

Silicon Carbide PiN Diode Chip

V_{RRM}	=	10000 V
$I_F @ 25\text{ }^\circ\text{C}$	=	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 $T_j = 210\text{ }^\circ\text{C}$, unless otherwise specified

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

Electrical Characteristics at $T_j = 210\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 2\text{ A}, T_j = 25\text{ }^\circ\text{C}$		4.4	4.8	V
		$I_F = 2\text{ A}, T_j = 210\text{ }^\circ\text{C}$		4.1	4.5	
Reverse current	I_R	$V_R = 10\text{ kV}, T_j = 25\text{ }^\circ\text{C}$		0.1	3	μA
		$V_R = 10\text{ kV}, T_j = 210\text{ }^\circ\text{C}$			50	
Total reverse recovery charge	Q_{rr}	$I_F \leq I_{F,MAX}$ $di_F/dt = 70\text{ A}/\mu\text{s}$ $T_j = 210\text{ }^\circ\text{C}$		558		nC
Switching time	t_s	$V_R = 1000\text{ V}$ $I_F = 1.5\text{ A}$				ns
		$V_R = 1000\text{ V}$ $I_F = 1.5\text{ A}$		< 236		
Total capacitance	C	$V_R = 1\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ }^\circ\text{C}$		20		pF
		$V_R = 400\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ }^\circ\text{C}$		5		
		$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ }^\circ\text{C}$		4		
Total capacitive charge	Q_C	$V_R = 1000\text{ V}, f = 1\text{ MHz}, T_j = 25\text{ }^\circ\text{C}$		5		nC

Figures:

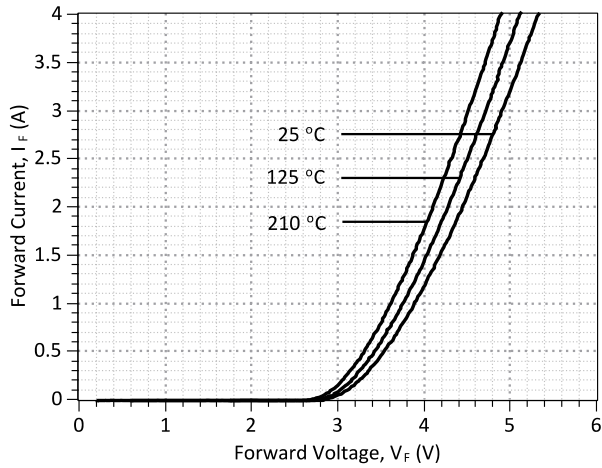


Figure 1: Typical Forward Characteristics

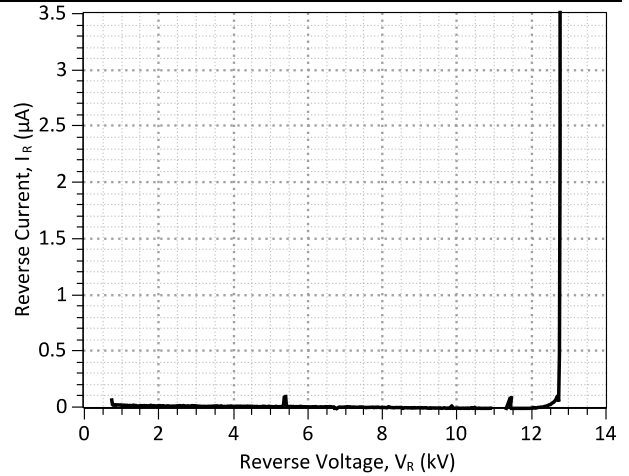


Figure 2: Typical Reverse Characteristics

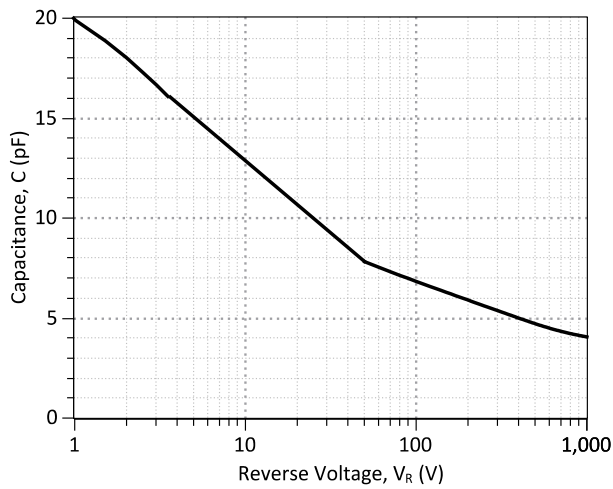


Figure 3: Typical Junction Capacitance vs Reverse Voltage Characteristics

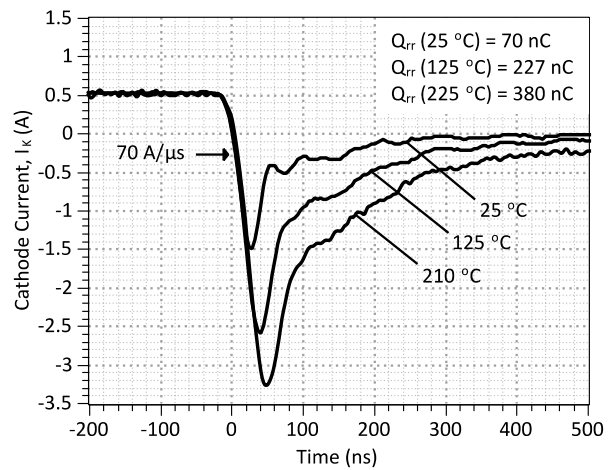


Figure 4: Typical Turn Off Characteristics at $I_k = 0.5 \text{ A}$ and $V_R = 1000 \text{ V}$

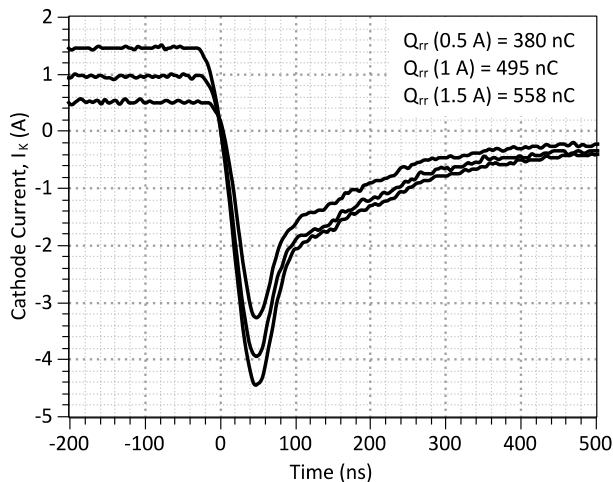


Figure 5: Typical Turn Off Characteristics at $T_j = 210 \text{ °C}$ and $V_R = 1000 \text{ V}$

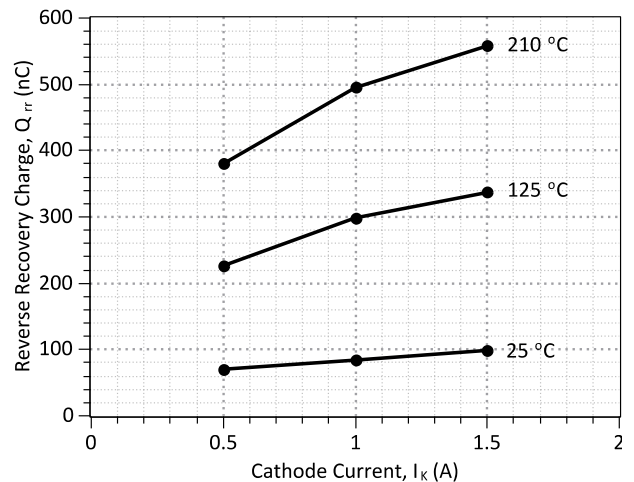


Figure 6: Reverse Recovery Charge vs Cathode Current

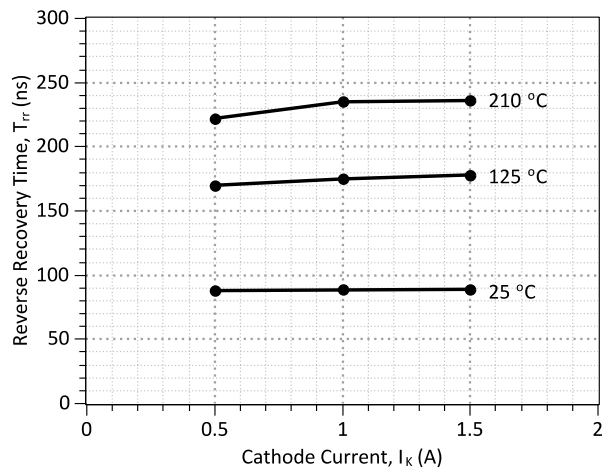
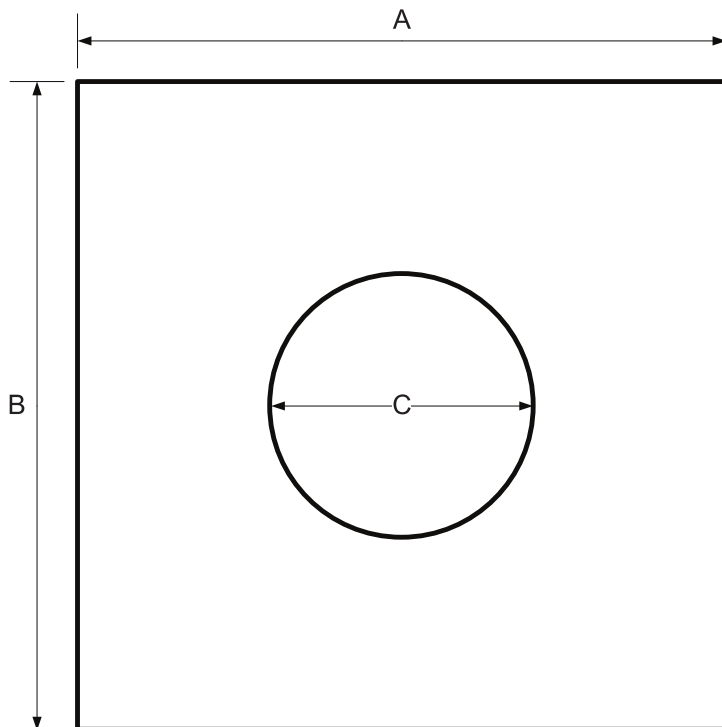


Figure 7: Reverse Recovery Time vs Cathode Current

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.

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*      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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