

Silicon Carbide Power Schottky Diode

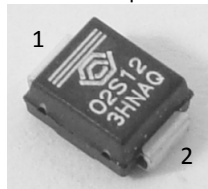
V_{RRM}	=	1200 V
I_F ($T_C = 25^\circ\text{C}$)	=	5 A
Q_C	=	9 nC

Features

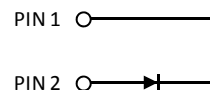
- 1200 V Schottky rectifier
- 175 °C maximum operating temperature
- Temperature independent switching behavior
- Superior surge current capability
- Positive temperature coefficient of V_F
- Extremely fast switching speeds
- Superior figure of merit Q_C/I_F

Package

- RoHS Compliant



DO – 214AA



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

- 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}		1200	V
Continuous forward current	I_F	$T_C \leq 160^\circ\text{C}$	2	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 160^\circ\text{C}$	3	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ ms}$ $T_C = 160^\circ\text{C}$, $t_p = 10\text{ ms}$	18 15	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$	100	A
I^2t value	$\int i^2 dt$	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ ms}$ $T_C = 160^\circ\text{C}$, $t_p = 10\text{ ms}$	1.6 1.1	A^2s
Power dissipation	P_{tot}	$T_C = 25^\circ\text{C}$	65	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	$I_F = 2\text{ A}$, $T_J = 25^\circ\text{C}$ $I_F = 2\text{ A}$, $T_J = 175^\circ\text{C}$		1.5 2.6	1.8 3.0	V
Reverse current	I_R	$V_R = 1200\text{ V}$, $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$, $T_J = 175^\circ\text{C}$		5 10	50 100	μA
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_J = 175^\circ\text{C}$	$V_R = 400\text{ V}$ $V_R = 960\text{ V}$		9 14	nC
Switching time	t_s		$V_R = 400\text{ V}$ $V_R = 960\text{ V}$		< 17	ns
Total capacitance	C	$V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25^\circ\text{C}$			131	pF
		$V_R = 400\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25^\circ\text{C}$			12	
		$V_R = 1000\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25^\circ\text{C}$			8	

Thermal Characteristics

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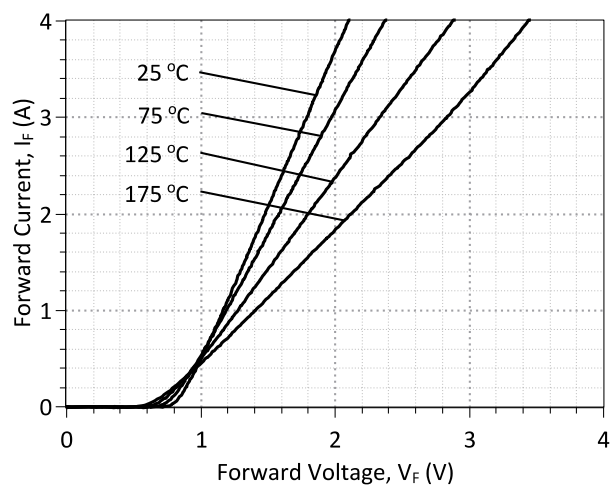


Figure 1: Typical Forward Characteristics

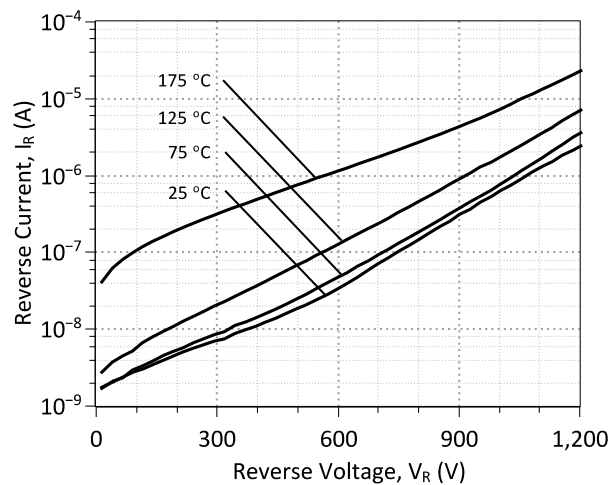


Figure 2: Typical Reverse Characteristics

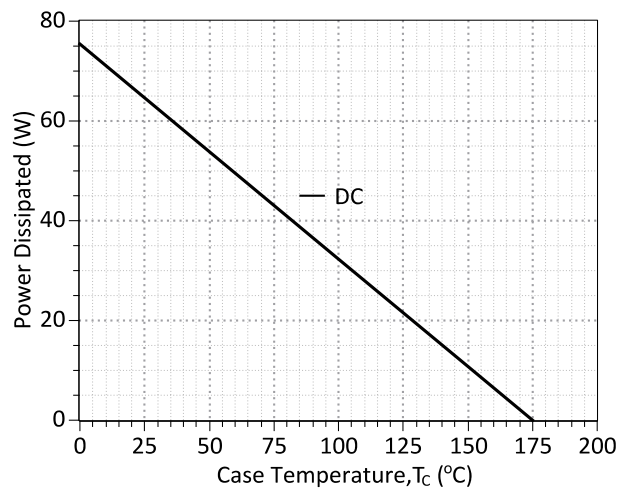
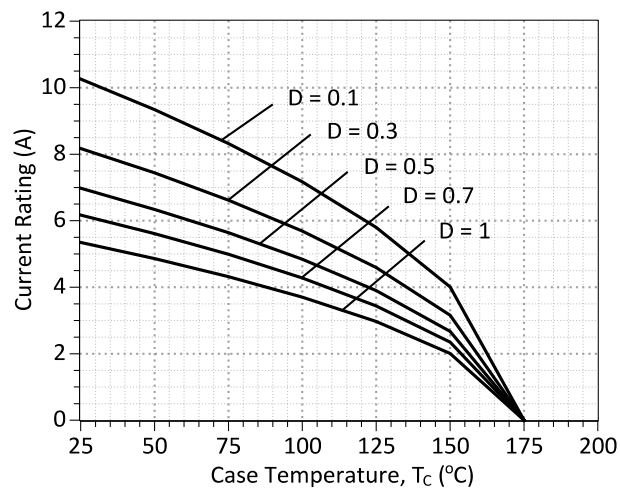


Figure 3: Power Derating Curve



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

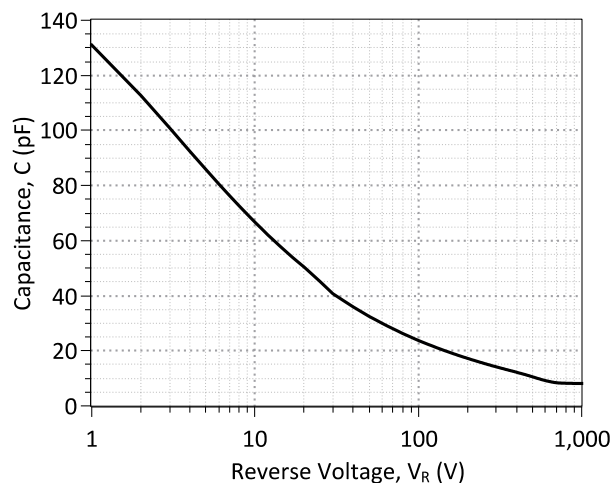


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

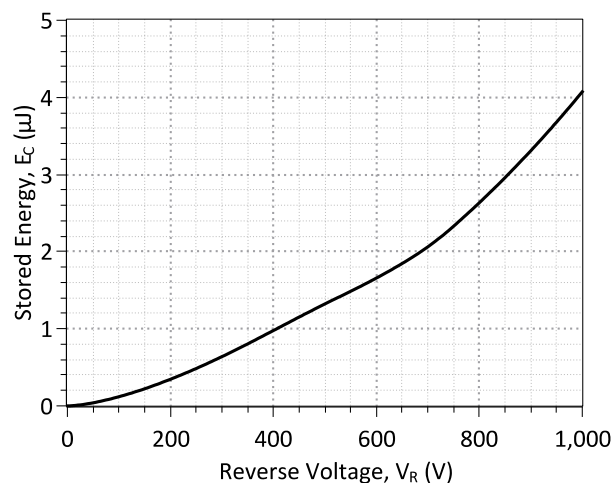


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

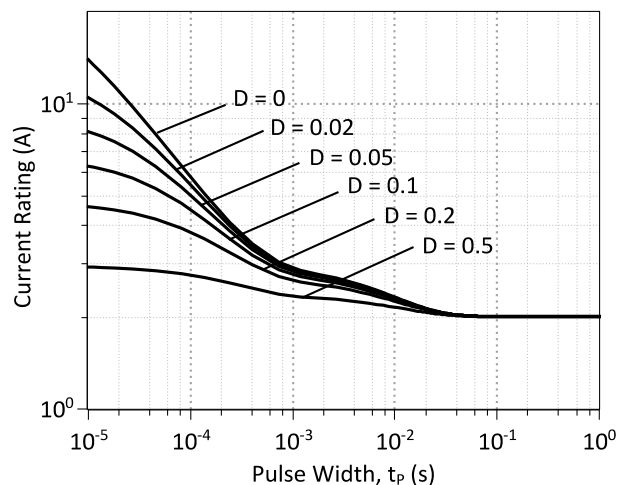


Figure 7: Current vs Pulse Duration Curves at $T_c = 160\text{ }^{\circ}\text{C}$

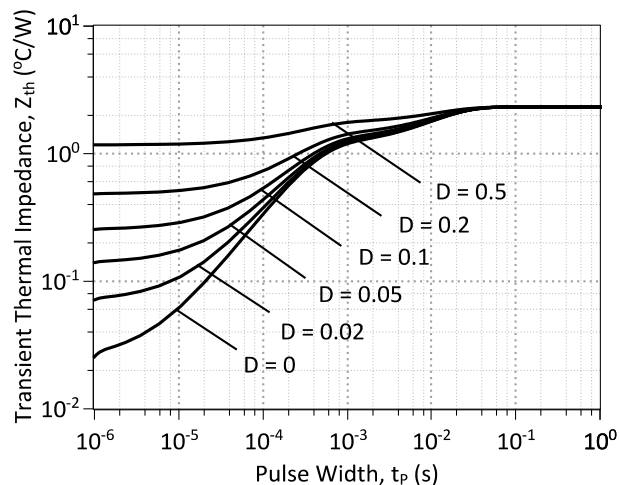
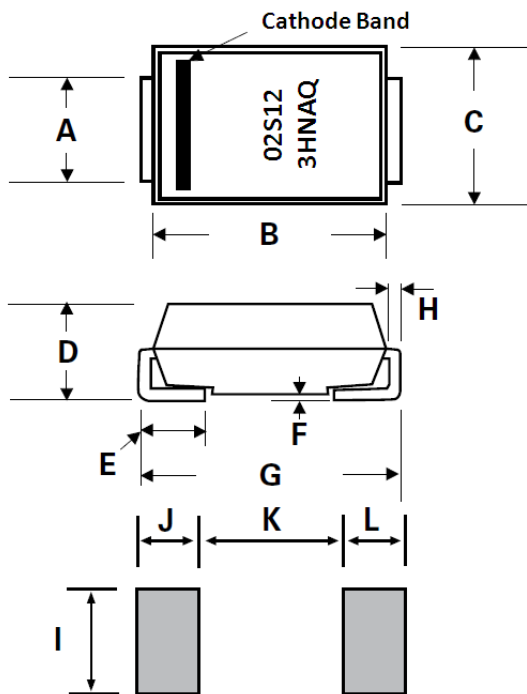


Figure 8: Transient Thermal Impedance

Package Dimensions:

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	

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SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GB02SLT12-214 device.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      09-SEP-2013    $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*      http://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 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
```