

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

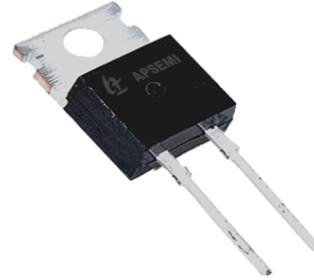
Applications

- 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
AC4D02120A	TO-220-2



Parameter	Rating	Units
V_{RRM}	1200	V
$I_F (T_C=135^\circ\text{C})$	5	A**
Q_c	11	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	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current	10 5 2	A	$T_C=25^\circ\text{C}$ $T_C=135^\circ\text{C}$ $T_C=165^\circ\text{C}$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	13 8.4	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	19 16.5	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_{FMax}	Non-Repetitive Peak Forward Current	200 160	A	$T_C=25^\circ\text{C}$, $t_p=10$ μs , Pulse $T_C=110^\circ\text{C}$, $t_p=10$ μs , Pulse	Fig. 8
P_{tot}	Power Dissipation	60 26	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-650\text{V}$	
$\int i^2 dt$	i^2t value	1.8 1.4	A ² 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	1.4 1.9	1.8 3	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	10 40	50 150	μA	$V_R = 1200\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	11		nC	$V_R = 800\text{ V}$, $I_F = 2\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	167 11 8		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	3.2		μJ	$V_R = 800\text{ V}$	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	2.5	$^\circ\text{C}/\text{W}$	Fig. 9

Typical Performance

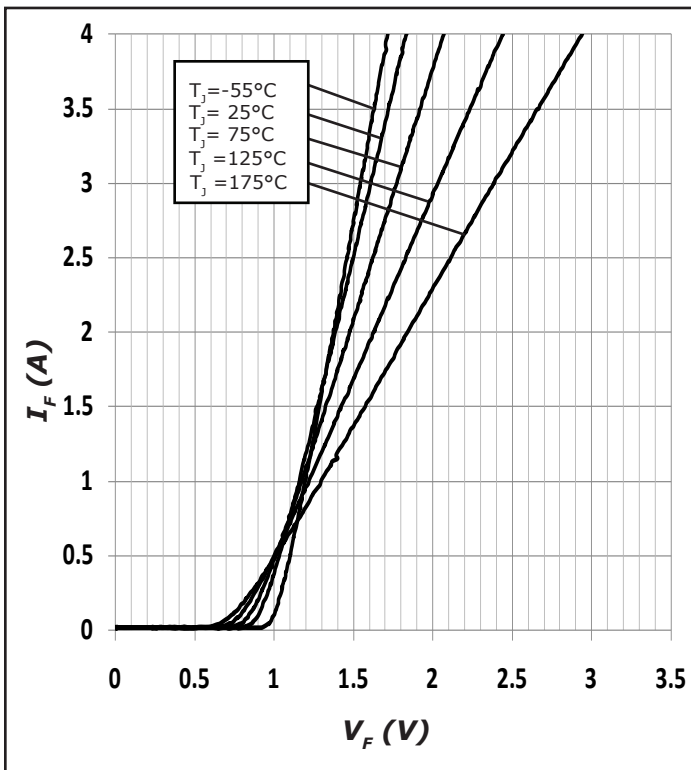


Figure 1. Forward Characteristics

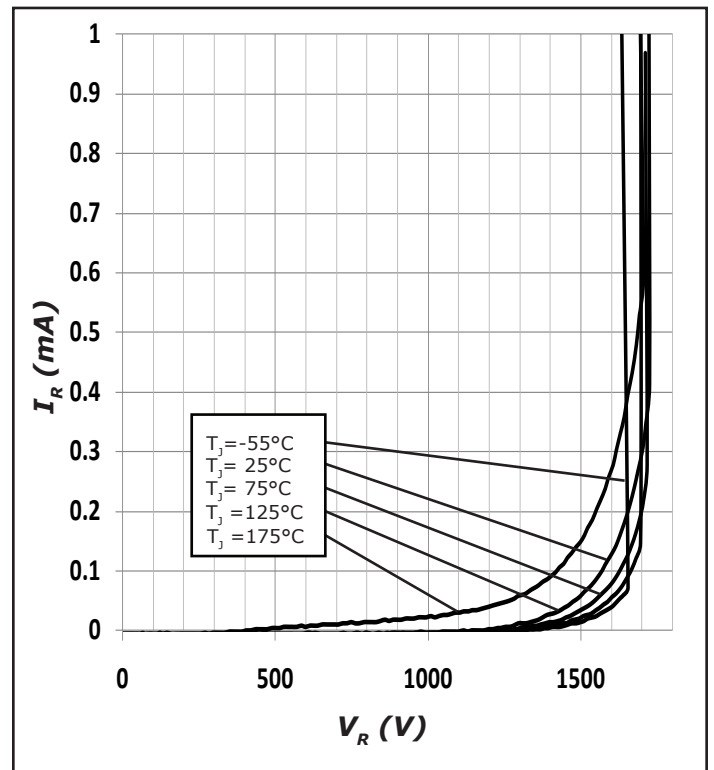


Figure 2. Reverse Characteristics



Typical Performance

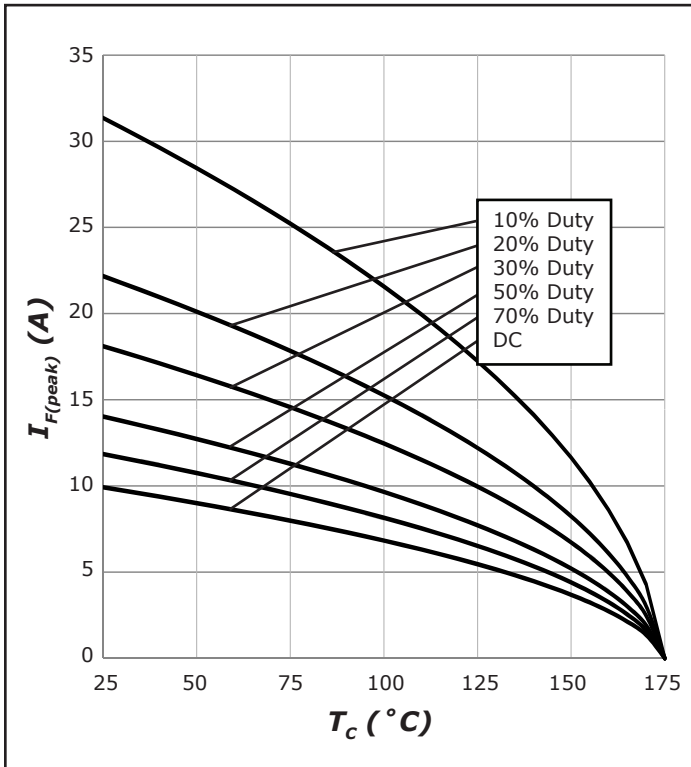


Figure 3. Current Derating

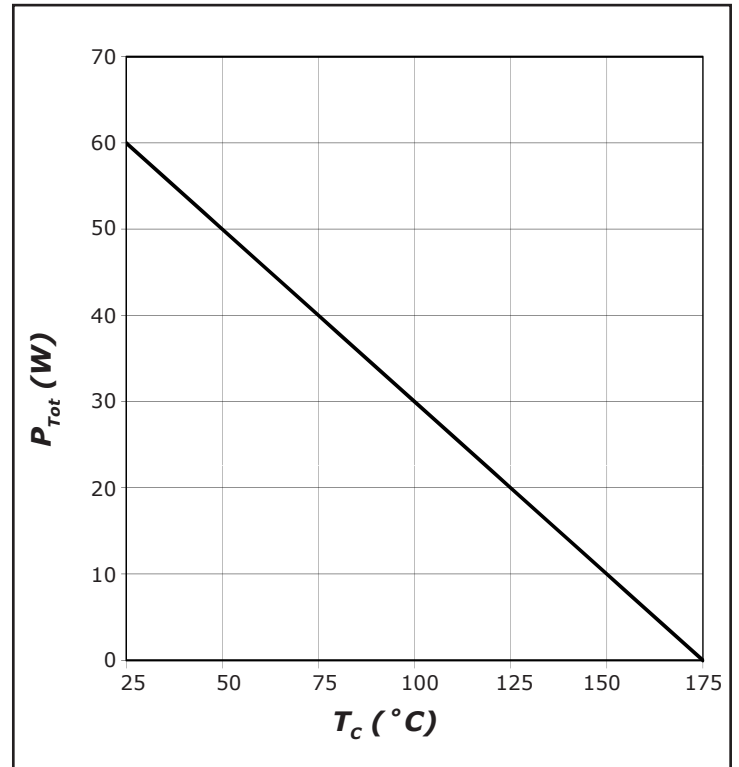


Figure 4. Power Derating

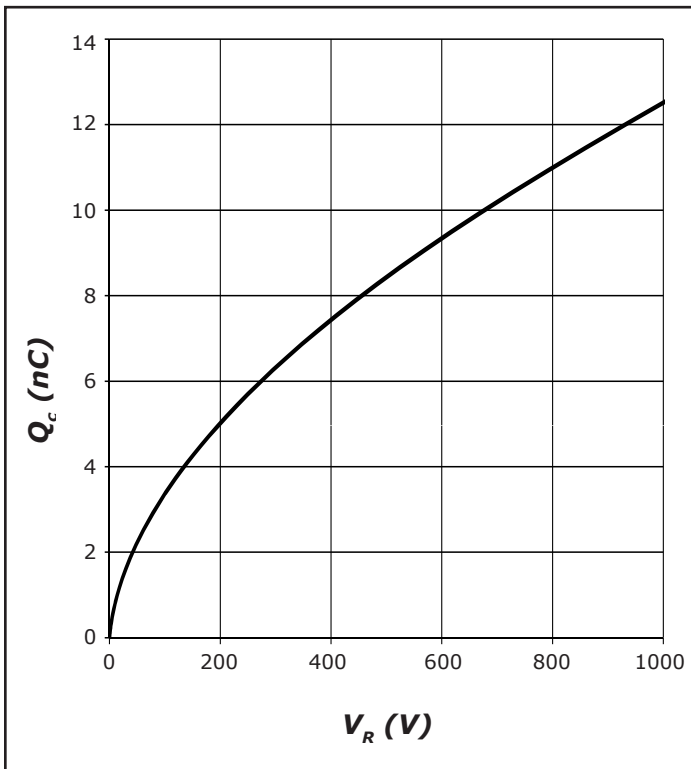


Figure 5. Recovery Charge vs. Reverse Voltage

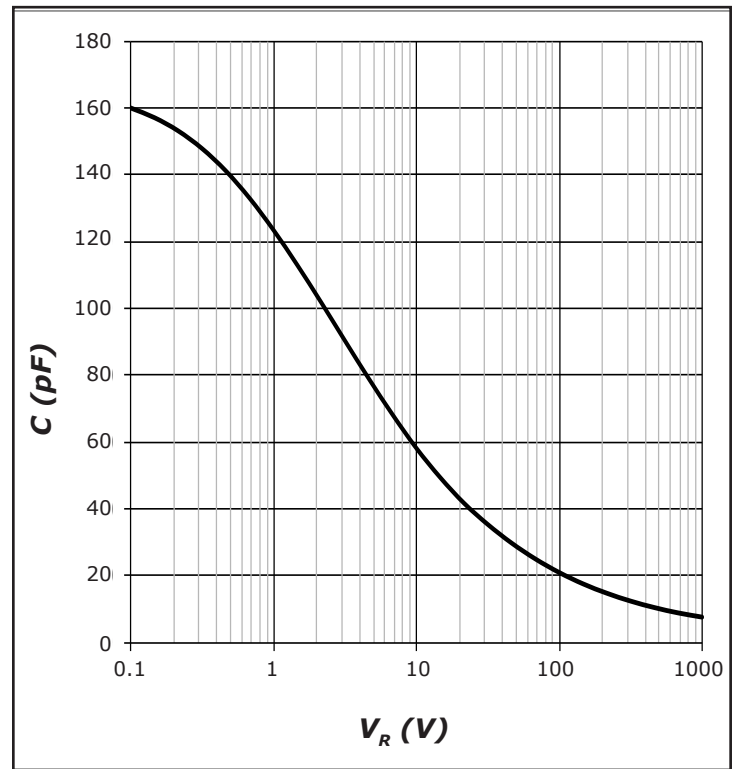


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

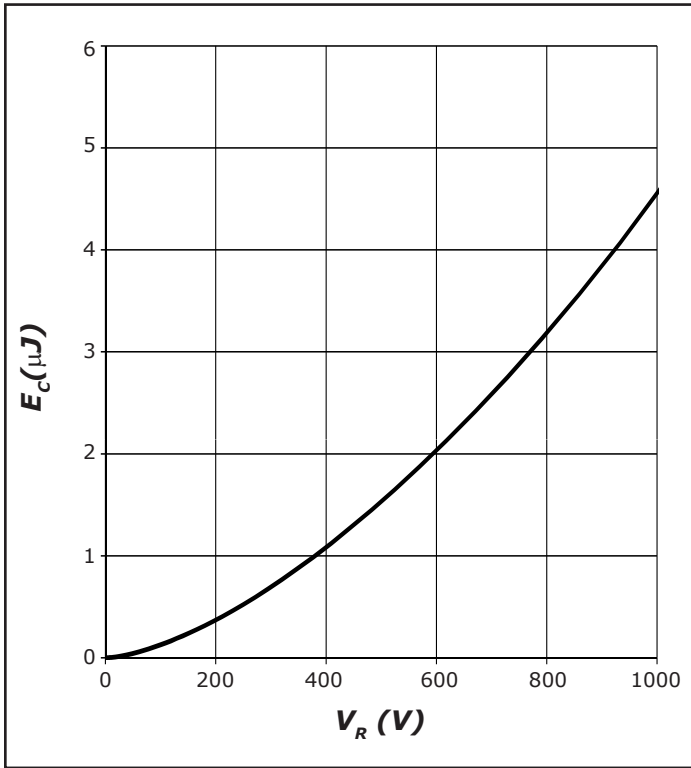


Figure 7. Typical Capacitance Stored Energy

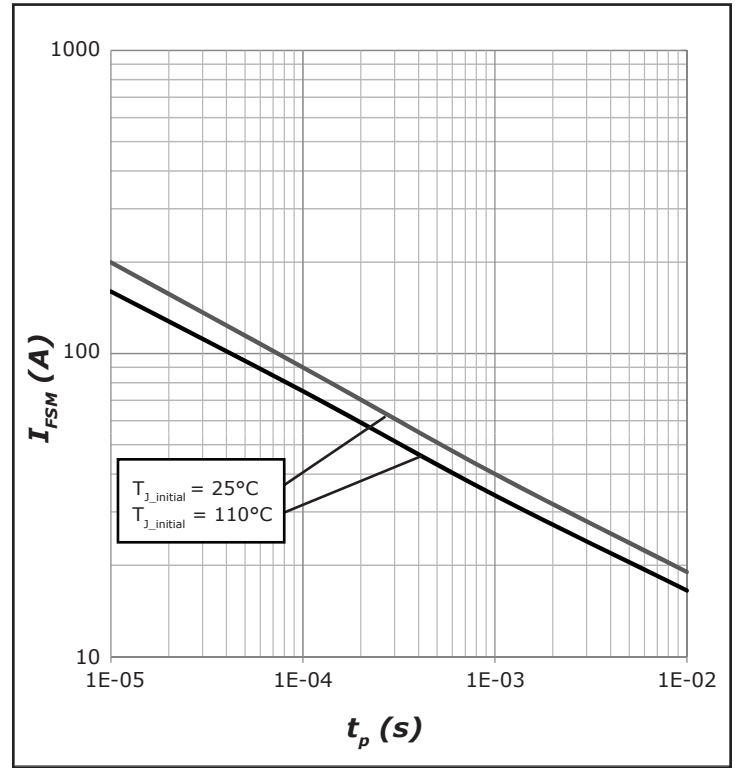


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

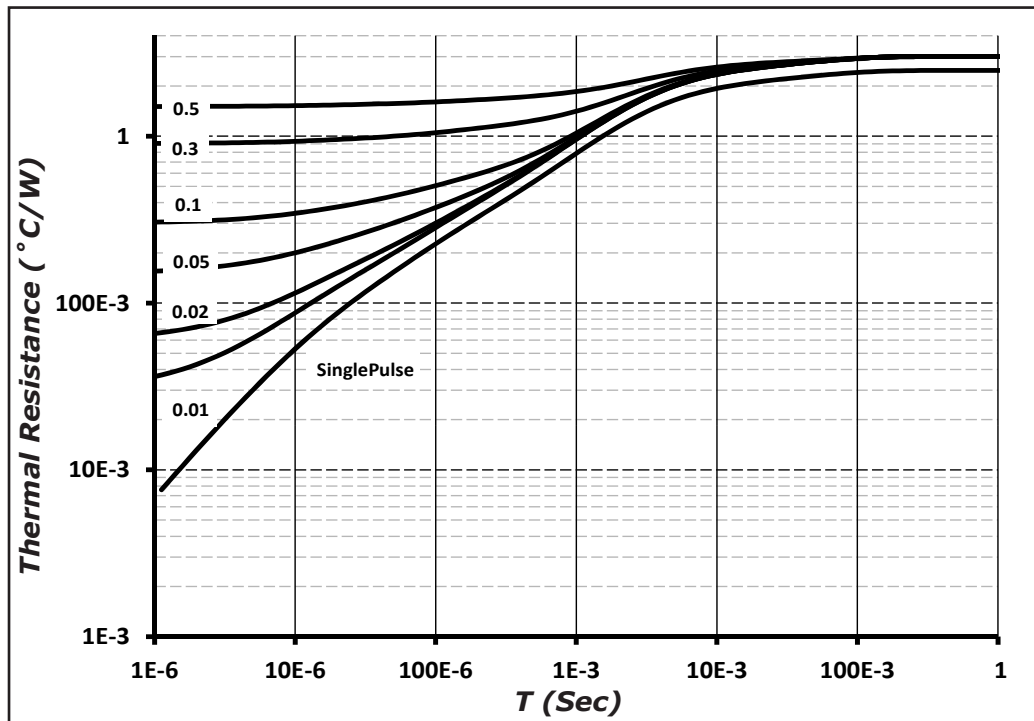
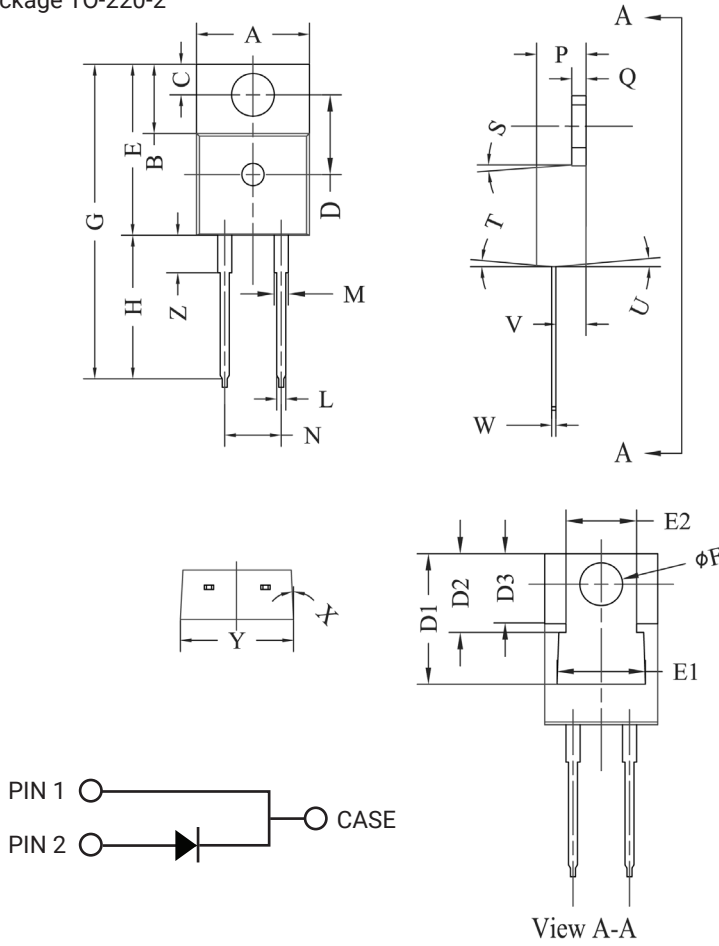


Figure 9. Transient Thermal Impedance



Package Dimensions

Package TO-220-2

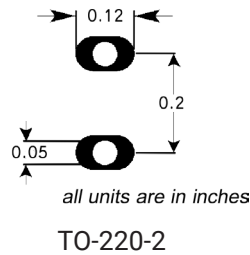


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	.251	5.77	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:

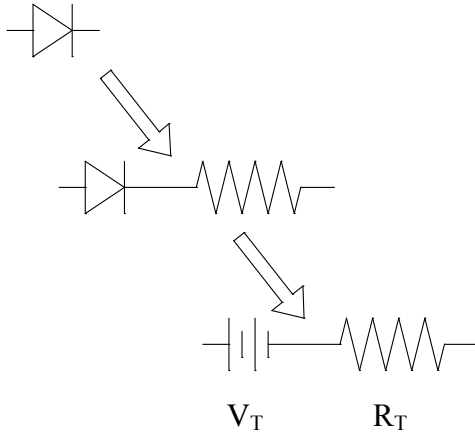
1. Dimension L, M, W apply for Solder Dip Finish

Recommended Solder Pad Layout



Part Number	Package
AC4D02120A	TO-220-2

Diode Model



$$V_{fT} = V_T + I_f \cdot R_T$$

$$V_T = 0.9592 + (T_J \cdot -1.20 \cdot 10^{-3})$$

$$R_T = 0.1673 + (T_J \cdot 2.10 \cdot 10^{-3})$$

Note: T_J = Diode Junction Temperature In Degrees Celsius