

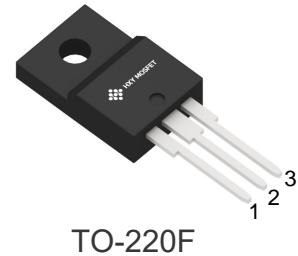


## Features

- 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

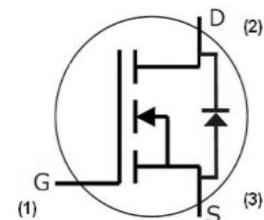
## Benefits

- 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



Ordering Part Number	Package	Brand
STF35N65DM2	TO-220F	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	$V_{GS} = 0\text{V}$ , $I_D = 100\mu\text{A}$	650	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	$V_{GS} = 18\text{V}$ , $T_C = 25^\circ\text{C}$	18	A	Fig. 14
		$V_{GS} = 18\text{V}$ , $T_C = 100^\circ\text{C}$	13		
$I_{D,pulse}$	Pulsed Drain Current	Pulse with $t_p$ limited by $T_{jmax}$	28	A	
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	43	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		3.46		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	$V_{GS} = 0\text{V}, I_D = 100\mu\text{A}$	650			V	
$V_{GS(th)}$	Gate Threshold voltage	$V_{GS} = V_{DS}, I_D = 5\text{mA}$		2.7		V	Fig. 9
		$V_{GS} = V_{DS}, I_D = 5\text{mA}, T_j = 175^\circ\text{C}$		1.8			
$I_{GSS}$	Gate-Source Leakage current	$V_{GS} = 20\text{V}, V_{DS} = 0\text{V}$			250	nA	
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 650\text{V}, V_{GS} = 0\text{V}, T_j = 25^\circ\text{C}$		1	50	$\mu\text{A}$	
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 18\text{V}, I_D = 10\text{A}$ $V_{GS} = 20\text{V}, I_D = 10\text{A}$		105 94	150	$\text{m}\Omega$	Fig. 3, 4, 5
		$V_{GS} = 18\text{V}, I_D = 10\text{A}, T_j = 175^\circ\text{C}$ $V_{GS} = 20\text{V}, I_D = 10\text{A}, T_j = 175^\circ\text{C}$		140 130			
$g_{fs}$	Transconductance	$V_{DS} = 20\text{V}, I_D = 10\text{A}$		13		S	Fig. 6
		$V_{DS} = 20\text{V}, I_D = 10\text{A}, T_j = 175^\circ\text{C}$		9			



### Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Q <sub>GS</sub>	Gate to Source Charge	$V_{DS} = 400V$ $I_D = 10A$ $V_{GS} = -4V/18V$		8.3		nC	Fig. 10
Q <sub>GD</sub>	Gate to Drain Charge			12.1			
Q <sub>G</sub>	Total Gate Charge			35.8			

### AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
C <sub>iss</sub>	Input Capacitance	$V_{GS} = 0V, V_{DS} = 600V$ $f = 1 MHz$ $V_{AC} = 25mV$		767		pF	Fig. 13
C <sub>oss</sub>	Output Capacitance			55		pF	
C <sub>rss</sub>	Reverse Transfer Capacitance			7		pF	
R <sub>G(int)</sub>	Internal Gate Resistance	f=1 MHz, V <sub>AC</sub> = 25mV		2.8		Ω	

### Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V <sub>SD</sub>	Diode Forward Voltage	$V_{GS} = -5V, I_{SD} = 7.5A$		4.0		V	Fig. 7,8
		$V_{GS} = -5V, I_{SD} = 7.5A, T_j = 175^\circ C$		3.5			
I <sub>S</sub>	Continuous Diode Forward Current	$V_{GS} = -5V, T_c = 25^\circ C$		10		A	
I <sub>S, pulse</sub>	Diode pulse Current	$V_{GS} = -5V$ , pulse width t <sub>p</sub> limited by T <sub>jmax</sub>		28		A	



## Typical Performance

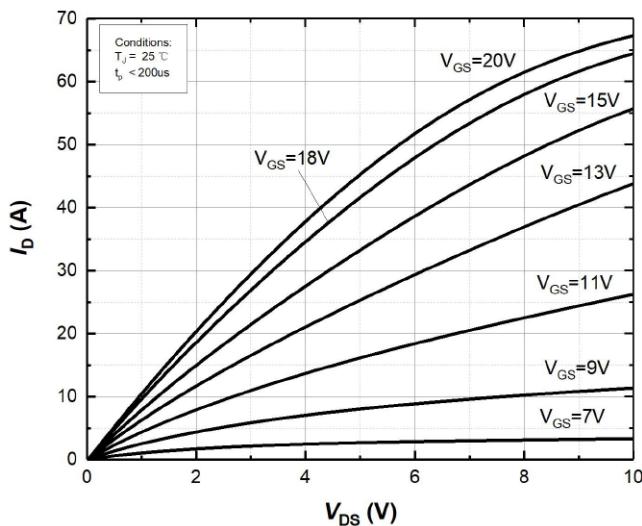


Figure 1. Output characteristics at  $T_j=25^\circ\text{C}$

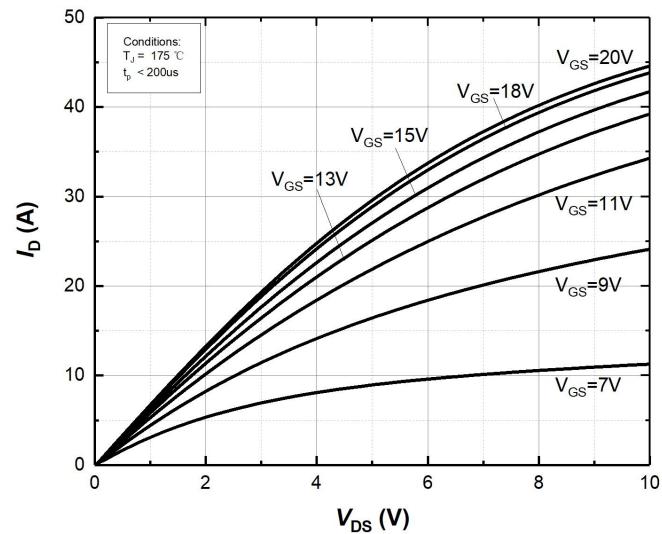


Figure 2. Output characteristics at  $T_j=175^\circ\text{C}$

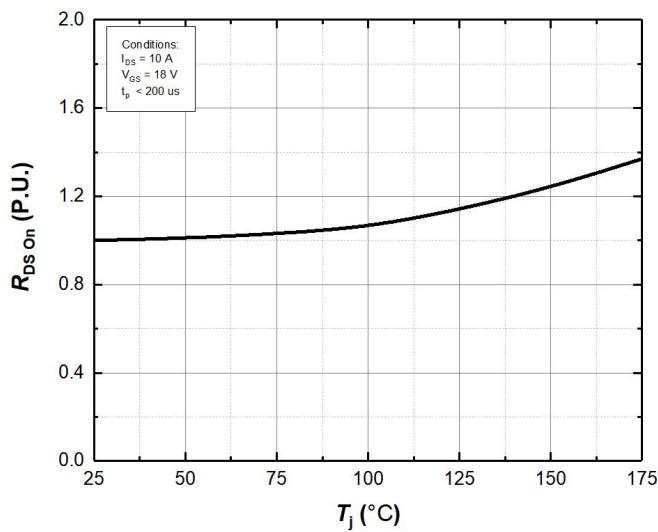


Figure 3. Normalized On-Resistance vs. Temperature

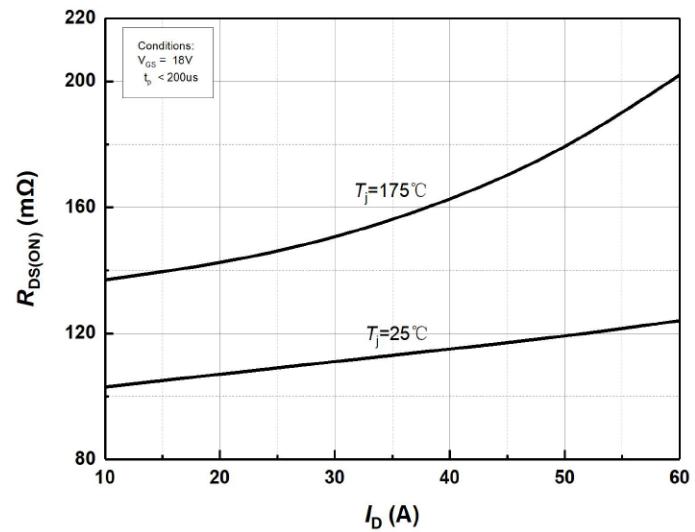


Figure 4. On-Resistance vs. Drain current for Various Temperature

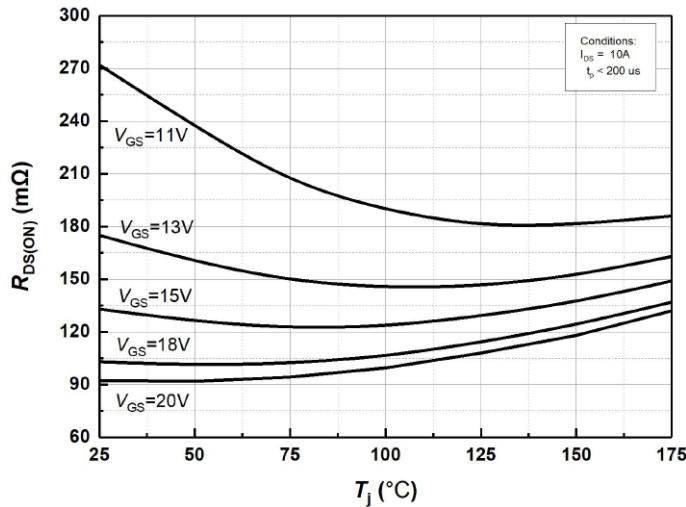


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

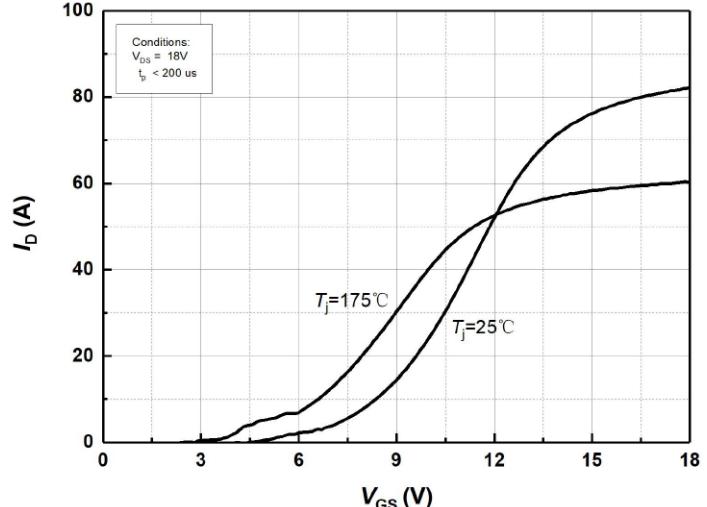


Figure 6. Transfer Characteristics for Various Junction Temperatures

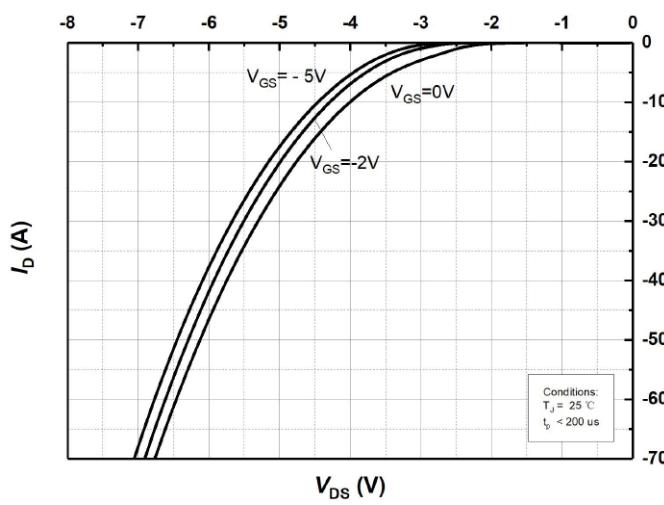


Figure 7. Body Diode Characteristics at  $T_J=25^\circ\text{C}$

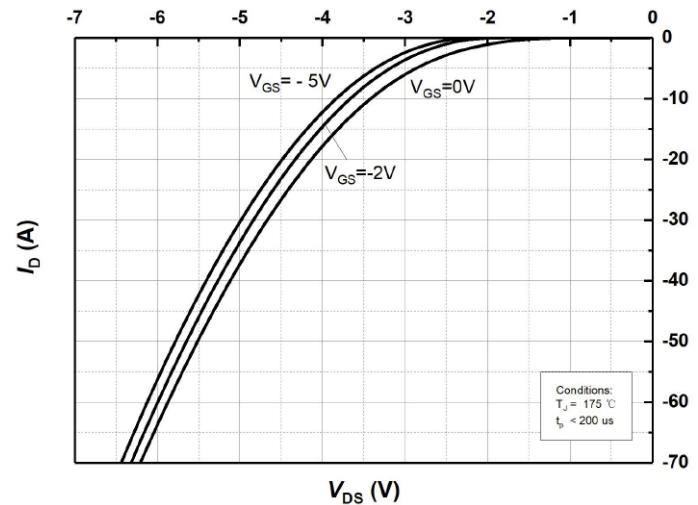
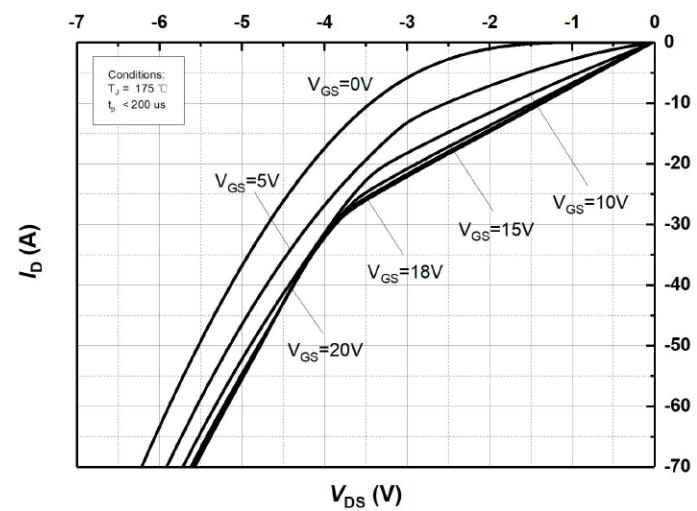
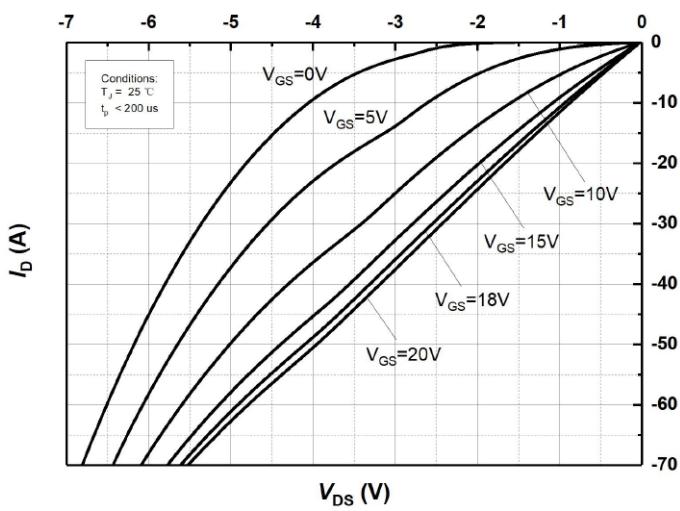
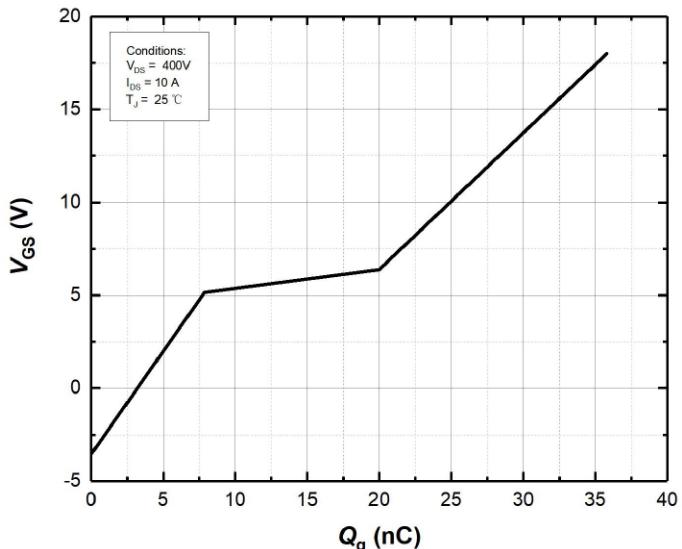
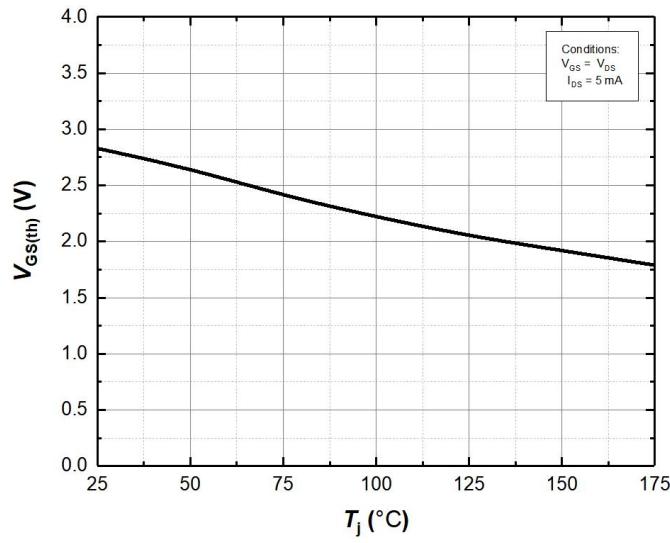


Figure 8. Body Diode Characteristics at  $T_J=175^\circ\text{C}$



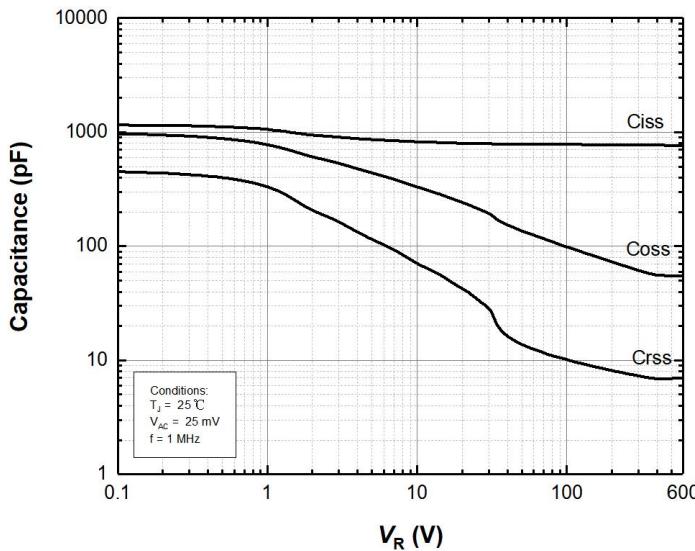


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

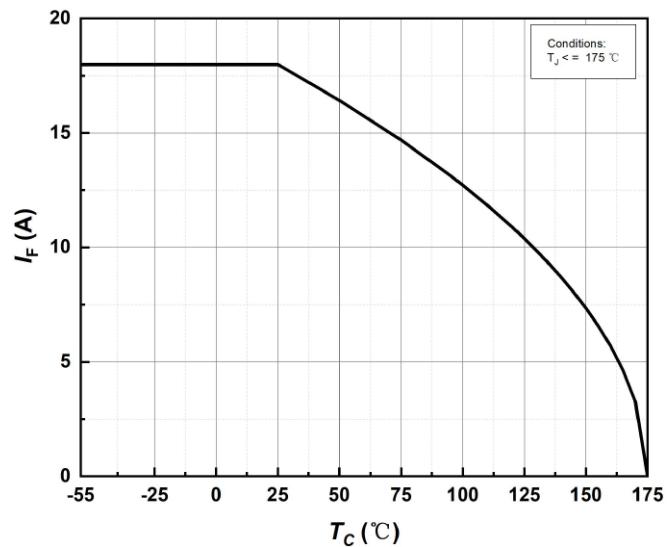


Figure 14. Continuous Drain Current Derating vs Case Temperature

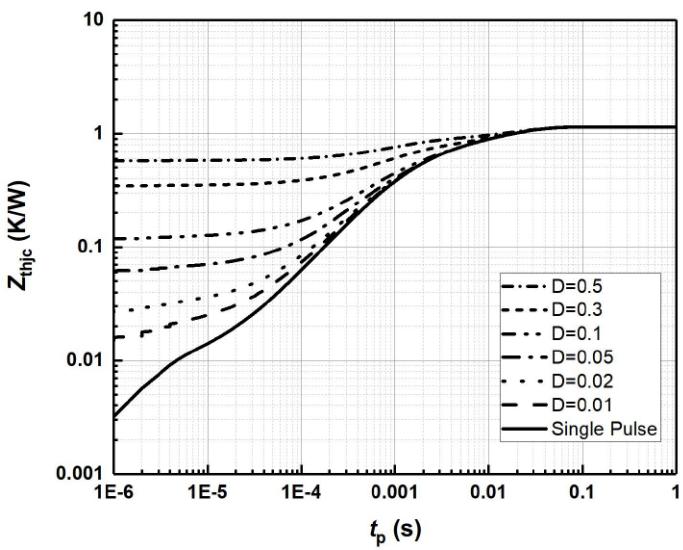


Figure 15. Transient Thermal Impedance (Junction – Case)

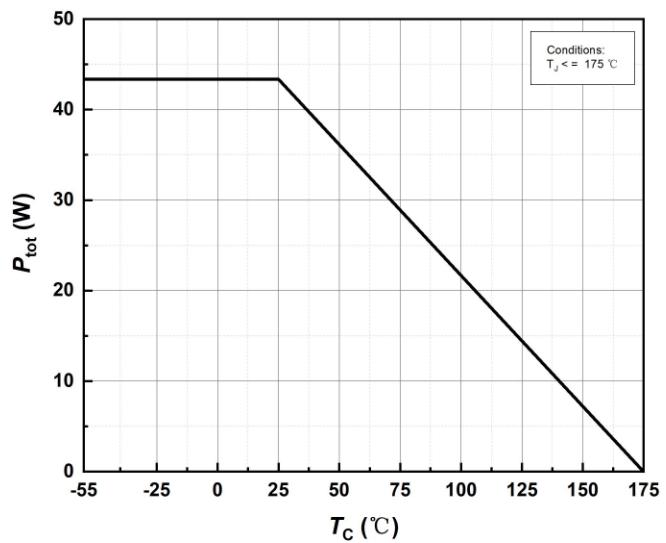


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

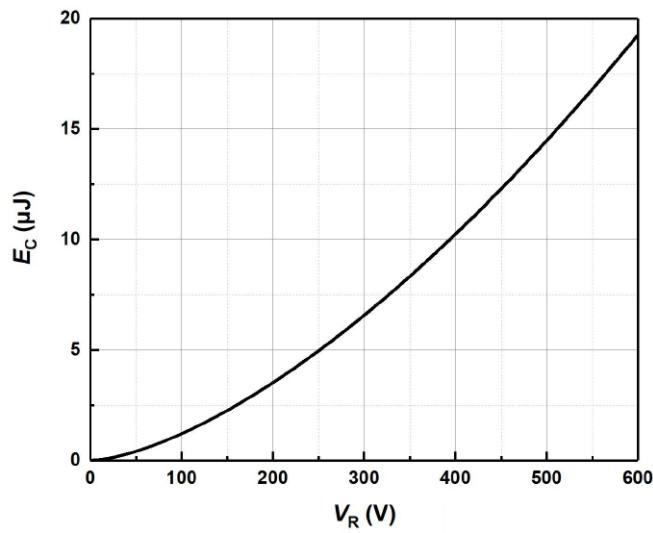


Figure 17. Output Capacitor Stored Energy

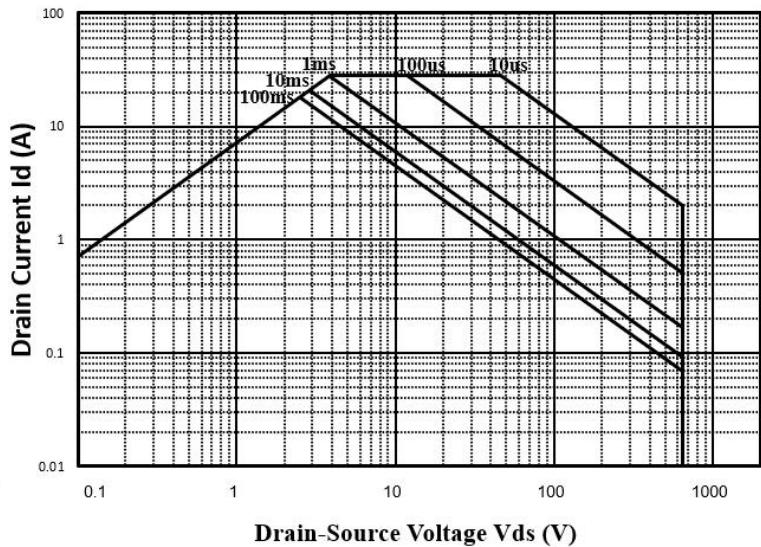
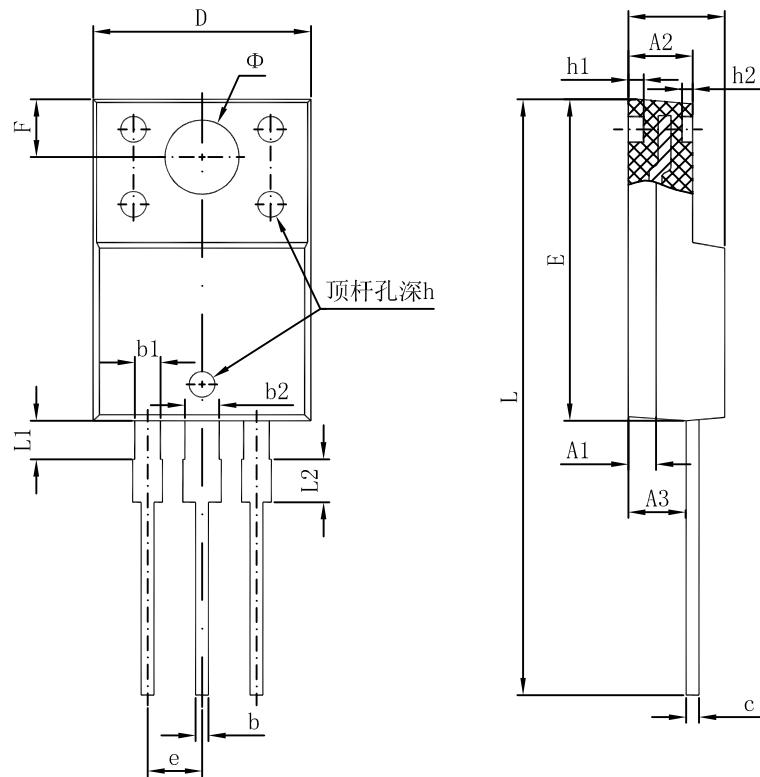


Figure 18. Safe Operating Area



## Package Dimensions

Package TO-220F



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300	REF.	0.051	REF.
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700		REF. 0.106	
Φ	3.500		REF. 0.138	
h	0.000	0.300	0.000	0.012
h1	0.800		REF. 0.031	
h2	0.500		REF. 0.020	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083



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