

APE HT-0324-5

High Temperature Silicon Carbide Power Bridge Rectifier

Silicon Carbide Schottky Diodes

FEATURES

• High temperature: T_{c(max)} = 225 °C, T_{j(max)} = 225 °C

1200 V / 5 A / 34.5 nC

• 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

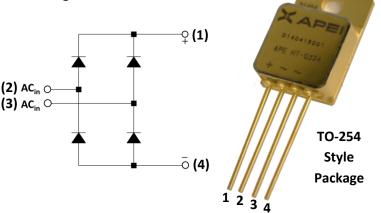
• Downhole tools

• High efficiency converters

Motor drives

Aerospace: Military & Commercial

• Smart grid/grid-tie distributed generation



Absolute Maximum Ratings ¹ (at T _j = 25 °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 °C	5	A		
I _{FRM}	Repetitive peak forward surge current	T_j = 25 °C, t_p = 10 ms, Half Sine Wave	26 ²			
I _{FSM}	Non-repetitive peak forward surge current	T_j = 25 °C, t_p = 10 ms, Half Sine Wave	46²			
	Power dissipation	T _c = 25 °C	87 ³			
P _{tot}		T _c = 100 °C	54 ³	W		
		T _c = 200 °C	11 ³			
Tj	Operating junction temperature		-50 to 225	°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 °C/W or less

³ Data obtained through APEI experimentation and/or calculation



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

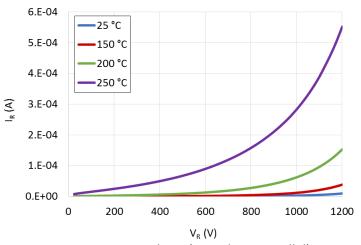
Thermal Characteristics (Per Die)							
Symbols	Parameter	Condition(s)	Values			l loite	
			Min.	Typical	Max.	Units	
$R_{\theta(j-c)}$	Thermal resistance junction- case	Calculated at 200 °C		2.3		°C/W	

Mechanical Characteristics							
Symbols	Parameter	Condition(s)	Values			Limita	
			Min.	Typical	Max.	Units	
W	Weight			9.0		g	
Ms	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	



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TYPICAL PERFORMANCE CURVES

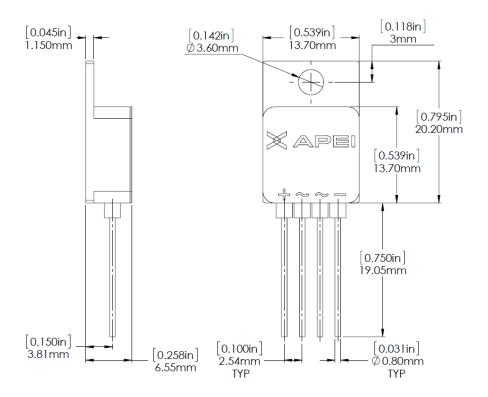


20 -25 °C 18 150°C 16 200 °C 14 250°C 12 I_F (A) 10 8 6 4 2 0 0 2 4 5 V_F (V)

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

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

PACKAGE DIMENSIONS



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