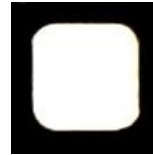


Silicon Carbide Power Schottky Diode

V_{RRM}	=	1200 V
$I_F @ 25\text{ }^\circ\text{C}$	=	100 A
Q_C	=	158 nC

Features

- 1200 V Schottky rectifier
- 175 °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



Die Size = 4.5 mm x 4.5 mm

Advantages

- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Low reverse recovery current
- Low device capacitance
- Low reverse leakage current at operating temperature

Applications

- Automotive Traction Inverters
- Power Factor Correction (PFC)
- Switched-Mode Power Supply (SMPS)
- Solar Inverters
- Wind Turbine Inverters
- Motor Drives
- Induction Heating
- Uninterruptible Power Supply (UPS)

Maximum Ratings at $T_j = 175\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Repetitive peak reverse voltage	V_{RRM}			1200		V
Continuous forward current	I_F	$T_C = 25\text{ }^\circ\text{C}$, $R_{thJC} = 0.24$		100		A
Continuous forward current	I_F	$T_C \leq 135\text{ }^\circ\text{C}$, $R_{thJC} = 0.24$		50		A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 135\text{ }^\circ\text{C}$, $R_{thJC} = 0.24$		87		A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$		350		A
		$T_C = 135\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$		313		A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$		1625		A
I^2t value	$\int i^2 dt$	$T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$		450		A^2s
		$T_C = 135\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$		300		A^2s
Power dissipation	P_{tot}	$T_C = 25\text{ }^\circ\text{C}$, $R_{thJC} = 0.24$		620		W
Operating and storage temperature	T_j, T_{stg}			-55 to 175		$^\circ\text{C}$

Electrical Characteristics at $T_j = 175\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 50\text{ A}$, $T_j = 25\text{ }^\circ\text{C}$		1.5	1.8	V
		$I_F = 50\text{ A}$, $T_j = 175\text{ }^\circ\text{C}$		2.4	3.0	
Reverse current	I_R	$V_R = 1200\text{ V}$, $T_j = 25\text{ }^\circ\text{C}$		25	1000	μA
		$V_R = 1200\text{ V}$, $T_j = 175\text{ }^\circ\text{C}$		100	3000	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 175\text{ }^\circ\text{C}$	$V_R = 400\text{ V}$	158		nC
	$V_R = 960\text{ V}$		247			
Switching time	t_s	$V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ }^\circ\text{C}$	$V_R = 400\text{ V}$	50		ns
			$V_R = 960\text{ V}$			
Total capacitance	C	$V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ }^\circ\text{C}$		2940		pF
		$V_R = 400\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ }^\circ\text{C}$		203		
		$V_R = 1000\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ }^\circ\text{C}$		142		

Figures:

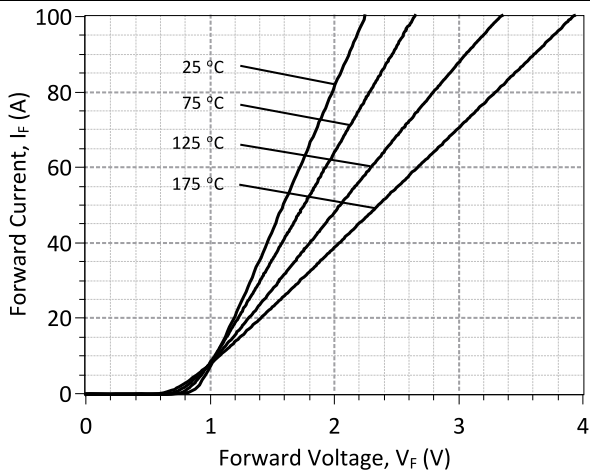


Figure 1: Typical Forward Characteristics

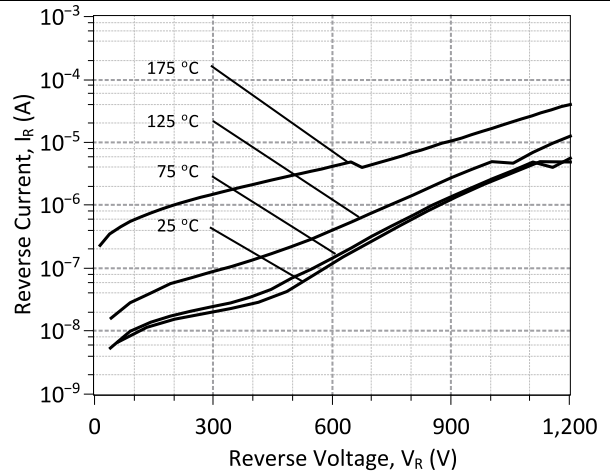


Figure 2: Typical Reverse Characteristics

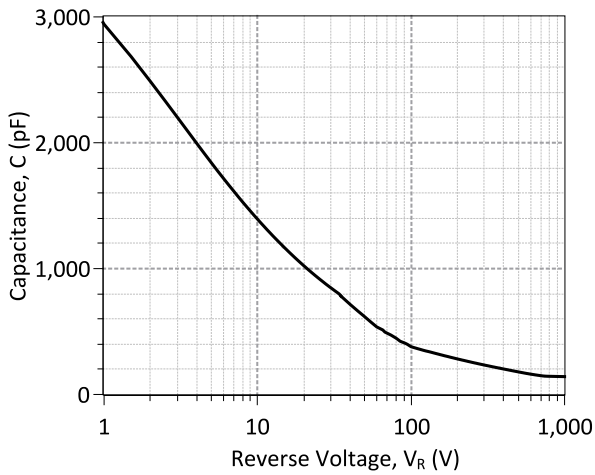


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

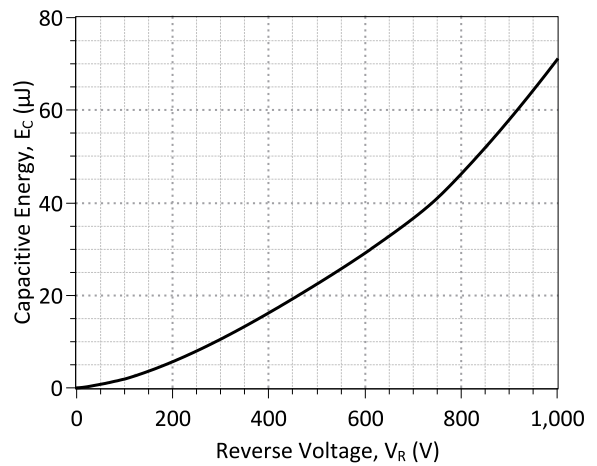
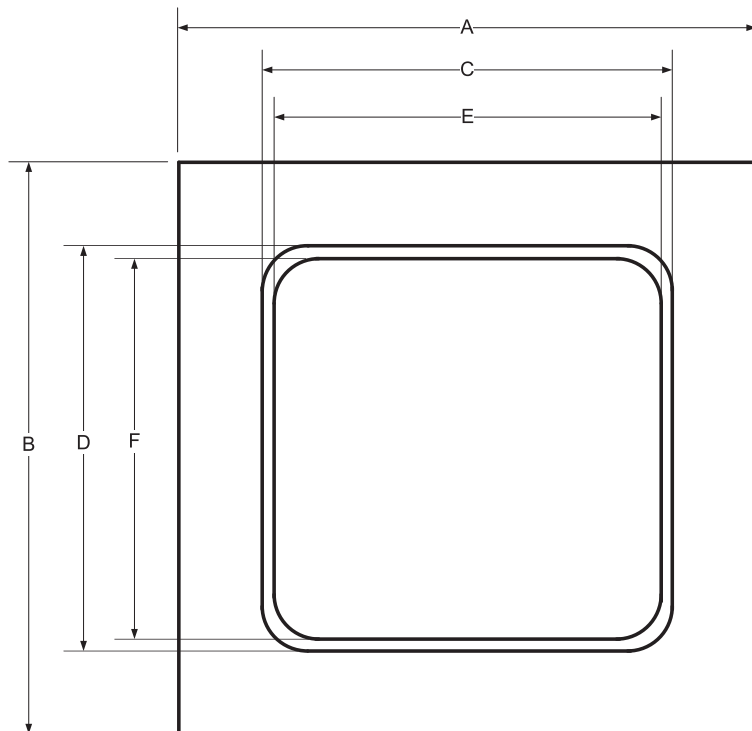


Figure 4: Typical Capacitive Energy vs Reverse Voltage Characteristics

Mechanical Parameters

Die Dimensions	4.5 x 4.5	mm ²
Anode Pad Size	4.24 x 4.24	
Die Area total / active	20.25/17.64	
Die Thickness	360	μm
Wafer Size	100	mm
Flat Position	0	deg
Die Frontside Passivation	Polyimide	
Anode Pad Metallization	4000 nm Al	
Backside Cathode Metallization	400 nm Ni + 200 nm Au	
Die Attach	Electrically conductive glue or solder	
Wire Bond	Al ≤ 380 μm	
Reject ink dot size	Φ ≥ 0.3 mm	
Recommended storage environment	Store in original container, in dry nitrogen, < 6 months at an ambient temperature of 23 °C	

Chip Dimensions:



DIE	A [mm]	4.5
	B [mm]	4.5
METAL	C [mm]	4.24
	D [mm]	4.24
WIRE BONDABLE	E [mm]	4.2
	F [mm]	4.2

Revision History

Date	Revision	Comments	Supersedes
2015/02/12	3	Inserted Mechanical Parameters	
2014/09/12	2	Updated Electrical Characteristics	
2013/11/12	1	Updated Electrical Characteristics	
2013/09/18	0	Initial Release	

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SPICE Model Parameters

This is a secure document. Please copy this code from the SPICE model PDF file on our website (http://www.genesicsemi.com/images/hit_sic/baredie/schottky/GB50SLT12-CAL_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB50SLT12-CAL.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0                $
*      $Date:      20-SEP-2013        $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*
*      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
D1 ANODE KATHODE GB50SLT12_SCHOTTKY
D2 ANODE KATHODE GB50SLT12_SURGE
.MODEL GB50SLT12_SCHOTTKY D
+ IS      1.99E-16      RS      0.015652965
+ N       1             IKF     1000
+ EG      1.2           XTI     3
+ TRS1    0.0042       TRS2    1.3E-05
+ CJO     3.86E-09     VJ      1.362328465
+ M       0.48198551   FC      0.5
+ TT      1.00E-10     BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    50           TYPE    SiC_Schottky
+ MFG     GeneSiC_Semi
.MODEL GB50SLT12_SURGE D
+ IS      1.54E-19     RS      0.1
+ TRS1    -0.004       N       3.941
+ EG      3.23         IKF     19
+ XTI     0            FC      0.5
+ TT      0            BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    50           TYPE    SiC_PiN
.ENDS
*
*      End of GB50SLT12-CAL SPICE Model
```