

High Temperature Silicon Carbide Power Bridge Rectifier

Silicon Carbide Schottky Diodes

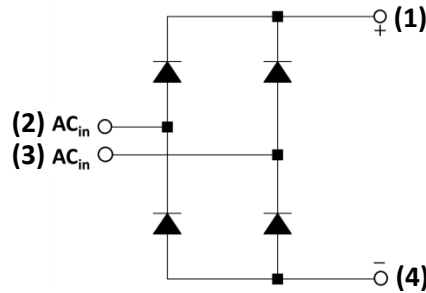
1200 V / 5 A / 34.5 nC

FEATURES

- High temperature: $T_{c(max)} = 225\text{ }^{\circ}\text{C}$, $T_{j(max)} = 225\text{ }^{\circ}\text{C}$
- AS9100:Rev. C-certified manufacturing, traceable throughout value chain
- Near zero forward and reverse recovery
- Extremely fast switching
- High system efficiency
- Hermetic seal; flux free, void free packaging
- Backside isolation
- High reliability

APPLICATIONS

- Downhole tools
- High efficiency converters
- Motor drives
- Aerospace: Military & Commercial
- Smart grid/grid-tie distributed generation



Absolute Maximum Ratings¹ (at $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise stated)

Symbol	Parameter	Condition(s)	Value	Units
V_{RRM}	Repetitive peak reverse voltage		1200	V
V_{DC}	DC blocking voltage		1200	
I_F	Average forward current	$T_j = 175\text{ }^{\circ}\text{C}$	5	A
I_{FRM}	Repetitive peak forward surge current	$T_j = 25\text{ }^{\circ}\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	26^2	
I_{FSM}	Non-repetitive peak forward surge current	$T_j = 25\text{ }^{\circ}\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	46^2	
P_{tot}	Power dissipation	$T_c = 25\text{ }^{\circ}\text{C}$	87^3	W
		$T_c = 100\text{ }^{\circ}\text{C}$	54^3	
		$T_c = 200\text{ }^{\circ}\text{C}$	11^3	
T_j	Operating junction temperature		-50 to 225	$^{\circ}\text{C}$
T_{stg}	Storage temperature		-50 to 225	

¹ Obtained from Cree, Inc. CPW4-1200S005B Rev. A - datasheet

² Assumes thermal resistance of $1.85\text{ }^{\circ}\text{C}/\text{W}$ or less

³ Data obtained through APEI experimentation and/or calculation

SiC Diode Electrical Characteristics¹						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
$V_{SD} = V_F$	Diode forward voltage	$I_F = 5 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	-	1.4	1.8	V
		$I_F = 5 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$	-	1.9	3.0	
I_R	Reverse current	$V_R = 1200 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$	-	20	150	μA
		$V_R = 1200 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$	-	40	300	
Q_C	Total capacitive charge	$V_R = 600 \text{ V}, I_F = 2 \text{ A}$ $di_F/dt = 500 \text{ A}/\mu\text{s}, T_j = 25 \text{ }^\circ\text{C}$		34.5		nC
C	Total capacitance	$V_R = 0 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	-	390	-	pF
		$V_R = 400 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	-	27	-	
		$V_R = 800 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	-	20	-	

Thermal Characteristics (Per Die)						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
$R_{\theta(j-c)}$	Thermal resistance junction-case	Calculated at 200 °C		2.3		$^\circ\text{C}/\text{W}$

Mechanical Characteristics						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
w	Weight			9.0		g
M_s	Mounting torque	6-32 screw into an Al heat sink		6.9	9.2	in-lb
		M3 screw into an Al heat sink		0.78	1.04	N-m

TYPICAL PERFORMANCE CURVES

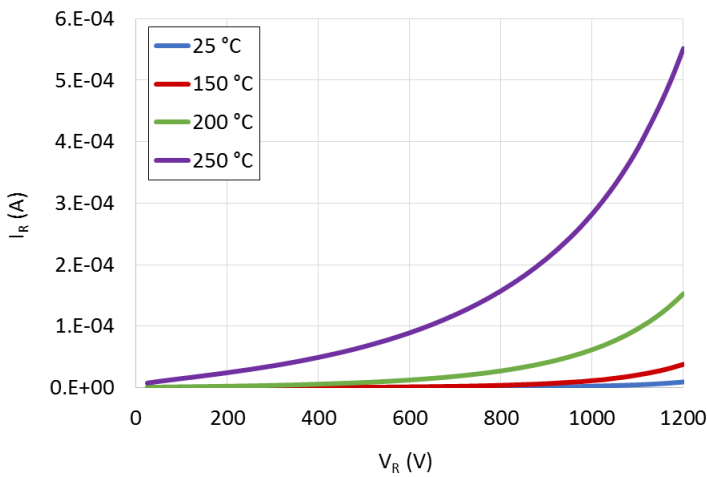


Fig. 1 – Reverse Leakage (2 Diodes in Parallel)

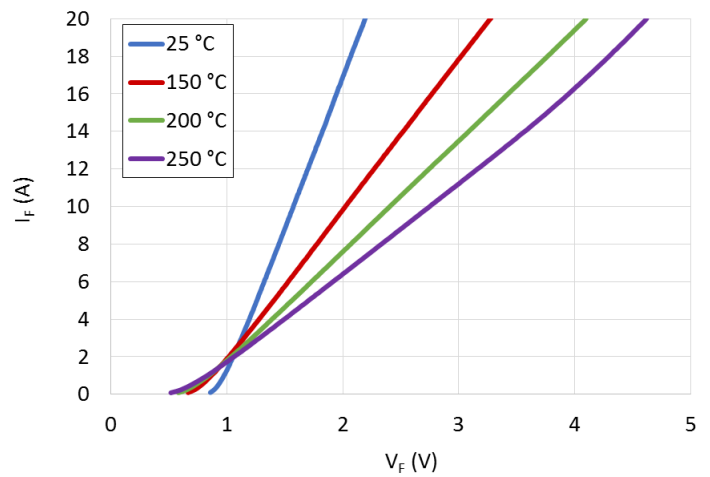
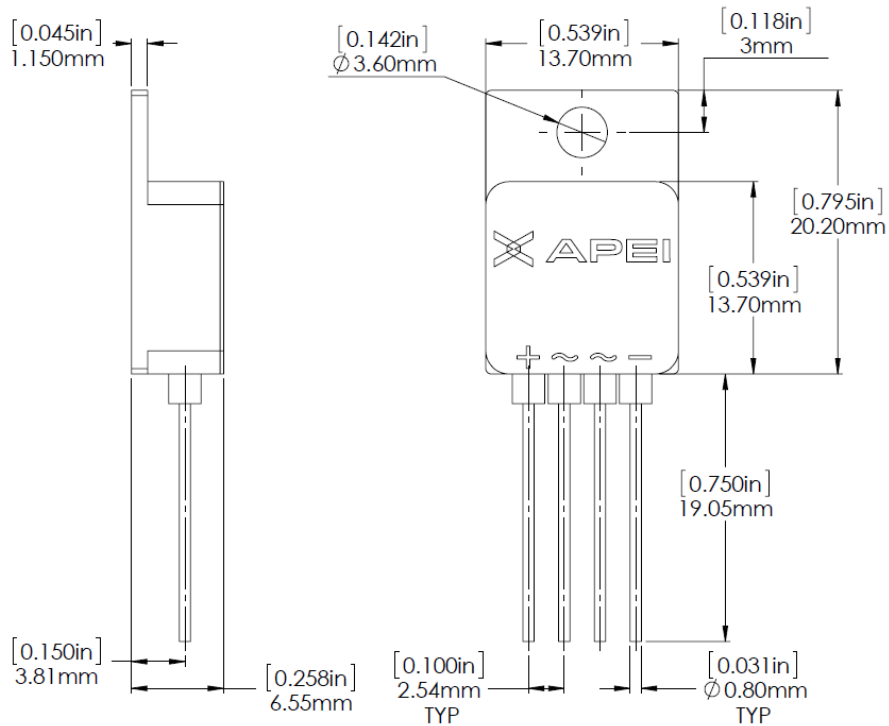


Fig. 2 – Forward Voltage (2 Diodes in Parallel)

PACKAGE DIMENSIONS



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PRELIMINARY

APE HT-0324-5

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