



## Features

- 600-Volt Schottky Rectifier
- Optimized for PFC Boost Diode Application
- 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

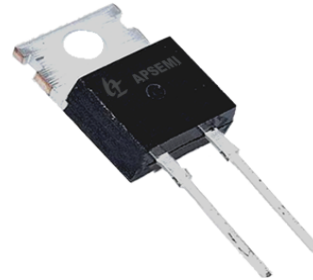
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

## Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

Part Number	Package
AC3D02060A	TO-220-2

Parameter	Rating	Units
$V_{RRM}$	<b>600</b>	V
$I_F (T_C=135^\circ\text{C})$	<b>4</b>	A**
$Q_C$	<b>5.8</b>	nC**



TO-220-2  
**Package**



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

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{RRM}$	Repetitive Peak Reverse Voltage	600	V		
$V_{RSM}$	Surge Peak Reverse Voltage	600	V		
$V_{DC}$	DC Blocking Voltage	600	V		
$I_F$	Continuous Forward Current	8 4 2	A	$T_C=25^\circ\text{C}$ $T_C=135^\circ\text{C}$ $T_C=161^\circ\text{C}$	Fig. 3
$I_{FRM}$	Repetitive Peak Forward Surge Current	11 7.5	A	$T_C=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$ $T_C=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$	
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	16.5 15	A	$T_C=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$ $T_C=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$	Fig. 8
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	120 110	A	$T_C=25^\circ\text{C}, t_p=10\text{ }\mu\text{s}, \text{Pulse}$ $T_C=110^\circ\text{C}, t_p=10\text{ }\mu\text{s}, \text{Pulse}$	Fig. 8
$P_{tot}$	Power Dissipation	39.5 17	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-600\text{V}$	
$\int i^2 dt$	$i^2t$ value	1.35 1.12	A <sup>2</sup> s	$T_C=25^\circ\text{C}, t_p=10\text{ ms}$ $T_C=110^\circ\text{C}, t_p=10\text{ ms}$	
$T_J, T_{stg}$	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 1.8	1.7 2.4	V	$I_F = 2\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 2\text{ A}$ $T_J = 175^\circ\text{C}$	Fig.1
$I_R$	Reverse Current	3 6	15 55	$\mu\text{A}$	$V_R = 600\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 600\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
$Q_C$	Total Capacitive Charge	5.8		nC	$V_R = 400\text{ V}$ , $I_F = 2\text{ A}$ $di/dt = 500\text{ A}/\mu\text{S}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	175 10.5 8.5		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	0.8		$\mu\text{J}$	$V_R = 400\text{ V}$	Fig. 7

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

**Thermal Characteristics**

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	TO-220 Package Thermal Resistance from Junction to Case	3.8	$^\circ\text{C}/\text{W}$

**Typical Performance**

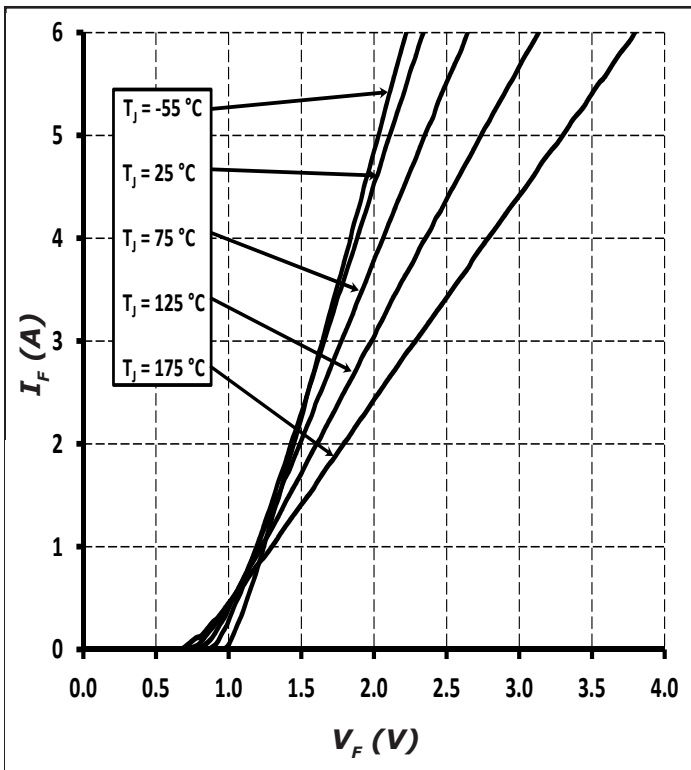


Figure 1. Forward Characteristics

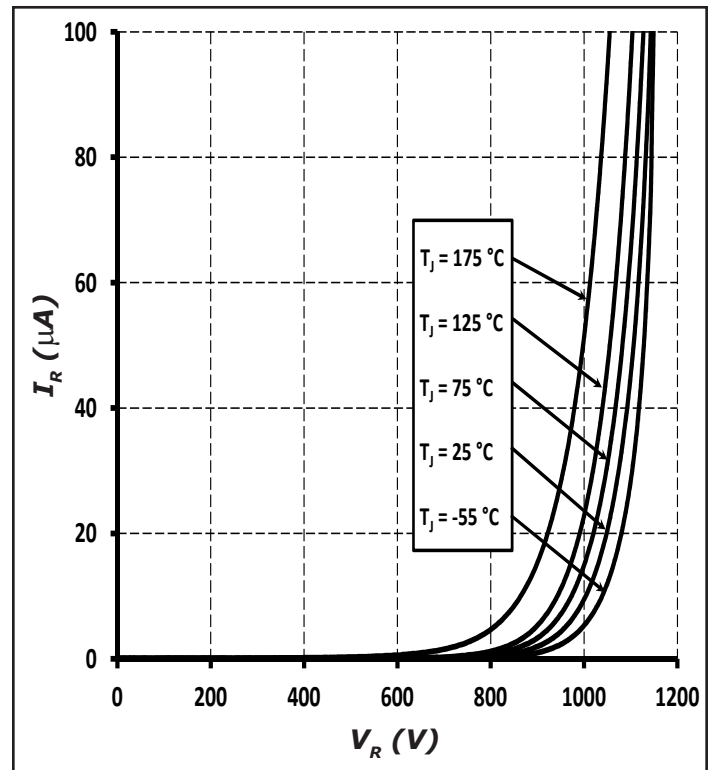


Figure 2. Reverse Characteristics



## Typical Performance

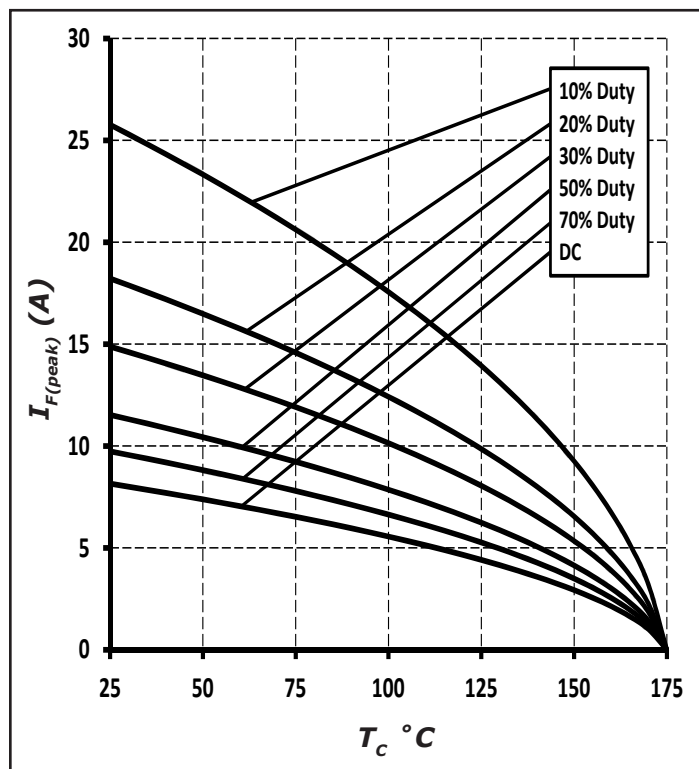


Figure 3. Current Derating

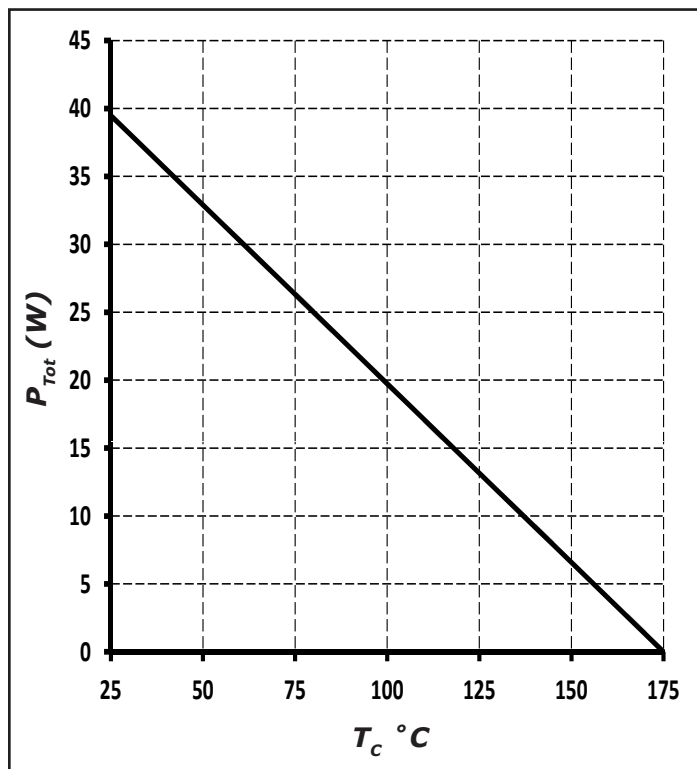


Figure 4. Power Derating

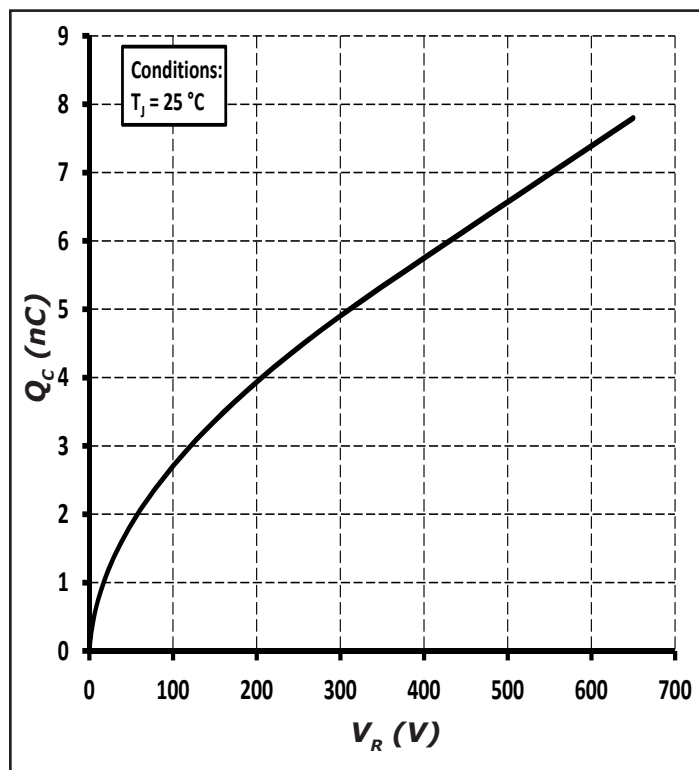


Figure 5. Total Capacitance Charge vs. Reverse Voltage

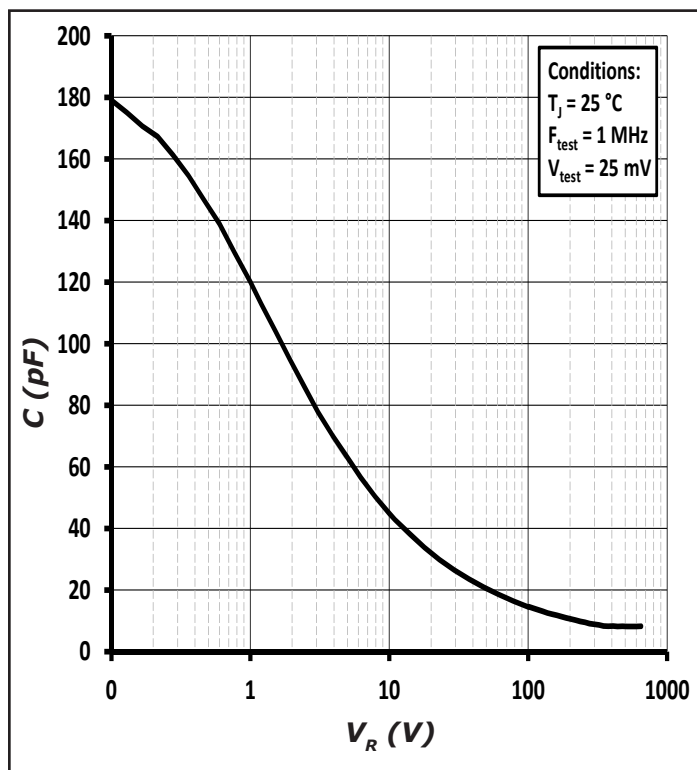


Figure 6. Capacitance vs. Reverse Voltage



### Typical Performance

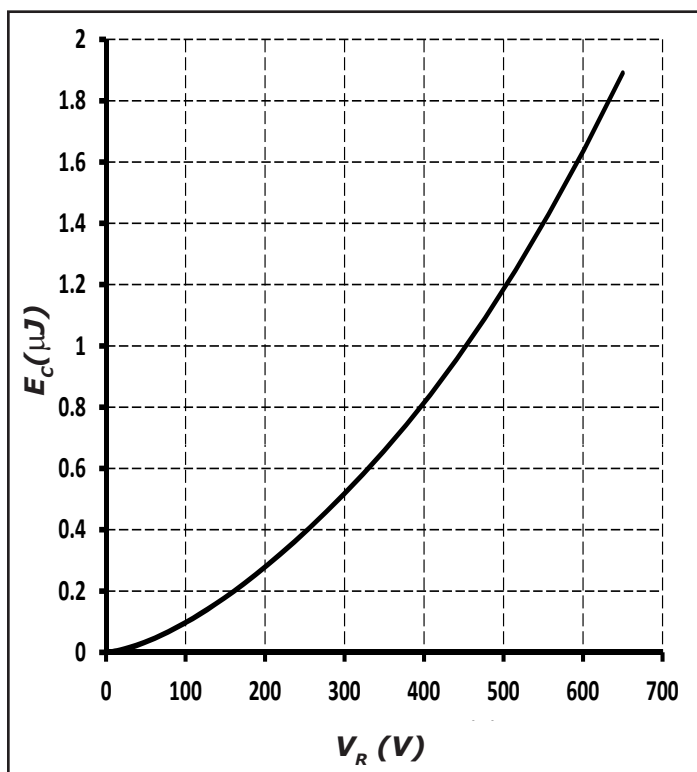


Figure 7. Capacitance Stored Energy

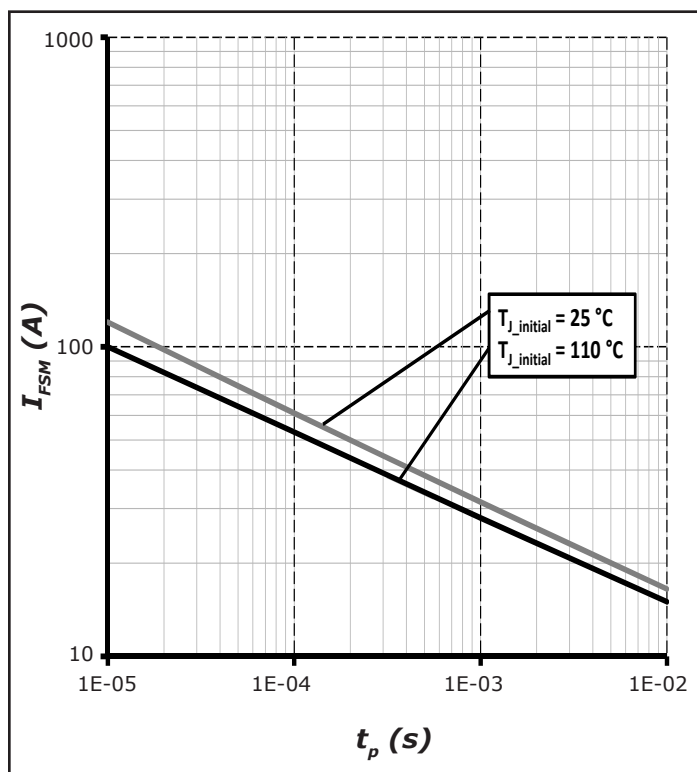


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)

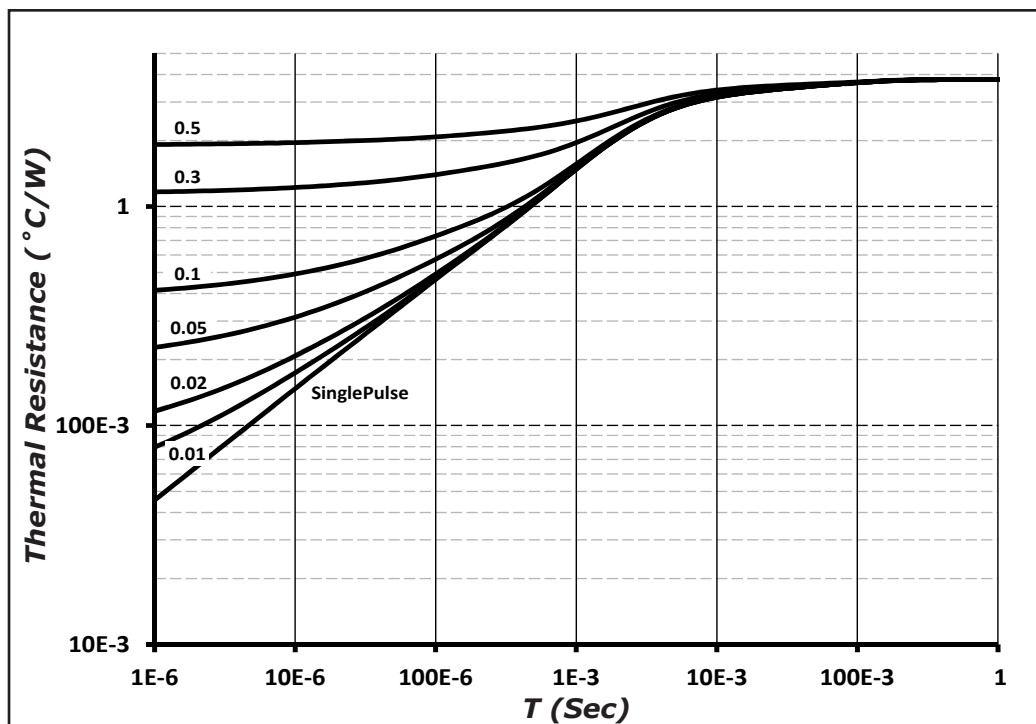
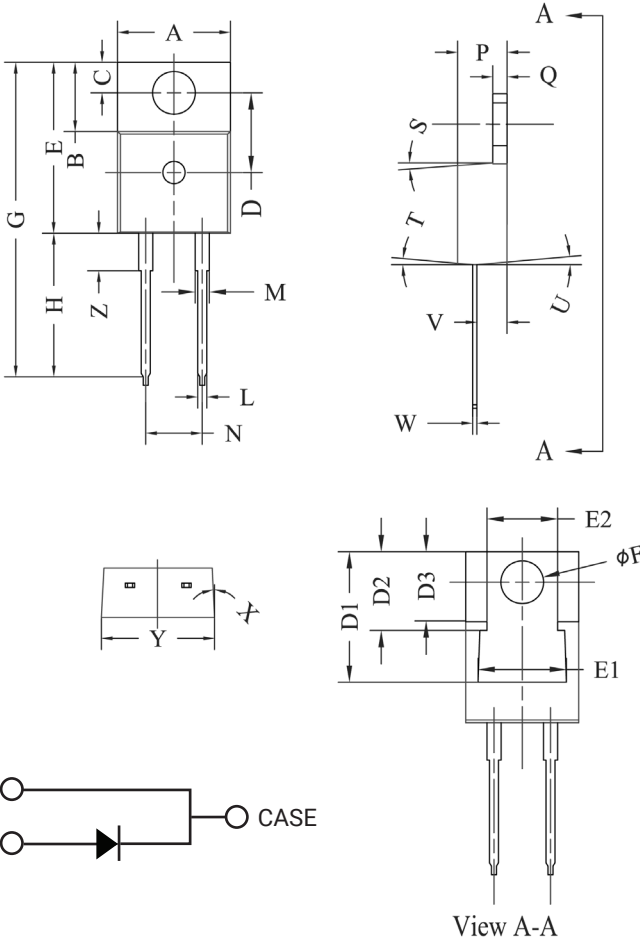


Figure 9. Transient Thermal Impedance

## Package Dimensions

Package TO-220-2

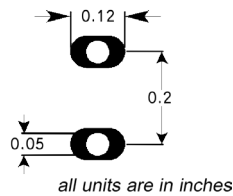


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	.251	5.77	6.37
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
L	.025	.036	.635	.914
M	.045	.055	1.143	1.550
N	.195	.205	4.953	5.207
P	.165	.185	4.191	4.699
Q	.048	.054	1.219	1.372
S	3°	6°	3°	6°
T	3°	6°	3°	6°
U	3°	6°	3°	6°
V	.094	.110	2.388	2.794
W	.014	.025	.356	.635
X	3°	5.5°	3°	5.5°
Y	.385	.410	9.779	10.414
Z	.130	.150	3.302	3.810

NOTE:

1. Dimension L, M, W apply for Solder Dip Finish

## Recommended Solder Pad Layout

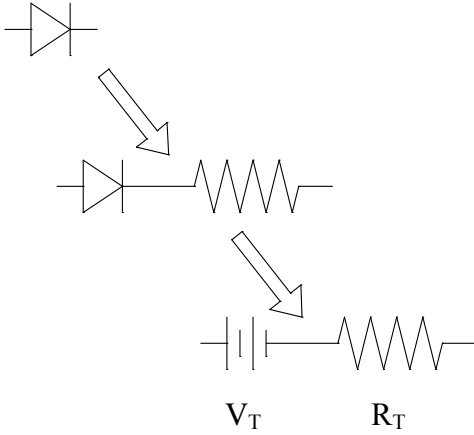


TO-220-2

Part Number	Package
AC3D02060A	TO-220-2



Diode Model



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

$$V_T = 0.98 + (T_j * -1.1 * 10^{-3})$$

$$R_T = 0.18 + (T_j * 1.8 * 10^{-3})$$

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