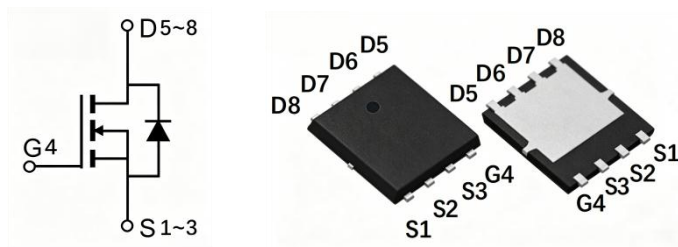


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	650	V
I_D	11	A
$R_{DS(ON)}$	380	m Ω
Q_G	21.3	nC



PDFN5x6

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness
- Easy to Parallel and Simple to Drive

Applications

- Battery Chargers
- Motor Drives
- Pulsed Power Applications
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)

Absolute Maximum Ratings (at $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	650	V
Gate-source Voltage (Absolute maximum values)	V_{GS}	-10/+22	V
Gate-source Voltage (Recommended operational values)		0/+18	
Drain Current (continuous; $T_C=25^{\circ}\text{C}$); $V_{GS}=15\text{V}$	I_D	11	A
Drain Current (continuous; $T_C=100^{\circ}\text{C}$); $V_{GS}=15\text{V}$		9	
Drain Current (pulsed); $V_{GS}=15\text{V}$; $T_C=25^{\circ}\text{C}$	I_{DM}	22	A
Power Dissipation ($T_C=25^{\circ}\text{C}$, $T_J=175^{\circ}\text{C}$)	P_D	52	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^{\circ}\text{C}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.88	$^{\circ}\text{C/W}$

Electrical Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics (at T _C =25°C unless otherwise specified)						
Drain-Source Breakdown Voltage	B _{VDS}	V _{GS} =0V; I _D =500uA	650	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V; V _{GS} =0V	-	-	10	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =18V; V _{DS} =0V	-	-	250	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} ; I _{DS} =1.8mA; T _J =25°C	2.7	-	4.5	V
Static Drain-Source on Resistance	R _{DS(on)}	V _{GS} =15V; I _D =5A; T _J =25°C	-	380	500	mΩ
		V _{GS} =15V; I _D =5A; T _J =175°C	-	325	-	
		V _{GS} =18V; I _D =5A; T _J =25°C	-	260	-	
		V _{GS} =18V; I _D =5A; T _J =175°C	-	270	-	
Dynamic characteristics (at T _C =25°C unless otherwise specified)						
Input Capacitance	C _{iss}	V _{DS} =500V; f=1MHz; V _{GS} =0V T _J =25°C	-	254	-	pF
Output Capacitance	C _{oss}		-	20.2	-	
Reverse Transfer Capacitance	C _{rss}		-	2.4	-	
Total Gate Charge	Q _G	V _{DD} =500V; V _{GS} =0/15V; I _D =5A T _J =25°C	-	21.3	-	nC
Gate-Source Charge	Q _{GS}		-	6.7	-	
Gate-Drain Charge	Q _{GD}		-	11.5	-	
Internal Gate Resistor	R _{Gint}	f=1MHz;	-	6.4	-	Ω
Turn-on Delay Time	t _{d(on)}	V _{DD} =500V; V _{GS} =0/15V; I _D =5A; R _{g(ext)} =10Ω	-	24	-	ns
Rise Time	t _r		-	42	-	
Turn-off Delay Time	t _{d(off)}		-	26.8	-	
Fall Time	t _f		-	76	-	

Reverse SiC Diode Characteristics(at $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{FSD}	$V_{GS}=0V$; $I_F=3A$; $T_J=25^{\circ}\text{C}$	-	3.5	-	V
Continuous Diode Forward Current	I_S	$V_{GS}=0V$; $T_J=25^{\circ}\text{C}$	-	11	-	A
Reverse Recovery Time	t_{RR}	$V_R=500V$; $V_{GS}=0V$; $I_F=5A$; $di/dt=530A/\mu s$; $T_J=25^{\circ}\text{C}$	-	17.8	-	ns
Reverse Recovery Charge	Q_{RR}		-	33.7	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	3.5	-	A

Typical Characteristics

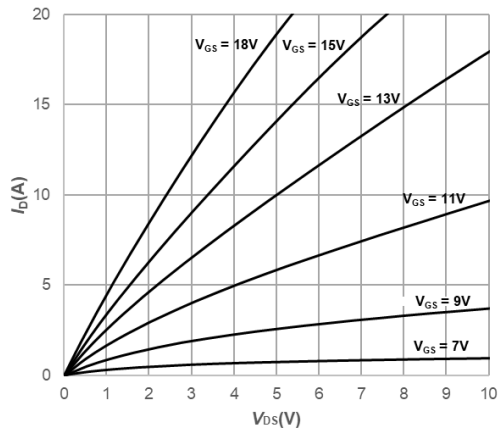


Fig1. Output Characteristics $T_j = 25^\circ\text{C}$

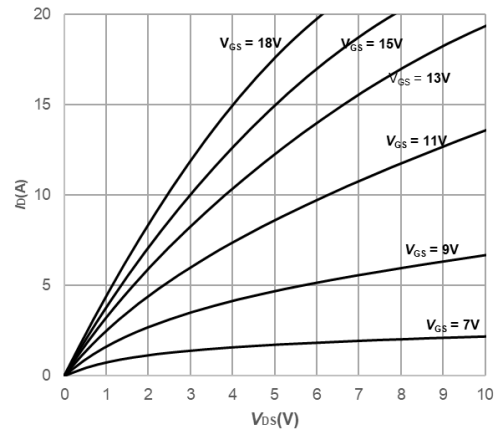


Fig2. Output Characteristics $T_j = 175^\circ\text{C}$

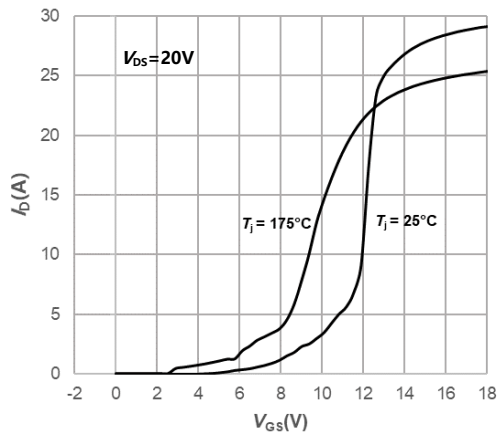


Fig3. Typical Transfer Characteristics

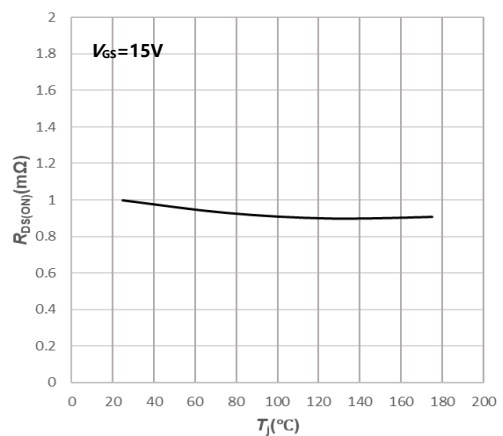


Fig4. Normalized On-Resistance vs. Temperature

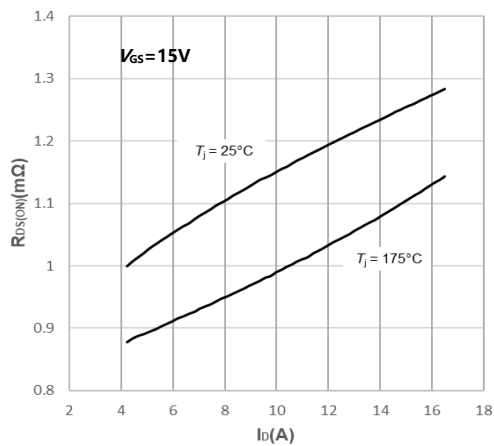


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

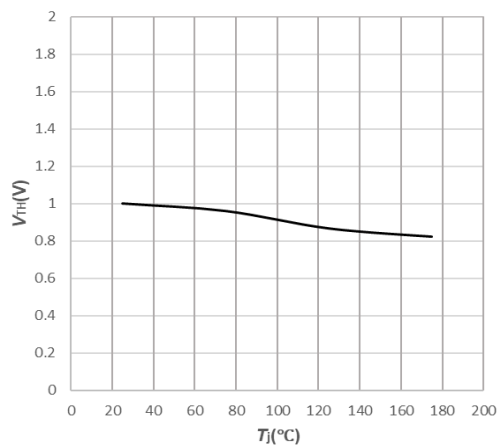


Fig6. Normalized Threshold Voltage vs. Temperature

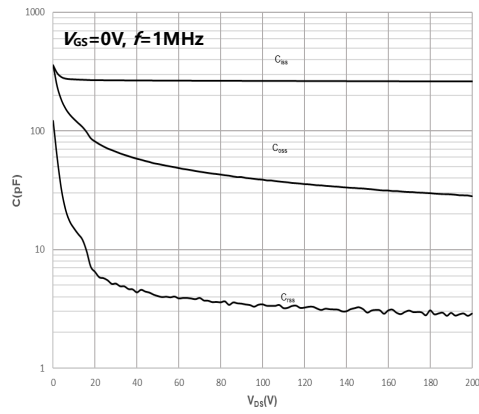


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

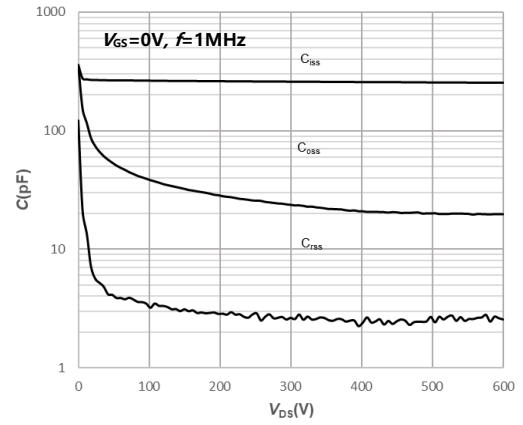


Fig8. Capacitances vs. Drain-Source Voltage (0-600V)

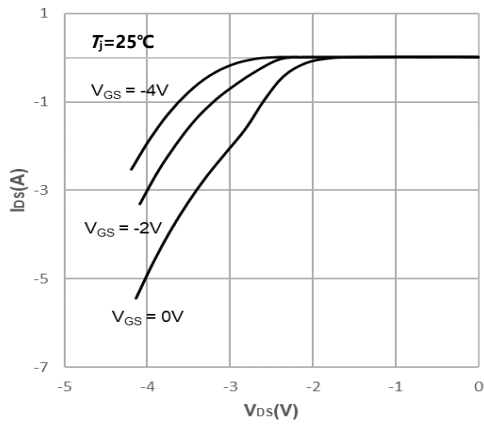
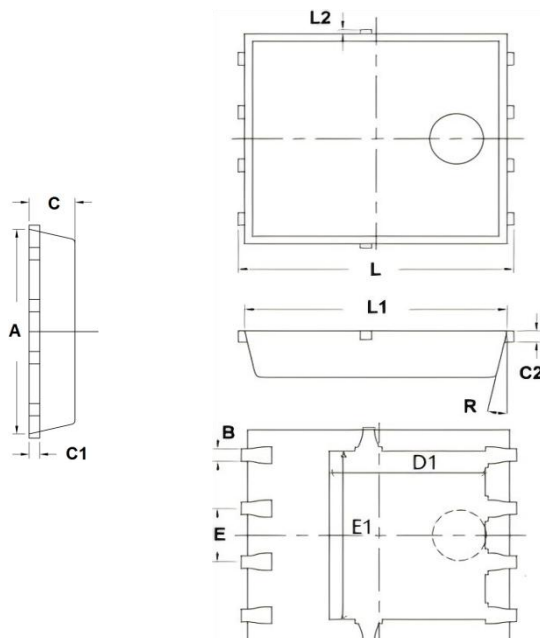


Fig9. Body Diode Characteristics

Package Outlines(Unit:mm)

PDFN5x6



Dim.	Min.	Max.
A	4.8	5.2
B	0.25	0.35
C	1	1.2
C1	Typ0.254	
C2	Typ0.254	
D1	3.35	3.81
E	Typ1.27	
E1	3.9	4.18
L	6	6.3
L1	5.7	6
L2	MAX 0.2	
R	Typ 13°	
All Dimensions in millimeter		

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