# **Electrical Datasheet\***

GB05SHT12-CAL

# Silicon Carbide Power Schottky Diode Chip

#### **Features**

- 1200 V Schottky rectifier
- 250 °C maximum operating temperature
- Temperature independent switching behavior
- Superior surge current capability
- $\bullet$  Positive temperature coefficient of  $V_{\text{F}}$
- Extremely fast switching speeds
- Superior figure of merit Q<sub>C</sub>/I<sub>F</sub>



## Maximum Ratings at T<sub>j</sub> = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	$V_{RRM}$		1200	V
Continuous forward current	I <sub>F</sub>	T <sub>C</sub> ≤ 215 °C	5	Α
RMS forward current	I <sub>F(RMS)</sub>	T <sub>C</sub> ≤ 215 °C	8	Α
Operating and storage temperature	$T_{j}$ , $T_{stg}$		-55 to 250	°C

## Electrical Characteristics at T<sub>j</sub> = 250 °C, unless otherwise specified

Dovemeter	Cumbal	Conditions -		Values		l lmi4	
Parameter	Symbol			min.	typ.	max.	Unit
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> = 5 A, T <sub>j</sub> = 25 °C		2.1		V	
	VF	$I_F = 5 \text{ A}, T_j = 210 ^{\circ}\text{C}$			3.5	V	V
Reverse current	1	V <sub>R</sub> = 1200 V, T <sub>j</sub>	= 25 °C		0.9	10	
	I <sub>R</sub>	$V_R = 1200 \text{ V}, T_j = 250 ^{\circ}\text{C}$		20.8	150	μΑ	
Total capacitive charge	Qc		V <sub>R</sub> = 400 V		17		200
		$I_F \le I_{F,MAX}$ - $dI_F/dt = 200 A/\mu s$	$V_{R} = 960 \text{ V}$		29		nC
Switching time	t <sub>s</sub>	$T_i = 210 ^{\circ}\text{C}$	V <sub>R</sub> = 400 V		< 25		ns
		V <sub>R</sub> = 960 V		\ 23		115	
Total capacitance	С	$V_R = 1 \text{ V, f} = 1 \text{ MHz, T}_j = 25 ^{\circ}\text{C}$		237			
		$V_R = 400 \text{ V}, f = 1 \text{ MHz}, T_j = 25 ^{\circ}\text{C}$		25		pF	
		$V_R = 1000 \text{ V, f} = 1 \text{ MHz, T}_j = 25 \text{ °C}$			20		
•		•	,				

#### **Thermal Characteristics**

Thermal redictation, junction case Table 1.00	Thermal resistance, junction - case	$R_{thJC}$	Assuming TO-276 package	1.38	°C/W
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<sup>\*</sup>For chip size and metallization, please refer to the mechanical datasheet (must have a non-disclosure agreement with GeneSiC Semiconductor).

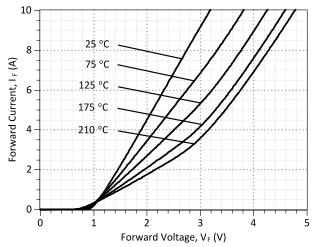


Figure 1: Typical Forward Characteristics

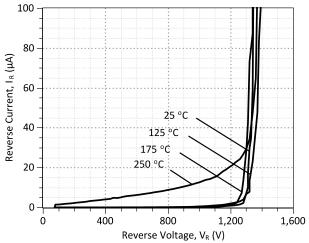


Figure 2: Typical Reverse Characteristics

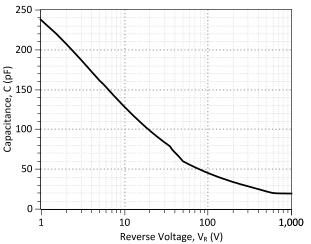


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

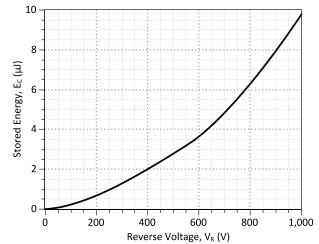


Figure 4: Typical Switching Energy vs Reverse Voltage Characteristics

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

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## **SPICE Model Parameters**

Copy the following code into a SPICE software program for simulation of the GB05SHT12-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
    httphttp://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 GB05SHT12-CAL SPICE Model
.SUBCKT GB05SHT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.0021); Temperature Dependant Resistor
D1 INT KATHODE GB05SHT12 25C; Call the 25C Diode Model
D2 ANODE KATHODE GB05SHT12 PIN; Call the PiN Diode Model
.MODEL GB05SHT12 25C D
+ IS 4.45E-15
                                    0.206
                         RS
+ N
         1.18144
                         IKF
                                    112.92
+ EG
         1.2
                         XTI
+ CJO
                                    0.419
         3.00E-10
                        VJ
+ M
         1.6
                         FC
                                    0.5
+ TT
        1.00E-10
1.00E-03
                         BV
                                    1500
+ IBV
                                   1200
                         VPK
+ IAVE
                                    SiC Schottky
                          \mathtt{TYPE}
+ MFG GeneSiC Semiconductor
.MODEL GB05SHT12 PIN D
      2.93E-12
                                   0.35326
+ IS
                        RS
+ N
                                   0.0043236
         4.6113
                         IKF
+ EG
         3.23
                         XTI
                                   60
+ FC
         0.5
                         TT
+ BV
         1500
                         IBV
                                   1.00E-03
+ VPK
         1200
                         IAVE
+ TYPE SiC_PiN
.ENDS
* End of GB05SHT12-CAL SPICE Model
```

Sep 2013