

High Temperature Silicon Carbide Power Schottky Diode

| | | |
|--------------------------|---|--------|
| V_{RRM} | = | 1200 V |
| $I_F @ 25^\circ\text{C}$ | = | 2.5 A |
| Q_C | = | 6 nC |

Features

- 1200 V Schottky rectifier
- 250°C maximum operating temperature
- Zero reverse recovery charge
- Superior surge current capability
- Positive temperature coefficient of V_F
- Temperature independent switching behavior
- Lowest figure of merit Q_C/I_F
- Available screened to Mil-PRF-19500



Die Size = 0.9 mm x 0.9 mm

Advantages

- High temperature operation
- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Industry's lowest reverse recovery charge
- Industry's lowest device capacitance
- Ideal for output switching of power supplies
- Best in class reverse leakage current at operating temperature

Applications

- Down Hole Oil Drilling
- Geothermal Instrumentation
- Solenoid Actuators
- General Purpose High-Temperature Switching
- Amplifiers
- Solar Inverters
- Switched-Mode Power Supply (SMPS)
- Power Factor Correction (PFC)

Maximum Ratings at $T_j = 250^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Values | | | Unit |
|--|----------------|--|--------|------------|------|----------------------|
| | | | min. | typ. | max. | |
| Repetitive peak reverse voltage | V_{RRM} | | | 1200 | | V |
| Continuous forward current | I_F | $T_C = 25^\circ\text{C}$, $R_{thJC} = 9.52$ | | 2.5 | | A |
| Continuous forward current | I_F | $T_C \leq 225^\circ\text{C}$, $R_{thJC} = 9.52$ | | 0.75 | | A |
| RMS forward current | $I_{F(RMS)}$ | $T_C \leq 225^\circ\text{C}$, $R_{thJC} = 9.52$ | | 1.3 | | A |
| Surge non-repetitive forward current, Half Sine Wave | $I_{F,SM}$ | $T_C = 25^\circ\text{C}$, $t_p = 10\text{ ms}$ | | 8 | | A |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_C = 25^\circ\text{C}$, $t_p = 10\ \mu\text{s}$ | | 65 | | A |
| I^2t value | $\int i^2 dt$ | $T_C = 25^\circ\text{C}$, $t_p = 10\text{ ms}$ | | 0.5 | | A^2S |
| Power dissipation | P_{tot} | $T_C = 25^\circ\text{C}$, $R_{thJC} = 9.52$ | | 26 | | W |
| Operating and storage temperature | T_j, T_{stg} | | | -55 to 250 | | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|-------------------------|--------|---|--|------|------|---------------|
| | | | min. | typ. | max. | |
| Diode forward voltage | V_F | $I_F = 0.75\text{ A}$, $T_j = 25^\circ\text{C}$ | | 1.7 | | V |
| | | $I_F = 0.75\text{ A}$, $T_j = 210^\circ\text{C}$ | | 2.8 | | |
| Reverse current | I_R | $V_R = 1200\text{ V}$, $T_j = 25^\circ\text{C}$ | | 1 | 10 | μA |
| | | $V_R = 1200\text{ V}$, $T_j = 250^\circ\text{C}$ | | 10 | 100 | |
| Total capacitive charge | Q_C | $I_F \leq I_{F,MAX}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210^\circ\text{C}$ | $V_R = 400\text{ V}$ | 6 | | nC |
| | | | $V_R = 960\text{ V}$ | 11 | | |
| Switching time | t_s | | $V_R = 400\text{ V}$ $V_R = 960\text{ V}$ | < 17 | | ns |
| Total capacitance | C | $V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25^\circ\text{C}$ | | 66 | | pF |
| | | $V_R = 400\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25^\circ\text{C}$ | | 10 | | |
| | | $V_R = 1000\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25^\circ\text{C}$ | | 8 | | |

Figures:

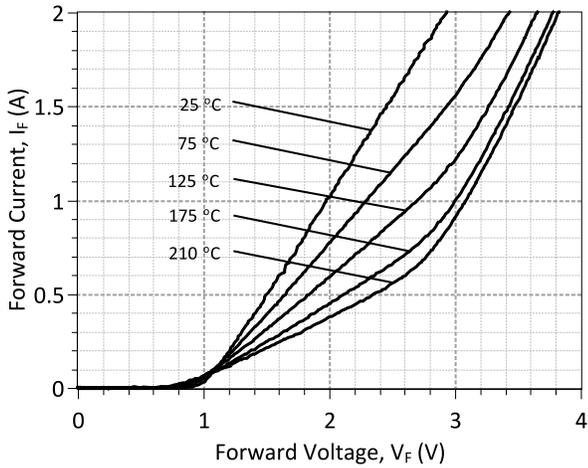


Figure 1: Typical Forward Characteristics

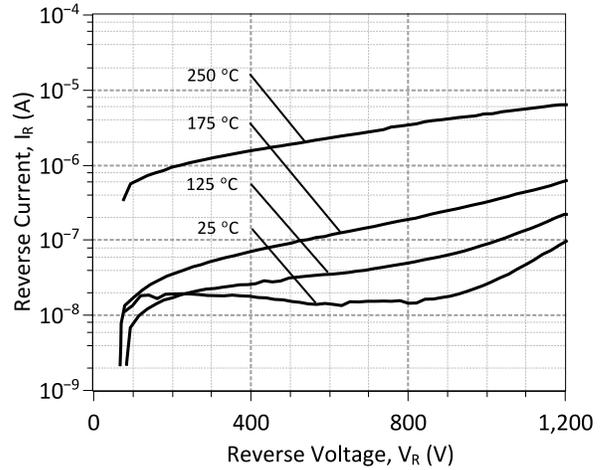


Figure 2: Typical Reverse Characteristics

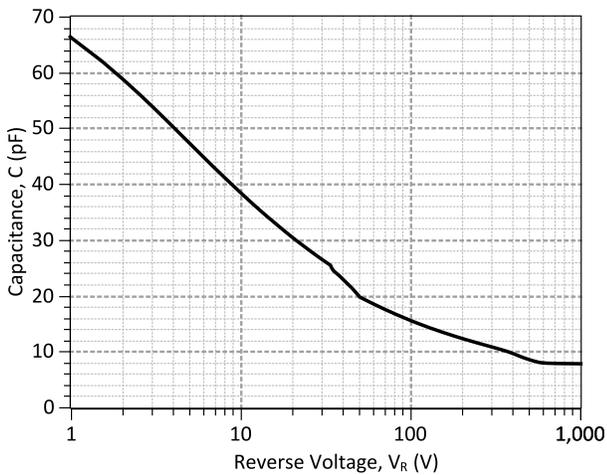


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

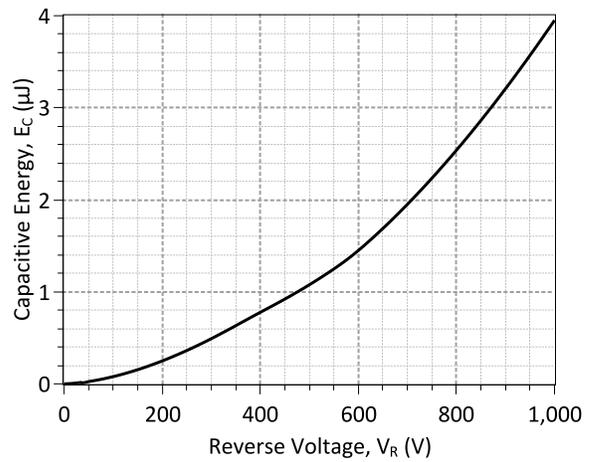
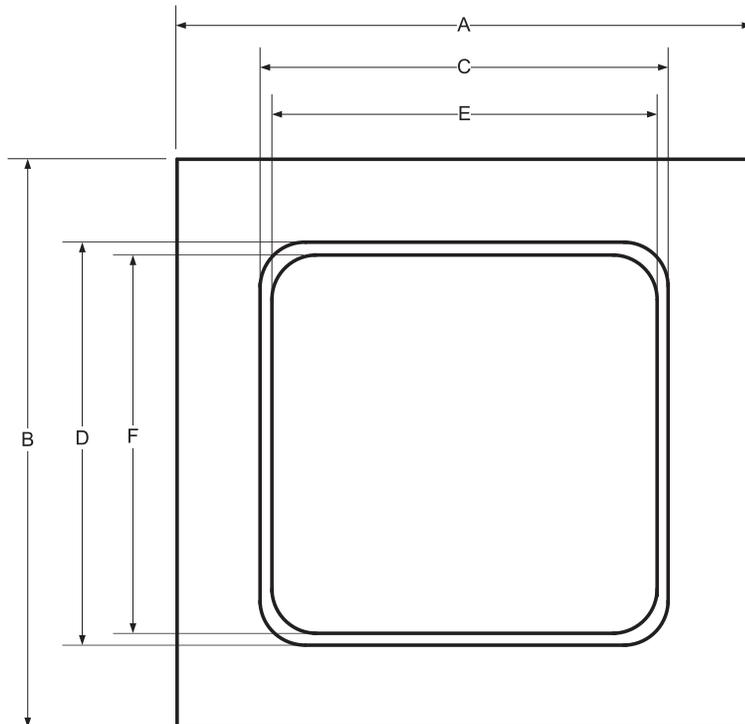


Figure 4: Typical Capacitive Energy vs Reverse Voltage Characteristics

Mechanical Parameters

| | | |
|---------------------------------|--|-----------------|
| Die Dimensions | 0.9 x 0.9 | mm ² |
| Anode pad size | 0.64 x 0.64 | |
| Die Area total / active | 0.81/0.36 | |
| 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 ≤ 350 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] | 0.9 |
| | B [mm] | 0.9 |
| METAL | C [mm] | 0.64 |
| | D [mm] | 0.64 |
| WIRE BONDABLE | E [mm] | 0.6 |
| | F [mm] | 0.6 |

Revision History

| Date | Revision | Comments | Supersedes |
|------------|----------|--------------------------------|------------|
| 2015/02/09 | 1 | Inserted Mechanical Parameters | |
| 2012/04/03 | 0 | Initial release | |

Published by

GeneSiC Semiconductor, Inc.
43670 Trade Center Place Suite 155
Dulles, VA 20166

GeneSiC Semiconductor, Inc. reserves right to make changes to the product specifications and data in this document without notice.

GeneSiC disclaims all and any warranty and liability arising out of use or application of any product. No license, express or implied to any intellectual property rights is granted by this document.

Unless otherwise expressly indicated, GeneSiC products are not designed, tested or authorized for use in life-saving, medical, aircraft navigation, communication, air traffic control and weapons systems, nor in applications where their failure may result in death, personal injury and/or property damage.

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/GB01SHT12-CAL_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB01SHT12-CAL.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      05-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 GB01SHT12-CAL SPICE Model
*
.SUBCKT GB01SHT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.0099); Temperature Dependant Resistor
D1 INT KATHODE GB01SHT12_25C; Call the 25C Diode Model
D2 ANODE KATHODE GB01SHT12_PIN; Call the PiN Diode Model
.MODEL GB01SHT12_25C D
+ IS      1.88E-18      RS      0.9255
+ N       1            IKF     98.29122743
+ EG      1.2          XTI     3
+ CJO     7.90E-11     VJ      0.367
+ M       1.63         FC      0.5
+ TT      1.00E-10     BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    1           TYPE     SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL GB01SHT12_PIN D
+ IS      2.76E-16      RS      0.84243
+ N       3.791461     IKF     2.98675
+ EG      3.23         XTI     30
+ FC      0.5          TT      0
+ BV      1200         IBV     1.00E-03
+ VPK     1200         IAVE    1
+ TYPE    SiC_PiN
.ENDS
*
*      End of GB01SHT12-CAL SPICE Model
```

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[GeneSiC Semiconductor:](#)

[GB01SHT12-CAL](#)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.