

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	$T_C \leq 205\text{ °C}$	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

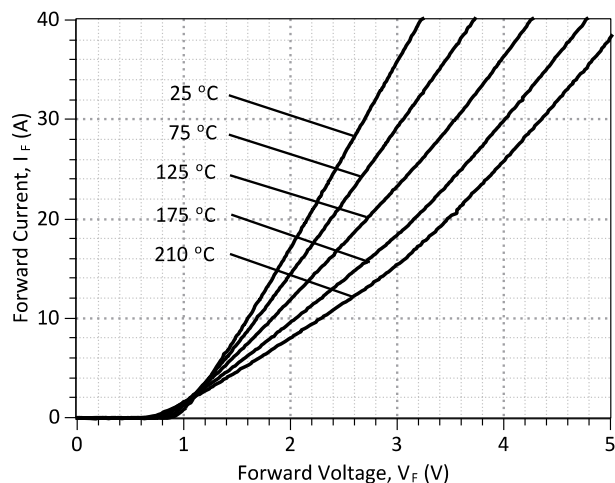
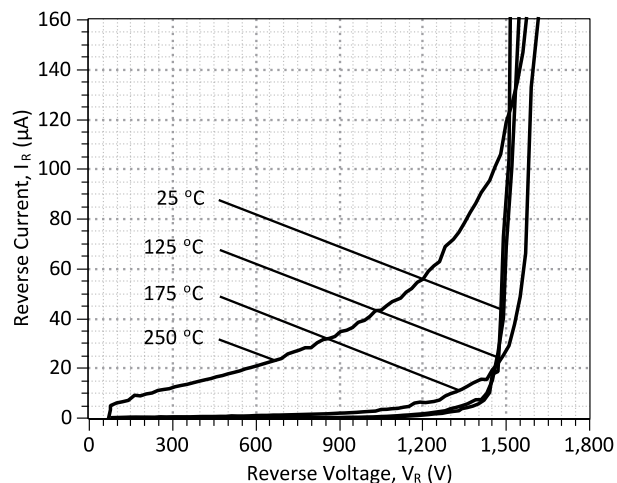
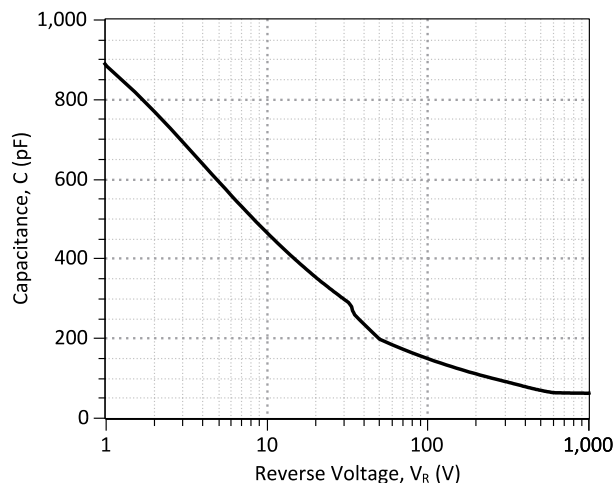
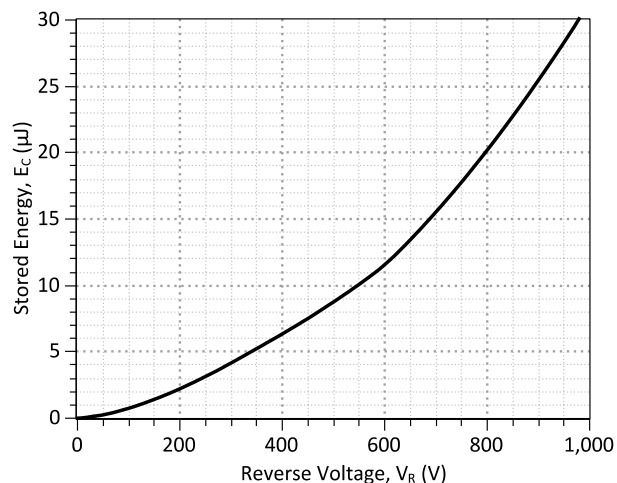
Electrical Characteristics at $T_J = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 20\text{ A}, T_J = 25\text{ °C}$ $I_F = 20\text{ A}, T_J = 210\text{ °C}$		2.2 3.5		V
Reverse current	I_R	$V_R = 1200\text{ V}, T_J = 25\text{ °C}$ $V_R = 1200\text{ V}, T_J = 250\text{ °C}$		1.2 56	20 300	μA
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_J = 210\text{ °C}$	$V_R = 400\text{ V}$ $V_R = 960\text{ V}$		58 95	nC
Switching time	t_s		$V_R = 400\text{ V}$ $V_R = 960\text{ V}$		< 49	ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_J = 25\text{ °C}$		884		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_J = 25\text{ °C}$		79		
		$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_J = 25\text{ °C}$		63		

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	

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 GB20SHT12-CAU 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 GB20SHT12-CAU SPICE Model
*
.SUBCKT GB20SHT12 ANODE KATHODE
D1 ANODE KATHODE GB20SHT12_25C; Call the Schottky Diode Model
D2 ANODE KATHODE GB20SHT12_PIN; Call the PiN Diode Model
.MODEL GB20SHT12_25C D
+ IS      1.74E-13      RS      0.05105
+ TRS1    0.005        TRS2    1.68E-5
+ N       1.2637323    IKF      1.884319
+ EG      1.2          XTI      3
+ CJO     1.15E-09     VJ       0.44
+ M       1.5          FC       0.5
+ TT      1.00E-10     BV       1500
+ IBV     1.00E-03     VPK      1200
+ IAVE    20           TYPE     SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL GB20SHT12_PIN D
+ IS      5.15E-15     RS      0.2
+ N       3.1605       IKF      0.00055844
+ EG      3.23         XTI      3
+ FC      0.5          TT       0
+ BV      1500         IBV      1.00E-03
+ VPK     1200         IAVE     20
+ TYPE    SiC_PiN
.ENDS
*
*  End of GB20SHT12-CAU SPICE Model
```

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