GeneSiC SEMICONDUCTOR — GB01SLT12-220

Silicon Carbide Power Schottky Diode

V_{RRM}	=	1200 V
$I_{F\ (Tc\ =\ 25°C)}$	=	2.5 A
$I_{F\ (Tc\ \leq\ 150°C)}$	=	1 A
Q_C	=	7 nC

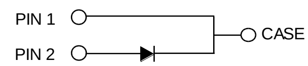
Features

- 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

TO – 220AC



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 °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 °C	2.5	A
Continuous forward current	I_F	$T_C \leq$ 150 °C	1	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq$ 150 °C	2	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms T_C = 150 °C, t_P = 10 ms	10 8	A
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	65	A
I^2t value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms T_C = 150 °C, t_P = 10 ms	0.5 0.3	A^2s
Power dissipation	P_{tot}	T_C = 25 °C	42	W
Operating and storage temperature	T_j , T_{stg}		-55 to 175	°C

Electrical Characteristics at T_j = 175 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values min.	Values typ.	Values max.	Unit
Diode forward voltage	V_F	I_F = 1 A, T_j = 25 °C I_F = 1 A, T_j = 175 °C			1.6 2.4	1.8 3.7	V
Reverse current	I_R	V_R = 1200 V, T_j = 25 °C V_R = 1200 V, T_j = 175 °C			1 10	10 100	µA
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ dI_F/dt = 200 A/µs T_j = 175 °C	V_R = 400 V V_R = 960 V		7 13		nC
Switching time	t_s	$I_F \leq I_{F,MAX}$ dI_F/dt = 200 A/µs T_j = 175 °C	V_R = 400 V V_R = 960 V		< 17		ns
Total capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C V_R = 400 V, f = 1 MHz, T_j = 25 °C V_R = 1000 V, f = 1 MHz, T_j = 25 °C			69 10 8		pF

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}		3.6	°C/W

Mechanical Properties

Mounting torque	M		0.6	Nm

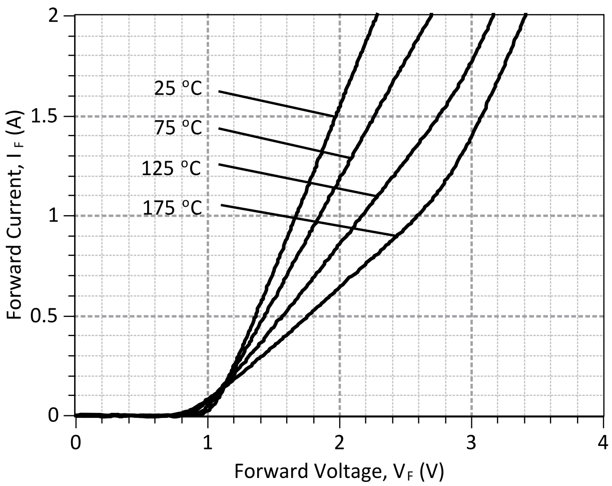


Figure 1: Typical Forward Characteristics

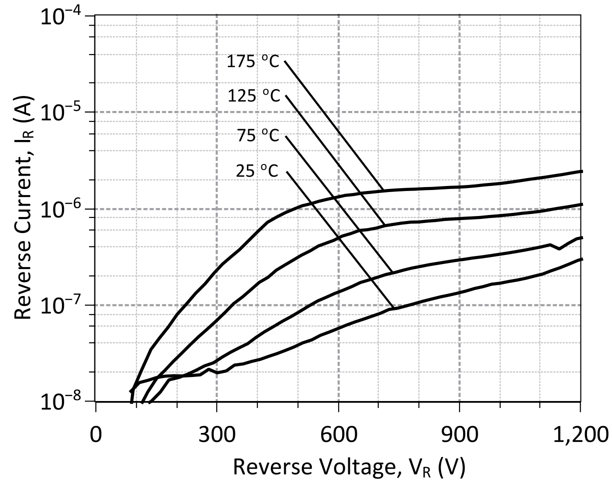


Figure 2: Typical Reverse Characteristics

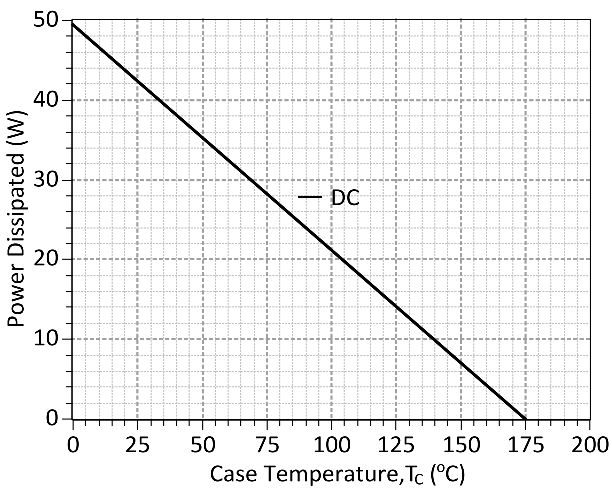


Figure 3: Power Derating Curve

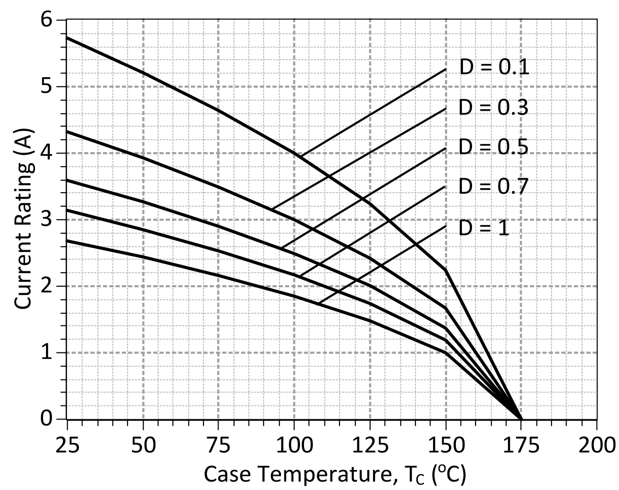


Figure 4: Current Derating Curves (D = t_P/T, t_P= 400 µs)
(Considering worst case Z_{th} conditions)

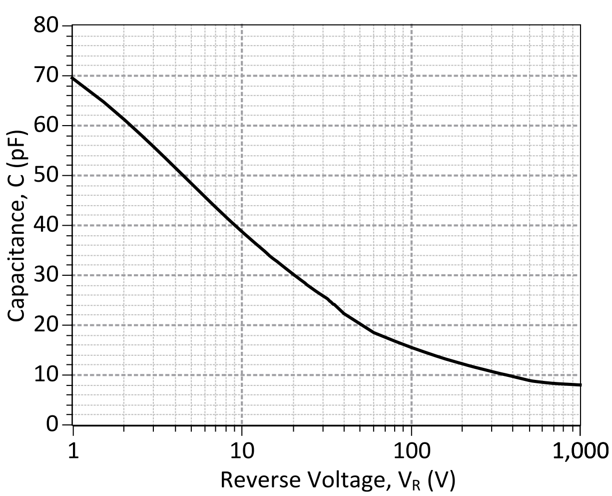


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

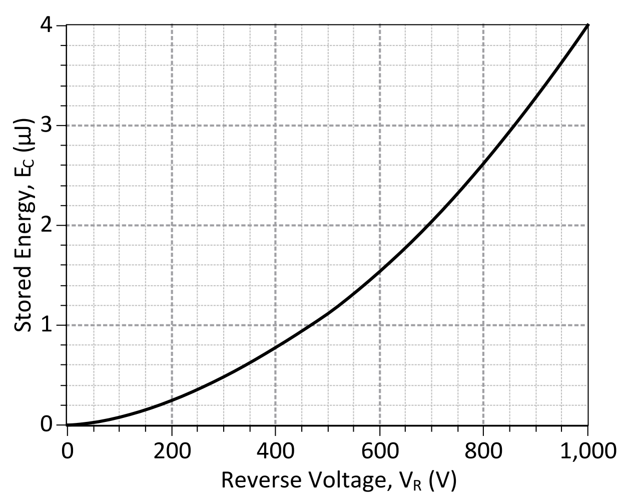


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

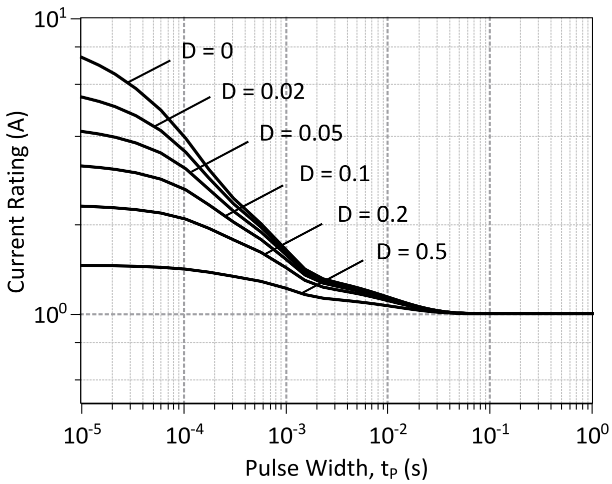


Figure 7: Current vs Pulse Duration Curves at T_C = 160 °C

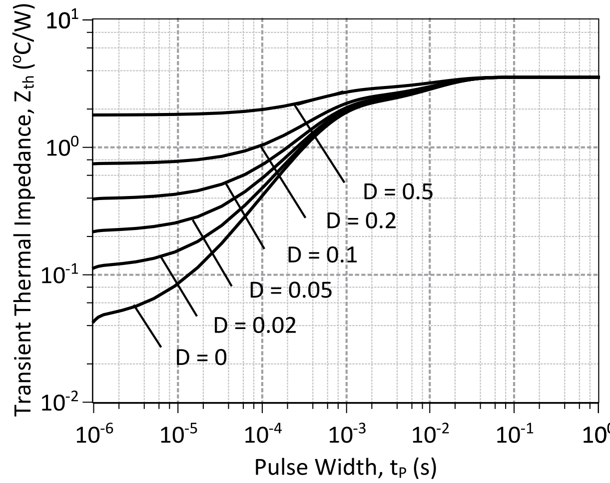
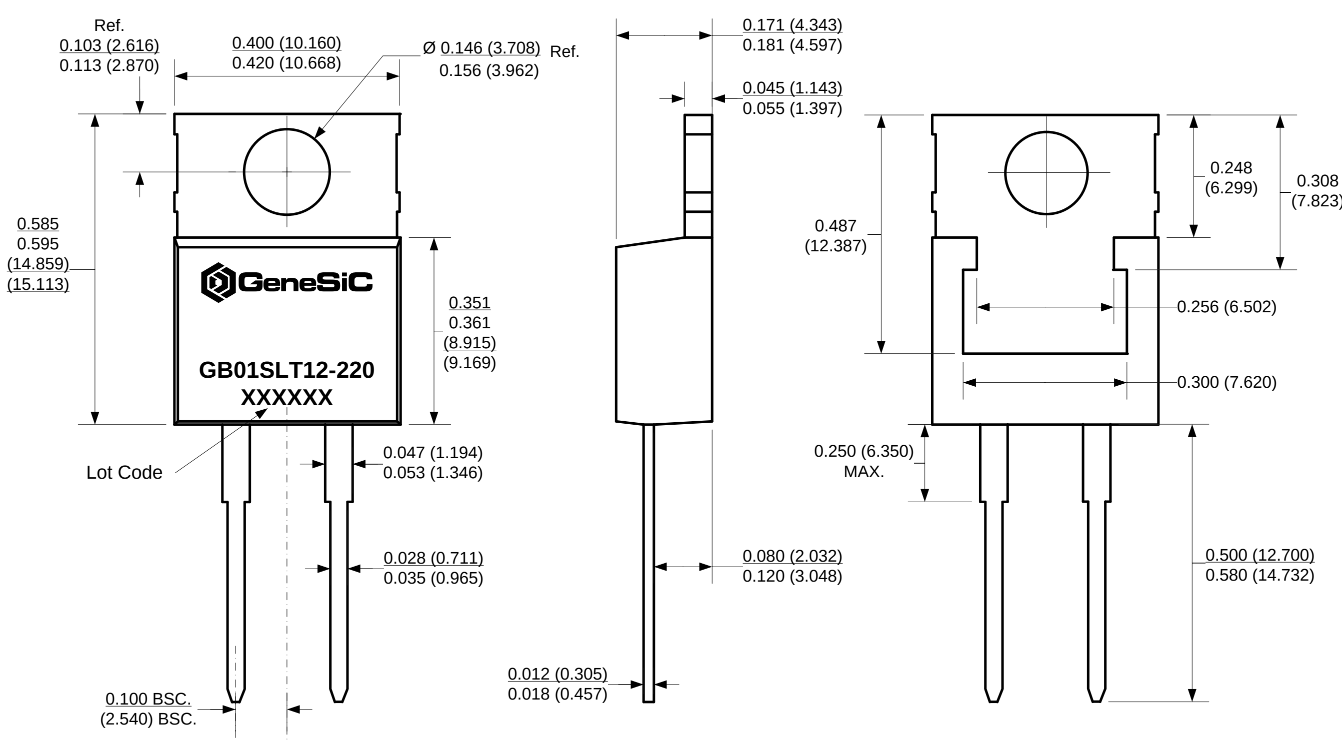


Figure 8: Transient Thermal Impedance

Package Dimensions:

TO-220AC **PACKAGE OUTLINE**



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	3	Updated Electrical Characteristics	
2013/02/05	2	Second generation update	
2012/05/22	1	Second generation release	
2010/12/13	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/GB01SLT12-220_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB01SLT12-220.

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*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   04-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 GB01SLT12-220 SPICE Model
*
.SUBCKT GB01SLT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.0069); Temperature Dependant Resistor
D1 INT KATHODE GB01SLT12_25C; Call the 25C Diode Model
D2 ANODE KATHODE GB01SLT12_PIN; Call the PiN Diode Model
.MODEL GB01SLT12_25C D
+ IS       7.27E-19        RS         0.592251
+ N        1               IKF        407.773
+ 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 GB01SLT12_PIN D
+ IS       1.08E-17        RS         1.8
+ N        2.2313          IKF        999
+ EG       3.23            XTI        -65
+ FC       0.5             TT         0
+ BV       1200            IBV        1.00E-03
+ VPK      1200            IAVE       1
+ TYPE     SiC_PiN
.ENDS
*
* End of GB01SLT12-220 SPICE Model
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