GeneSiC
S E M I C O N D U C T O R

GB50SLT12-247

Silicon Carbide Power Schottky Diode

V_{RRM}	=	1200 V
V_F	=	1.6 V
I_F	=	50 A
Q_C	=	247 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

case

PIN 1 — CASE
PIN 2
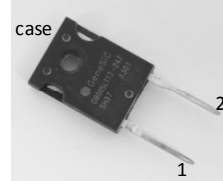
TO – 247AC

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	$T_C \leq 135$ °C	50	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 135$ °C	87	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25$ °C, $t_P = 10$ ms	350	A
		$T_C = 135$ °C, $t_P = 10$ ms	313	
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	450	A^2s
		$T_C = 135$ °C, $t_P = 10$ ms	300	
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			Unit
				min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 50$ A, $T_j = 25$ °C			1.6	1.8	V
		$I_F = 50$ A, $T_j = 175$ °C			2.6	3.0	
Reverse current	I_R	$V_R = 1200$ V, $T_j = 25$ °C			200	1000	μA
		$V_R = 1200$ V, $T_j = 175$ °C			400	3000	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ dl$_F$/dt = 200 A/μs $T_j = 175$ °C	$V_R = 400$ V		158		nC
			$V_R = 960$ V		247		
Switching time	t_s		$V_R = 400$ V				ns
			$V_R = 960$ V		50		
Total capacitance	C	$V_R = 1$ V, $f = 1$ MHz, $T_j = 25$ °C			2940		pF
		$V_R = 400$ V, $f = 1$ MHz, $T_j = 25$ °C			203		
		$V_R = 1000$ V, $f = 1$ MHz, $T_j = 25$ °C			142		

Thermal Characteristics

Parameter	Symbol			Values		Unit
Thermal resistance, junction - case	R_{thJC}			0.242		°C/W

Mechanical Properties

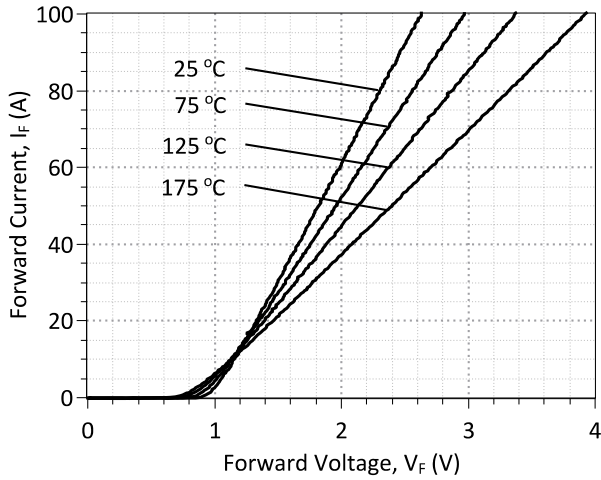| Parameter	Symbol			Values		Unit
Mounting torque	M			0.6		Nm

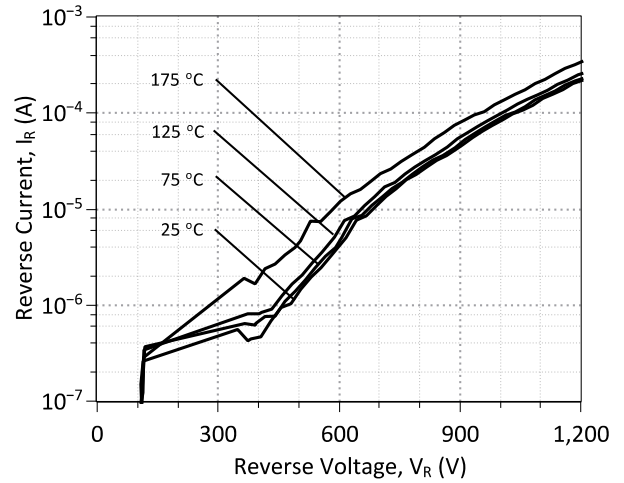**Figure 1: Typical Forward Characteristics**

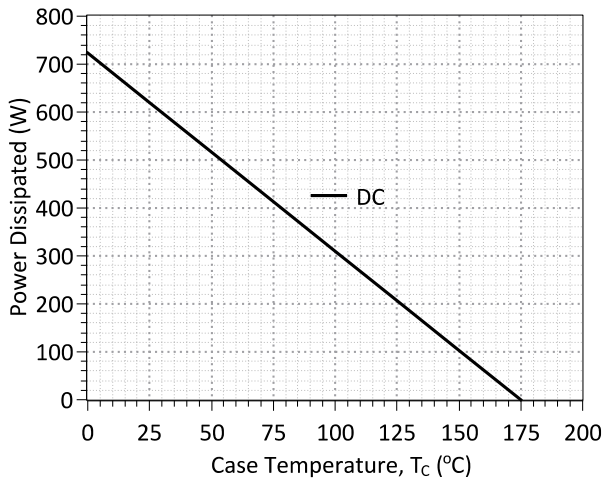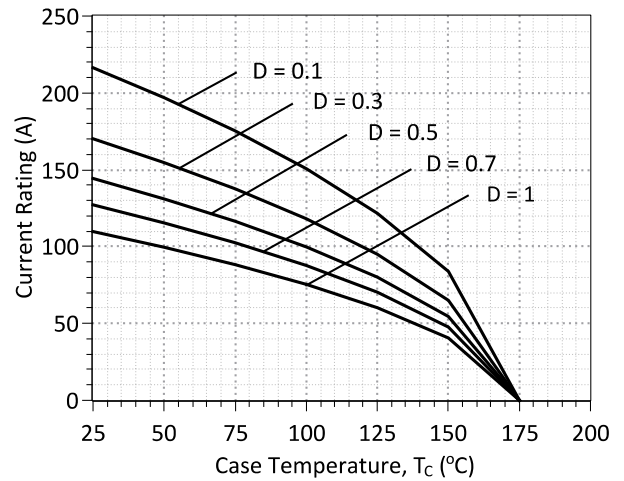**Figure 2: Typical Reverse Characteristics**

Figure 3: Power Derating Curve

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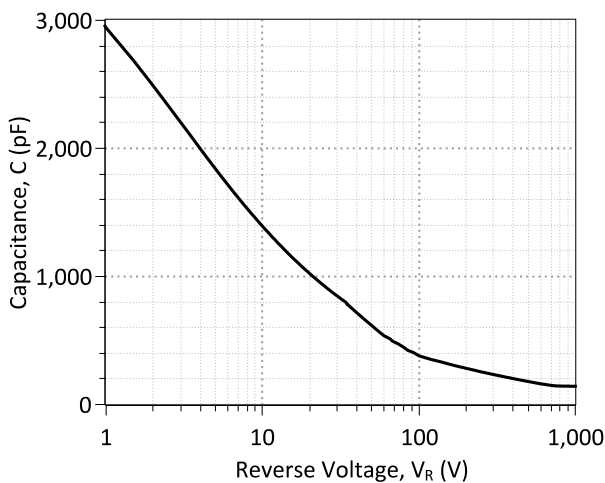

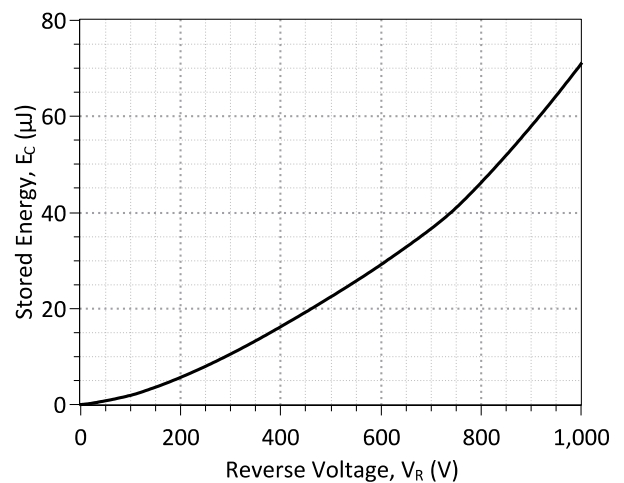**Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics**

Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics
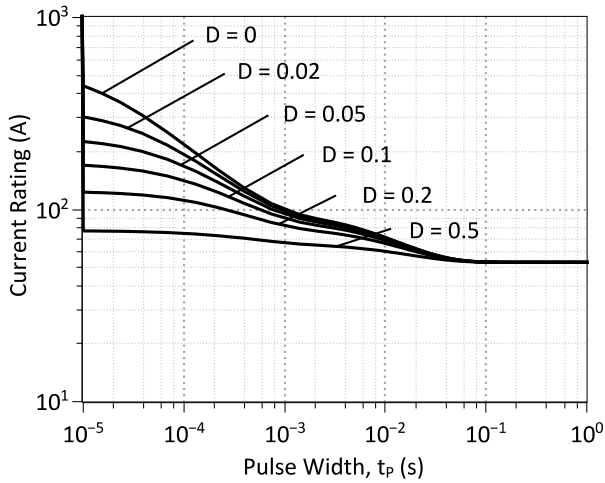
Figure 7: Current vs Pulse Duration Curves at T_C = 135 °C

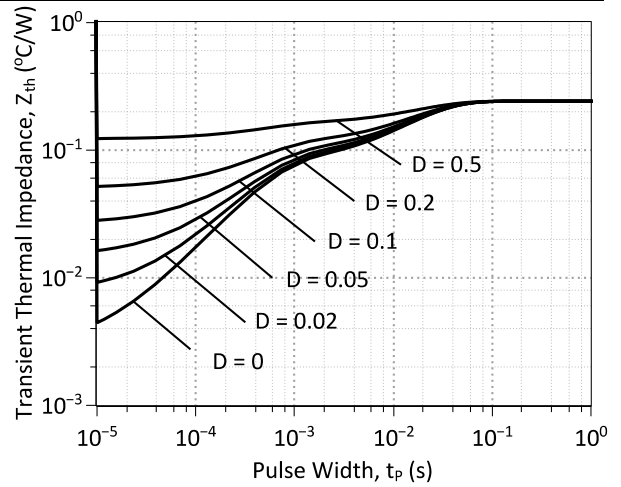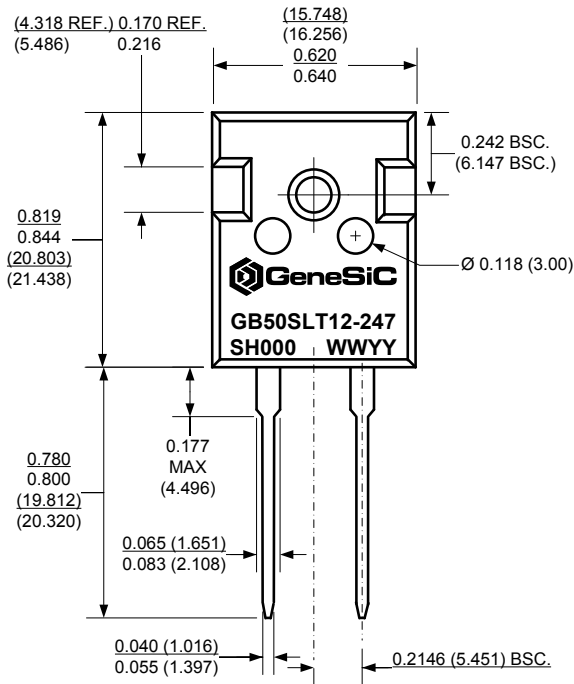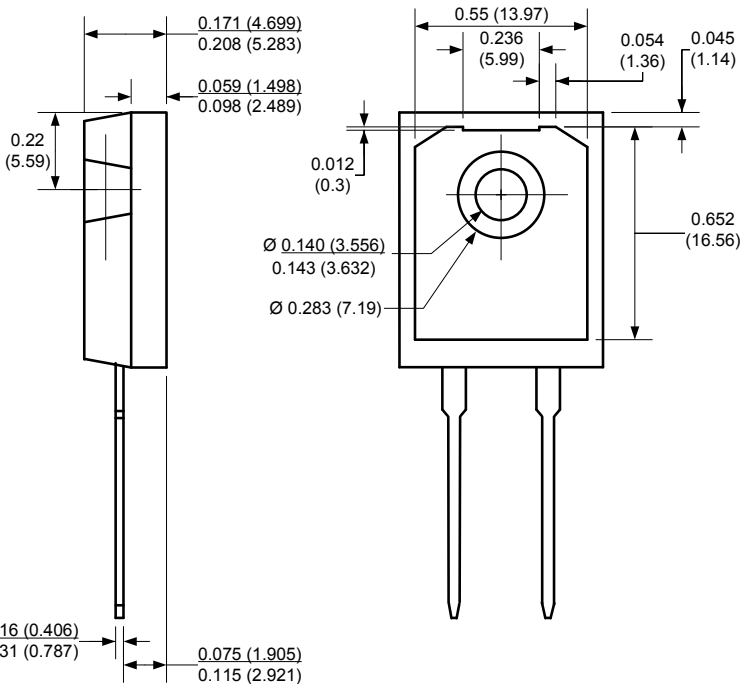Figure 8: Transient Thermal Impedance

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
2013/11/12	2	Updated Electrical Characteristics	
2013/02/07	1	Updated Electrical Characteristics	
2012/12/17	0	Initial release	

Published by

GeneSiC Semiconductor, Inc.
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Dulles, VA 20166

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SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GB50SLT12-247 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.
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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 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
```