



Features

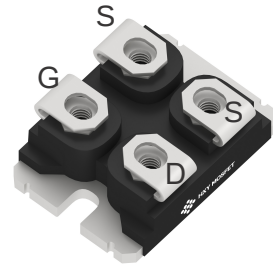
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant

Benefits

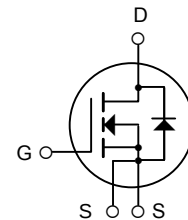
- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

Applications

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High Voltage DC/DC Converters



SOT-227



Ordering Part Number	Package	Brand
STE145N65M5	SOT-227	HXY MOSFET

Maximum Ratings (T_c = 25 °C unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit	Note
V _{DSmax}	Drain-Source Voltage	V _{GS} = 0V, I _D = 100μA	750	V	
V _{GSmax}	Gate-Source voltage	AC (f > 1 Hz)	-10/+25	V	
V _{GSop}	Recommend Gate-Source Voltage	Static	-4/+18	V	
I _D	Continuous Drain current	V _{GS} = 18V, T _C = 25°C	165	A	Fig. 14
		V _{GS} = 18V, T _C = 100°C	117		
I _{D,pulse}	Pulsed Drain Current	Pulse with t _p limited by T _{jmax} at 1 ms Pulse with t _p limited by T _{jmax} at 100 μs	350 703	A	
P _D	Power Dissipation	T _C = 25°C, T _j = 175°C	417	W	Fig.16
T _j	Operating junction temperature		-55~175	°C	
T _{stg}	Storage temperature		-55~175	°C	



Thermal Characteristics

Symbol	Parameter	Value			Unit	Note
		Min.	Typ.	Max.		
$R_{th(jc)}$	Thermal resistance from Junction to Case		0.36		K/W	Fig. 15
$R_{th(ja)}$	Thermal resistance from Junction to Ambient		40		K/W	

Electrical Characteristics (T_c = 25°C unless other wise specified)

Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-Source Breakdown voltage	$V_{GS} = 0V, I_D = 100\mu A$	750			V	
$V_{GS(th)}$	Gate Threshold voltage	$V_{GS} = V_{DS}, I_D = 36mA$		2.7		V	Fig. 9
		$V_{GS} = V_{DS}, I_D = 36mA, T_j = 175^\circ C$		1.8			
I_{GSS}	Gate-Source Leakage current	$V_{GS} = 18V, V_{DS} = 0V$			250	nA	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 750V, V_{GS} = 0V, T_j = 25^\circ C$		1	50	μA	
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 18V, I_D = 80A$		11	15	m Ω	Fig. 3, 4, 5
		$V_{GS} = 18V, I_D = 80A, T_j = 175^\circ C$		15			
g_{fs}	Transconductance	$V_{DS} = 18V, I_D = 80A$		83		S	Fig. 6
		$V_{DS} = 18V, I_D = 80A, T_j = 175^\circ C$		66			



Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Q_{GS}	Gate to Source Charge	$V_{DS} = 400V$ $I_D = 80A$ $V_{GS} = -4V/18V$		125		nC	Fig. 10
Q_{GD}	Gate to Drain Charge			52			
Q_G	Total Gate Charge			268			

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 600V$ $f = 1\text{ MHz}$ $V_{AC} = 25mV$		6220		pF	Fig. 13
C_{oss}	Output Capacitance			482		pF	
C_{rss}	Reverse Transfer Capacitance			37		pF	
$R_{G(int)}$	Internal Gate Resistance	$f = 1\text{ MHz}, V_{AC} = 25mV$		1		Ω	



Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V_{SD}	Diode Forward Voltage	$V_{GS} = -4V, I_{SD} = 20A$		3.5		V	Fig. 7,8
		$V_{GS} = -4V, I_{SD} = 20A, T_j = 175^{\circ}C$		3.1			
I_S	Continuous Diode Forward Current	$V_{GS} = -4V, T_C = 25^{\circ}C$		103		A	
$I_{S, pulse}$	Diode pulse Current	$V_{GS} = -4V$, pulse width t_p limited by T_{jmax}		350		A	

Module Characteristic

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V_{ISOL}	Isolation Test Voltage	RMS, $f = 50Hz$, $t = 60sec$, $I_{ISOL} \leq 10mA$		4.3		kV	
T_{STG}	Storage Temperature		-55		150	$^{\circ}C$	
M	Terminal Connection Torque	Screw M4	1		1.5	Nm	
	Mounting Torque	Screw M4	1		1.5		
G	Weight of Module			29		g	
	Creepage Distance	Terminal to Heatsink		11.5		mm	
		Terminal to Terminal		12			
	Clearance Distance	Terminal to Heatsink		9.6		mm	
		Terminal to Terminal		7			



Typical Performance

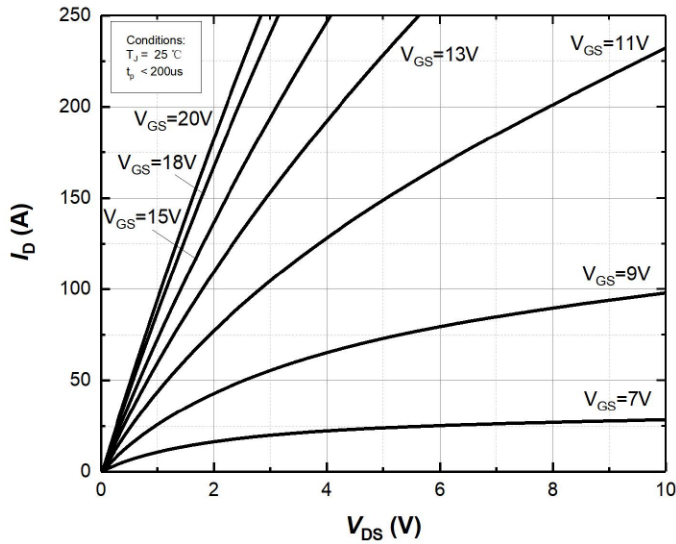


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

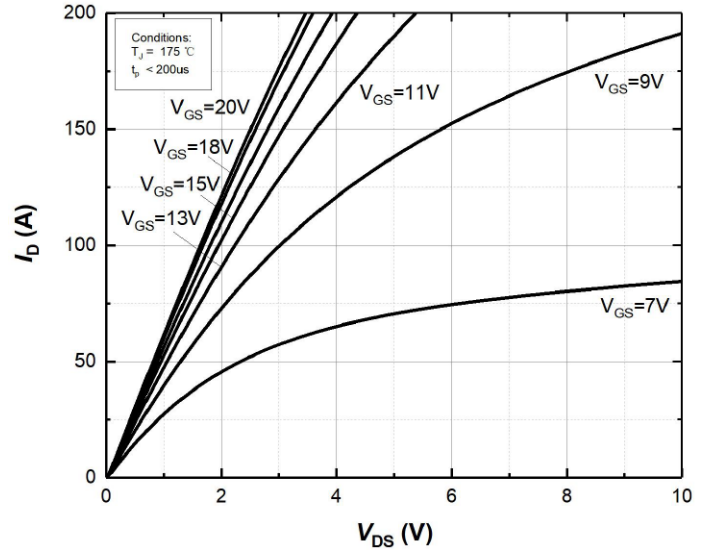


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

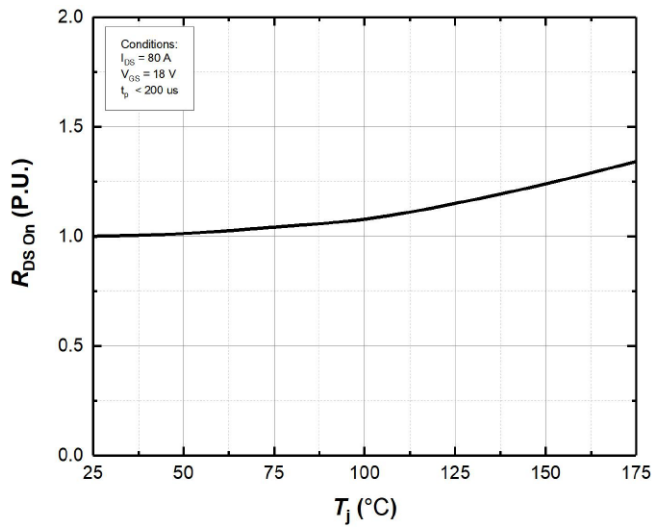


Figure 3. Normalized On-Resistance vs. Temperature

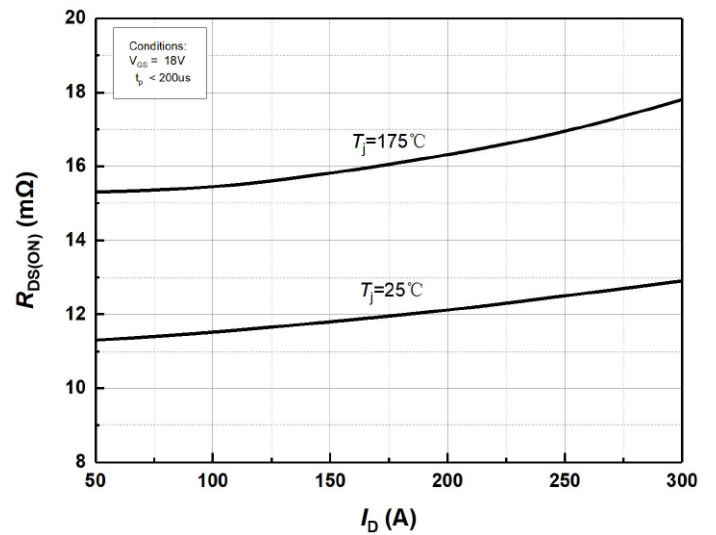


Figure 4. On-Resistance vs. Drain current for Various Temperature

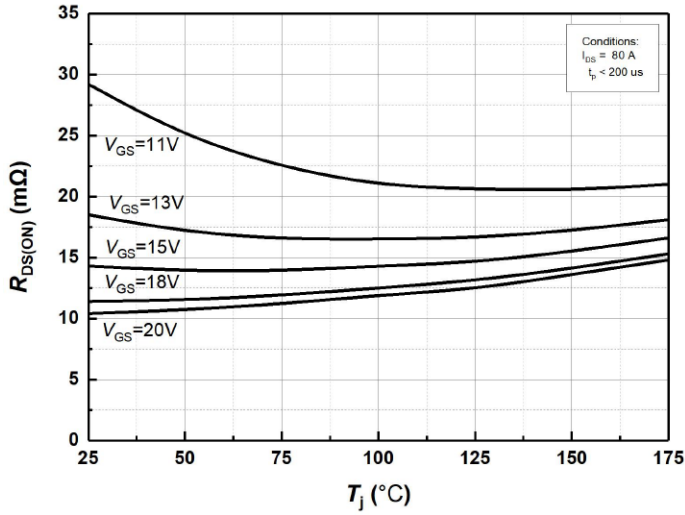


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

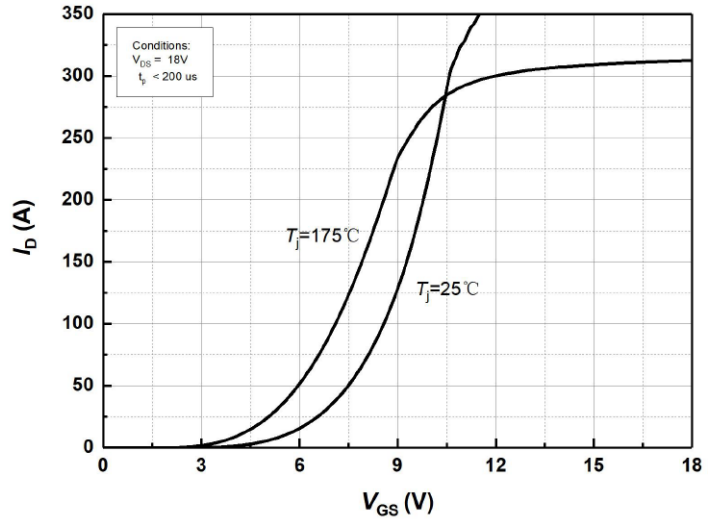


Figure 6. Transfer Characteristics for Various Junction Temperatures

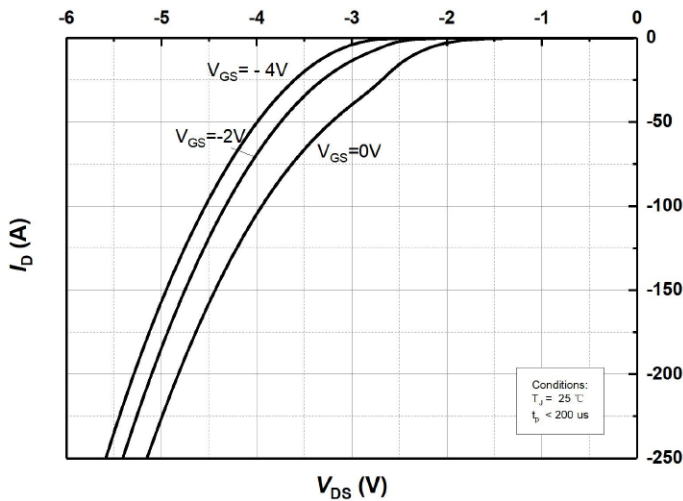


Figure 7. Body Diode Characteristics at $T_J=25^{\circ}C$

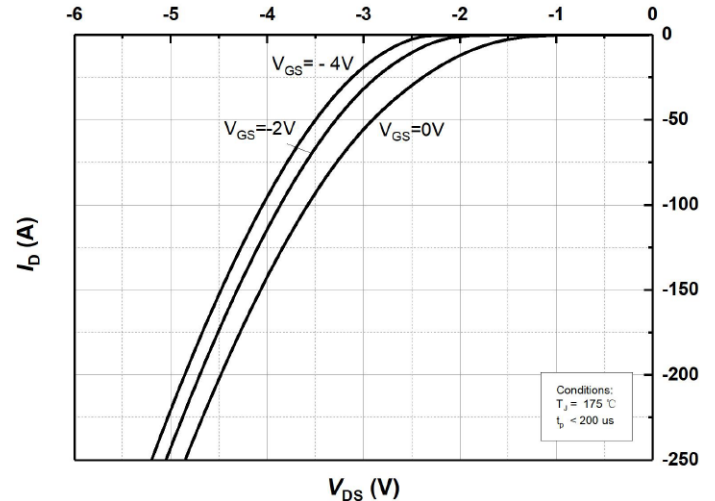


Figure 8. Body Diode Characteristics at $T_J=175^{\circ}C$

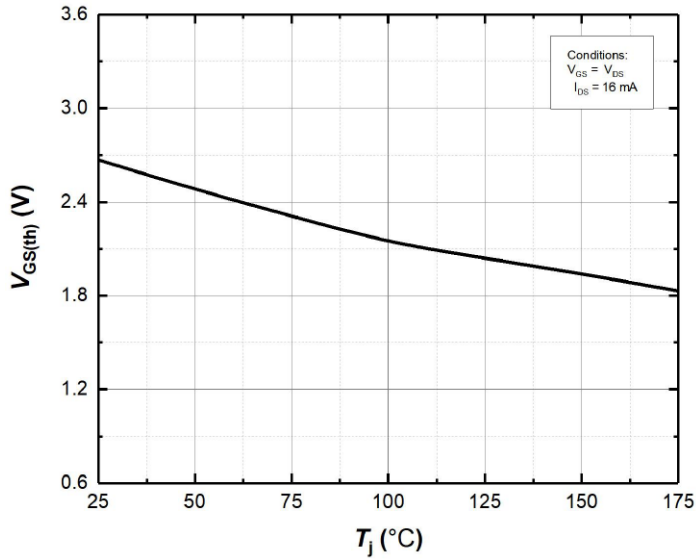


Figure 9. Threshold Voltage vs. Temperature

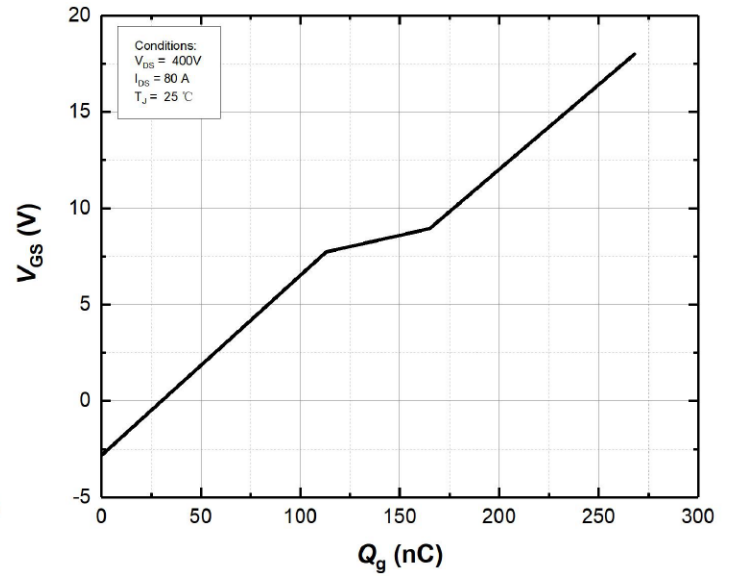


Figure 10 Gate Charge Characteristics

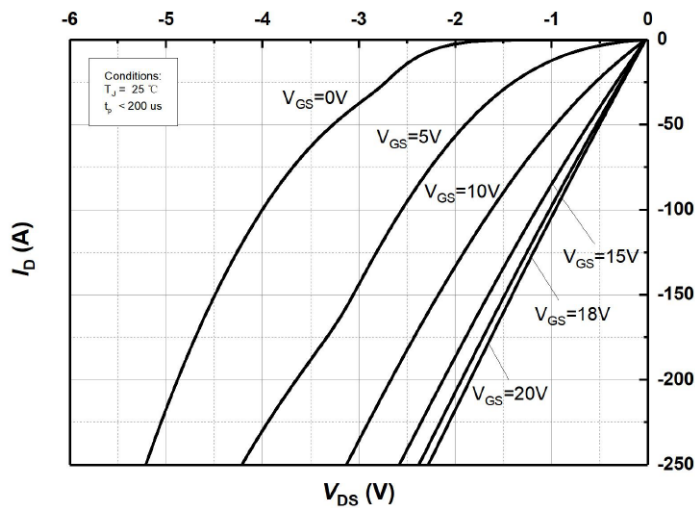


Figure 11. 3rd Quadrant Characteristic at $T_J=25\text{ °C}$

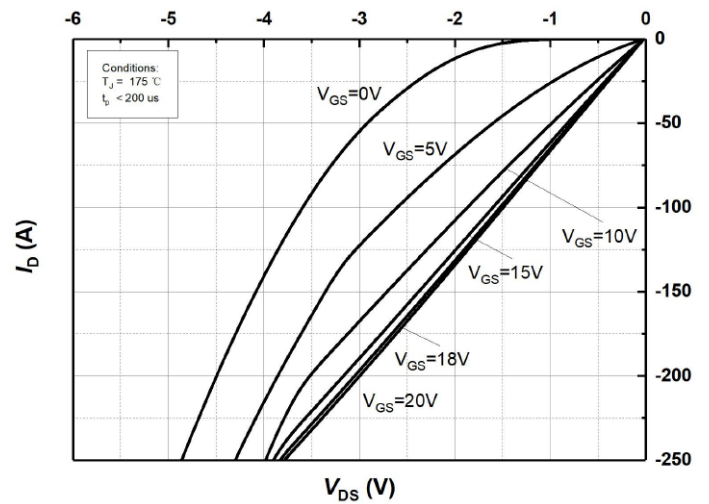


Figure 12. 3rd Quadrant Characteristic at $T_J=175\text{ °C}$

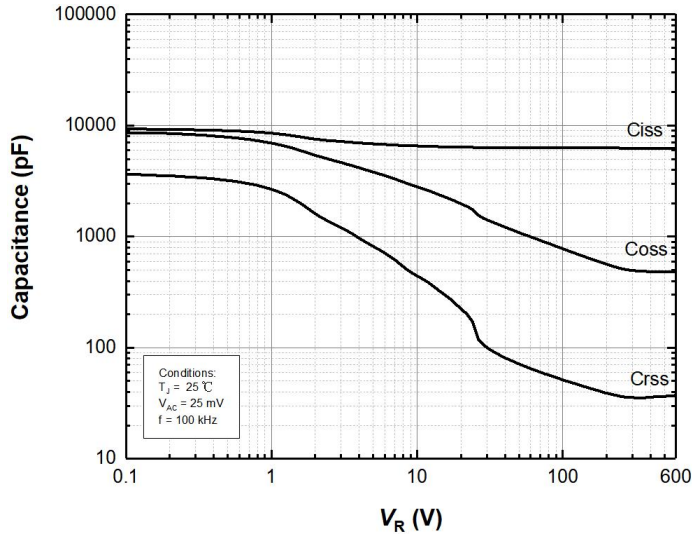


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

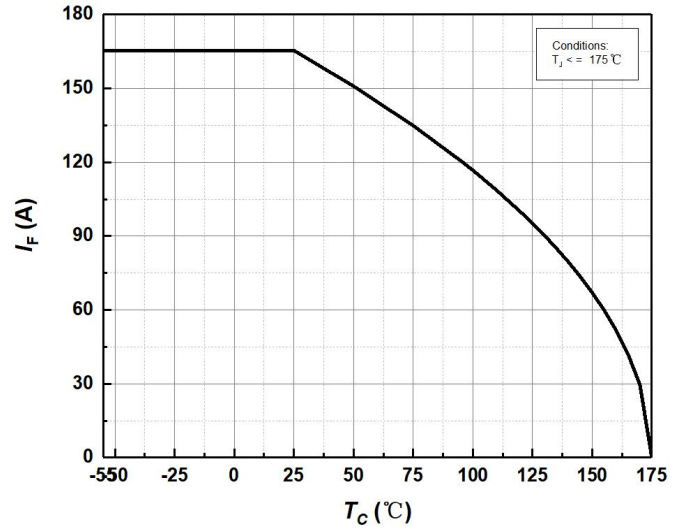


Figure 14. Continuous Drain Current Derating vs Case Temperature

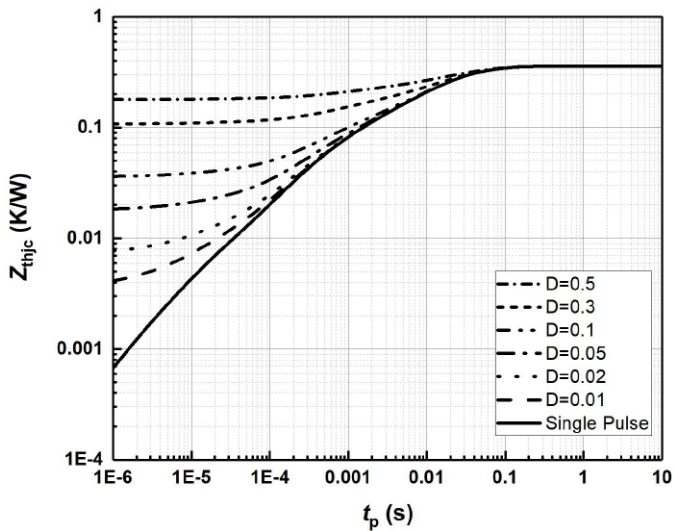


Figure 15. Transient Thermal Impedance (Junction – Case)

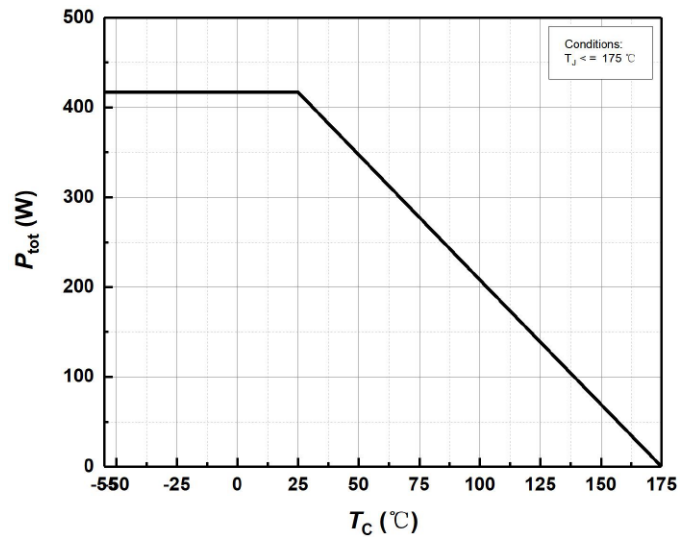


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

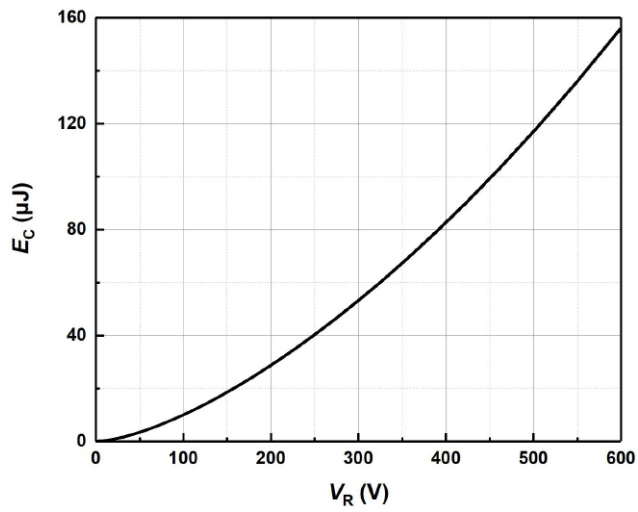


Figure 17. Output Capacitor Stored Energy

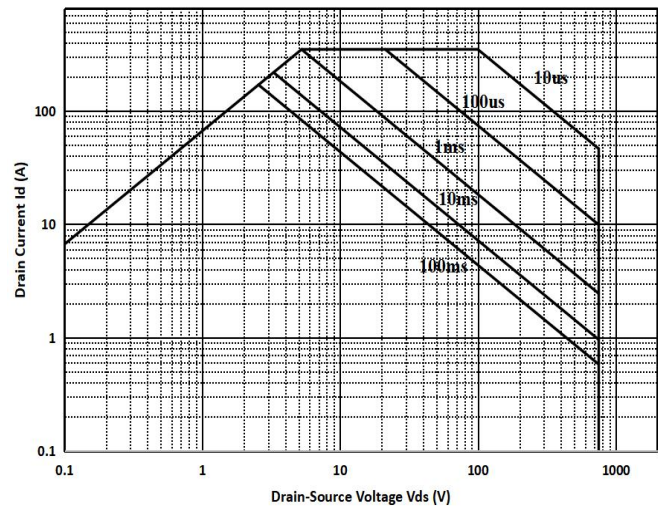
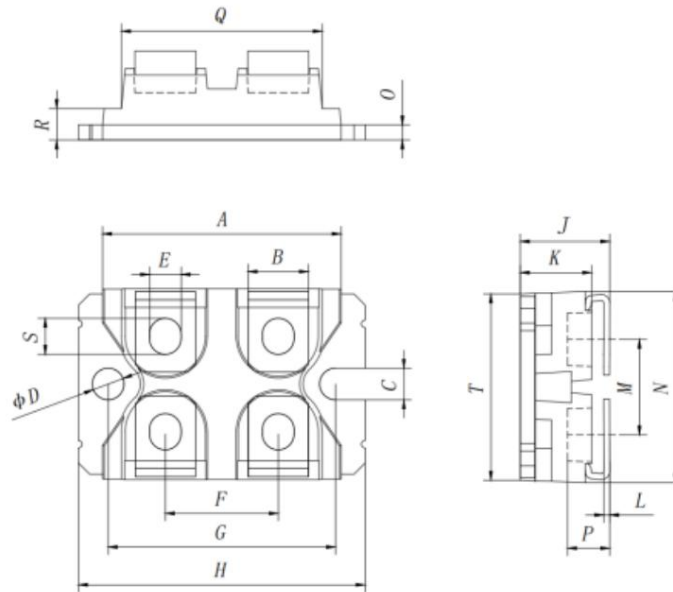


Figure 18. Safe Operating Area



Package Dimensions

Package SOT-227



SYMBOLS	DIMENSION IN MM		
	MIN	NOM	MAX
A	31.60	31.80	32.60
B	7.90	8.10	8.30
C	4.10	4.20	4.30
D	4.10	4.20	4.30
E	4.10	4.20	4.30
F	14.80	15.00	15.20
G	30.00	30.20	30.40
H	37.90	38.10	38.30
J	11.75	11.95	12.15
K	9.40	9.60	9.80
L	0.75	0.80	0.85
M	12.40	12.70	13.00
N	25.50	25.70	25.90
O	1.90	2.00	2.10
P	5.30	5.60	5.90
Q	26.50	26.70	27.20
R	3.90	4.20	4.50
S	4.55	4.75	4.95
T	24.70	25.00	25.30



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