GeneSiC SEMICONDUCTOR — GB50SLT12-247

Silicon Carbide Power Schottky Diode

V_{RRM}	=	1200 V
$I_{F\ (Tc\ =\ 25°C)}$	=	100 A
$I_{F\ (Tc\ \leq\ 135°C)}$	=	50 A
Q_C	=	158 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

- Automotive Traction Inverters
- Power Factor Correction (PFC)
- Switched-Mode Power Supply (SMPS)
- Solar Inverters
- Wind Turbine Inverters
- Motor Drives
- Induction Heating
- Uninterruptible Power Supply (UPS)

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	100	A
Continuous forward current	I_F	T_C ≤ 135 °C	50	A
RMS forward current	$I_{F(RMS)}$	T_C ≤ 135 °C	87	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms T_C = 135 °C, t_P = 10 ms	350 313	A
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	1625	A
I^2t value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms T_C = 135 °C, t_P = 10 ms	450 300	A^2s
Power dissipation	P_{tot}	T_C = 25 °C	620	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 = 50 A, T_j = 25 °C I_F = 50 A, T_j = 175 °C			1.5 2.4	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			25 100	1000 3000	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		158 247		nC
Switching time	t_s		V_R = 400 V V_R = 960 V		50		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			2940 203 142		pF

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}		0.242	°C/W

Mechanical Properties

Mounting torque	M		0.6	Nm

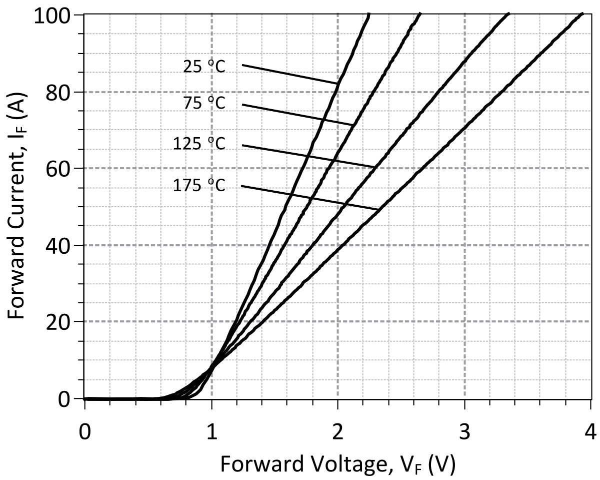


Figure 1: Typical Forward Characteristics

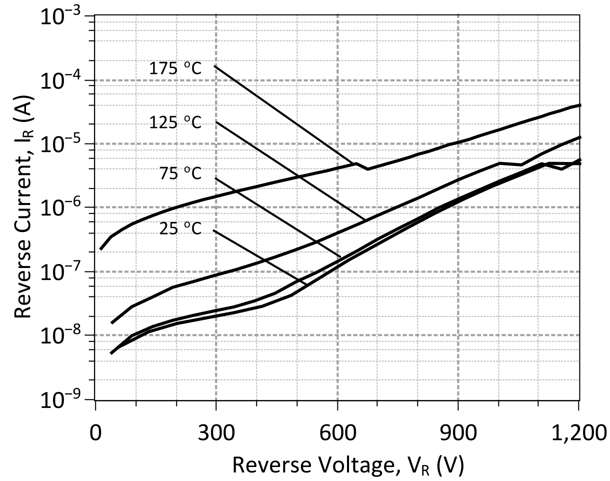


Figure 2: Typical Reverse Characteristics

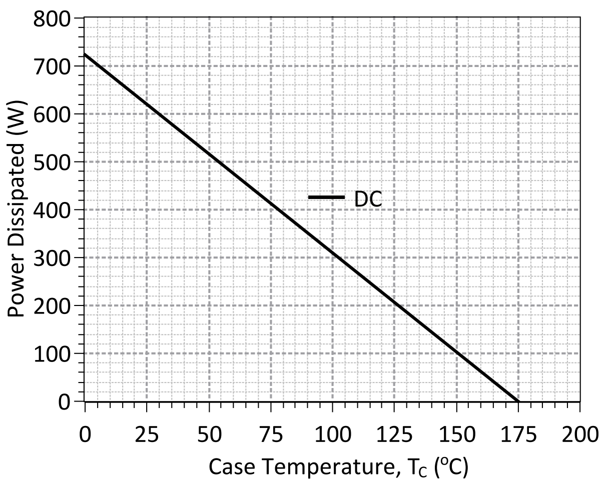


Figure 3: Power Derating Curve

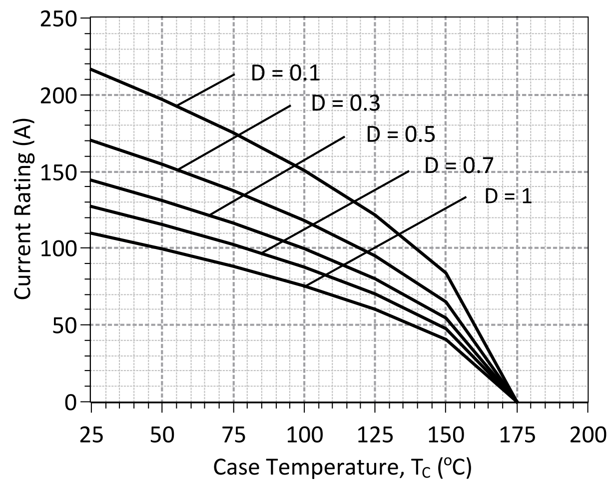


Figure 4: Current Derating Curves (D = t_P/T, t_P= 400 μs) (Considering worst case Z_{th} conditions)

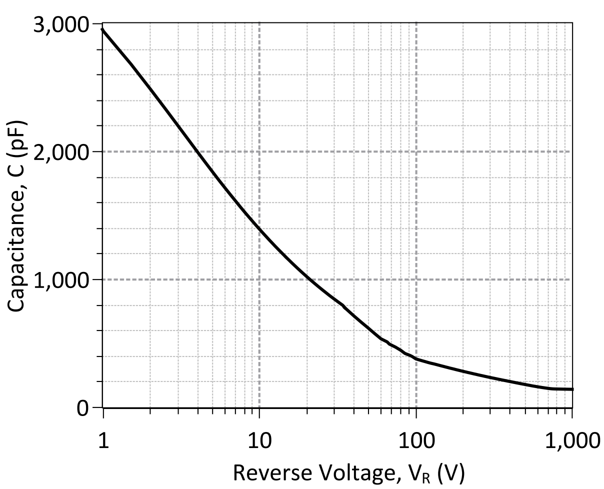


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

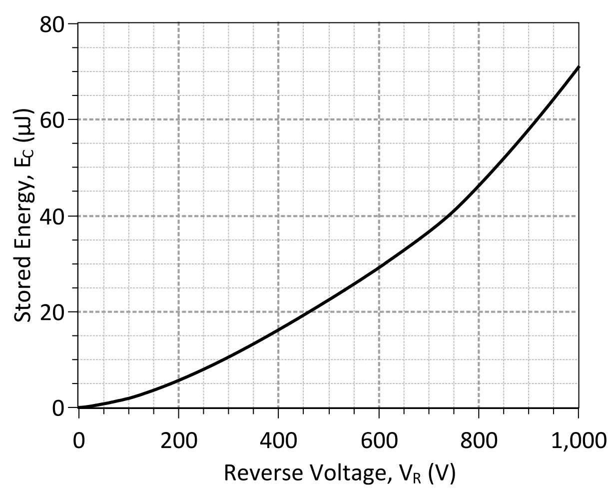


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

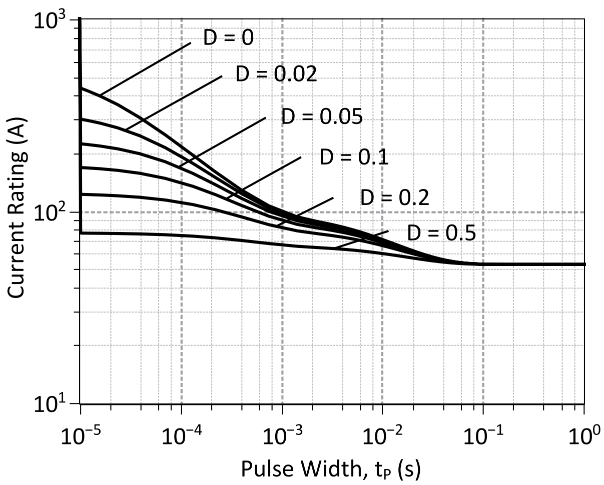


Figure 7: Current vs Pulse Duration Curves at T_C = 135 °C

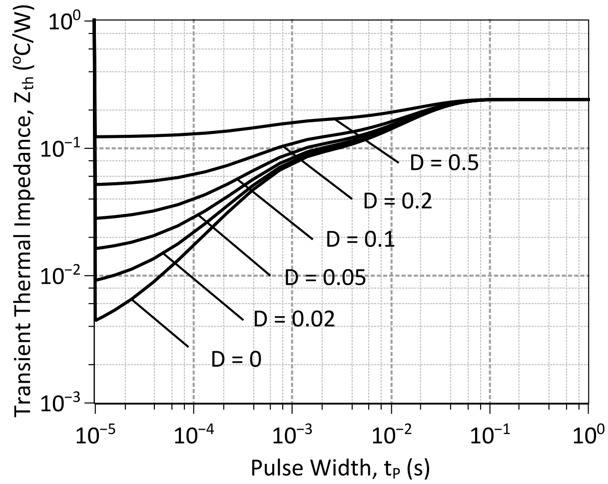
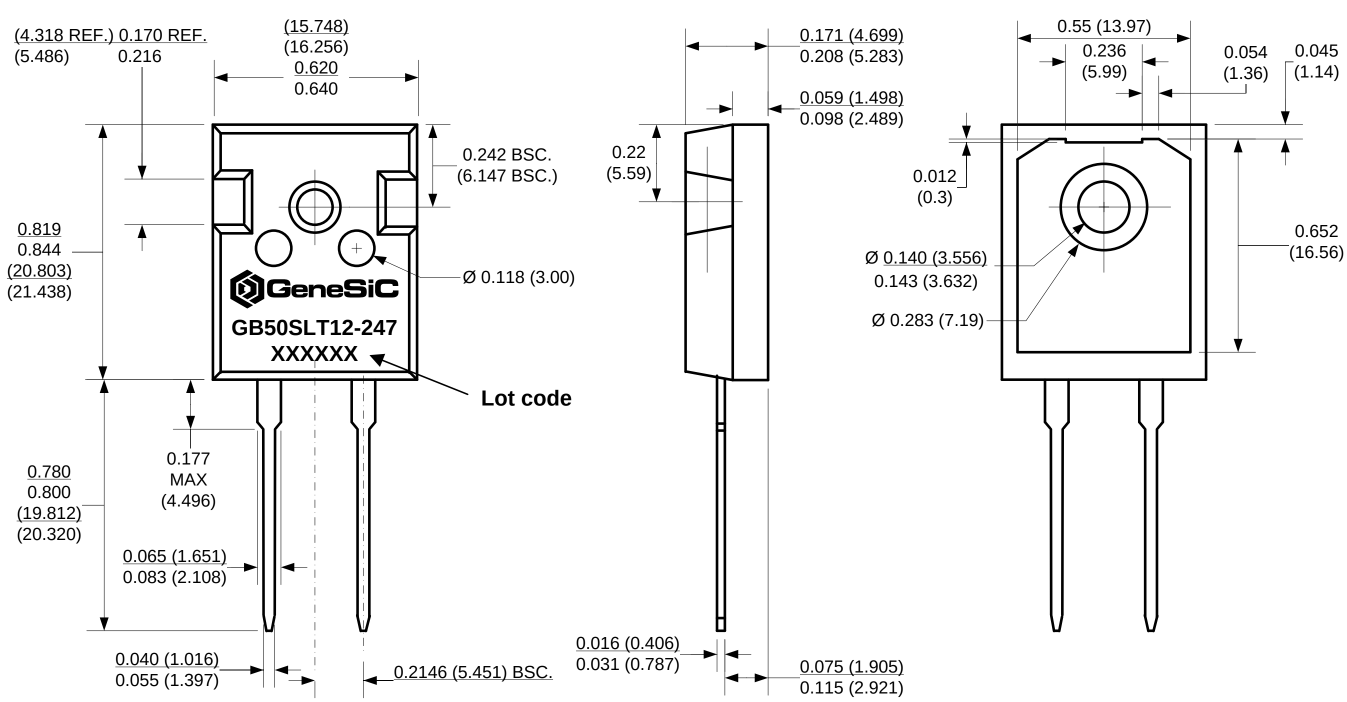


Figure 8: Transient Thermal Impedance

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
2014/12/17	3	Updated Electrical Characteristics	
2014/08/26	2	Updated Electrical Characteristics	
2013/02/07	1	Updated Electrical Characteristics	
2012/12/17	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/GB50SLT12-247_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GA50SLT12-247.

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*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   20-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 GB50SLT12-247 SPICE Model
*
.SUBCKT GB50SLT12 ANODE KATHODE
D1 ANODE KATHODE GB50SLT12_SCHOTTKY
D2 ANODE KATHODE GB50SLT12_SURGE
.MODEL GB50SLT12_SCHOTTKY D
+ IS       1.99E-16        RS         0.015652965
+ N        1               IKF        1000
+ EG       1.2             XTI        3
+ TRS1     0.0042          TRS2       1.3E-05
+ CJO      3.86E-09        VJ         1.362328465
+ M        0.48198551      FC         0.5
+ TT       1.00E-10        BV         1200
+ IBV      1.00E-03        VPK        1200
+ IAVE     50              TYPE       SiC_Schottky
+ MFG      GeneSiC_Semi
.MODEL GB50SLT12_SURGE D
+ IS       1.54E-19        RS         0.1
+ 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     50              TYPE       SiC_PiN
.ENDS
*
* End of GB50SLT12-247 SPICE Model
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