PRELIMINARY

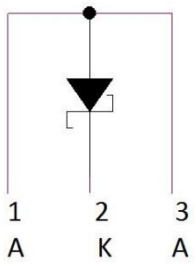
APE HT-0122

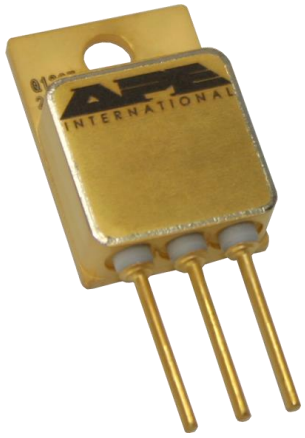
High Temperature Silicon Carbide Schottky Diode

FEATURES

1200 V / 20 A @ 175°C / 130 nC

- **High temperature: $T_{C(max)}$ = 225 °C**
  $T_{J(max)}$ = 225 °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 A** **2 K** **3 A**

APPLICATIONS

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

Absolute Maximum Ratings[1]

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 °C	20	A
I_{FRM}	Repetitive peak forward surge current	T_C = 25 °C, t_P = 10 ms half sine wave	91[2]	
I_{FSM}	Non-repetitive peak forward surge current	T_C = 25 °C, t_P = 10 ms half sine wave	130[2]	
P_{tot}	Power dissipation	T_C = 25 °C	200	W
		T_C = 100 °C	125	
		T_C = 200 °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 A, T_J = 25 °C		1.5	1.8	V
		I_F = 20 A, T_J = 175 °C		2.2	3	
I_R	Reverse current	V_R = 1200 V, T_J = 25 °C		35	200	µA
		V_R = 1200 V, T_J = 175 °C		65	400	
Q_C	Total capacitive charge	V_R = 1200 V, I_F = 20 A di_F/dt = 200 A/µs, T_J = 25 °C		130		nC
C	Total capacitance	V_R = 0 V, T_J = 25 °C, f = 1 MHz		1500		pF
		V_R = 400 V, T_J = 25 °C, f = 1 MHz		93		
		V_R = 800 V, T_J = 25 °C, f = 1 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	°C/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

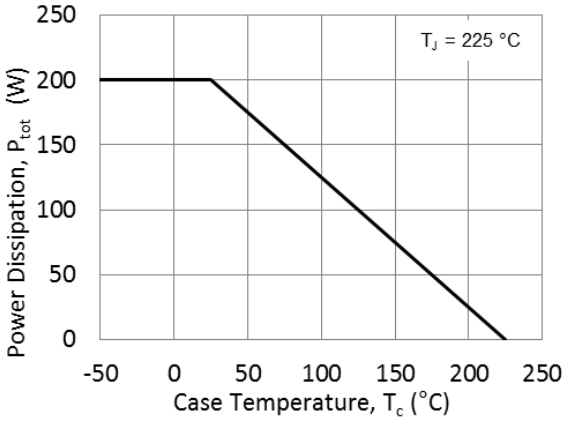


Figure 1 - Rated power dissipation P_{tot} vs. case temperature T_c

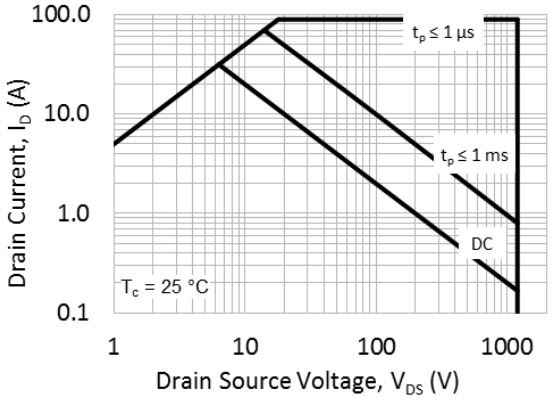


Figure 2 - Maximum safe operating area $I_D = f(V_{DS})$ during pulse operation (SOA)

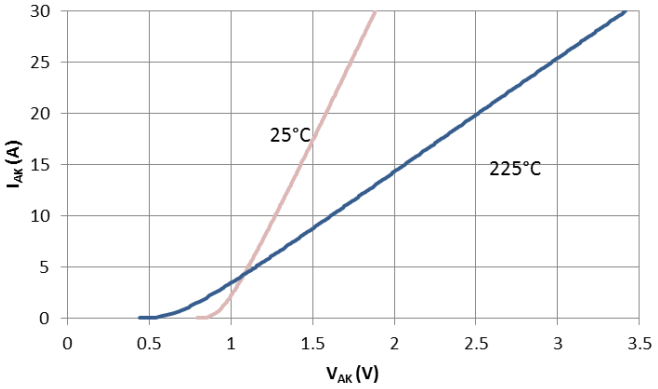


Figure 3 - Forward Characteristics

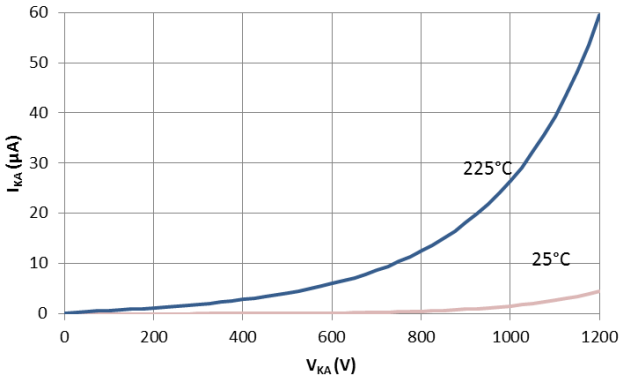
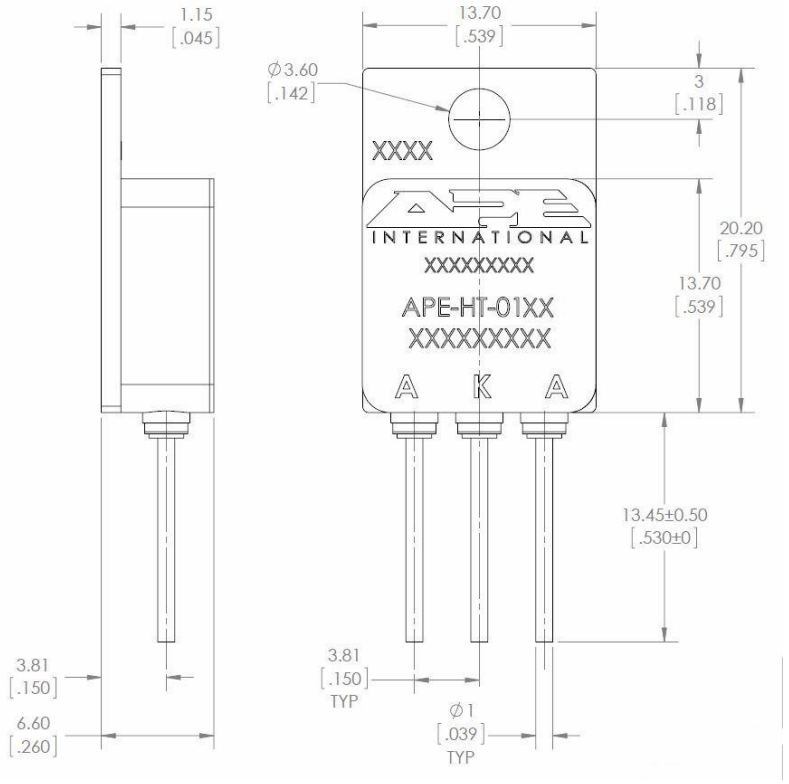


Figure 4 - Reverse Characteristics

PACKAGE DIMENSIONS

All dimensions shown are in inches [millimeters]



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

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