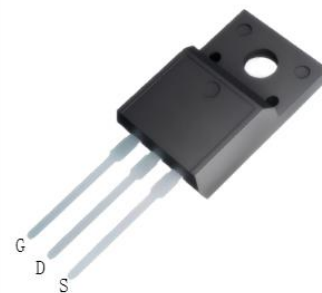
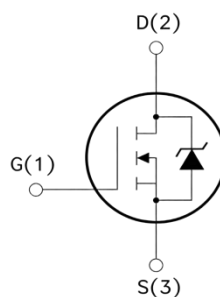


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	650	V
I_D	7	A
$R_{DS(ON)}$	540	m Ω
Q_G	27	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 $T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Drain-source Voltage	V_{DS}	$V_{GS}=0V$	650	V
Gate-source Voltage	V_{GS}	Absolute maximum values	-10/+22	V
	V_{GSop}	Recommended operational values	0/+18	
Drain Current (continuous)	I_D	$V_{GS}=18V; T_C=25^\circ\text{C}$	7	A
		$V_{GS}=18V; T_C=100^\circ\text{C}$	5	
Drain Current (pulsed)	I_{DM}	$V_{GS}=18V; T_C=25^\circ\text{C}$	14	A
Power Dissipation	P_D	$T_C=25^\circ\text{C}; T_J=175^\circ\text{C}$	26	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-	-55 to +175	$^\circ\text{C}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	-	5.8	$^\circ\text{C/W}$

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
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} ; I _{DS} =1.3mA	2.7	-	4.5	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V; V _{GS} =0V; T _J =25°C	-	-	10	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	-	540	700	mΩ
		V _{GS} =15V; I _D =3.6A; T _J =175°C	-	460	-	
		V _{GS} =18V; I _D =3.6A	-	380	-	
		V _{GS} =18V; I _D =3.6A; T _J =175°C	-	430	-	
Dynamic characteristics (at T _C =25°C unless otherwise specified)						
Input Capacitance	C _{iss}	V _{DS} =500V; f=100KHz; V _{GS} =0V; T _J =25°C	-	190	-	pF
Output Capacitance	C _{oss}		-	15.3	-	
Reverse Transfer Capacitance	C _{rss}		-	1.7	-	
Total Gate Charge	Q _G	V _{DS} =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	-	
Gate Resistor	R _G	f=1MHz; V _{AC} =25mV	-	7.5	-	Ω
Turn-on Delay Time	t _{d(on)}	V _{DS} =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 $T_J=25^{\circ}\text{C}$ 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	$V_{GS}=0V; T_J=25^{\circ}\text{C}$	-	7	-	A
Reverse Recovery Time	t_{RR}	$V_R=500V; V_{GS}=0V; I_F=3.6A; di/dt=850A/\mu s; T_J=25^{\circ}\text{C}$	-	11	-	ns
Reverse Recovery Charge	Q_{RR}		-	35	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	5.5	-	A

Typical Characteristics

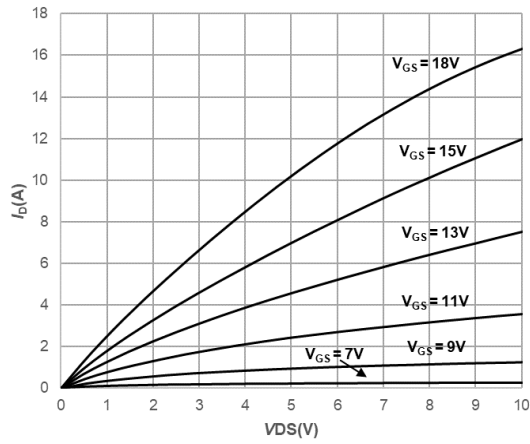


Fig1. Output Characteristics $T_j = 25^\circ\text{C}$

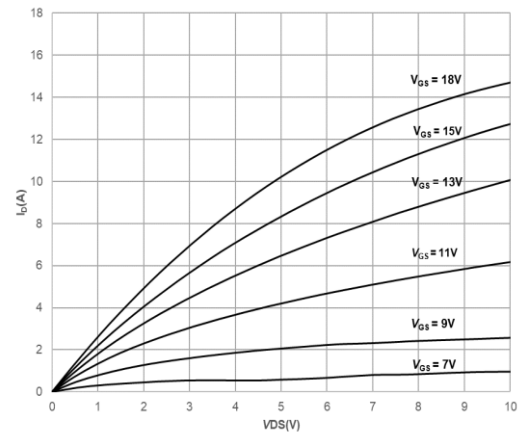


Fig2. Output Characteristics $T_j = 175^\circ\text{C}$

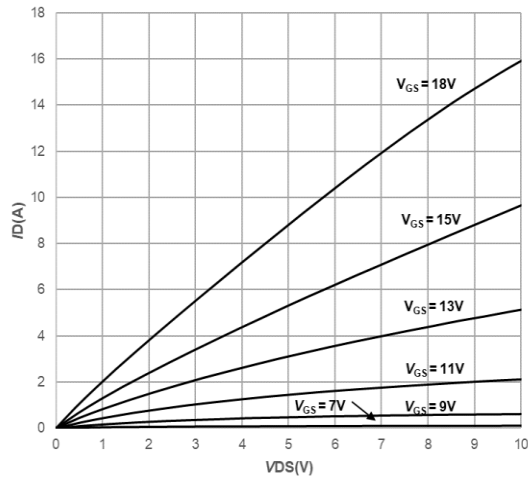


Fig2. Output Characteristics $T_j = -40^\circ\text{C}$

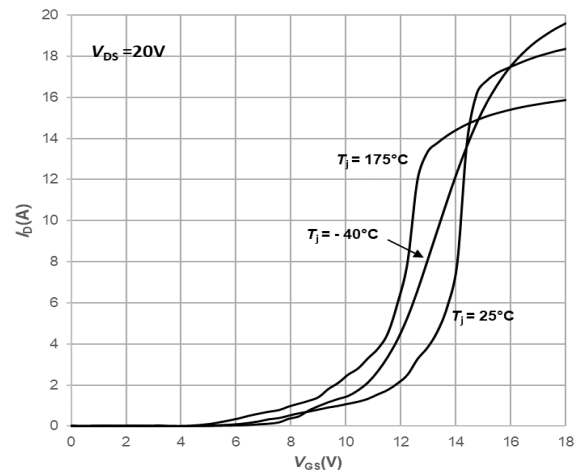


Fig3. Typical Transfer Characteristics

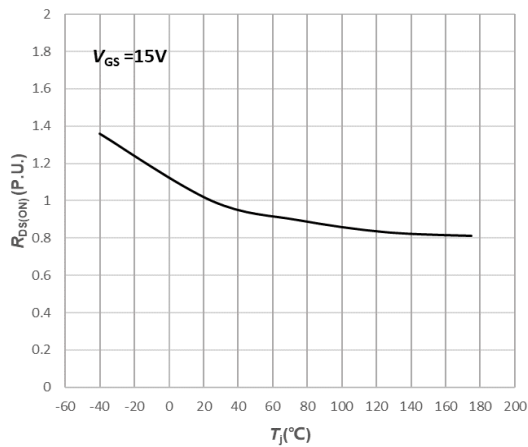


Fig4. Normalized On-Resistance vs. Temperature

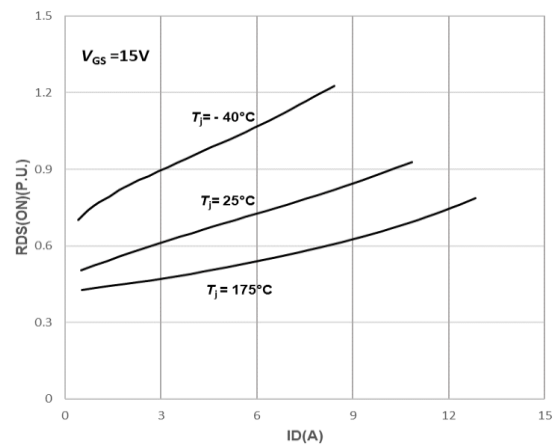


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

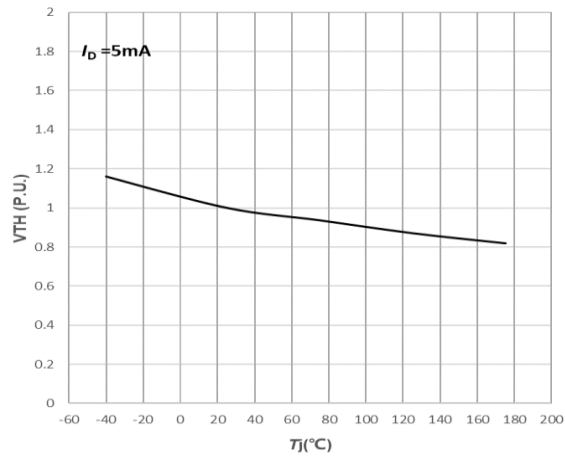


Fig6. Normalized Threshold Voltage vs. Temperature

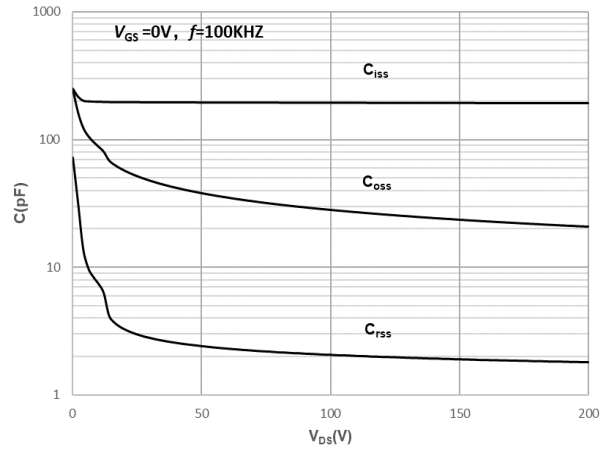


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

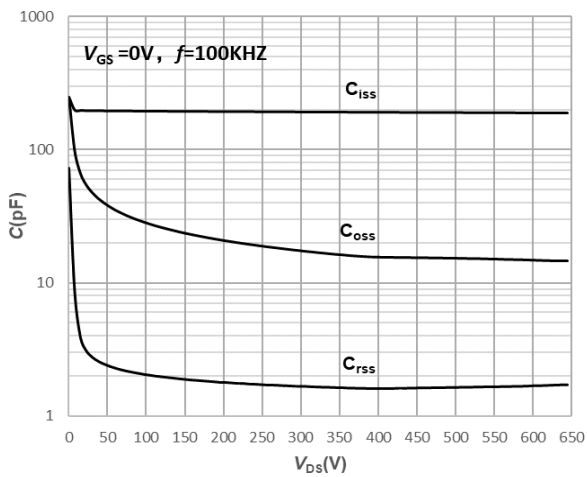


Fig8. Capacitances vs. Drain-Source Voltage (0-650V)

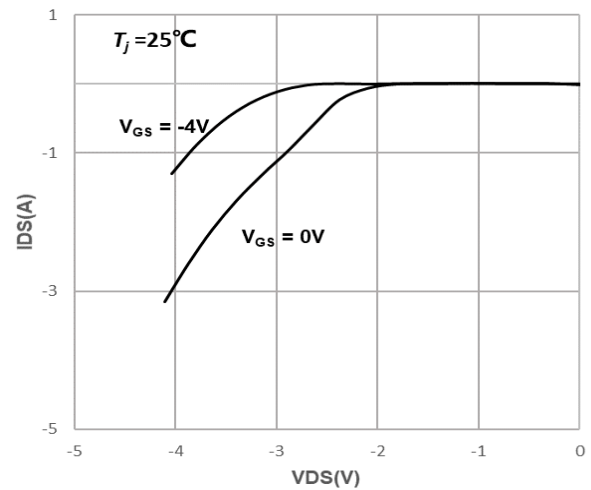
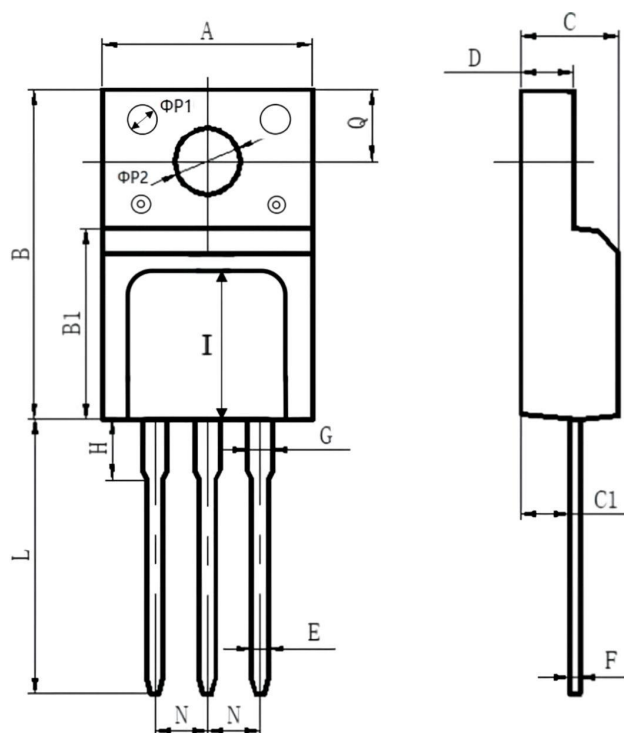


Fig9. Body Diode Characteristics

Package Outlines(Unit:mm)

TO-220F



Ref.	Dimensions(mm)	
	MIN	MAX
A	9.70	10.30
B	15.50	16.10
B1	8.99	9.39
C	4.40	4.80
C1	2.15	2.55
D	2.44	2.64
E	0.70	0.90
F	0.40	0.60
G	1.12	1.42
H	3.40	3.80
I	7.40	7.60
L	12.6	13.6
N	2.34	2.74
Q	3.15	3.55
ΦP1	1.40	1.60
ΦP2	3.00	3.30

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