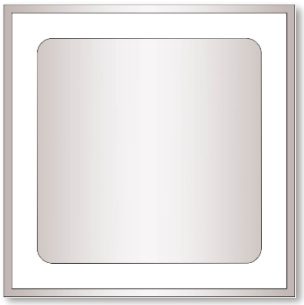
CPW2-0650-S012B

Gen 2 Silicon Carbide Schottky Diode



Package Type: Bare Die
PN's: CPW2-0650-S012B

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	35	A
		T_c = 135°C	16	
		T_c = 150°C	12	
Repetitive Peak Forward Surge Current, assumes t_p = 10ms, Half Sine Wave Pulse	I_{FRM}	T_c = 25°C	51.5	A
		T_c = 110°C	33.5	
Non-Repetitive Forward Surge Current, assumes t_p = 10ms, Half Sine Wave Pulse	I_{FSM}	T_c = 25°C	104	A
		T_c = 110°C	82	
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) < 1.05°C/W

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

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions
Forward Voltage	V_f	1.5	1.8	V	I_F = 12 A
		2.0	2.4		I_F = 12 A, T_{VJ} = 175°C
Reverse Current	I_R	15	74	µA	V_R = 650 V
		29	295		V_R = 650 V, T_{VJ} = 175°C
Total Capacitive Charge	Q_C	34		nC	V_R = 400 V, I_F = 12 A, di/dt = 500 A/µs
Total Capacitance	C	641.5		pF	V_R = 0 V, f = 1Mhz
		57			V_R = 200 V, f = 1Mhz
		47.5			V_R = 400 V, f = 1Mhz
Capacitance Stored Energy	E_C	4.8		µJ	V_R = 400 V

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance from Junction to Case[1]	$R_{th(j-c)}$	1.05	°C/W

Note:
[1]Tested in TO-247 Package

Typical Performance

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

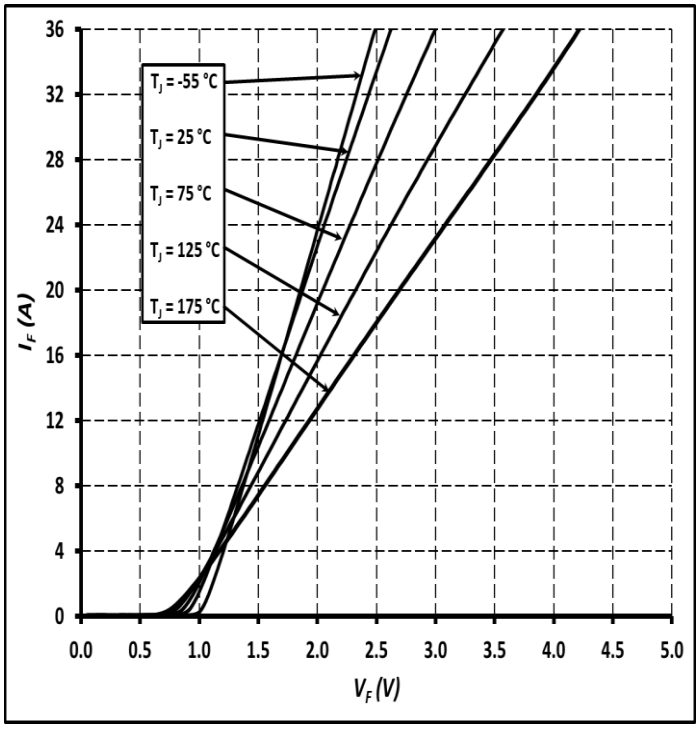


Figure 1.

Typical Forward Characteristics

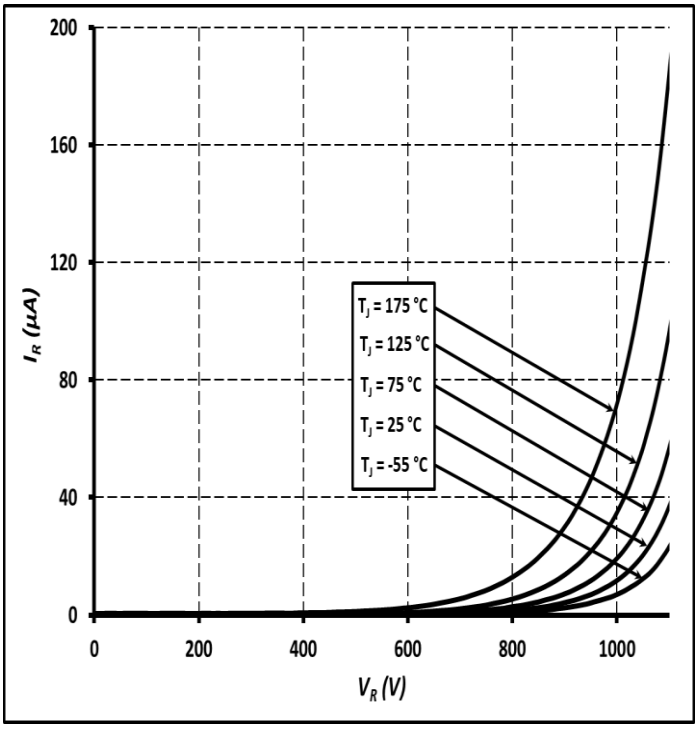


Figure 2.

Typical Reverse Characteristics

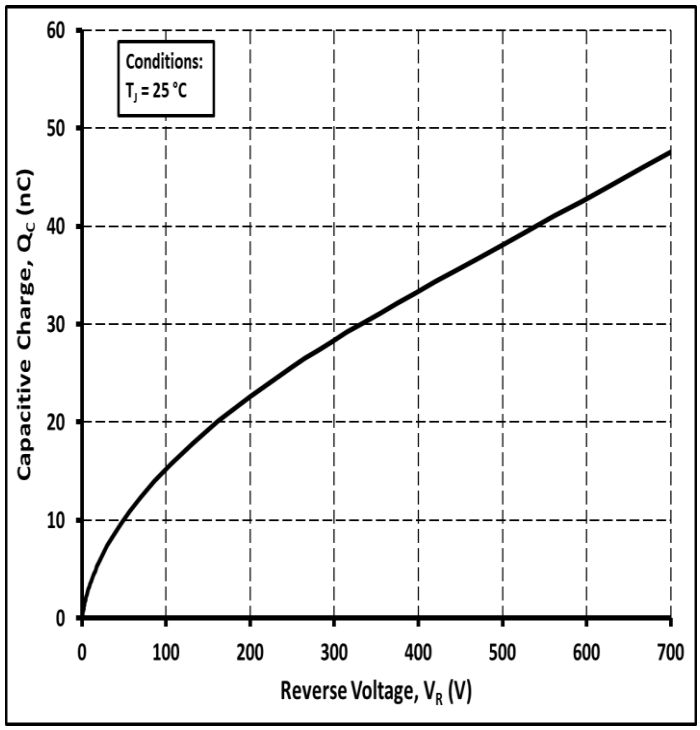


Figure 3.

Typical Capacitance vs Reverse Voltage

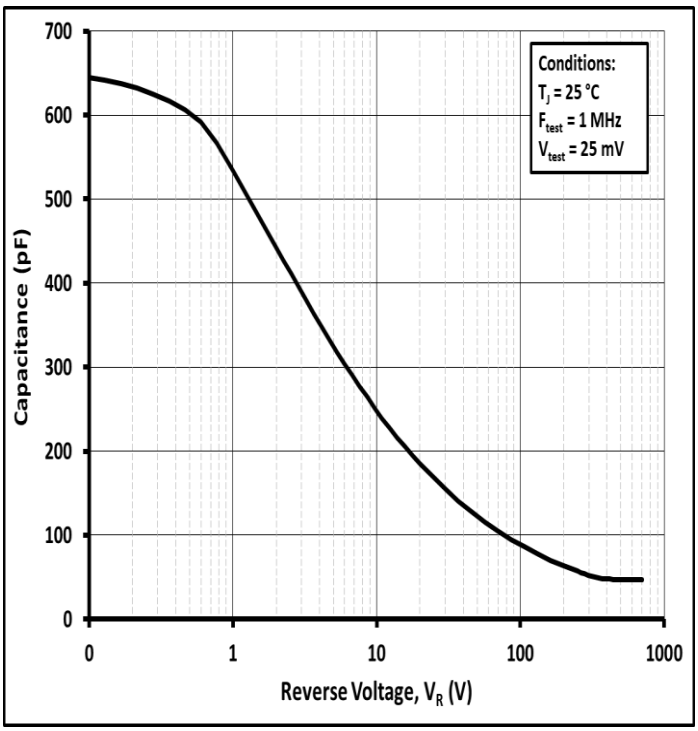
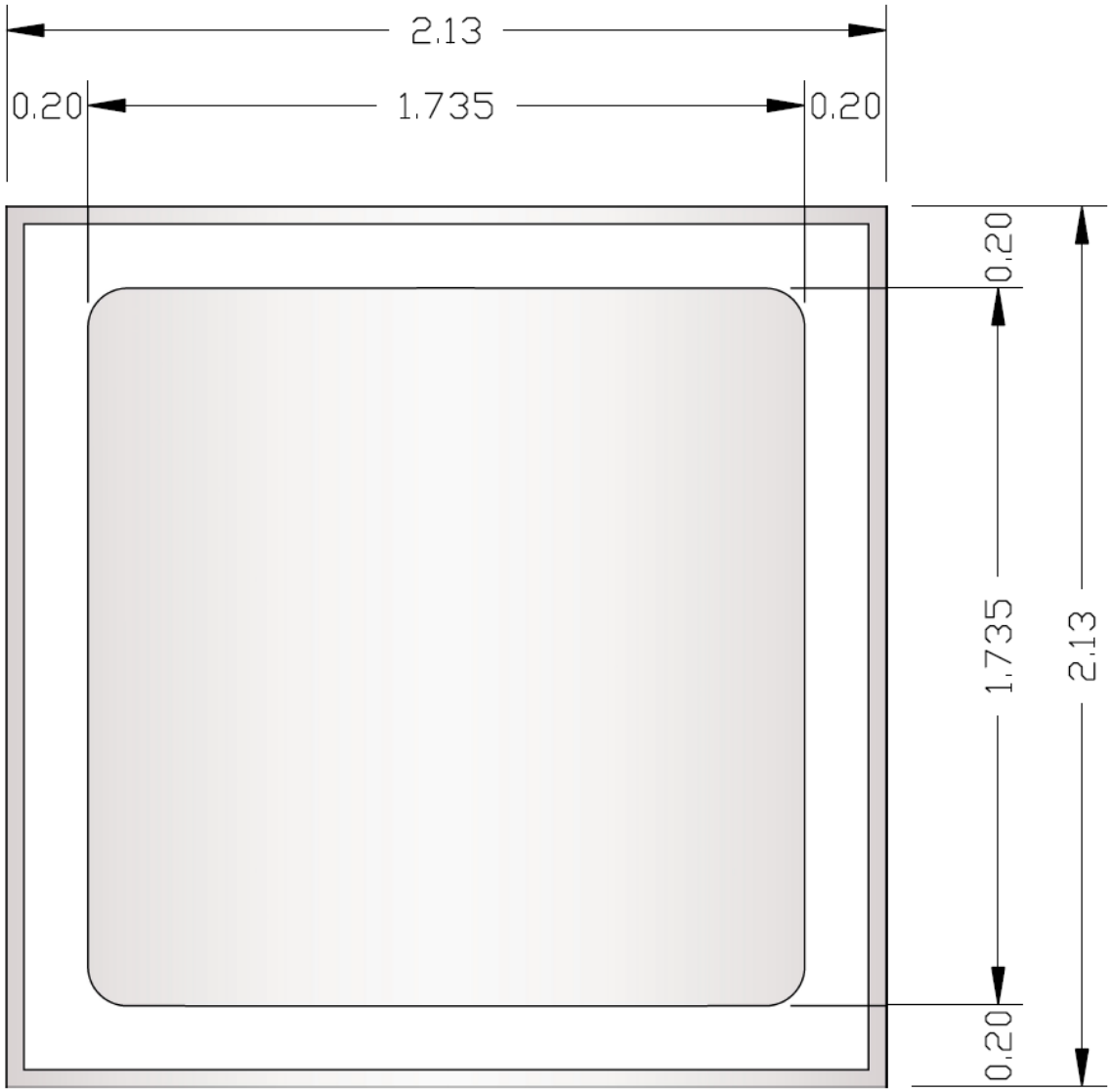


Figure 4.

Typical Recovery Charge vs Reverse Voltage

Product Dimensions CPW2-0650-S012B



Product Dimensions CPW2-0650-S012B

Parameter	Typical	Units
Die Size (L x W)	2.13 x 2.13	mm
Anode Pad Opening	1.73 x 1.73	mm
Die Thickness[1]	377 ± 10%	µm
Topside Anode Metalization (Al)	4	µm
Backside Cathode Metalization (Ni/Ag)	1.8	µm
Frontside Passivation	Polyimide	

[1]SiC Thickness

Product Ordering Information

Order Number	Description	Package
CPW2-0650-S012B-FU6	SiC Diode G2 IND 650V/12A FULL MLT	Bare Die Product

Revision History

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

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Contact info:

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

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