

High Temperature Silicon Carbide Power Schottky Diode

V_{RRM}	=	650 V
I_F	=	2.5 A
Q_C	=	7 nC

Features

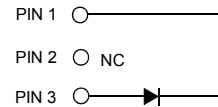
- 650 V Schottky rectifier
- 250 °C maximum operating temperature
- Electrically isolated base-plate
- Zero reverse recovery charge
- Superior surge current capability
- Positive temperature coefficient of V_F
- Temperature independent switching behavior
- Lowest figure of merit Q_C/I_F
- Available screened to Mil-PRF-19500

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

Package

- RoHS Compliant



TO – 257 (Isolated Base-plate Hermetic Package)

Applications

- Down Hole Oil Drilling, Geothermal Instrumentation
- High Temperature DC/DC Converters
- High Temperature Motor and Servo Drives
- High Temperature Inverters
- High Temperature Actuator Control
- Military Power Supplies

Maximum Ratings at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values		Unit
			min.	typ.	
Repetitive peak reverse voltage	V_{RRM}			650	V
Continuous forward current	I_F	$T_C = 25\text{ °C}$		2.5	A
Continuous forward current	I_F	$T_C \leq 225\text{ °C}$		0.75	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 225\text{ °C}$		1.3	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$		10	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$		65	A
i^2t value	$\int i^2 dt$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$		0.5	A ² S
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$		24	W
Operating and storage temperature	T_j, T_{stg}			-55 to 250	°C

Electrical Characteristics at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 0.75\text{ A}, T_j = 25\text{ °C}$		1.4		V
		$I_F = 0.75\text{ A}, T_j = 250\text{ °C}$		2.3		
Reverse current	I_R	$V_R = 650\text{ V}, T_j = 25\text{ °C}$		1	5	μA
		$V_R = 650\text{ V}, T_j = 250\text{ °C}$		5	50	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210\text{ °C}$	$V_R = 400\text{ V}$	7		nC
Switching time	t_s		$V_R = 400\text{ V}$	< 17		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		76		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		12		
		$V_R = 650\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$		12		

Thermal Characteristics

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

Mounting torque	M	0.6	Nm
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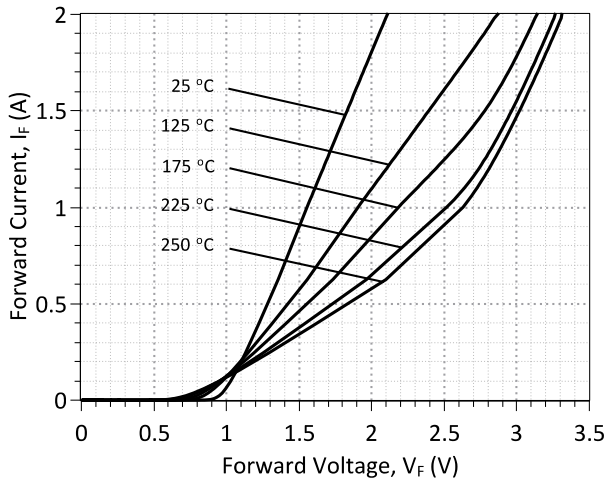


Figure 1: Typical Forward Characteristics

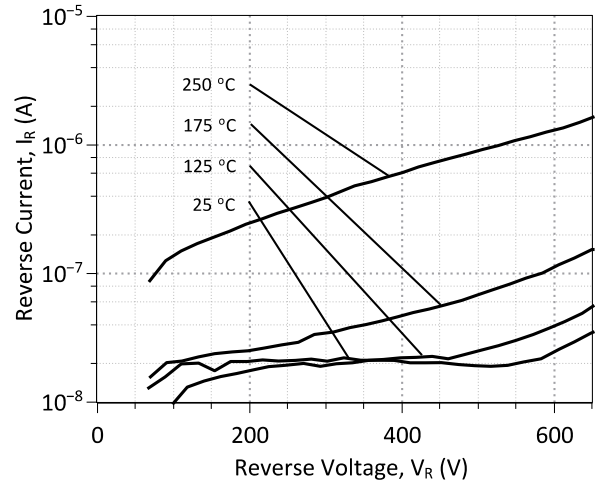


Figure 2: Typical Reverse Characteristics

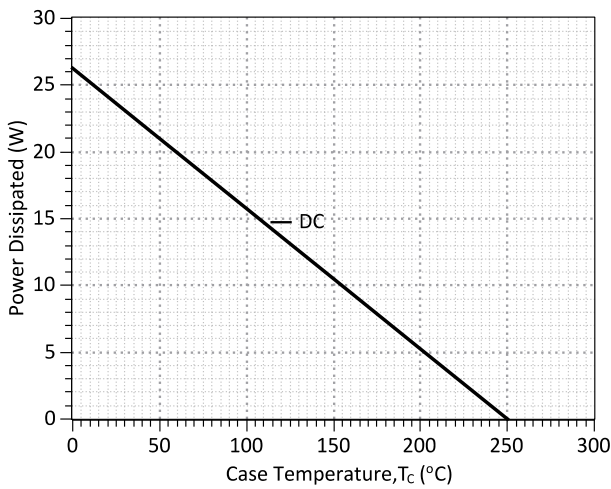
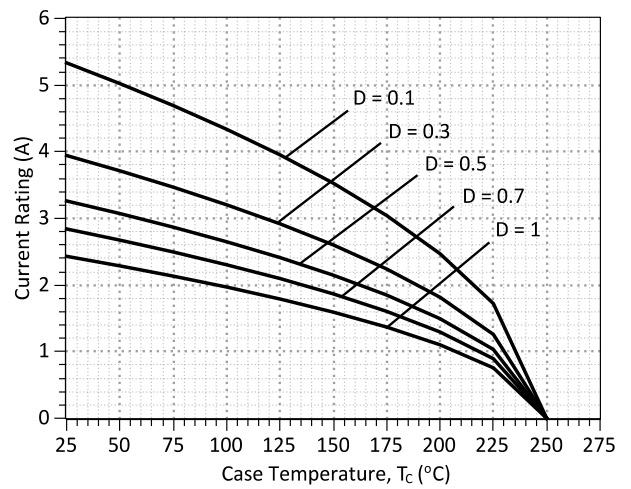


Figure 3: Power Derating Curve



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

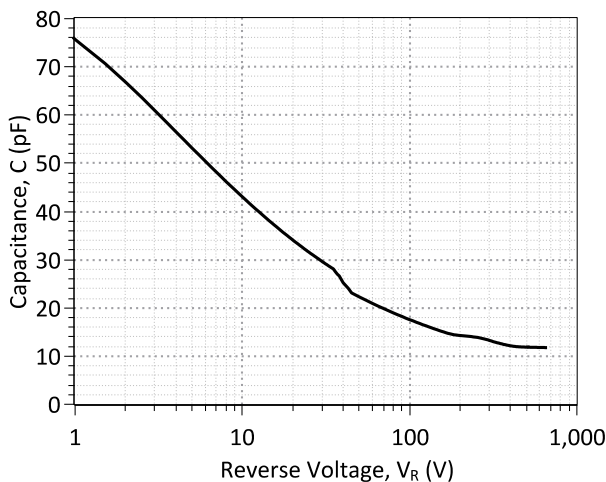


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

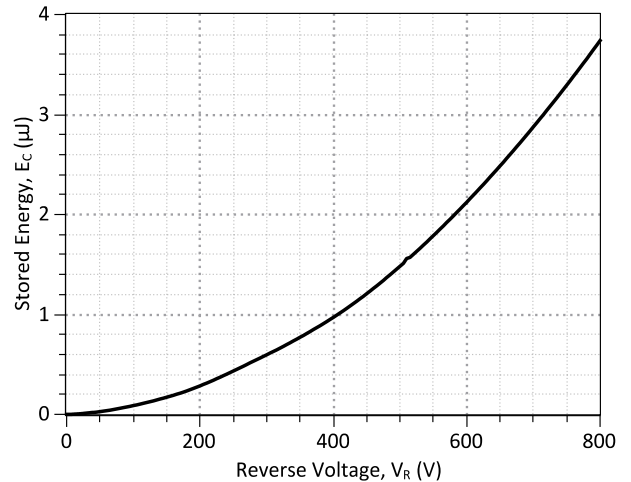


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

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 1N8030-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 1N8030-GA SPICE Model
*
.SUBCKT 1N8030 ANODE KATHODE
D1 ANODE KATHODE 1N8030_25C; Call the Schottky Diode Model
D2 ANODE KATHODE 1N8030_PIN; Call the PiN Diode Model
.MODEL 1N8030_25C D
+ IS      3.57E-18      RS      0.49751
+ TRS1    0.0057       TRS2    2.40E-05
+ N       1            IKF     322
+ EG      1.2          XTI     3
+ CJO     9.12E-11     VJ     0.371817384
+ M       1.527759838  FC      0.5
+ TT      1.00E-10     BV     650
+ IBV     1.00E-03     VPK    650
+ IAVE    1            TYPE    SiC_Schottky
+ MFG     GeneSiC_Semiconductor
.MODEL 1N8030_PIN D
+ IS      5.73E-11     RS      0.72994
+ N       5            IKF     800
+ EG      3.23         XTI     -14
+ FC      0.5          TT      0
+ BV     650           IBV     1.00E-03
+ VPK    650           IAVE    1
+ TYPE    SiC_PiN
.ENDS
*
*      End of 1N8030-GA SPICE Model
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