

Silicon Carbide Power Schottky Diode

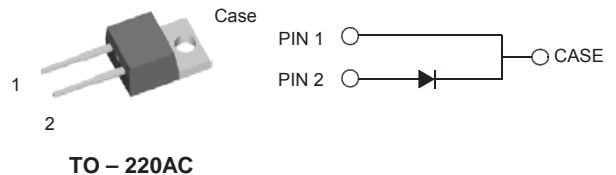
V_{RRM}	=	1200 V
I_F	=	10 A
Q_C	=	37 nC

Features

- 1200 V Schottky rectifier
- 175 °C maximum operating temperature
- Zero reverse recovery charge
- Positive temperature coefficient of V_F
- Extremely fast switching speeds
- Temperature independent switching behavior
- Lowest figure of merit Q_C/I_F

Package

- RoHS Compliant



Advantages

- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Industry's lowest reverse recovery charge
- Industry's lowest device capacitance
- Ideal for output switching of power supplies
- Best in class reverse leakage current at operating temperature

Applications

- Power Factor Correction (PFC)
- Switched-Mode Power Supply (SMPS)
- Solar Inverters
- Wind Turbine Inverters
- Motor Drives
- Induction Heating
- Uninterruptible Power Supply (UPS)
- Voltage Clamping

Maximum Ratings, at $T_j = 175\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \leq 150\text{ °C}$	10	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150\text{ °C}$	17	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	tbd	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ }\mu\text{s}$	tbd	A
i^2t value	$\int i^2 dt$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	tbd	A ² s
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	190	W
Operating and storage temperature	T_j, T_{stg}		-55 to 175	°C

Electrical Characteristics, at $T_j = 175\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 10\text{ A}$, $T_j = 25\text{ °C}$	1.70	1.8		V
		$I_F = 10\text{ A}$, $T_j = 175\text{ °C}$	3.00			
Reverse current	I_R	$V_R = 1200\text{ V}$, $T_j = 25\text{ °C}$	10	240		μA
		$V_R = 1200\text{ V}$, $T_j = 175\text{ °C}$	40	1000		
Total capacitive charge	Q_C	$V_R = 950\text{ V}$, $I_F \leq I_{F,max}$	37			nC
Switching time	t_s	$di_F/dt = 330\text{ A}/\mu\text{s}$, $T_j = 150\text{ °C}$	< 15			ns
Total capacitance	C	$V_R = 3\text{ V}$, $f = 1\text{ kHz}$, $T_j = 25\text{ °C}$	337			pF
		$V_R = 200\text{ V}$, $f = 1\text{ kHz}$, $T_j = 25\text{ °C}$	61			

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	0.79	°C/W
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Mechanical Properties

Mounting torque	M	0.6	Nm
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1. Considering worst case Z_{th} conditions

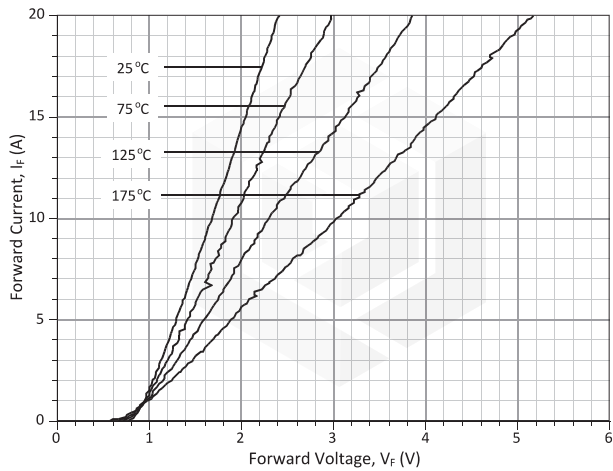


Figure 1: Typical Forward Characteristics

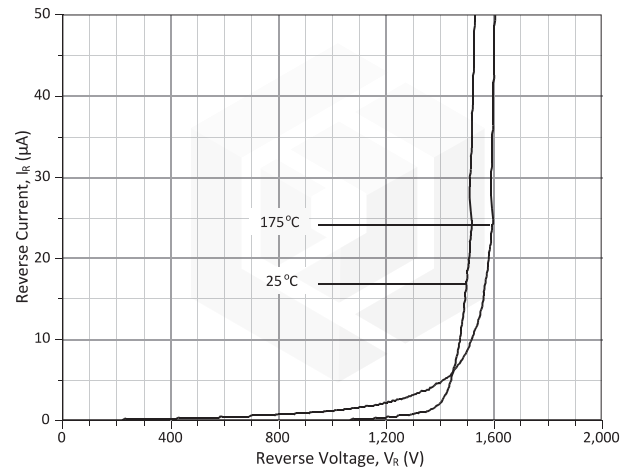


Figure 2: Typical Reverse Characteristics

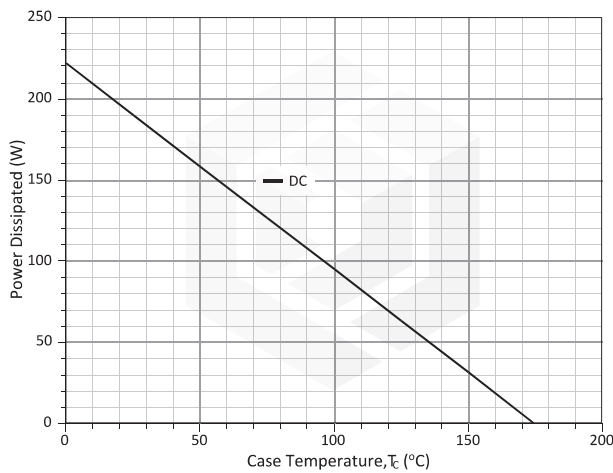


Figure 3: Typical Power Derating Curve

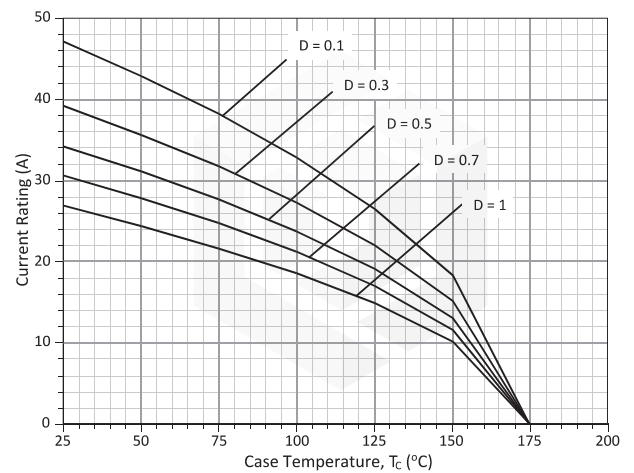


Figure 4: Typical Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)

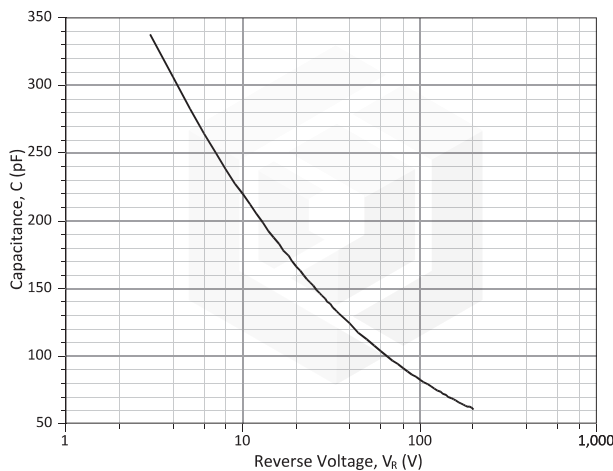


Figure 5: Typical Junction Capacitance versus Reverse Voltage Characteristics

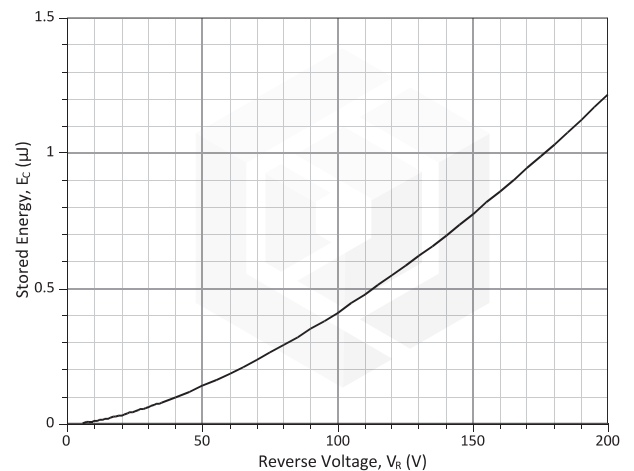


Figure 6: Typical Switching Energy versus Reverse Voltage Characteristics

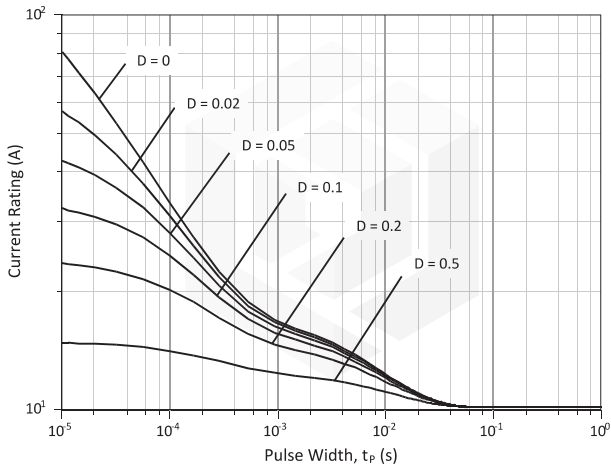


Figure 7: Typical Current versus Pulse Duration Curves at $T_c = 150\text{ }^\circ\text{C}$

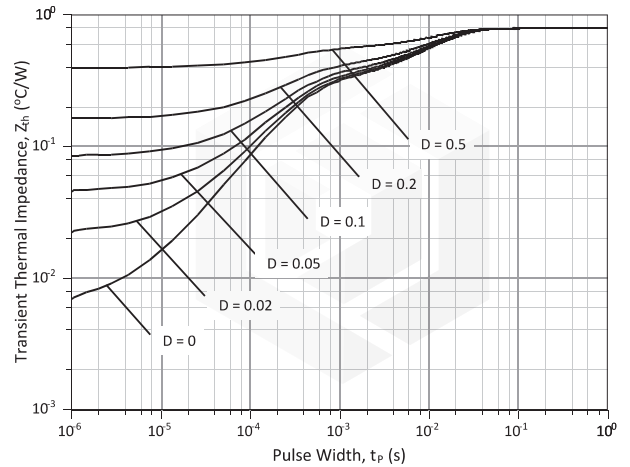
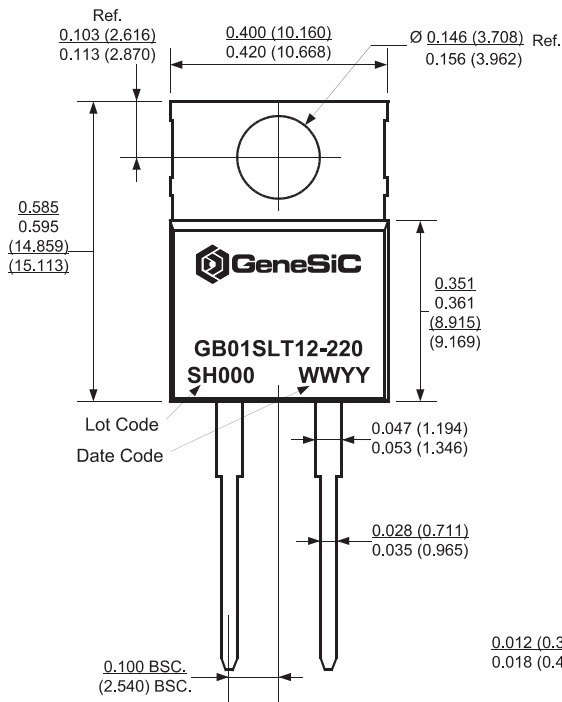


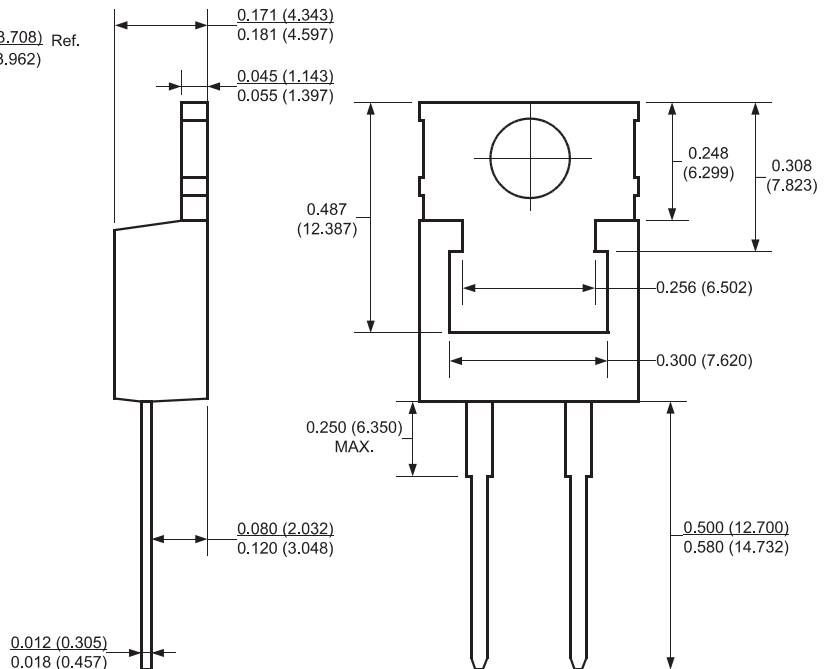
Figure 8: Typical Transient Thermal Impedance

Package Dimensions:

TO-220AC



PACKAGE OUTLINE



NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BRACKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS

Revision History

Date	Revision	Comments	Supersedes
2010/12/14	1	Second generation release	GA10SLT12-220

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