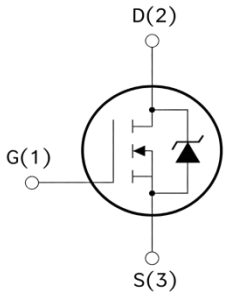
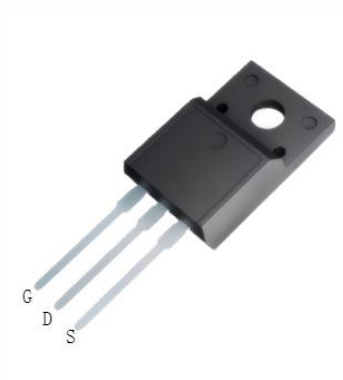
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	800	V
I_D	6.9	A
$R_{DS(ON)}$	410	mΩ
Q_G	19.2	nC





TO-220F

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Low impedance package with driver source pin
- Easy to parallel and simple to drive

Applications

- Motor Drives
- Battery Chargers
- Photovoltaic-storage-charging
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)

Absolute Maximum Ratings (at T_J=25℃ unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Drain-source Voltage	V_{DS}	V_{GS}=0V	800	V
Gate-source Voltage	V_{GS}	Absolute maximum values	-10/+22	V
	V_{GSop}	Recommended operational values	0/+18	
Drain Current (continuous)	I_D	V_{GS}=18V; T_C=25°C	6.9	A
		V_{GS}=18V; T_C=100°C	4.9	
Drain Current (pulsed)	I_{DM}	V_{GS}=18V; T_C=25°C	13.8	A
Power Dissipation	P_D	T_C=25°C; T_J=175°C	25.8	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-	-55 to +175	°C
Thermal Resistance from Junction to Case	$R_{\theta JC}$	-	5.8	°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	800	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}; I_{DS}=1.3mA	2.6	-	4.6	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=800V; V_{GS}=0V; T_J=25°C	-	-	100	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=18V; V_{DS}=0V	-	-	250	nA
Static Drain-Source on Resistance	$R_{DS(on)}$	V_{GS}=15V; I_D=3.6A	-	560	-	mΩ
		V_{GS}=15V; I_D=3.6A; T_J=175°C	-	459	-	
		V_{GS}=18V; I_D=3.6A	-	410	533	
		V_{GS}=18V; I_D=3.6A; T_J=175°C	-	418	-	
Dynamic characteristics (at T_C=25°C unless otherwise specified)						
Input Capacitance	C_{iss}	V_{DS}=400V; f=100KHz; V_{GS}=0V; T_J=25°C	-	191	-	pF
Output Capacitance	C_{oss}		-	15.6	-	
Reverse Transfer Capacitance	C_{rss}		-	1.6	-	
Total Gate Charge	Q_G	V_{DS}=400V; V_{GS}=0/18V; I_D=3.6A; T_J=25°C	-	19.2	-	nC
Gate-Source Charge	Q_{GS}		-	6.4	-	
Gate-Drain Charge	Q_{GD}		-	3.1	-	
Gate Resistor	R_G	f=1MHz	-	7.5	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=400V; V_{GS}=0/18V; I_D=3.6A; $R_{g(ext)}$=5Ω; L=200uH	-	9.2	-	ns
Rise Time	t_r		-	39.2	-	
Turn-off Delay Time	$t_{d(off)}$		-	13.6	-	
Fall Time	t_f		-	39.2	-	

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=1.8A; T_J=25°C	-	3.5	-	V
Continuous Diode Forward Current	I_S	V_{GS}=0V; T_J=25°C	-	6.9	-	A
Reverse Recovery Time	t_{RR}	V_R=400V; V_{GS}=0V; I_F=3.6A; di/dt=834A/μs; T_J=25°C	-	12	-	ns
Reverse Recovery Charge	Q_{RR}		-	34.5	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	5.1	-	A

Typical Characteristics

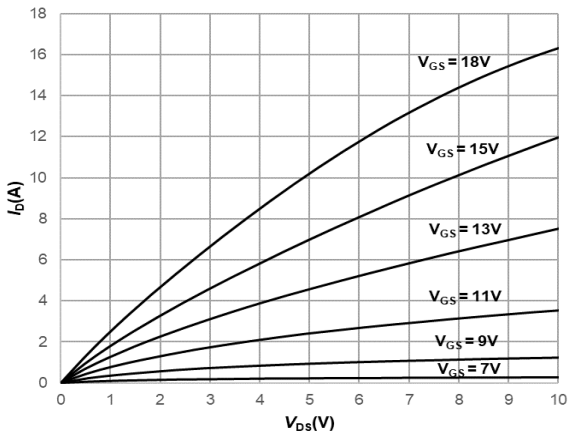


Fig1. Output Characteristics T_j=25℃

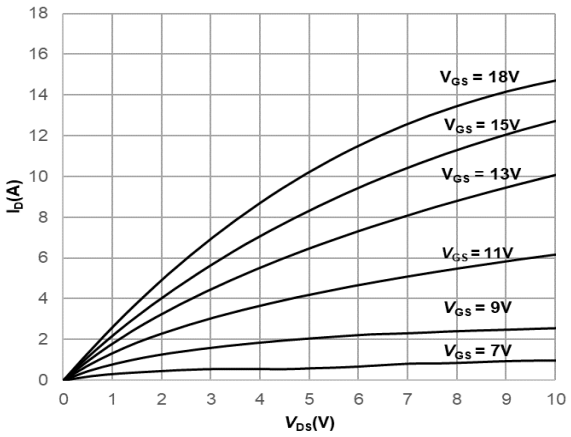


Fig2. Output Characteristics T_j=175℃

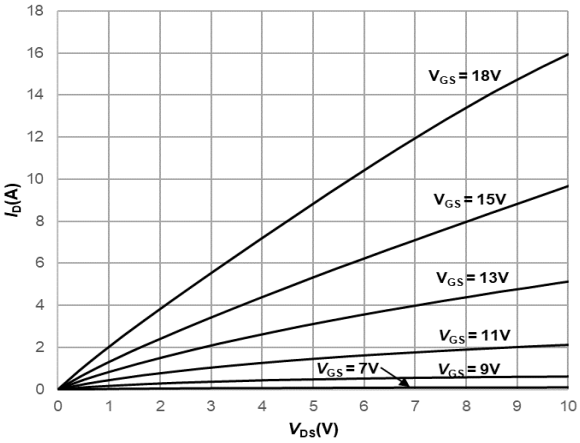


Fig3. Output Characteristics T_j= -40℃

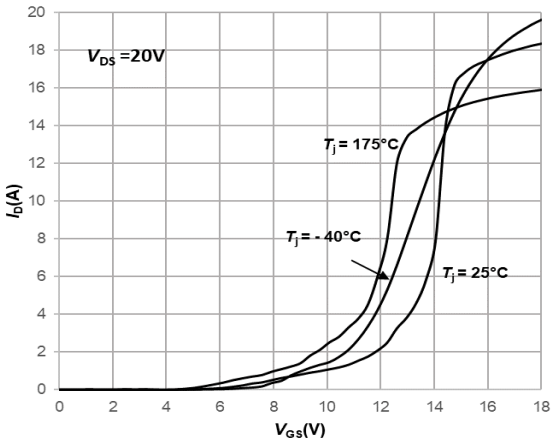


Fig4. Typical Transfer Characteristics

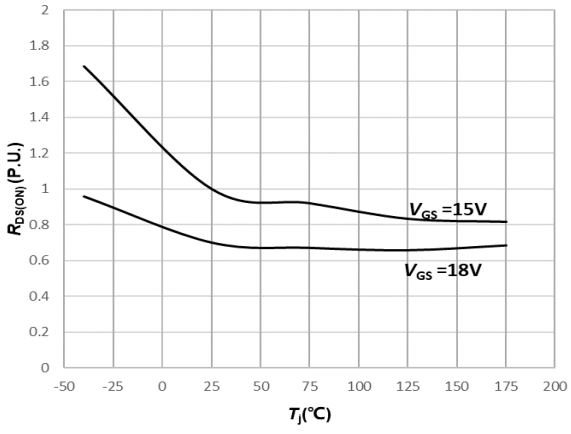


Fig5. Normalized On-Resistance vs. Temperature

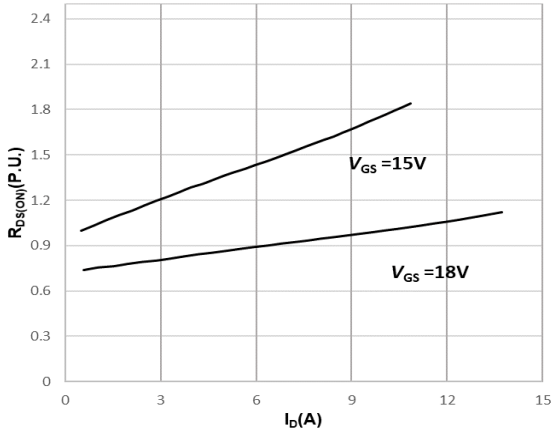


Fig6. Normalized On-Resistance vs. Drain Current For T_j=25℃

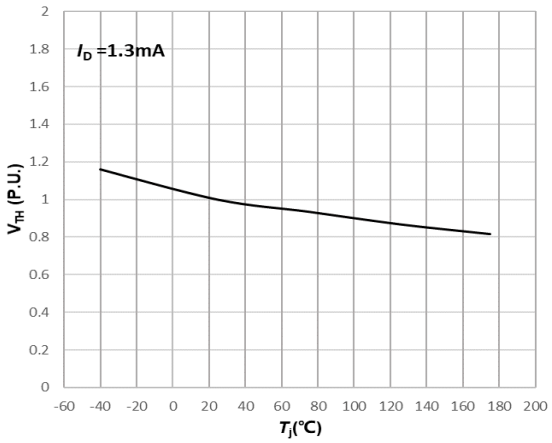


Fig7. Normalized Threshold Voltage vs. Temperature

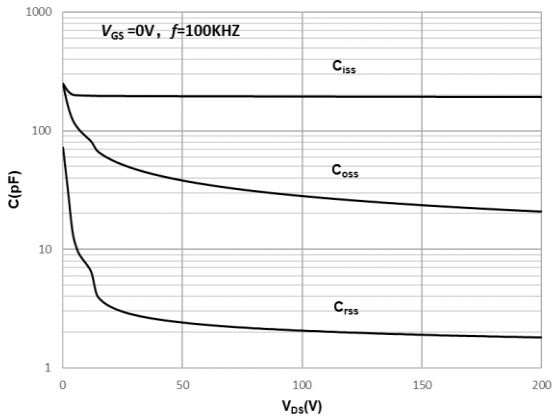


Fig8. Capacitances vs. Drain-Source Voltage (0-200V)

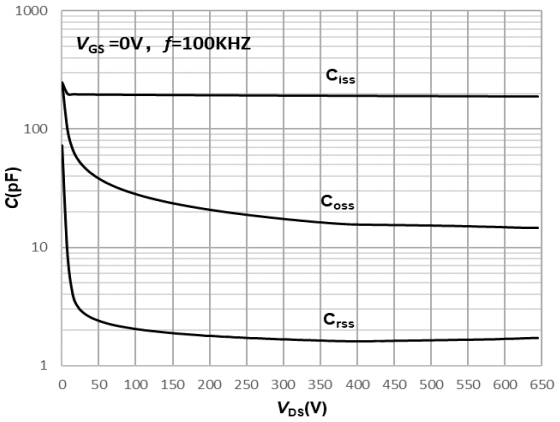


Fig9. Capacitances vs. Drain-Source Voltage (0-600V)

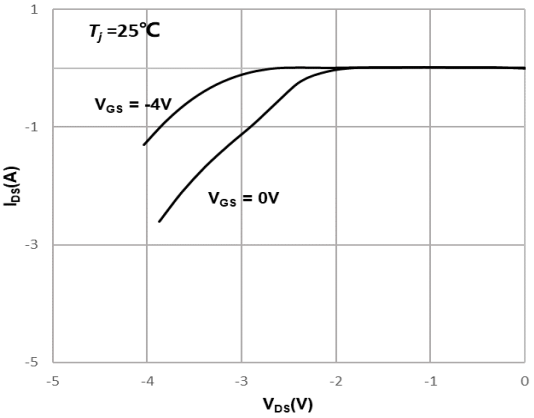


Fig10. Body Diode Characteristics

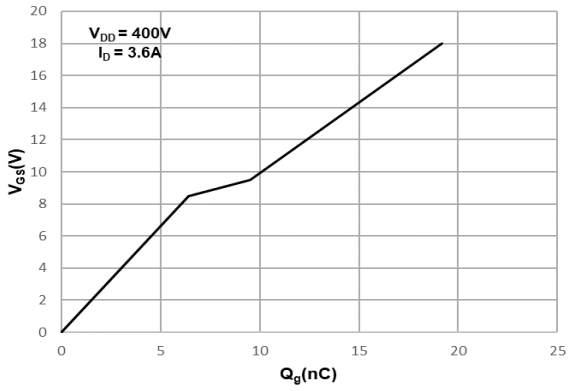


Fig11. Gate Charge Characteristic

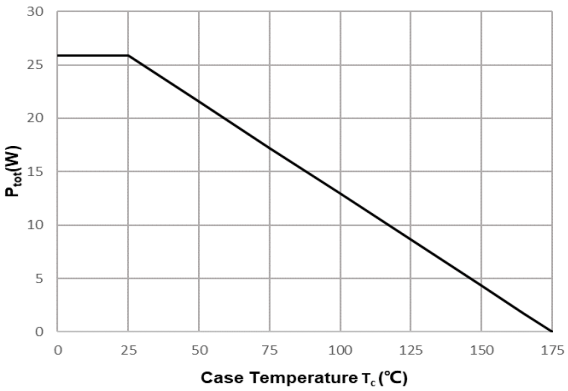


Fig12. Power Dissipation vs. Case temperature

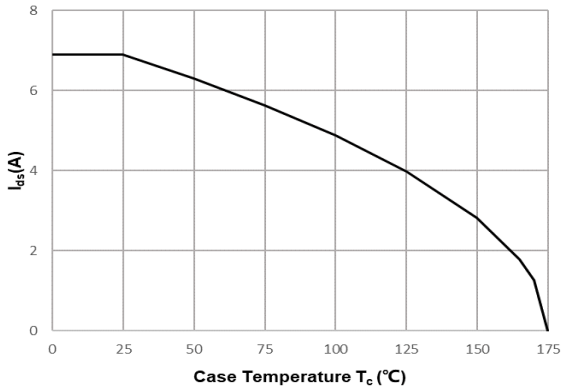
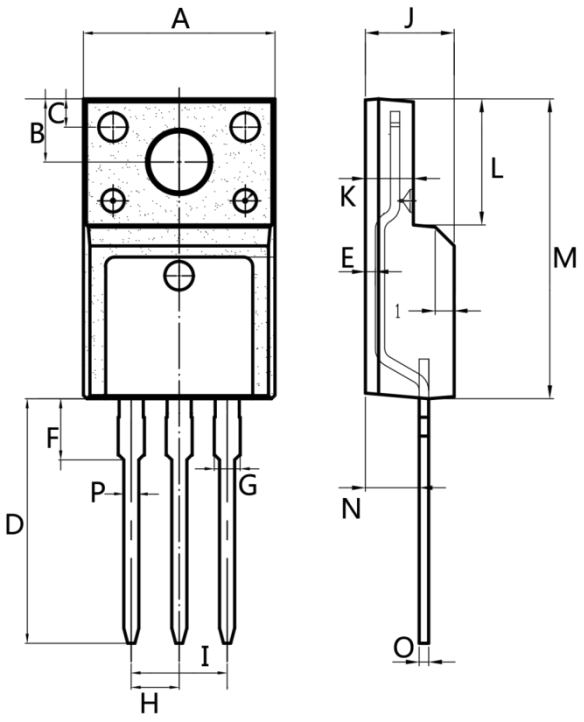


Fig13. Continuous Drain Current vs. Case Temperature

Package Outlines(Unit:mm)

TO-220F



Dim.	Min.	Max.
A	9.95	10.35
B	2.95	3.25
C	1.25	1.45
D	12.8	13.2
E	0.4	0.6
F	2.8	3.5
G	1.3	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.5	5
K	2.45	2.65
L	6.5	6.8
M	15.4	16
N	2.75	3.05
O	0.45	0.55
P	0.7	0.9

All Dimensions in millimeter

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