

## High Temperature Silicon Carbide Power Schottky Diode

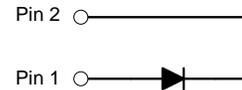
$V_{RRM}$	=	300 V
$I_F (T_C=25^\circ\text{C})$	=	4 A
$Q_C$	=	9 nC

### Features

- 300 V Schottky rectifier
- 225 °C maximum operating temperature
- Zero reverse recovery charge
- Superior surge current capability
- Positive temperature coefficient of  $V_F$
- Temperature independent switching behavior
- Lowest figure of merit  $Q_C/I_F$
- Available screened to Mil-PRF-19500

### Package

- RoHS Compliant



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### Advantages

- High temperature operation
- 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

- Down Hole Oil Drilling
- Geothermal Instrumentation
- Solenoid Actuators
- General Purpose High-Temperature Switching
- Amplifiers
- Solar Inverters
- Switched-Mode Power Supply (SMPS)
- Power Factor Correction (PFC)

### Maximum Ratings at $T_j = 225^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	$V_{RRM}$		300	V
Continuous forward current	$I_F$	$T_C = 25^\circ\text{C}$	4	A
Continuous forward current	$I_F$	$T_C \leq 225^\circ\text{C}$	2	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 225^\circ\text{C}$	4	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$	10	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ\text{C}, t_p = 10\ \mu\text{s}$	65	A
$I^2t$ value	$\int I^2 dt$	$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$	0.5	$\text{A}^2\text{S}$
Power dissipation	$P_{tot}$	$T_C = 25^\circ\text{C}$	64	W
Operating and storage temperature	$T_j, T_{stg}$		-55 to 225	$^\circ\text{C}$

### Electrical Characteristics at $T_j = 225^\circ\text{C}$ , unless otherwise specified

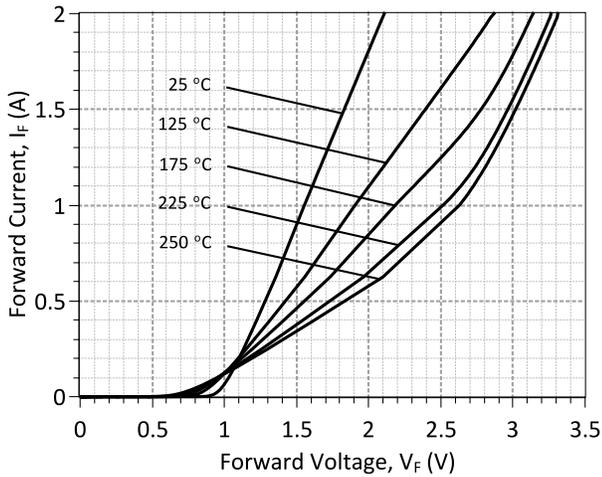
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	$V_F$	$I_F = 1\text{ A}, T_j = 25^\circ\text{C}$		1.6		V
		$I_F = 1\text{ A}, T_j = 225^\circ\text{C}$		2.6		
Reverse current	$I_R$	$V_R = 300\text{ V}, T_j = 25^\circ\text{C}$		1	5	$\mu\text{A}$
		$V_R = 300\text{ V}, T_j = 225^\circ\text{C}$		5	50	
Total capacitive charge	$Q_C$	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210^\circ\text{C}$		9		nC
Switching time	$t_s$	$V_R = 300\text{ V}$		< 17		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		76		pF
		$V_R = 300\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		15		

### Thermal Characteristics

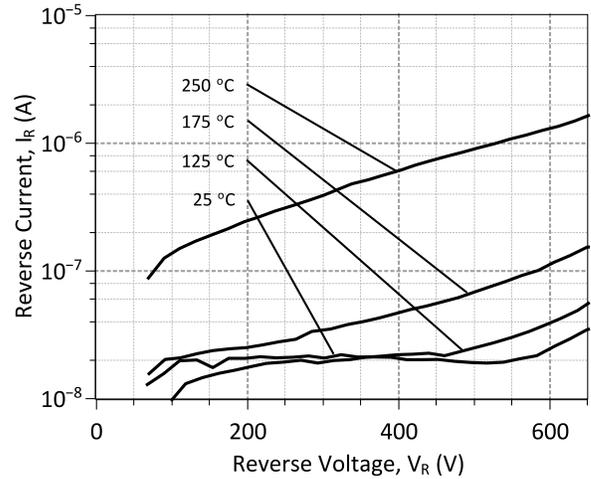
Thermal resistance, junction - case	$R_{thJC}$	5.55	$^\circ\text{C}/\text{W}$
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### Mechanical Properties

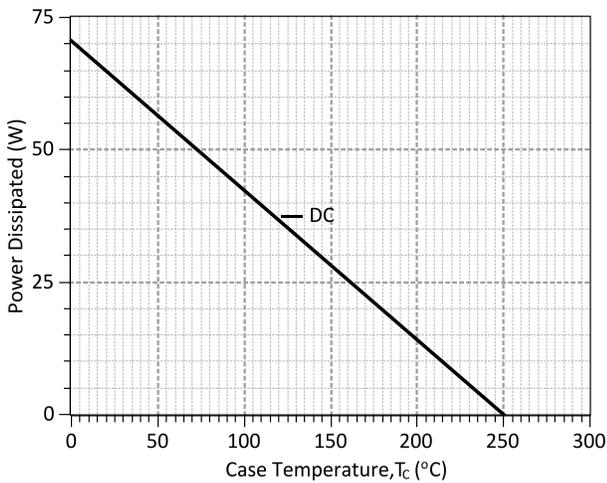
Mounting torque	M	0.6	Nm
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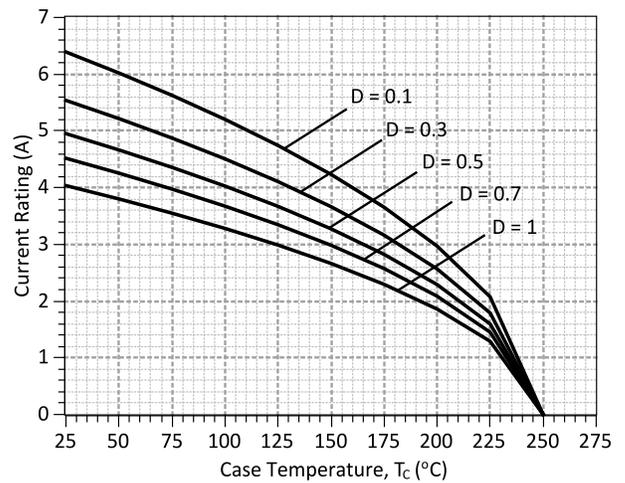
**Figure 1: Typical Forward Characteristics**



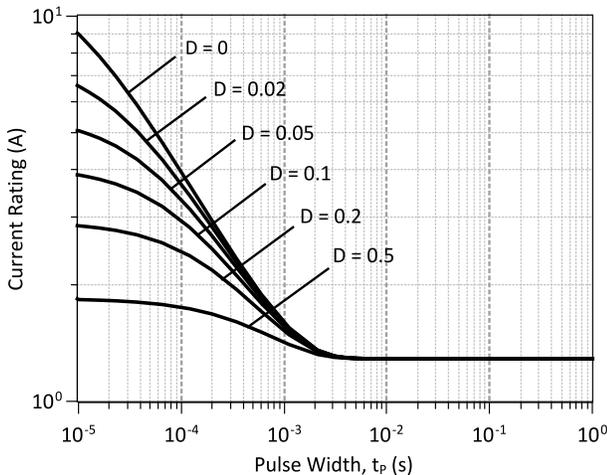
**Figure 2: Typical Reverse Characteristics**



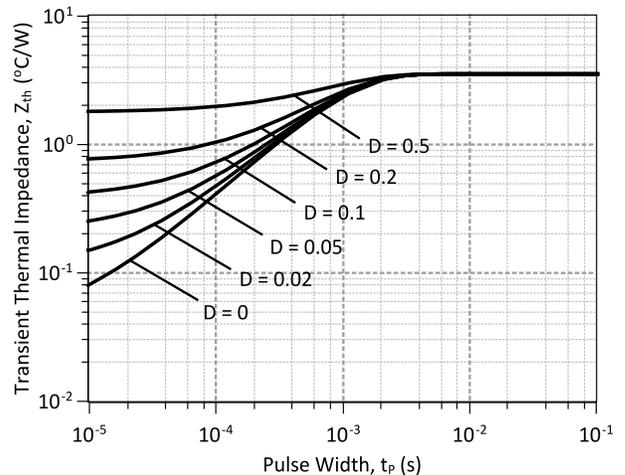
**Figure 3: Power Derating Curve**



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



**Figure 5: Current vs Pulse Duration Curves at  $T_C = 225 \text{ }^\circ\text{C}$**

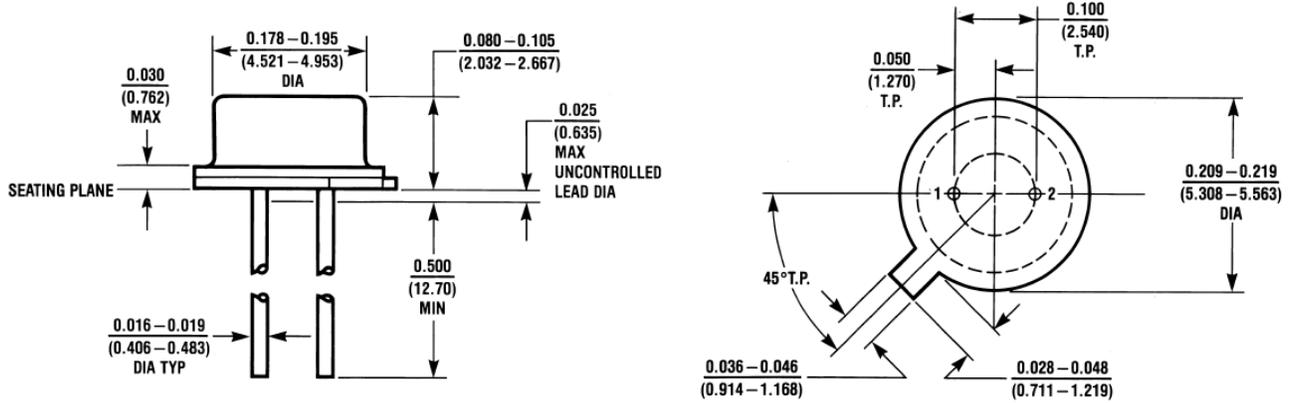


**Figure 6: Transient Thermal Impedance**

Package Dimensions:

TO-46

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
2014/08/29	0	Initial release	

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## SPICE Model Parameters

This is a secure document. Copy this code from the SPICE model PDF file on our website into a SPICE software program for simulation of the GB02SHT03-46.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      29-AUG-2014   $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*
*      COPYRIGHT (C) 2014 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 GB02SHT03-46 SPICE Model
*
.SUBCKT GB02SHT03ANODE KATHODE
D1 ANODE KATHODE GB02SHT03_25C; Call the Schottky Diode Model
D2 ANODE KATHODE GB02SHT03_PIN; Call the PiN Diode Model
.MODEL GB02SHT03_25C D
+ IS      3.57E-18      RS      0.49751
+ TRS1    0.0057       TRS2    2.40E-05
+ N       1            IKF     322
+ EG      1.2          XTI     3
+ CJO     9.12E-11     VJ     0.371817384
+ M       1.527759838  FC      0.5
+ TT      1.00E-10     BV     300
+ IBV     1.00E-03    VPK     300
+ IAVE    2            TYPE    SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL GB02SHT03_PIN D
+ IS      5.73E-11     RS      0.72994
+ N       5            IKF     800
+ EG      3.23         XTI     -14
+ FC      0.5          TT      0
+ BV     300           IBV     1.00E-03
+ VPK    300           IAVE    2
+ TYPE    SiC_PiN
.ENDS
*
*      End of GB02SHT03 SPICE Model
```



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#### Как с нами связаться

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