

## Silicon Carbide PiN Diode Chip

### Features

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



### Advantages

- Industry's lowest conduction losses
- 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   | $V_{RRM}$      |                          | 8          | kV   |
| Continuous forward current        | $I_F$          | $T_C \leq 150\text{ °C}$ | 2          | A    |
| RMS forward current               | $I_{F(RMS)}$   | $T_C \leq 150\text{ °C}$ | 1          | 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         | $V_F$    | $I_F = 2\text{ A}, T_j = 25\text{ °C}$                                               |        | 4.6   | 4.8  | V             |
|                               |          | $I_F = 2\text{ A}, T_j = 225\text{ °C}$                                              |        | 3.9   | 4.5  |               |
| Reverse current               | $I_R$    | $V_R = 8\text{ kV}, T_j = 25\text{ °C}$                                              |        | 0.1   | 3    | $\mu\text{A}$ |
|                               |          | $V_R = 8\text{ kV}, T_j = 175\text{ °C}$                                             |        |       | 50   |               |
| Total reverse recovery charge | $Q_{rr}$ | $I_F \leq I_{F,MAX}$<br>$di_F/dt = 70\text{ A}/\mu\text{s}$<br>$T_j = 225\text{ °C}$ |        | 558   |      | nC            |
| Switching time                | $t_s$    | $V_R = 1000\text{ V}$<br>$I_F = 1.5\text{ A}$                                        |        | < 236 |      | ns            |
| Total capacitance             | C        | $V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$                             |        | 20    |      | pF            |
|                               |          | $V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$                           |        | 5     |      |               |
|                               |          | $V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$                          |        | 4     |      |               |
| Total capacitive charge       | $Q_C$    | $V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ °C}$                          |        | 5.34  |      | nC            |

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

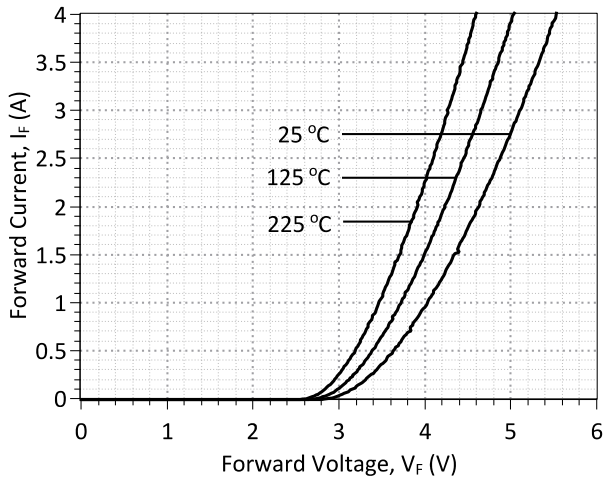


Figure 1: Typical Forward Characteristics

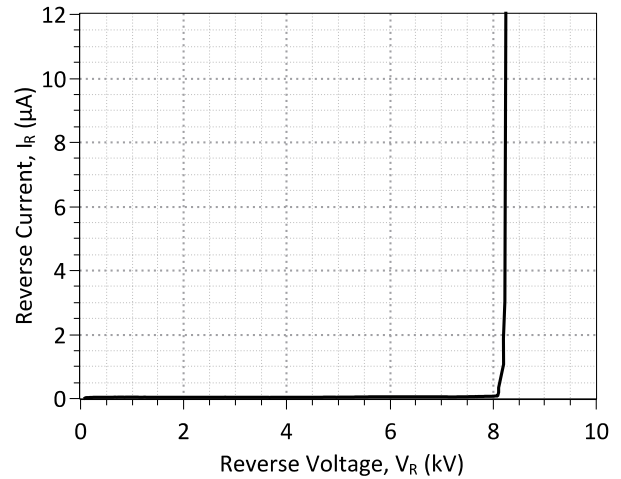


Figure 2: Typical Reverse Characteristics

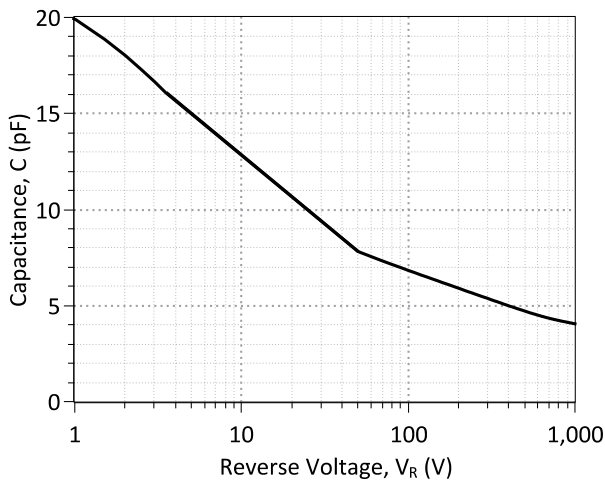


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

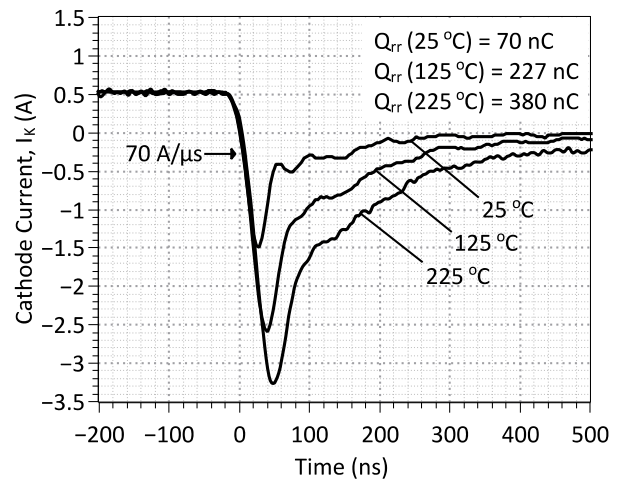


Figure 4: Typical Turn Off Characteristics at  $I_K = 0.5$  A and  $V_R = 1000$  V

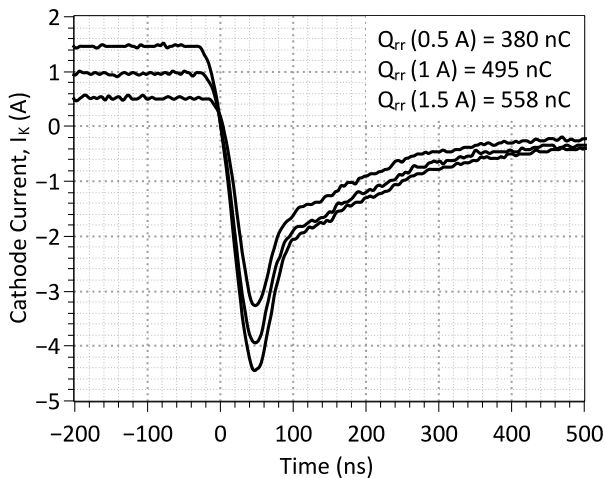


Figure 5: Typical Turn Off Characteristics at  $T_J = 225$  °C and  $V_R = 1000$  V

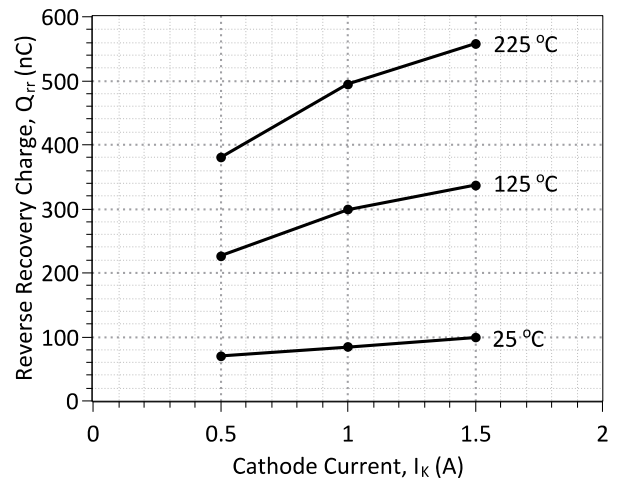
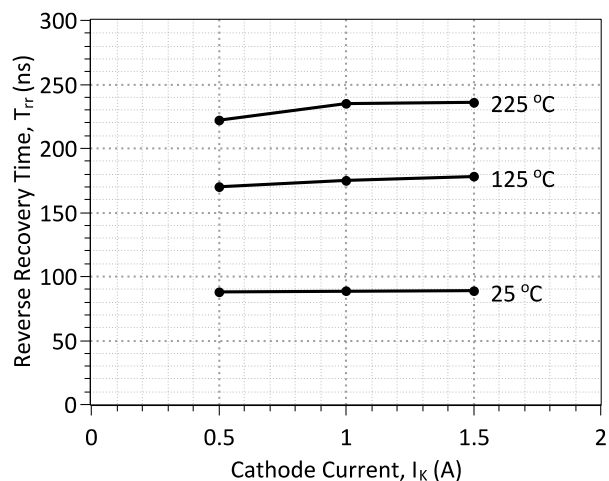


Figure 6: Reverse Recovery Charge vs Cathode Current



**Figure 7: Reverse Recovery Time vs Cathode Current**

| Revision History |          |                 |            |
|------------------|----------|-----------------|------------|
| Date             | Revision | Comments        | Supersedes |
| 2013/02/18       | 0        | Initial release |            |
|                  |          |                 |            |

Published by  
 GeneSiC Semiconductor, Inc.  
 43670 Trade Center Place Suite 155  
 Dulles, VA 20166

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