Silicon Carbide PiN Diode Chip

V_{RRM}	=	10000 V
I_F @ 25 °C	=	2 A
Q_C	=	5 nC

Features

- 10 kV blocking
- 210 °C operating temperature
- Fast turn off characteristics
- Soft reverse recovery characteristics
- Ultra-Fast high temperature switching

Die Size = 2.4 mm x 2.4 mm

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 = 210 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		10	kV
Continuous forward current	I_F	$T_C \le 150$ °C	2	A
RMS forward current	$I_{F(RMS)}$	$T_C \le 150$ °C	1	A
Operating and storage temperature	T_j , T_{stg}		-55 to 210	°C

Electrical Characteristics at T_j = 210 °C, unless otherwise specified

Parameter	Symbol	Conditions		Values min.	Values typ.	Values max.	Unit
Diode forward voltage	V_F	I_F = 2 A, T_j = 25 °C I_F = 2 A, T_j = 210 °C			4.4 4.1	4.8 4.5	V
Reverse current	I_R	V_R = 10 kV, T_j = 25 °C V_R = 10 kV, T_j = 210 °C			0.1	3 50	µA
Total reverse recovery charge	Q_{rr}	$I_F \le I_{F,MAX}$ dI_F/dt = 70 A/µs T_j = 210 °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 V_R = 400 V, f = 1 MHz, T_j = 25 °C V_R = 1000 V, f = 1 MHz, T_j = 25 °C			20 5 4		pF
Total capacitive charge	Q_C	V_R = 1000 V, f = 1 MHz, T_j = 25 °C			5		nC

Figures:

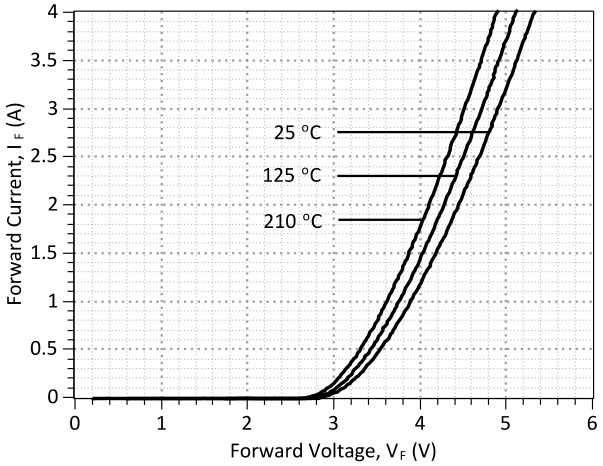


Figure 1: Typical Forward Characteristics

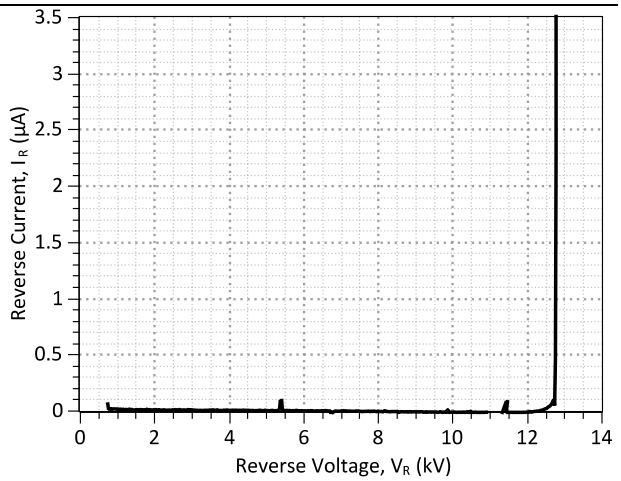


Figure 2: Typical Reverse Characteristics

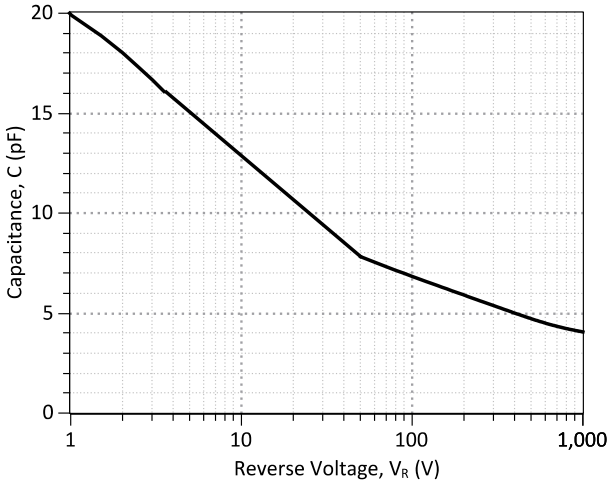


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

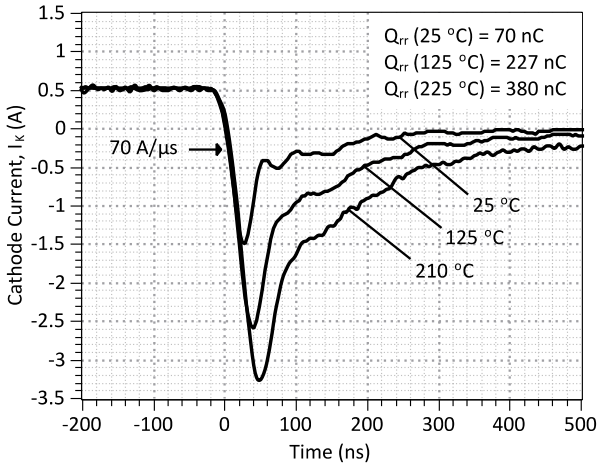


Figure 4: Typical Turn Off Characteristics at I_k = 0.5 A and V_R = 1000 V

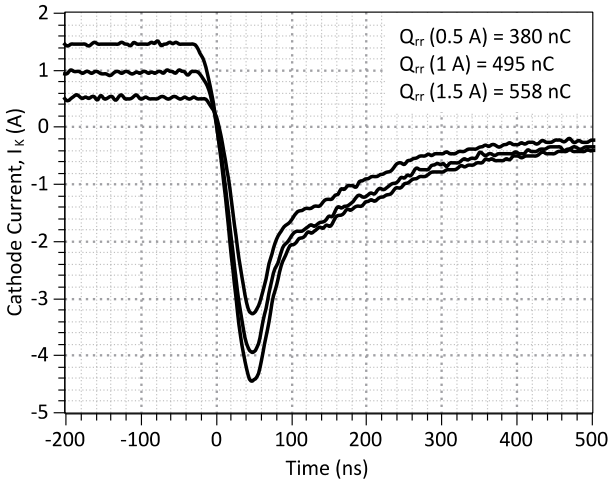


Figure 5: Typical Turn Off Characteristics at T_j = 210 °C and V_R = 1000 V

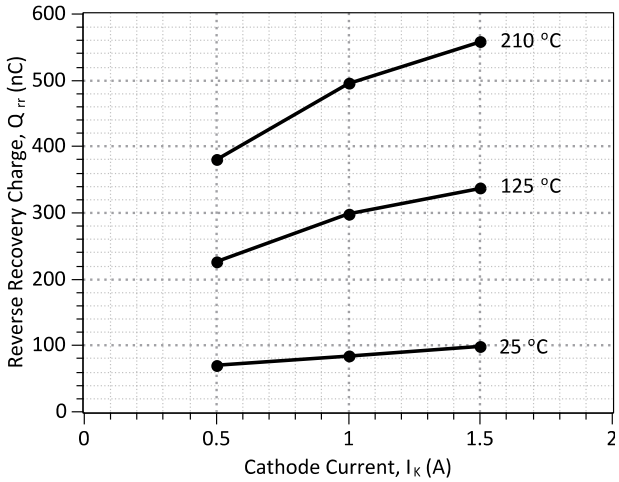


Figure 6: Reverse Recovery Charge vs Cathode Current

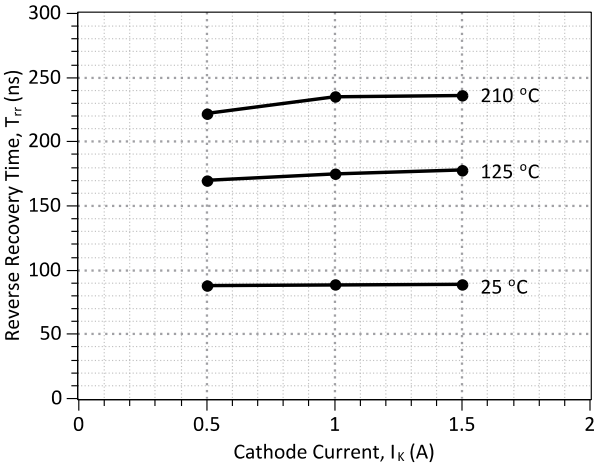
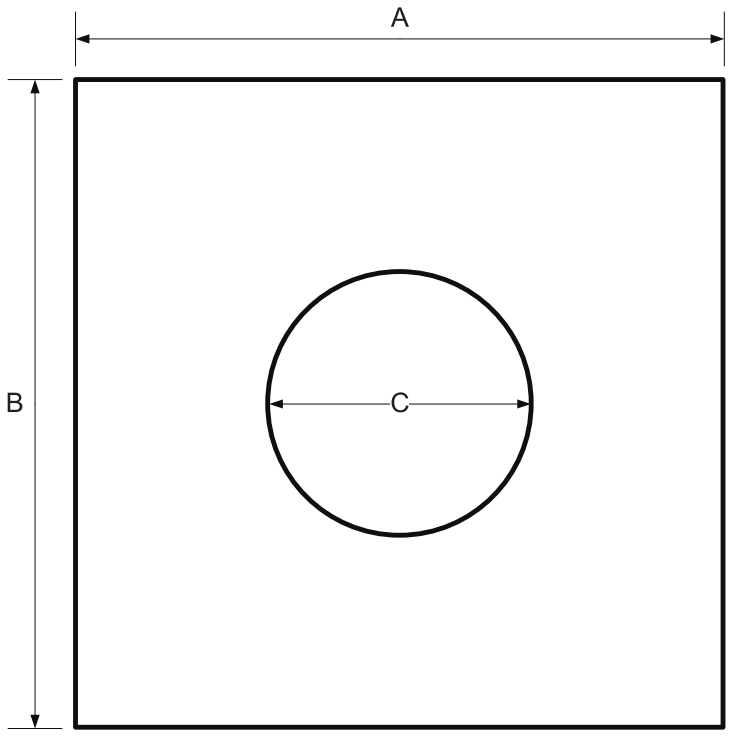


Figure 7: Reverse Recovery Time vs Cathode Current

Mechanical Parameters

Die Dimensions	2.4 x 2.4	mm^2
Anode pad size	Φ 0.98	mm
Area total / active	5.76/0.75	mm^2
Die Thickness	450	µm
Wafer Size	76.2	mm
Flat Position	0	deg
Die Frontside Passivation	Polyimide	
Anode Pad Metallization	4000 nm Al	
Backside Cathode Metallization	400 nm Ni + 200 nm Au	
Die Attach	Electrically conductive glue or solder	
Wire Bond	Al ≤ 130 µm	
Reject ink dot size	Φ ≥ 0.3 mm	
Recommended storage environment	Store in original container, in dry nitrogen, < 6 months at an ambient temperature of 23 °C	

Chip Dimensions:



DIE	A [mm]	2.4
	B [mm]	2.4
METAL	C [mm]	0.98

Revision History			
Date	Revision	Comments	Supersedes
2015/02/24	1	Inserted Mechanical Parameters	
2012/08/15	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/images/hit_sic/baredie/pin/GA01PNS100-CAL_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GA01PNS100-CAL device.

```
*     MODEL OF GeneSiC Semiconductor Inc.
*
*     $Revision:   1.0           $
*     $Date:   05-SEP-2013       $
*
*     GeneSiC Semiconductor Inc.
*     43670 Trade Center Place Ste. 155
*     Dulles, VA 20166
*     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
* TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A
* PARTICULAR PURPOSE."
* Models accurate up to 2 times rated drain current.
*
* Start of GA01PNS100-CAL SPICE Model
*
 .MODEL GA01PNS100 D
+ IS       1.00E-25
+ RS       0.49
+ N        2.1612
+ IKF      0.043903
+ EG       3.23
+ XTI      10
+ TRS1     -0.00155
+ CJO      2.28E-11
+ VJ       2.304
+ M        0.376
+ FC       0.5
+ BV       11000
+ IBV      1.00E-03
+ VPK      10000
+ IAVE     1
+ TYPE     SiC_PiN
+ MFG      GeneSiC_Semi
*
* End of GA01PNS100-CAL SPICE Model
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