



### Features

- 650-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on  $V_F$

### Benefits

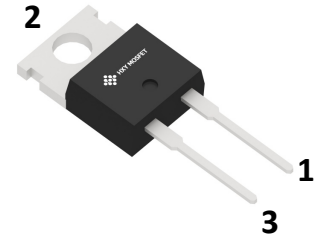
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

### Applications

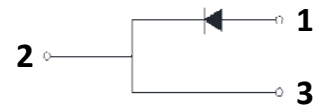
- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives



Part Number	Package	Brand
IDT10S60C	TO-220C-2L	HXY MOSFET



TO-220C-2L



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

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{RRM}$	Repetitive Peak Reverse Voltage	650	V		
$V_{RSM}$	Surge Peak Reverse Voltage	650	V		
$V_{DC}$	DC Blocking Voltage	650	V		
$I_F$	Continuous Forward Current	30 14.5 10	A	$T_C=25^\circ\text{C}$ $T_C=135^\circ\text{C}$ $T_C=153^\circ\text{C}$	Fig. 3
$I_{FRM}$	Repetitive Peak Forward Surge Current	46 31	A	$T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave $T_C=110^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave	
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	90 71	A	$T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave $T_C=110^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave	Fig. 8
$I_{FMax}$	Non-Repetitive Peak Forward Surge Current	860 680	A	$T_C=25^\circ\text{C}$ , $t_p = 10$ $\mu\text{s}$ , Pulse $T_C=110^\circ\text{C}$ , $t_p = 10$ $\mu\text{s}$ , Pulse	Fig. 8
$P_{tot}$	Power Dissipation	136.5 59	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$	Fig. 4
$T_J, T_{stg}$	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	



### Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_F$	Forward Voltage	1.5 2.0	1.8 2.4	V	$I_F = 10\text{ A}$ , $T_J = 25^\circ\text{C}$ $I_F = 10\text{ A}$ , $T_J = 175^\circ\text{C}$	Fig. 1
$I_R$	Reverse Current	12 24	60 220	$\mu\text{A}$	$V_R = 650\text{ V}$ , $T_J = 25^\circ\text{C}$ $V_R = 650\text{ V}$ , $T_J = 175^\circ\text{C}$	Fig. 2
$Q_C$	Total Capacitive Charge	24		nC	$V_R = 400\text{ V}$ , $I_F = 10\text{ A}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	460.5 44 40		pF	$V_R = 0\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 200\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 400\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$	Fig. 6
$E_C$	Capacitance Stored Energy	3.6		$\mu\text{J}$	$V_R = 400\text{ V}$	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

### Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.1	$^\circ\text{C}/\text{W}$	Fig. 9

### Typical Performance

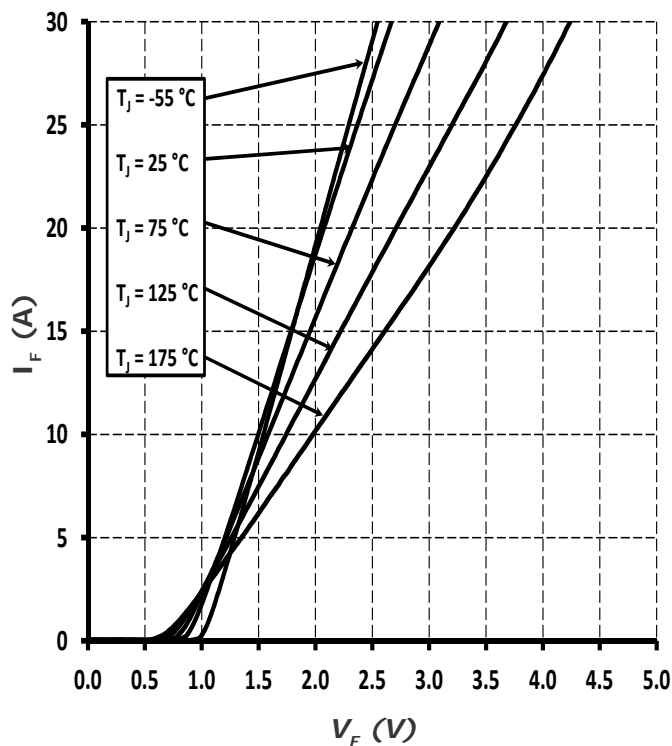


Figure 1. Forward Characteristics

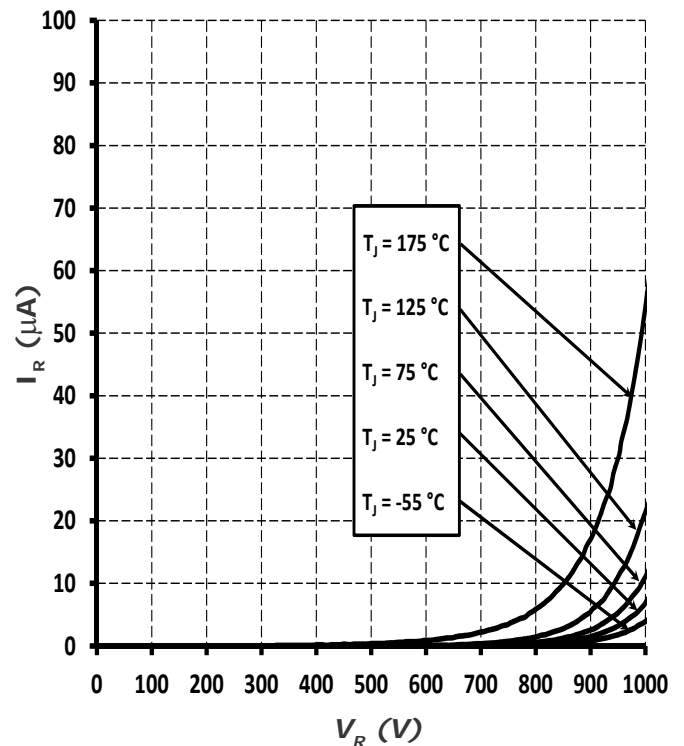


Figure 2. Reverse Characteristics



### Typical Performance

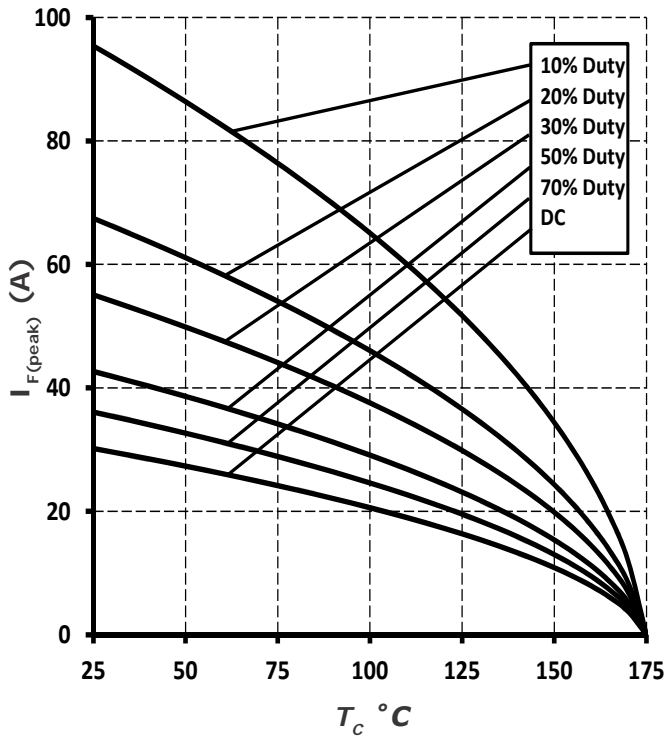


Figure 3. Current Derating

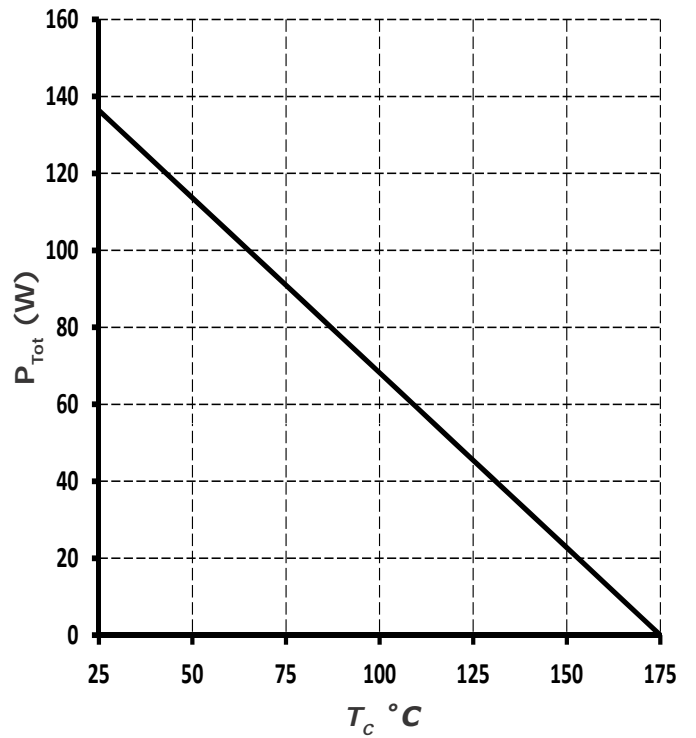


Figure 4. Power Derating

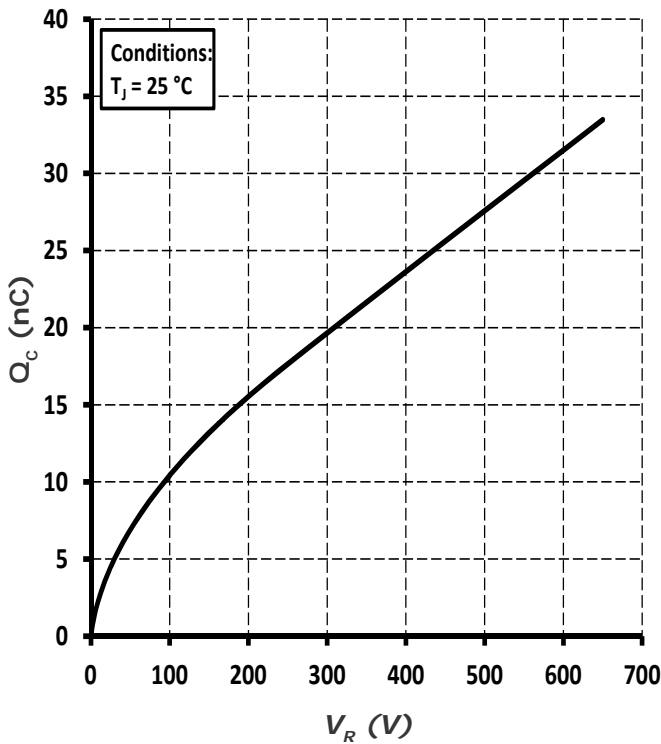


Figure 5. Total Capacitance Charge vs. Reverse Voltage

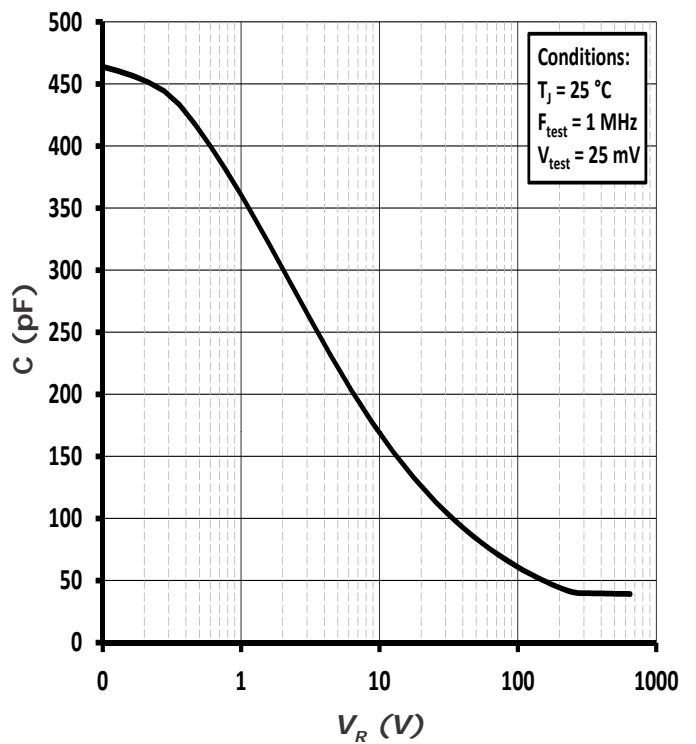


Figure 6. Capacitance vs. Reverse Voltage



### Typical Performance

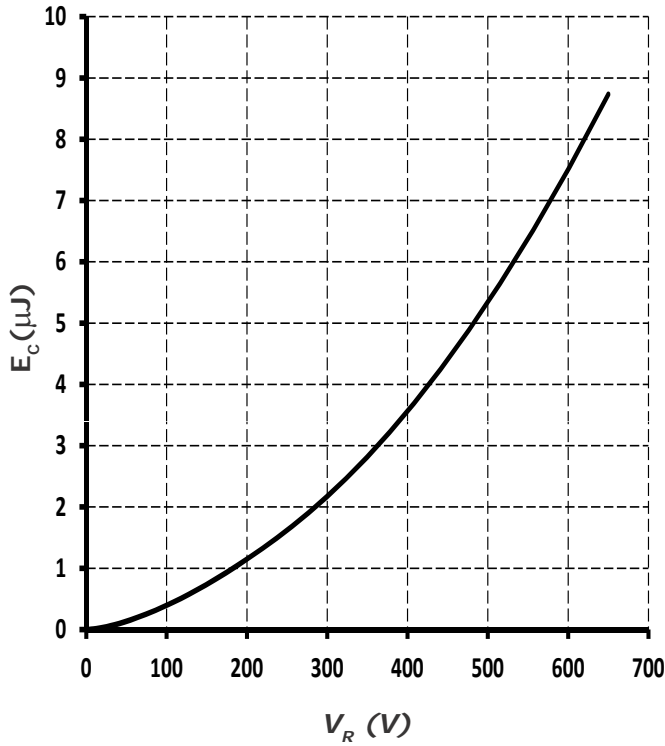


Figure 7. Capacitance Stored Energy

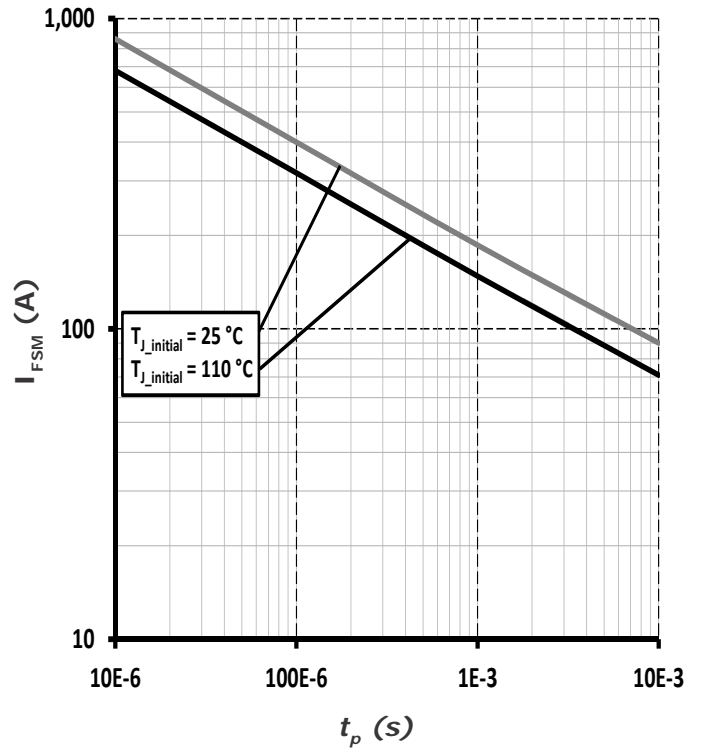


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

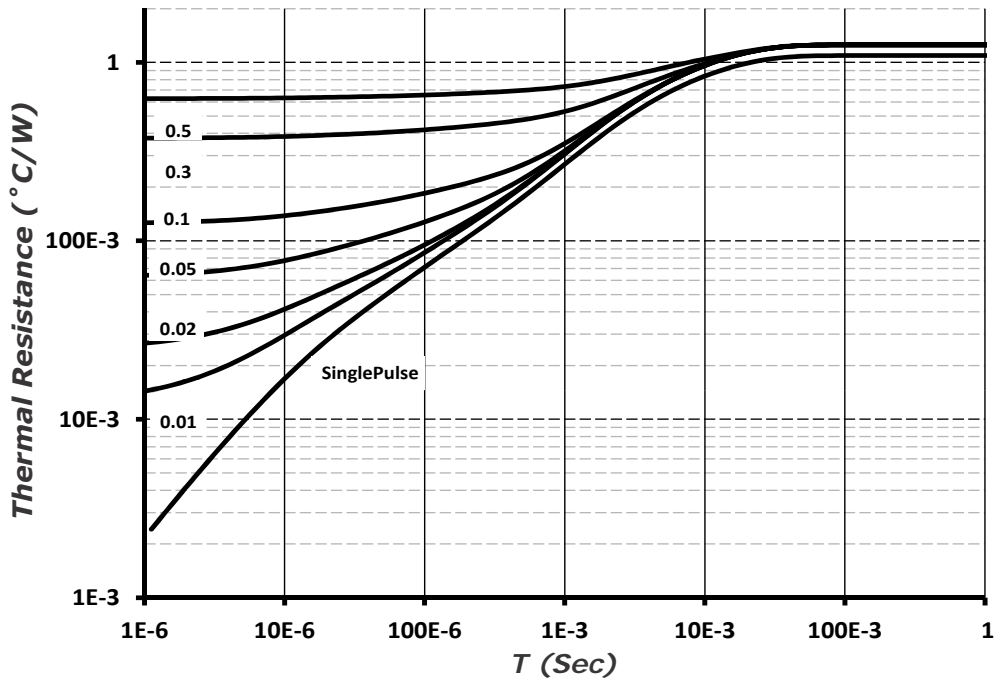
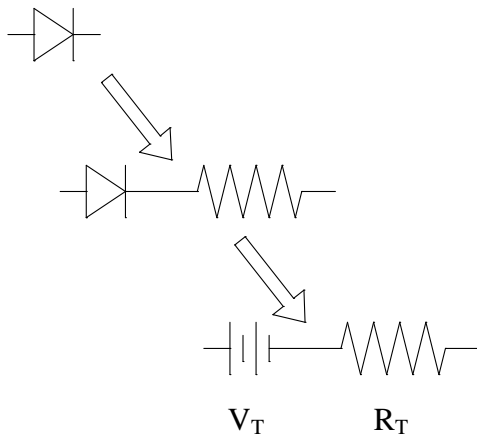


Figure 9. Transient Thermal Impedance



## Diode Model



$$V_{fT} = V_T + I_f * R_T$$

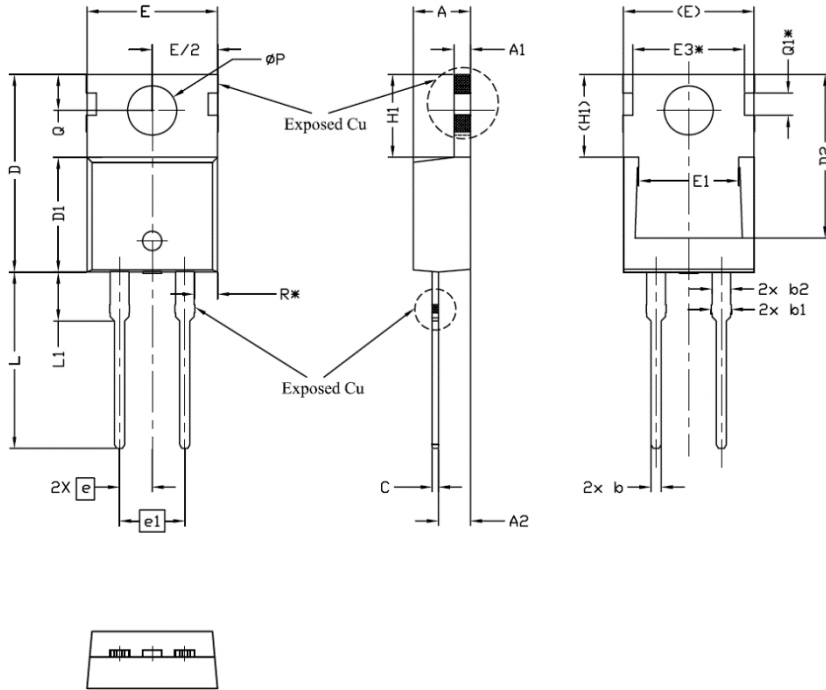
$$V_T = 0.94 + (T_J * -1.3 * 10^{-3})$$

$$R_T = 0.044 + (T_J * 4.4 * 10^{-4})$$

Note:  $T_J$  = Diode Junction Temperature In Degrees Celsius,  
valid from 25°C to 175°C

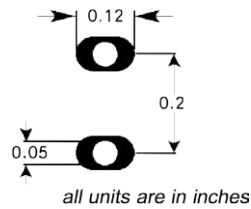


**Package Information**  
**TO-220C-2L**



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.24	4.44	4.64	
A1	1.15	1.27	1.40	
A2	2.30	2.48	2.70	
b	0.70	0.80	0.90	
b1	1.20	1.55	1.75	
b2	1.20	1.45	1.70	
c	0.40	0.50	0.60	
D	14.70	15.37	16.00	4
D1	8.82	8.92	9.02	
D2	12.43	12.73	12.83	5
E	9.96	10.16	10.36	4,5
E1	6.86	7.77	8.89	5
E3*	8.70REF.			
e	2.54BSC			
e1	5.08BSC			
H1	6.30	6.45	6.60	5,6
L	13.47	13.72	13.97	
L1	3.60	3.80	4.00	
$\varnothing P$	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73REF.			
R*	1.82REF.			

**Recommended Solder Pad Layout**





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