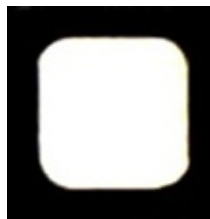# Silicon Carbide Power Schottky Diode Chip

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 °C, unless otherwise specified

| Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \leq 215$ °C	5	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 215$ °C	8	A
Operating and storage temperature	T_j , T_{stg}		-55 to 250	°C

Electrical Characteristics at T_j = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values min.	Values typ.	Values max.	Unit
Diode forward voltage	V_F	$I_F = 5$ A, $T_j = 25$ °C			2.1		V
		$I_F = 5$ A, $T_j = 210$ °C			3.5		
Reverse current	I_R	$V_R = 1200$ V, $T_j = 25$ °C			0.9	10	µA
		$V_R = 1200$ V, $T_j = 250$ °C			20.8	150	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200$ A/µs $T_j = 210$ °C	$V_R = 400$ V		17		nC
			$V_R = 960$ V		29		
Switching time	t_s		$V_R = 400$ V		< 25		ns
			$V_R = 960$ V				
Total capacitance	C	$V_R = 1$ V, f = 1 MHz, $T_j = 25$ °C			237		pF
		$V_R = 400$ V, f = 1 MHz, $T_j = 25$ °C			25		
		$V_R = 1000$ V, f = 1 MHz, $T_j = 25$ °C			20		

Thermal Characteristics

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance, junction - case	R_{thJC}	Assuming TO-276 package	1.38	°C/W

***For chip size and metallization, please refer to the mechanical datasheet (must have a non-disclosure agreement with GeneSiC Semiconductor).**
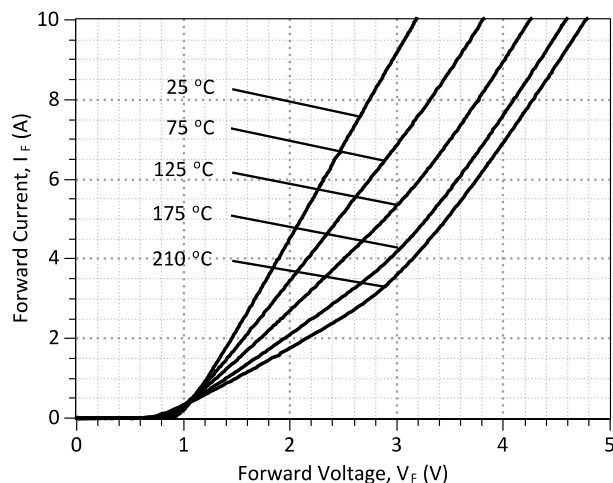
Figure 1: Typical Forward Characteristics
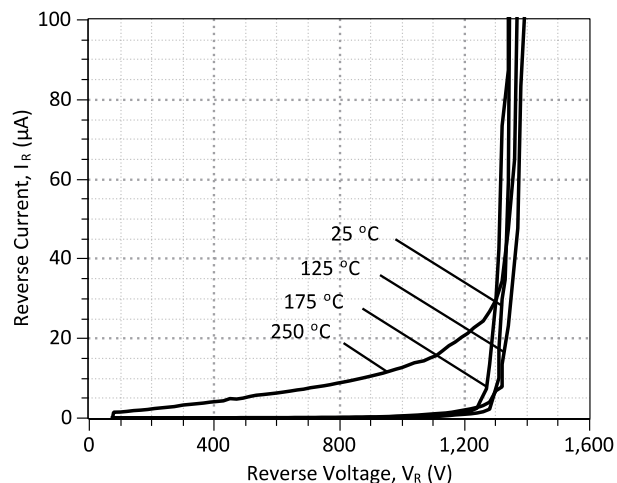
Figure 2: Typical Reverse Characteristics
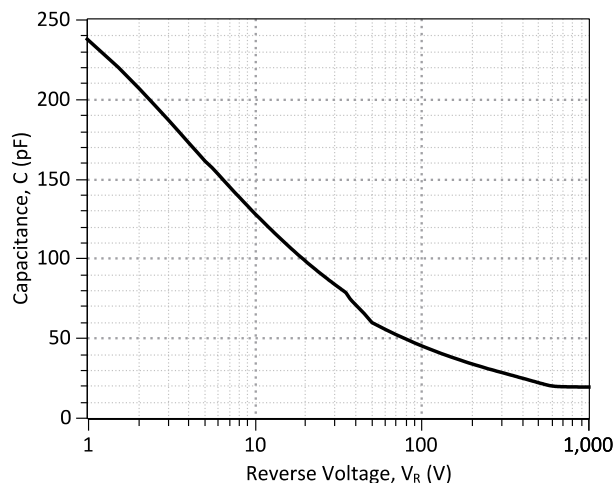
Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics
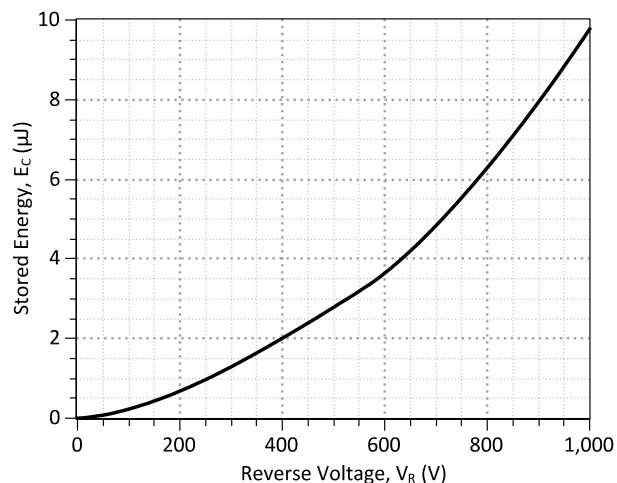
Figure 4: Typical Switching Energy vs Reverse Voltage Characteristics

Revision History

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

GeneSiC
SEMICONDUCTOR

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        RS        0.206
+ N        1.18144         IKF       112.92
+ EG       1.2             XTI       3
+ CJO      3.00E-10        VJ        0.419
+ M        1.6             FC        0.5
+ TT       1.00E-10        BV        1500
+ IBV      1.00E-03        VPK       1200
+ IAVE     5               TYPE      SiC_Schottky
+ MFG      GeneSiC_Semiconductor
.MODEL GB05SHT12_PIN D
+ IS       2.93E-12        RS        0.35326
+ N        4.6113          IKF       0.0043236
+ EG       3.23            XTI       60
+ FC       0.5             TT        0
+ BV       1500            IBV       1.00E-03
+ VPK      1200            IAVE      5
+ TYPE     SiC_PiN
.ENDS
*
* End of GB05SHT12-CAL SPICE Model
```