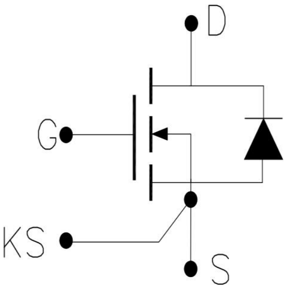
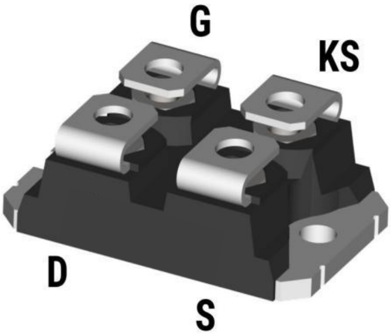
Single Unit SiC MOSFET Module

Parameter	Value	Unit
V_{DS}	1200	V
I_{DS}	110	A
$R_{DS(ON)}$	17	mΩ





Features：

- 1200V/17mΩ @Tj =25℃,V_{GS} =18V
- 175℃ maximum junction temperature
- Low Device Capacitances(Coss,Crss)
- Faster and More Efficient Switching

Applications：

- UPS
- Motor Drive
- EV Charging
- High Voltage DC-DC Converters
- Induction Heating and Welding
- Smart Grid Transmission and Distribution

Maximum Ratings(Tj =25°C unless otherwise specified)

Parameter	Symbol	Conditions		Ratings	Unit
Drain-Source Voltage	V_{DSS}	G-S Short		1200	V
Gate-Sourse Voltage	V_{GSS}	D-S Short, AC frequency ≥1Hz, Note1		-10 to +22	V
DC Continuous Drain Current	I_{DS}	V_{GS}=+15V	T_C=25℃	105	A
DC Continuous Drain Current	I_{DS}		T_C=100℃	75	A
DC Continuous Drain Current	I_{DS}	V_{GS}=+18V	T_C=25℃	110	A
DC Continuous Drain Current	I_{DS}		T_C=100℃	80	A
Pulse Drain Current	I_{DSM}	Pulse width≤3μs, VGS=+15V, Note2		313	A
Total Power Dissipation	P_{tot}	T_C=25℃		350	W
Max Junction Temperature	T_{jmax}	-		175	℃
Storage Temperature	T_{stg}	-		-50 to 175	℃

Note1: Recommended Operating Value, +18V/-5V, +15V/-4V

Note2: Pulse width limited by maximum junction temperature

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	V_{GS}=0V, I_D=100uA		1200	-	-	V
I_{DSS}	Zero gate voltage drain Current	V_{DS}=1200V, V_{GS}=0V		-	1	-	μA
$V_{GS(th)}$	Gate-source threshold Voltage	I_D=35mA, V_{DS}=V_{GS}	Tj=25℃	1.8	2.7	-	V
			Tj=175℃	-	2.05	-	V

I_{GSS}	Gate-Source Leakage Current	V_{GS}=22V, V_{DS}=0V	Tj=25℃	-	-	100	nA
$R_{DS(on)}$ (Chip)	Static drain-source On-state resistance	I_D=60A V_{GS}=+15V	Tj=25℃	-	20	-	m
			Tj=175℃	-	29	-	m
		I_D=60A V_{GS}=+18V	Tj=25℃	-	17	22.5	m
			Tj=175℃	-	25	-	m
$V_{DS(on)}$ (Chip)	Static drain-source On-state Voltage	I_D=60A V_{GS}=+15V	Tj=25℃	-	1.20	-	V
			Tj=175℃	-	1.74	-	V
		I_D=60A V_{GS}=+18V	Tj=25℃	-	1.02	1.35	V
			Tj=175℃	-	1.50	-	V
C_{iss}	Input Capacitance	V_D=800V, V_{GS}=0V, f =1MHz, V_{AC}=25mV		-	5814	-	pF
C_{oss}	Output Capacitance			-	177	-	pF
C_{rss}	Reverse transfer Capacitance			-	14.2	-	pF
Q_g	Total gate charge	V_{DD}=800V, I_D=60A, V_{GS}=+15/-5V		-	180	-	nC
R_{Gint}	Internal Gate Resistance	Tj=25℃		-	1.3	-	Ω
$t_{d(on)}$	Turn-on delay time	V_{DD}=800V I_D=60A V_{GS}=+15/-4V R_{gon}=R_{goff} =1.0Ω Inductive load switching operation	Tj=25℃	-	45	-	ns
			Tj=150℃	-	39	-	
t_r	Rise time		Tj=25℃	-	18	-	ns
			Tj=150℃	-	16	-	
$t_{d(off)}$	Turn-off delay time		Tj=25℃	-	20	-	ns
			Tj=150℃	-	25	-	
t_f	Fall time		Tj=25℃	-	11	-	ns
			Tj=150℃	-	35	-	
E_{on}	Turn-on power dissipation		Tj=25℃	-	492	-	μJ
			Tj=150℃	-	662	-	
E_{off}	Turn-off power dissipation		Tj=25℃	-	205	-	μJ
			Tj=150℃	-	200	-	
$R_{th(j-c)}$	FET Thermal Resistance	Junction to Case		-	0.36	0.48	K/W

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

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
V_{SD}	Body Diode Forward Voltage	V_{GS}= -5V I_{SD}=30A	Tj=25℃	-	4.6	-	V
			Tj=175℃	-	4.2	-	
T_{rr}	Reverse recovery time	V_{DD}=800V, I_D=60A V_{GS}=+15/-4V R_{gon}=R_{goff} =1.0Ω Inductive load switching operation	Tj=25℃	-	35	-	ns
			Tj=150℃	-	47	-	
Q_{rr}	Reverse recovery charge		Tj=25℃	-	240	-	nC
			Tj=150℃	-	475	-	
I_{rrm}	Reverse recovery current		Tj=25℃	-	14	-	A
			Tj=150℃	-	21	-	A

Module Characteristics

Parameter	Conditions	Value	Unit
Isolation Voltage	RMS, f =50Hz, t =1min	3.4	KV
CTI	-	>400	-
Mounting torque for module mounting	M4	1.5	Nm
Weight	-	28	g

Typical Characteristics

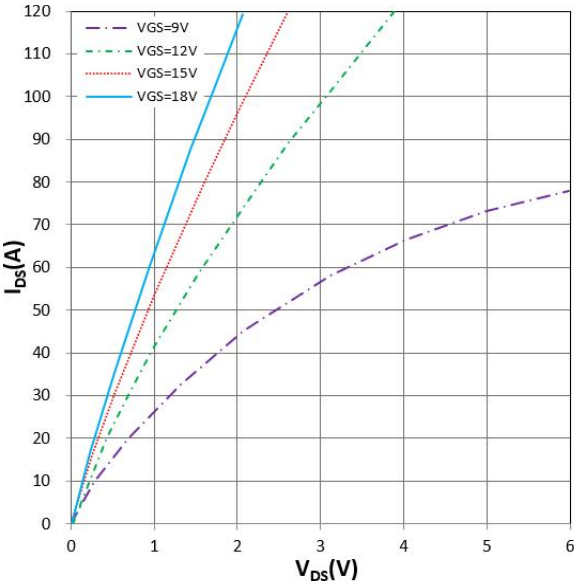


Fig1. I_{DS} vs V_{DS} (T_{vj}=25℃)

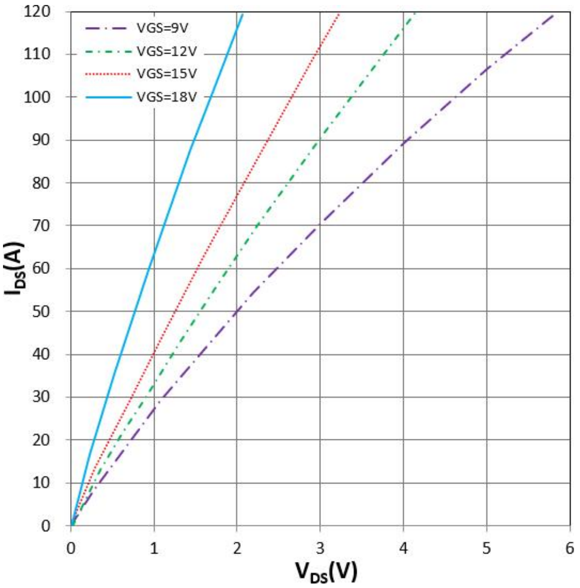


Fig 2. I_{DS} vs V_{DS} (T_{vj}= 175℃)

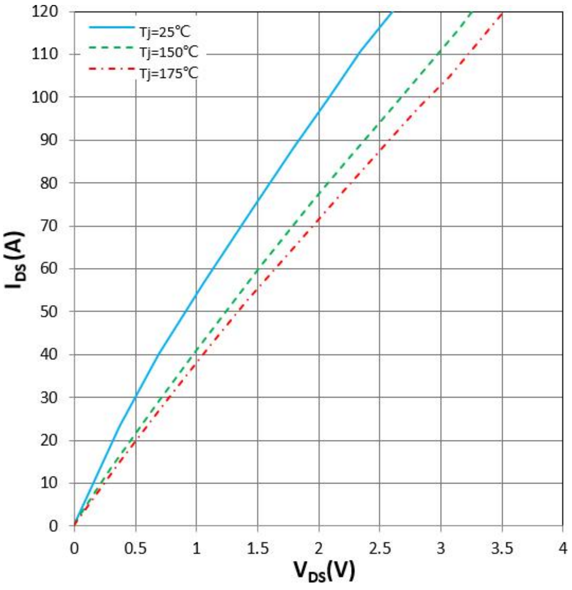


Fig 3. I_{SD} vs V_{SD} ,V_{GS}±15V

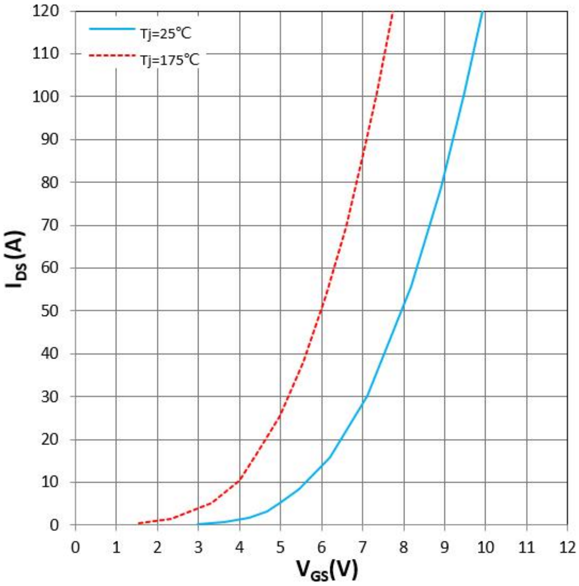


Fig 4. I_{DS} vs V_{GS} ,V_{DS}=+10V

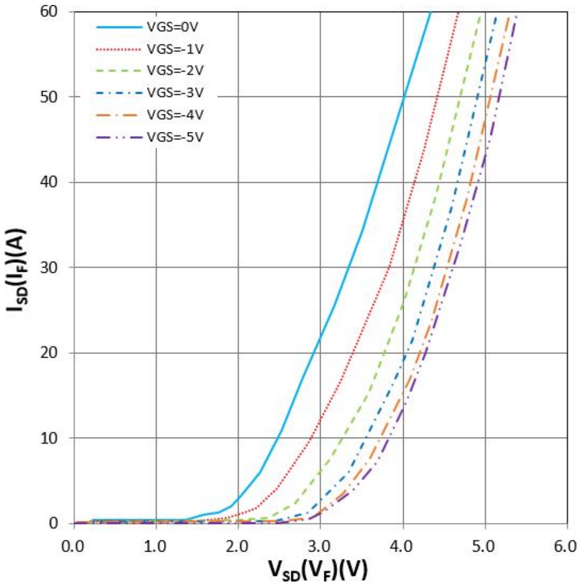


Fig 5. I_{SD} vs V_{SD} (V_F) ,T_j =25℃

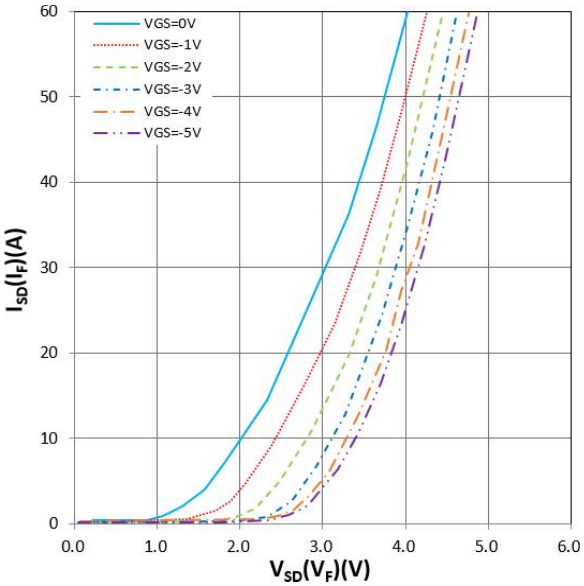


Fig 6. I_{SD} vs V_{SD} (V_F) ,T_j =175℃

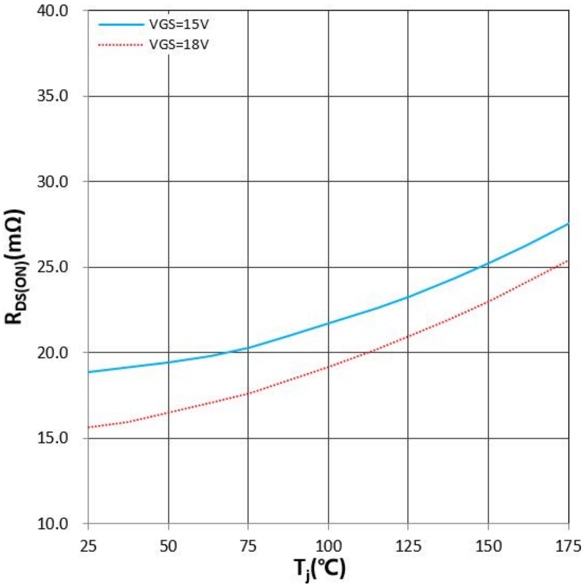


Fig 7. $R_{DS(ON)}$ vs T_j , I_D =60A

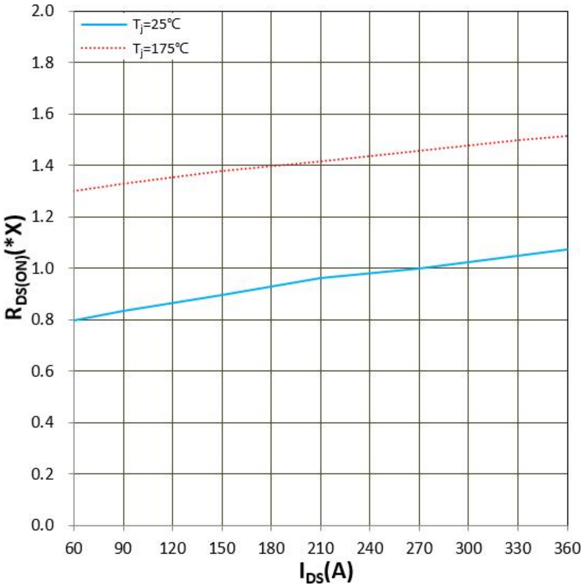


Fig 8.$R_{DS(ON)}$ vs I_{DS} , V_{GS} =+15V

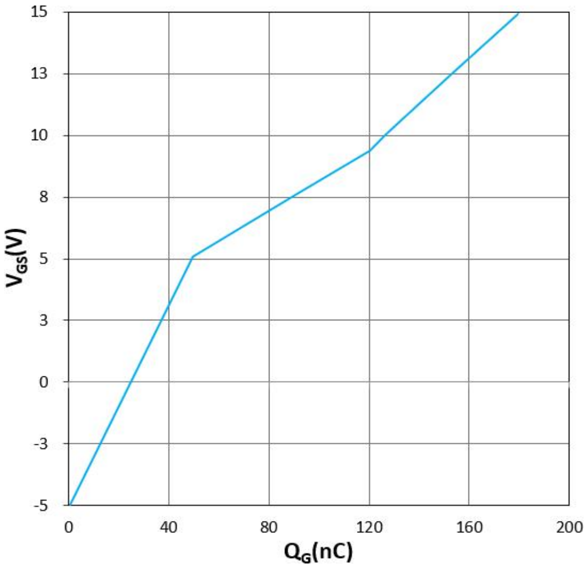


Fig 9. V_{GS} vs Q_g, V_{DS}=800V, I_D=60A, T_j=25℃

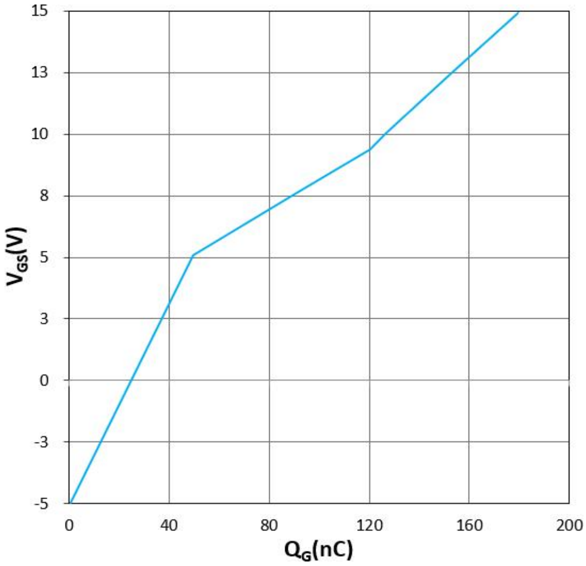


Fig 10. $V_{GS(TH)}$ vs T_j , V_{GS}=V_{DS}, I_D=35mA

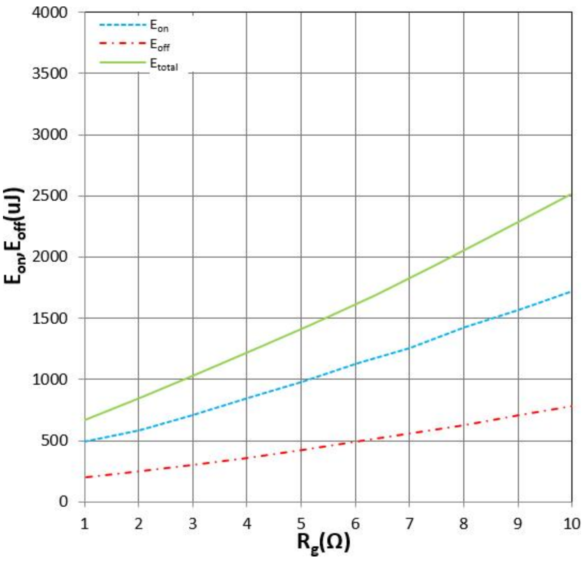


Fig 11. E_{on}, E_{off} vs R_g
Tj =25°C, V_{CC}=800V, V_{GS}=+15V/-4V, I_D =60A

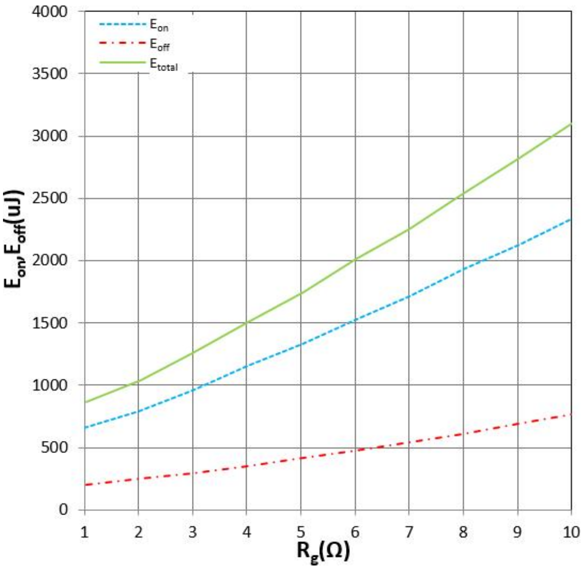


Fig 12. E_{on}, E_{off} vs R_g
Tj =150°C, V_{CC}=800V, V_{GS}=+15V/-4V, I_D=60A

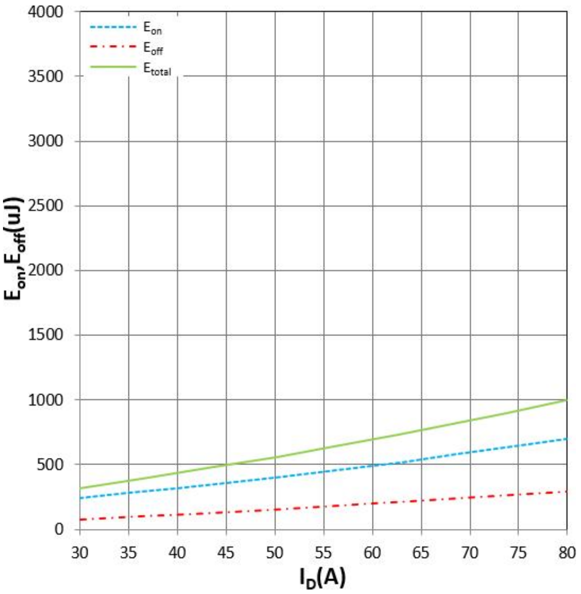


Fig 13. E_{on}, E_{off} vs I_{DS},Tj=25°C
V_{CC}=800V,V_{GS} =+15V/-4V
R_{gon}=R_{goff} =1.0Ω, Inductive Load

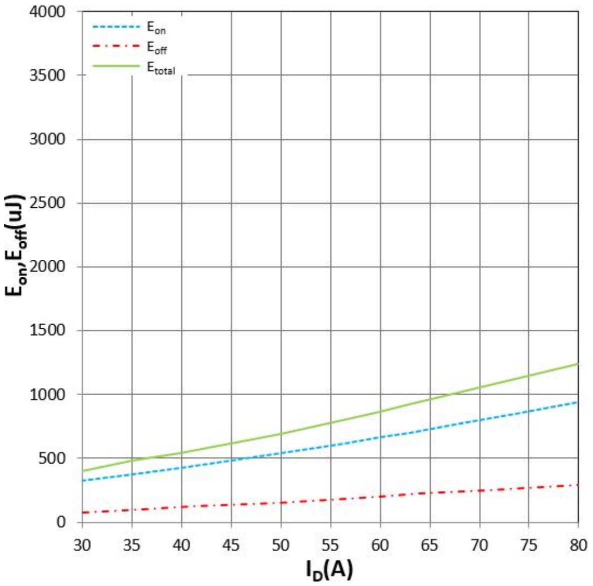


Fig 14. E_{on}, E_{off} vs I_{DS}
Tj =150°C, V_{CC} =800V, V_{GS} =+15V/-4V
R_{gon}=R_{goff} =1.0Ω, Inductive Load

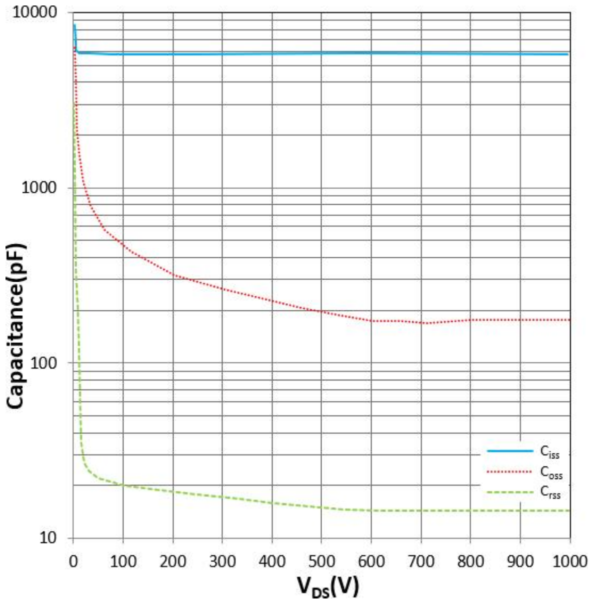
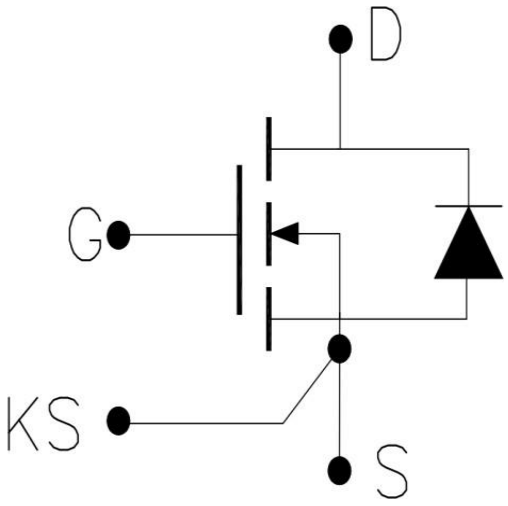


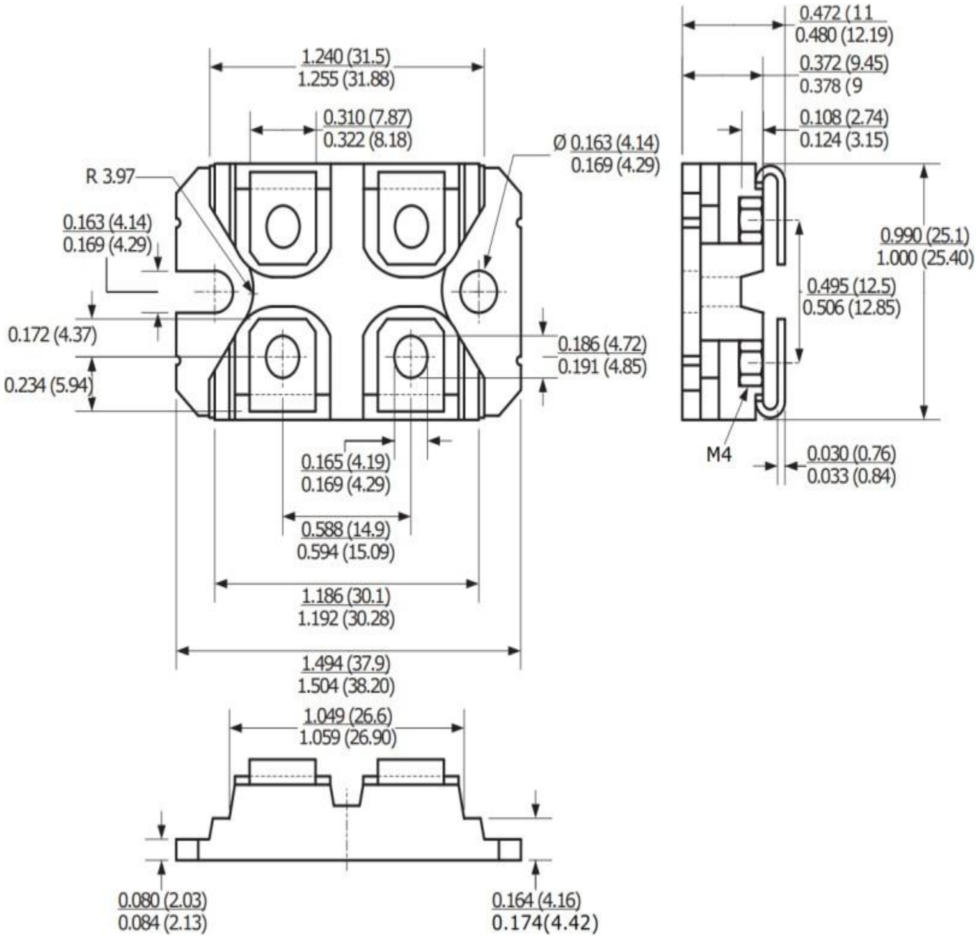
Fig 15. C_{ies},C_{oss},C_{rss} vs V_{DS}
Tj =25℃, f=1MHz, V_{AC} =25mV

Circuit Diagram



Package Outline (Unit: mm):

SOT-227



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