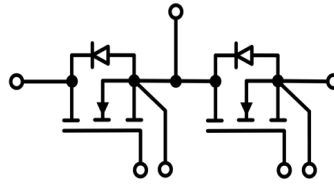


62mm SiC Half Bridge Module

Parameter	Value	Unit
V_{CES}	1200	V
I_C	200	A
$R_{DS(ON)}$	8	mΩ



Features:

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

Applications:

- DC/DC, High-frequency switch applications
- Motor drive, Power supply
- Inverter, Solar energy applications

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

Parameter	Conditions	Symbol	Value	Unit
Drain-source voltage	$T_J=25^{\circ}\text{C}$, $V_{GS}=0\text{V}$, $I_D=100\mu\text{A}$	V_{DSS}	1200	V
Continuous DC drain current	$T_C=25^{\circ}\text{C}$, $V_{GS}=18\text{V}$	$I_{D\text{ nom}}$	200	A
Repetitive peak collector current	$t_P=1\text{ms}$	$I_{D\text{ pulse}}$	400	A
Total power dissipation	$T_C=25^{\circ}\text{C}$, $T_{vj\text{ max}}=175^{\circ}\text{C}$	P_{tot}	800	W
Static Gate-source voltage	Static (DC)	$V_{GS\text{ max}}(\text{DC})$	-5/+20	V
Static Gate-source voltage	Duty cycle < 1%, pulse width < 200ns	$V_{GS\text{ max}}(\text{Transient})$	-10/+23	V
Recommended operation voltage		$V_{GS\text{ on}}$ $V_{GS\text{ off}}$	15 to 18 -3.5 to -2	V

Note1: Pulse width limited by maximum junction temperature

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

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Zero gate voltage drain current	$V_{GS}=0\text{V}$, $V_{DS}=1200\text{V}$	$T_J=25^{\circ}\text{C}$	I_{DSS}			100	μA
Gate leakage current	$V_{DS}=0\text{V}$, $V_{GS}=-5\sim 20\text{V}$	$T_J=25^{\circ}\text{C}$	I_{GSS}			± 100	nA
Gate threshold voltage	$V_{GS}=V_{DS}$, $I_D=40\text{mA}$	$T_J=25^{\circ}\text{C}$ $T_J=175^{\circ}\text{C}$	$V_{GS(th)}$	2.0	2.8 2.0	4.0	V
Drain-source on resistance	$V_{GS}=18\text{V}$, $I_D=200\text{A}$	$T_J=25^{\circ}\text{C}$ $T_J=175^{\circ}\text{C}$	$R_{DS(on)}$		8 12	10	mΩ
Internal gate resistor	$f=100\text{KHz}$		R_{Gint}		3.6		Ω
Input capacitance	$f=100\text{KHz}$, $V_{DS}=800\text{V}$, $V_{GS}=0$		C_{iss}		10.2		nF

Output capacitance	V	$T_{vj}=25^{\circ}\text{C}$	C_{oss}		620		pF
Reverse transfer capacitance			C_{rss}		36.2		pF
Coss stored energy		$T_{vj}=25^{\circ}\text{C}$	E_{oss}		246		μJ
Total gate charge	VDS=800V, ID=200A, VGS=-3 to 18V	$T_{vj}=25^{\circ}\text{C}$	Q_G		370		nC
Gate-source charge			Q_{GS}		88		nC
Gate-drain charge			Q_{GD}		190		nC
Turn-on delay time	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω L= 100 μH	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	$t_{d\ on}$		45 41 39		ns
Rise time	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω L= 100 μH	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	t_r		60 54 52		
Turn-off delay time	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω , L= 100 μH	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	$t_{d\ off}$		94 112 118		
Fall time	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω , L= 100 μH	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	t_f		30 32 32		
Turn-on energy loss per pulse	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω , L=100 μH , di/dt=42.7kV/ μs ($T_{vj}=175^{\circ}\text{C}$)	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	E_{on}		5.3 4.8 4.6		mJ
Turn-off energy loss per pulse	ID=200A, VDS=800 V VDS=+18V/-3.5V, RG=2.7 Ω , L=100 μH , dv/dt= 15.4kA/ μs ($T_{vj}=175^{\circ}\text{C}$)	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	E_{off}		3.5 3.7 3.9		
Thermal resistance, junction to case	per MOSFET		R_{thJC}		0.18		K/W
Temperature under switching conditions			$T_{vj\ op}$	-40		175	$^{\circ}\text{C}$

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

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

Parameter	Conditions	Symbol	Value	Unit
Continuous DC forward current	$V_{GS}=-2\text{V}$, $T_{vj}=25^{\circ}\text{C}$	I_{SD}	200	A
Repetitive peak forward current	$V_{GS}=-2\text{V}$, $T_{vj}=25^{\circ}\text{C}$, $t_p<1\text{ms}$	I_{SDM}	400	A

Diode Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	$I_F=200\text{A}$, $V_{GS}=-2\text{V}$ $I_F=200\text{A}$, $V_{GS}=-2\text{V}$ $I_F=200\text{A}$, $V_{GS}=-2\text{V}$	$T_{vj}=25^{\circ}\text{C}$ $T_{vj}=125^{\circ}\text{C}$ $T_{vj}=175^{\circ}\text{C}$	V_F	5.9 5.5 5.3		V

Peak reverse recovery current	$I_F=200A$, $di_F/dt=10kA/\mu s(T_{vj}=175.^\circ C)$ $V_R=800V$, $V_{GS}=-3.5V/+18V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=175^\circ C$	I_{RM}		176 210 255		A
Recovered charge	$I_F=200A$, $di_F/dt=10kA/\mu s(T_{vj}=175.^\circ C)$ $V_R=800V$, $V_{GS}=-3.5V/+18V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=175^\circ C$	Q_{rr}		8.0 5.2 4.9		μC
Reverse recovered energy	$I_F=400A$, $di_F/dt=10kA/\mu s(T_{vj}=175.^\circ C)$ $V_R=800V$, $V_{GS}=-3.5V/+18V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=175^\circ C$	E_{rec}		682 765 862		μJ

Module Characteristics

Parameter	Conditions	Symbol	Value			Unit
Isolation test voltage	RMS, f=50Hz, t= 1min	VISOL	4000			V
Internal isolation			Al ₂ O ₃			
Storage temperature		Tstg	-40		125	°C
Mounting torque for modul mounting		M	3.0		6.0	Nm
Weight		W		325		g

Characteristics diagrams

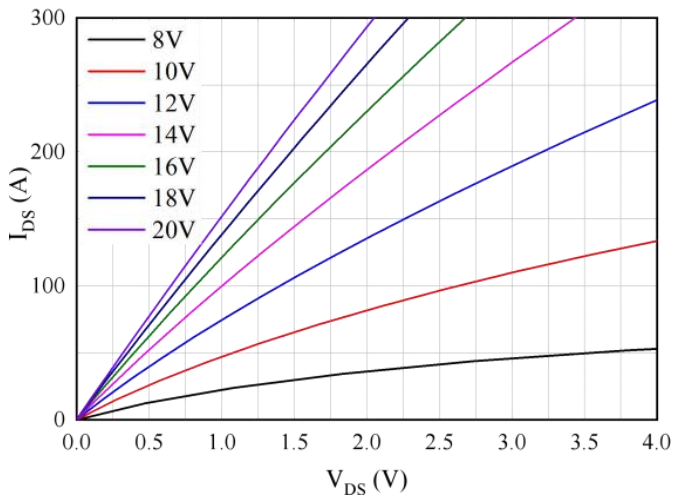


Figure 1. Typical output characteristics ($T_{vj}=25^\circ C$)

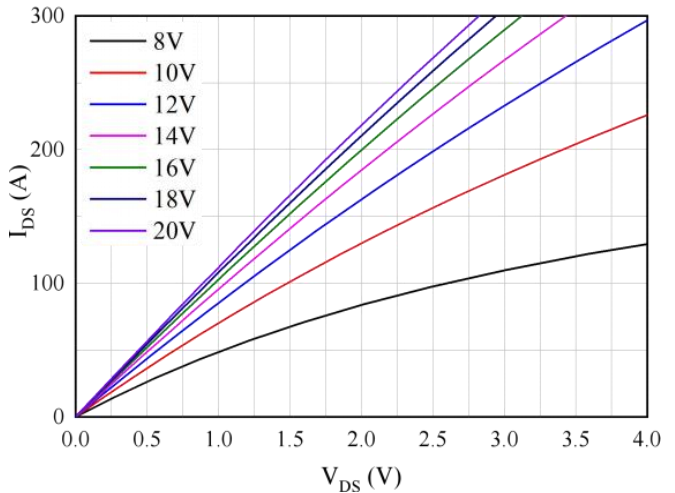


Figure 2. Typical output characteristics ($T_{vj}=125^\circ C$)

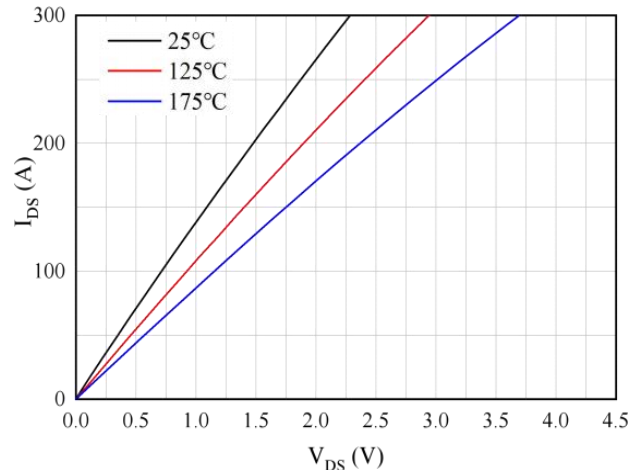
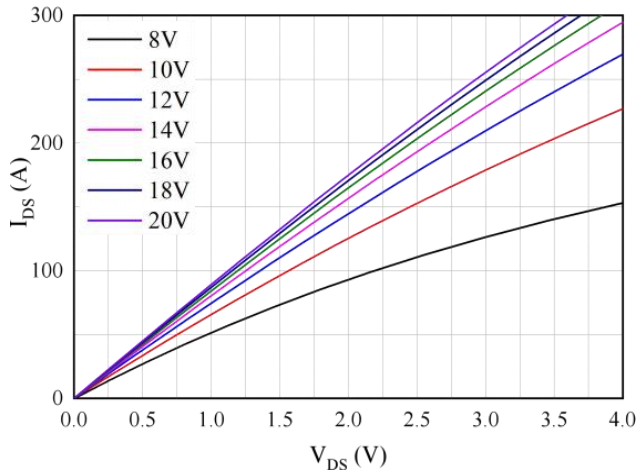


Figure 3. Typical output characteristics (Tvj= 175°C)

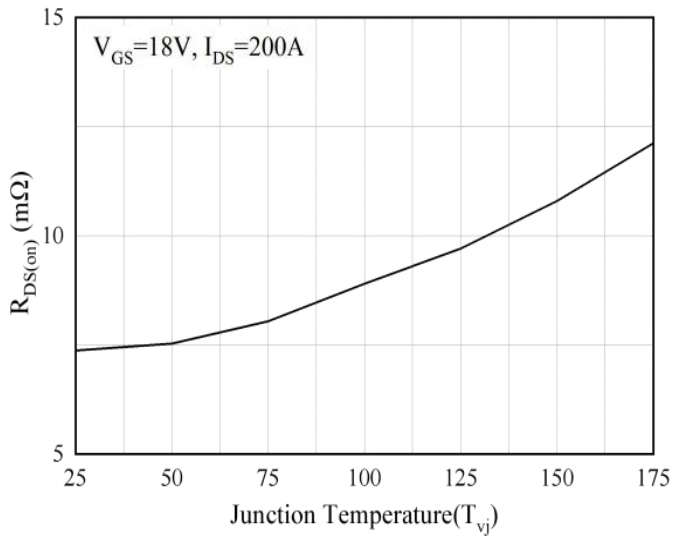


Figure 4. Output curves (VGS= 18V)

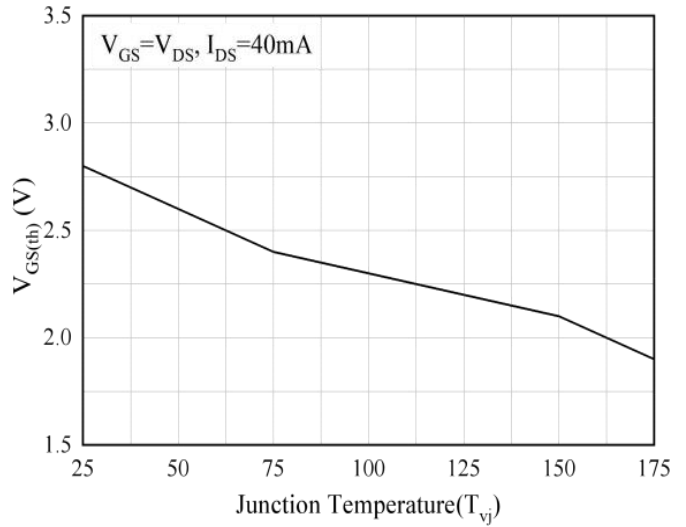


Figure 5. R_DS(on) on vs. Temperature

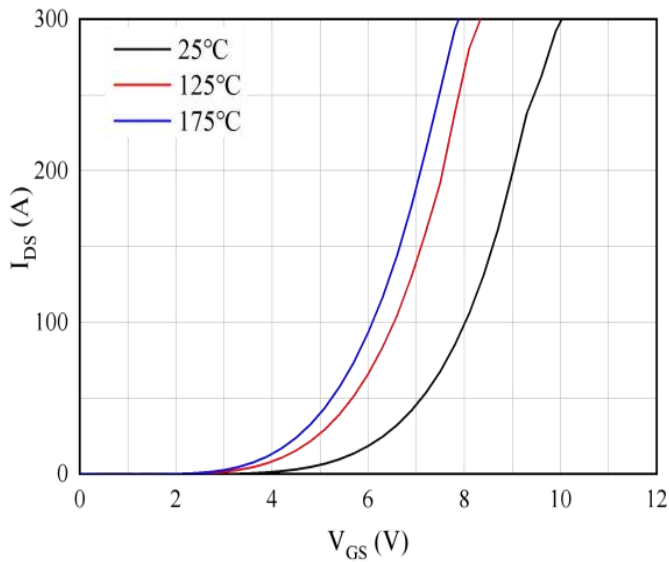


Figure 6. VGS(th) vs. Temperature

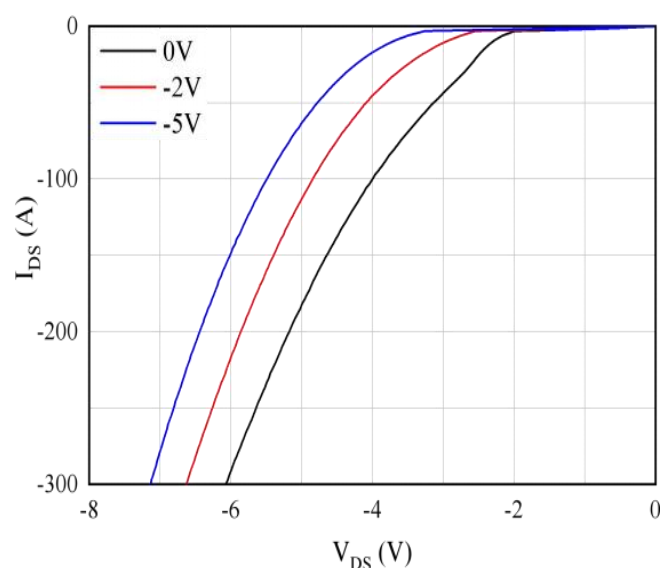


Figure 7. Transfer curves (VDS=20V)

Figure 8. Body diode curves (Tvj=25°C)

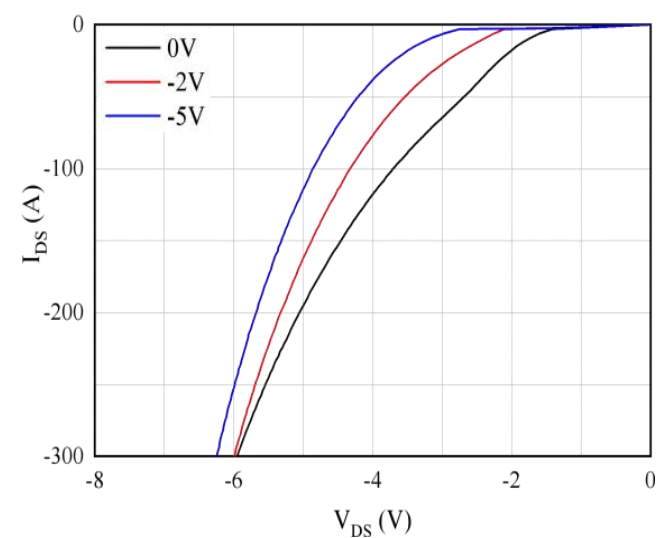
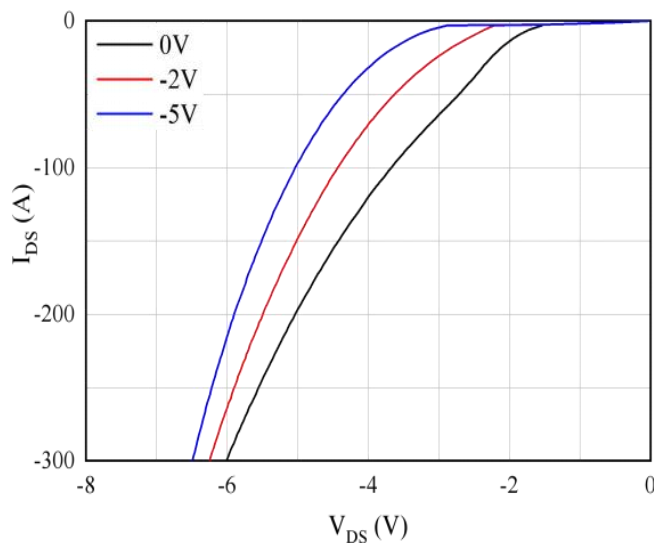


Figure 9. Body diode curves (Tvj= 125°C)

Figure 10. Body diode curves (Tvj= 175°C)

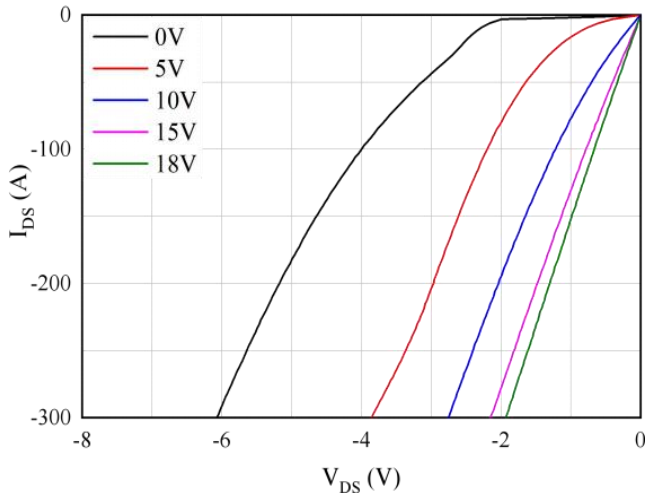


Figure 11. 3rd Quadrant curves (Tvj=25°C)

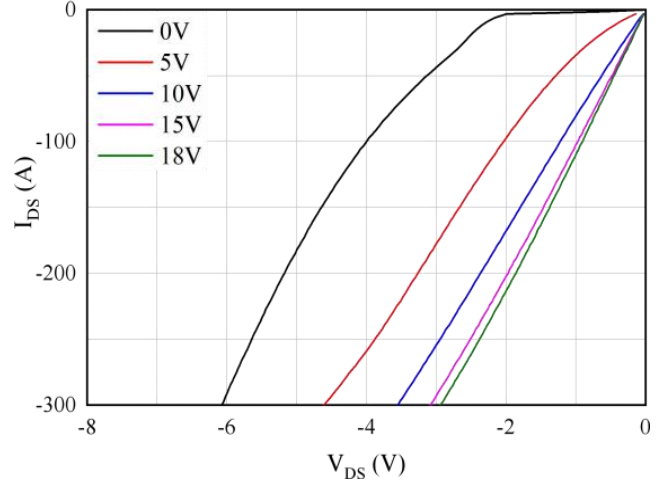


Figure 12. 3rd Quadrant curves (Tvj= 125°C)

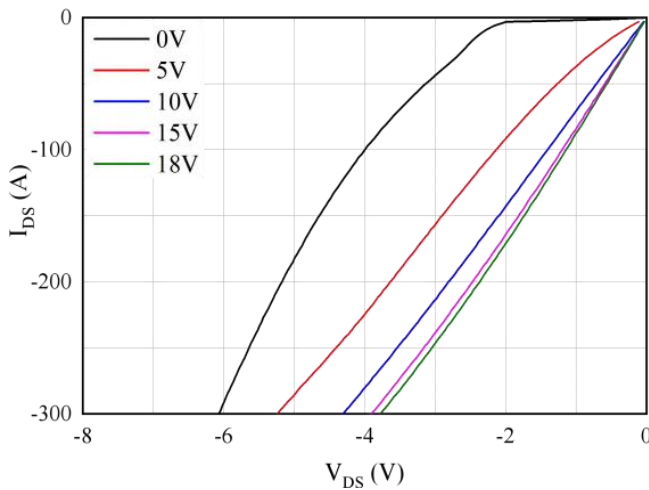


Figure 13. 3rd Quadrant curves (Tvj= 175°C)

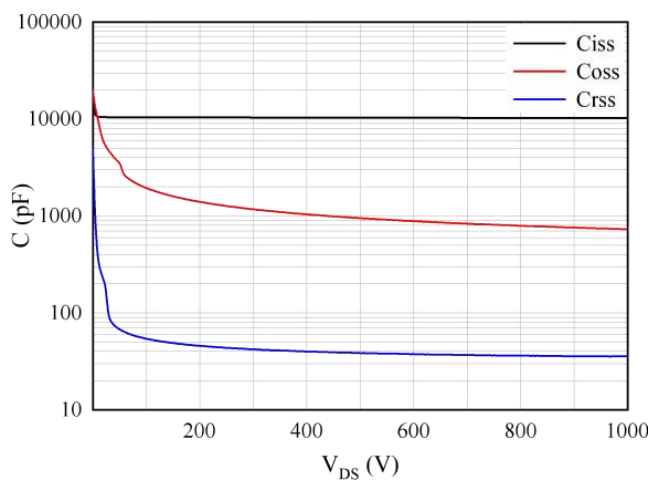


Figure 14. Capacitance vs. V_DS

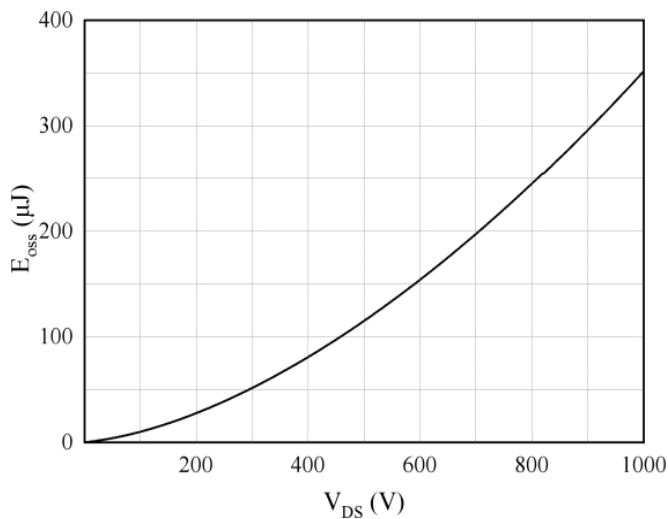


Figure 15. Output capacitor stored energy

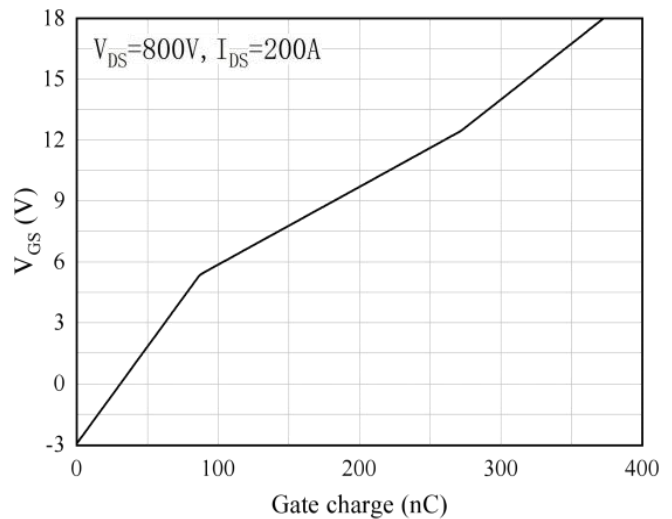


Figure 16. Gate charge characteristics

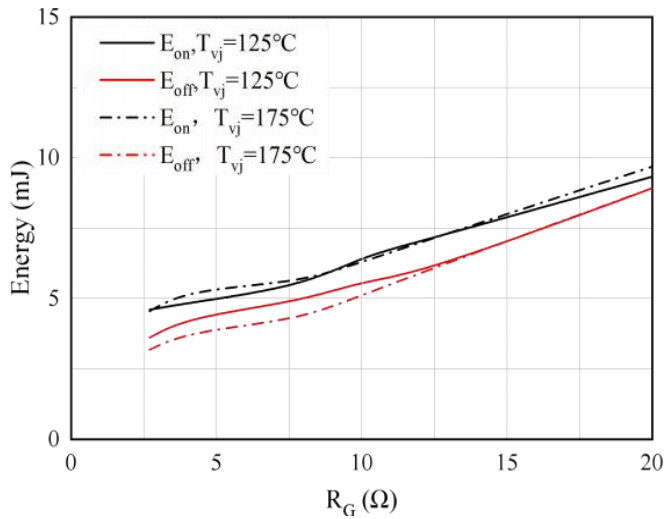


Figure 17. Switching energy vs. $R_G(\text{ext})$

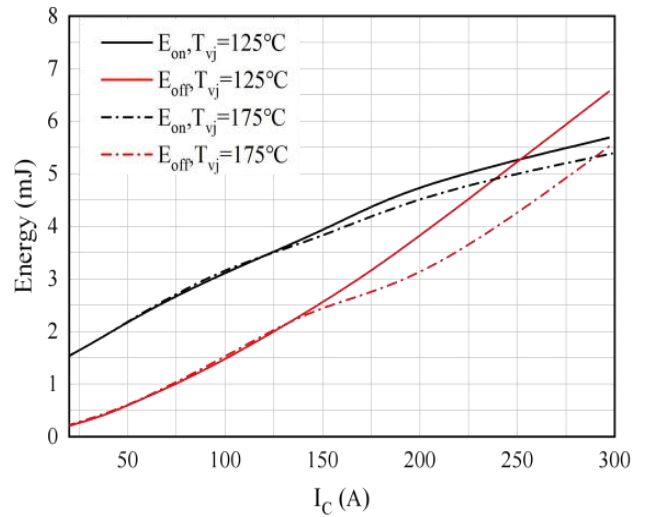


Figure 18. Switching energy vs. I_{DS}

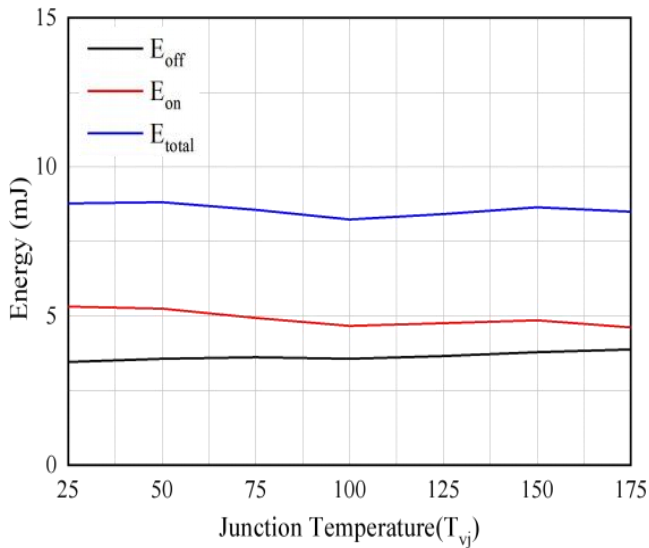


Figure 19. Switching energy vs. Temperature

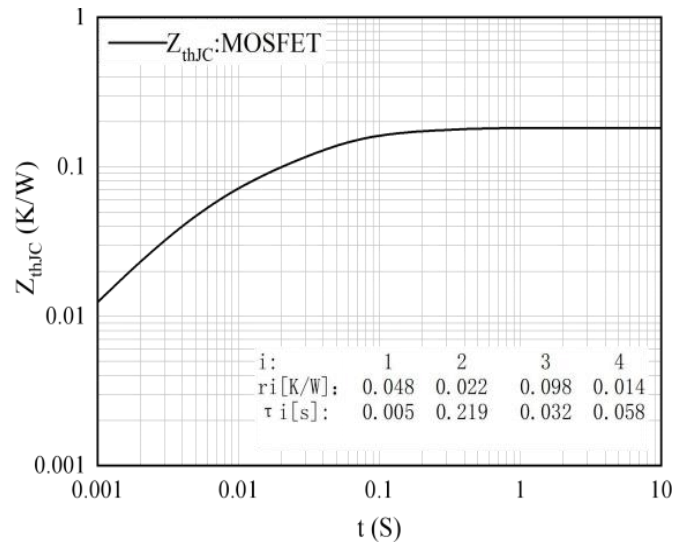
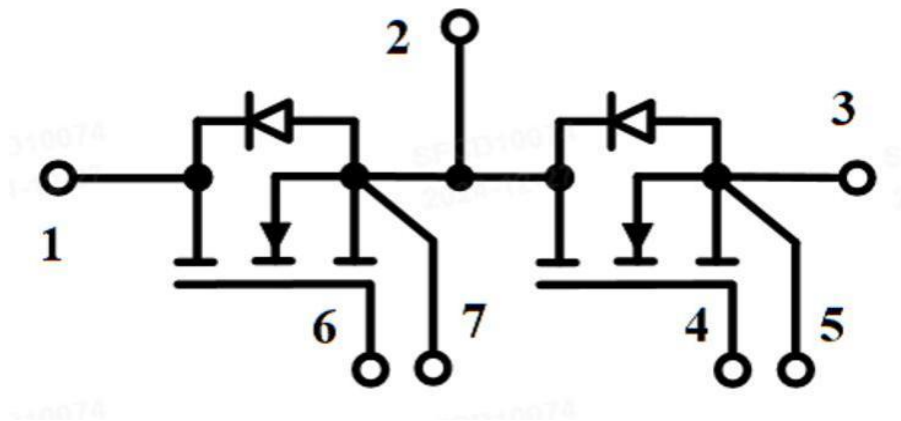
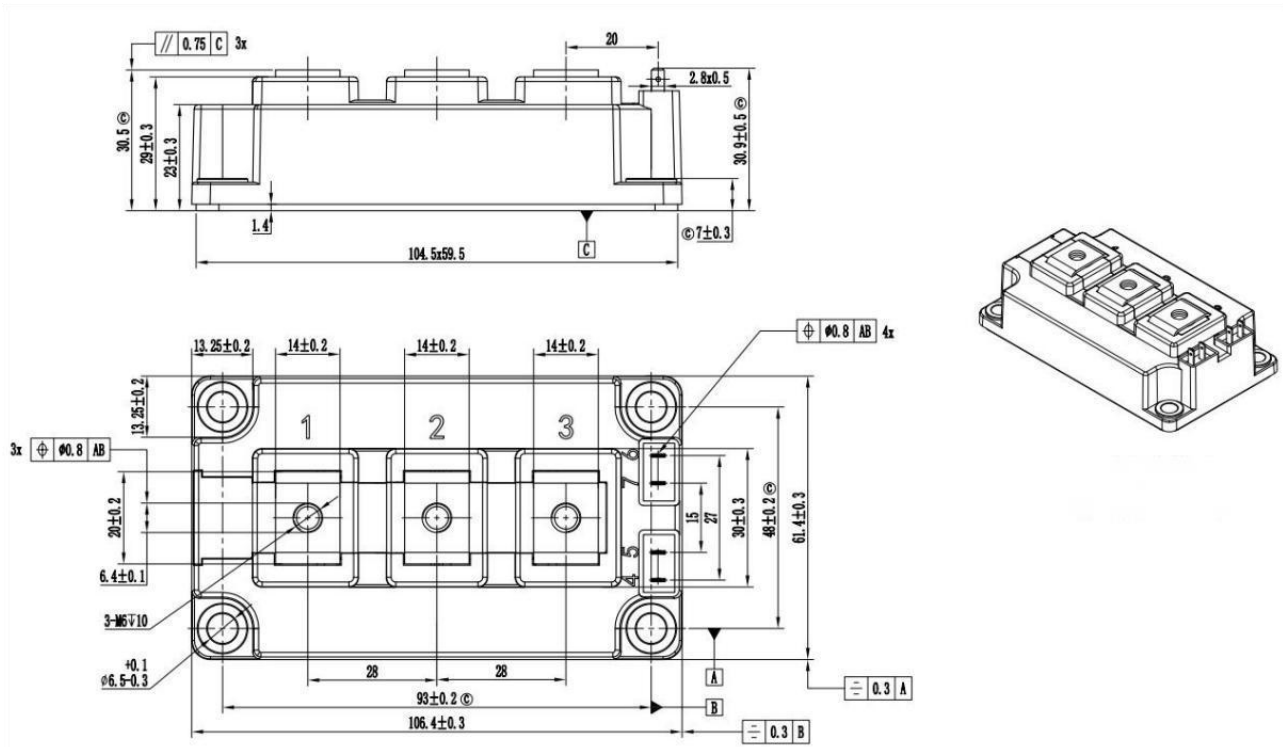


Figure 20. Transient thermal impedance MOSFET

Internal Circuit:



Package Outline (Unit: mm):



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