

High Temperature Silicon Carbide Power Schottky Diode

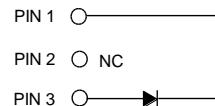
V_{RRM}	=	1200 V
$I_F(T_c=25^\circ C)$	=	30 A
Q_c	=	58 nC

Features

- 1200 V Schottky rectifier
- 250 °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 $T_j = 250^\circ C$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_c = 25^\circ C$	30	A
Continuous forward current	I_F	$T_c \leq 225^\circ C$	9.4	A
RMS forward current	$I_{F(RMS)}$	$T_c \leq 225^\circ C$	16	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_c = 25^\circ C, t_p = 10 \text{ ms}$	65	A
Non-repetitive peak forward current	$I_{F,max}$	$T_c = 25^\circ C, t_p = 10 \mu\text{s}$	280	A
I^2t value	$\int I^2 dt$	$T_c = 25^\circ C, t_p = 10 \text{ ms}$	20	A^2S
Power dissipation	P_{tot}	$T_c = 25^\circ C$	230	W
Operating and storage temperature	T_j, T_{stg}		-55 to 250	°C

Electrical Characteristics at $T_j = 250^\circ C$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 10 \text{ A}, T_j = 25^\circ C$	1.6	2.3		V
		$I_F = 10 \text{ A}, T_j = 210^\circ C$	2.3			
Reverse current	I_R	$V_R = 1200 \text{ V}, T_j = 25^\circ C$	1	55	300	μA
		$V_R = 1200 \text{ V}, T_j = 250^\circ C$	55			
Total capacitive charge	Q_c	$I_F \leq I_{F,MAX}$	58	95		nC
		$dI_F/dt = 200 \text{ A}/\mu\text{s}$	95			
Switching time	t_s	$T_j = 210^\circ C$	< 49			ns
		$V_R = 1 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	884			
Total capacitance	C	$V_R = 400 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	79	63		pF
		$V_R = 1000 \text{ V}, f = 1 \text{ MHz}, T_j = 25^\circ C$	63			

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	1.08	°C/W
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Mechanical Properties

Mounting torque	M	0.6	Nm
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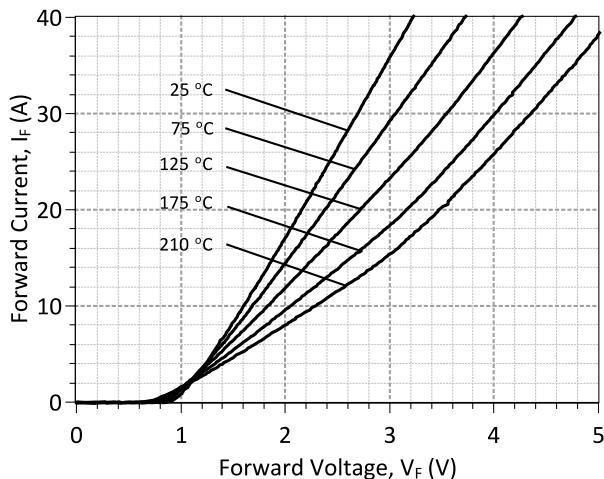


Figure 1: Typical Forward Characteristics

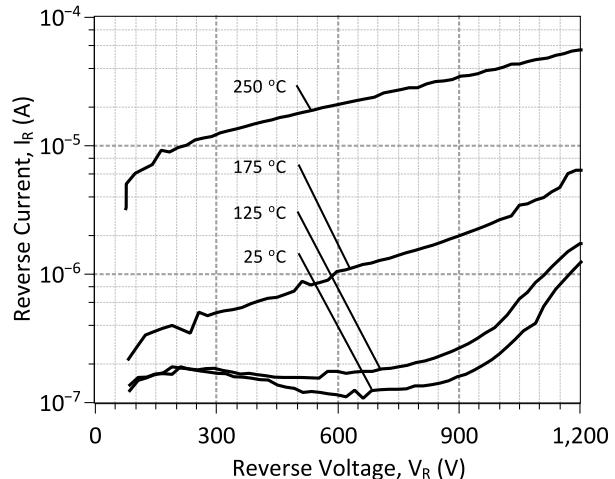


Figure 2: Typical Reverse Characteristics

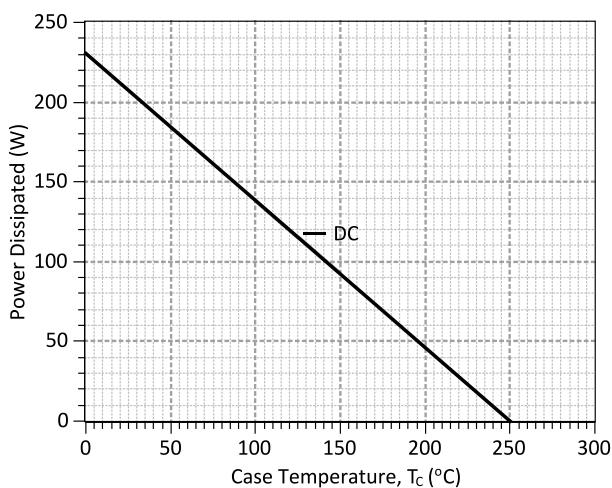


Figure 3: Power Derating Curve

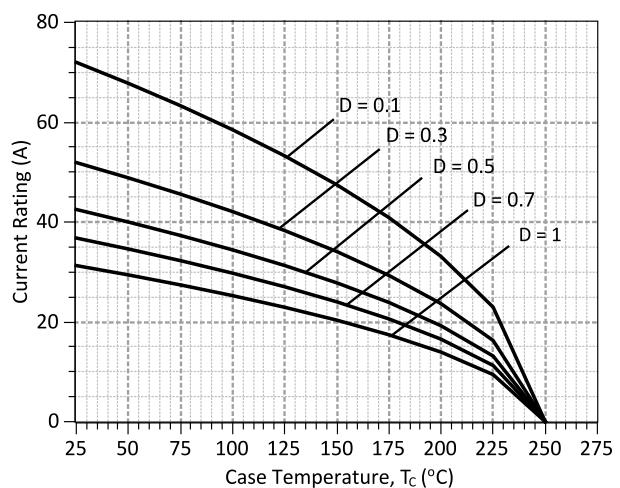


Figure 4: Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)
 (Considering worst case Z_{th} conditions)

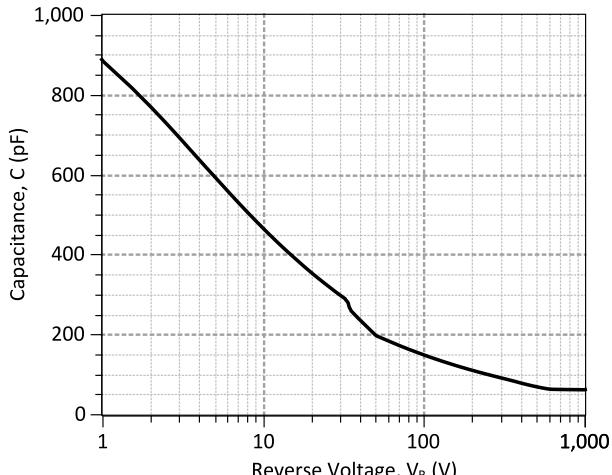


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

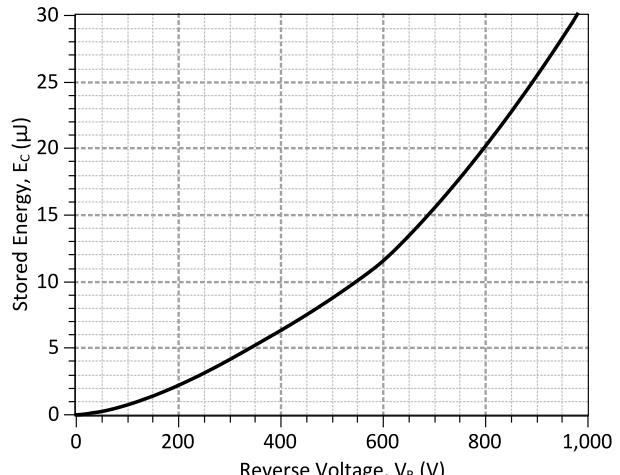


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

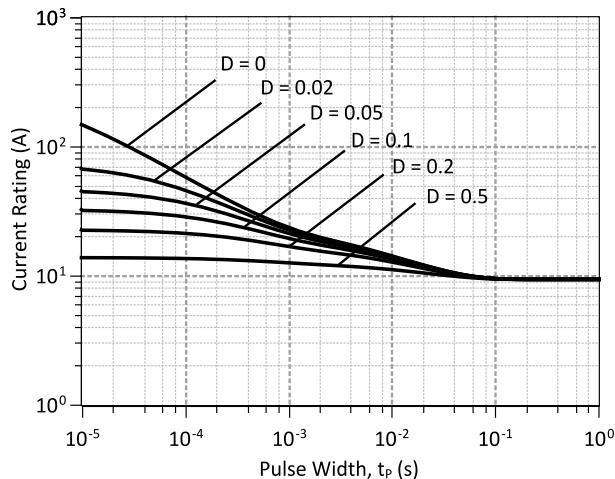


Figure 7: Current vs Pulse Duration Curves at $T_c = 225\text{ }^\circ\text{C}$

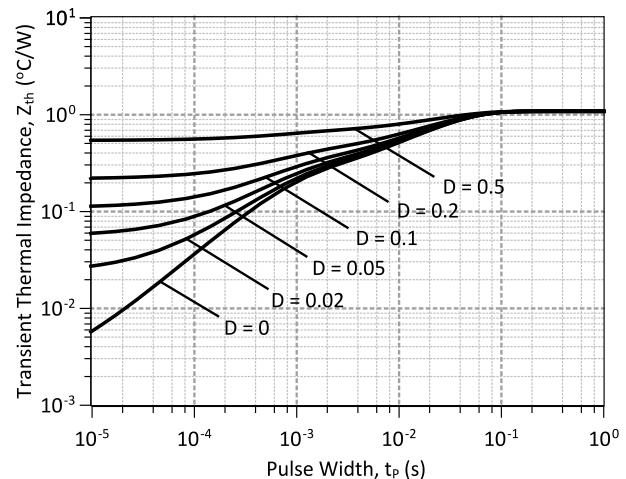
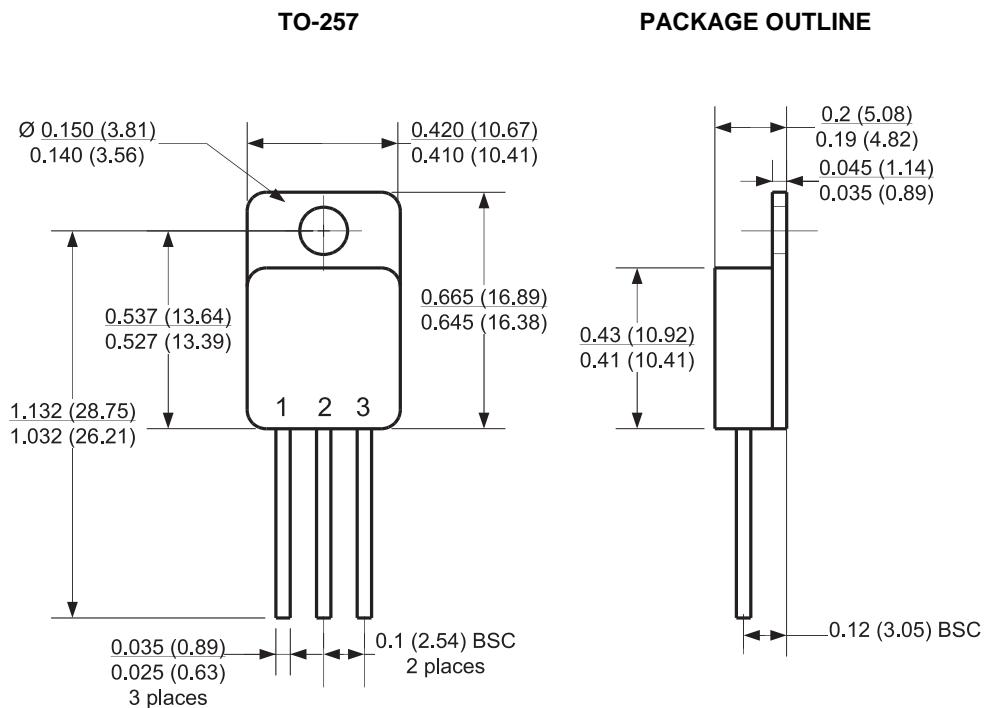


Figure 8: Transient Thermal Impedance

Package Dimensions:



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	

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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 1N8028-GA.

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* MODEL OF GeneSiC Semiconductor Inc.
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* $Revision: 1.0      $
* $Date: 05-SEP-2013  $
*
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* 43670 Trade Center Place Ste. 155
* Dulles, VA 20166
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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 1N8028-GA SPICE Model
*
.SUBCKT 1N8028 ANODE KATHODE
D1 ANODE KATHODE 1N8028_25C; Call the Schottky Diode Model
D2 ANODE KATHODE 1N8028_PIN; Call the PiN Diode Model
.MODEL 1N8028_25C D
+ IS      1.74E-13      RS      0.05105
+ TRS1    0.005        TRS2    1.68E-5
+ N       1.2637323    IKF     1.884319
+ 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
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+ EG      3.23          XTI     3
+ FC      0.5          TT      0
+ BV      1200          IBV    1.00E-03
+ VPK    1200          IAVE    20
+ TYPE    Sic_PiN
.ENDS
*
* End of 1N8028-GA SPICE Model

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