High Temperature Silicon Carbide Power Schottky Diode

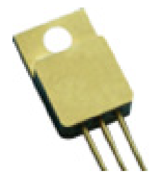
V_{RRM}	=	1200 V
$I_{F\ (Tc=25°C)}$	=	2.5 A
Q_C	=	6 nC

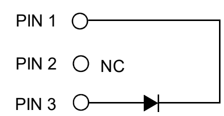
Features

- 1200 V Schottky rectifier
- 210°C maximum operating temperature
- Electrically isolated base-plate
- Zero reverse recovery charge
- Superior surge current capability
- Positive temperature coefficient of V_F
- Temperature independent switching behavior
- Lowest figure of merit Q_C/I_F
- Available screened to Mil-PRF-19500

Package

- RoHS Compliant





TO – 257 (Isolated Base-plate Hermetic Package)

Advantages

- High temperature operation
- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Industry's lowest reverse recovery charge
- Industry's lowest device capacitance
- Ideal for output switching of power supplies
- Best in class reverse leakage current at operating temperature

Applications

- Down Hole Oil Drilling
- Geothermal Instrumentation
- Solenoid Actuators
- General Purpose High-Temperature Switching
- Amplifiers
- Solar Inverters
- Switched-Mode Power Supply (SMPS)
- Power Factor Correction (PFC)

Maximum Ratings at T_j = 210 °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 ≤ 190 °C	0.75	A
RMS forward current	$I_{F(RMS)}$	T_C ≤ 190 °C	1.3	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms	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	0.5	A^2S
Power dissipation	P_{tot}	T_C = 25 °C	26	W
Operating and storage temperature	T_j , T_{stg}		-55 to 210	°C

Electrical Characteristics at T_j = 210 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values min.	Values typ.	Values max.	Unit
Diode forward voltage	V_F	I_F = 0.75 A, T_j = 25 °C			1.7		V
		I_F = 0.75 A, T_j = 210 °C			2.8		
Reverse current	I_R	V_R = 1200 V, T_j = 25 °C			1	10	µA
		V_R = 1200 V, T_j = 210 °C			10	100	
Total capacitive charge	Q_C	$I_F \le I_{F,MAX}$, dI_F/dt = 200 A/µs, T_j = 210 °C	V_R = 400 V		6		nC
			V_R = 960 V		11		
Switching time	t_s		V_R = 400 V V_R = 960 V		< 17		ns
Total capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C			66		pF
		V_R = 400 V, f = 1 MHz, T_j = 25 °C			10		
		V_R = 1000 V, f = 1 MHz, T_j = 25 °C			8		

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	9.52	°C/W

Mechanical Properties

Mounting torque	M	0.6	Nm

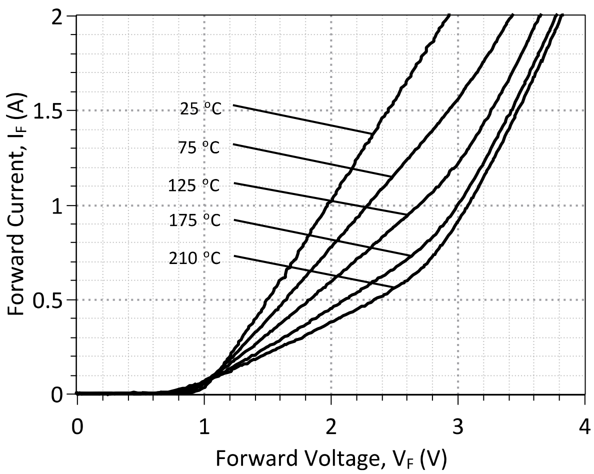


Figure 1: Typical Forward Characteristics

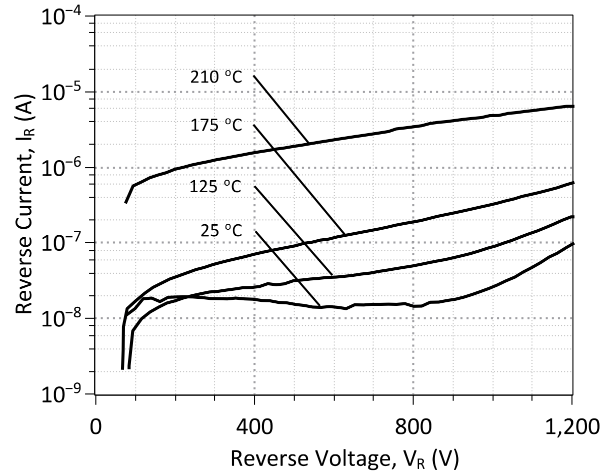


Figure 2: Typical Reverse Characteristics

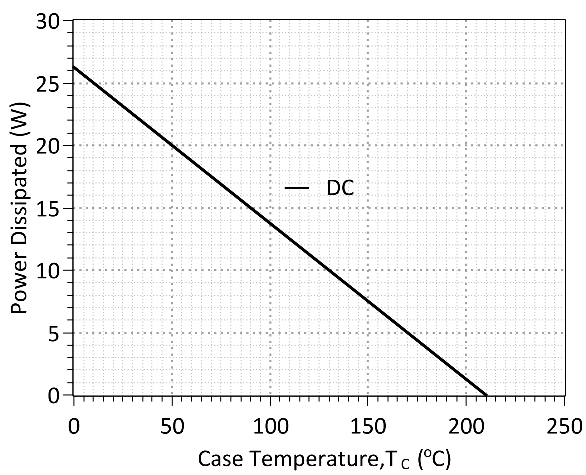


Figure 3: Power Derating Curve

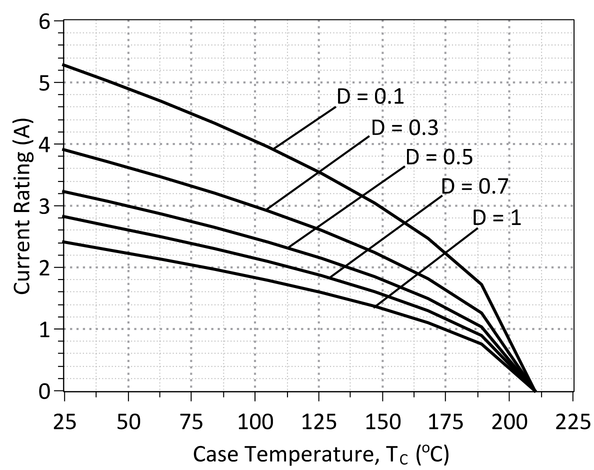


Figure 4: Current Derating Curves ($D = t_P/T$, t_P= 400 µs) (Considering worst case Z_{th} conditions)

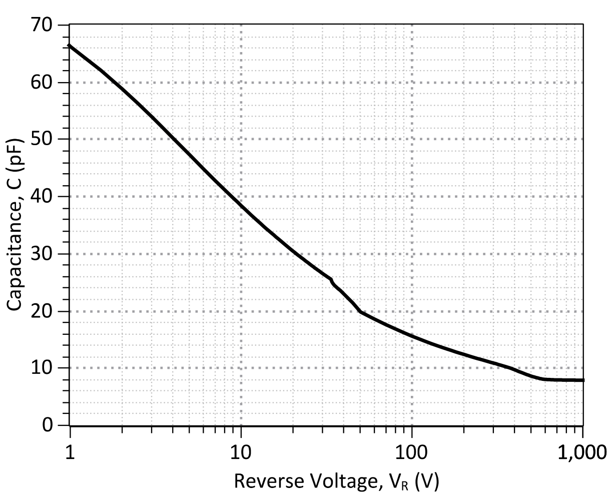


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

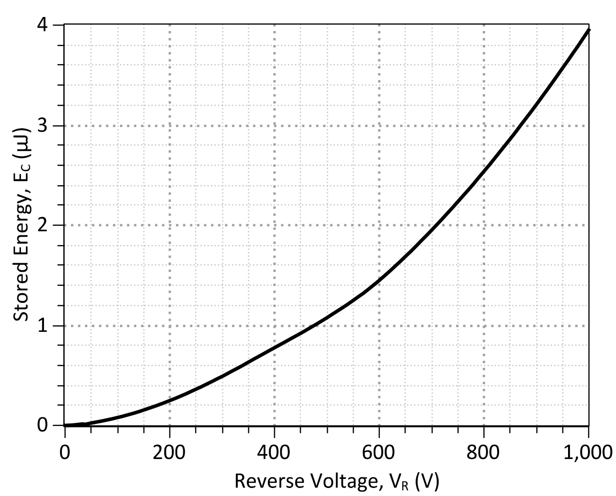


Figure 6: Typical Capacitive Energy vs Reverse Voltage Characteristics

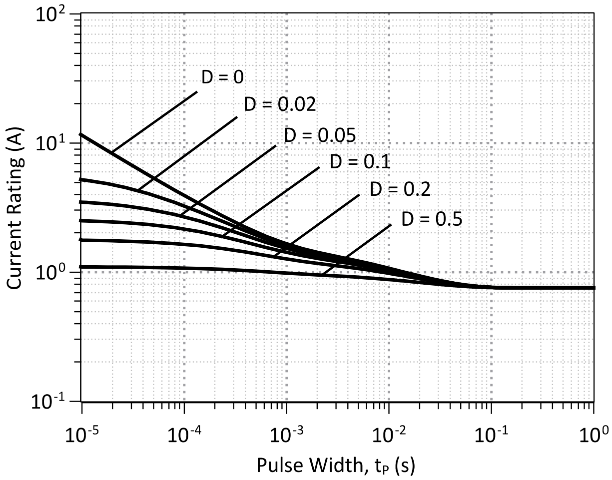


Figure 7: Current vs Pulse Duration Curves at T_C = 190 °C

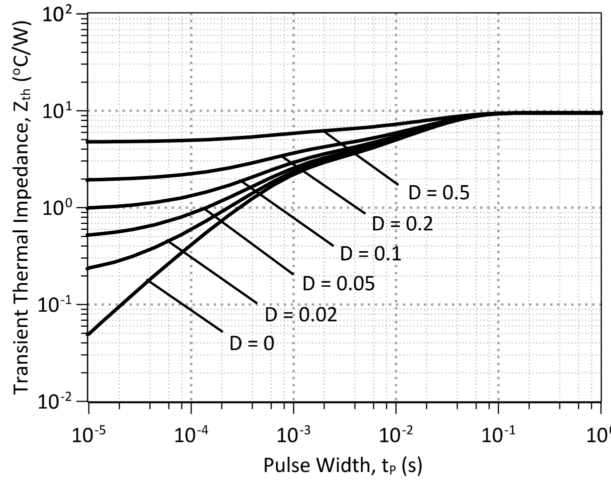
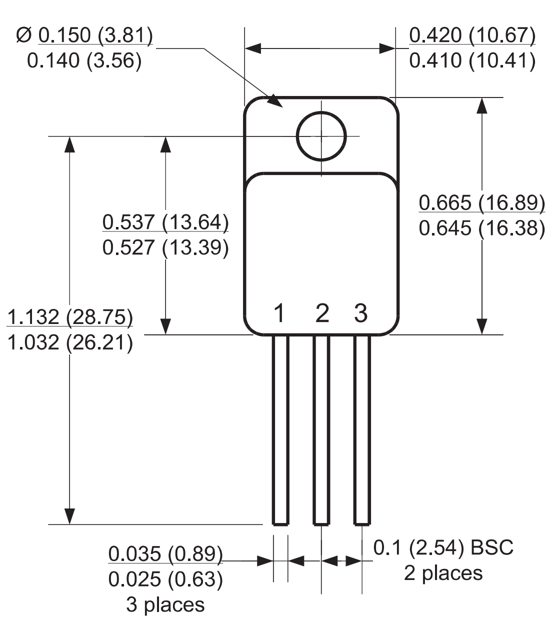


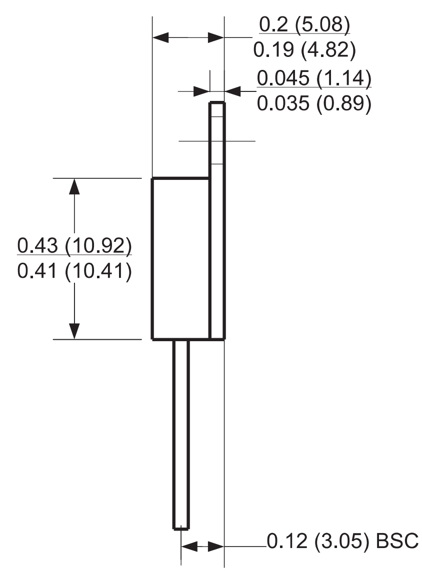
Figure 8: Transient Thermal Impedance

Package Dimensions:

TO-257



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	1	Updated Electrical Characteristics	
2012/04/24	0	Initial release	

Published by
GeneSiC Semiconductor, Inc.
43670 Trade Center Place Suite 155
Dulles, VA 20166

SPICE Model Parameters

This is a secure document. Copy this code from the SPICE model PDF file on our website into a SPICE software program for simulation of the 1N8024-GA.

```
*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   05-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 1N8024-GA SPICE Model
*
.SUBCKT 1N8024 ANODE KATHODE
R1 ANODE INT R=((TEMP-24)*0.0099); Temperature Dependant Resistor
D1 INT KATHODE 1N8024_25C; Call the 25C Diode Model
D2 ANODE KATHODE 1N8024_PIN; Call the PiN Diode Model
.MODEL 1N8024_25C D
+ IS       1.88E-18        RS         0.9255
+ N        1               IKF        98.29122743
+ 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 1N8024_PIN D
+ IS       2.76E-16        RS         0.84243
+ N        3.791461        IKF        2.98675
+ EG       3.23            XTI        30
+ FC       0.5             TT         0
+ BV       1200            IBV        1.00E-03
+ VPK      1200            IAVE       1
+ TYPE     SiC_PiN
.ENDS
*
* End of 1N8024-GA SPICE Model
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