



## Features

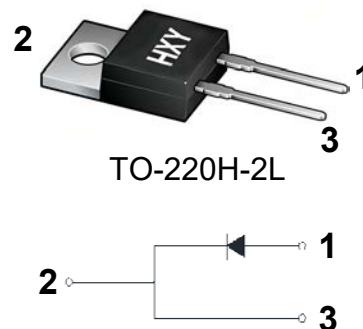
- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching
- Positive Temperature Coefficient on  $V_F$

## 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 (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters



Part Number	Package	Qty(PCS)
HMSC020SDA120K	TO-220H-2L	50

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{RRM}$	Repetitive Peak Reverse Voltage	1200	V		
$V_{RSM}$	Surge Peak Reverse Voltage	1300	V		
$V_R$	DC Peak Reverse Voltage	1200	V		
$I_F$	Continuous Forward Current	54.5 26 20	A	$T_C=25^{\circ}\text{C}$ $T_C=135^{\circ}\text{C}$ $T_C=150^{\circ}\text{C}$	Fig. 3
$I_{FRM}$	Repetitive Peak Forward Surge Current	91 61	A	$T_C=25^{\circ}\text{C}$ , $t_p=10$ ms, Half Sine Pulse $T_C=110^{\circ}\text{C}$ , $t_p=10$ ms, Half Sine Pulse	
$I_{FSM}$	Non-Repetitive Forward Surge Current	130 110	A	$T_C=25^{\circ}\text{C}$ , $t_p=10$ ms, Half Sine Pulse $T_C=110^{\circ}\text{C}$ , $t_p=10$ ms, Half Sine Pulse	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	1150 950	A	$T_C=25^{\circ}\text{C}$ , $t_p=10$ ms, Pulse $T_C=110^{\circ}\text{C}$ , $t_p=10$ ms, Pulse	Fig. 8
$P_{tot}$	Power Dissipation	250 112.5	W	$T_C=25^{\circ}\text{C}$ $T_C=110^{\circ}\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-960\text{V}$	
$\int i^2 dt$	$i^2t$ value	84.5 60.5	$\text{A}^2\text{s}$	$T_C=25^{\circ}\text{C}$ , $t_p=10$ ms $T_C=110^{\circ}\text{C}$ , $t_p=10$ ms	
$T_J$	Operating Junction Range	-55 to +175	$^{\circ}\text{C}$		
$T_{stg}$	Storage Temperature Range	-55 to +135	$^{\circ}\text{C}$		
	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 2.2	1.8 3	V	$I_F = 20\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 20\text{ A}$ $T_J = 175^\circ\text{C}$	Fig. 1
$I_R$	Reverse Current	35 65	200 400	$\mu\text{A}$	$V_R = 1200\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
$Q_C$	Total Capacitive Charge	99		nC	$V_R = 800\text{ V}$ , $I_F = 20\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	1500 93 67		pF	$V_R = 0\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 400\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 800\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$	Fig. 6
$E_C$	Capacitance Stored Energy	28		$\mu\text{J}$	$V_R = 800\text{ V}$	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	0.6	$^\circ\text{C}/\text{W}$	Fig. 9

## Typical Performance

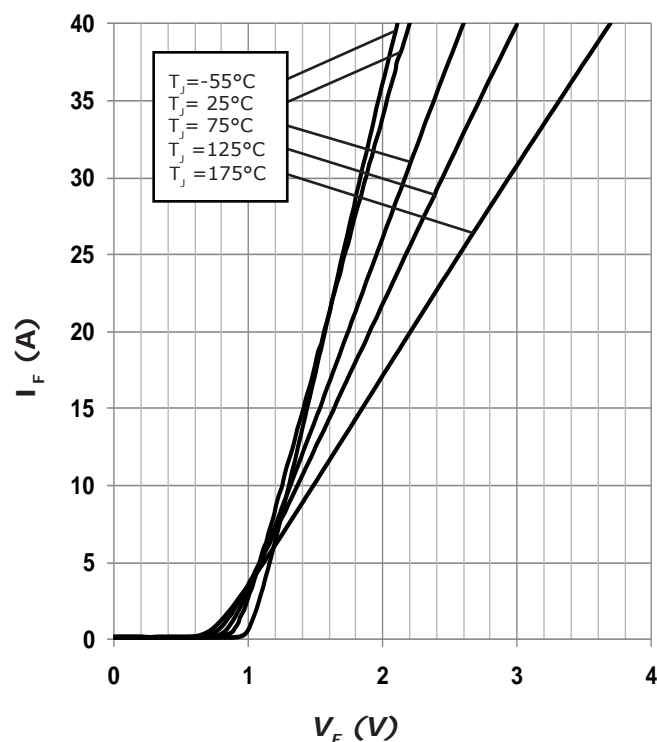


Figure 1. Forward Characteristics

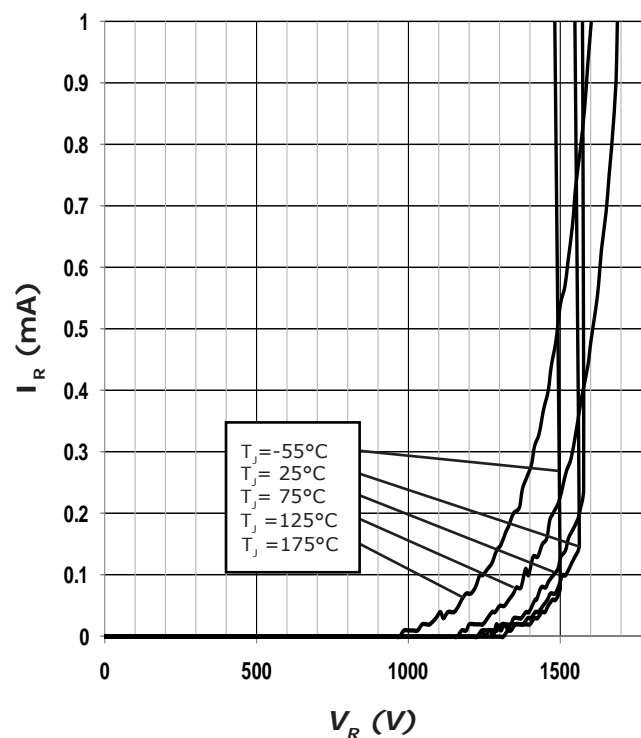


Figure 2. Reverse Characteristics



## Typical Performance

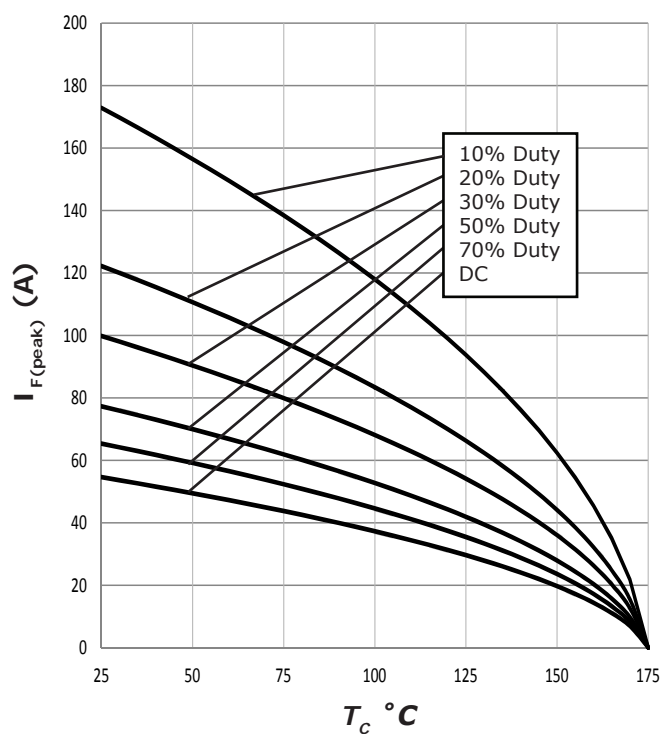


Figure 3. Current Derating

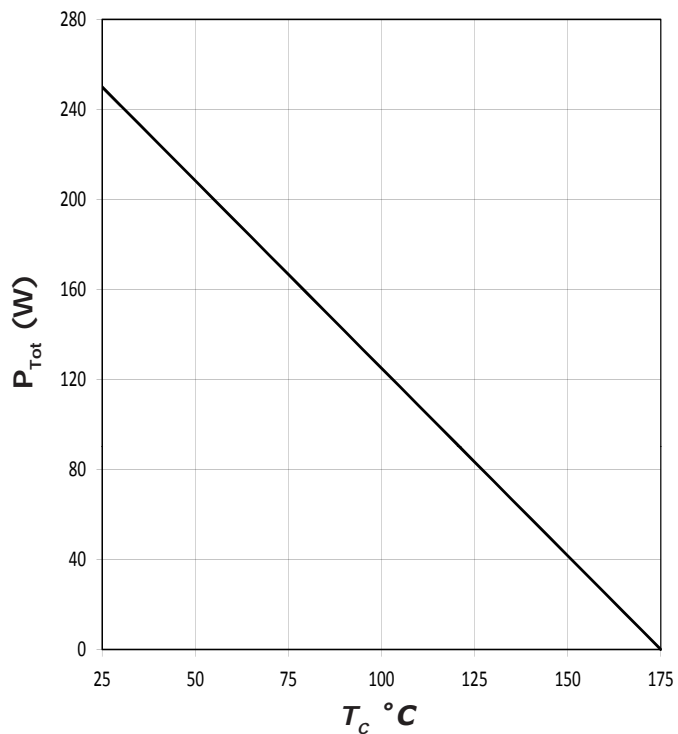


Figure 4. Power Derating

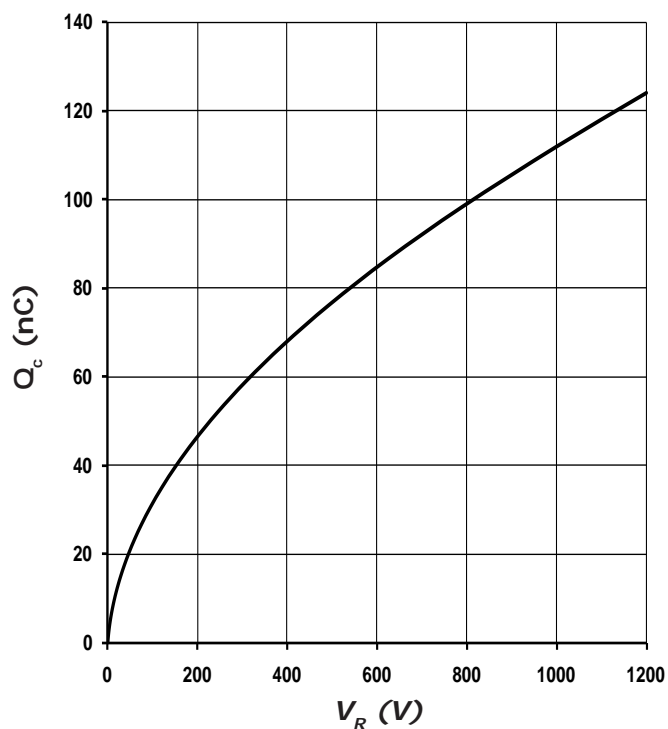


Figure 5. Recovery Charge vs. Reverse Voltage

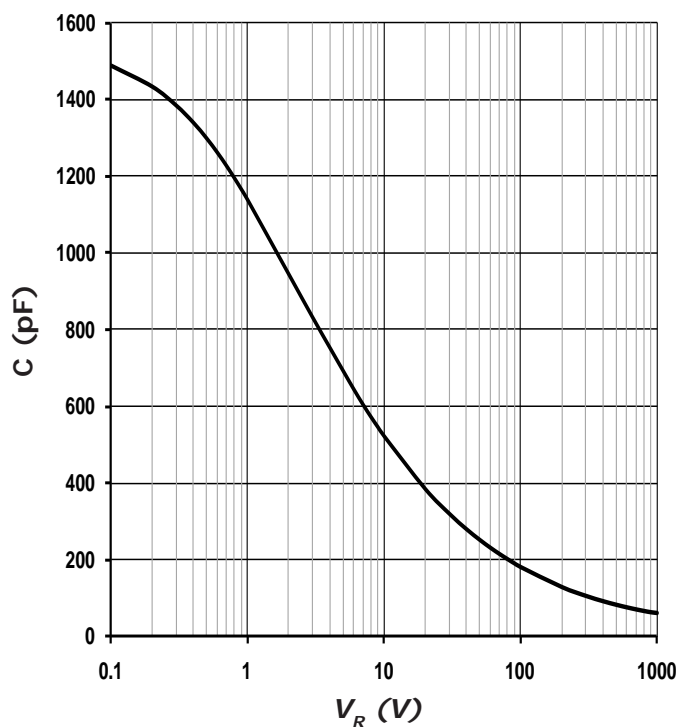


Figure 6. Capacitance vs. Reverse Voltage



## Typical Performance

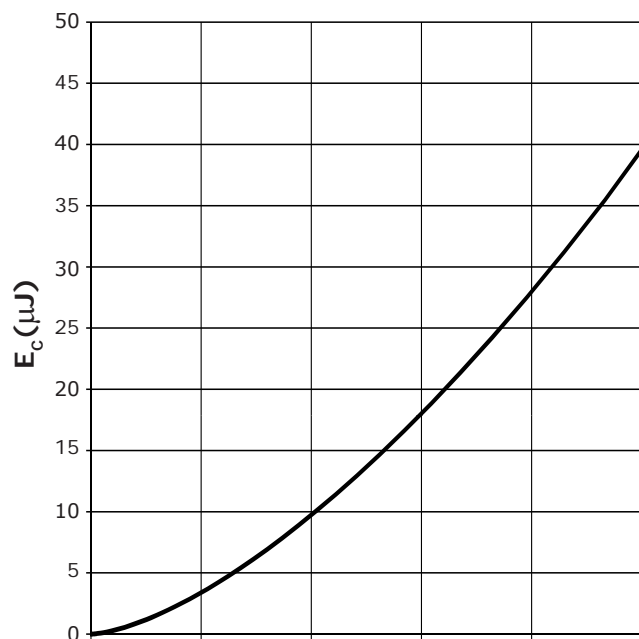


Figure 7. Typical Capacitance Stored Energy

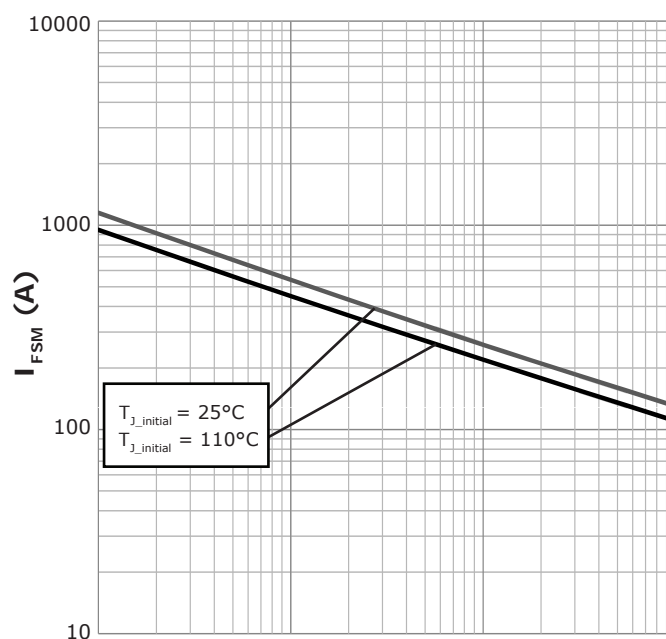


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)

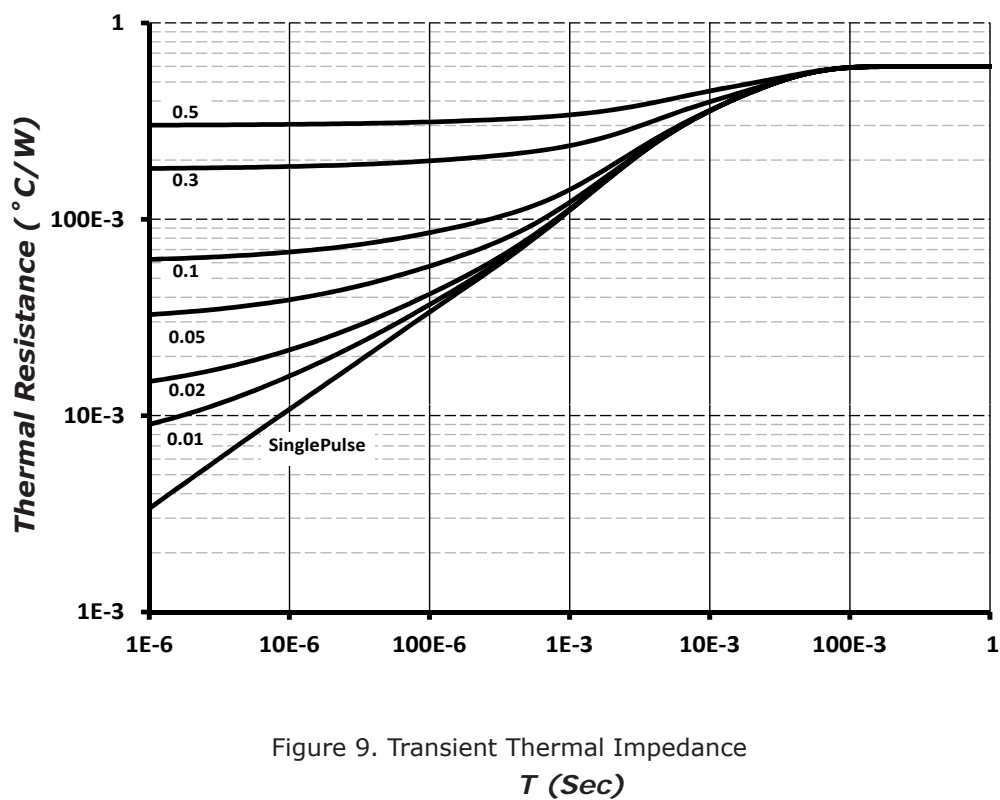
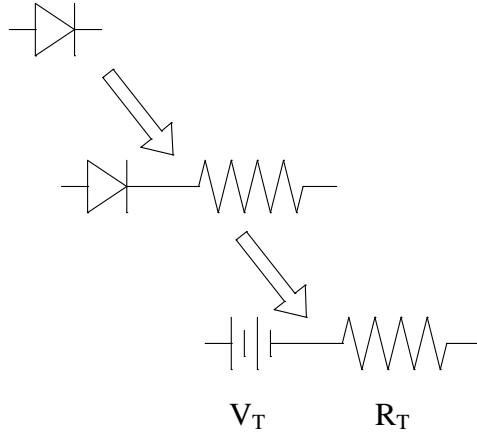


Figure 9. Transient Thermal Impedance  
 $T$  (Sec)



## Diode Model



$$V_{\text{IT}} = V_T + I_f \cdot R_T$$

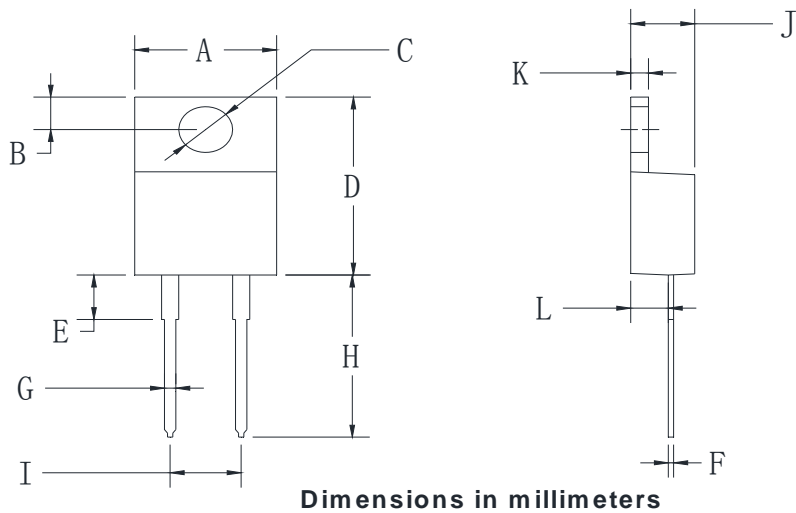
$$V_T = 0.97 + (T_J \cdot -1.40 \cdot 10^{-3})$$

$$R_T = 0.023 + (T_J \cdot 2.71 \cdot 10^{-4})$$

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

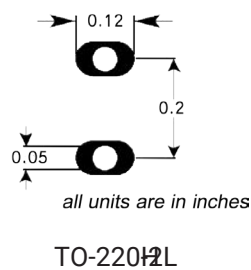


Package Information  
TO-220H-2L



TO-220H-2L		
Dim	Min	Max
A	9.5	10.9
B	2.22	3.27
C	3.34	4.31
D	14.5	15.5
E	3.16	4.46
F	0.28	0.64
G	0.68	0.94
H	13.06	14.62
I	4.55	5.60
J	4.04	5.1
K	1.14	1.4
L	2.14	3.19

Recommended Solder Pad Layout





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