



APSEMI

AC3D25170H Silicon Carbide Schottky Diode



Features

- 1700-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Halogen-Free; RoHS Compliant

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	Marking
AC3D25170H	TO-247-2	AC3D25170H

Parameter	Rating	Units
V_{RRM}	1700	V
$I_F (T_C=135^{\circ}C)$	26.3	A**
Q_c	230	nC**



TO-247-2
Package



Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1700	V		
V_{RSM}	Surge Peak Reverse Voltage	1700	V		
V_{DC}	DC Blocking Voltage	1700	V		
I_F	Continuous Forward Current	26.3	A	$T_C < 135^{\circ}C$	
I_{FRM}	Repetitive Peak Forward Surge Current	99 57	A	$T_C = 25^{\circ}C, t_p = 10 \text{ ms, Half Sine Wave, D=1}$ $T_C = 110^{\circ}C, t_p = 10 \text{ ms, Half Sine Wave, D=1}$	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	117 88	A	$T_C = 25^{\circ}C, t_p = 10 \text{ ms, Half Sine Wave, D=1}$ $T_C = 110^{\circ}C, t_p = 10 \text{ ms, Half Sine Wave, D=1}$	
P_{tot}	Power Dissipation	377 163	W	$T_C = 25^{\circ}C$ $T_C = 110^{\circ}C$	
T_C	Maximum Case Temperature	135	$^{\circ}C$		
T_J	Operating Junction Range	-55 to +175	$^{\circ}C$		
T_{stg}	Storage Temperature Range	-55 to +135	$^{\circ}C$		
	TO-247 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	1.8 3.2	2.5 4	V	$I_F = 25\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 25\text{ A}$ $T_J = 175^\circ\text{C}$	
I_R	Reverse Current	20 100	100 400	μA	$V_R = 1700\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1700\text{ V}$ $T_J = 175^\circ\text{C}$	
Q_C	Total Capacitive Charge	230		nC	$V_R = 1700\text{ V}$, $I_F = 25\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	
C	Total Capacitance	2079 187.5 97		pF	$V_R = 0\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 200\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 800\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$	

Note:

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

Thermal Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.4	$^\circ\text{C}/\text{W}$

Typical Performance

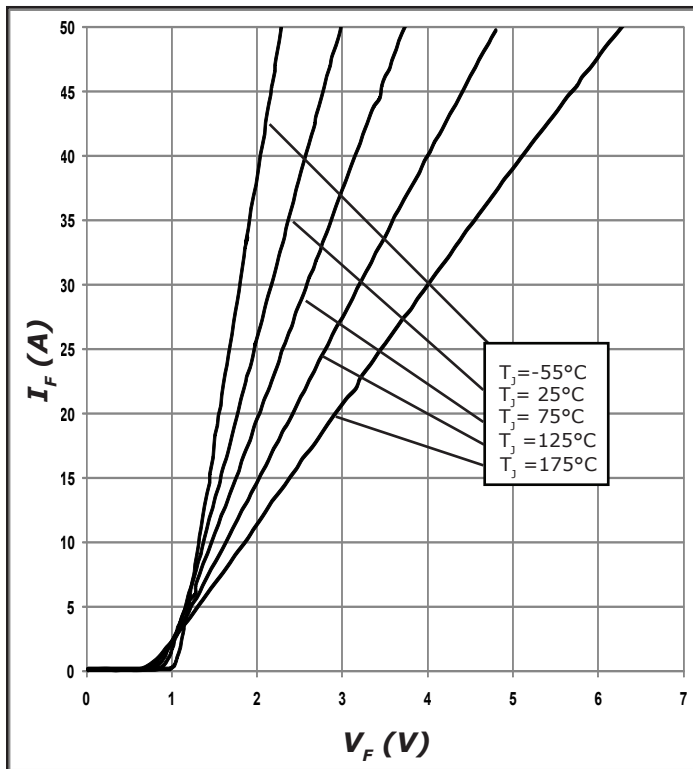


Figure 1. Forward Characteristics

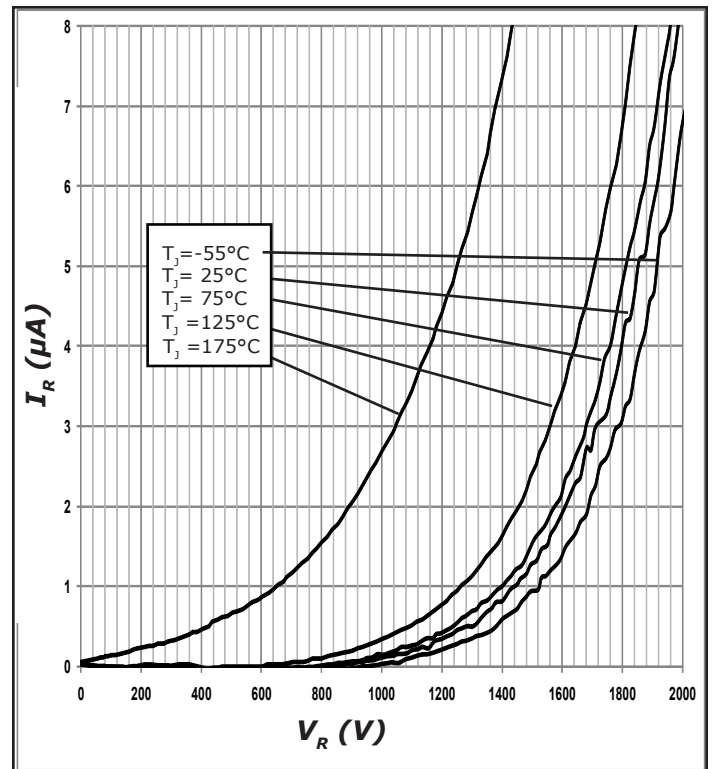


Figure 2. Reverse Characteristics



Typical Performance

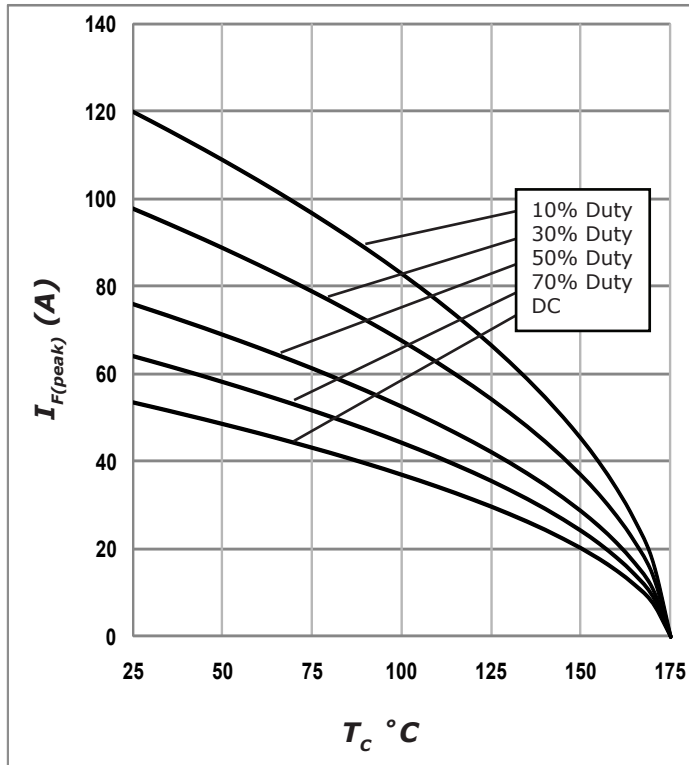


Figure 3. Current Derating

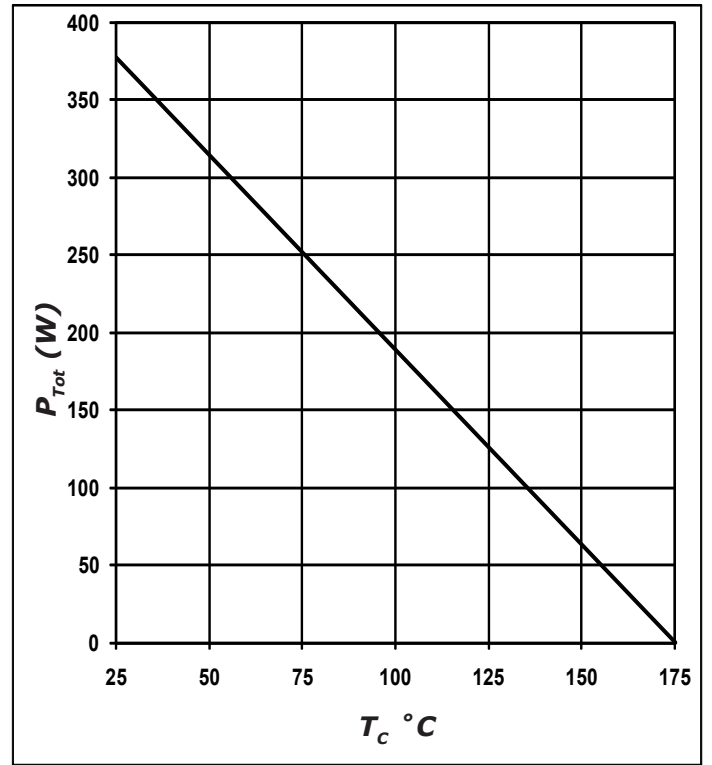


Figure 4. Power Derating

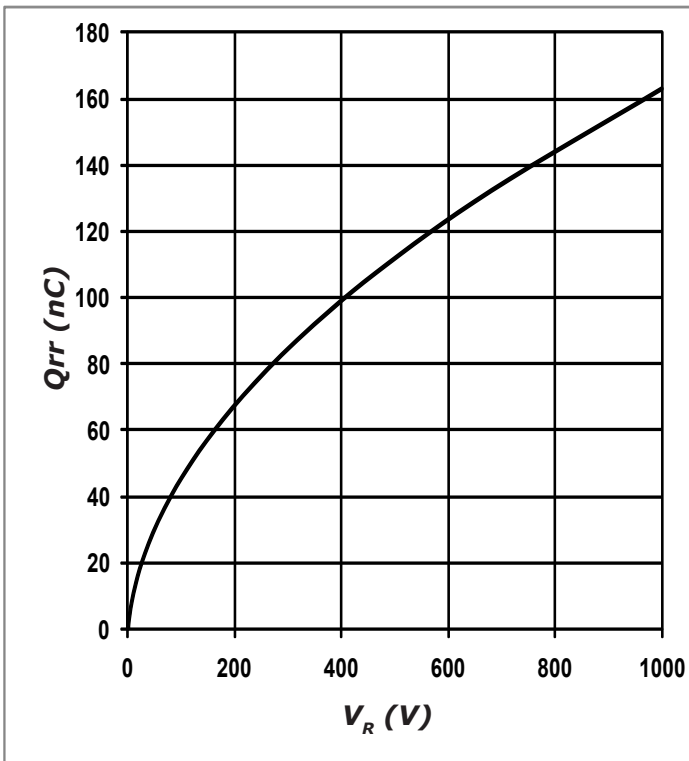


Figure 5. Recovery Charge vs. Reverse Voltage

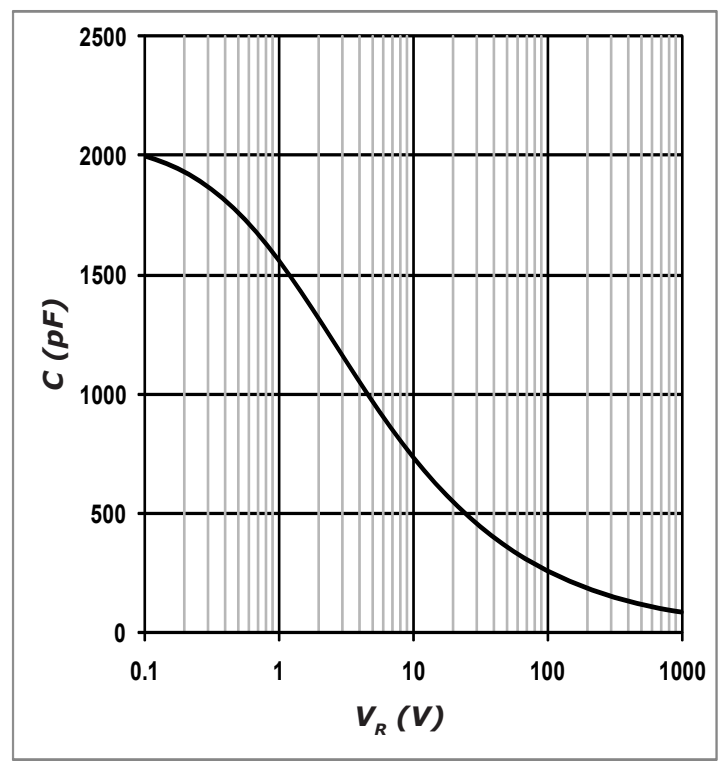


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

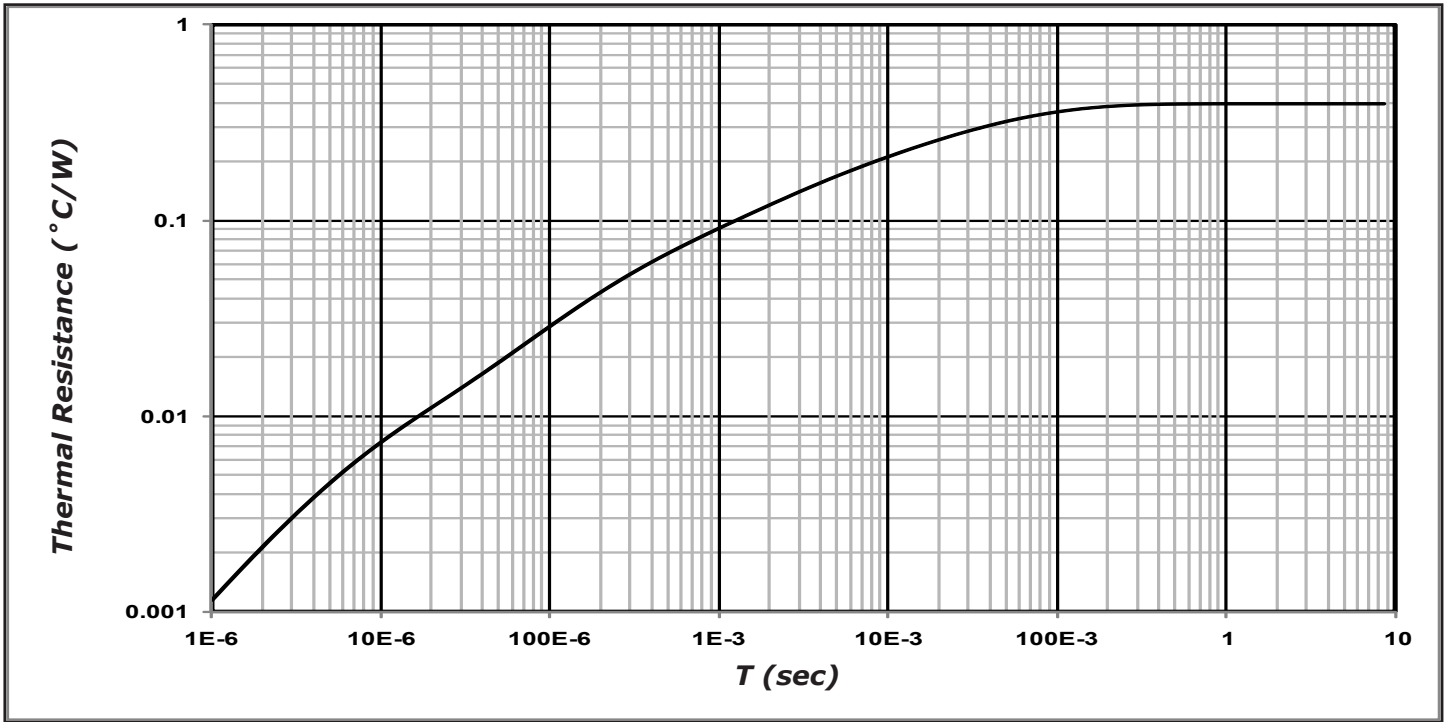
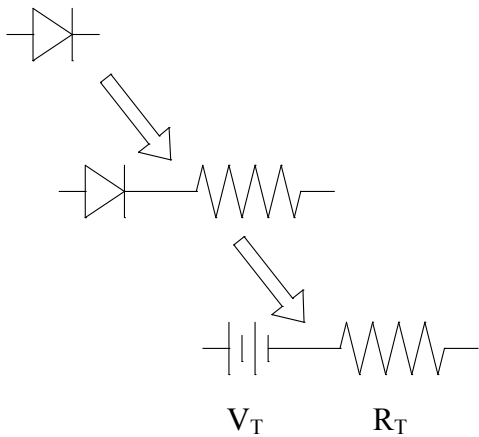


Figure 7. Transient Thermal Impedance

Diode Model



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

$$V_T = 0.99 + (T_j \cdot -1.50 \cdot 10^{-3})$$

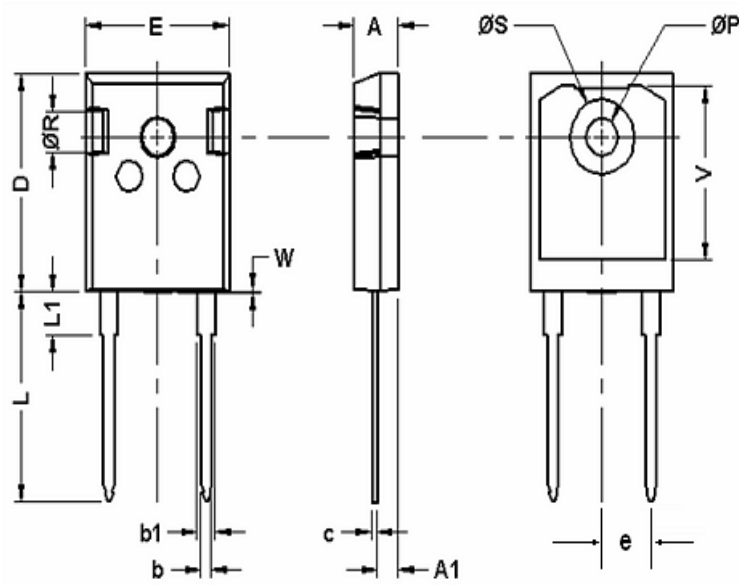
$$R_T = 0.03 + (T_j \cdot 0.5 \cdot 10^{-3})$$

Note: T_j = Diode Junction Temperature in Degrees Celsius



Package Dimensions

Package TO-247-2



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	0.185	0.209	4.70	5.31
A1	0.087	0.102	2.21	2.59
b	0.040	0.055	1.02	1.40
b1	0.065	0.088	1.65	2.23
C	0.016	0.031	0.41	0.79
D	0.819	0.845	20.80	21.46
E	0.61	0.640	15.49	16.26
e	0.215	0.215	5.46	5.46
L	0.78	0.80	19.81	20.32
L1	0.164	0.176	4.17	4.47
øP	0.140	0.144	3.56	3.66
Q	0.212	0.244	5.38	6.20
øR	0.135	0.157	3.43	3.99
øS	0.278	0.288	7.06	7.32
V	0.652	0.662	16.56	16.81
W	0.000	0.006	0.00	0.15

