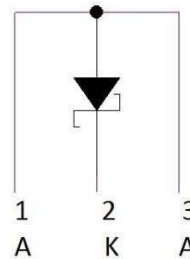
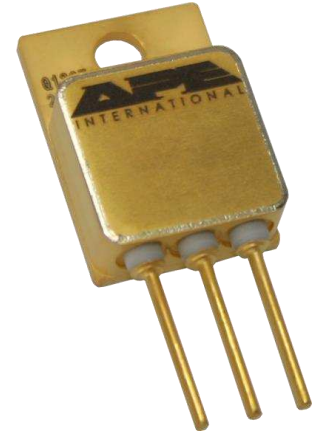


High Temperature Silicon Carbide Schottky Diode

FEATURES

1200 V / 20 A @ 175°C / 130 nC

- High temperature: $T_{C(max)} = 225\text{ °C}$
 $T_{J(max)} = 225\text{ °C}$
- 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 packaging
- Backside isolation
- High reliability



TO-254 Package 1 2 3
A K A

APPLICATIONS

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

Absolute Maximum Ratings¹

Symbol	Parameter	Condition(s)	Value	Units
V_{RRM}	Repetitive peak reverse voltage		1200	V
V_{RSM}	Surge peak reverse voltage		1300	
V_{DC}	DC blocking voltage		1200	
$I_{F(AVG)}$	Average forward current	$T_J = 175\text{ °C}$	20	A
I_{FRM}	Repetitive peak forward surge current	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$ half sine wave	91^2	
I_{FSM}	Non-repetitive peak forward surge current	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$ half sine wave	130^2	
P_{tot}	Power dissipation	$T_C = 25\text{ °C}$	200	W
		$T_C = 100\text{ °C}$	125	
		$T_C = 200\text{ °C}$	25	
T_J	Operating junction temperature		-50 to 225 ³	°C
T_{stg}	Storage temperature		-50 to 225 ³	°C
V_{isol}	Insulation test voltage	AC, 1 min.	TBD	V
		AC, 1 s.	TBD	V

¹ Obtained from Cree Inc. CPW4-1200S020B Rev. - datasheet

² Assumes thermal resistance of 0.62°C/W or less

³ Data obtained through APEI experimentation and/or calculation



SiC Diode Electrical Characteristics ¹						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
$V_{SD} = V_F$	Diode forward voltage	$I_F = 20 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$		1.5	1.8	V
		$I_F = 20 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$		2.2	3	
I_R	Reverse current	$V_R = 1200 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$		35	200	μA
		$V_R = 1200 \text{ V}, T_J = 175 \text{ }^\circ\text{C}$		65	400	
Q_C	Total capacitive charge	$V_R = 1200 \text{ V}, I_F = 20 \text{ A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}, T_J = 25 \text{ }^\circ\text{C}$		130		nC
C	Total capacitance	$V_R = 0 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$		1500		pF
		$V_R = 400 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$		93		
		$V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$		67		

Thermal Characteristics						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
$R_{\theta(j-c)}$	Thermal resistance junction-case	Calculated at 200 °C		TBD	1.0	$^\circ\text{C}/\text{W}$

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

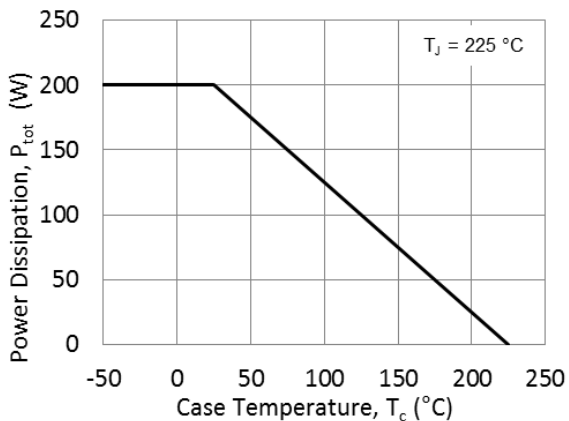
TYPICAL PERFORMANCE CURVES


Figure 1 - Rated power dissipation P_{tot} vs. case temperature T_c

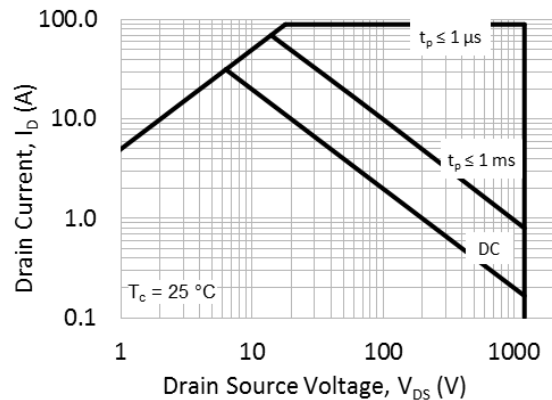


Figure 2 - Maximum safe operating area $I_b = f(V_{DS})$ during pulse operation (SOA)

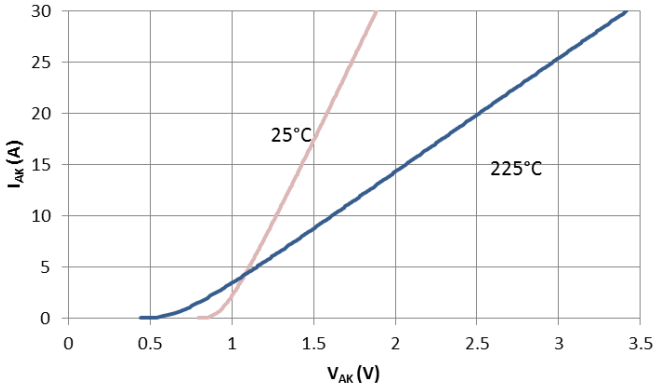


Figure 3 - Forward Characteristics

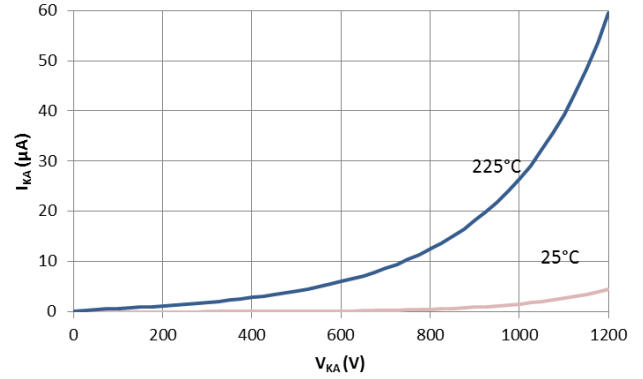
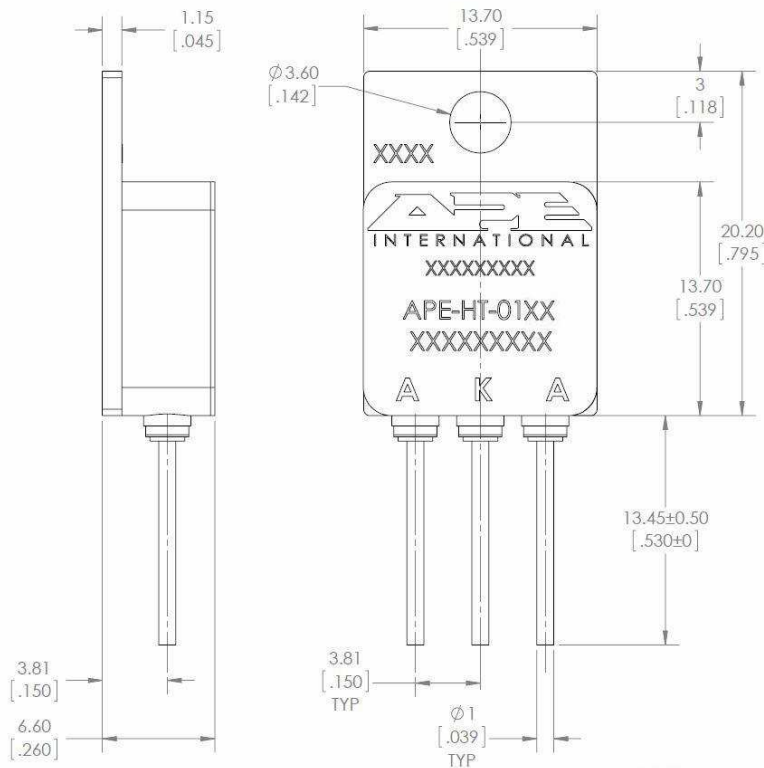


Figure 4 - Reverse Characteristics

PACKAGE DIMENSIONS

All dimensions shown are in inches [millimeters]



PART NUMBER	PACKAGE	MARKING
APE HT-0122	TO-254	Q120709001





PRELIMINARY

APE HT-0122

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