

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D@25^{\circ}C$
650V	105mΩ@18V	31A
	94mΩ@20V	

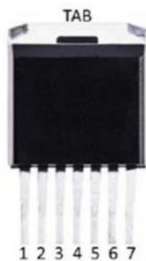
Feature

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

Application

- Switch Mode Power Supplies
- Renewable Energy
- Motor Drives
- High Voltage DC/DC Converters

Package

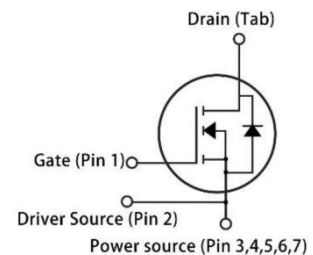


TO-263-7

Marking



Circuit diagram



Absolute maximum ratings ($T_c=25^{\circ}C$ 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 ($f > 1 Hz$)	-10/+25	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	$V_{GS}=20V, T_C=25^{\circ}C$	31	A
	I_D	$V_{GS}=20V, T_C=100^{\circ}C$	22	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax} at 1 ms	53	A
		Pulse with t_p limited by T_{jmax} at 10 μs	131	A
Power Dissipation	P_D	$T_C=25^{\circ}C$	130	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction-to-Case	1.15	$^{\circ}C/W$
Junction Temperature	T_J		-55 ~ +175	$^{\circ}C$
Storage Temperature	T_{STG}		-55 ~ +175	$^{\circ}C$

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} = 20V, V _{DS} = 0V			250	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 5mA		2.7		V
		V _{DS} = V _{GS} , I _D = 5mA, T _J = 175°C		1.8		
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 18V, I _D = 10A		105	150	mΩ
		V _{GS} = 20V, I _D = 10A		94		
		V _{GS} = 18V, I _D = 10A, T _J = 175°C		140		
		V _{GS} = 20V, I _D = 10A, T _J = 175°C		130		
Transconductance	g _{fs}	V _{GS} = 20V, I _D = 10A		13		S
		V _{GS} = 20V, I _D = 10A, T _J = 175°C		9		
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = 600V, V _{GS} = 0V, f = 1MHz V _{AC} = 25mV		767		pF
Output Capacitance	C _{oss}			55		
Reverse Transfer Capacitance	C _{rss}			7		
Total Gate Charge	Q _g	V _{DS} = 400V, V _{GS} = -4V/18V, I _D = 10A		35.8		nC
Gate-Source Charge	Q _{gs}			8.3		
Gate-Drain Charge	Q _{gd}			12.1		
Internal Gate Resistance	R _{G(int)}	f = 1 MHz, V _{AC} = 25mV		2.8		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I _S	V _{GS} = -5V, T _C = 25°C		26		A
Diode Forward voltage	V _{SD}	V _{GS} = -5V, I _{SD} = 7.5A		4.0		V
		V _{GS} = -5V, I _{SD} = 7.5A, T _J = 175°C		3.5		
Diode pulse Current	I _{S,pulse}	V _{GS} = -5V, pulse width t _p limited by T _{jmax}		53		A

Typical Characteristics

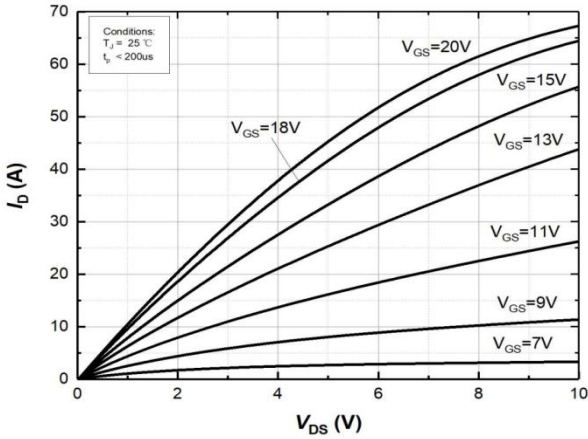


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

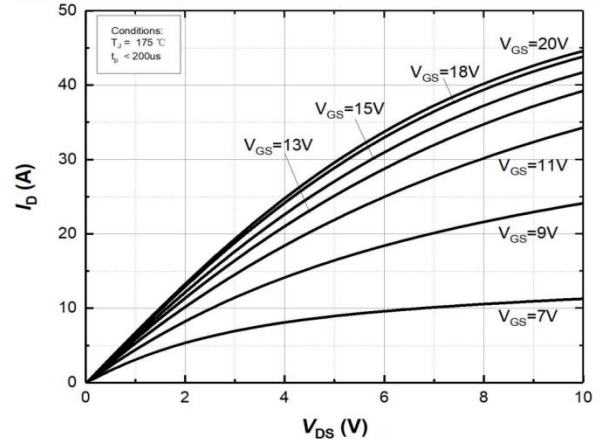


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

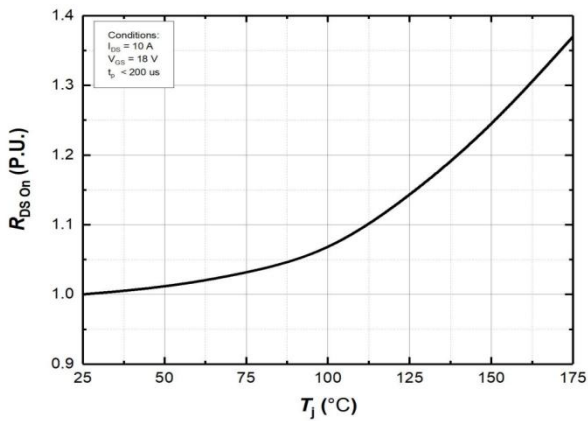


Figure 3. Normalized On-Resistance vs. Temperature

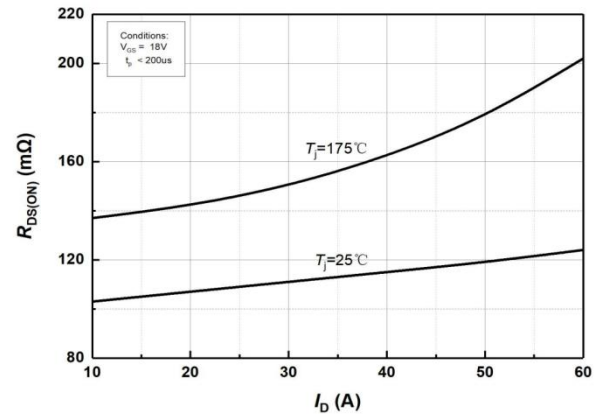


Figure 4. On-Resistance vs. Drain current for Various Temperature

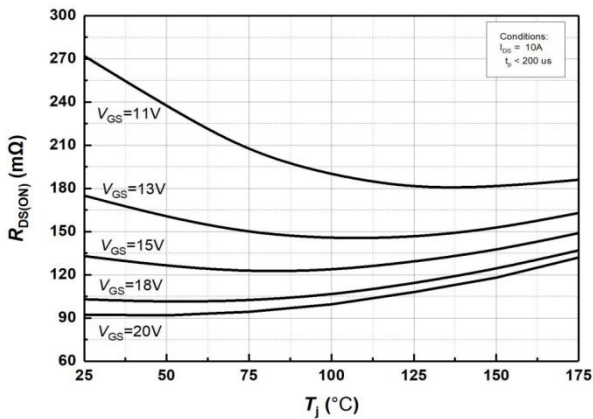


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

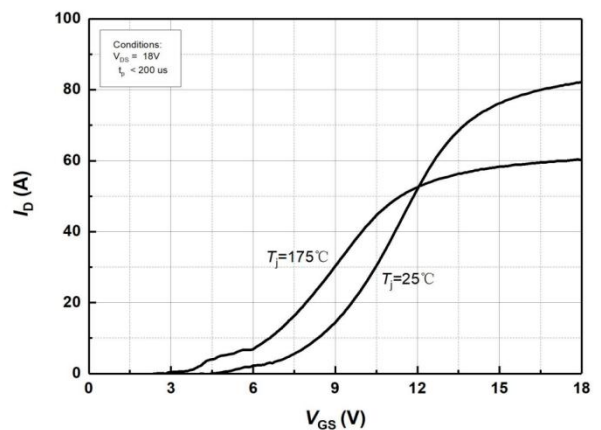


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

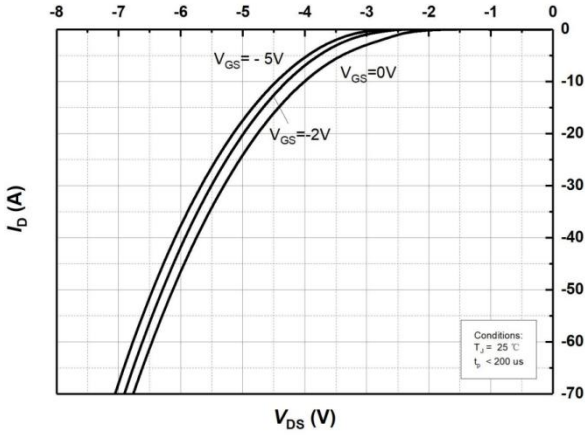


Figure 7. Body Diode Characteristics at $T_j=25^\circ\text{C}$

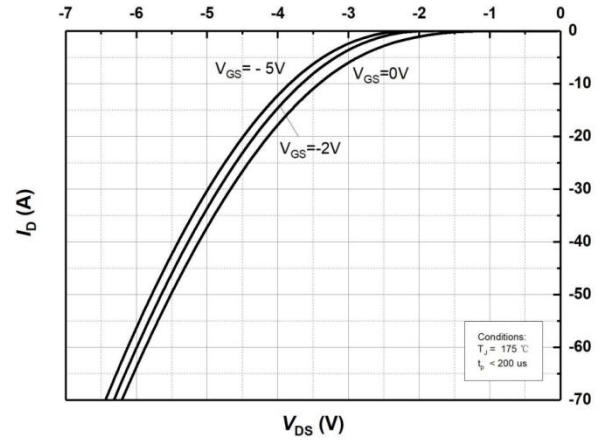


Figure 8. Body Diode Characteristics at $T_j=175^\circ\text{C}$

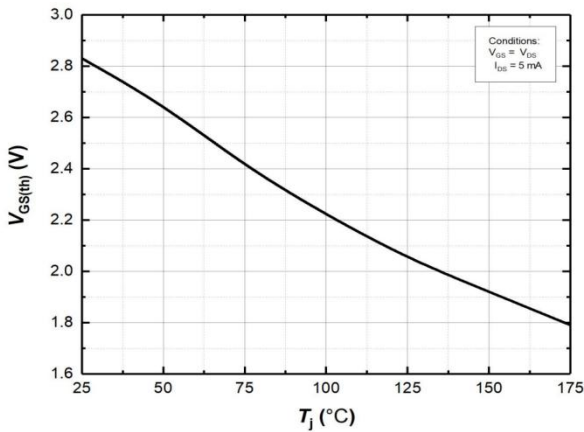


Figure 9. Threshold Voltage vs. Temperature

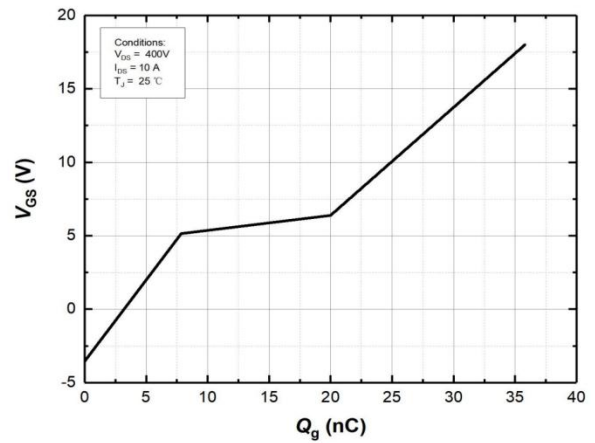


Figure 10 Gate Charge Characteristics

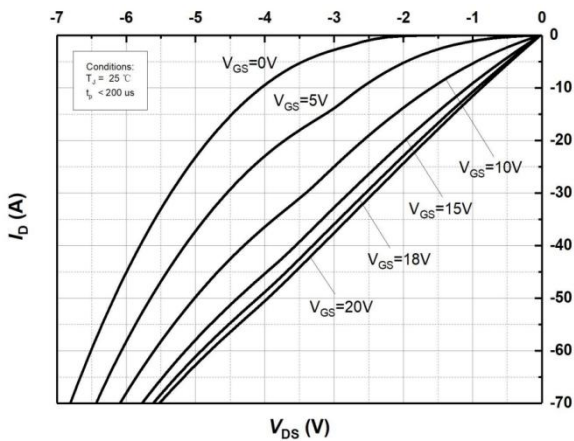


Figure 11. 3rd Quadrant Characteristic at $T_j=25^\circ\text{C}$

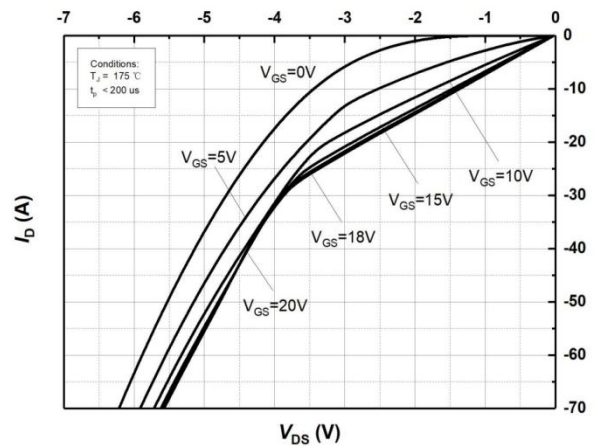


Figure 12. 3rd Quadrant Characteristic at $T_j=175^\circ\text{C}$

Typical Characteristics

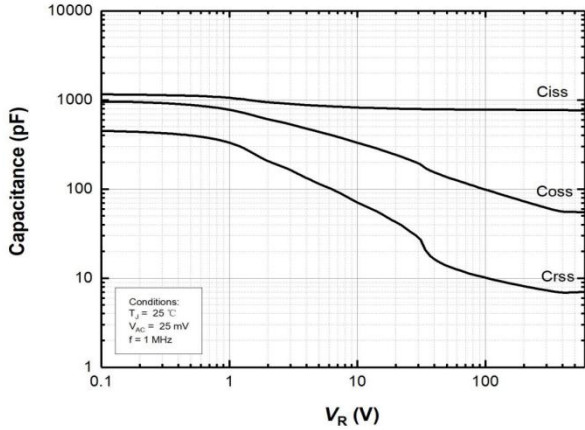


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

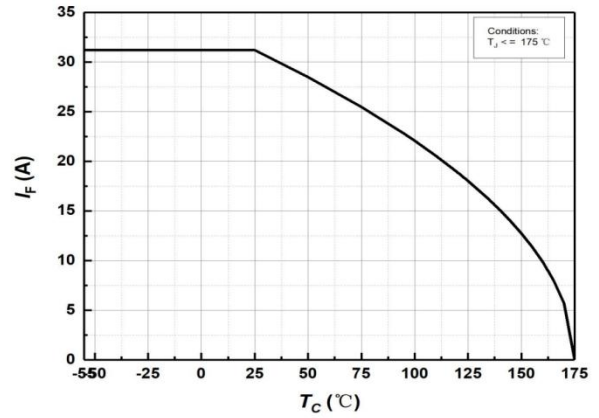


Figure 14. Continuous Drain Current Derating vs Case Temperature

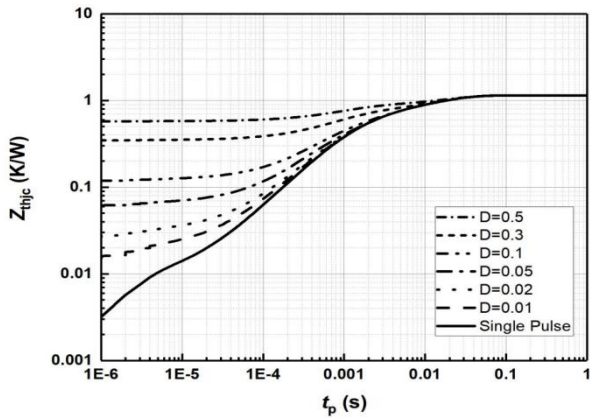


Figure 15. Transient Thermal Impedance (Junction – Case)

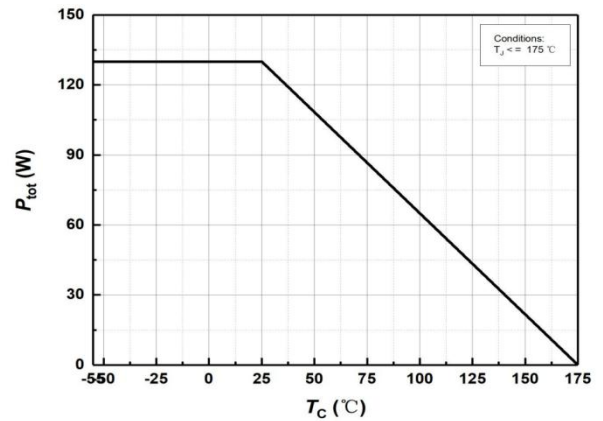


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

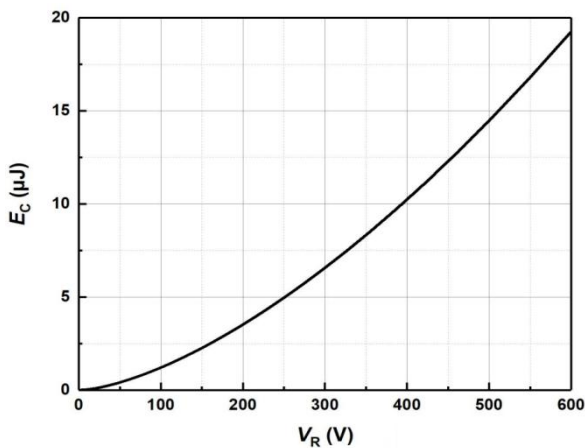


Figure 17. Output Capacitor Stored Energy

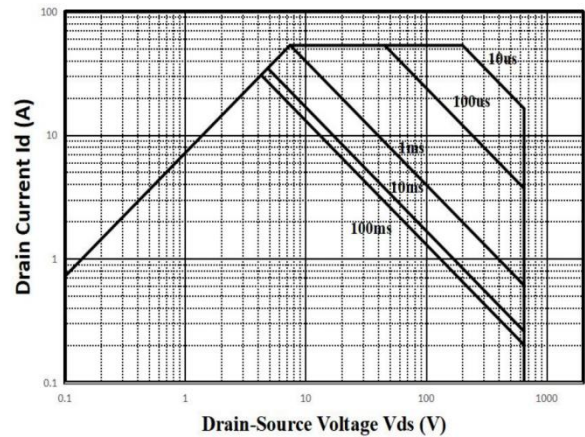
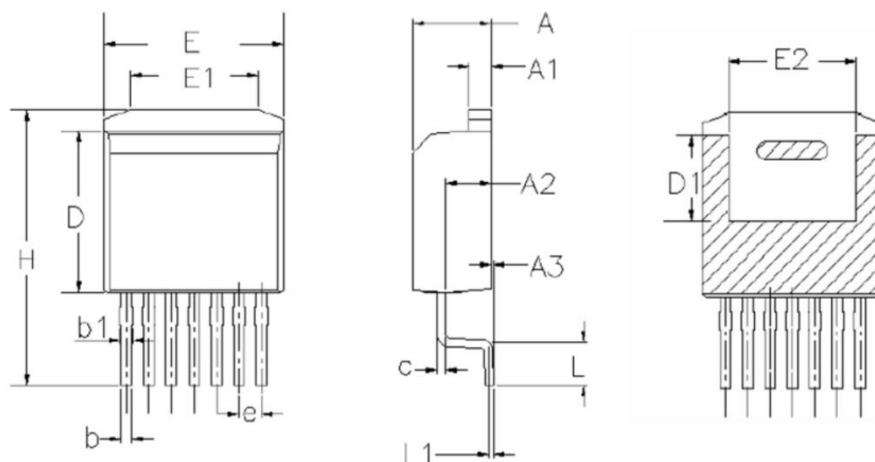


Figure 18. Safe Operating Area

TO-263-7 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.600	0.169	0.181
A1	1.200	1.400	0.047	0.055
A2	2.400	2.750	0.094	0.108
A3	0.000	0.250	0.000	0.010
b	0.500	0.700	0.020	0.028
b1	0.600	0.900	0.024	0.035
c	0.400	0.600	0.016	0.024
D	8.880	9.280	0.350	0.365
D1	4.650	6.650	0.183	0.262
e	1.270 BSC		0.050 BSC	
E	10.080	10.280	0.397	0.405
E1	6.500	8.300	0.256	0.327
E2	6.820	7.97	0.269	0.314
H	14.800	16.000	0.583	0.630
L	1.900	2.750	0.075	0.108