

Features

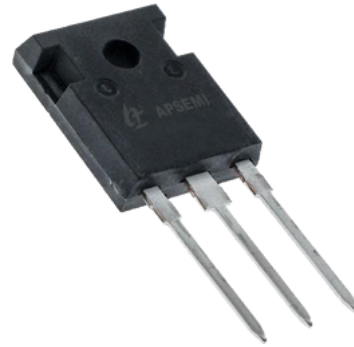
- 600-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F



Parameter	Rating	Units
V_{RRM}	600	V
$I_F (T_C=135^{\circ}C)$	26	A**
Q_c	48	nC**

Benefits

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

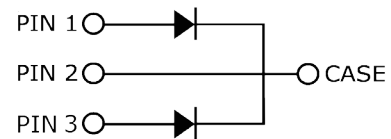


TO-247-3
Package

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
AC3D20060D	TO-247-3



Maximum Ratings ($T_C = 25\text{ }^{\circ}\text{C}$ 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 (Per Leg/Device)	27.5/55 13/26 10/20	A	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$ $T_C=149^{\circ}C$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	46* 31*	A	$T_C=25^{\circ}C$, $t_p = 10$ ms, Half Sine Wave $T_C=110^{\circ}C$, $t_p=10$ ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	90* 71*	A	$T_C=25^{\circ}C$, $t_p = 10$ ms, Half Sine Wave $T_C=110^{\circ}C$, $t_p = 10$ ms, Half Sine Wave	Fig. 8
I_{FSM}	Non-Repetitive Peak Forward Surge Current	860* 680*	A	$T_C=25^{\circ}C$, $t_p = 10$ μ s, Pulse $T_C=110^{\circ}C$, $t_p = 10$ μ s, Pulse	Fig. 8
P_{tot}	Power Dissipation (Per Leg/Device)	136.5 59	W	$T_C=25^{\circ}C$ $T_C=110^{\circ}C$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-650V$	
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^{\circ}C$		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

**Electrical Characteristics (Per Leg)**

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	10 20	50 200	μA	$V_R = 600\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 600\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	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		μJ	$V_R = 400\text{ V}$	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	1.3** 0.65*	$^\circ\text{C}/\text{W}$	Fig. 9

** Per Leg, * Both Legs

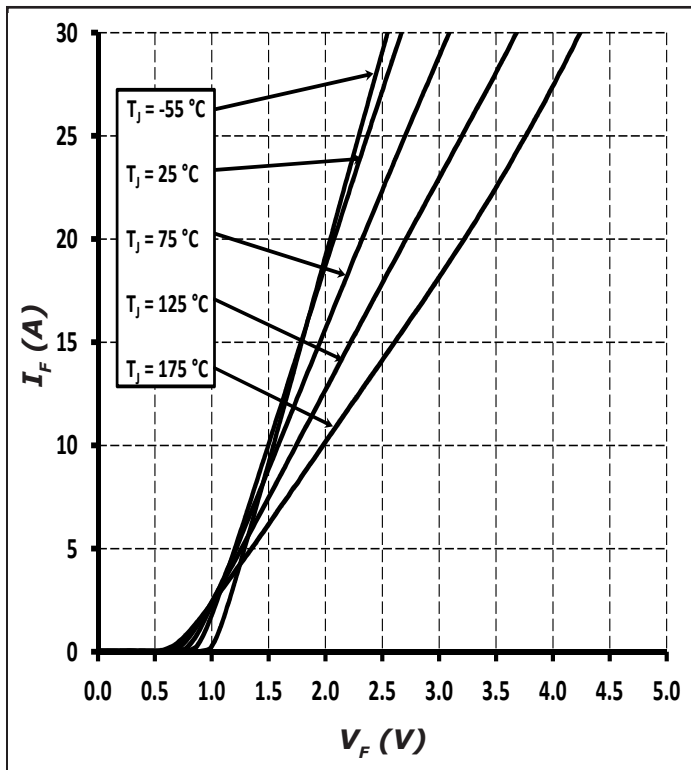
Typical Performance (Per Leg)

Figure 1. Forward Characteristics

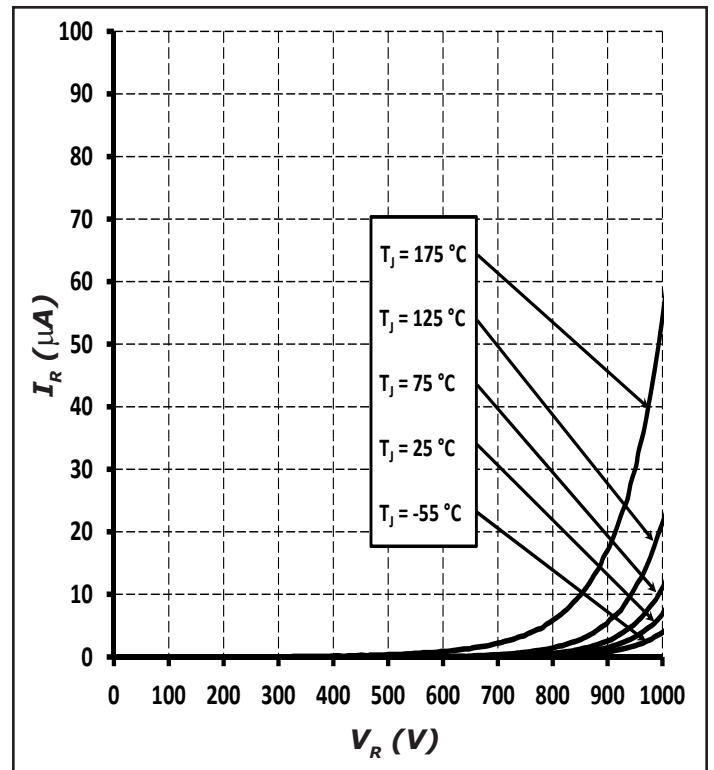


Figure 2. Reverse Characteristics



Typical Performance (Per Leg)

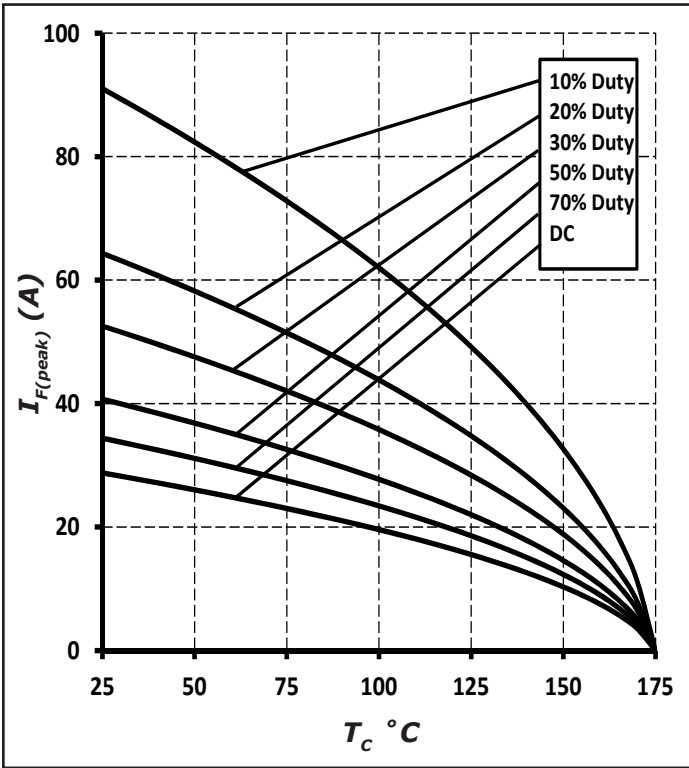


Figure 3. Current Derating

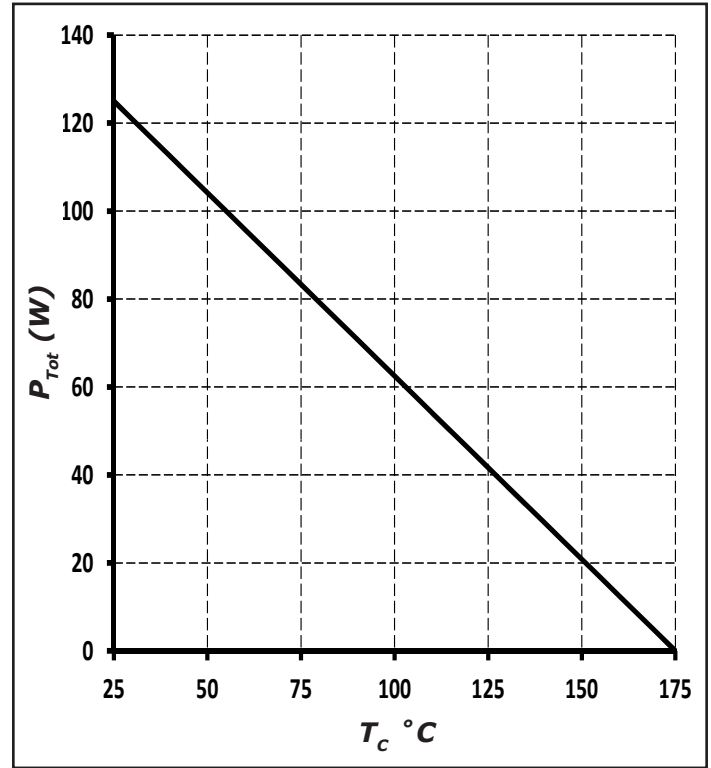


Figure 4. Power Derating

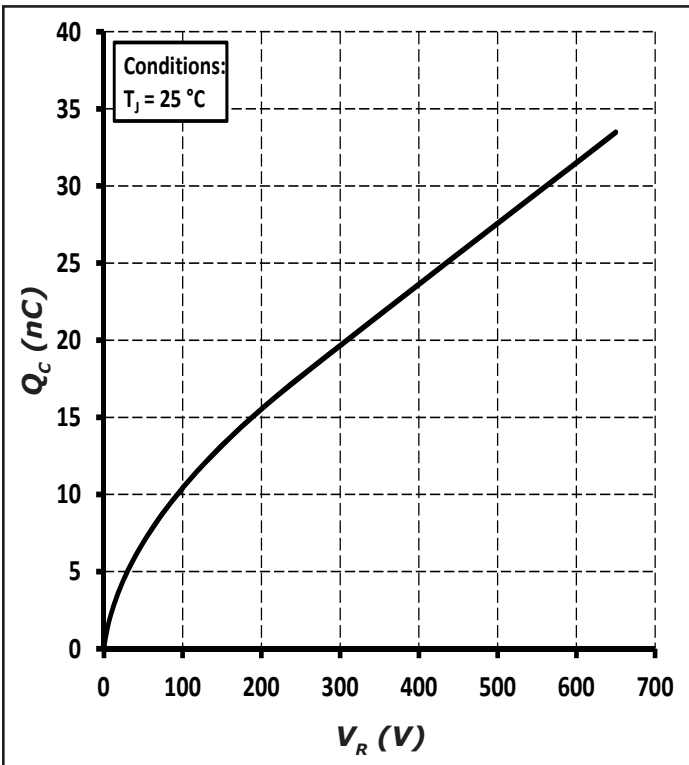


Figure 5. Total Capacitance Charge vs. Reverse Voltage

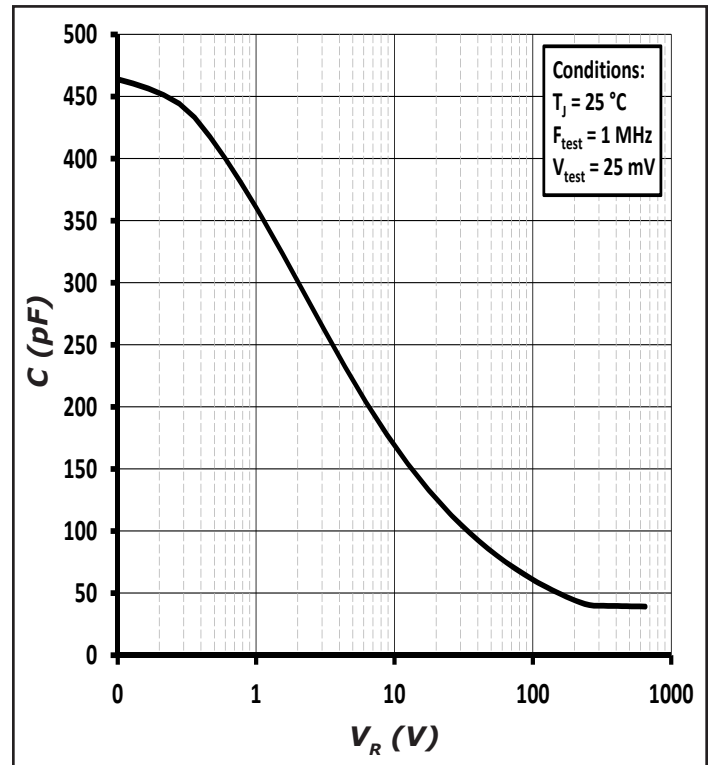


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance

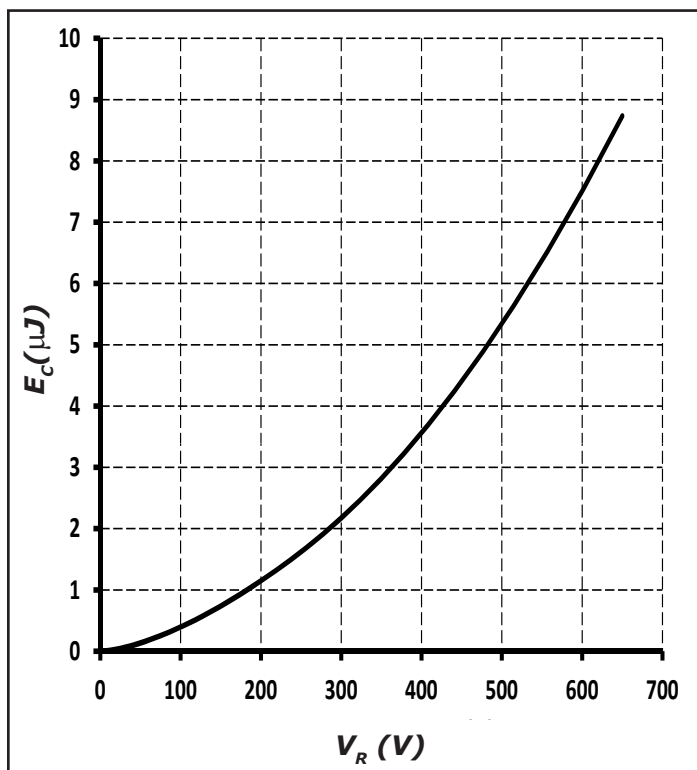


Figure 7. Capacitance Stored Energy

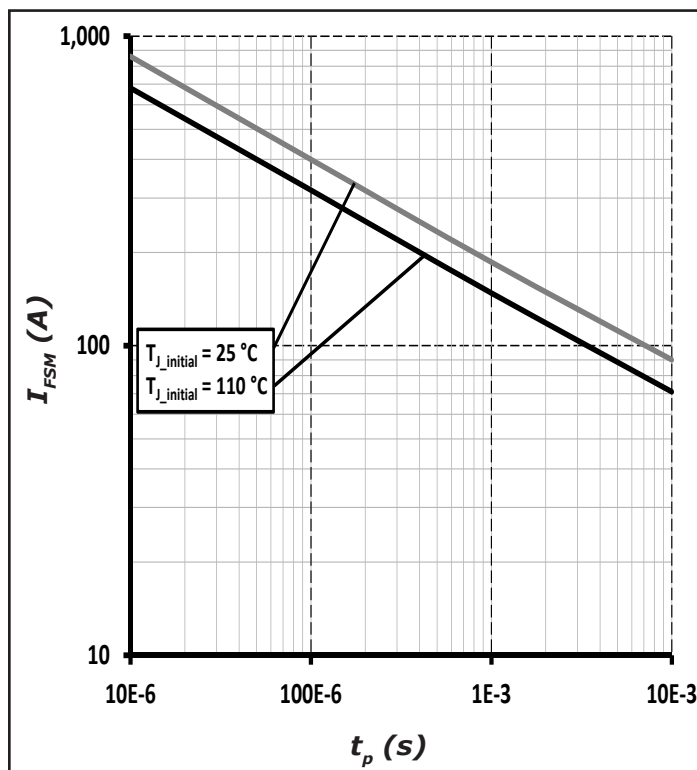


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

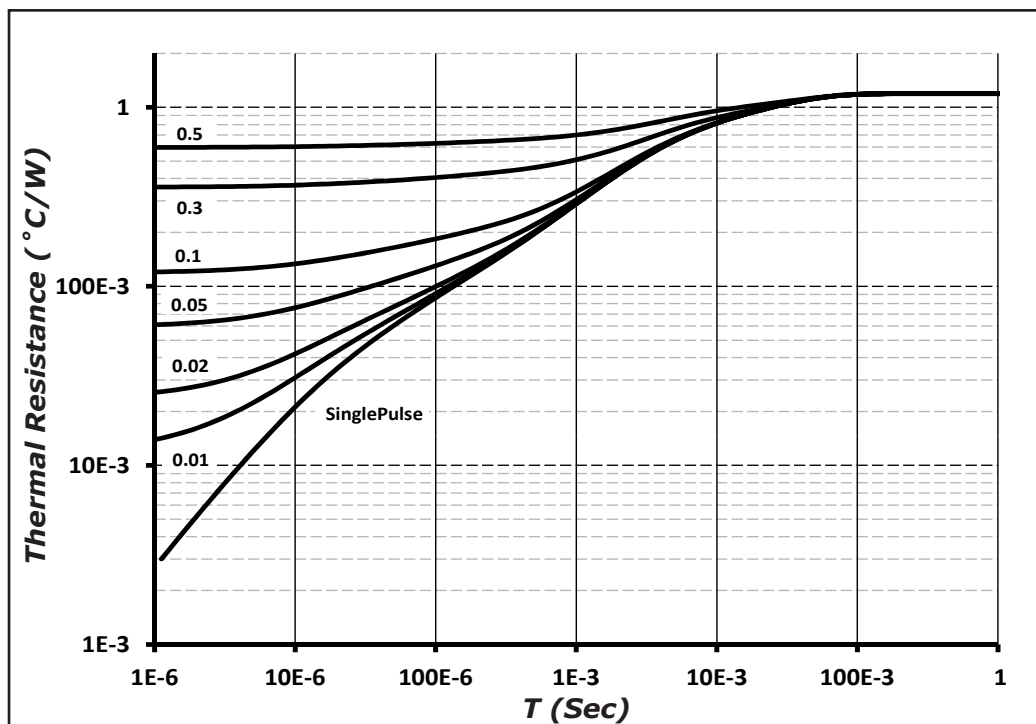
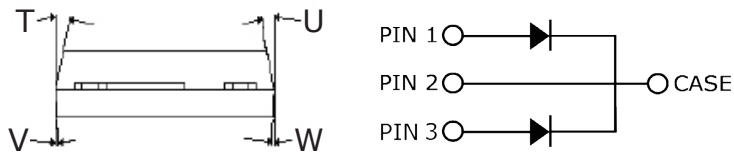
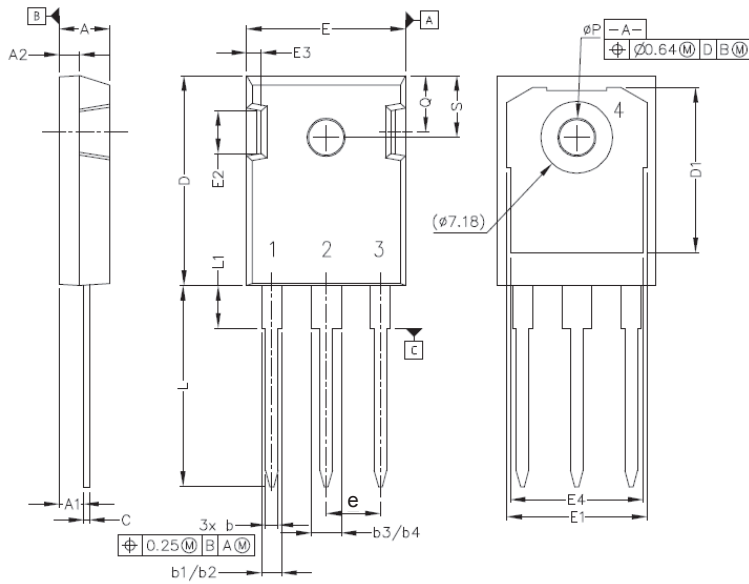


Figure 9. Transient Thermal Impedance

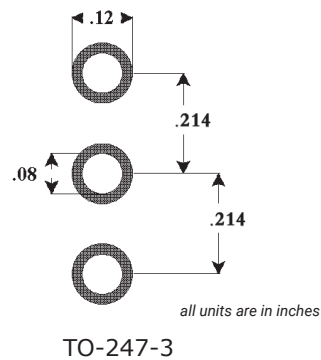
Package Dimensions

Package TO-247-3



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	9°	11°	9°	11°
U	9°	11°	9°	11°
V	2°	8°	2°	8°
W	2°	8°	2°	8°

Recommended Solder Pad Layout



Part Number	Package
AC3D20060D	TO-247-3

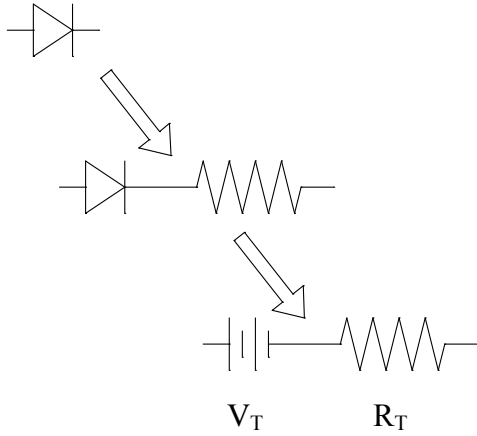


APSEMI

AC3D20060D

Silicon Carbide Schottky Diode

Diode Model (Per Leg)



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

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

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

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