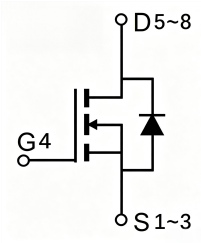
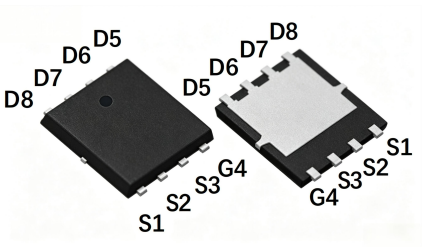
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	650	V
I_D	9	A
$R_{DS(ON)}$	540	mΩ
Q_G	27	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℃ 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°C) ; V_{GS}=15V	I_D	9	A
Drain Current (continuous;T_C=100°C); V_{GS}=15V		6.6	
Drain Current (pulsed); V_{GS}=15V; T_C=25°C	I_{DM}	19	A
Power Dissipation (T_C=25°C, T_J=175°C)	P_D	52	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.9	°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}=1.3mA; T_J=25°C	2.6	-	4.6	V
Static Drain-Source on Resistance	$R_{DS(on)}$	V_{GS}=15V; I_D=3.6A; T_J=25°C	-	540	700	mΩ
		V_{GS}=15V; I_D=3.6A; T_J=175°C	-	460	-	
		V_{GS}=18V; I_D=3.6A; T_J=25°C	-	380	-	
		V_{GS}=18V; I_D=3.6A; T_J=175°C	-	387	-	
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	-	190	-	pF
Output Capacitance	C_{oss}		-	15	-	
Reverse Transfer Capacitance	C_{rss}		-	1.65	-	
Total Gate Charge	Q_G	V_{DD}=500V; V_{GS}=0/15V; I_D=3.6A T_j=25°C	-	27	-	nC
Gate-Source Charge	Q_{GS}		-	9.5	-	
Gate-Drain Charge	Q_{GD}		-	3.0	-	
Internal Gate Resistor	R_{Gint}	f=1MHz;	-	20	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=500V; V_{GS}=0/18V; I_D=3.6A; $R_{g(ext)}$=10Ω	-	15	-	ns
Rise Time	t_r		-	39	-	
Turn-off Delay Time	$t_{d(off)}$		-	16	-	
Fall Time	t_f		-	69	-	

Reverse SiC Diode Characteristics(at T_J=25℃ 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°C	-	3.5	-	V
Continuous Diode Forward Current	I_S	V_{GS}=0V; T_j=25°C	-	9.3	-	A
Reverse Recovery Time	t_{RR}	V_R=500V; V_{GS}=0V; I_F=3.6A; di/dt=850A/μs, T_j=25°C	-	11	-	ns
Reverse Recovery Charge	Q_{RR}		-	35	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	5.5	-	A

Typical Characteristics

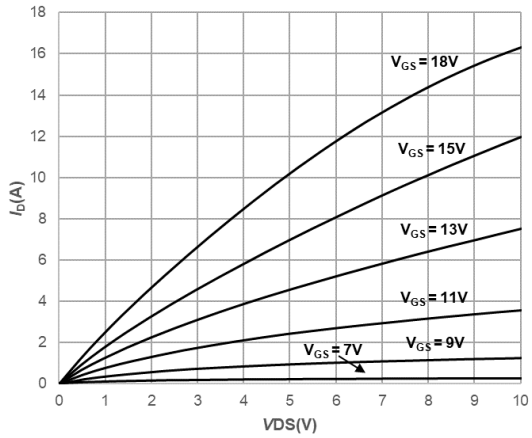


Fig1. Output Characteristics T_j=25℃

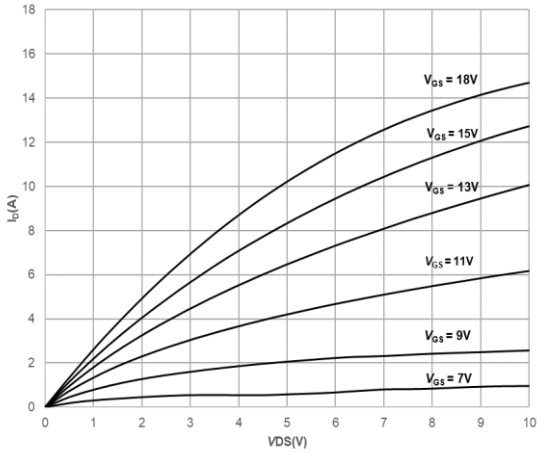


Fig2. Output Characteristics T_j=175℃

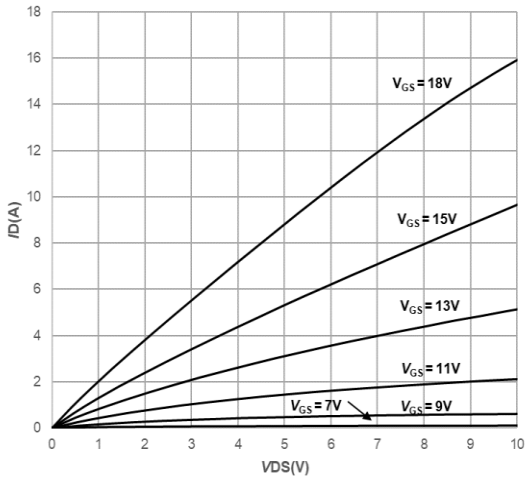


Fig2. Output Characteristics T_j= -40℃

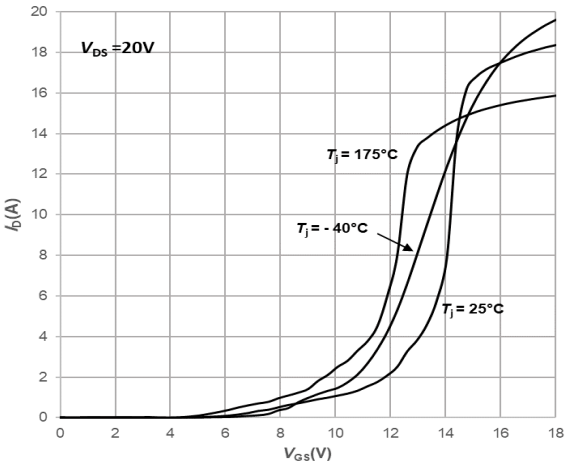


Fig3. Typical Transfer Characteristics

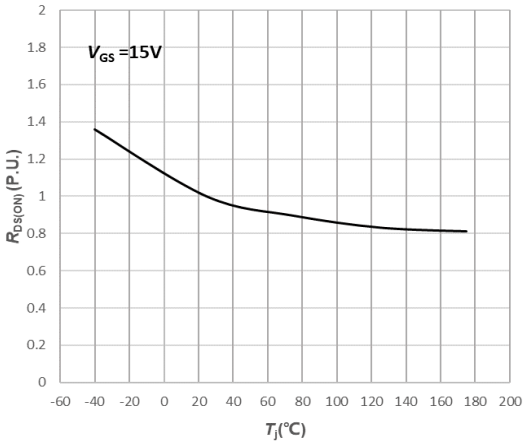


Fig4. Normalized On-Resistance vs. Temperature

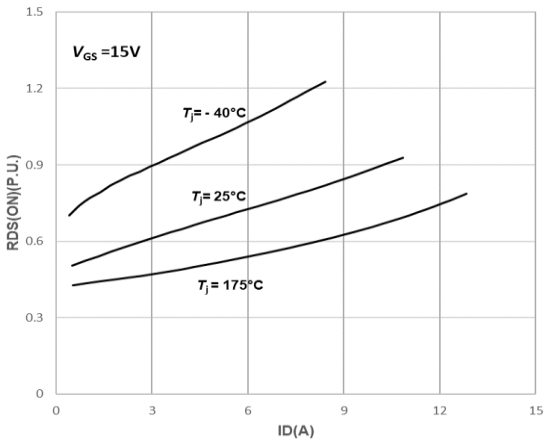


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

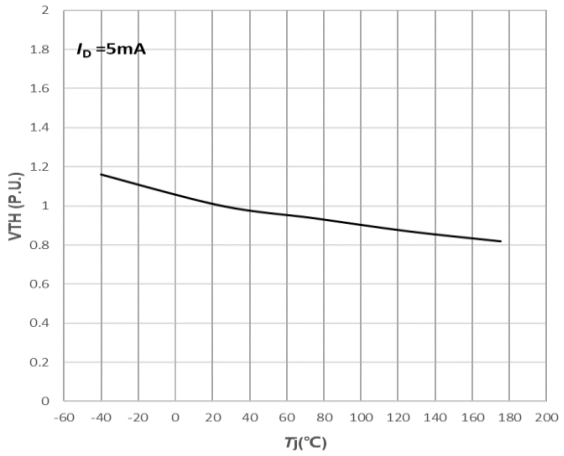


Fig6. Normalized Threshold Voltage vs. Temperature

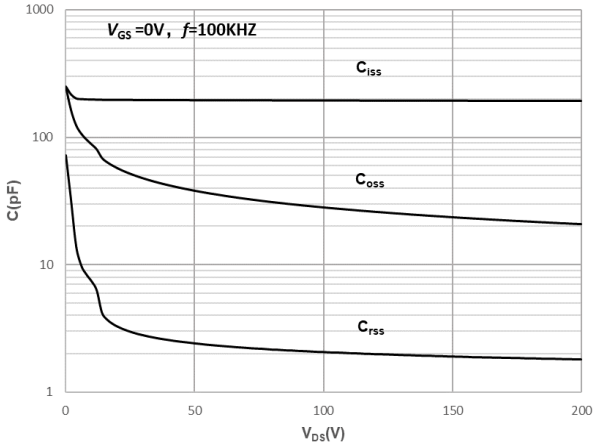


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

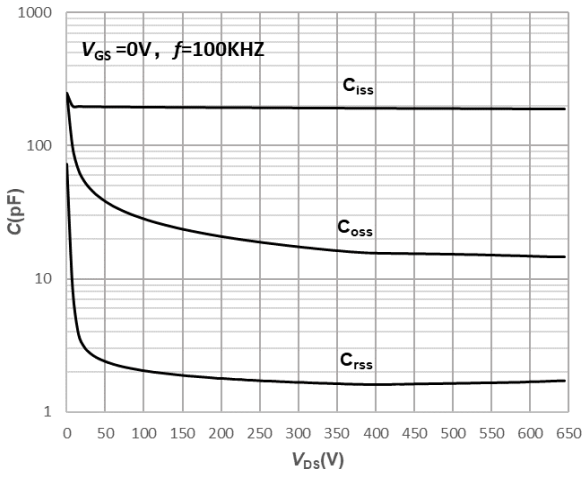


Fig8. Capacitances vs. Drain-Source Voltage (0-650V)

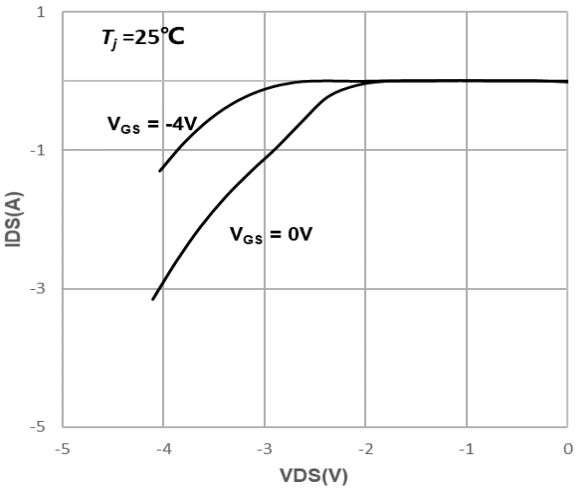
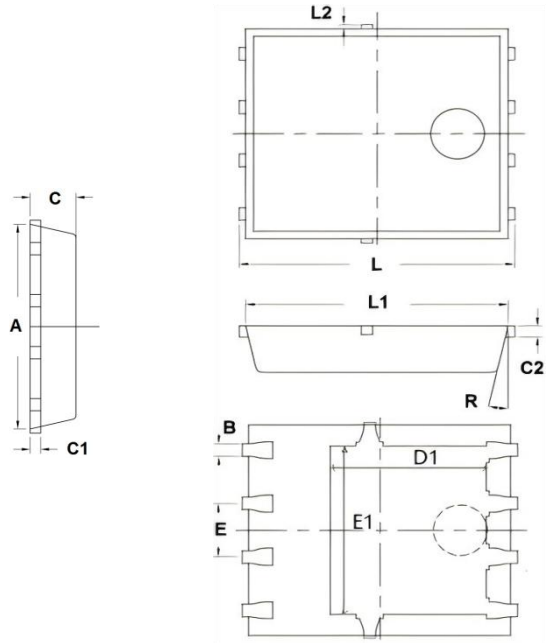


Fig9. Body Diode Characteristics

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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