

## 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<sub>j</sub> = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V <sub>RRM</sub>		15	kV
Continuous forward current	I <sub>F</sub>	T <sub>C</sub> ≤ 150 °C	1	А
RMS forward current	I <sub>F(RMS)</sub>	T <sub>C</sub> ≤ 150 °C	0.5	А
Operating and storage temperature	T <sub>j</sub> , T <sub>stg</sub>		-55 to 250	°C

#### Electrical Characteristics at T<sub>j</sub> = 250 °C, unless otherwise specified

Parameter	Symbol	Conditions -		Values			11
				min.	typ.	max.	Unit
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> = 1 A, T <sub>j</sub> =	25 °C		6.5	7.0	V
		I <sub>F</sub> = 1 A, T <sub>j</sub> = 2	I <sub>F</sub> = 1 A, T <sub>j</sub> = 225 °C		4.4	5.0	v
Reverse current	I <sub>R</sub>	V <sub>R</sub> = 15 kV, T <sub>j</sub> :	= 25 °C		1	20	
		V <sub>R</sub> = 15 kV, T <sub>j</sub> =	= 225 °C	5 1	100	μA	
Total reverse recovery charge	Q <sub>rr</sub>	$I_F \leq I_{F,MAX}$	V <sub>R</sub> = 1000 V I <sub>F</sub> = 1.5 A		558		nC
Switching time	t <sub>s</sub>	dI <sub>F</sub> /dt = 70 A/μs T <sub>j</sub> = 225 °C	$V_{\rm R} = 1000 \text{ V}$ $I_{\rm F} = 1.5 \text{ A}$		< 236		ns
Total capacitance		V <sub>R</sub> = 1 V, f = 1 MHz	z, T <sub>j</sub> = 25 °C		28		
	С	V <sub>R</sub> = 400 V, f = 1 MH	lz, T <sub>i</sub> = 25 °C		8		pF
		V <sub>R</sub> = 1000 V, f = 1 MI	Hz, T <sub>j</sub> = 25 °C		7		
Total capacitive charge	Q <sub>c</sub>	V <sub>R</sub> = 1000 V, f = 1 MI	Hz, T <sub>j</sub> = 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).

## **Electrical Datasheet\***

# GA01PNS150-CAU

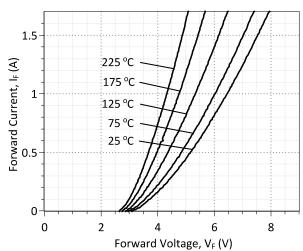


Figure 1: Typical Forward Characteristics

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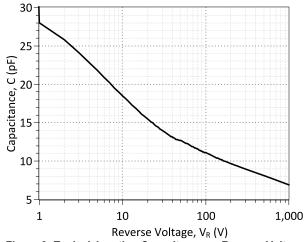
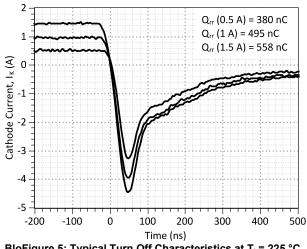


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics



BloFigure 5: Typical Turn Off Characteristics at T\_j = 225 °C and \$V\_{\rm R}\$ = 1000 V

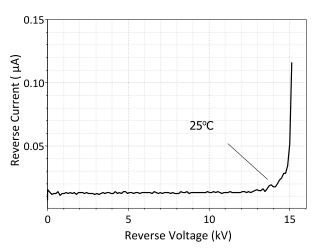
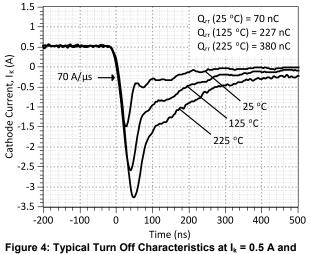


Figure 2: Typical Reverse Characteristics



 $V_{R} = 1000 \text{ V}$ 

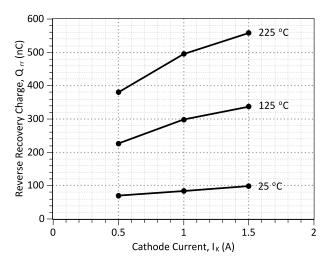


Figure 6: Reverse Recovery Charge vs Cathode Current



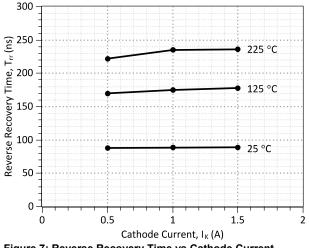


Figure 7: Reverse Recovery Time vs Cathode Current

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

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## **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.
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     43670 Trade Center Place Ste. 155
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     Dulles, VA 20166
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    http://www.genesicsemi.com/index.php/hit-sic/baredie
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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-CAU SPICE Model
.MODEL GA01PNS150 D
       9.71E-12
+ IS
+ RS
          2.07
         5.7869
+ N
+ IKF
         0.039646
+ EG
          3.23
+ XTI
          58
+ TRS1
         -0.0034
+ CJO
         2.28E-11
+ VJ
         2.304
          0.376
+ M
+ FC
         0.5
+ BV
         16000
        1.00E-03
+ IBV
+ VPK
         15000
+ IAVE
          1
+ TYPE
         SiC PiN
+ MFG GeneSiC_Semi
* End of GA01PNS150-CAU SPICE Model
```