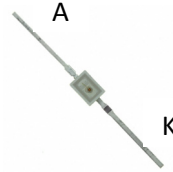


Silicon Carbide PiN Diode

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

| Parameter | Symbol | Conditions | Values | Unit |
|-----------------------------------|----------------|--------------------------|------------|------|
| Repetitive peak reverse voltage | V_{RRM} | | 15 | kV |
| Continuous forward current | I_F | $T_C \leq 150\text{ °C}$ | 1 | A |
| RMS forward current | $I_{F(RMS)}$ | $T_C \leq 150\text{ °C}$ | 0.5 | A |
| 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 | $I_F = 1\text{ A}, T_j = 25\text{ °C}$ | | 6.5 | 7.0 | V |
| | | $I_F = 1\text{ A}, T_j = 225\text{ °C}$ | | 4.4 | 5.0 | |
| Reverse current | I_R | $V_R = 15\text{ kV}, T_j = 25\text{ °C}$ | | 1 | 20 | μA |
| | | $V_R = 15\text{ kV}, T_j = 225\text{ °C}$ | | 5 | 100 | |
| Total reverse recovery charge | Q_{rr} | $I_F \leq I_{F,MAX}$ $di_F/dt = 70\text{ A}/\mu\text{s}$ $T_j = 225\text{ °C}$ | | 558 | | nC |
| Switching time | t_s | $V_R = 1000\text{ V}$ $I_F = 1.5\text{ A}$ $V_R = 1000\text{ V}$ $I_F = 1.5\text{ A}$ | | < 236 | | ns |
| Total capacitance | C | $V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$ | | 28 | | pF |
| | | $V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$ | | 8 | | |
| | | $V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$ | | 7 | | |
| Total capacitive charge | Q_C | $V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$ | | 5.34 | | nC |

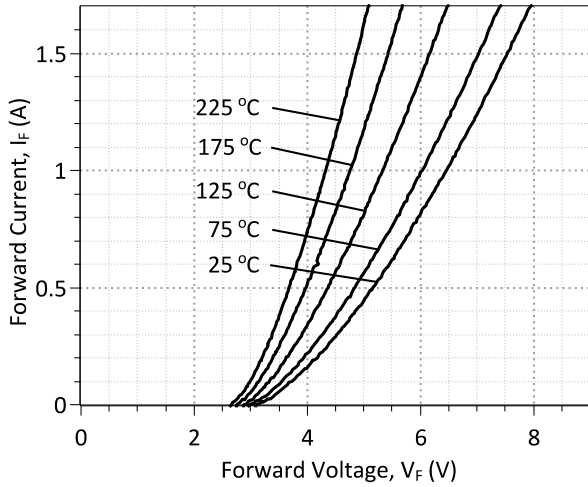


Figure 1: Typical Forward Characteristics

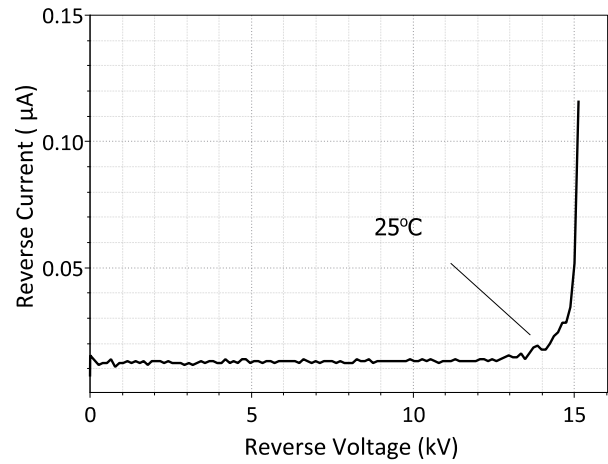


Figure 2: Typical Reverse Characteristics

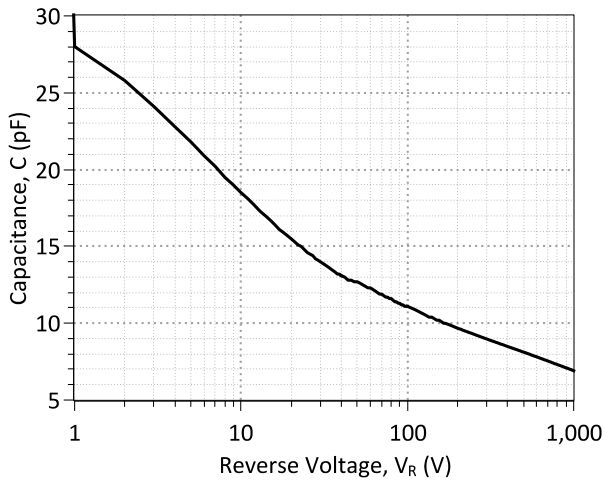


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

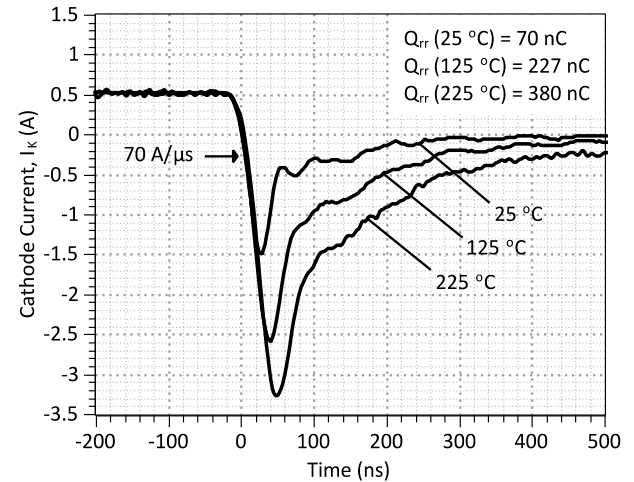


Figure 4: Typical Turn Off Characteristics at $I_k = 0.5$ A and $V_R = 1000$ V

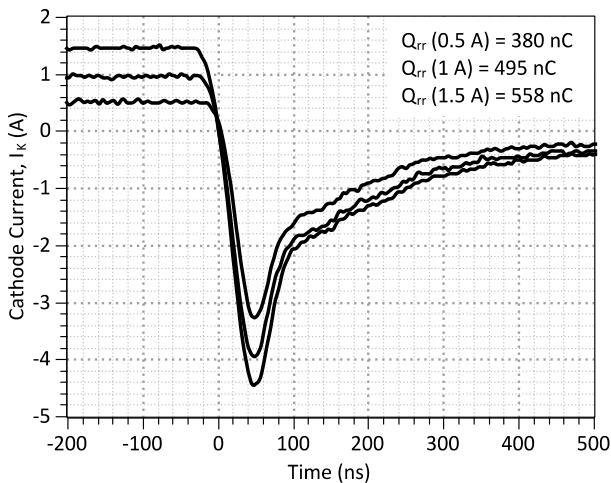


Figure 5: Typical Turn Off Characteristics at $T_j = 225$ °C and $V_R = 1000$ V

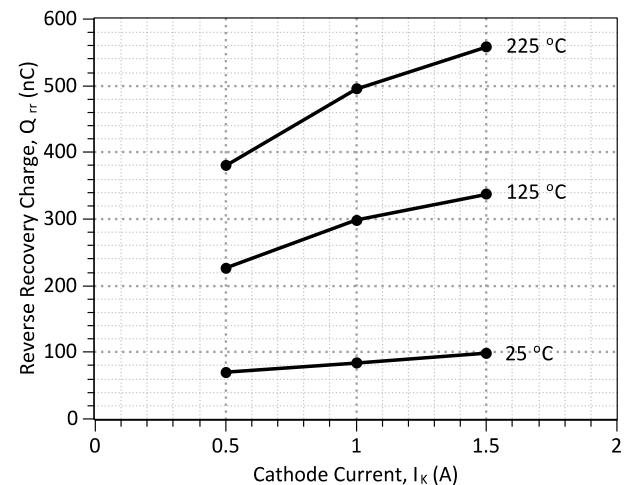


Figure 6: Reverse Recovery Charge vs Cathode Current

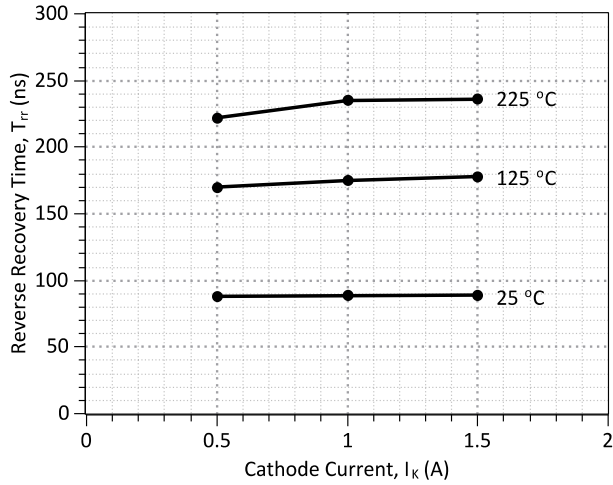


Figure 7: Reverse Recovery Time vs Cathode Current

| Revision History | | | |
|------------------|----------|-----------------|------------|
| Date | Revision | Comments | Supersedes |
| 2014/09/15 | 0 | Initial release | |
| | | | |

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SPICE Model Parameters

Copy the following code into a SPICE software program for simulation of the GA01PNS150-220 device.

```
*      MODEL OF GeneSiC Semiconductor Inc.
*
*      $Revision:   1.0           $
*      $Date:      15-SEP-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 GA01PNS150-220 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 GA01PNS150-220 SPICE Model
```