

## Silicon Carbide Power Schottky Diode

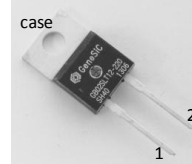
$V_{RRM}$	=	1200 V
$I_F (T_C = 25^\circ\text{C})$	=	5 A
$I_F (T_C \leq 150^\circ\text{C})$	=	2 A
$Q_C$	=	9 nC

### Features

- Industry's leading low leakage currents
- 175 °C maximum operating temperature
- Temperature independent switching behavior
- Superior surge current capability
- Positive temperature coefficient of  $V_F$
- Extremely fast switching speeds
- Superior figure of merit  $Q_C/I_F$

### Package

- RoHS Compliant


**TO – 220AC**


### Advantages

- Low standby power losses
- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Low reverse recovery current
- Low device capacitance
- Low 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)
- High Voltage Multipliers

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

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	$V_{RRM}$		1200	V
Continuous forward current	$I_F$	$T_C = 25^\circ\text{C}$	5	A
Continuous forward current	$I_F$	$T_C \leq 150^\circ\text{C}$	2	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150^\circ\text{C}$	3	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$ $T_C = 150^\circ\text{C}, t_p = 10\text{ ms}$	18 15	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}$	100	A
$I^2t$ value	$\int i^2 dt$	$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$ $T_C = 150^\circ\text{C}, t_p = 10\text{ ms}$	1.6 1.1	$\text{A}^2\text{s}$
Power dissipation	$P_{tot}$	$T_C = 25^\circ\text{C}$	65	W
Operating and storage temperature	$T_j, T_{stg}$		-55 to 175	$^\circ\text{C}$

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

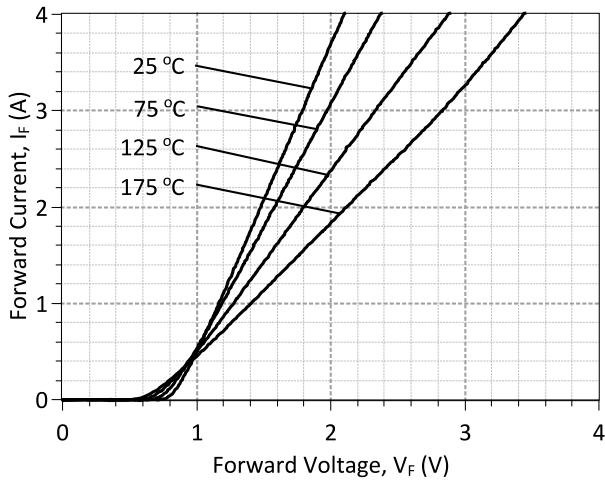
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	$V_F$	$I_F = 2\text{ A}, T_j = 25^\circ\text{C}$ $I_F = 2\text{ A}, T_j = 175^\circ\text{C}$		1.5 2.6	1.8 3.0	V
Reverse current	$I_R$	$V_R = 1200\text{ V}, T_j = 25^\circ\text{C}$ $V_R = 1200\text{ V}, T_j = 175^\circ\text{C}$		5 10	50 100	$\mu\text{A}$
Total capacitive charge	$Q_C$	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 175^\circ\text{C}$	$V_R = 400\text{ V}$	9		nC
			$V_R = 960\text{ V}$	14		
Switching time	$t_s$		$V_R = 400\text{ V}$ $V_R = 960\text{ V}$	< 17		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$ $V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$ $V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		131 12 8		pF

### Thermal Characteristics

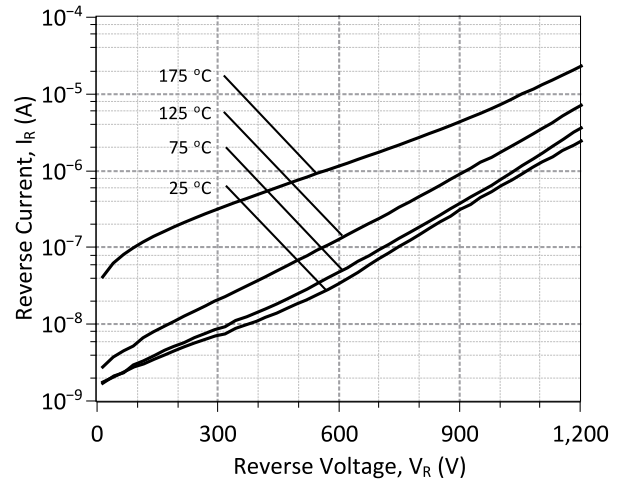
Thermal resistance, junction - case	$R_{thJC}$	2.3	$^\circ\text{C}/\text{W}$
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### Mechanical Properties

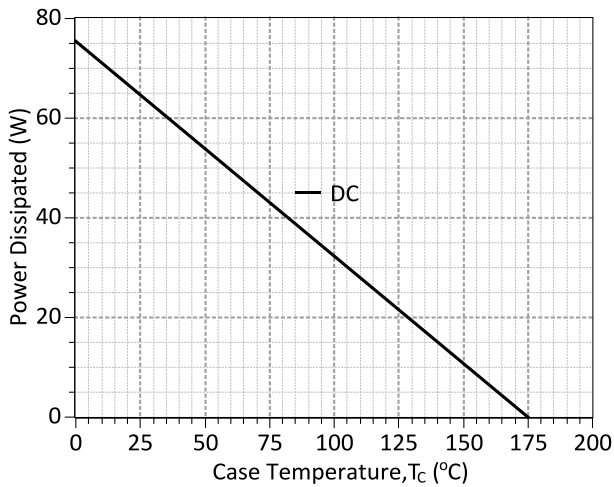
Mounting torque	M	0.6	Nm
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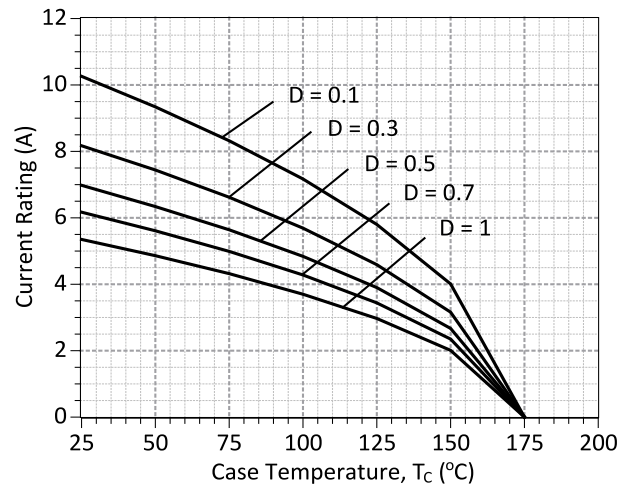
**Figure 1: Typical Forward Characteristics**



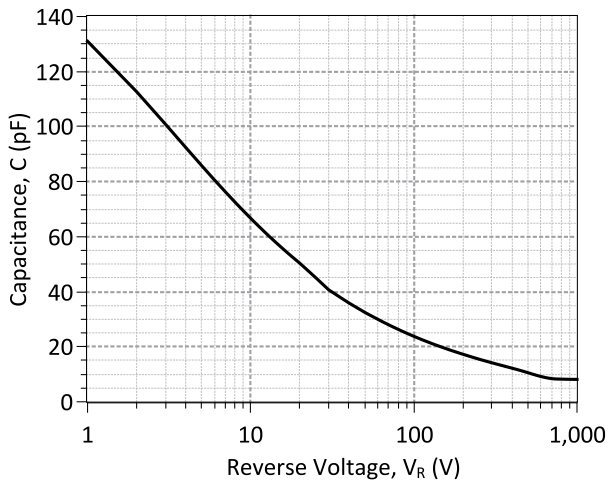
**Figure 2: Typical Reverse Characteristics**



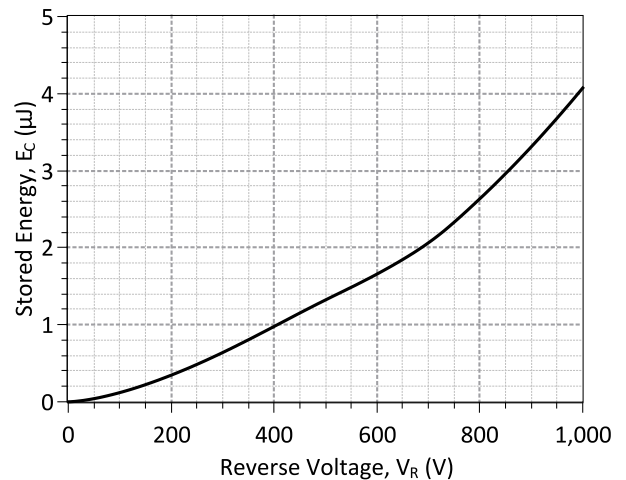
**Figure 3: Power Derating Curve**



**Figure 4: Current Derating Curves ( $D = t_p/T$ ,  $t_p = 400 \mu s$ )  
(Considering worst case  $Z_{th}$  conditions)**



**Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics**



**Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics**

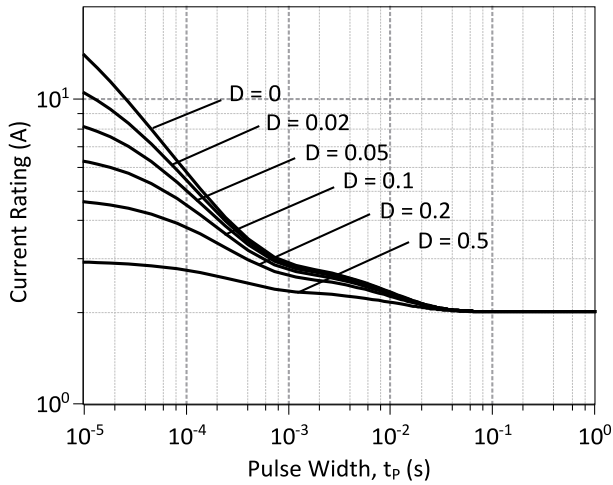


Figure 7: Current vs Pulse Duration Curves at  $T_c = 160\text{ }^\circ\text{C}$

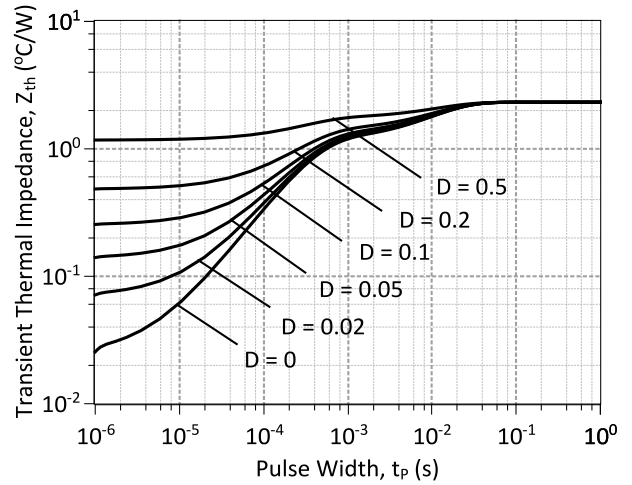
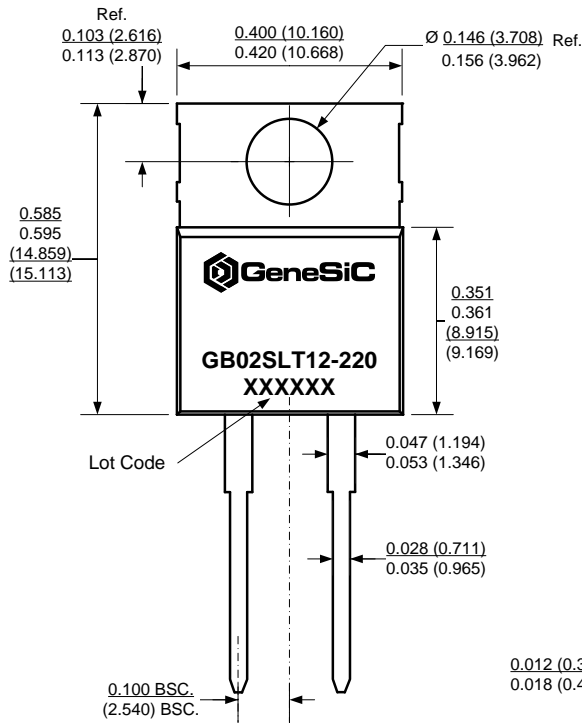


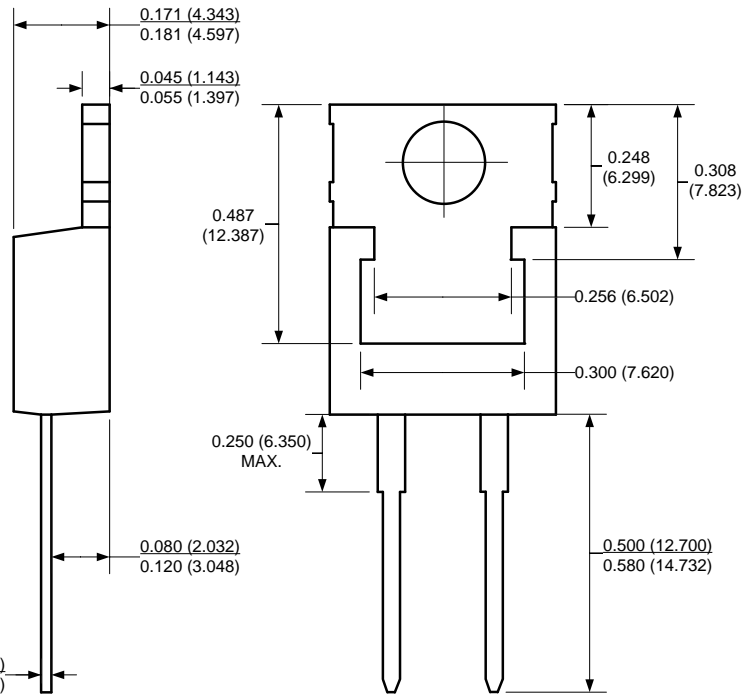
Figure 8: Transient Thermal Impedance

**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
2014/08/26	4	Updated Electrical Characteristics	
2013/06/12	3	Updated Electrical Characteristics	
2012/12/18	2	Second generation update	
2012/05/22	1	Second generation release	
2010/12/13	0	Initial release	

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## SPICE Model Parameters

This is a secure document. Please copy this code from the SPICE model PDF file on our website ([http://www.genesicsemi.com/images/products\\_sic/rectifiers/GB02SLT12-220\\_SPICE.pdf](http://www.genesicsemi.com/images/products_sic/rectifiers/GB02SLT12-220_SPICE.pdf)) into LTSPICE (version 4) software for simulation of the GB02SLT12-220.

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*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      04-SEP-2013   $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*
*      COPYRIGHT (C) 2013 GeneSiC Semiconductor Inc.
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*
*      These models are provided "AS IS, WHERE IS, AND WITH NO WARRANTY
*      OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED
*      TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A
*      PARTICULAR PURPOSE."
*      Models accurate up to 2 times rated drain current.
*
*      Start of GB02SLT12-220 SPICE Model
*
.SUBCKT GB02SLT12 ANODE KATHODE
D1 ANODE KATHODE GB02SLT12
D2 ANODE KATHODE GB02SLT12_PIN
.MODEL GB02SLT12 D
+ IS      2.05E-15      RS      0.282
+ TRS1    0.0054       TRS2    3E-05
+ N       1            IKF     251
+ EG      1.2          XTI     -1.8
+ CJO     1.61E-10     VJ      0.4508
+ M       1.586        FC      0.5
+ TT      1.00E-10     BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    2            TYPE    SiC_Schottky
+ MFG     GeneSiC_Semi
.MODEL GB02SLT12_PIN D
+ IS      1.54E-25     RS      0.39
+ TRS1    -0.003      N       3.941
+ EG      3.23        IKF     19
+ XTI     0           FC      0.5
+ TT      0           BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    10          TYPE    SiC_PiN
.ENDS
*
*      End of GB02SLT12-220 SPICE Model
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