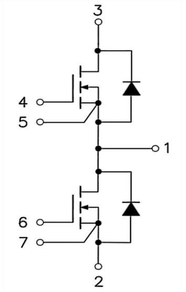
34mm Half Bridge SiC Module

Parameter	Value	Unit
V_{DS}	1200	V
I_D	126	A
$R_{DS(ON)}$	15	mΩ



Features:

- ■ Low switching losses
- ■ Low inductance design
- ■ Fast intrinsic diode with low reverse recovery

Applications:

- ■ DC/DC, High-frequency switch applications
- ■ Motor drive, Power supply
- ■ Inverter, Welding applications

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

Symbol	Parameter	Conditions	Ratings	Unit
V_{DSS}	Drain-Source Voltage	G-S Short	1200	V
V_{GSS}	Gate-Sourse Voltage	D-S Short, AC frequency ≥1Hz, Note1	-10 to 23	V
I_{DS}	DC Continuous Drain Current	T_C =25℃, V_{GS} =18V	126	A
		T_C =100°C, V_{GS} =18V	90	A
I_{SD}	Source-Drain Current(diode)	T_C =25℃, with ON signal	126	A
		T_C =100℃, with ON signal	90	A
I_{DSM}	Pulse Drain Current	T_C =25℃, Pulse width =1ms, V_{GS} =18V, Note2	340	A
P_{tot}	Total Power Dissipation	T_C =25℃	893	W
T_{jmax}	Max Junction Temperature	-	175	°C
T_{stg}	Storage Temperature	-	-55 to 175	°C

Note1: Recommended Operating Value, +18V/-4V

Note2: Pulse width limited by maximum junction temperature

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

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =100μA		1200	-	-	V
$V_{GS(th)}$	Gate-source threshold Voltage	I_D =27mA, V_{DS} =V_{GS}	T_j =25°C	2.0	2.8	3.7	V
			T_j =150°C	-	2.1	-	
			T_j =175°C	-	2.0	-	
I_{DSS}	Zero gate voltage drain Current	V_{DS} =1200V, V_{GS} =0V	T_j =25°C	0	1	50	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} =18V, V_{DS} =0V	T_j =25°C	0	1	200	nA
$R_{DS(on)}$	Static drain-source	I_D =80A	T_j =25°C	-	15	18	
			T_j =150°C	-	25	-	

(Chip)	On-state resistance	V_{GS} =+18V	T_j =175°C	-	28	-	mΩ
$V_{DS(on)}$ (Chip)	Static drain-source On-state Voltage	I_D =80A V_{GS} =+18V	T_j =25°C	-	1.89	-	V
			T_j =150°C		3.15		
			T_j =175°C	-	3.53	-	
C_{iss}	Input Capacitance	V_D =1000V, V_{GS} =0V f =1MHz, V_{AC} =25mV		-	4.3	-	nF
C_{oss}	Output Capacitance			-	0.214	-	
C_{rss}	Reverse transfer Capacitance			-	0.019	-	
R_{Gint}	Internal gate resistor	f =1MHz, I_D=0V		-	1.4	-	Ω
Q_g	Total gate charge	V_{DD} =800V, I_D =80A, V_{GS} =+18/-4V		-	222	-	nC
Q_{gs}	Gate-source charge			-	55	-	
Q_{gd}	Gate-drain charge			-	88	-	
$R_{th(j-c)}$	FET Thermal Resistance	Junction to Case, Note1		-	0.168	-	°C /W

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

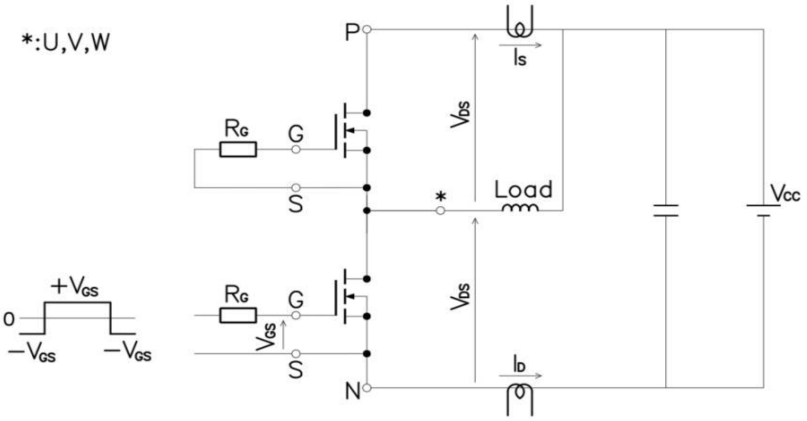
Body Diode Electrical characteristics (Tj =25°C unless otherwise specified, chip: Target)

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
V_{SD}	Body Diode Forward Voltage	V_{GS} =-4V, I_{SD} =40A	T_j =25°C	-	4.1	-	V
			T_j =150°C	-	3.7	-	
			T_j =175°C	-	3.6	-	
I_S	Continuous Diode Forward Current	V_{GS} = -4V	T_j =25°C	-	-	97	A
T_{rr}	Reverse recovery time	V_{DD} =800V, I_D =80A V_{GS} =+18/-4V, R_g =1Ω Inductive load switching operation	T_j =25°C	-	21	-	ns
Q_{rr}	Reverse recovery charge		T_j =25°C	-	470	-	nC
I_{rr}	Diode switching power dissipation		T_j =25°C	-	40	-	A

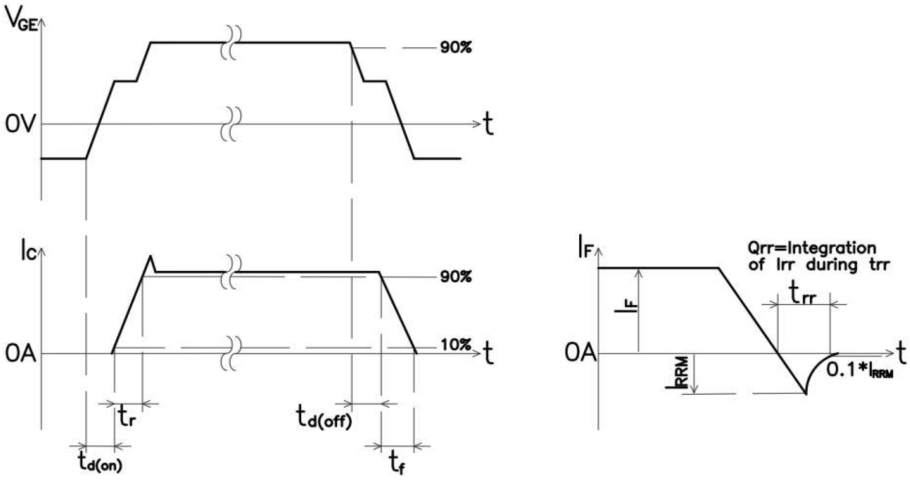
Module Characteristics

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	T_C =25°C	0.8	mΩ
Mounting torque for module mounting	M5, M6	3 to 6	Nm
Weight	-	160	g

Test Conditions



Switching time measure circuit



Switching time definition

Characteristics diagrams

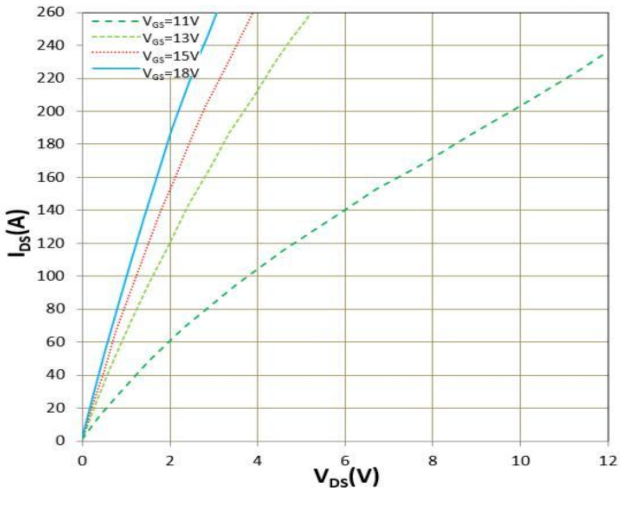


Figure 1. I_{DS} vs V_{DS} (Tvj=25℃)

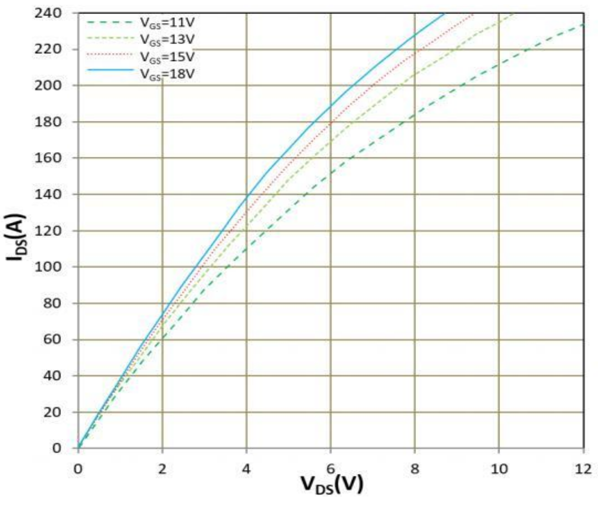


Figure 2. I_{DS} vs V_{DS} (Tvj= 175℃)

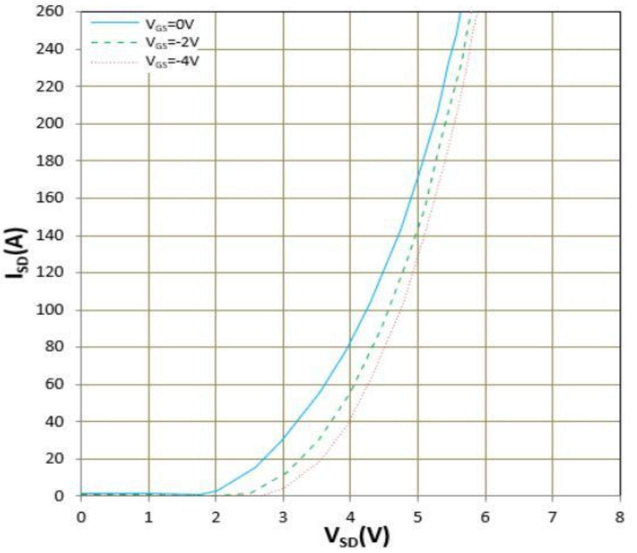


Figure 3. ISD vs VSD (Tvj= 125℃)

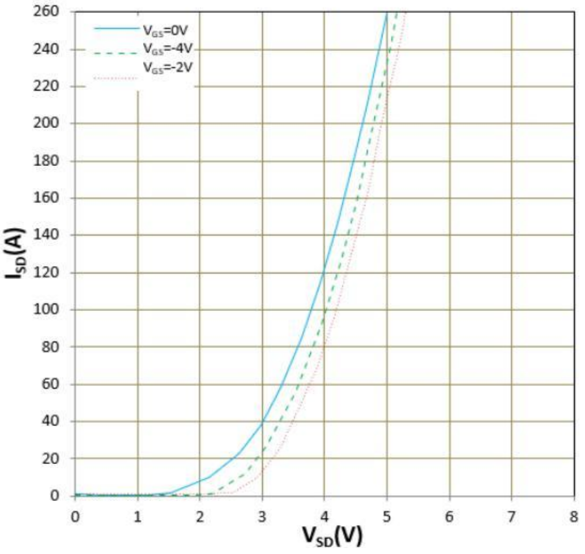


Figure 4. ISD vs VSD(Tvj= 175℃)

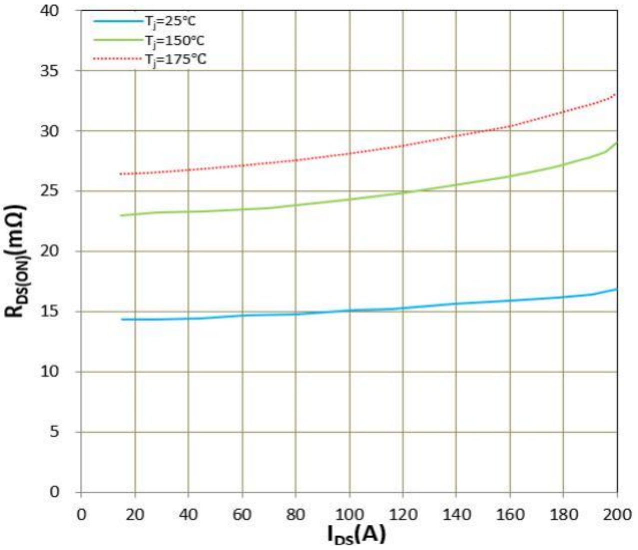


Figure 5. RDS(ON) vs IDS

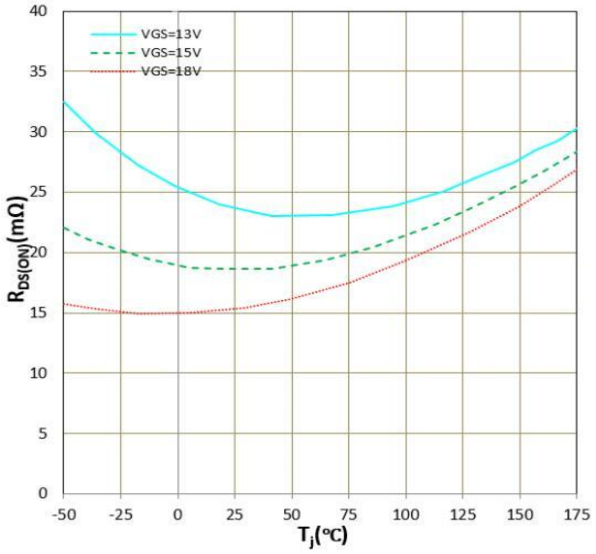


Figure 6. RDS(ON) vs Tj IDS=80A

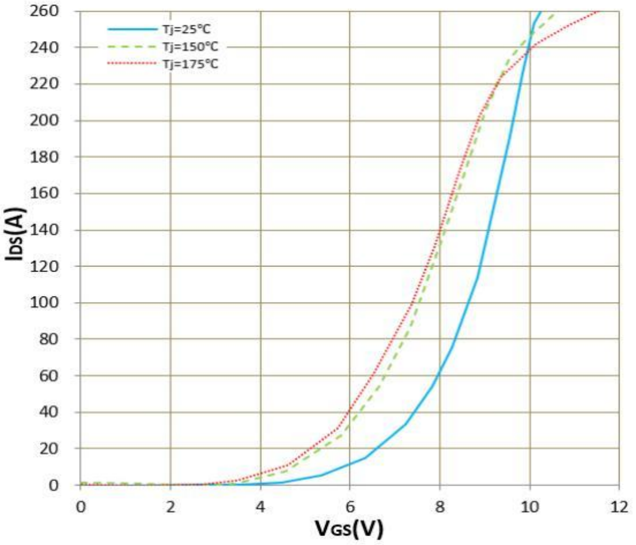


Figure 7. Transfer curves (VDS=20V)

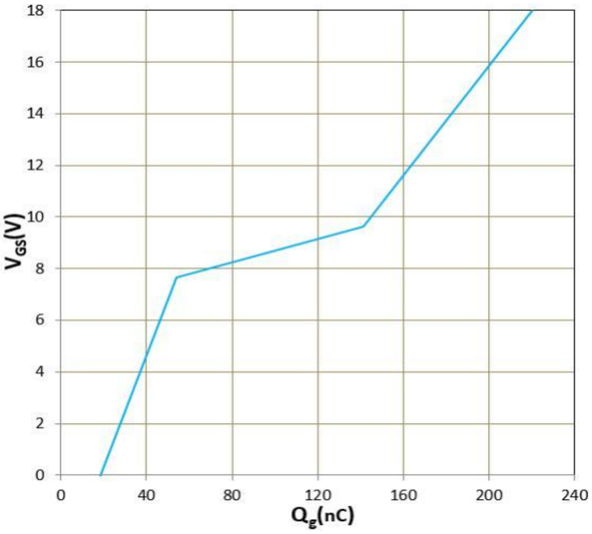
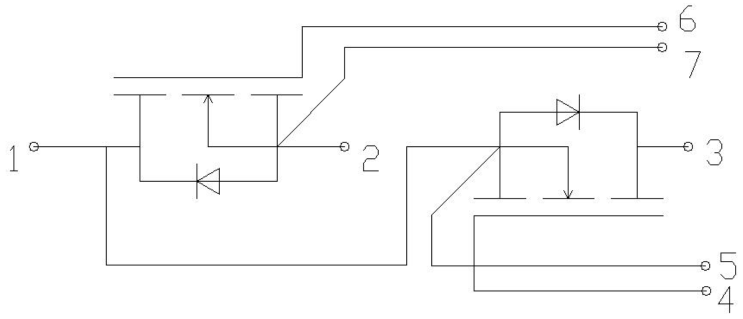
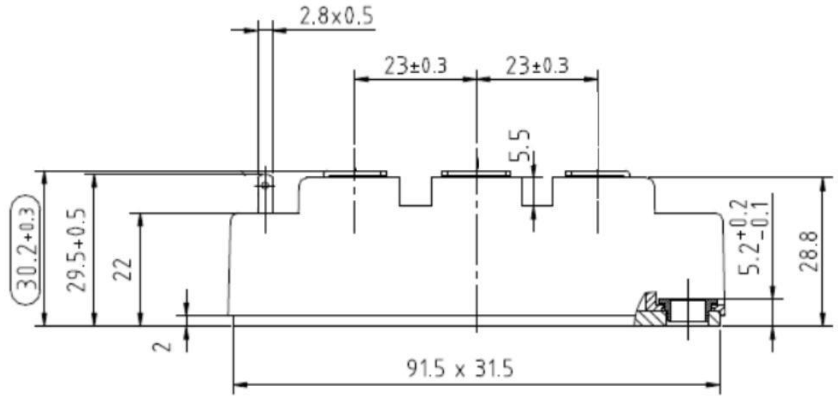


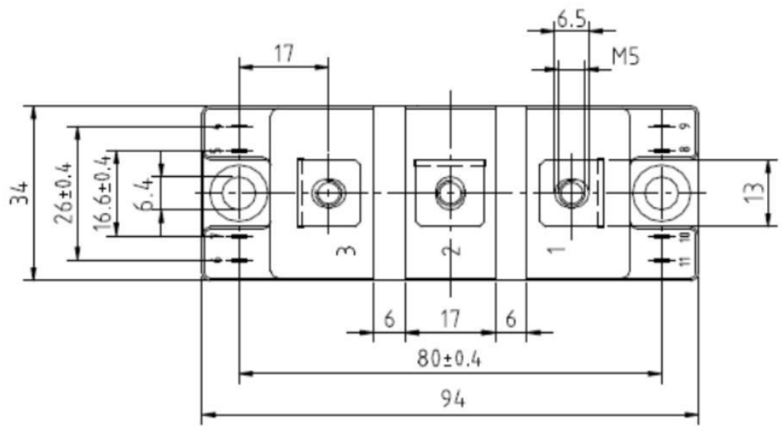
Figure 8. Body diode curves(Tvj=25℃)

Internal Circuit:



Package Outline (Unit: mm):





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