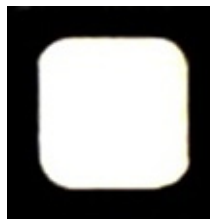


## Silicon Carbide Power Schottky Diode Chip

### Features

- 650 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	$V_{RRM}$		650	V
Continuous forward current	$I_F$	$T_C \leq 205\text{ °C}$	20	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 205\text{ °C}$	35	A
Operating and storage temperature	$T_j, T_{stg}$		-55 to 250	°C

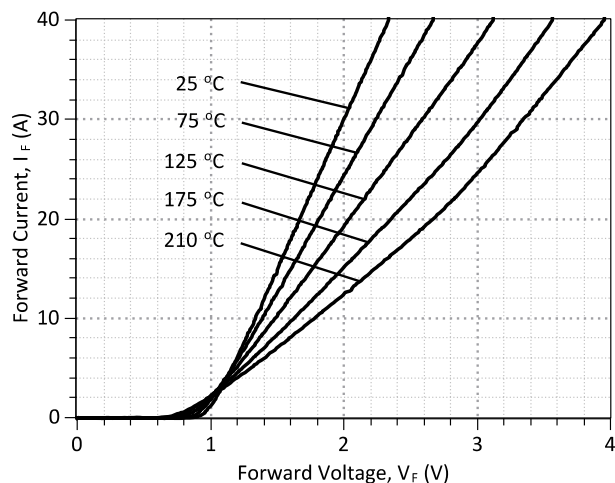
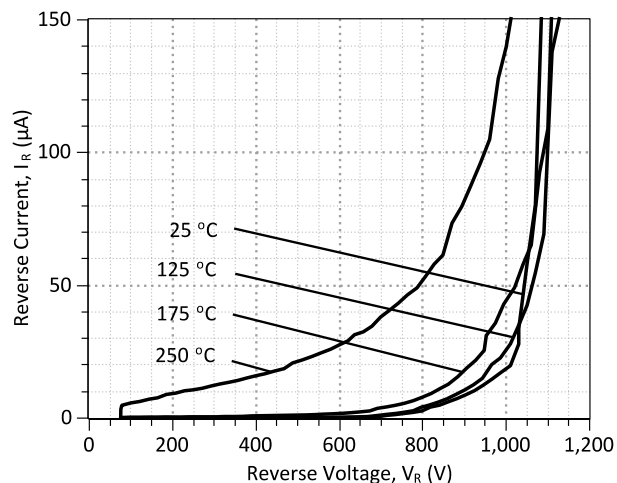
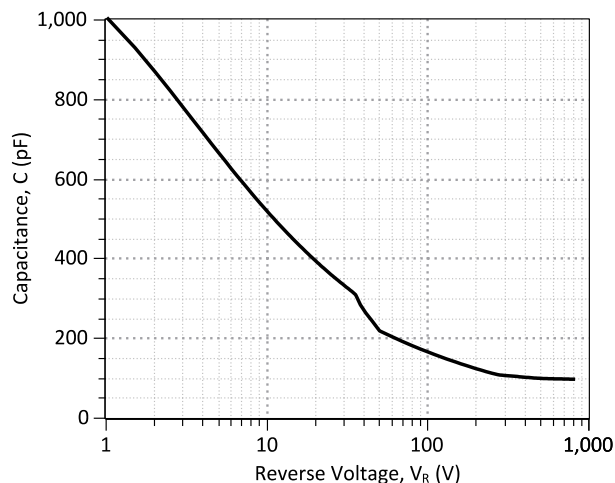
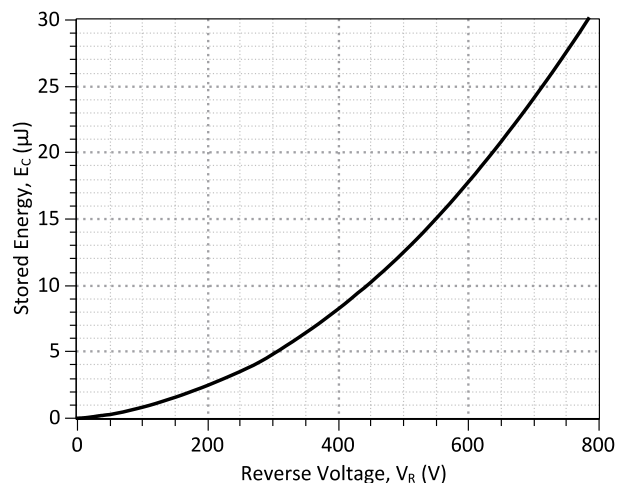
### Electrical Characteristics at $T_j = 250\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	$V_F$	$I_F = 20\text{ A}, T_j = 25\text{ °C}$		1.67		V
		$I_F = 20\text{ A}, T_j = 210\text{ °C}$		2.7		
Reverse current	$I_R$	$V_R = 650\text{ V}, T_j = 25\text{ °C}$		0.34	5	$\mu\text{A}$
		$V_R = 650\text{ V}, T_j = 250\text{ °C}$		32	150	
Total capacitive charge	$Q_C$	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210\text{ °C}$		66		nC
Switching time	$t_s$	$V_R = 400\text{ V}$ $V_R = 400\text{ V}$		< 49		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		1107		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		103		
		$V_R = 800\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		98		

### Thermal Characteristics

Thermal resistance, junction - case	$R_{thJC}$	Assuming TO-276 package	0.49	°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	

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## SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GB20SHT06-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 GB20SHT06-CAL SPICE Model
*
.SUBCKT GB05SHT06 ANODE KATHODE
D1 ANODE KATHODE GB05SHT06_25C; Call the Schottky Diode Model
D2 ANODE KATHODE GB05SHT06_PIN; Call the PiN Diode Model
.MODEL GB05SHT06_25C D
+ IS      8.46E-17      RS      0.0319
+ N        1          IKF      1000
+ EG       1.2         XTI      3
+ TRS1     0.0038      TRS2     3.00E-05
+ CJO      1.26E-09    VJ       0.438
+ M        1.5278      FC       0.5
+ TT       1.00E-10    BV       800
+ IBV      1.00E-03    VPK      650
+ IAVE     20          TYPE     SiC_Schottky
+ MFG      GeneSiC_Semiconductor
.MODEL GB05SHT06_PIN D
+ IS      2.77E-10      RS      0.086693
+ N        3.3505      IKF      3.67E-06
+ EG       3.23        XTI      -10
+ FC       0.5         TT       0
+ BV       800         IBV      1.00E-03
+ VPK      650         IAVE     20
+ TYPE     SiC_PiN
.ENDS
*
*      End of GB20SHT06-CAL SPICE Model
```

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