

High Temperature Silicon Carbide Schottky Diode

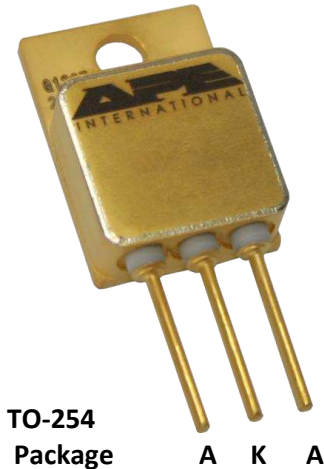
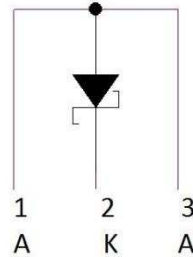
FEATURES

- 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

1200 V / 20 A / 70 nC

APPLICATIONS

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



Absolute Maximum Ratings ¹ ($T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)				
Symbol	Parameter	Condition(s)	Value	Units
V_{RRM}	Repetitive peak reverse voltage		1200	V
V_{DC}	DC blocking voltage	$I_R = 0.4\text{ mA}$	1200	
I_F	Continuous forward current	Limited by T_j	20	A
I_{FRM}	Repetitive peak forward surge current	Limited by T_j , $D = 10\%$	74	
I_{FSM}	Non-repetitive peak forward surge current	PW = 8.3 ms sinusoidal PW = 10 μs square	84 358	
P_{tot}	Power dissipation	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 100\text{ }^{\circ}\text{C}$ $T_j = 225\text{ }^{\circ}\text{C}$	TBD ² TBD ² TBD ²	W
T_j	Operating junction temperature		-50 to 205 ²	$^{\circ}\text{C}$
T_{stg}	Storage temperature		-50 to 225 ²	$^{\circ}\text{C}$
V_{isol}	Insulation test voltage	AC, 1 min.	TBD ²	V
		AC, 1 s.	TBD ²	V

¹ Obtained from ROHM Co., Ltd. TSQ50001-S6103TCS Rev. 0 datasheet

² Data verified 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	$I_F = 20 \text{ A}, T_j = 25 \text{ }^\circ\text{C}^3$	-	1.5	1.75	V
		$I_F = 20 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$	-	2.0	-	
I_R	Reverse current	$V_R = 1200 \text{ V}, T_j = 25 \text{ }^\circ\text{C}^3$	-	20	400	μA
		$V_R = 1200 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$	-	240	-	
Q_C	Total capacitive charge	$V_R = 800 \text{ V}, di_F/dt = 500 \text{ A}/\mu\text{s}$	-	70	-	nC
t_c	Switching time	$V_R = 800 \text{ V}, di_F/dt = 500 \text{ A}/\mu\text{s}$	-	18	-	ns
C	Total capacitance	$V_R = 1 \text{ V}, f = 1 \text{ MHz}$	-	1300	-	pF
		$V_R = 800 \text{ V}, f = 1 \text{ MHz}$	-	100	-	

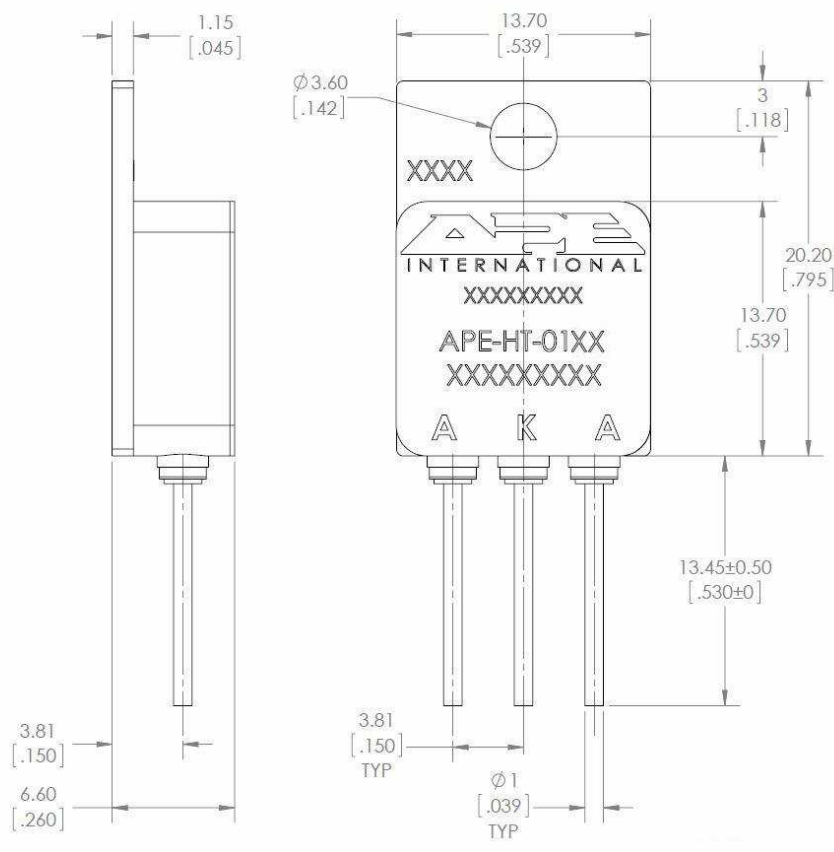
Thermal Characteristics						
Symbols	Parameter	Condition(s)	Values			Units
			Min.	Typical	Max.	
$R_{\theta(j-c)}$	Thermal resistance junction-case	Calculated at 200 °C		TBD	1.0	$^\circ\text{C}/\text{W}$

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

³ Tested on chip

PACKAGE DIMENSIONS

All dimensions shown are in inches [millimeters]



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

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PRELIMINARY

APE HT-0112

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