Silicon Carbide Power Schottky Diode Chip

V_{RRM}	=	1200 V
V_F	=	1.5 V
I_F	=	50 A
Q_C	=	247 nC

Features

- 1200 V Schottky rectifier
- 175 °C maximum operating temperature
- Electrically isolated base-plate
- Positive temperature coefficient of V_F
- Fast switching speeds
- Superior figure of merit Q_C/I_F

Advantages

- Improved circuit efficiency (Lower overall cost)
- Significantly reduced switching losses compare to Si PiN diodes
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Low reverse recovery current
- Low device capacitance

Applications

- Down Hole Oil Drilling, Geothermal Instrumentation
- High Voltage Multipliers
- Military Power Supplies

Maximum Ratings at T_j = 175 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \le 135$ °C	50	A
RMS forward current	$I_{F(RMS)}$	$T_C \le 135$ °C	87	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms T_C = 135 °C, t_P = 10 ms	350 313	A
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	1625	A
I^2t value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms	tbd	A^2S
Power dissipation	P_{tot}	T_C = 25 °C	620	W
Operating and storage temperature	T_j , T_{stg}		-55 to 175	°C

Electrical Characteristics at T_j = 175 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values			Unit
				min.	typ.	max.	
Diode forward voltage	V_F	I_F = 50 A, T_j = 25 °C I_F = 50 A, T_j = 175 °C		1.35 2.05	1.51 2.31	1.80 2.75	V
Reverse current	I_R	V_R = 1200 V, T_j = 25 °C V_R = 1200 V, T_j = 175 °C			200 340	1000 2650	µA
Total capacitive charge	Q_C	$I_F \le I_{F,MAX}$ dI_F/dt = 200 A/µs T_j = 175 °C	V_R = 400 V		158		nC
Switching time	t_s		V_R = 400 V		50		ns
Total capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C V_R = 400 V, f = 1 MHz, T_j = 25 °C V_R = 1000 V, f = 1 MHz, T_j = 25 °C			2940 203 142		pF

***For chip size and metallization, please refer to the mechanical datasheet (must have a non-disclosure agreement with GeneSiC Semiconductor).**

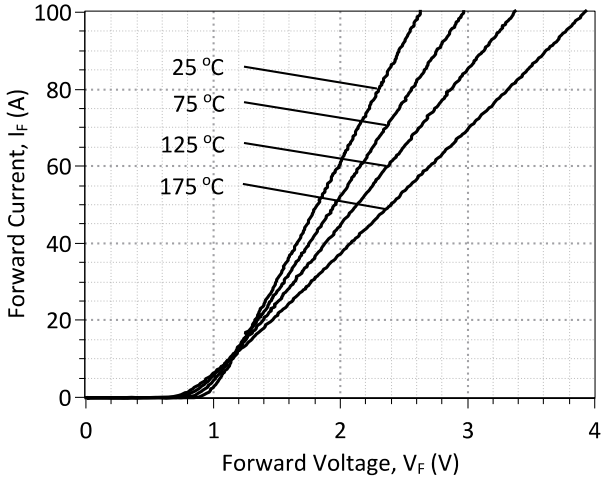

Figure 1: Typical Forward Characteristics

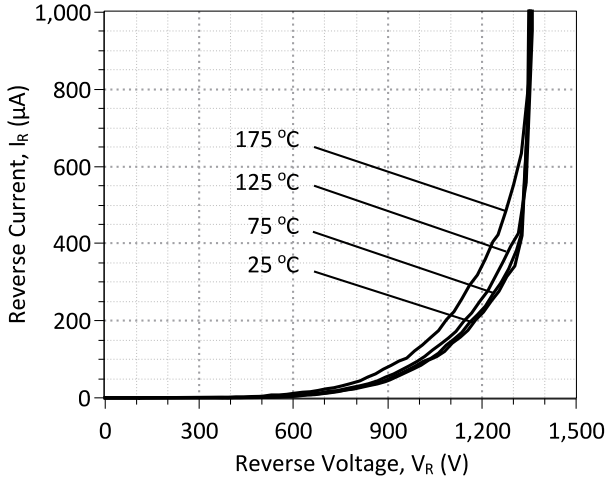

Figure 2: Typical Reverse Characteristics

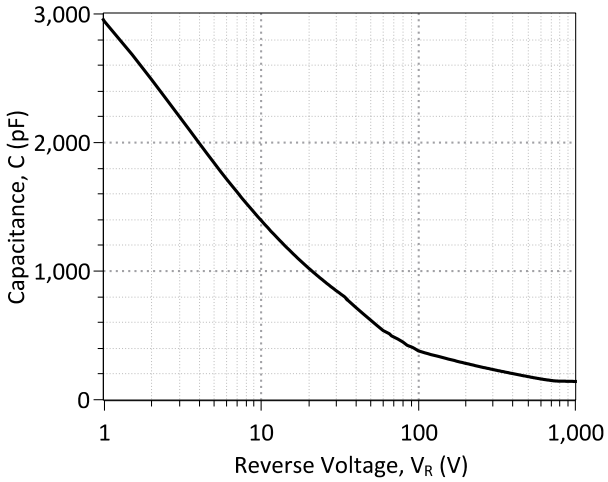

Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

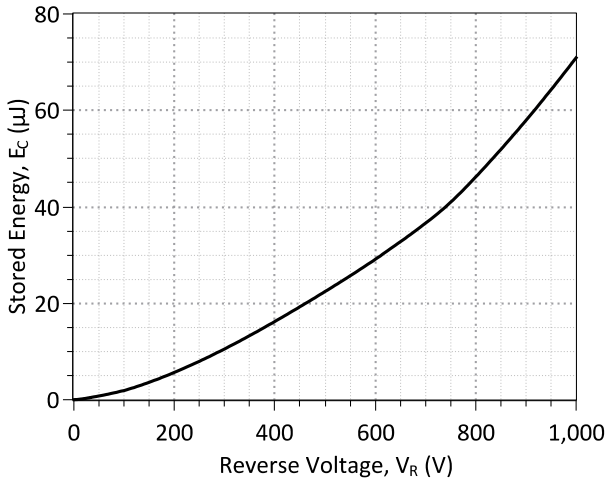

Figure 4: Typical Switching Energy vs Reverse Voltage Characteristics

Revision History			
Date	Revision	Comments	Supersedes
2013/09/18	0	Initial Release	

Published by
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Dulles, VA 20166

SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GB50SLT12-CAL device.

```
*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   04-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 GB50SLT12-CAL SPICE Model
*
.SUBCKT GB50SLT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*9.39E-05); Temperature Dependant Resistor
D1 INT KATHODE GB50SLT12_25C; Call the 25C Diode Model
.MODEL GB50SLT12_25C D
+ IS       1.99E-16        RS         0.015652965
+ N        1               IKF        1000
+ EG       1.2             XTI        3
+ CJO      3.86E-09        VJ         1.362328465
+ M        0.48198551      FC         0.5
+ TT       1.00E-10        BV         1500
+ IBV      1.00E-03        VPK        1200
+ IAVE     50              TYPE       SiC_Schottky
+ MFG      GeneSiC_Semiconductor
.ENDS
*
* End of GB50SLT12-CAL SPICE Model
```