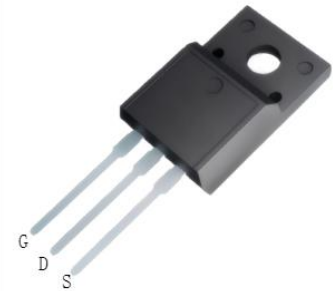
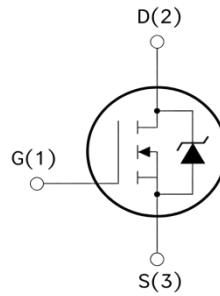


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	800	V
I_D	8.5	A
$R_{DS(ON)}$	280	m Ω
Q_G	22.3	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}	$V_{GS}=0V$	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	$V_{GS}=18V; T_C=25^\circ\text{C}$	8.5	A
		$V_{GS}=18V; T_C=100^\circ\text{C}$	6	
Drain Current (pulsed)	I_{DM}	$V_{GS}=18V; T_C=25^\circ\text{C}$	17	A
Power Dissipation	P_D	$T_C=25^\circ\text{C}; T_J=175^\circ\text{C}$	25.8	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-	-55 to +175	$^\circ\text{C}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	-	5.6	$^\circ\text{C/W}$

Electrical Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics (at $T_C=25^\circ\text{C}$ unless otherwise specified)						
Drain-Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0V; I_D=500\mu A$	800	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}; I_{DS}=1.8mA$	2.6	-	4.6	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=800V; V_{GS}=0V; T_J=25^\circ\text{C}$	-	-	100	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=18V; V_{DS}=0V$	-	-	250	nA
Static Drain-Source on Resistance	$R_{DS(on)}$	$V_{GS}=15V; I_D=5A$	-	415	-	m Ω
		$V_{GS}=15V; I_D=5A; T_J=175^\circ\text{C}$	-	340	-	
		$V_{GS}=18V; I_D=5A$	-	280	364	
		$V_{GS}=18V; I_D=5A; T_J=175^\circ\text{C}$	-	276	-	
Dynamic characteristics (at $T_C=25^\circ\text{C}$ unless otherwise specified)						
Input Capacitance	C_{iss}	$V_{DS}=400V; f=100KHz; V_{GS}=0V; T_J=25^\circ\text{C}$	-	267	-	pF
Output Capacitance	C_{oss}		-	21.1	-	
Reverse Transfer Capacitance	C_{rss}		-	2.21	-	
Total Gate Charge	Q_G	$V_{DS}=400V; V_{GS}=0/18V; I_D=5A; T_J=25^\circ\text{C}$	-	22.3	-	nC
Gate-Source Charge	Q_{GS}		-	10.3	-	
Gate-Drain Charge	Q_{GD}		-	5.9	-	
Gate Resistor	R_G	$f=1MHz$	-	6.4	-	Ω
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=400V; V_{GS}=0/18V; I_D=5A; R_{g(ext)}=5\Omega; L=200\mu H$	-	12.0	-	ns
Rise Time	t_r		-	40.4	-	
Turn-off Delay Time	$t_{d(off)}$		-	16.0	-	
Fall Time	t_f		-	39.2	-	

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	$V_{GS}=0V; T_J=25^\circ\text{C}$	-	8.5	-	A
Reverse Recovery Time	t_{RR}	$V_R=400V; V_{GS}=0V; I_F=5A; di/dt=830A/\mu s; T_J=25^\circ\text{C}$	-	11.2	-	ns
Reverse Recovery Charge	Q_{RR}		-	31.8	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	4.8	-	A

Typical Characteristics

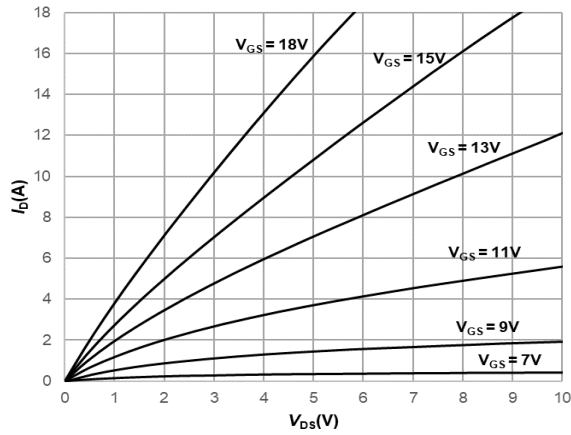


Fig1. Output Characteristics $T_j=25^\circ\text{C}$

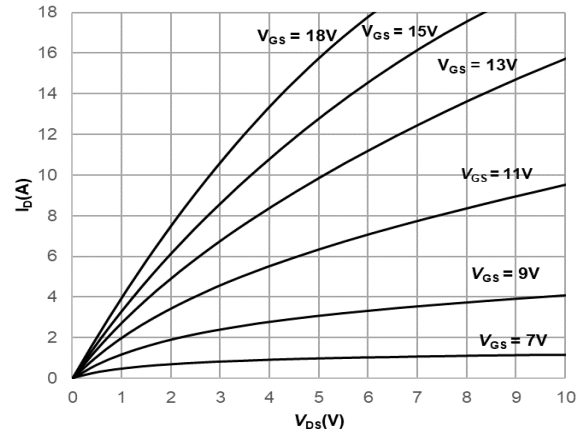


Fig2. Output Characteristics $T_j=175^\circ\text{C}$

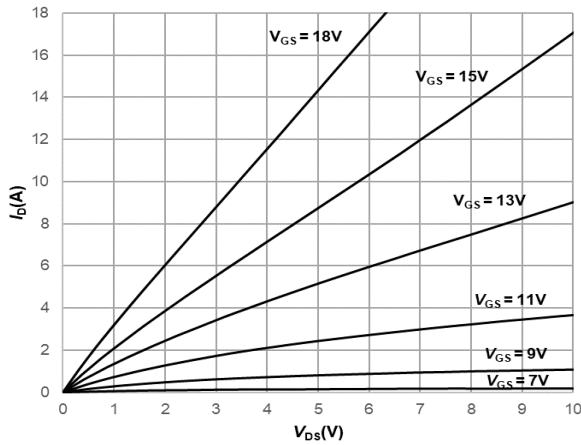


Fig3. Output Characteristics $T_j=-40^\circ\text{C}$

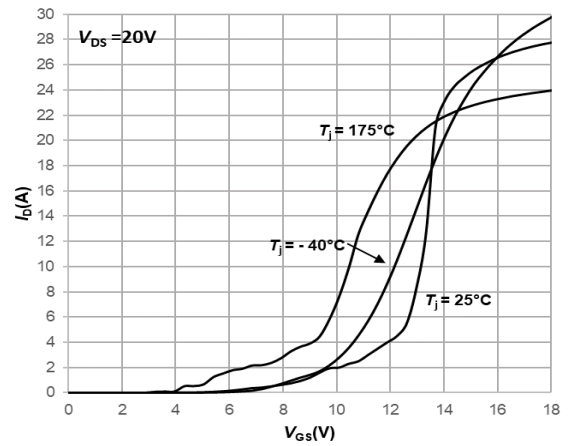


Fig4. Typical Transfer Characteristics

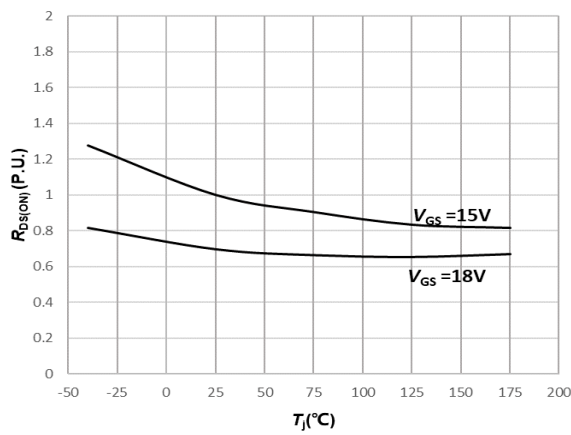


Fig5. Normalized On-Resistance vs. Temperature

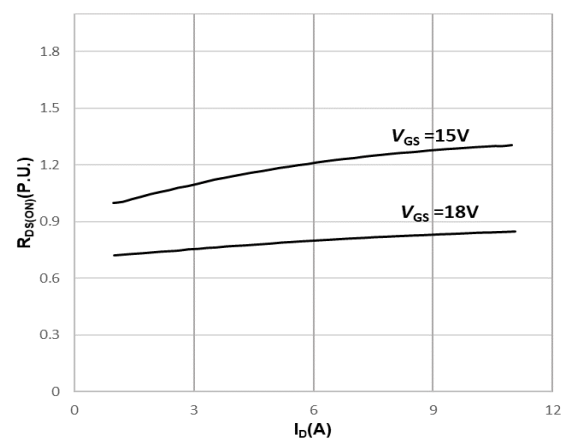


Fig6. Normalized On-Resistance vs. Drain Current For $T_j=25^\circ\text{C}$

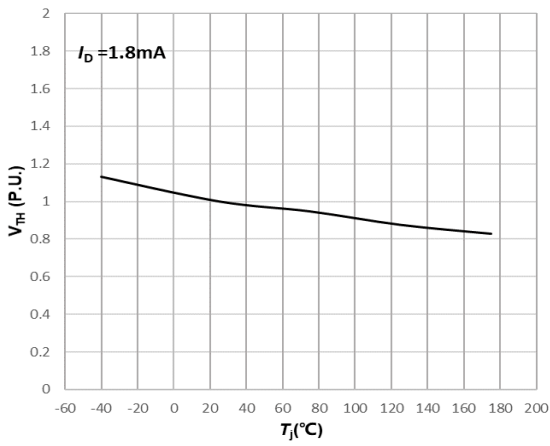


Fig7. Normalized Threshold Voltage vs. Temperature

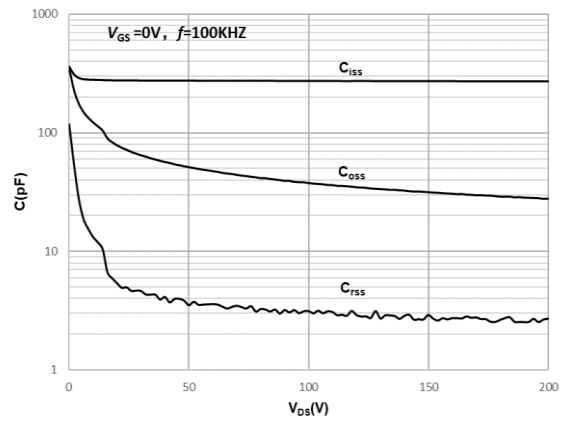


Fig8. Capacitances vs. Drain-Source Voltage (0-200V)

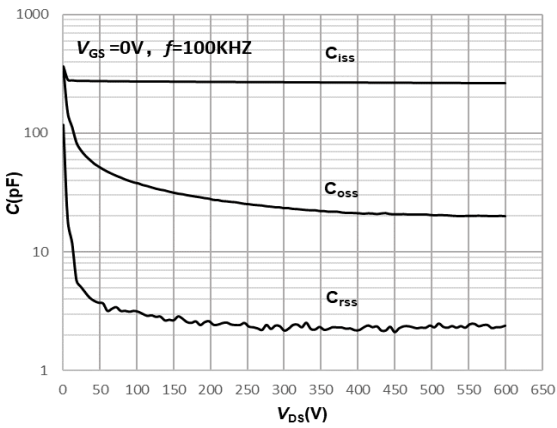


Fig9. Capacitances vs. Drain-Source Voltage (0-600V)

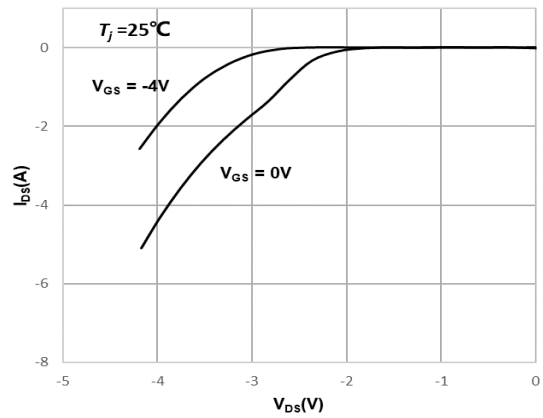


Fig10. Body Diode Characteristics

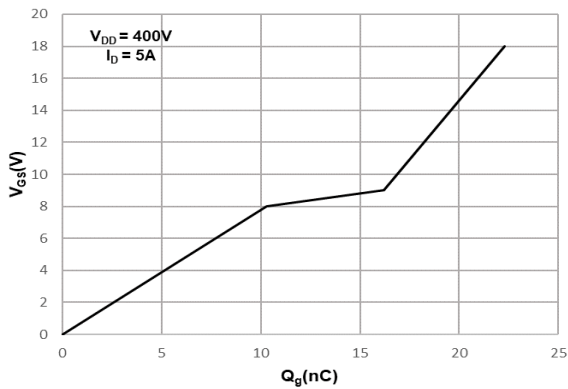


Fig11. Gate Charge Characteristic

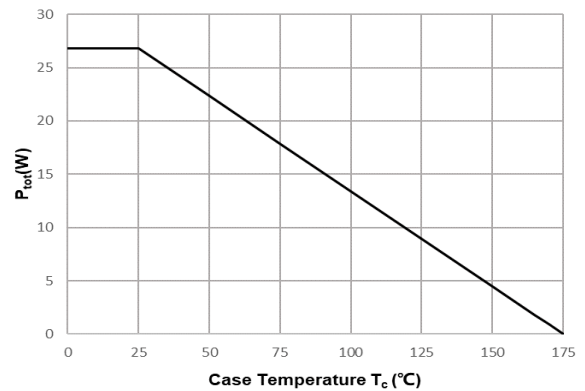


Fig12. Power Dissipation vs. Case temperature

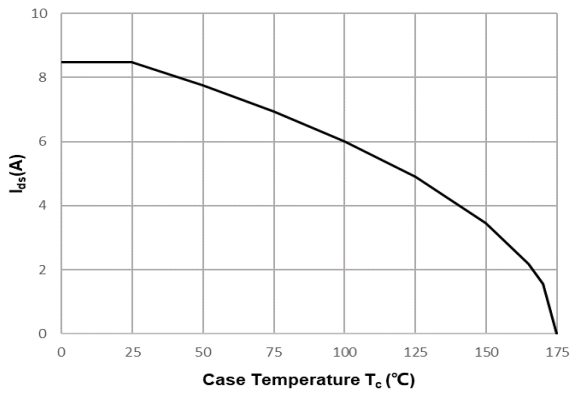
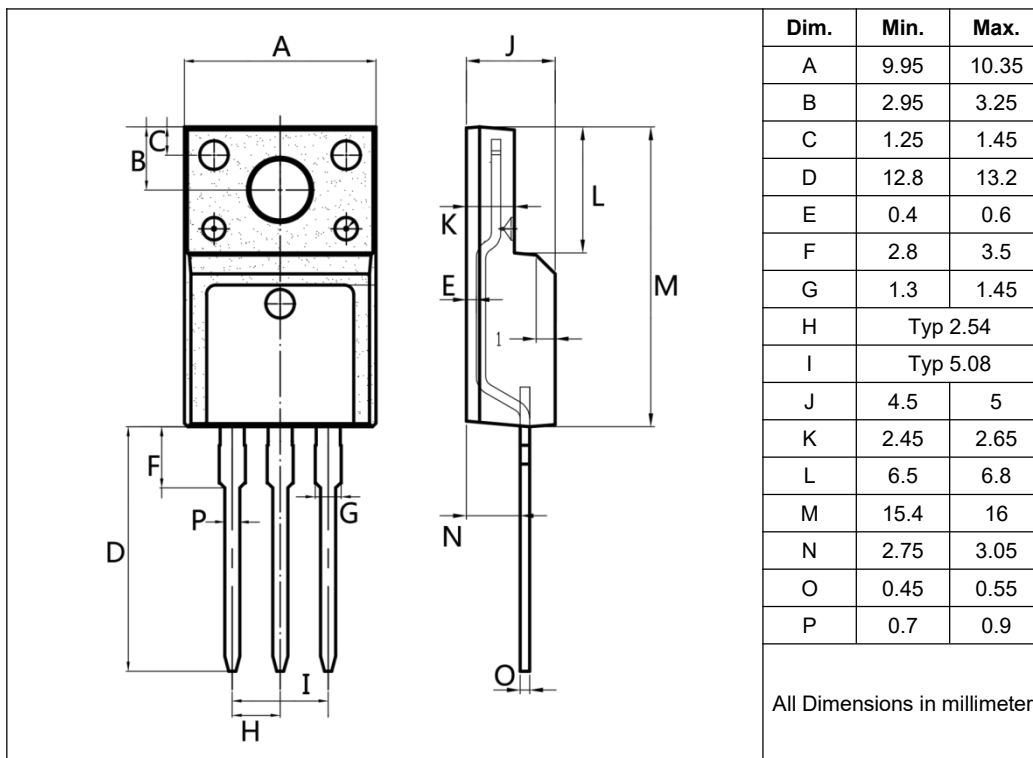


Fig13. Continuous Drain Current vs. Case Temperature

Package Outlines(Unit:mm)

TO-220F



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