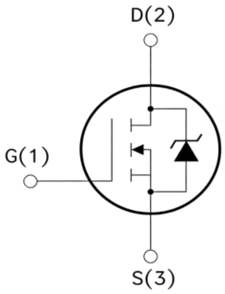
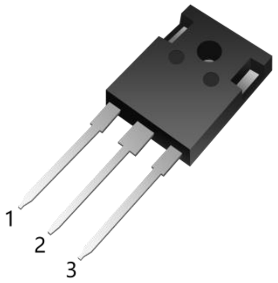
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1200	V
I_D	36	A
$R_{DS(on)}$	80	mΩ
Q_G	51	nC





TO-247-3L

Features

- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery (Qrr)
- Easy to Parallel and Simple to Drive

Applications

- Power Factor Correction Modules
- Switch Mode Power Supplies
- DC-AC Inverters
- High Voltage DC/DC Converters

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

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	V_{DS}	V_{GS}=0V, I_D=100μA	1200	V
Gate to Source Voltage	V_{GS}	Absolute maximum values	-10/+22	V
Recommended Operation Voltage of Gate to Source	V_{GSop}	Recommended operational values	-4/+18	V
Continuous Drain Current	I_D	V_{GS}=18V, T_C=25℃	36	A
		V_{GS}=18V, T_C=100℃	25	
Pulsed Drain Current	I_{DM}	Pulse with Tp limited by Tjmax	80	A
Power Dissipation	P_{tot}	T_C=25℃, T_j=175℃	283	W
Operating and Storage Temperature	T_j, T_{stg}		-55 to +175	℃

Thermal Characteristics

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Thermal Resistance from Junction to Case	Rth(j-c)	-	0.55	-	℃/W

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=500μA	1200			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=VDS, I_D=5mA, T_j=25℃	2		4	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=1200V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=18V, V_{DS}=0V			100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=18V, I_D=20A		80	104	mΩ
		V_{GS}=18V, I_D=20A, T_j =175℃		122		

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS} =800V, f=1MHz, T_j =25℃		944		pF
Output Capacitance	C_{oss}			42.6		
Reverse Transfer Capacitance	C_{rss}			4.1		
Total Gate Charge	Q_g	V_{GS}=-4/18V, V_{DS}=800V, I_D=20A, T_j =25℃		51		nC
Gate-Source Charge	Q_{gs}			13		
Gate-Drain Charge	Q_{gd}			25		
Gate Resistance	R_g	V_{AC}=25mV, f=1MHz		4		Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=-4/18V, V_{DD}=800V, I_D=20A, R_g=10Ω		38		ns
Rise Time	t_r			46		
Turn-Off Delay Time	$t_{d(off)}$			32		
Fall Time	t_f			41		
Turn-On Energy	E_{on}			108		μJ
Turn-Off Energy	E_{off}			49		

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{SD}	V_{GS}=-4V, I_{SD}=10A, T_j =25℃	-	4.5		V
Continuous Diode Forward Current	I_S	V_{GS}=-4V, T_j =25℃		36		A
Reverse Recovery Time	t_{rr}	V_{GS}= -4V, I_{SD}=20A, V_R=800V, di/dt=800A/us, T_j =25℃		17.5		ns
Reverse Recovery Charge	Q_{rr}			71.4		nC
Peak Reverse Recovery Current	I_{rrm}			6.8		A

Typical Characteristics

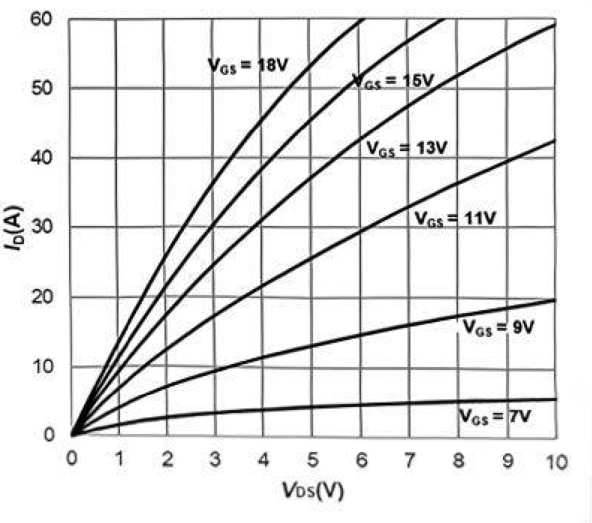


Fig 1. Output Characteristics Tj =25℃

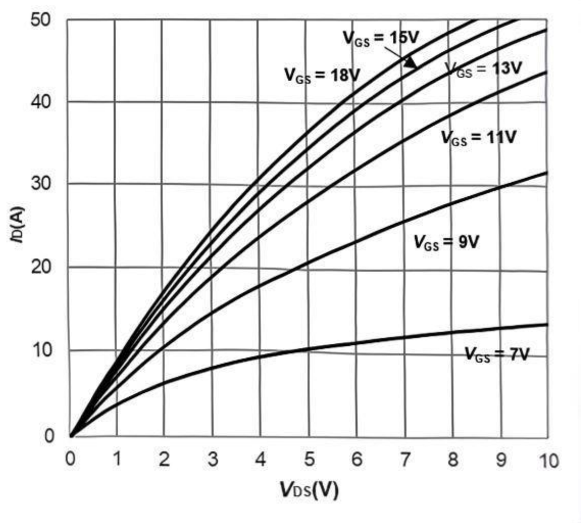


Fig 2. Output Characteristics Tj=175℃

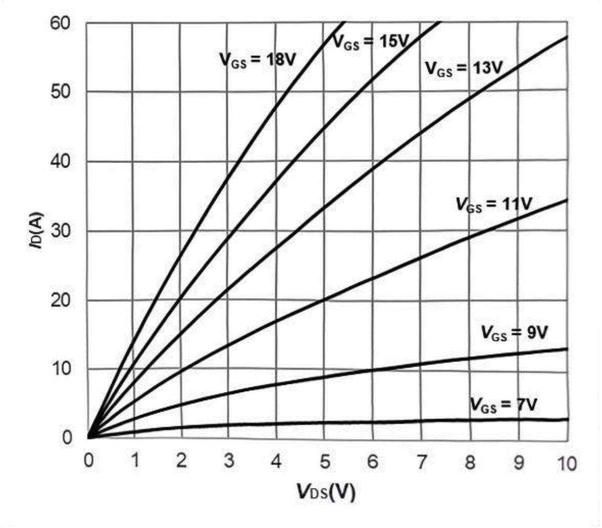


Fig 3. Output Characteristics Tj=-55℃

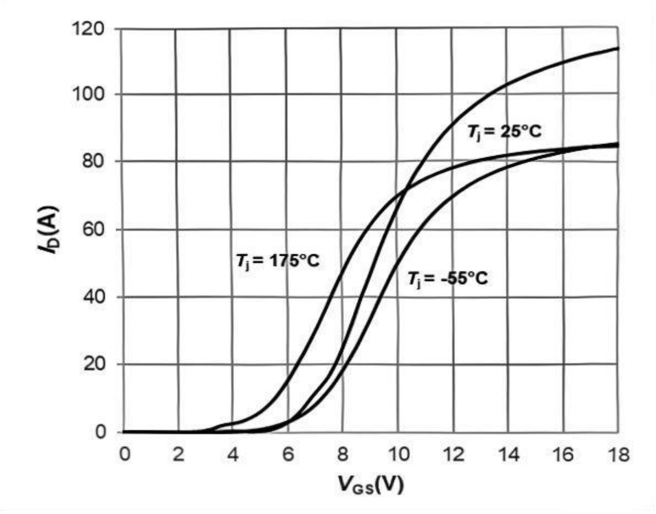


Fig 4. Typical Transfer Characteristics

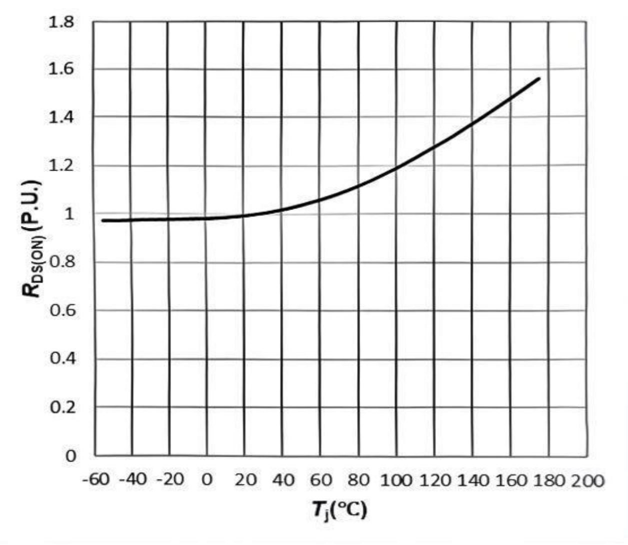


Fig 5.Transient thermal impedance IGBT, Z_{thJC}=f(t)

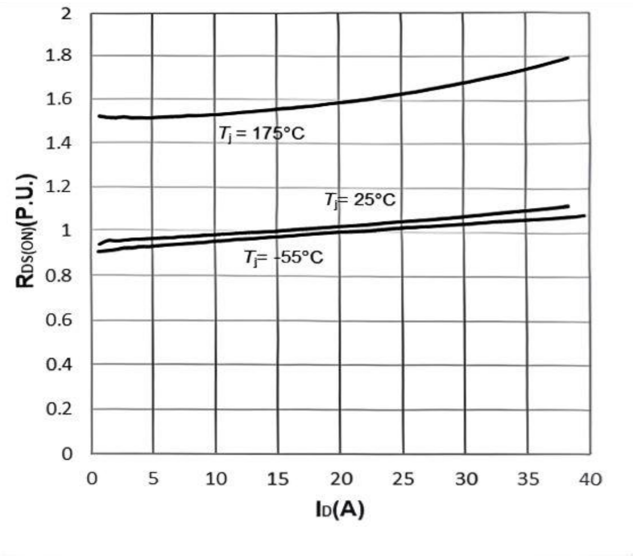


Fig 6.Transient thermal impedance FRD, Z_{thJC}=f(t)

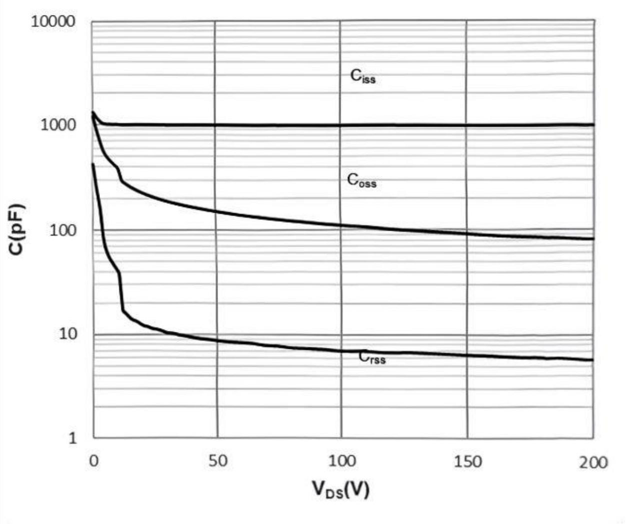


Fig 7. Capacitances vs. Drain-Source Voltage (0-200V)

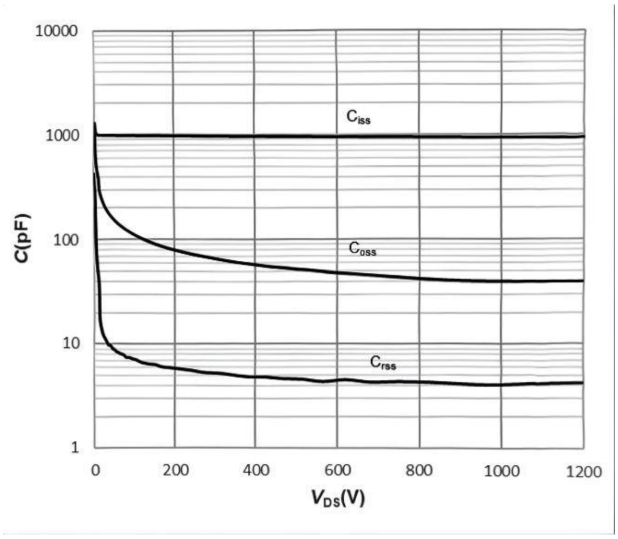


Fig 8. Capacitances vs. Drain-Source Voltage (0-1200V)

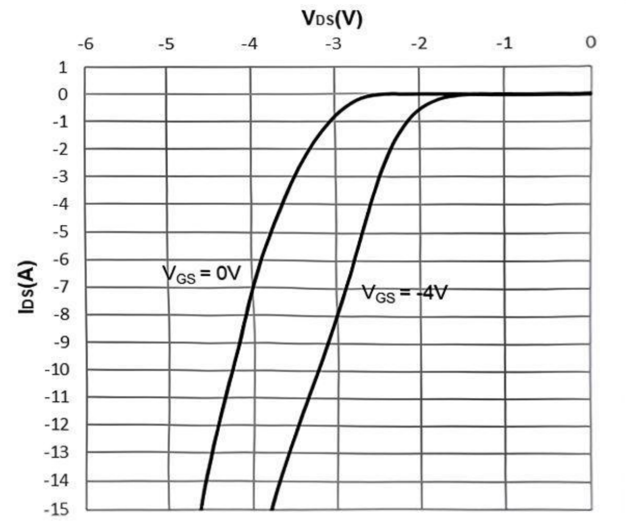


Fig 9. Body Diode Characteristics

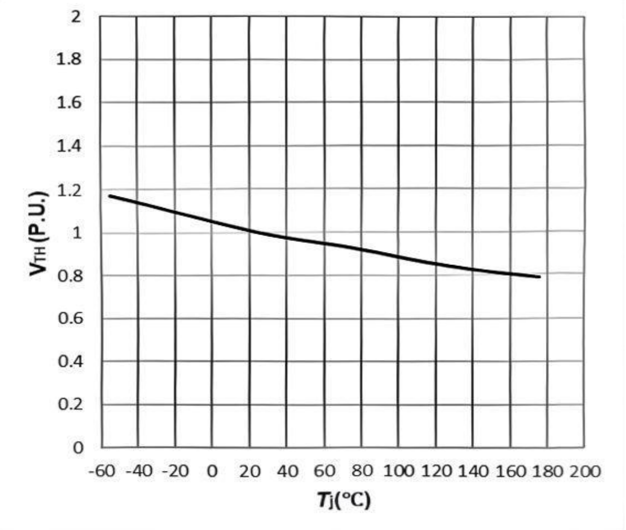


Fig 10. Normalized Threshold Voltage vs. Temperature

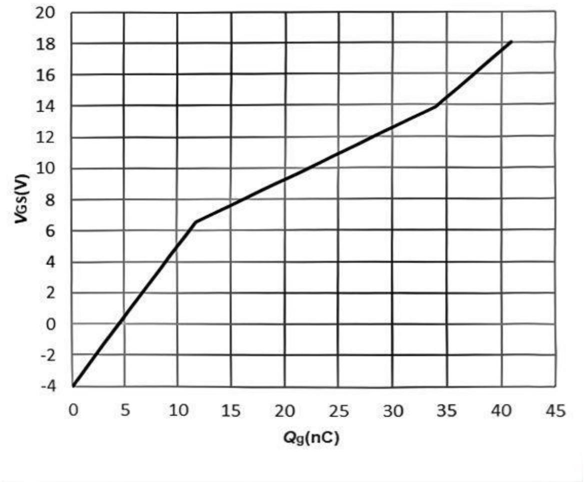


Fig 11. Gate Charge Characteristics

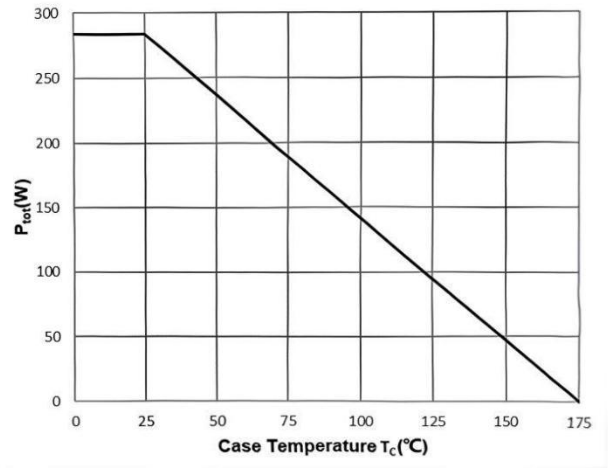


Fig 12. Power Dissipation vs. Case Temperature

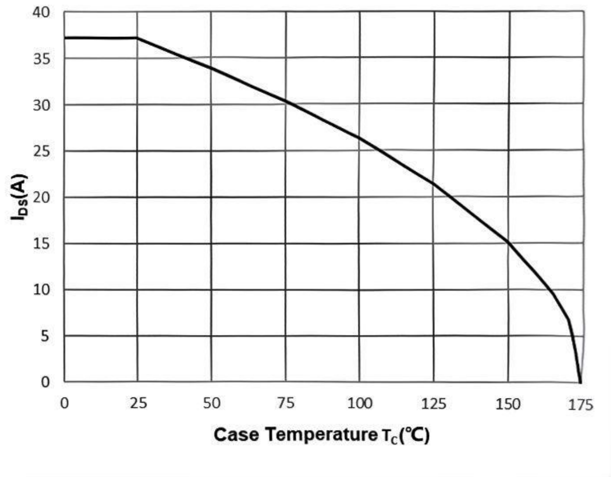
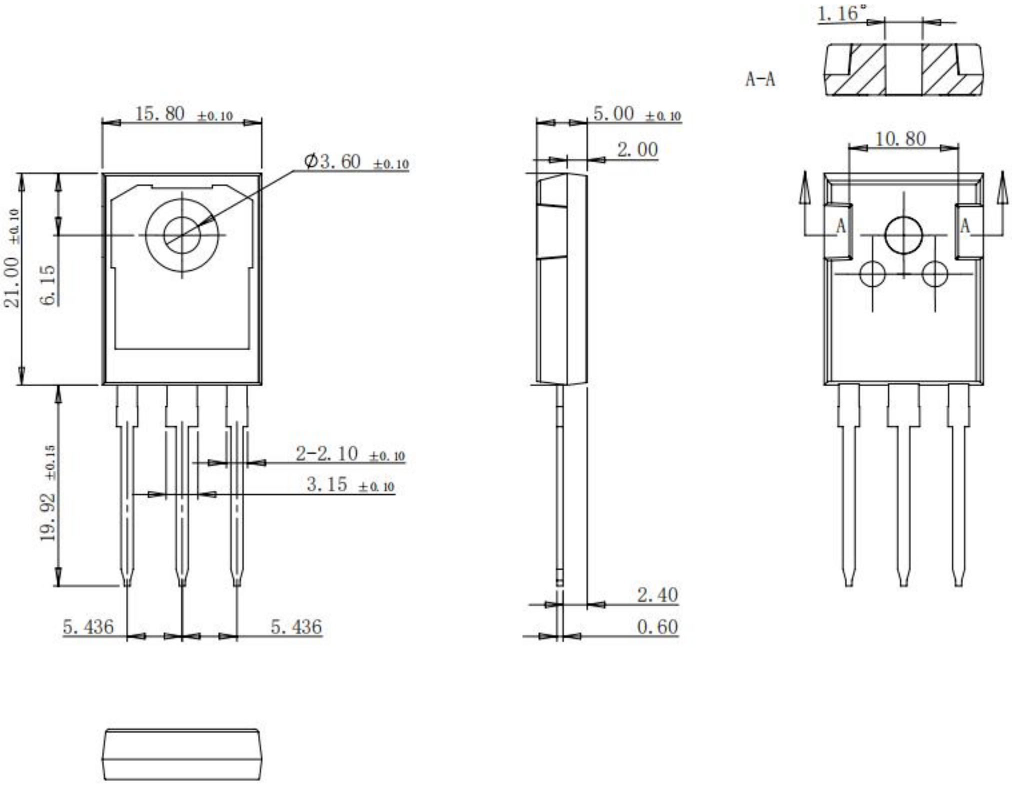


Fig 13. Maximum DC Drain to Source Current vs. Case Temperature

Package Outline (Unit：mm)

TO-247-3L



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