GeneSiC SEMICONDUCTOR

GB10SLT12-220

Silicon Carbide Power Schottky Diode

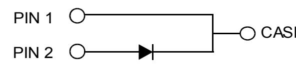
V_{RRM}	=	1200 V
$I_{F\ (Tc = 25°C)}$	=	25 A
Q_C	=	31 nC

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



TO – 220AC

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 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \leq 150$ °C	10	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150$ °C	17	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	65 55	A
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	280	A
I^2t value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms T_C = 150 °C, t_P = 10 ms	21 15	A^2s
Power dissipation	P_{tot}	T_C = 25 °C	190	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			Unit
				min.	typ.	max.	
Diode forward voltage	V_F	I_F = 10 A, T_j = 25 °C I_F = 10 A, T_j = 175 °C			1.5 2.6	1.8 3.0	V
Reverse current	I_R	V_R = 1200 V, T_j = 25 °C V_R = 1200 V, T_j = 175 °C			5 10	50 100	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		31 52		nC
Switching time	t_s		V_R = 400 V V_R = 960 V		< 25		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			490 45 33		pF

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}		0.8	°C/W

Mechanical Properties

Mounting torque	M		0.6	Nm

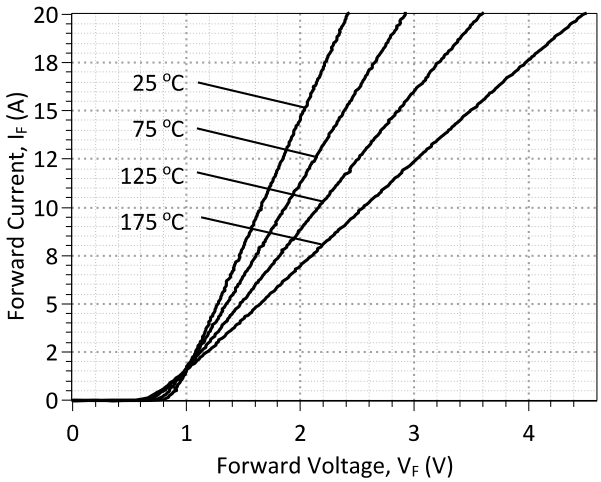


Figure 1: Typical Forward Characteristics

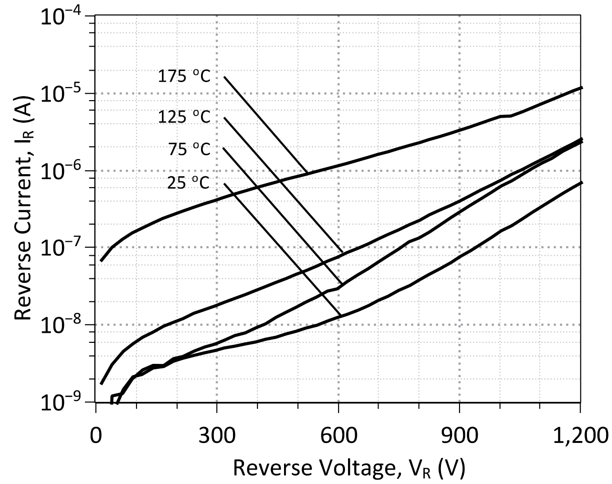


Figure 2: Typical Reverse Characteristics

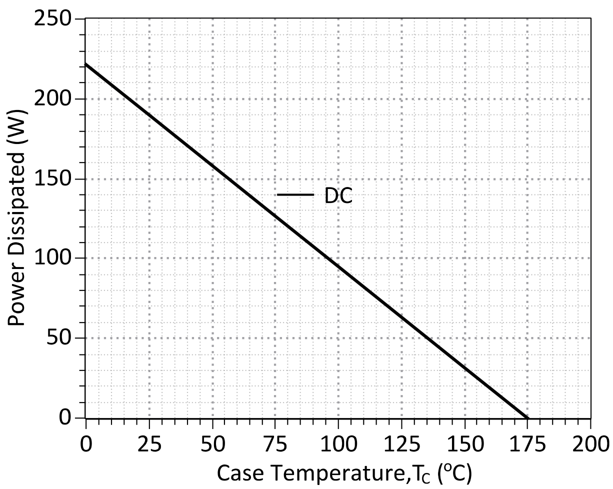


Figure 3: Power Derating Curve

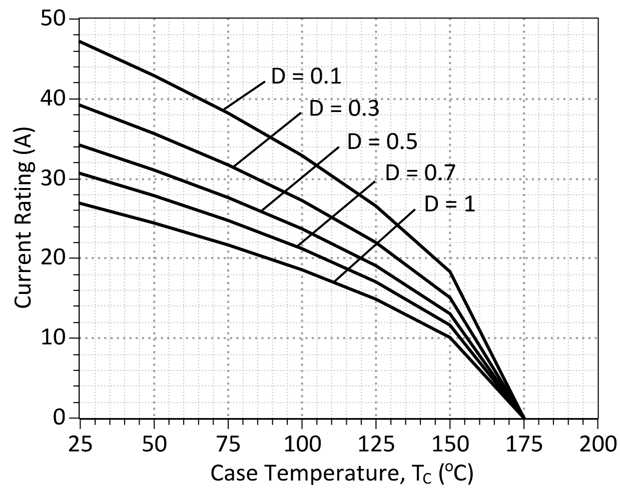


Figure 4: Current Derating Curves ($D = t_P/T$, t_P= 400 µs)
(Considering worst case Z_{th} conditions)

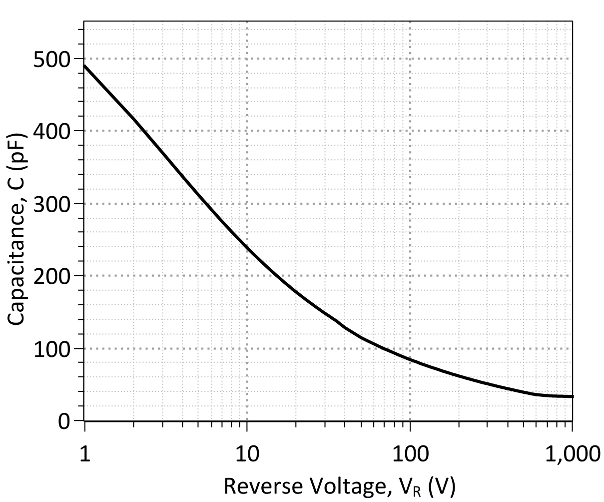


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

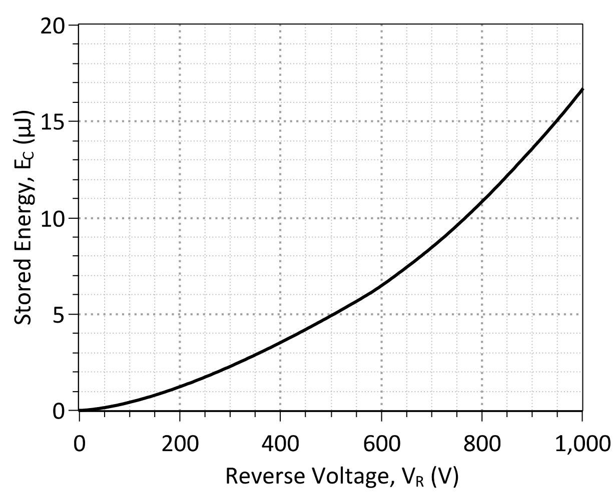


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

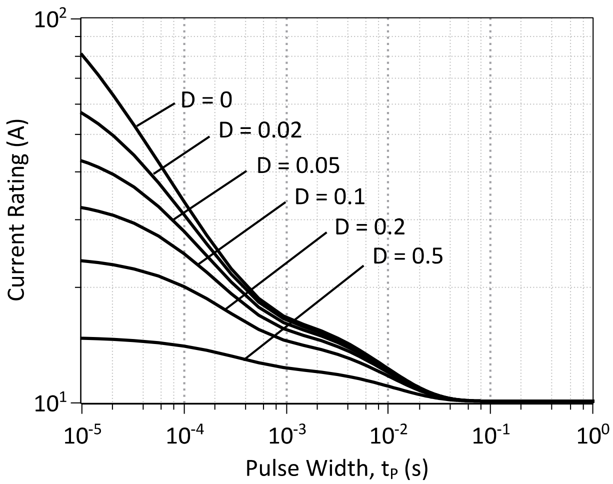


Figure 7: Current vs Pulse Duration Curves at T_C = 150 °C

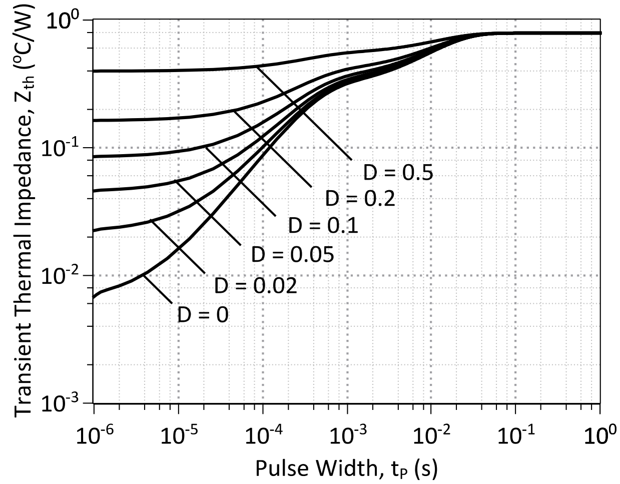
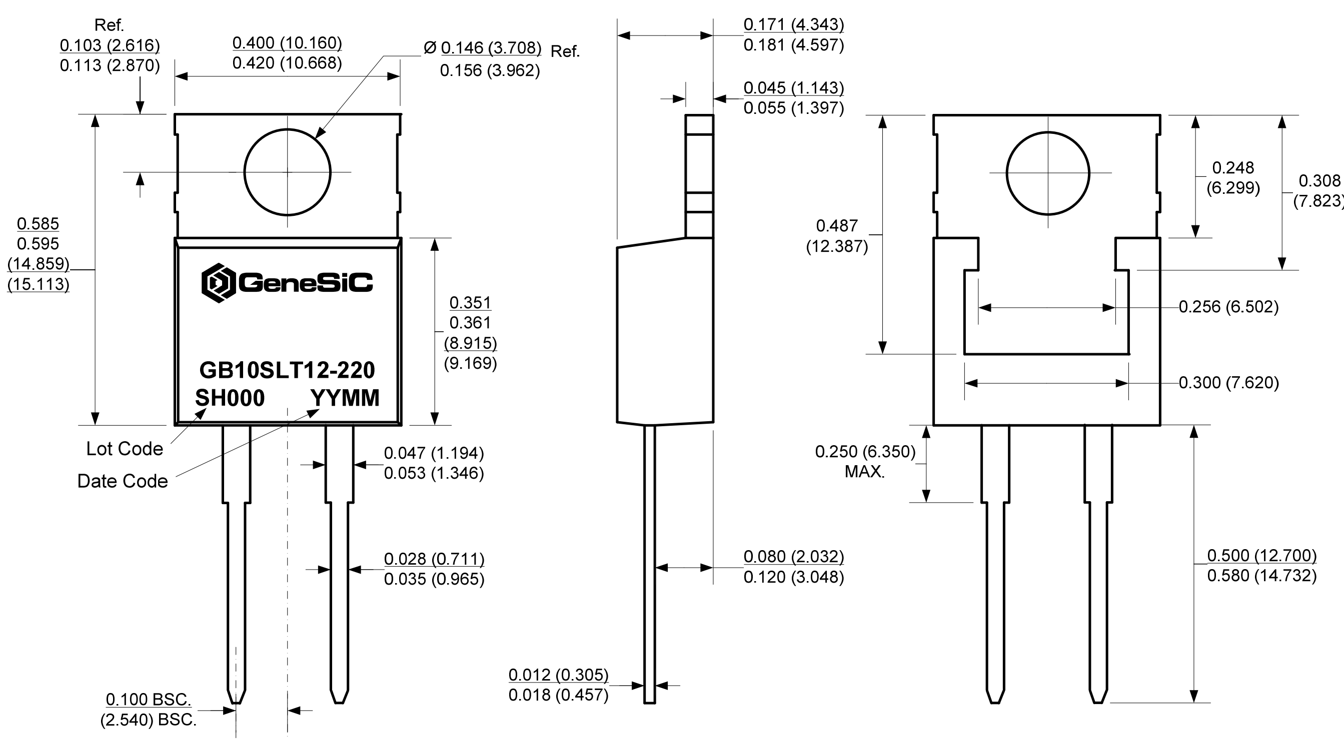


Figure 8: Transient Thermal Impedance

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	4	Updated Electrical Characteristics	
2013/06/12	3	Updated Electrical Characteristics	
2012/12/18	2	Second generation update	
2012/05/22	1	Second generation release	
2010/12/14	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

Copy the following code into a SPICE software program for simulation of the GB10SLT12-220 device.

```
*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   20-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 GB10SLT12-220 SPICE Model
*
.SUBCKT GB10SLT12 ANODE KATHODE
D1 ANODE KATHODE GB10SLT12_SCHOTTKY
D2 ANODE KATHODE GB10SLT12_PIN
.MODEL GB10SLT12_SCHOTTKY D
+ IS       4.55E-15        RS         0.0736
+ N        1               IKF        1000
+ EG       1.2             XTI        -2
+ TRS1     0.0054347826    TRS2       2.71739E-05
+ CJO      6.40E-10        VJ         0.469
+ M        1.508           FC         0.5
+ TT       1.00E-10        BV         1200
+ IBV      1.00E-03        VPK        1200
+ IAVE     10              TYPE       SiC_Schottky
+ MFG      GeneSiC_Semi
.MODEL GB10SLT12_PIN D
+ IS       1.54E-22        RS         0.19
+ TRS1     -0.004          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 GB10SLT12-220 SPICE Model
```