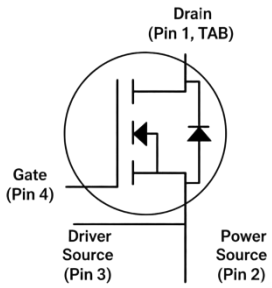
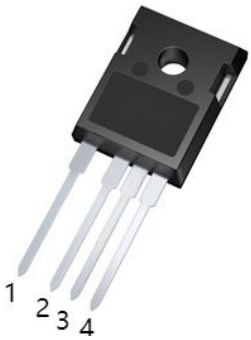
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	750	V
I_D	38	A
$R_{DS(ON)}$	70	mΩ
Q_G	44.7	nC





TO-247-4L

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
- 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	Conditions	Value	Unit
Drain-source Voltage	V_{DS}	V_{GS}=0V	750	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	38.4	A
		V_{GS}=18V; T_C=100°C	27.2	
Drain Current (pulsed)	I_{DM}	V_{GS}=18V; T_C=25°C	78	A
Power Dissipation	P_D	T_C=25°C; T_J=175°C	136	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-	-55 to +175	°C
Thermal Resistance from Junction to Case	$R_{\theta JC}$	-	1.1	°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	750	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}; I_{DS}=7.5mA	2.6	-	4.6	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=750V; 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=17A	-	105	-	mΩ
		V_{GS}=15V; I_D=17A; T_J=175°C	-	86	-	
		V_{GS}=18V; I_D=17A	-	70	90	
		V_{GS}=18V; I_D=17A; T_J=175°C	-	72	-	
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	-	1040	-	pF
Output Capacitance	C_{oss}		-	96	-	
Reverse Transfer Capacitance	C_{rss}		-	7	-	
Total Gate Charge	Q_G	V_{DS}=400V; V_{GS}=0/+18V; I_D=17A; T_J=25°C	-	44.7	-	nC
Gate-Source Charge	Q_{GS}		-	15.3	-	
Gate-Drain Charge	Q_{GD}		-	12	-	
Gate Resistor	R_G	f=100KHz; V_{AC}=25mV	-	3	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=400V; V_{GS}=0/+18V; I_D=17A; $R_{g(ext)}$=5Ω; L=200uH	-	14.4	-	ns
Rise Time	t_r		-	43.6	-	
Turn-off Delay Time	$t_{d(off)}$		-	29.6	-	
Fall Time	t_f		-	28.8	-	

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=8.5A; T_J=25°C	-	3.4	-	V
Continuous Diode Forward Current	I_S	V_{GS}=0V; T_J=25°C	-	38.4	-	A
Reverse Recovery Time	t_{RR}	V_R=400V; V_{GS}=0V; I_F=17A; di/dt=1360A/μs; T_J=25°C	-	15.4	-	ns
Reverse Recovery Charge	Q_{RR}		-	73.5	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	7.4	-	A

Typical Characteristics

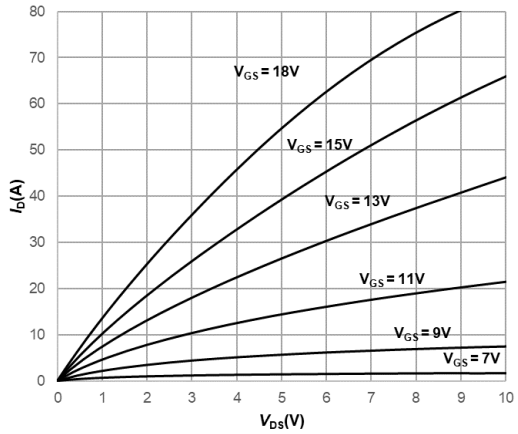


Fig1. Output Characteristics T_j=25℃

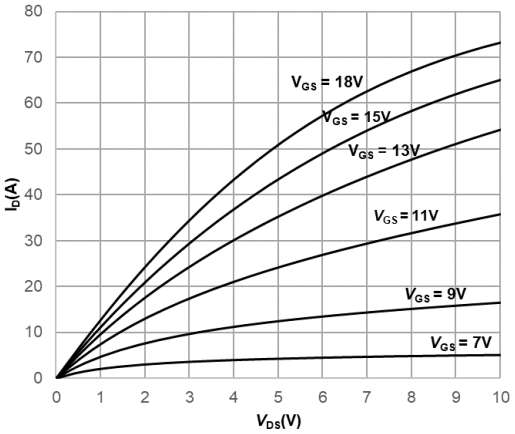


Fig2. Output Characteristics T_j=175℃

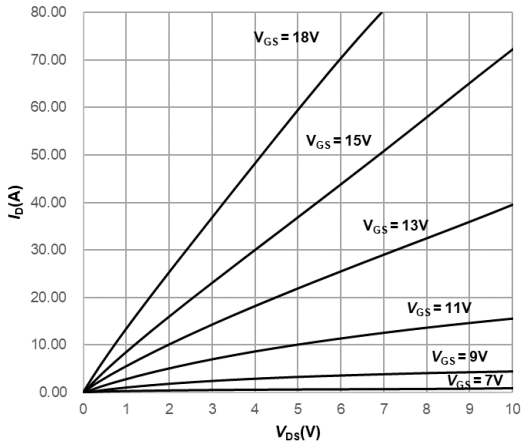


Fig3. Output Characteristics T_j=-40℃

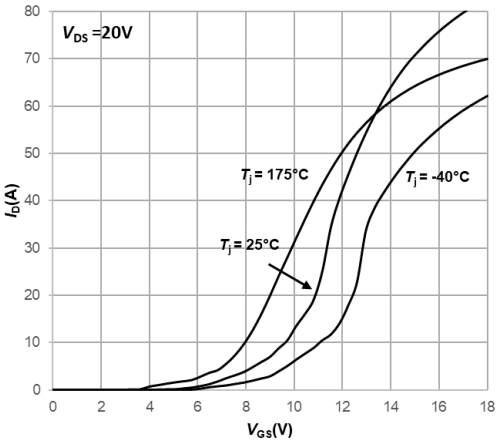


Fig4. Typical Transfer Characteristics

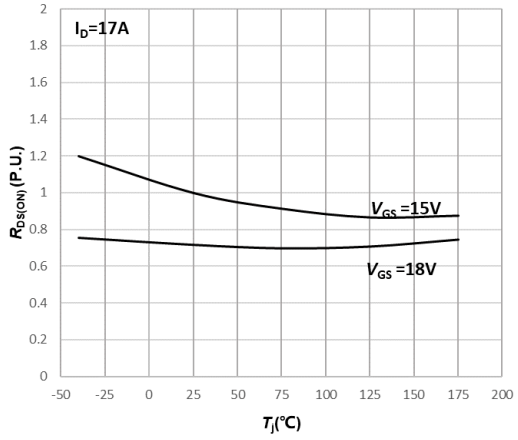


Fig5. Normalized On-Resistance vs. Temperature

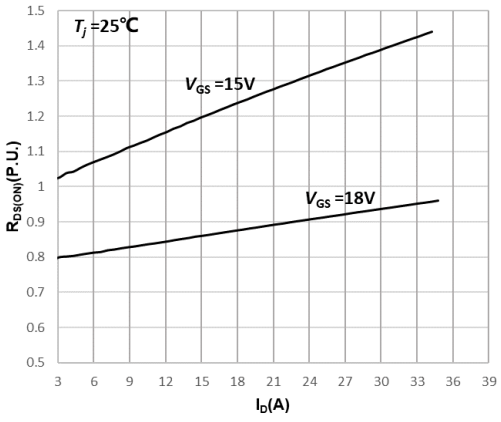


Fig6. Normalized On-Resistance vs. Drain Current For Various V_{GS}

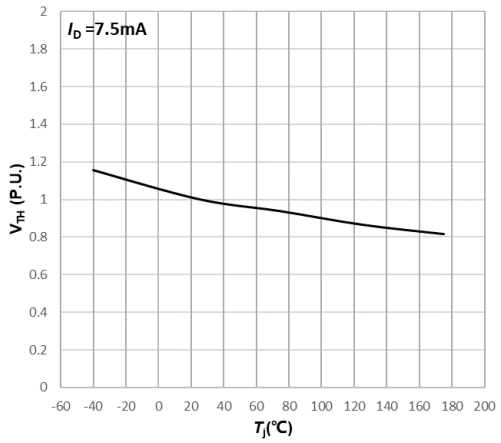


Fig7. Normalized Threshold Voltage vs. Temperature

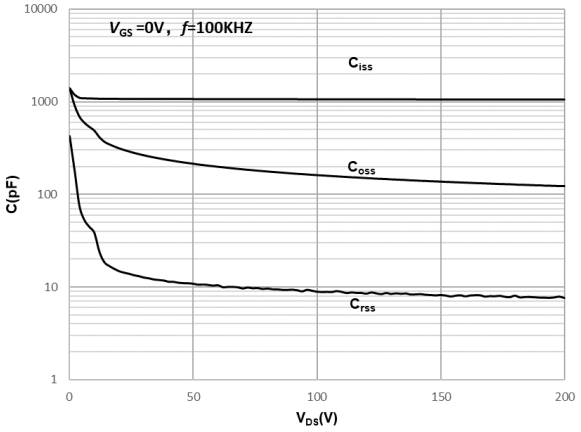


Fig8. Capacitances vs. Drain-Source Voltage (0-200V)

For T_j=25℃

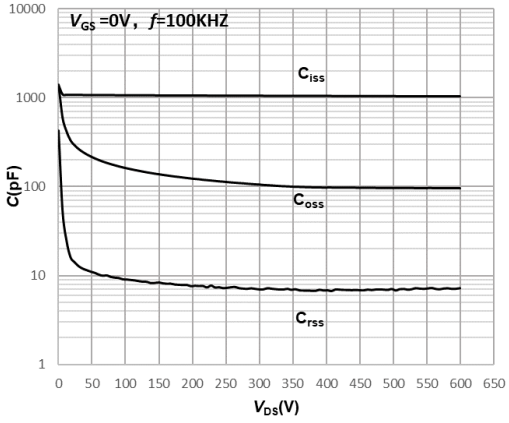


Fig9. Capacitances vs. Drain-Source Voltage (0-600V)

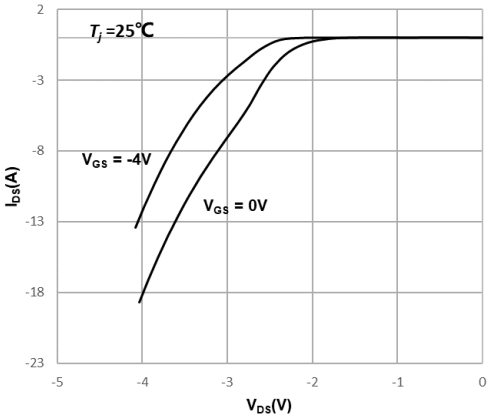


Fig10. Body Diode Characteristics

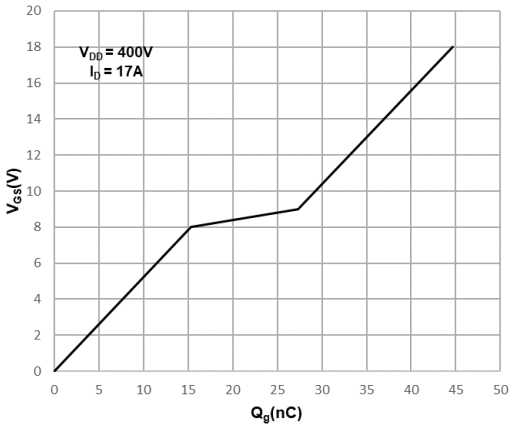


Fig11. Typical Gate Charge

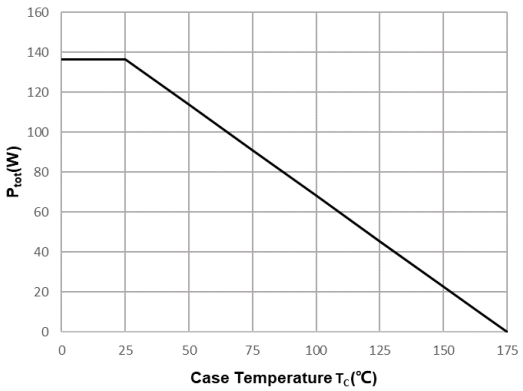


Fig12. Power Dissipation vs. Case Temperature

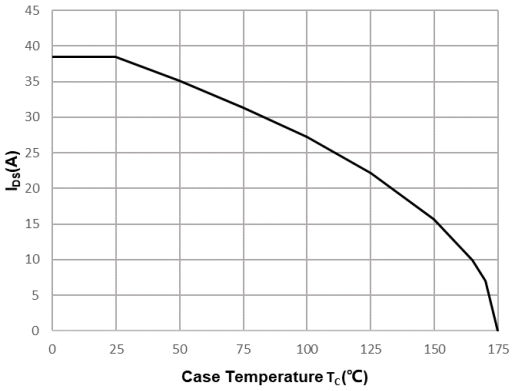
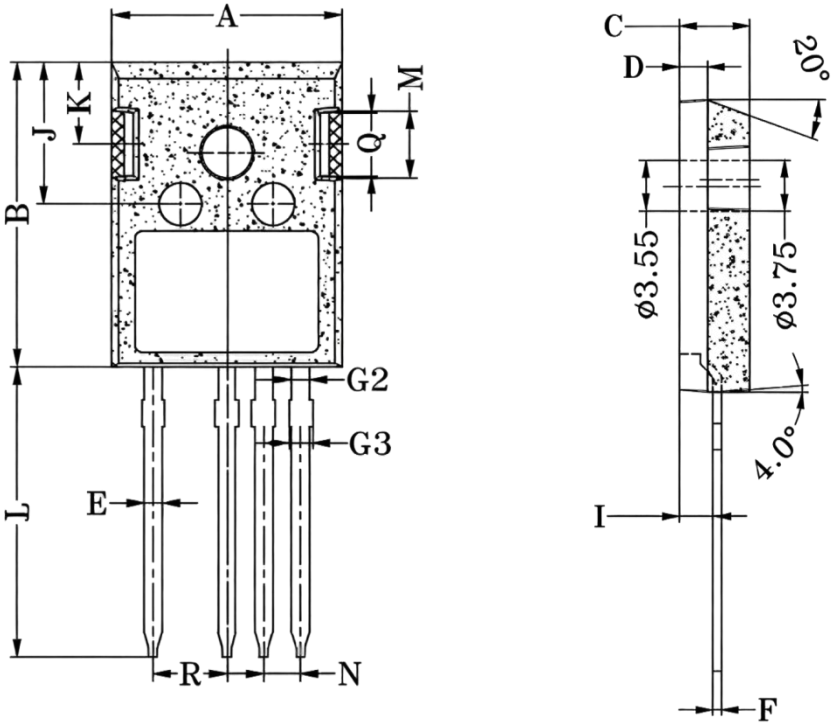
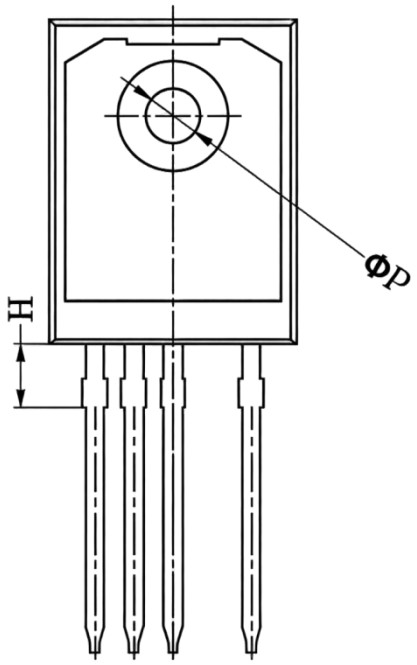


Fig13. Maximum DC Drain to Source Current vs. Case Temperature

Package Outlines(Unit:mm)

TO-247-4L





Symbol	Dimensions in Millimeter	
	MIN	MAX
A	15.80	16.00
B	20.90	21.10
C	4.90	5.10
D	1.90	2.10
E	1.10	1.30
F	0.50	0.70
G2	1.10	1.30
G3	1.18	1.38
H	4.18	4.38
I	2.30	2.50
J	9.65	9.85
K	5.54	5.74
L	19.80	20.20
M	4.50	4.70
N	2.34	2.74
ϕ P	3.40	3.60
Q	4.232	4.432
R	4.88	5.28

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