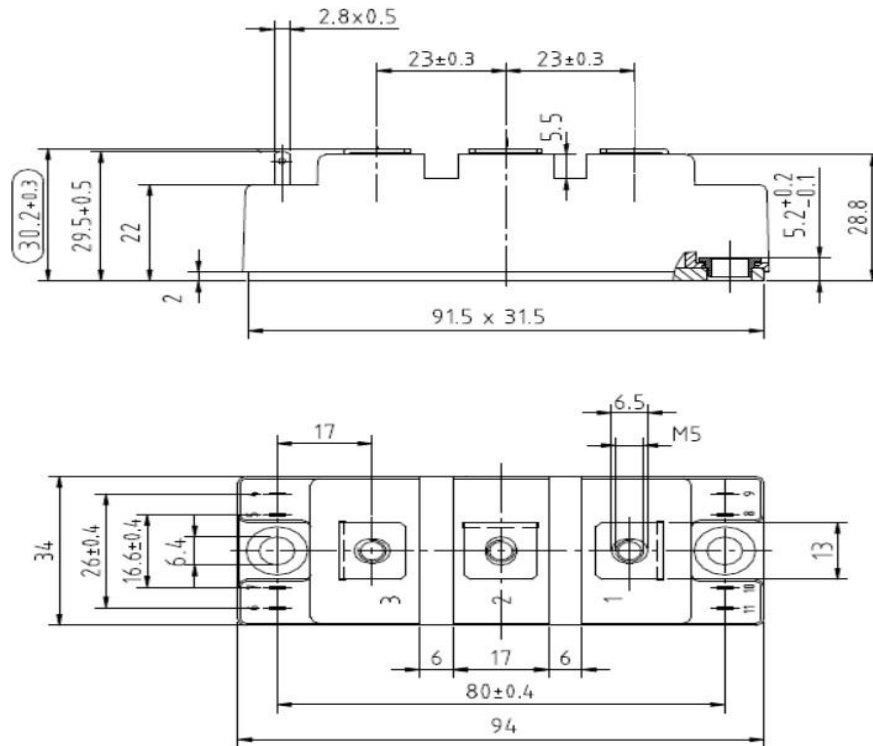


Figure 8. Gate charge
VDS=800V, IDS=160A, IGS=1mA, Tj=25°C

Internal Circuit:



Package Outline (Unit: mm):



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