

Silicon Carbide Power Schottky Diode

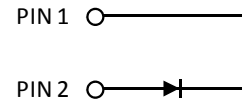
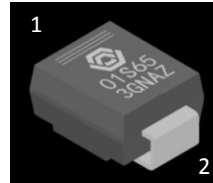
| | | |
|------------------------------------|---|--------------|
| V_{RRM} | = | 650 V |
| $I_F (T_C = 25^\circ\text{C})$ | = | 2.5 A |
| $I_F (T_C \leq 150^\circ\text{C})$ | = | 1 A |
| Q_C | = | 7 nC |

Features

- Industry's leading low leakage currents
- 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

Package

- RoHS Compliant



SMB / DO – 214AA

Advantages

- Low standby power losses
- 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

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

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

| Parameter | Symbol | Conditions | Values | | Unit |
|--|----------------|---|------------|--|----------------------|
| | | | | | |
| Repetitive peak reverse voltage | V_{RRM} | | 650 | | V |
| Continuous forward current | I_F | $T_C = 25^\circ\text{C}$ | 2.5 | | A |
| Continuous forward current | I_F | $T_C \leq 150^\circ\text{C}$ | 1 | | A |
| RMS forward current | $I_{F(RMS)}$ | $T_C \leq 150^\circ\text{C}$ | 2 | | A |
| Surge non-repetitive forward current, Half Sine Wave | $I_{F,SM}$ | $T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$ | 10 | | 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} | $T_C = 25^\circ\text{C}$ | 64 | | W |
| Operating and storage temperature | T_j, T_{stg} | | -55 to 175 | | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|-------------------------|--------|---|--------|------|------|---------------|
| | | | min. | typ. | max. | |
| Diode forward voltage | V_F | $I_F = 1\text{ A}, T_j = 25^\circ\text{C}$ | 1.5 | 2.0 | | V |
| | | $I_F = 1\text{ A}, T_j = 175^\circ\text{C}$ | 2.3 | 3.0 | | |
| Reverse current | I_R | $V_R = 650\text{ V}, T_j = 25^\circ\text{C}$ | 1 | 10 | | μA |
| | | $V_R = 650\text{ V}, T_j = 175^\circ\text{C}$ | 5 | 50 | | |
| Total capacitive charge | Q_C | $I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 175^\circ\text{C}$ | 7 | | | nC |
| Switching time | t_s | $V_R = 400\text{ V}$ $V_R = 400\text{ V}$ | < 20 | | | ns |
| Total capacitance | C | $V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$ | 76 | | | pF |
| | | $V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$ | 12 | | | |

Thermal Characteristics

| | | | |
|-------------------------------------|------------|------|---------------------------|
| Thermal resistance, junction - case | R_{thJC} | 3.55 | $^\circ\text{C}/\text{W}$ |
|-------------------------------------|------------|------|---------------------------|

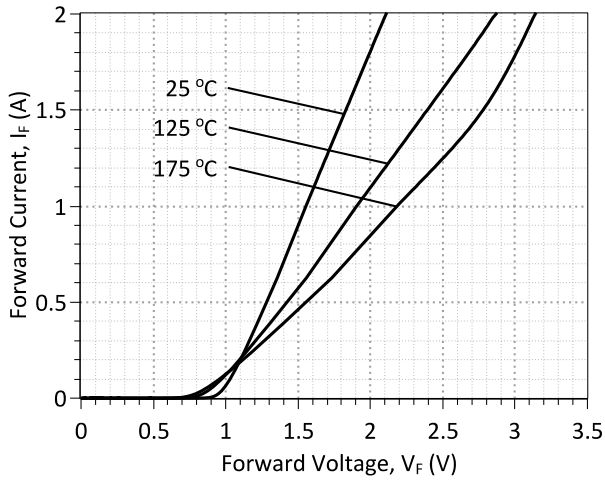


Figure 1: Typical Forward Characteristics

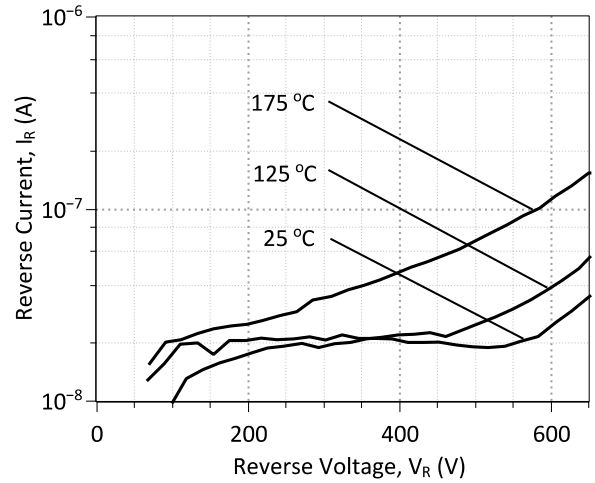


Figure 2: Typical Reverse Characteristics

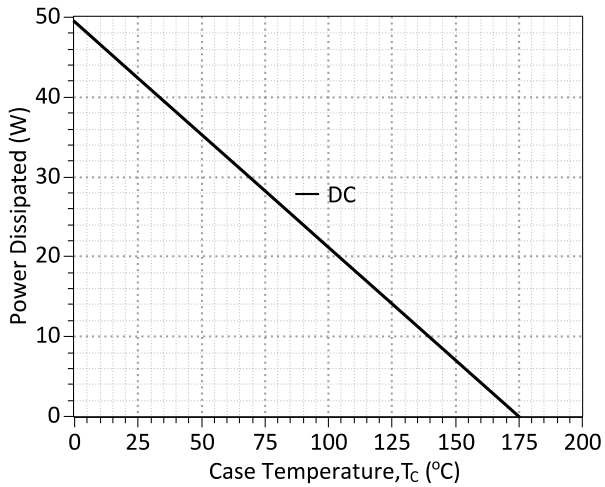
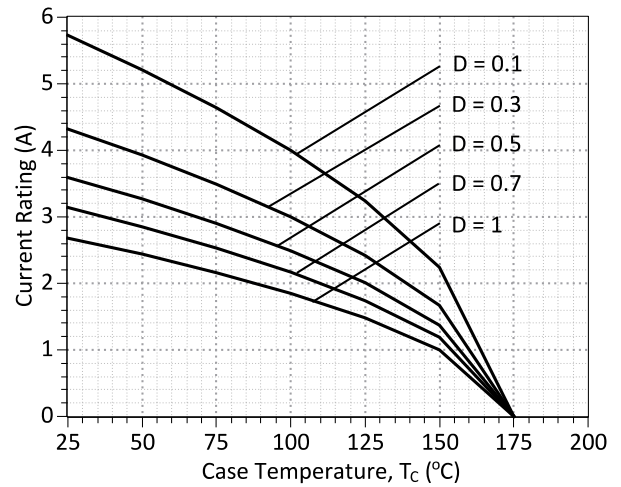


Figure 3: Power Derating Curve



**Figure 4: Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)
(Considering worst case Z_{th} conditions)**

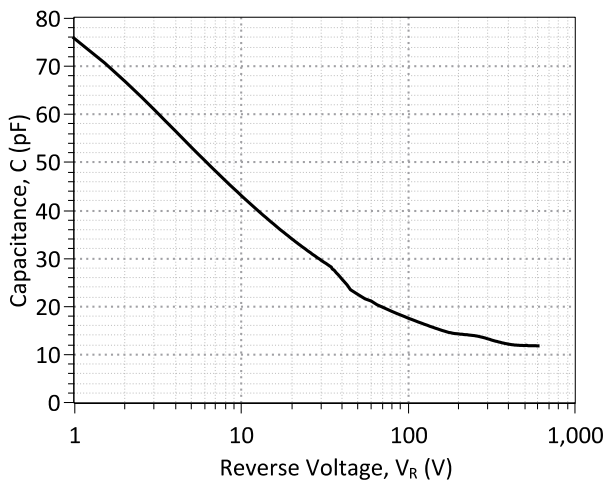


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

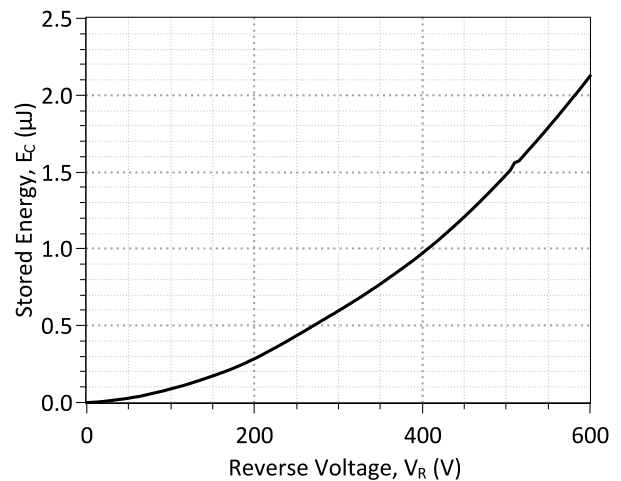


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

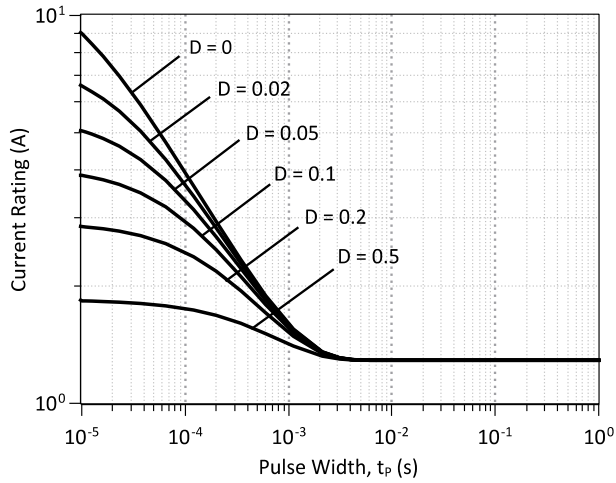


Figure 7: Current vs Pulse Duration Curves at $T_c = 160\text{ }^\circ\text{C}$

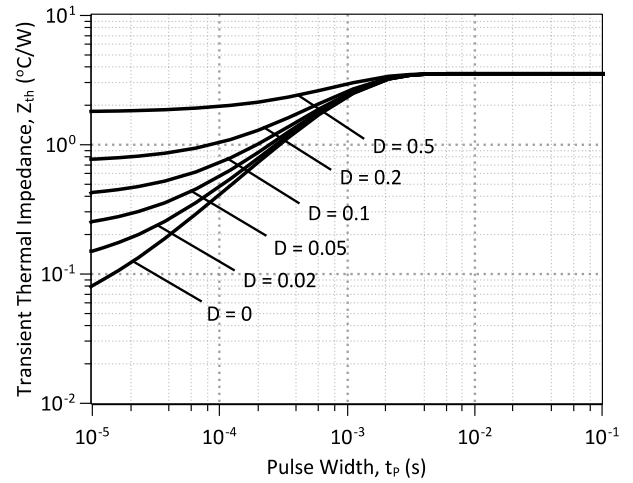
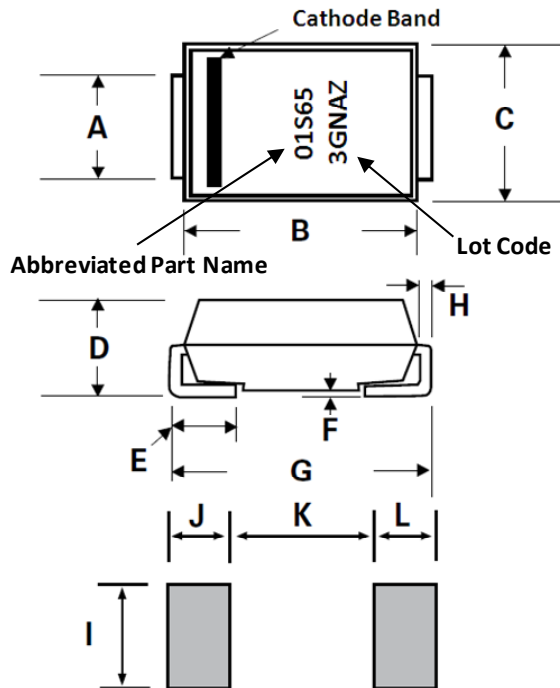


Figure 8: Transient Thermal Impedance

Package Dimensions:

SMB / DO - 214AA

PACKAGE OUTLINE



| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.077 | 0.086 | 1.950 | 2.200 |
| B | 0.160 | 0.180 | 4.060 | 4.570 |
| C | 0.130 | 0.155 | 3.300 | 3.940 |
| D | 0.084 | 0.096 | 2.130 | 2.440 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.205 | 0.220 | 5.210 | 5.590 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.089 | - | 2.260 | - |
| J | 0.085 | - | 2.160 | - |
| K | - | 0.107 | - | 2.740 |
| L | 0.085 | - | 2.160 | - |

NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BRACKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS

Revision History

| Date | Revision | Comments | Supersedes |
|------------|----------|------------------------------------|------------|
| 2014/08/26 | 1 | Updated Electrical Characteristics | |
| 2013/09/09 | 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/products_sic/rectifiers/GB01SLT06-214_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB01SLT06-214.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      09-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 GB01SLT06-214 SPICE Model
*
.SUBCKT GB01SLT06 ANODE KATHODE
D1 ANODE KATHODE GB01SLT06_25C; Call the Schottky Diode Model
D2 ANODE KATHODE GB01SLT06_PIN; Call the PiN Diode Model
.MODEL GB01SLT06_25C D
+ IS      3.57E-18      RS      0.49751
+ TRS1    0.0057       TRS2    2.40E-05
+ N       1            IKF     322
+ EG      1.2          XTI     3
+ CJO     9.12E-11     VJ     0.371817384
+ M       1.527759838  FC      0.5
+ TT      1.00E-10     BV     650
+ IBV     1.00E-03     VPK    650
+ IAVE    1            TYPE    SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL GB01SLT06_PIN D
+ IS      5.73E-11     RS      0.72994
+ N       5            IKF     800
+ EG      3.23         XTI     -14
+ FC      0.5          TT      0
+ BV     650           IBV     1.00E-03
+ VPK    650           IAVE    1
+ TYPE    SiC_PiN
.ENDS
*
*      End of GB01SLT06-214 SPICE Model
```

Mouser Electronics

Authorized Distributor

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

[GeneSiC Semiconductor:](#)

[GB01SLT06-214](#)