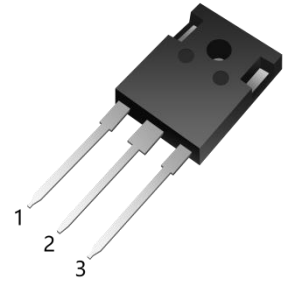
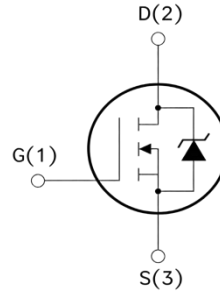


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	650	V
I_D	120	A
$R_{DS(ON)}$	20	m Ω
Q_G	125	nC



TO-247-3L

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 $T_J=25^{\circ}C$ 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; $T_c=25^{\circ}C$)	I_D	120	A
Drain Current (continuous; $T_c=100^{\circ}C$)		100	
Drain Current (pulsed)	I_{DM}	240	A
Power Dissipation ($T_c=25^{\circ}C$, $T_J=175^{\circ}C$)	P_D	333	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^{\circ}C$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.45	$^{\circ}C/W$

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	$B_{V_{DS}}$	$V_{GS}=0V; I_D=500\mu A$	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	$V_{GS(th)}$	$V_{GS}=V_{DS}; I_{DS}=23mA; T_J=25^\circ\text{C}$	2.7	-	4.5	V
Static Drain-Source on Resistance	$R_{DS(on)}$	$V_{GS}=18V; I_D=60A; T_J=25^\circ\text{C}$	-	20	26	m Ω
		$V_{GS}=18V; I_D=60A; T_J=175^\circ\text{C}$	-	23	-	
Dynamic characteristics (at $T_C=25^\circ\text{C}$ unless otherwise specified)						
Input Capacitance	C_{iss}	$V_{DS}=500V; f=1MHz; V_{GS}=0V$ $T_J=25^\circ\text{C}$	-	3200	-	pF
Output Capacitance	C_{oss}		-	230	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Total Gate Charge	Q_G	$V_{DD}=500V; V_{GS}=0/18V; I_D=60A$ $T_J=25^\circ\text{C}$	-	125	-	nC
Gate-Source Charge	Q_{GS}		-	35	-	
Gate-Drain Charge	Q_{GD}		-	17	-	
Internal Gate Resistor	R_{Gint}	$f=1MHz; V_{AC}=25mA$	-	1.3	-	Ω
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=500V; V_{GS}=0/18V; I_D=20A;$ $R_{g(ext)}=10\Omega$	-	21	-	ns
Rise Time	t_r		-	76	-	
Turn-off Delay Time	$t_{d(off)}$		-	70	-	
Fall Time	t_f		-	37	-	

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}	$V_{GS}=0V; I_F=30A; T_J=25^\circ\text{C}$	-	3.4	-	V
Continuous Diode Forward Current	I_S	$T_J=25^\circ\text{C}$	-	120	-	A
Reverse Recovery Time	t_{RR}	$V_R=500V; V_{GS}=0V; I_F=60A;$ $di/dt = 400A/\mu s; T_J=25^\circ\text{C}$	-	35	-	ns
Reverse Recovery Charge	Q_{RR}		-	130	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	6	-	A

Typical Characteristics

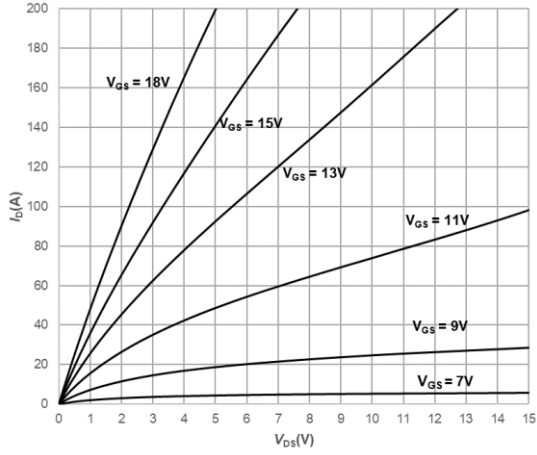


Fig1. Output Characteristics $T_j=25^\circ\text{C}$

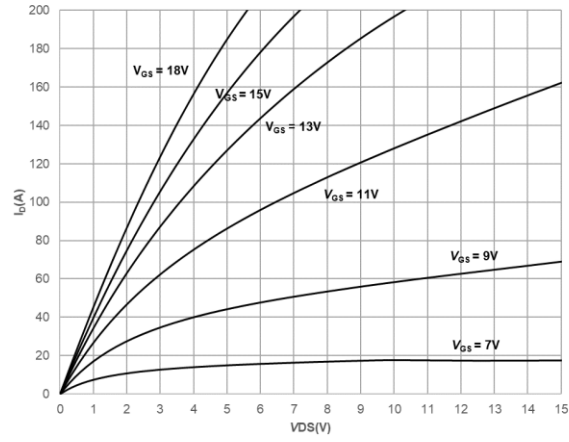


Fig2. Output Characteristics $T_j=175^\circ\text{C}$

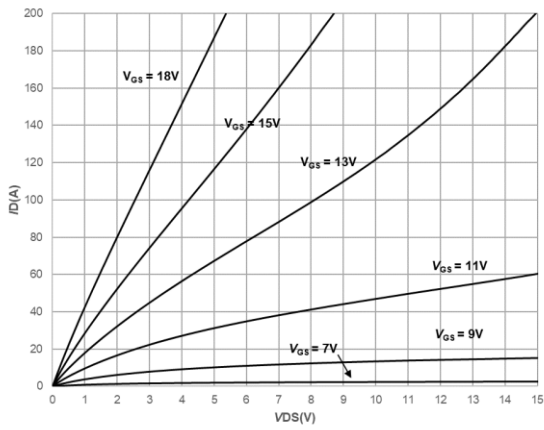


Fig3. Output Characteristics $T_j=-40^\circ\text{C}$

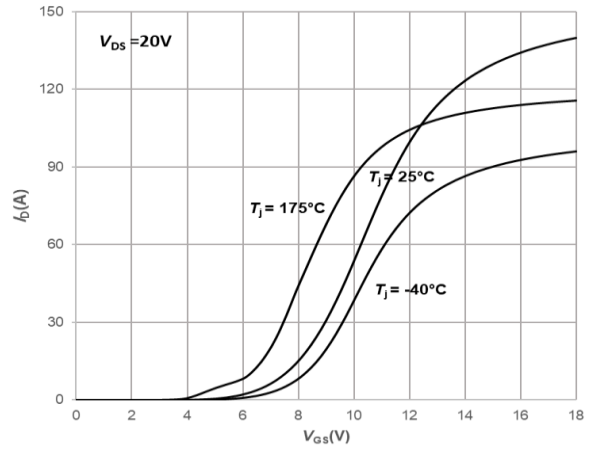


Fig4. Typical Transfer Characteristics

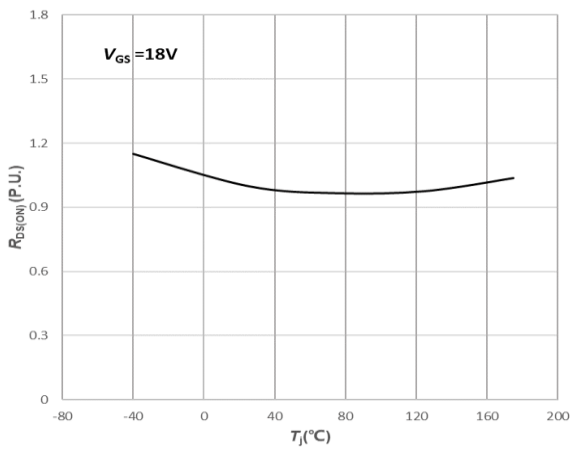


Fig5. Normalized On-Resistance vs. Temperature

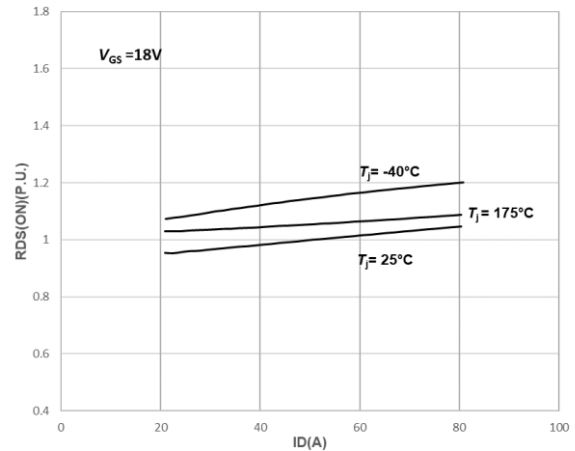


Fig6. Normalized On-Resistance vs. Drain Current For Various Temperatures

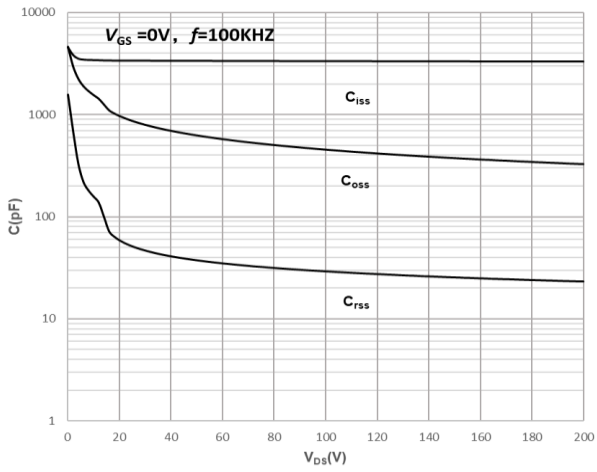


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

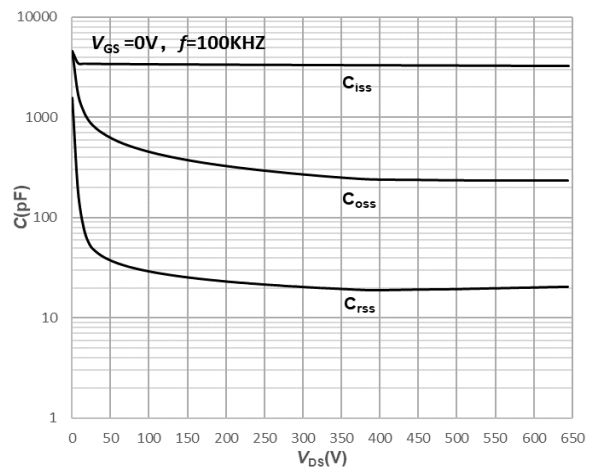


Fig8. Capacitances vs. Drain-Source Voltage (0-650V)

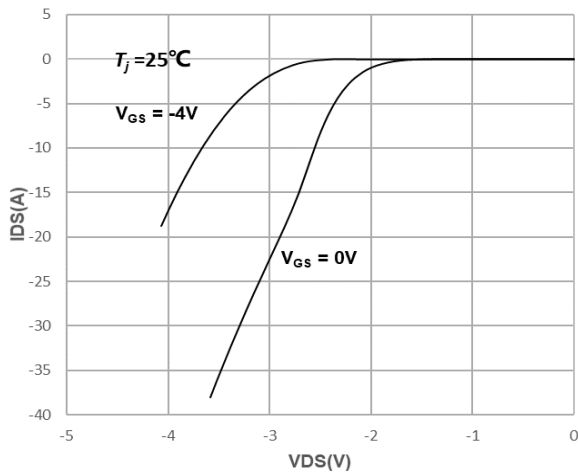


Fig9. Body Diode Characteristics

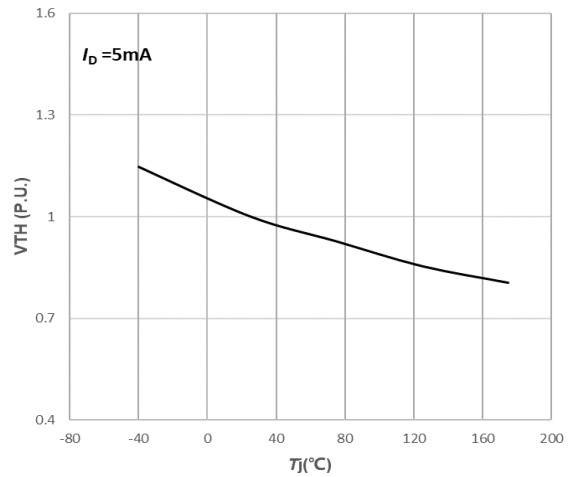
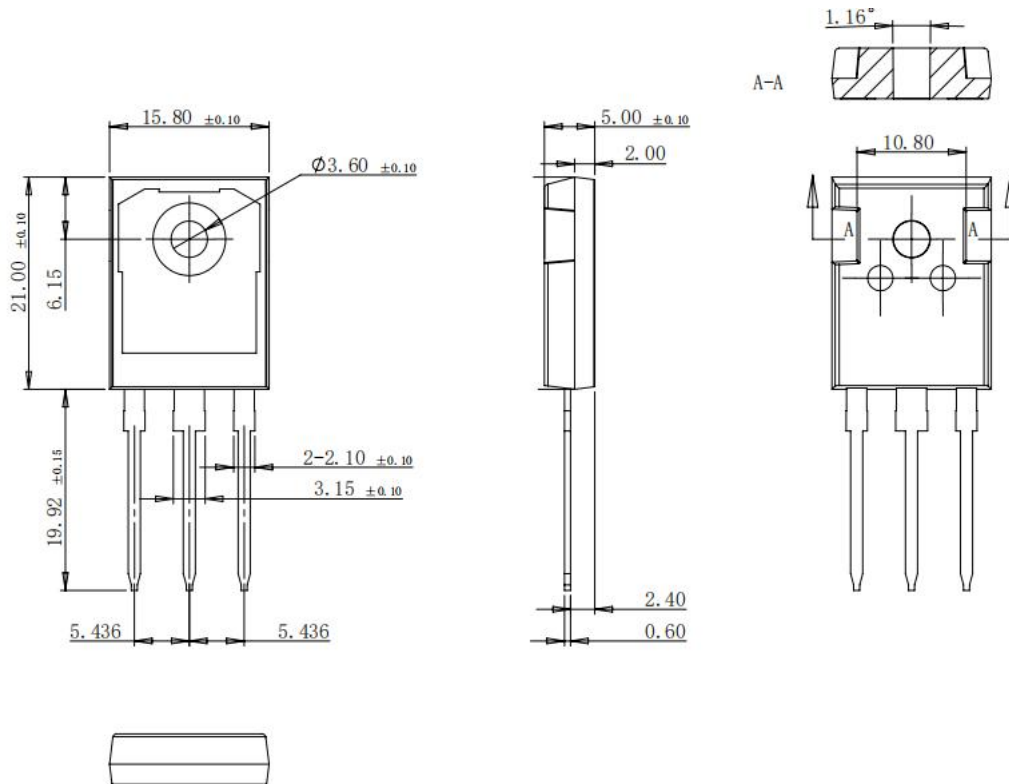


Fig10. Normalized Threshold Voltage vs. Temperature

Package Outlines(Unit:mm)

TO-247-3L



*Important Usage Information and Disclaimer

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