

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D@25^{\circ}C$
650V	55mΩ@18V	54A

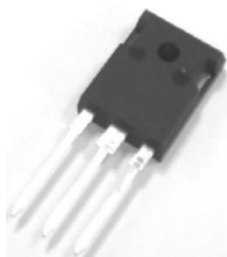
Feature

- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitance with High-Speed switching
- Low reverse recovery(Qrr)

Application

- Switch Mode Power Supplies
- Renewable energy
- Motor drives
- High Voltage DC/DC Converters

Package

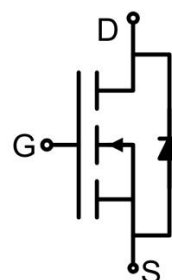


TO-247-3

Marking



Circuit diagram



Absolute maximum ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	$V_{GS}=0V, I_D = 100\mu A$	650	V
Gate-Source Voltage	V_{GSmax}	AC (f > 1Hz)	-10/+25	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	$V_{GS}=18V, T_C=25^{\circ}C$	54	A
	I_D	$V_{GS}=18V, T_C=100^{\circ}C$	38	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse width t_p limited by T_{jmax} at 1ms	93	A
		Pulse width t_p limited by T_{jmax} at 100μs	231	A
Power Dissipation	P_D	$T_C=25^{\circ}C$	203	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction-to-Case	0.74	°C/W
Junction Temperature	T_J		-55 ~ +175	°C
Storage Temperature	T_{STG}		-55 ~ +175	°C

Electrical characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =100μA	650			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =650V,V _{GS} = 0V		1	50	μA
Gate-Source leakage current	I _{GSS}	V _{GS} =18V, V _{DS} = 0V			250	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =5mA		2.8		V
		V _{DS} =V _{GS} , I _D =5mA ,T _J =175℃		1.8		
Drain-source on-resistance	R _{DS(on)}	V _{GS} =18V, I _D =15A		55	80	mΩ
		V _{GS} =18V, I _D =15A,T _J =175℃		90		
Transconductance	g _{fs}	V _{GS} =18V, I _D =15A		18		S
		V _{GS} =18V, I _D =15A,T _J =175℃		11		
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =600V,V _{GS} =0V,f =1MHz V _{AC} =25mV		1410		pF
Output Capacitance	C _{oss}			119		
Reverse Transfer Capacitance	C _{rss}			4		
Total Gate Charge	Q _g	V _{DS} =400V,V _{GS} =-4V/18V, I _D =15A		54		nC
Gate-Source Charge	Q _{gs}			14		
Gate-Drain Charge	Q _{gd}			11		
Internal Gate Resistance	R _{G(int)}	f =1MHz,V _{AC} =25mV		1.8		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I _S	V _{GS} =-4V,T _C =25℃		45		A
Diode Forward voltage	V _{SD}	V _{GS} =-4V, I _{SD} =8.8A		3.9		V
		V _{GS} =-4V, I _{SD} =8.8A,T _J =175℃		3.2		
Diode pulse Current	I _{S,pulse}	V _{GS} =-4V, pulse width t _p limited by T _{imax}		93		A

Typical Characteristics

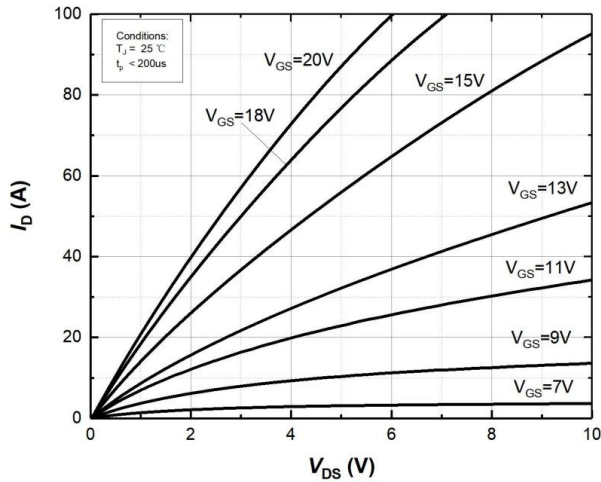


Figure 1. Output characteristics at $T_j=25^{\circ}\text{C}$

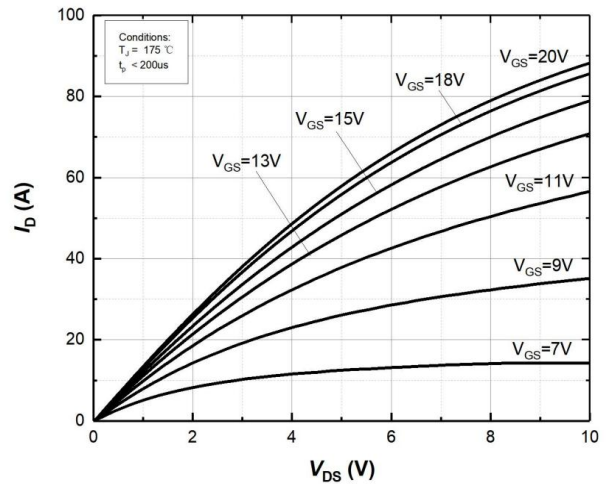


Figure 2. Output characteristics at $T_j=175^{\circ}\text{C}$

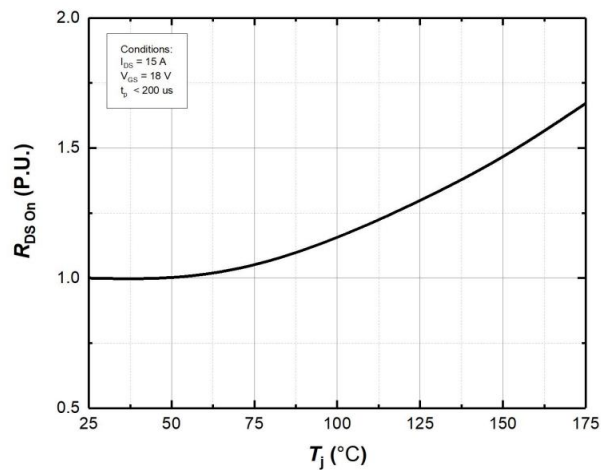


Figure 3. Normalized On-Resistance vs. Temperature

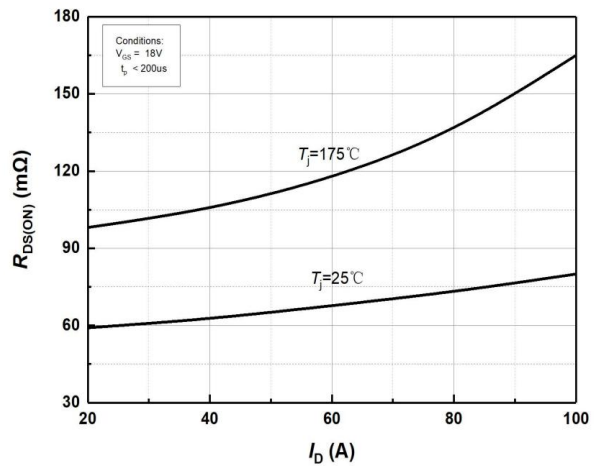


Figure 4. On-Resistance vs. Drain current for Various Temperature

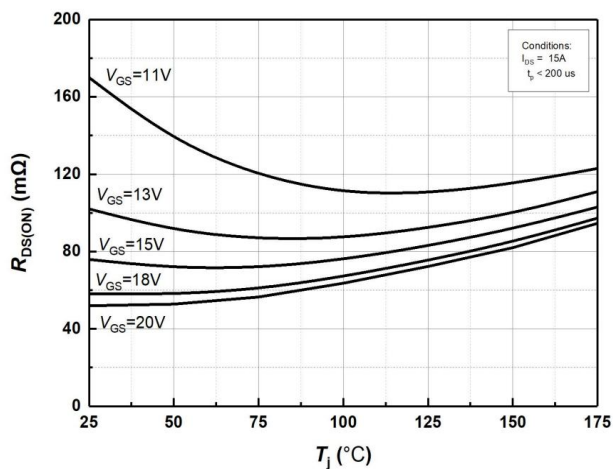


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

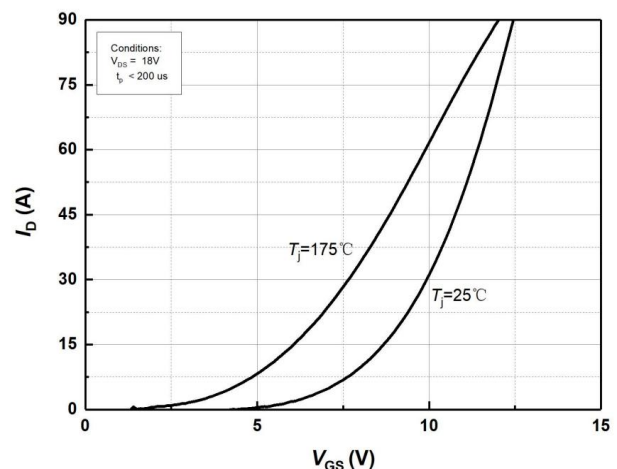


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

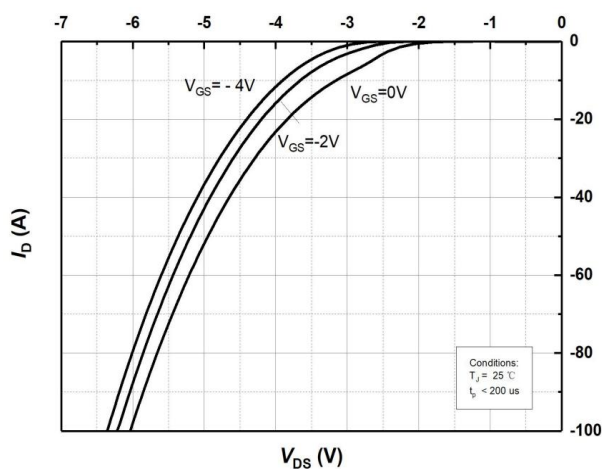


Figure 7. Body Diode Characteristics at Tj=25°C

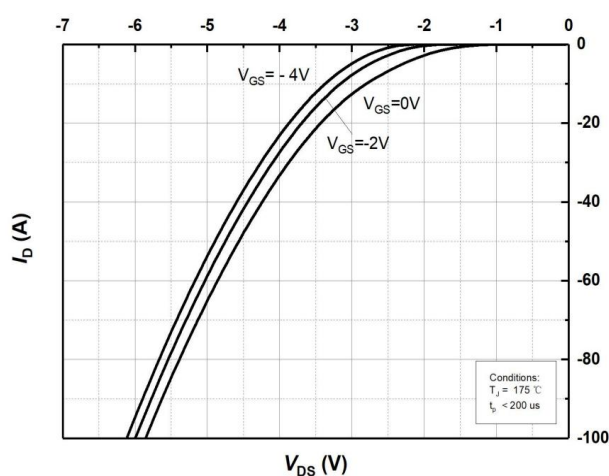


Figure 8. Body Diode Characteristics at Tj=175°C

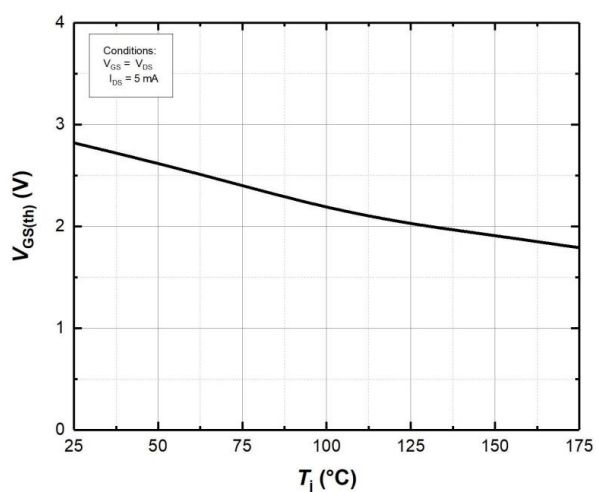


Figure 9. Threshold Voltage vs. Temperature

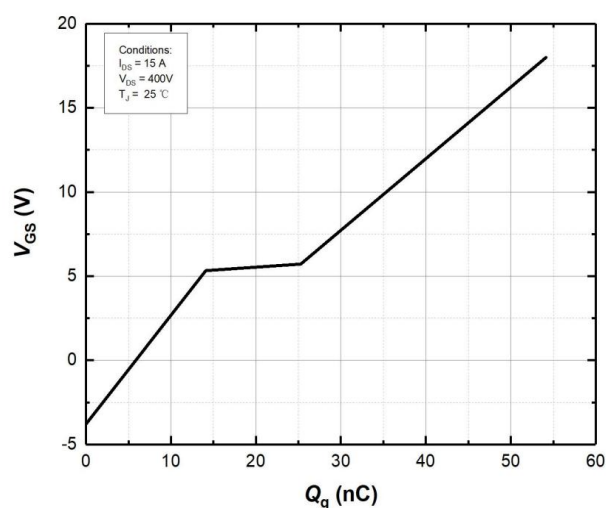


Figure 10 Gate Charge Characteristics

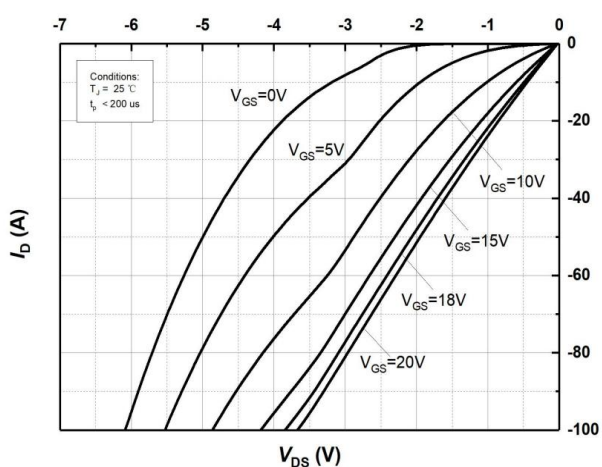


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

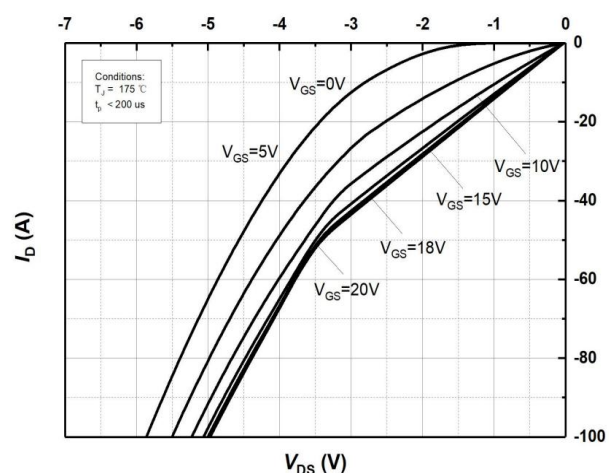


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Characteristics

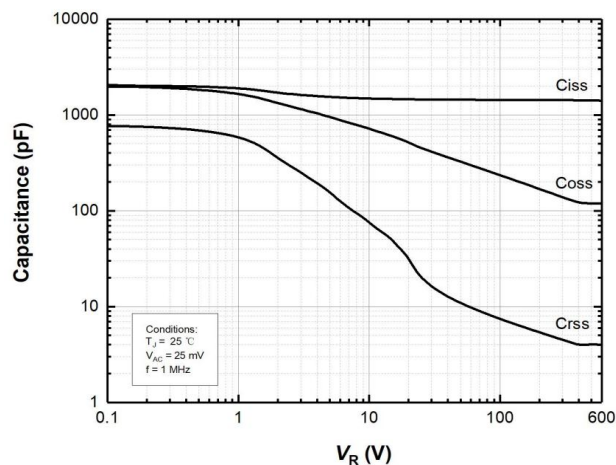


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

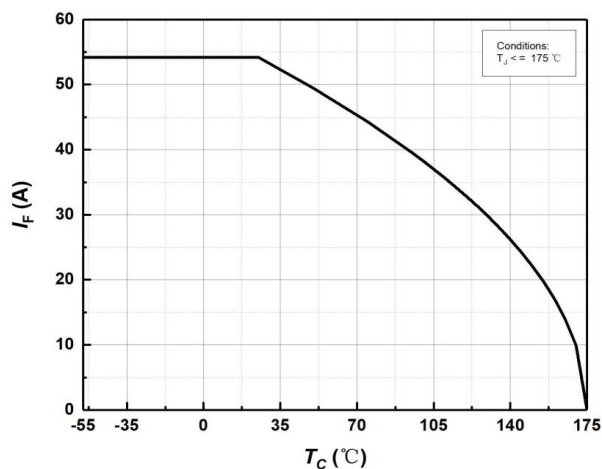


Figure 14. Continuous Drain Current Derating vs Case Temperature

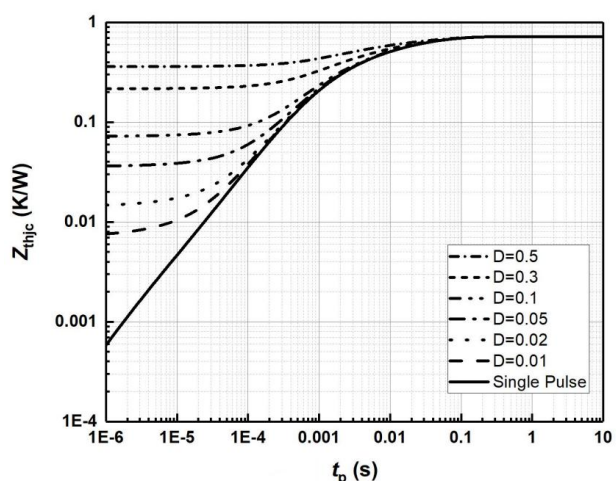


Figure 15. Transient Thermal Impedance (Junction – Case)

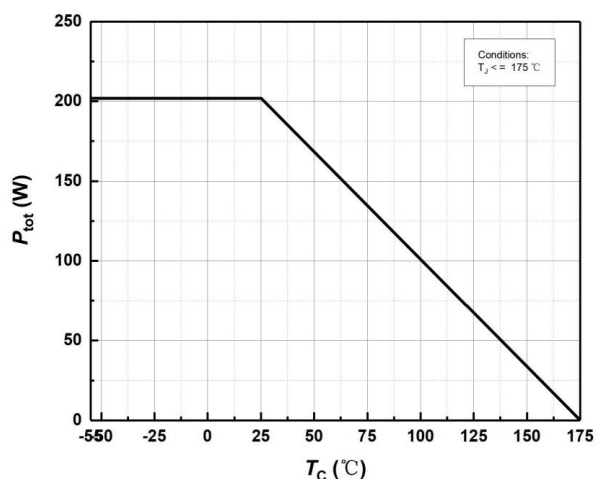


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

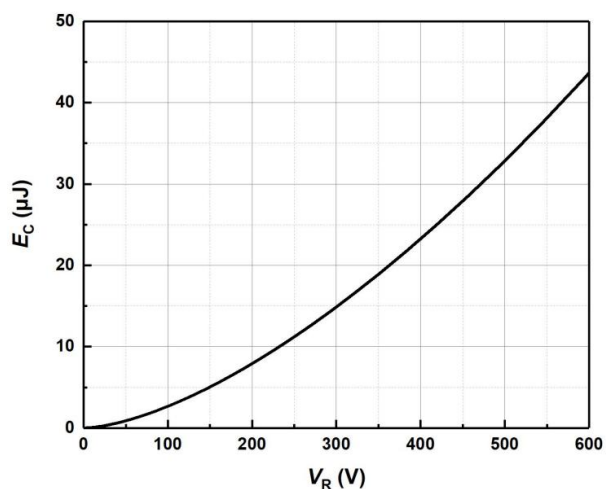


Figure 17. Output Capacitor Stored Energy

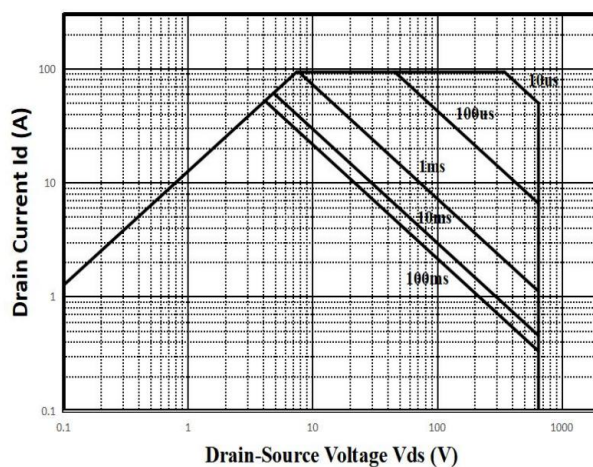
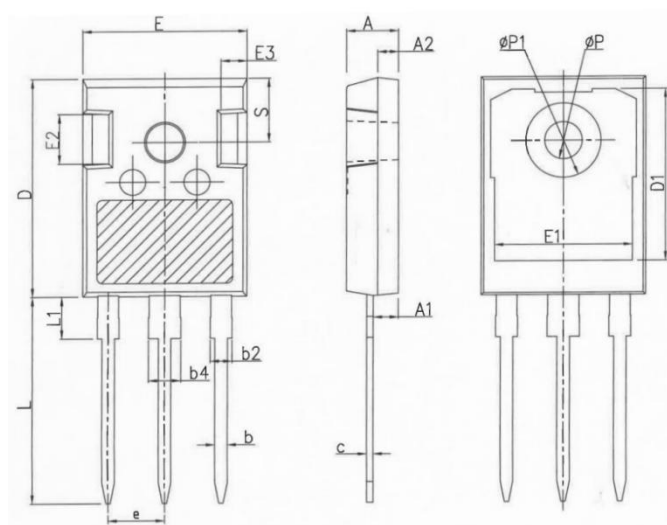


Figure 18. Safe Operating Area

TO-247-3 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.200	0.189	0.205
A1	2.210	2.590	0.087	0.102
A2	1.850	2.150	0.073	0.085
b	1.110	1.360	0.044	0.054
b2	1.910	2.210	0.075	0.087
b4	2.910	3.210	0.115	0.126
c	0.510	0.750	0.020	0.030
D	20.700	21.300	0.815	0.839
D1	16.250	16.850	0.640	0.663
E	15.500	16.100	0.610	0.634
E1	13.000	13.600	0.512	0.535
E2	4.800	5.200	0.189	0.205
E3	2.300	2.700	0.091	0.106
e	5.440 BSC		0.214 BSC	
L	19.620	20.220	0.772	0.796
L1	-	4.300	-	0.169
ϕP	3.400	3.800	0.134	0.150
$\phi P1$	-	7.300	-	0.287
S	6.150 BSC		0.242 BSC	