

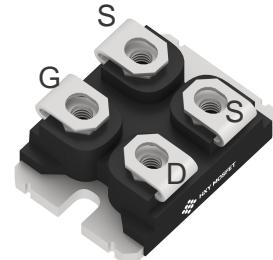


## Features

- 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

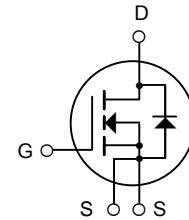
- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements



SOT-227

## Applications

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



Ordering Part Number	Package	Brand
IXFN170N65X2	SOT-227	HXY MOSFET

## Maximum Ratings ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit	Note
$V_{DSmax}$	Drain-Source Voltage	$V_{GS} = 0\text{V}$ , $I_D = 100\mu\text{A}$	750	V	
$V_{GSmax}$	Gate-Source voltage	AC ( $f > 1\text{ Hz}$ )	-10/+25	V	
$V_{GSop}$	Recommend Gate-Source Voltage	Static	-4/+18	V	
$I_D$	Continuous Drain current	$V_{GS} = 18\text{V}$ , $T_C = 25^\circ\text{C}$	165	A	Fig. 14
		$V_{GS} = 18\text{V}$ , $T_C = 100^\circ\text{C}$	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 $\mu\text{s}$	350 703	A	
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	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** ( $T_c = 25^\circ\text{C}$  unless otherwise specified)

### Static Characteristics

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



### Gate Charge Characteristics

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

### AC Characteristics

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



### 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	$V_{GS} = -4V, \text{pulse width } t_p \text{ limited by } T_{jmax}$		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	°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

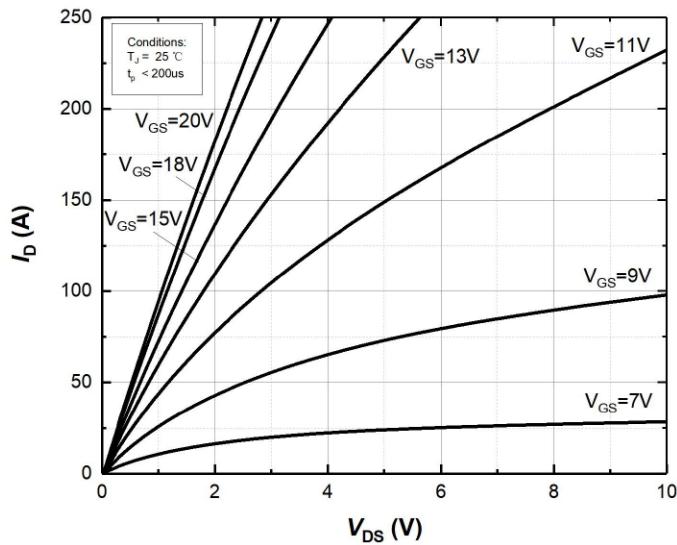


Figure 1. Output characteristics at  $T_j=25^\circ\text{C}$

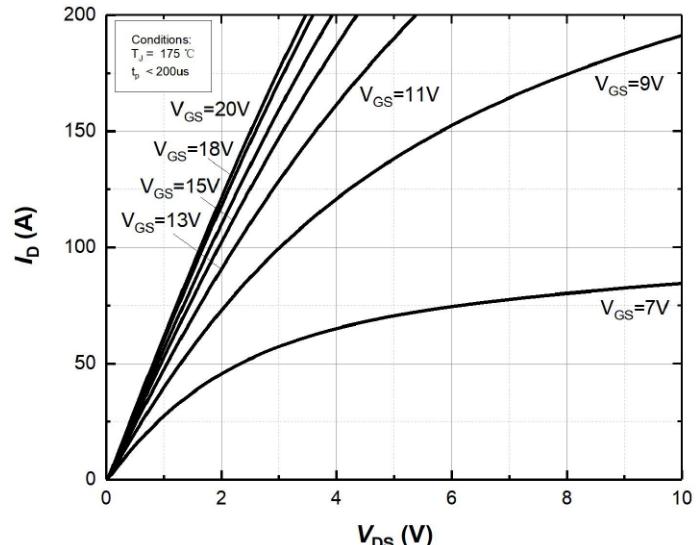


Figure 2. Output characteristics at  $T_j=175^\circ\text{C}$

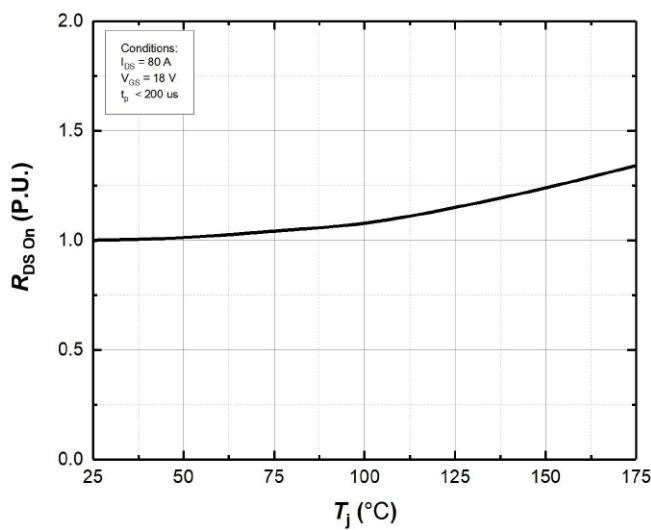


Figure 3. Normalized On-Resistance vs. Temperature

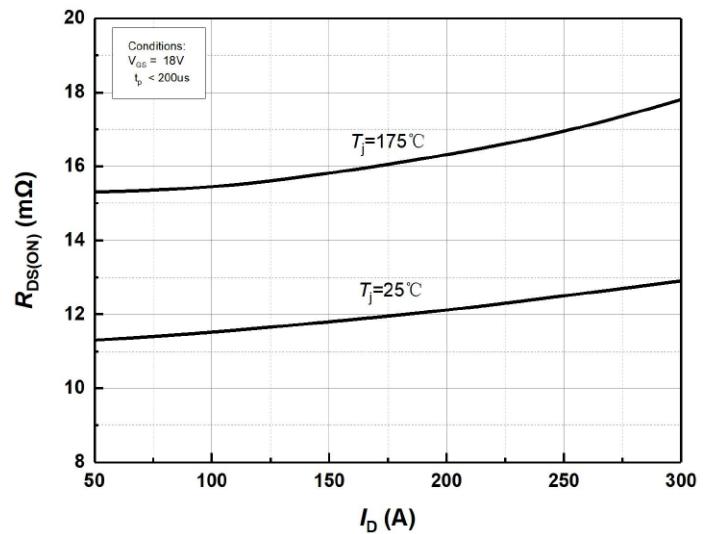


Figure 4. On-Resistance vs. Drain current for Various Temperature

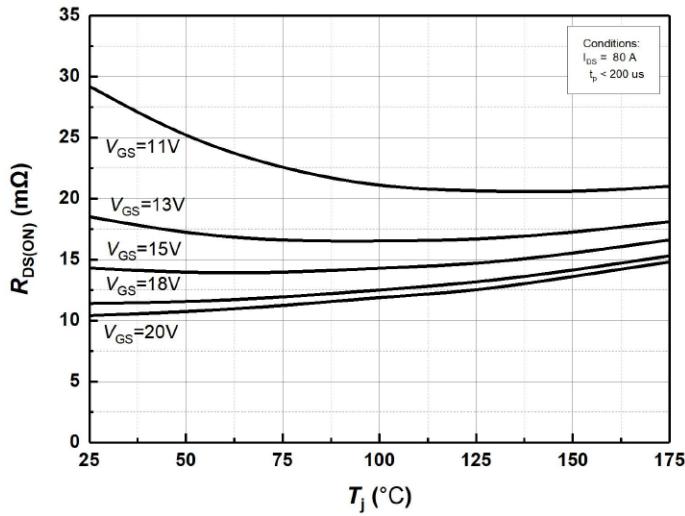


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

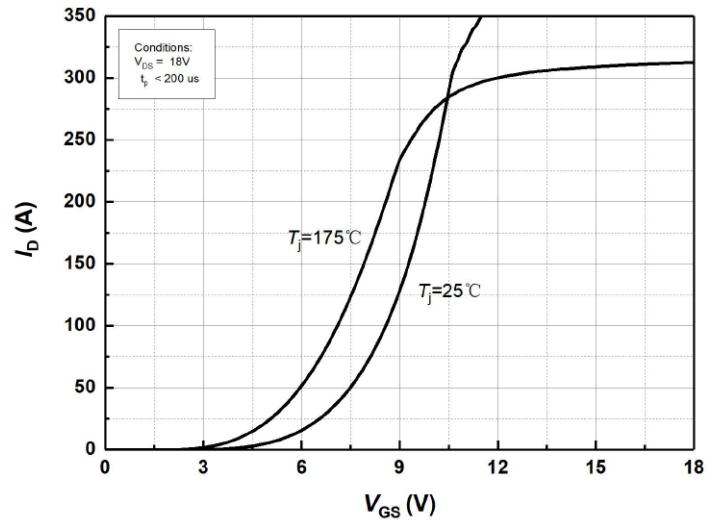


Figure 6. Transfer Characteristics for Various Junction Temperatures

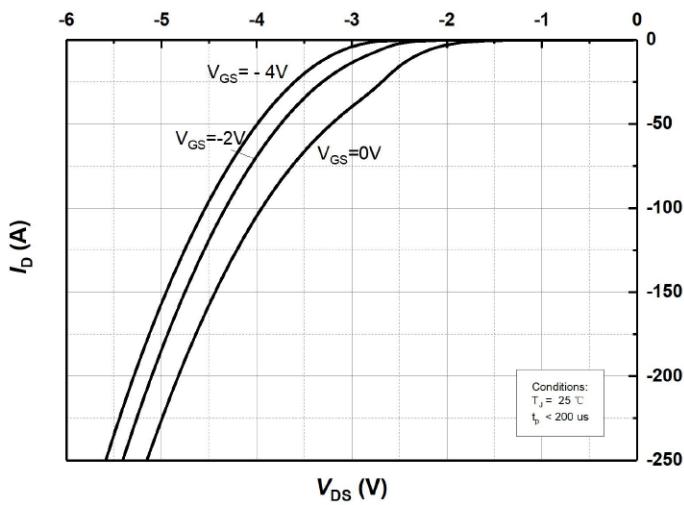


Figure 7. Body Diode Characteristics at  $T_j=25$  °C

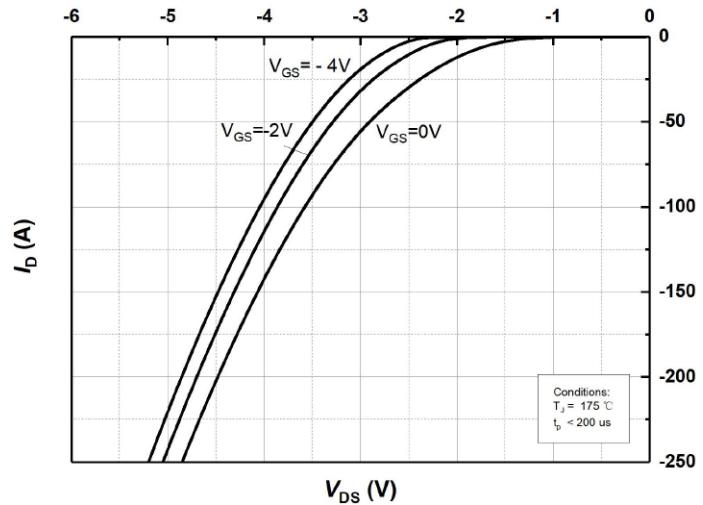


Figure 8. Body Diode Characteristics at  $T_j=175$  °C

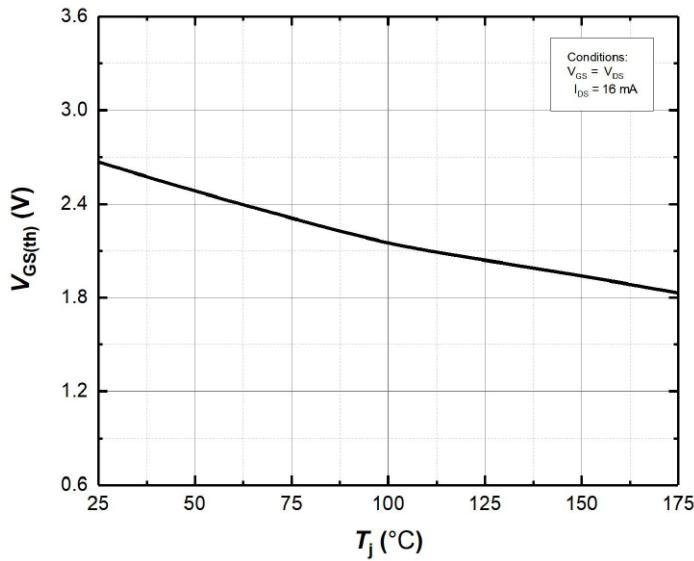


Figure 9. Threshold Voltage vs. Temperature

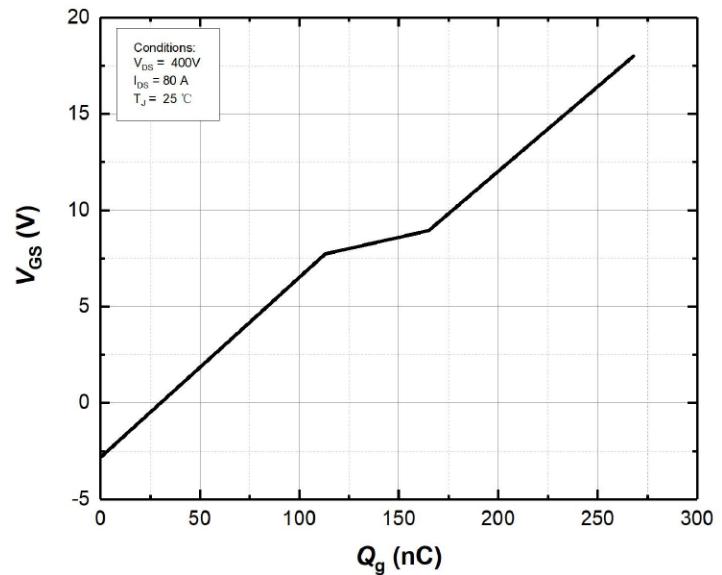


Figure 10 Gate Charge Characteristics

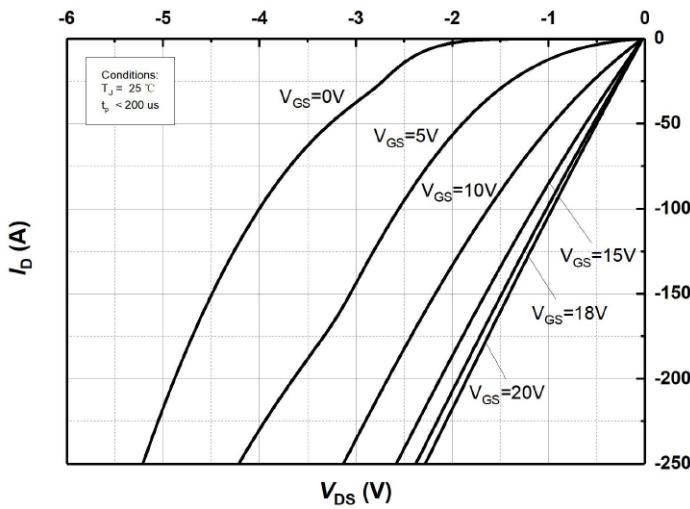


Figure 11. 3rd Quadrant Characteristic at  $T_j=25^\circ\text{C}$

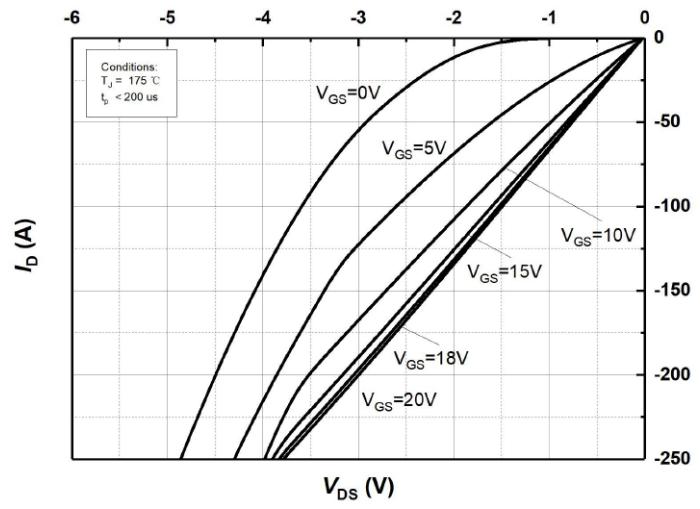


Figure 12. 3rd Quadrant Characteristic at  $T_j=175^\circ\text{C}$

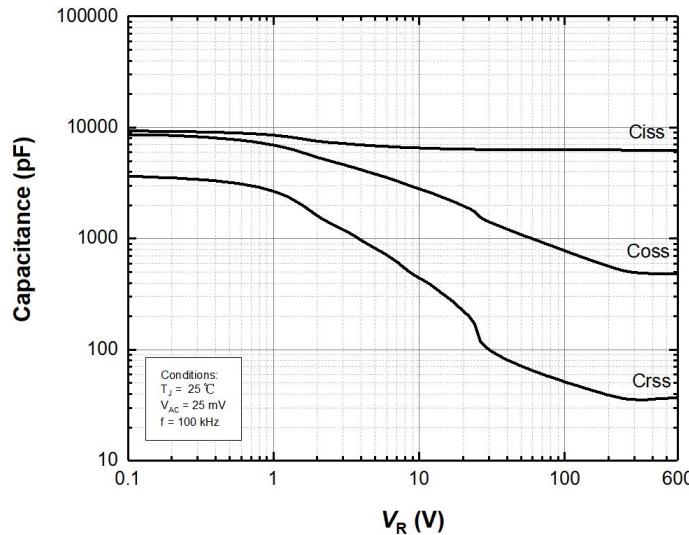


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

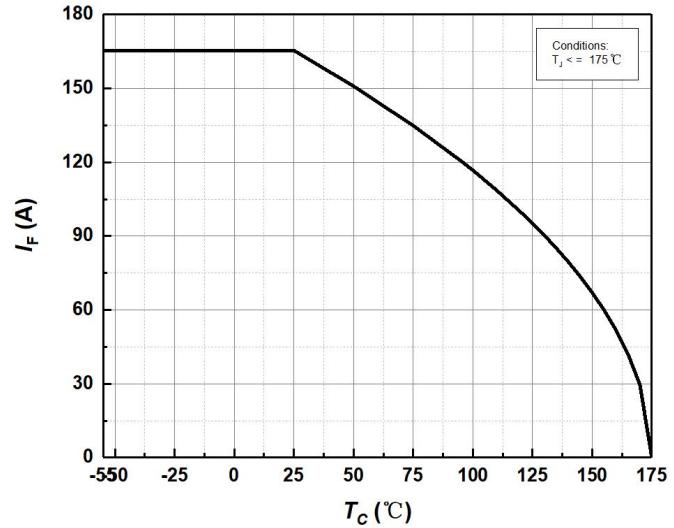


Figure 14. Continuous Drain Current Derating vs Case Temperature

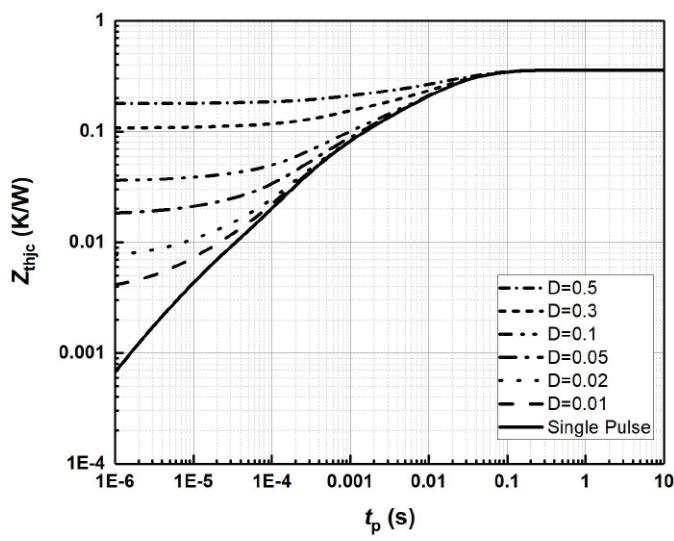


Figure 15. Transient Thermal Impedance (Junction – Case)

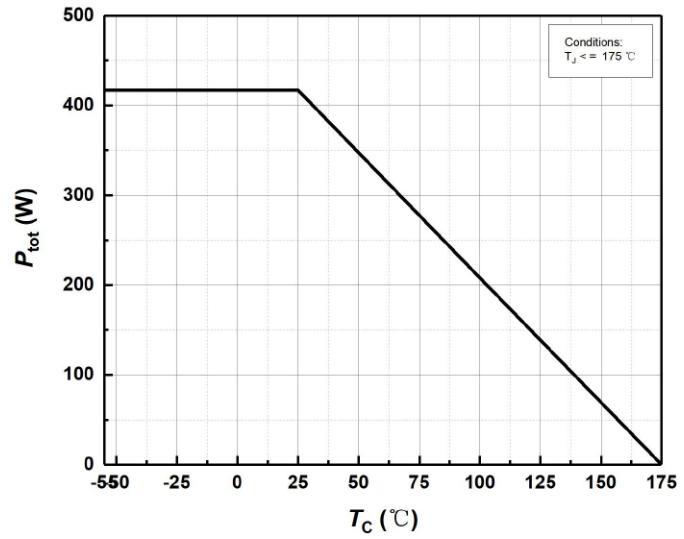


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

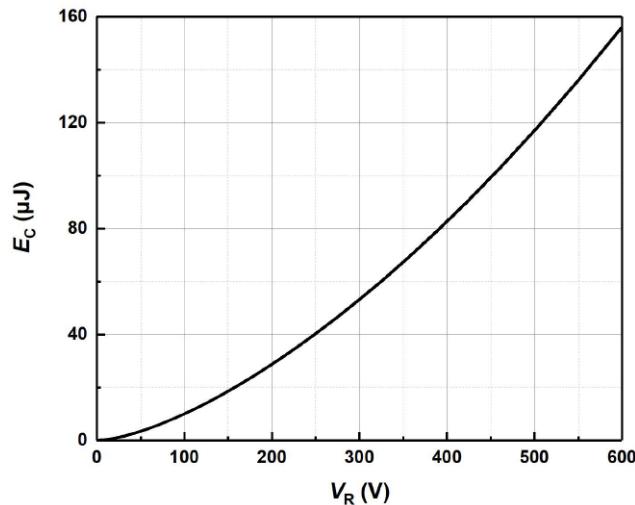


Figure 17. Output Capacitor Stored Energy

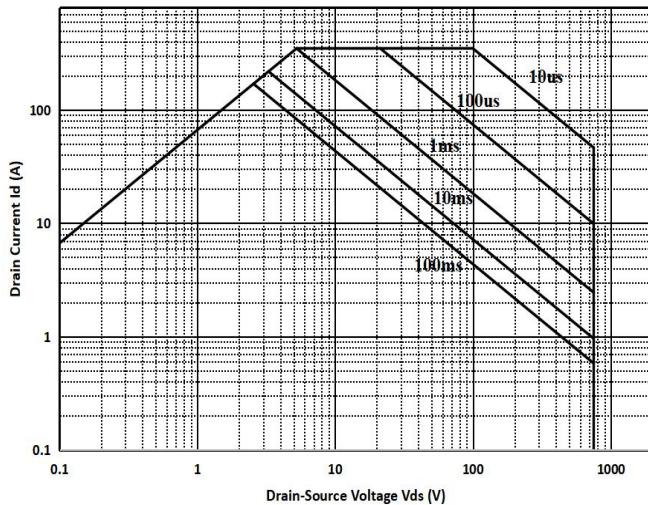
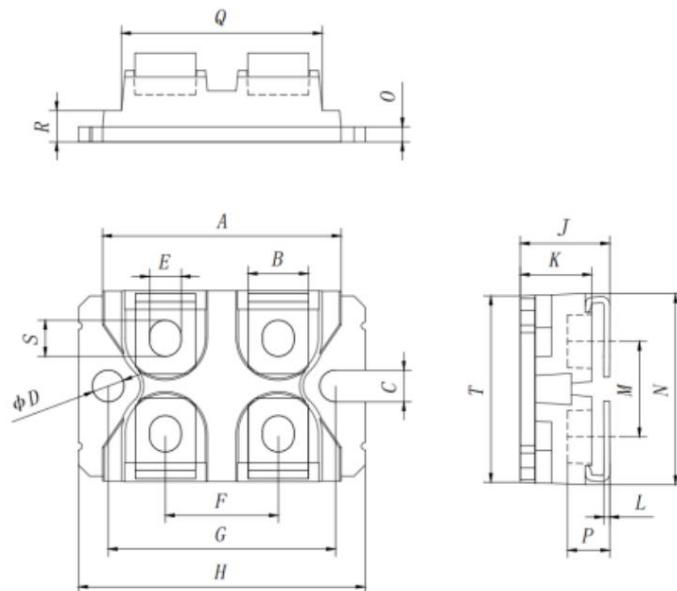


Figure 18. Safe Operating Area



## 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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