GB20SLT12-247

GeneSiC SEMICONDUCTOR

Silicon Carbide Power Schottky Diode

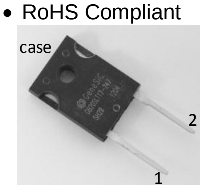
V_{RRM}	=	1200 V
$I_{F\ (Tc\ =\ 25°C)}$	=	50 A
$I_{F\ (Tc\ \leq\ 145°C)}$	=	20 A
Q_C	=	69 nC

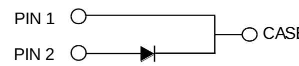
Features

- 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 – 247AC

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	50	A
Continuous forward current	I_F	T_C ≤ 145 °C	20	A
RMS forward current	$I_{F(RMS)}$	T_C ≤ 145 °C	35	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms T_C = 145 °C, t_P = 10 ms	140 125	A
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	650	A
I^2t value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms T_C = 145 °C, t_P = 10 ms	98 78	A^2s
Power dissipation	P_{tot}	T_C = 25 °C	306	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 = 20 A, T_j = 25 °C I_F = 20 A, T_j = 175 °C			1.6 2.6	2.0 3.0	V
Reverse current	I_R	V_R = 1200 V, T_j = 25 °C V_R = 1200 V, T_j = 175 °C			20 40	200 400	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		69 112		nC
Switching time	t_s		V_R = 400 V V_R = 960 V		< 49		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			968 76 62		pF

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	0.5	°C/W

Mechanical Properties

Mounting torque	M	0.6	Nm

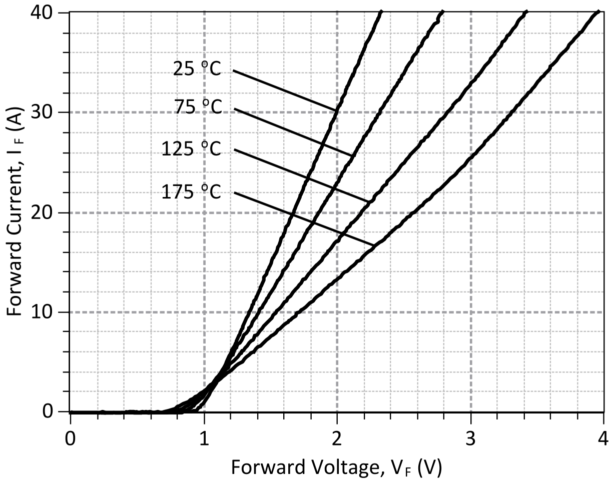


Figure 1: Typical Forward Characteristics

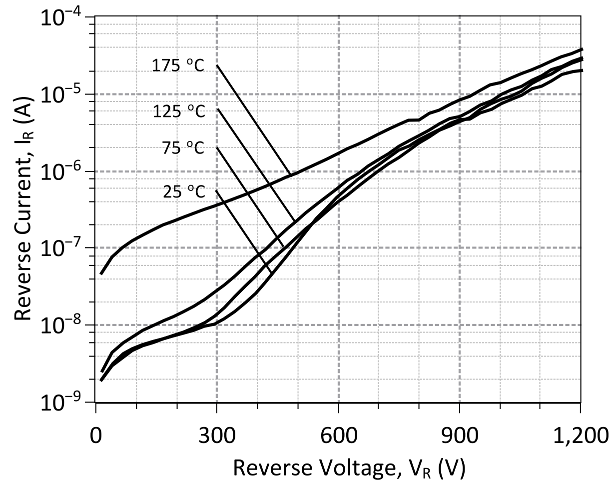


Figure 2: Typical Reverse Characteristics

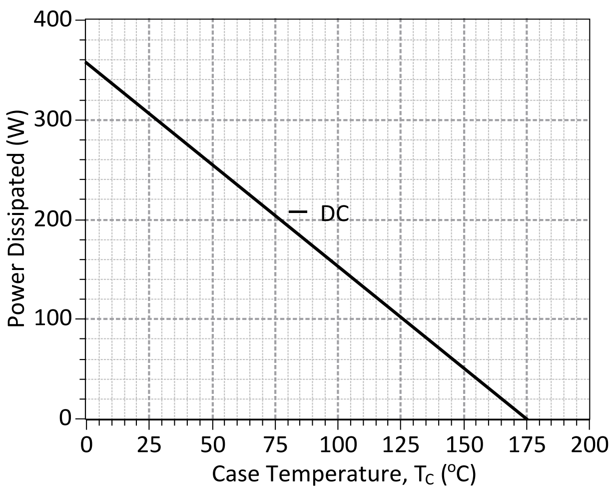


Figure 3: Power Derating Curve

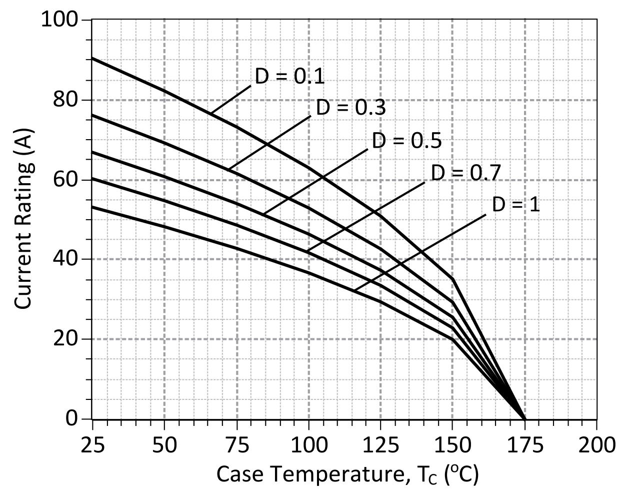


Figure 4: Current Derating Curves (D = t_P/T, t_P= 400 µs) (Considering worst case Z_{th} conditions)

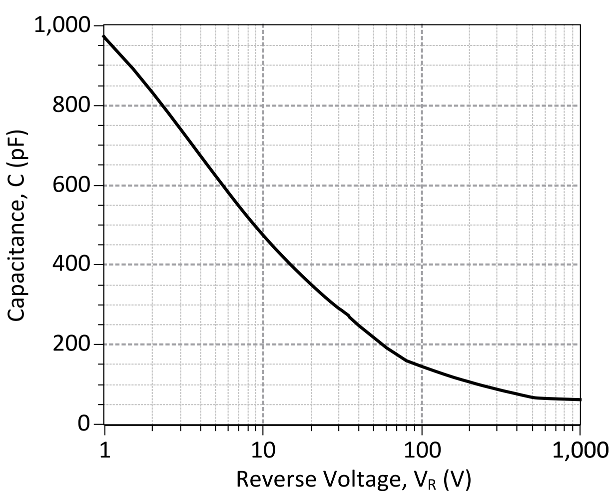


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

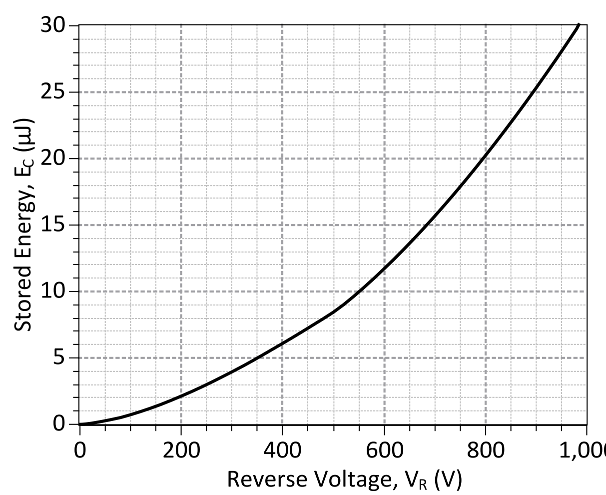


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

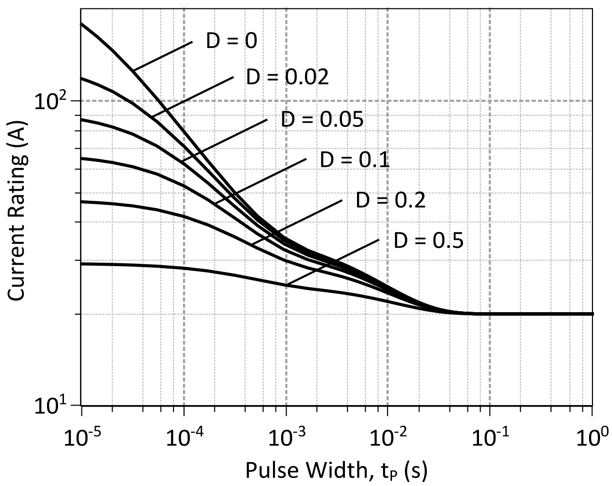


Figure 7: Current vs Pulse Duration Curves at T_C = 145 °C

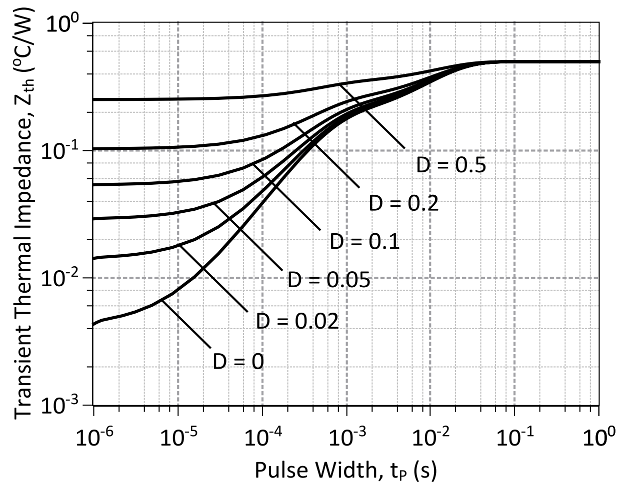
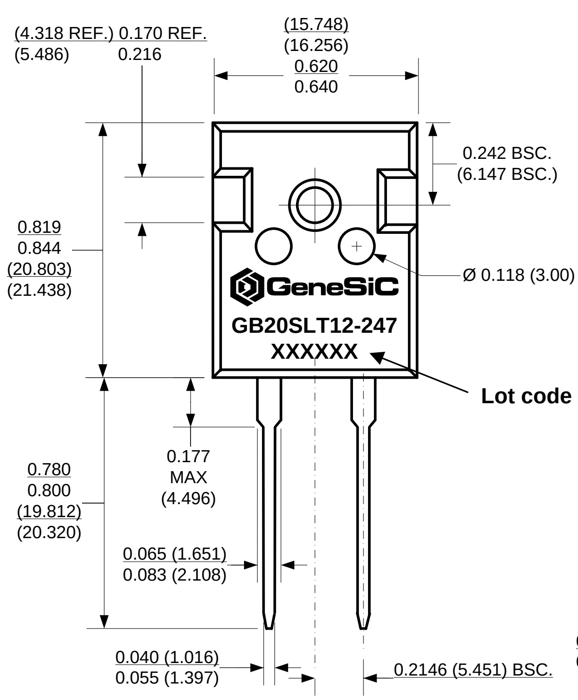


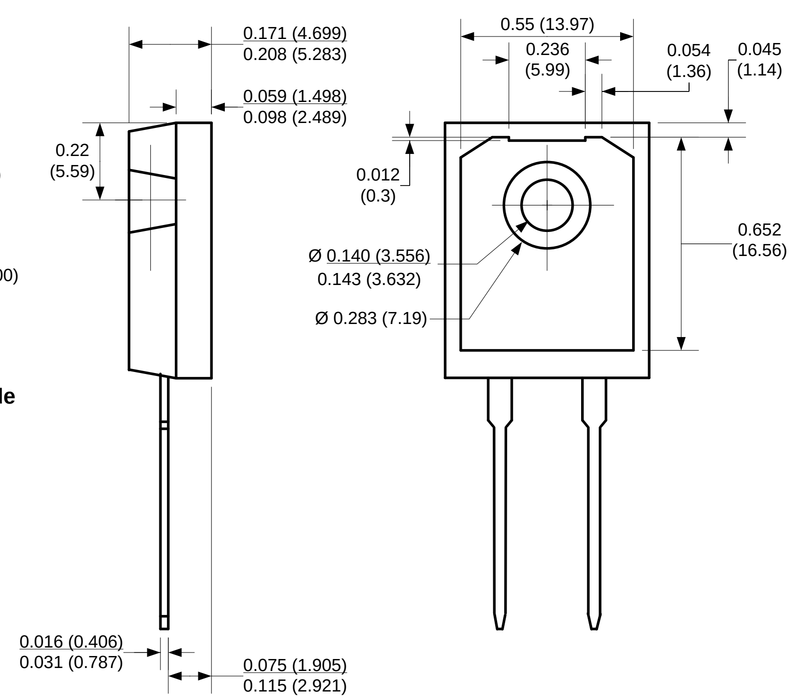
Figure 8: Transient Thermal Impedance

Package Dimensions:

TO-247AC



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	
2013/02/28	2	Second generation update	
2012/05/22	1	Second generation release	
2010/12/14	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/GB20SLT12-247_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB20SLT12-247.

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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.
*     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 GB20SLT12-247 SPICE Model
*
.SUBCKT GB20SLT12 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.00035); Temperature Dependant Resistor
D1 INT KATHODE GB20SLT12_25C; Call the 25C Diode Model
D2 ANODE KATHODE GB20SLT12_PIN; Call the PiN Diode Model
.MODEL GB20SLT12_25C D
+ IS       5.48E-17        RS         0.03214547
+ N        1               IKF        1000
+ EG       1.2             XTI        3
+ CJO      1.15E-09        VJ         0.44
+ M        1.5             FC         0.5
+ TT       1.00E-10        BV         1200
+ IBV      1.00E-03        VPK        1200
+ IAVE     20              TYPE       SiC_Schottky
+ MFG      GeneSiC_Semiconductor
.MODEL GB20SLT12_PIN D
+ IS       1.54E-13        RS         0.23
+ N        3.941           IKF        19
+ EG       3.23            XTI        0
+ FC       0.5             TT         0
+ BV       1200            IBV        1.00E-03
+ VPK      1200            IAVE       1
+ TYPE     SiC_PiN
.ENDS
*
* End of GB20SLT12-247 SPICE Model
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