

Silicon Carbide Power Schottky Diode Chip

Features

- 1200 V Schottky rectifier
- 250 °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



Maximum Ratings at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \leq 235\text{ °C}$	1	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 235\text{ °C}$	2	A
Operating and storage temperature	T_j, T_{stg}		-55 to 250	°C

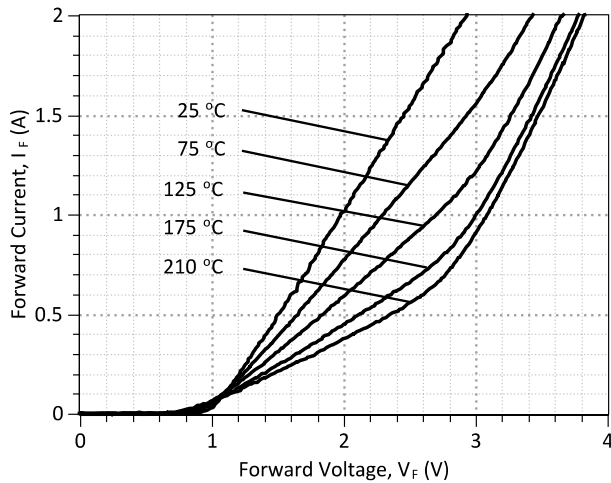
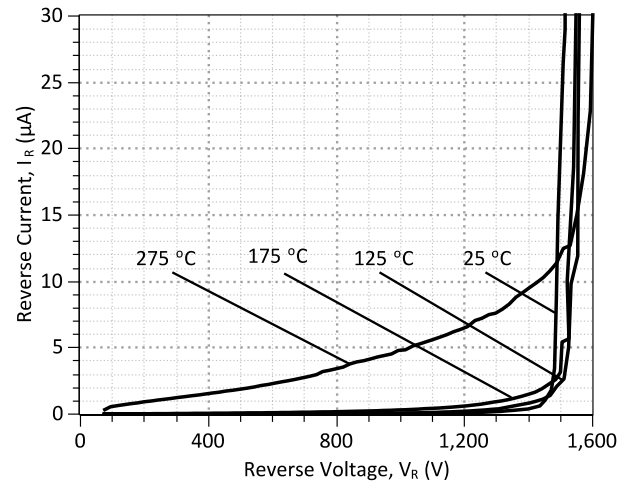
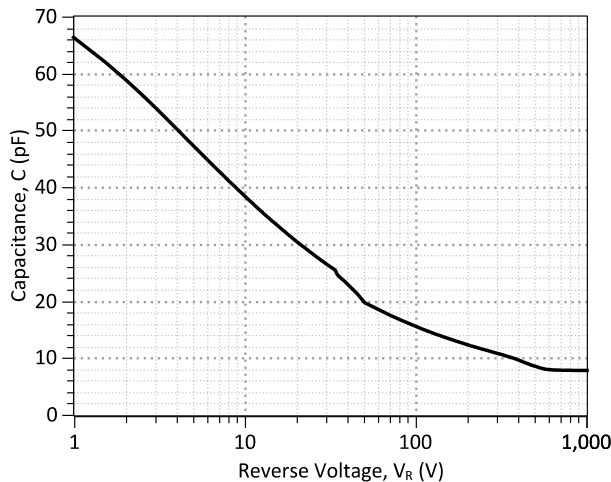
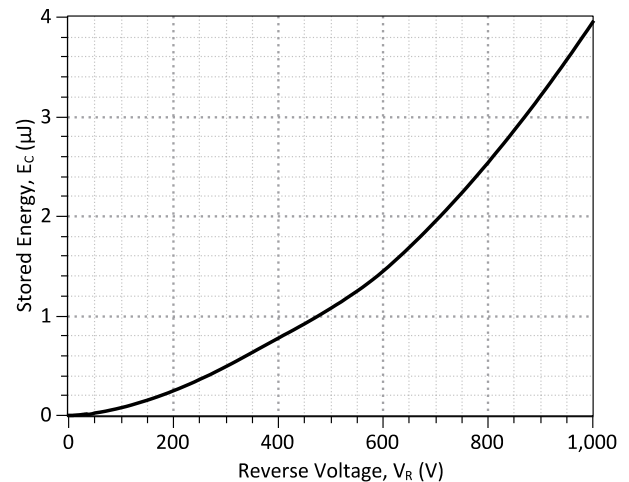
Electrical Characteristics at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 1\text{ A}, T_j = 25\text{ °C}$		1.96		V
		$I_F = 1\text{ A}, T_j = 210\text{ °C}$		3.1		
Reverse current	I_R	$V_R = 1200\text{ V}, T_j = 25\text{ °C}$		0.1	10	μA
		$V_R = 1200\text{ V}, T_j = 275\text{ °C}$		6.6	30	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210\text{ °C}$	$V_R = 400\text{ V}$	6		nC
	$V_R = 960\text{ V}$		11			
Switching time	t_s	$V_R = 400\text{ V}$ $V_R = 960\text{ V}$		< 17		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		66		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		10		
		$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		8		

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	Assuming TO-276 package	3.55	°C/W
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*For chip size and metallization, please refer to the mechanical datasheet (must have a non-disclosure agreement with GeneSiC Semiconductor).


Figure 1: Typical Forward Characteristics

Figure 2: Typical Reverse Characteristics

Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

Figure 4: Typical Switching Energy vs Reverse Voltage Characteristics
Revision History

Date	Revision	Comments	Supersedes
2012/04/03	0	Initial release	

Published by
 GeneSiC Semiconductor, Inc.
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 Dulles, VA 20166

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SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GB01SHT12-CAL device.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      05-SEP-2013   $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*      http://www.genesicsemi.com/index.php/sic-products/schottky
*
*      COPYRIGHT (C) 2013 GeneSiC Semiconductor Inc.
*      ALL RIGHTS RESERVED
*
*      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 GB01SHT12-CAL SPICE Model
*
.SUBCKT GB01SHT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.0099); Temperature Dependant Resistor
D1 INT KATHODE GB01SHT12_25C; Call the 25C Diode Model
D2 ANODE KATHODE GB01SHT12_PIN; Call the PiN Diode Model
.MODEL GB01SHT12_25C D
+ IS      1.88E-18      RS      0.9255
+ N       1            IKF     98.29122743
+ EG      1.2          XTI     3
+ CJO     7.90E-11     VJ      0.367
+ M       1.63         FC      0.5
+ TT      1.00E-10     BV      1500
+ IBV     1.00E-03     VPK     1200
+ IAVE    1            TYPE    SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL GB01SHT12_PIN D
+ IS      2.76E-16      RS      0.84243
+ N       3.791461     IKF     2.98675
+ EG      3.23         XTI     30
+ FC      0.5          TT      0
+ BV      1500         IBV     1.00E-03
+ VPK     1200         IAVE    1
+ TYPE    SiC_PiN
.ENDS
*
*      End of GB01SHT12-CAL SPICE Model
```