

Silicon Carbide Power Schottky Diode

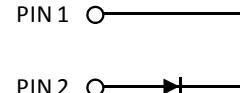
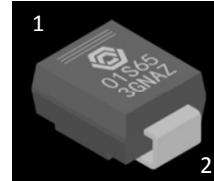
Features

- 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}	= 650 V
$I_F (T_C = 25^\circ C)$	= 2.5 A
$I_F (T_C \leq 150^\circ C)$	= 1 A
Q_C	= 7 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}		650	V
Continuous forward current	I_F	$T_C = 25^\circ C$	2.5	A
Continuous forward current	I_F	$T_C \leq 150^\circ C$	1	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150^\circ C$	2	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25^\circ C, t_p = 10 \text{ ms}$	10	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ C, t_p = 10 \mu\text{s}$	65	A
I^2t value	$\int I^2 dt$	$T_C = 25^\circ C, t_p = 10 \text{ ms}$	0.5	A^2S
Power dissipation	P_{tot}	$T_C = 25^\circ C$	64	W
Operating and storage temperature	T_j, T_{stg}		-55 to 175	°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	$I_F = 1 \text{ A}, T_j = 25^\circ C$	1.5	2.0	3.0	V
		$I_F = 1 \text{ A}, T_j = 175^\circ C$	2.3			
Reverse current	I_R	$V_R = 650 \text{ V}, T_j = 25^\circ C$	1	10	50	μA
		$V_R = 650 \text{ V}, T_j = 175^\circ C$	5			
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$	7			nC
Switching time	t_s	$dI_F/dt = 200 \text{ A}/\mu\text{s}$	7			ns
		$T_j = 175^\circ C$	$V_R = 400 \text{ V}$	< 20		
Total capacitance	C	$V_R = 1 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	76			pF
		$V_R = 400 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	12			

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	3.55	°C/W
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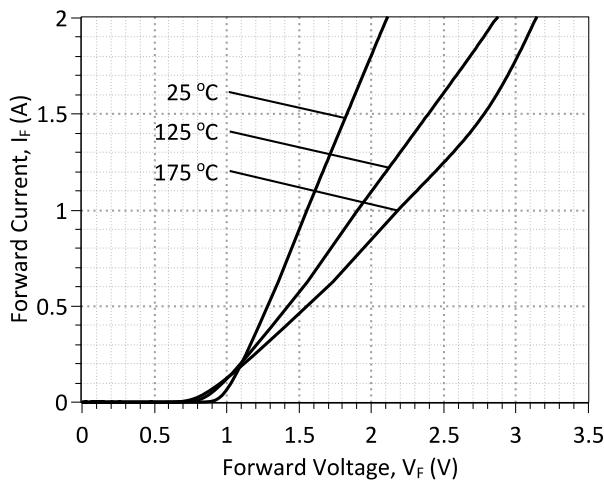


Figure 1: Typical Forward Characteristics

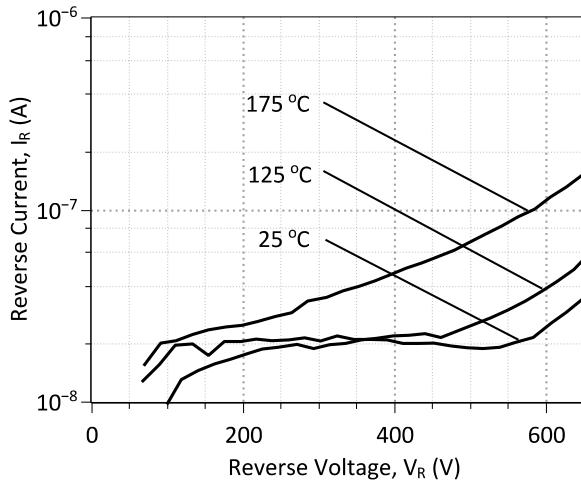


Figure 2: Typical Reverse Characteristics

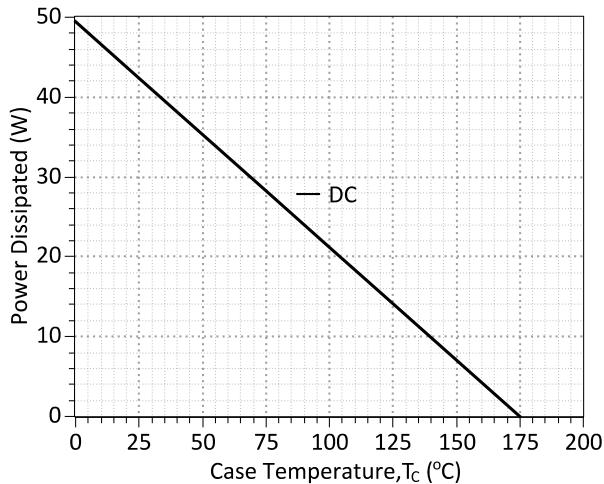


Figure 3: Power Derating Curve

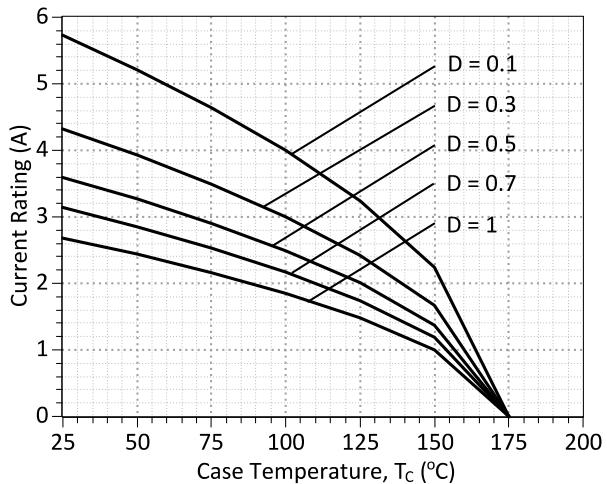


Figure 4: Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)
(Considering worst case Z_{th} conditions)

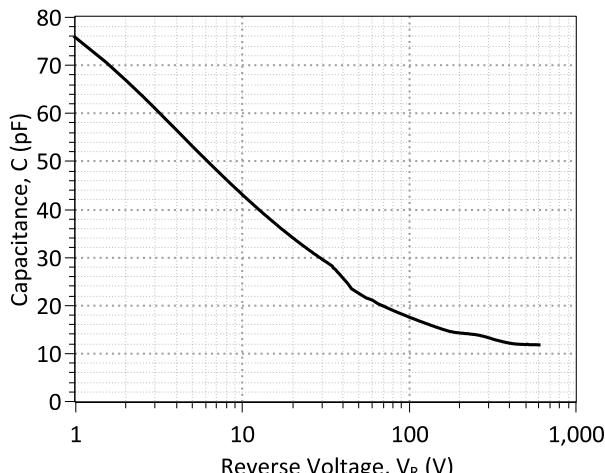


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

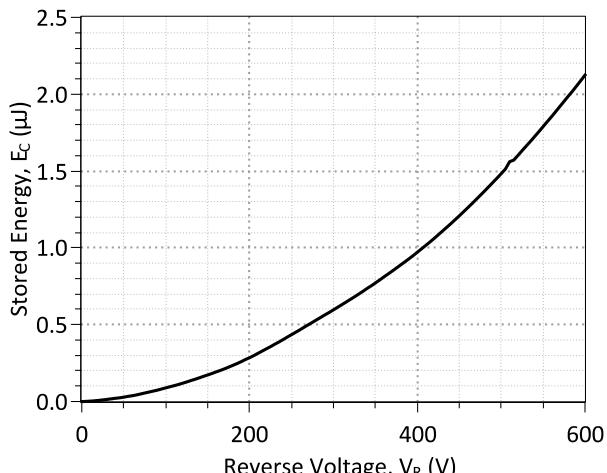


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

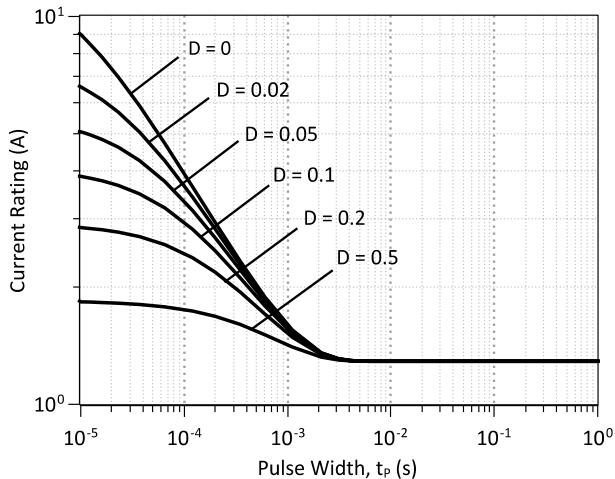


Figure 7: Current vs Pulse Duration Curves at $T_c = 160 \text{ } ^\circ\text{C}$

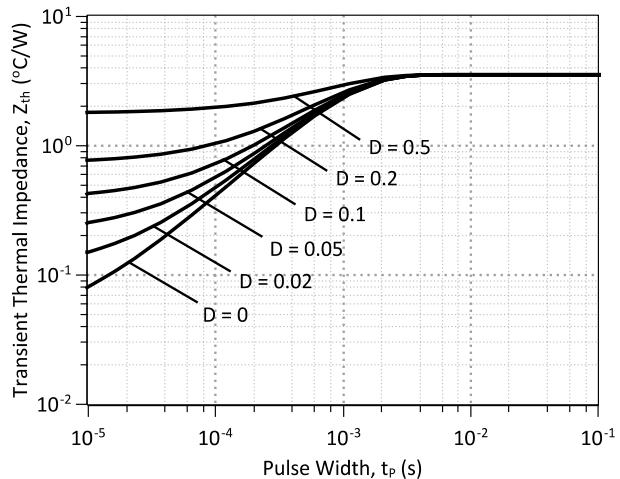
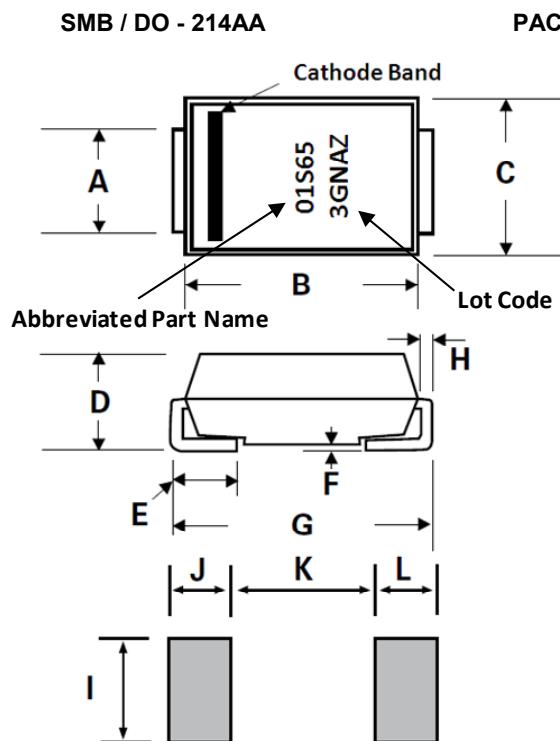


Figure 8: Transient Thermal Impedance

Package Dimensions:



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/GB01SLT06-214_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB01SLT06-214.

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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
*
*      COPYRIGHT (C) 2013 GeneSiC Semiconductor Inc.
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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
*      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
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