

Silicon Carbide Power Schottky Diode

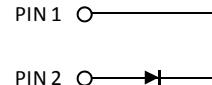
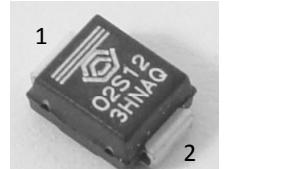
Features

- 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

V_{RRM}	= 1200 V
$I_F (T_C = 25^\circ C)$	= 5 A
$I_F (T_C \leq 150^\circ C)$	= 2 A
Q_C	= 9 nC

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 $T_j = 175^\circ C$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C = 25^\circ C$	5	A
Continuous forward current	I_F	$T_C \leq 150^\circ C$	2	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150^\circ C$	3	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25^\circ C, t_p = 10 \text{ ms}$ $T_C = 150^\circ C, t_p = 10 \text{ ms}$	18 15	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ C, t_p = 10 \mu\text{s}$	100	A
I^2t value	$\int I^2 dt$	$T_C = 25^\circ C, t_p = 10 \text{ ms}$ $T_C = 150^\circ C, t_p = 10 \text{ ms}$	1.6 1.1	A^2s
Power dissipation	P_{tot}	$T_C = 25^\circ C$	65	W
Operating and storage temperature	T_j, T_{stg}		-55 to 175	$^\circ C$

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

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 2 \text{ A}, T_j = 25^\circ C$	1.5	1.8	2.6	V
		$I_F = 2 \text{ A}, T_j = 175^\circ C$	2.6	3.0		
Reverse current	I_R	$V_R = 1200 \text{ V}, T_j = 25^\circ C$	5	50	100	μA
		$V_R = 1200 \text{ V}, T_j = 175^\circ C$	10	100		
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$	9			nC
		$dI_F/dt = 200 \text{ A}/\mu\text{s}$	14			
Switching time	t_s	$T_j = 175^\circ C$				ns
Total capacitance	C	$V_R = 1 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	131			pF
		$V_R = 400 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	12			
		$V_R = 1000 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	8			

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	2.3	$^\circ C/W$
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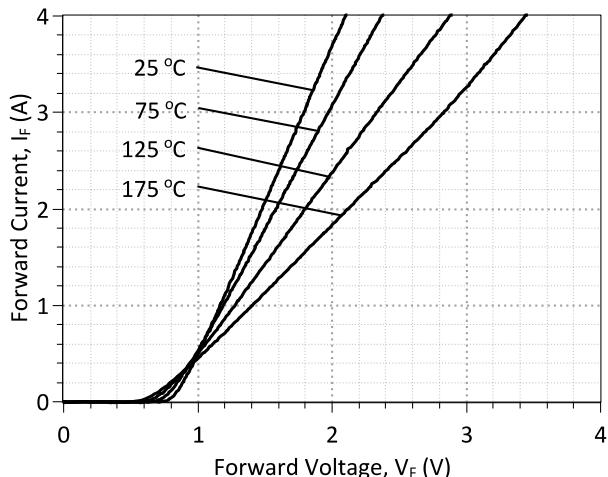


Figure 1: Typical Forward Characteristics

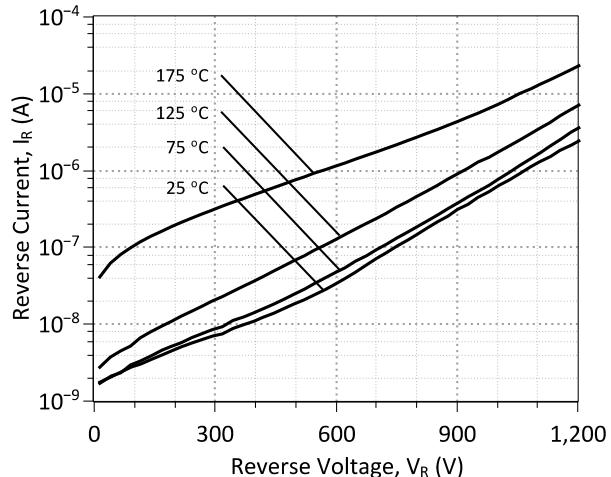


Figure 2: Typical Reverse Characteristics

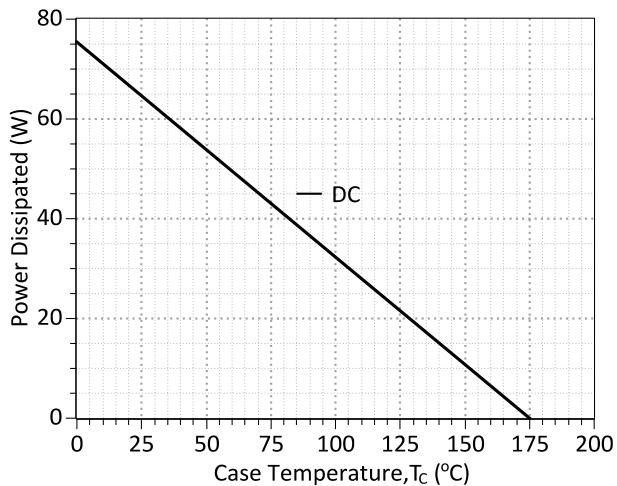


Figure 3: Power Derating Curve

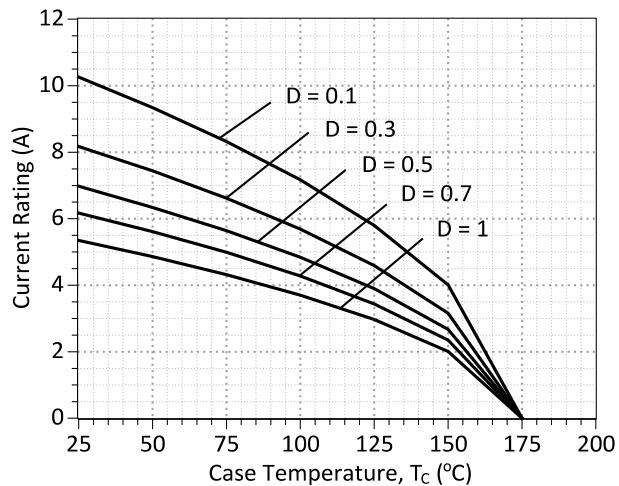


Figure 4: Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu\text{s}$)
(Considering worst case Z_{th} conditions)

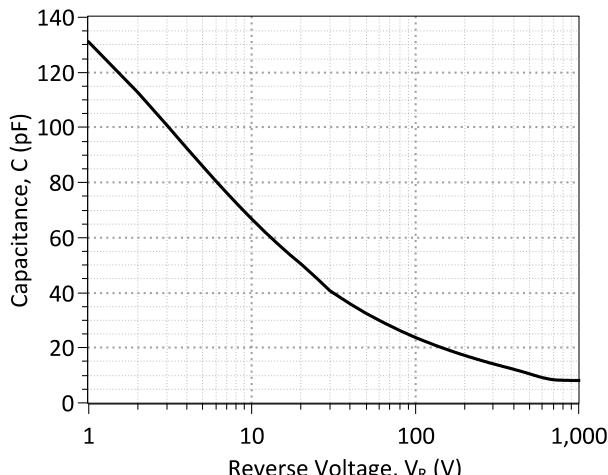


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

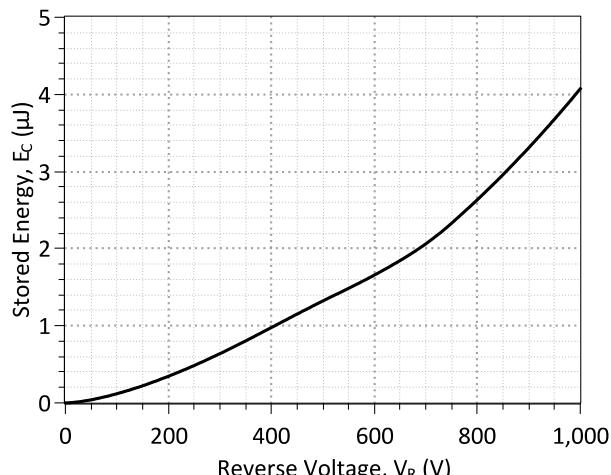


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

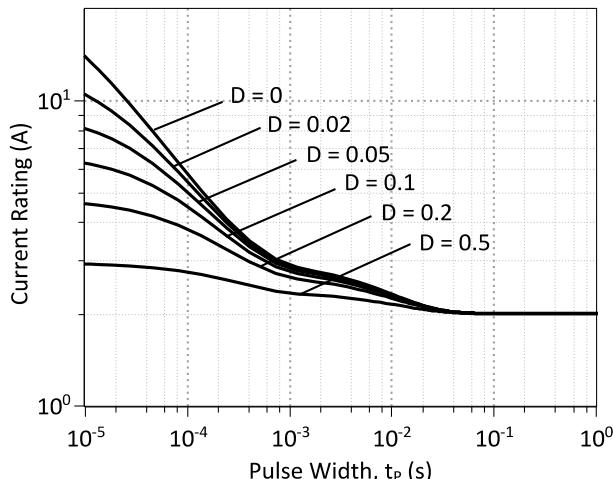


Figure 7: Current vs Pulse Duration Curves at $T_c = 160 \text{ } ^\circ\text{C}$

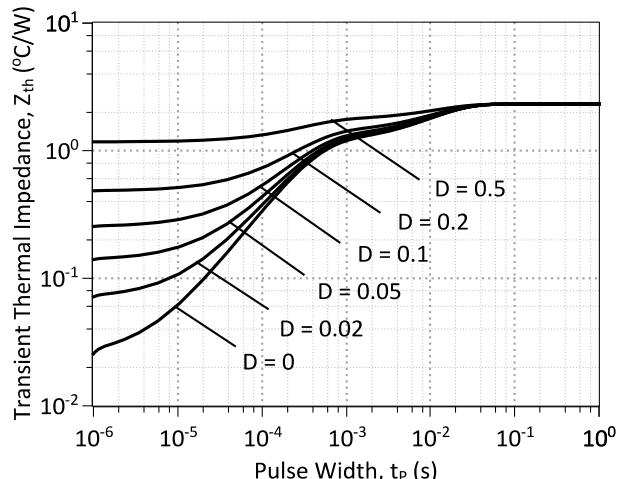
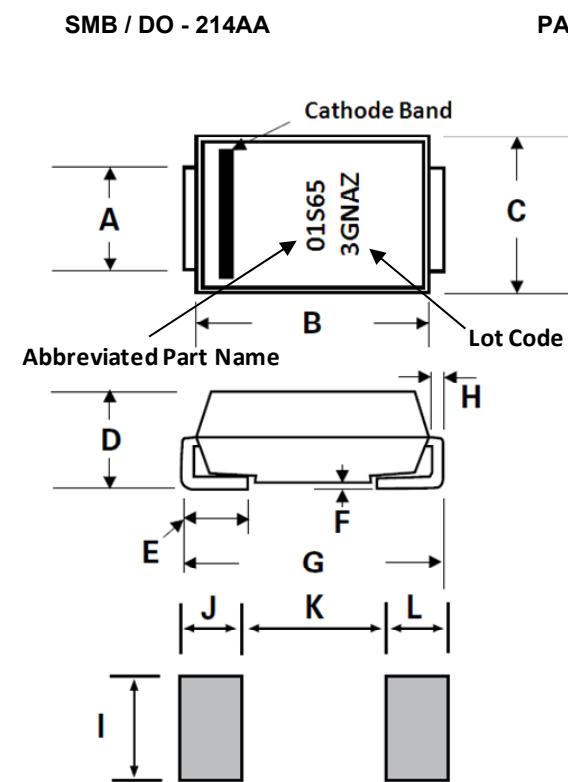


Figure 8: Transient Thermal Impedance

Package Dimensions:



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	

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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/products_sic/rectifiers/GB02SLT12-214_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB02SLT12-214.

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*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:  1.0          $
*      $Date:    09-SEP-2013      $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*
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*      These models are provided "AS IS, WHERE IS, AND WITH NO WARRANTY
*      OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED
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*      PARTICULAR PURPOSE."
*      Models accurate up to 2 times rated drain current.
*
*      Start of GB02SLT12-214 SPICE Model
*
.SUBCKT GB02SLT12 ANODE KATHODE
D1 ANODE KATHODE GB02SLT12
D2 ANODE KATHODE GB02SLT12_PIN
.MODEL GB02SLT12 D
+ IS      2.05E-15      RS      0.282
+ TRS1    0.0054      TRS2    3E-05
+ N       1            IKF     251
+ EG      1.2          XTI     -1.8
+ CJO     1.61E-10     VJ      0.4508
+ M       1.586         FC      0.5
+ TT      1.00E-10     BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    2            TYPE    Sic_Schottky
+ MFG     GeneSiC_Semi
.MODEL GB02SLT12_PIN D
+ IS      1.54E-25      RS      0.39
+ TRS1    -0.003       N       3.941
+ EG      3.23          IKF     19
+ XTI     0             FC      0.5
+ TT      0             BV      1200
+ IBV     1.00E-03     VPK     1200
+ IAVE    10            TYPE    Sic_PiN
.ENDS
*
*      End of GB02SLT12-214 SPICE Model
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