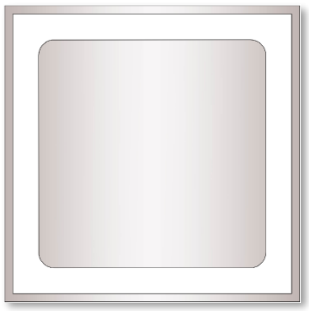
CPW2-0650-S010B

Gen 2 Silicon Carbide Schottky Diode



Package Type: Bare Die
PN's: CPW2-0650-S010B

Description

This is the 2nd generation of high voltage, high performance Z-Rec© silicon carbide Schottky diode in a packageless bare die format to be implemented into any custom module design. The lower forward voltage, smaller reverse leakage current, zero reverse recovery, and high thermal conductivity make this Schottky diode ideal for high frequency switching applications including high density DC to DC converters. This Schottky diode can be used in conjunction with either IGBT or MOSFET as an anti-parallel diode, or as a rectifier.

Features

- 650V Schottky Rectifier
- Zero Reverse Recovery
- Zero Forward Recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

Applications

- Power factor correction
- Solar inverter
- UPS
- SMPS

Absolute Maximum Ratings

Stress beyond those listed under absolute maximum ratings may damage the device.

Parameter	Symbol		Rating	Unit
Repetitive Peak Reverse Voltage	V_{RRM}		650	V
Continuous Forward Current	I_F	T_c = 25°C	30	A
		T_c = 135°C	14.5	
		T_c = 153°C	10	
Repetitive Peak Forward Surge Current, assumes t_p = 10ms, Half Sine Wave Pulse	I_{FRM}	T_c = 25°C	46	A
		T_c = 110°C	31	
Non-Repetitive Forward Surge Current, assumes t_p = 10ms, Half Sine Wave Pulse	I_{FSM}	T_c = 25°C	90	A
		T_c = 110°C	71	
Virtual Junction and Storage Temperature	T_{VJ}, T_{stg}		-55 to +175	°C
Maximum Processing Temperature, in non-reactive ambient	T_{proc}		325	°C

Note: All above notation to T_c specifies case temperature from die packaged in TO-247, with Rth(j-c) < 1.1°C/W

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

Electrical Characteristics (T_{VJ} = 25˚C)

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions
Forward Voltage	V_f	1.5	1.8	V	I_F = 10 A
		2.0	2.4		I_F = 10 A, T_{VJ} = 175°C
Reverse Current	I_R	12	60	µA	V_R = 650 V
		24	220		V_R = 650 V, T_{VJ} = 175°C
Total Capacitive Charge	Q_C	24		nC	V_R = 400 V, I_F = 10 A, di/dt = 500 A/µs
Total Capacitance	C	460.5		pF	V_R = 0 V, f = 1Mhz
		44			V_R = 200 V, f = 1Mhz
		40			V_R = 400 V, f = 1Mhz
Capacitance Stored Energy	E_C	3.6		µJ	V_R = 400 V

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance from Junction to Case[1]	$R_{th(j-c)}$	1.1	°C/W

Note:
[1]Tested in TO-247 Package

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

Typical Performance

All the graphs are based on a die placed in a TO-247 package.

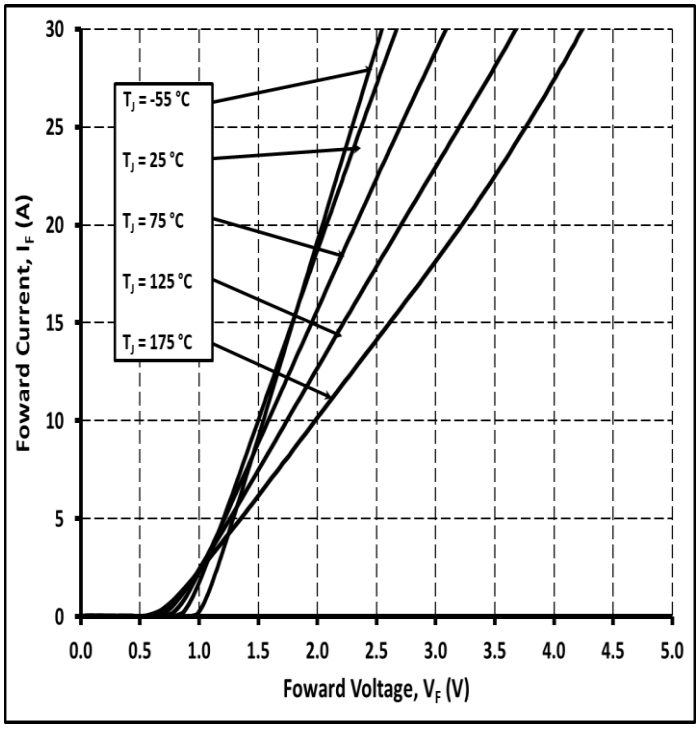


Figure 1.

Typical Forward Characteristics

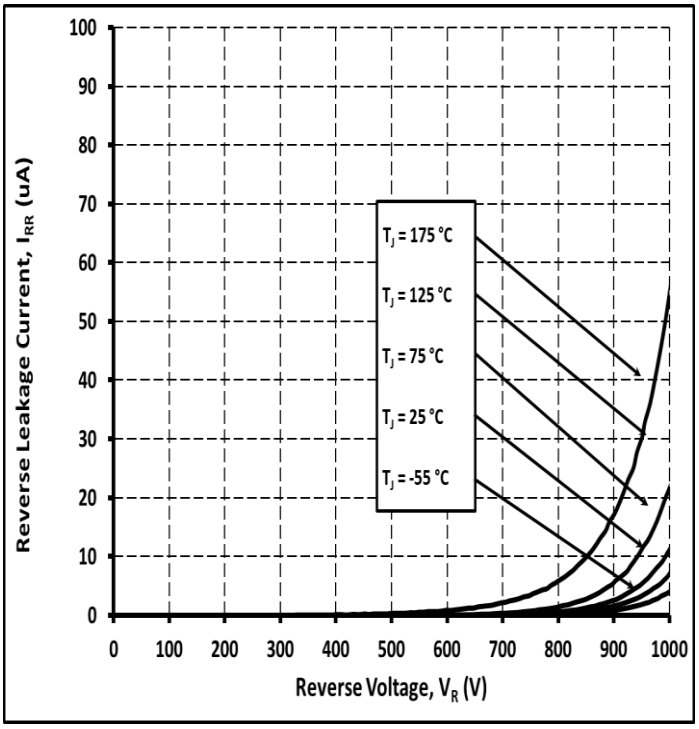


Figure 2.

Typical Reverse Characteristics

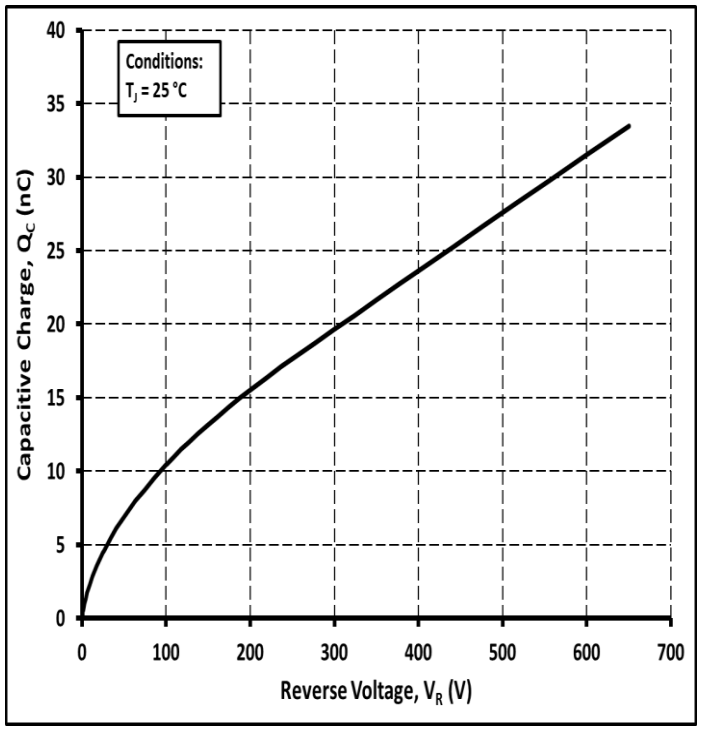


Figure 3.

Typical Capacitance vs Reverse Voltage

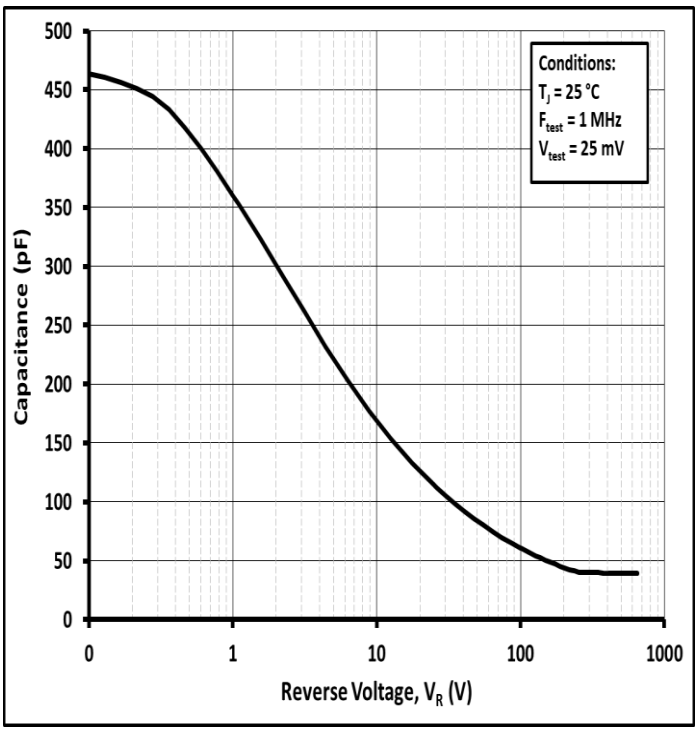
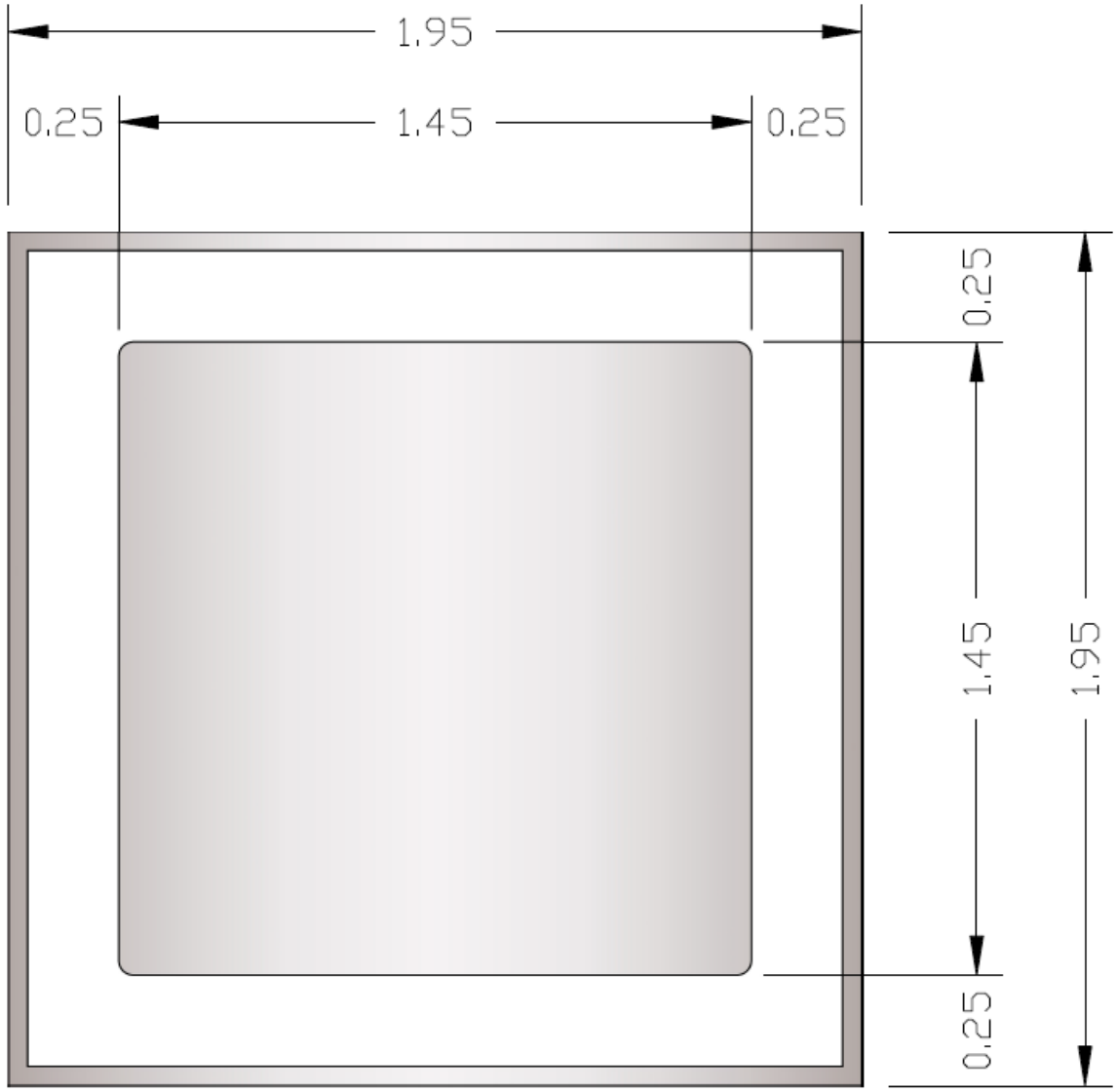


Figure 4.

Typical Recovery Charge vs Reverse Voltage

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

Product Dimensions CPW2-0650-S010B



Product Dimensions CPW2-0650-S010B

Parameter	Typical	Units
Die Size (L x W)	1.95 x 1.95	mm
Anode Pad Opening	1.45 x 1.45	mm
Die Thickness[1]	377 ± 10%	µm
Topside Anode Metalization (Al)	4	µm
Backside Cathode Metalization (Ni/Ag)	1.8	µm
Frontside Passivation (polymide)	Polyimide	

[1]SiC Thickness

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

Product Ordering Information

Order Number	Description	Package
CPW2-0650-S010B-FU6	SiC Diode G2 IND 650V/10A FULL MLT	Bare Die Product

Revision History

Revision History	Date of Change	Brief Summary
3	9/1/2023	• Template updated

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

Notes & Disclaimer

This document and the information contained herein are subject to change without notice. Any such change shall be evidenced by the publication of an updated version of this document by Wolfspeed. No communication from any employee or agent of Wolfspeed or any third party shall effect an amendment or modification of this document. No responsibility is assumed by Wolfspeed for any infringement of patents or other rights of third parties which may result from use of the information contained herein. No license is granted by implication or otherwise under any patent or patent rights of Wolfspeed.

Notwithstanding any application-specific information, guidance, assistance, or support that Wolfspeed may provide, the buyer of this product is solely responsible for determining the suitability of this product for the buyer's purposes, including without limitation for use in the applications identified in the next bullet point, and for the compliance of the buyers' products, including those that incorporate this product, with all applicable legal, regulatory, and safety-related requirements.

This product has not been designed or tested for use in, and is not intended for use in, applications in which failure of the product would reasonably be expected to cause death, personal injury, or property damage, including but not limited to equipment implanted into the human body, life-support machines, cardiac defibrillators, and similar emergency medical equipment, aircraft navigation, communication, and control systems, aircraft power and propulsion systems, air traffic control systems, and equipment used in the planning, construction, maintenance, or operation of nuclear facilities.

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Wolfspeed representative or from the Product Documentation sections of www.Wolfspeed.com.

REACh Compliance

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact your Wolfspeed representative to ensure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information is also available upon request.

Contact info:

4600 Silicon Drive
Durham, NC 27703 USA
Tel: +1.919.313.5300
www.wolfspeed.com/power

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
PATENT: https://www.wolfspeed.com/legal/patents

The information in this document is subject to change without notice.

© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.