Silicon Carbide PiN Diode Chip

Features

- 15 kV blocking
- 250 °C operating temperature
- Fast turn off characteristics
- Soft reverse recovery characteristics
- Ultra-Fast high temperature switching

Advantages

- Industry's first > 10 kV power rectifier
- Reduced stacking
- Reduced system complexity/Increased reliability

Applications

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

Maximum Ratings at T_j = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		15	kV
Continuous forward current	I_F	$T_C \leq 150$ °C	1	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 150$ °C	0.5	A
Operating and storage temperature	T_j , T_{stg}		-55 to 250	°C

Electrical Characteristics at T_j = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values			Unit
				min.	typ.	max.	
Diode forward voltage	V_F	I_F = 1 A, T_j = 25 °C			6.5	7.0	V
		I_F = 1 A, T_j = 225 °C			4.4	5.0	
Reverse current	I_R	V_R = 15 kV, T_j = 25 °C			1	20	μA
		V_R = 15 kV, T_j = 225 °C			5	100	
Total reverse recovery charge	Q_{rr}	$I_F \leq I_{F,MAX}$ dI_F/dt = 70 A/μs T_j = 225 °C	V_R = 1000 V I_F = 1.5 A		558		nC
Switching time	t_s		V_R = 1000 V I_F = 1.5 A		< 236		ns
Total capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C			28		pF
		V_R = 400 V, f = 1 MHz, T_j = 25 °C			8		
		V_R = 1000 V, f = 1 MHz, T_j = 25 °C			7		
Total capacitive charge	Q_C	V_R = 1000 V, f = 1 MHz, T_j = 25 °C			5.34		nC

***For chip size and metallization, please refer to the mechanical datasheet (must have a non-disclosure agreement with GeneSiC Semiconductor).**

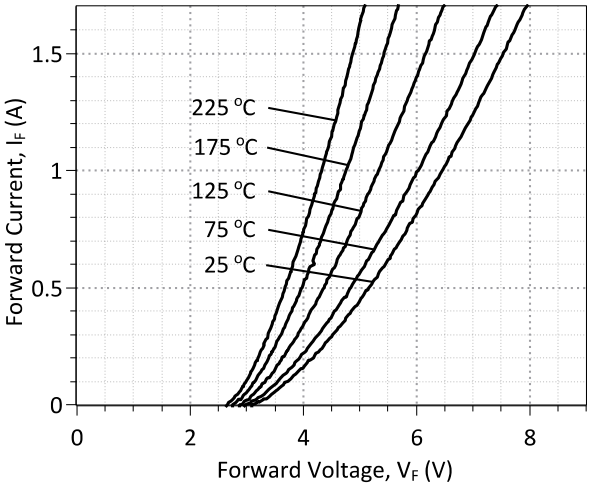


Figure 1: Typical Forward Characteristics

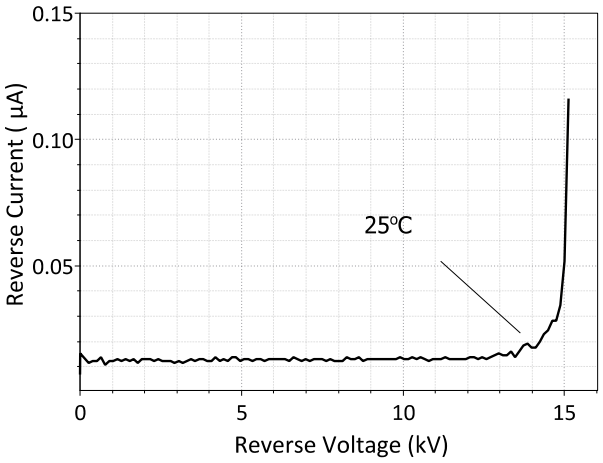


Figure 2: Typical Reverse Characteristics

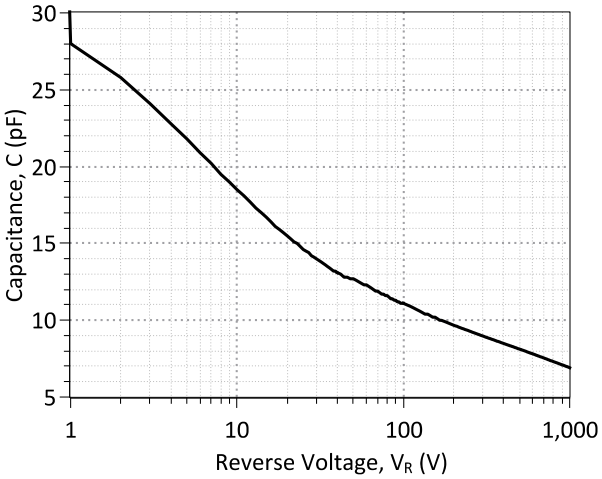


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

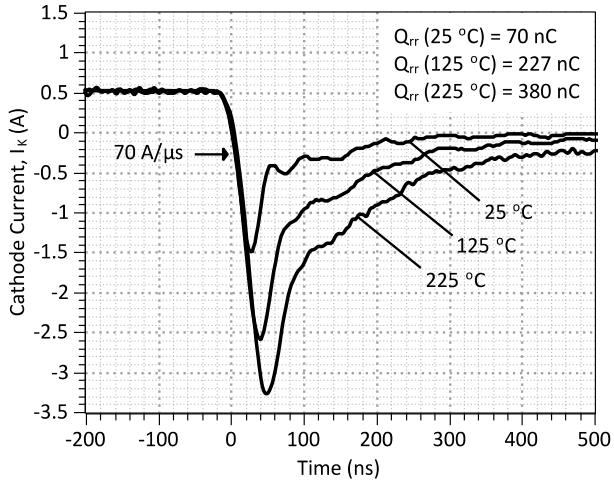
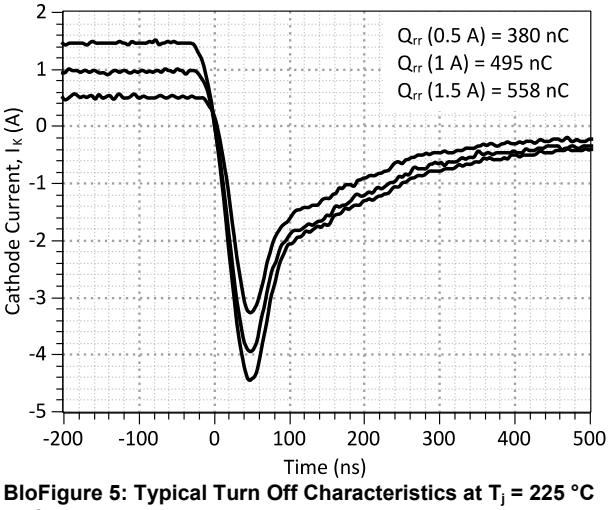


Figure 4: Typical Turn Off Characteristics at I_k = 0.5 A and V_R = 1000 V



BloFigure 5: Typical Turn Off Characteristics at T_j = 225 °C and V_R = 1000 V

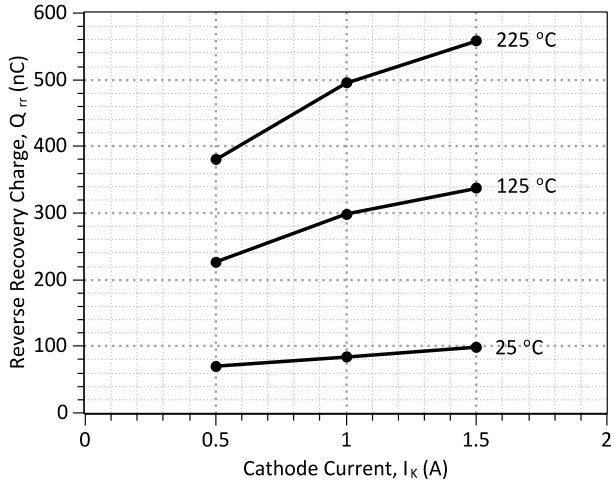


Figure 6: Reverse Recovery Charge vs Cathode Current

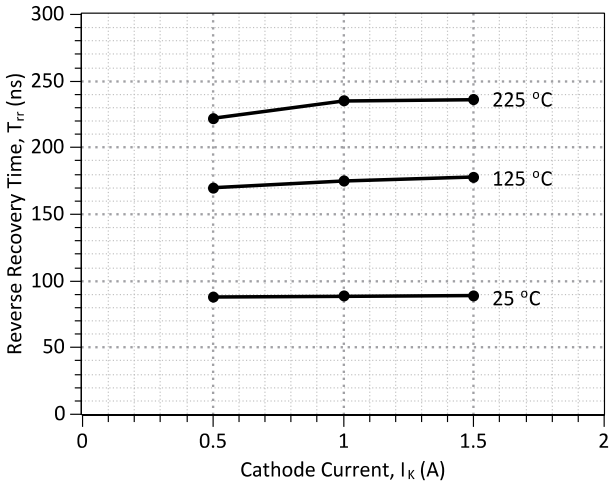


Figure 7: Reverse Recovery Time vs Cathode Current

Revision History			
Date	Revision	Comments	Supersedes
2014/08/26	0	Initial release	

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43670 Trade Center Place Suite 155
Dulles, VA 20166

SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GA01PNS150-CAU device.

```
*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   26-AUG-2014       $
*
*     GeneSiC Semiconductor Inc.
*     43670 Trade Center Place Ste. 155
*     Dulles, VA 20166
*     http://www.genesicsemi.com/index.php/hit-sic/baredie
*
*     COPYRIGHT (C) 2014 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 GA01PNS150-CAU SPICE Model
*
 .MODEL GA01PNS150 D
+ IS       9.71E-12
+ RS       2.07
+ N        5.7869
+ IKF      0.039646
+ EG       3.23
+ XTI      58
+ TRS1     -0.0034
+ CJO      2.28E-11
+ VJ       2.304
+ M        0.376
+ FC       0.5
+ BV       16000
+ IBV      1.00E-03
+ VPK      15000
+ IAVE     1
+ TYPE     SiC_PiN
+ MFG      GeneSiC_Semi
*
* End of GA01PNS150-CAU SPICE Model
```