

Silicon Carbide PiN Diode

V_{RRM}	=	15.0 kV
$I_F (T_c=25^\circ\text{C})$	=	1 A

Features

- 15 kV blocking
- 175 °C operating temperature
- Fast turn off characteristics
- Soft reverse recovery characteristics
- Ultra-Fast high temperature switching

Package

- RoHS Compliant



Advantages

- Highest voltage rectifier commercially available
- Reduced stacking
- Reduced system complexity/Increased reliability

Applications

- Voltage Multiplier
- Ignition/Triggering Circuits
- Oil/Downhole
- Lighting
- Defense

Maximum Ratings at $T_j = 175^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		15	kV
Continuous forward current	I_F		1	A
RMS forward current	$I_{F(RMS)}$		0.5	A
Operating and storage temperature	T_j, T_{stg}		-55 to 175	°C

Electrical Characteristics at $T_j = 175^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 1\text{ A}, T_j = 25^\circ\text{C}$		6.4		V
		$I_F = 1\text{ A}, T_j = 175^\circ\text{C}$		4.7		
Reverse current	I_R	$V_R = 8\text{ kV}, T_j = 25^\circ\text{C}$ $V_R = 8\text{ kV}, T_j = 175^\circ\text{C}$		1	20 100	μA
Total reverse recovery charge	Q_{rr}	$I_F \leq I_{F,MAX}$ $di_F/dt = 70\text{ A}/\mu\text{s}$ $T_j = 175^\circ\text{C}$		558		nC
Switching time	t_s	$V_R = 1000\text{ V}$ $I_F = 1.5\text{ A}$		< 236		ns
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		22		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		4		
		$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		3		
Total capacitive charge	Q_C	$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25^\circ\text{C}$		4.5		nC

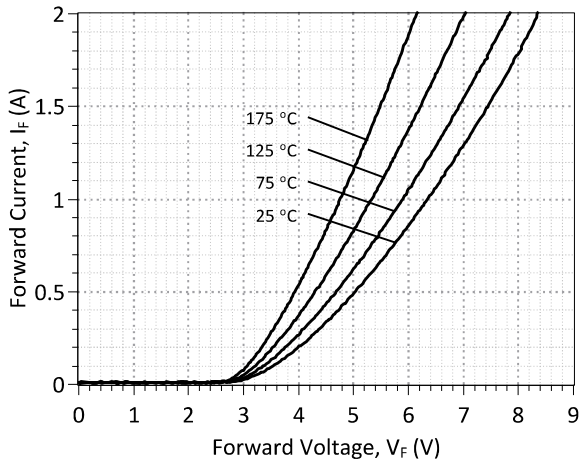


Figure 1: Typical Forward Characteristics

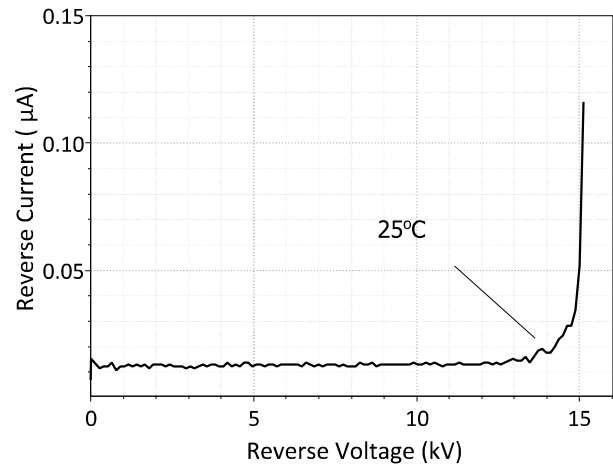


Figure 2: Typical Reverse Characteristics at 25°C

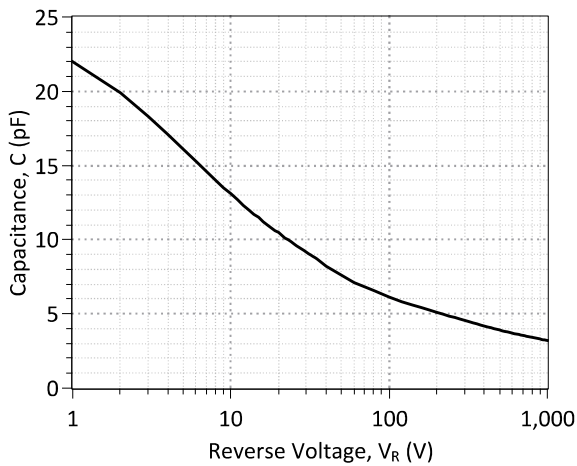


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

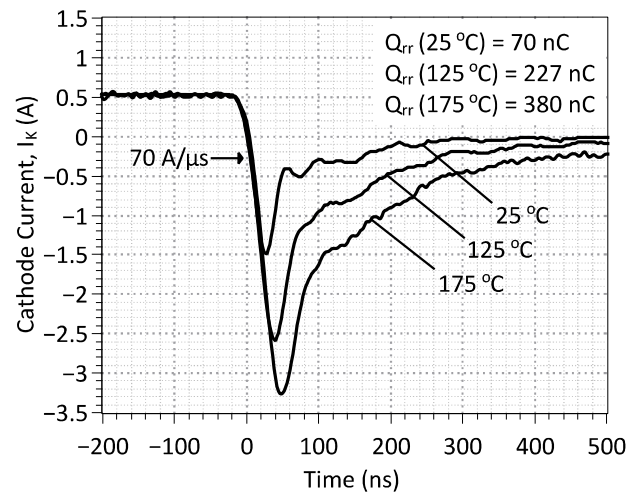


Figure 4: Typical Turn Off Characteristics at $I_k = 0.5$ A and $V_R = 1000$ V

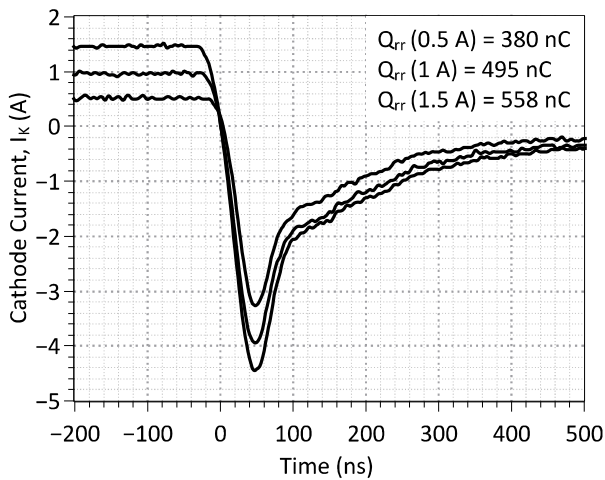


Figure 5: Typical Turn Off Characteristics at $T_j = 175^\circ\text{C}$ and $V_R = 1000$ V

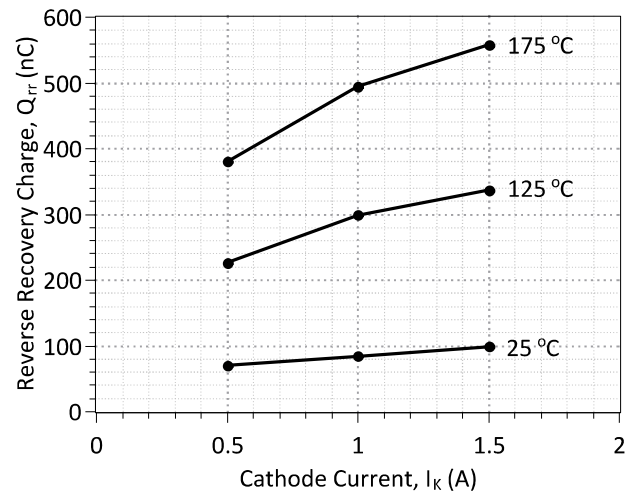


Figure 6: Reverse Recovery Charge vs Cathode Current

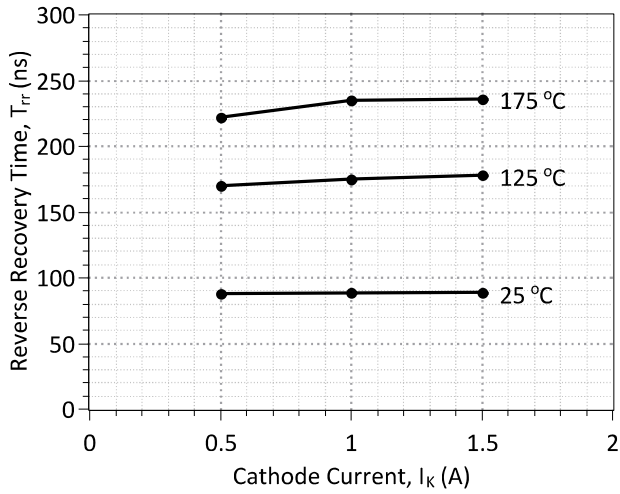
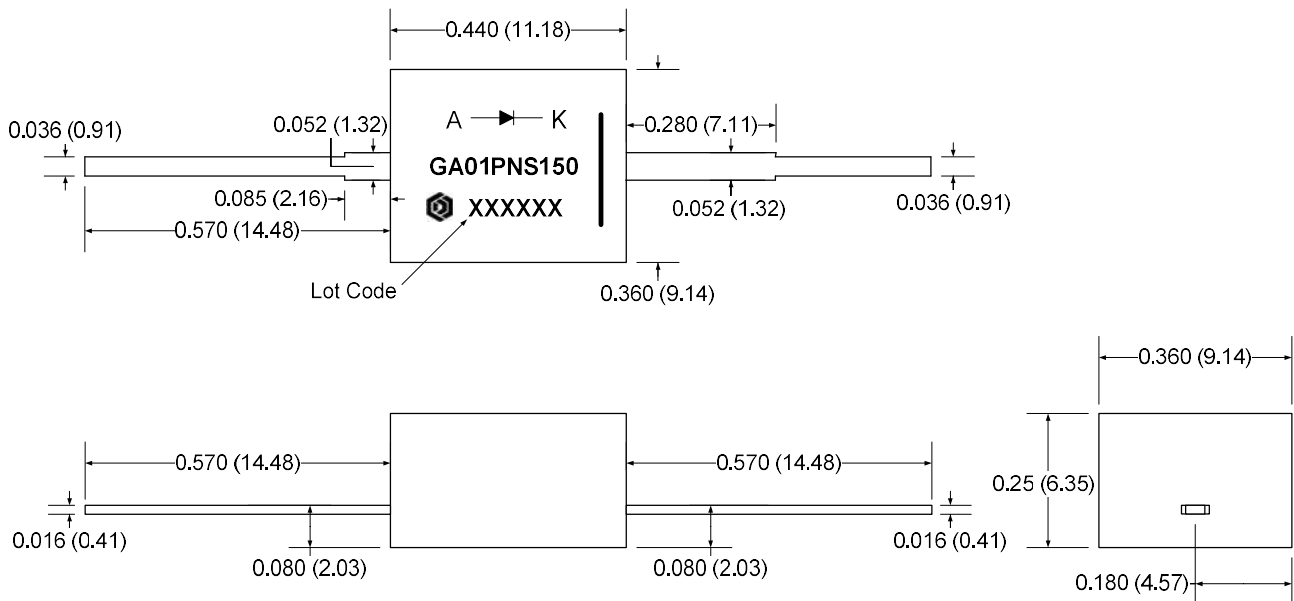


Figure 7: Reverse Recovery Time vs Cathode Current

Package Dimensions:

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
2015/04/30	1	Updated Electrical Characteristics	
2014/11/07	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/sic_pin/GA01PNS150-220_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GA01PNS150-220.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.1           $
*      $Date:      30-APR-2015   $
*
*      GeneSiC Semiconductor Inc.
*      43670 Trade Center Place Ste. 155
*      Dulles, VA 20166
*
*      COPYRIGHT (C) 2014 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
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*      PARTICULAR PURPOSE."
*      Models accurate up to 2 times rated drain current.
*
*      Start of GA01PNS150-220 SPICE Model
*
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+ IS      9.2491e-015
+ RS      2.24770
+ N       3.3373
+ IKF     0.00011784
+ EG      3.23
+ XTI     25
+ TRS1    -0.0024
+ CJO     2.28E-11
+ VJ      2.304
+ M       0.376
+ FC      0.5
+ BV      8000
+ IBV     1.00E-03
+ VPK     15000
+ IAVE    1
+ TYPE    SiC_PiN
+ MFG     GeneSiC_Semi
*
*      End of GA01PNS150-220 SPICE Model
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