

## Product Summary

$V_{RRM}$ (V)	$I_o$ (A)	$V_{F(typ)}$ @ +125°C (V)	$I_{R(MAX)}$ @ $V_{RRM}$ (mA)
45	12	0.38	0.3

## Description

The SBR12U45LH1 uses SBR patented technology that offers ultra-low  $V_F$  to reduce forward power loss and improve efficiency. Encapsulated in the new PDI-5SP package with a 0.75mm low height profile and protruding leads for easy soldering, it is especially suited for use as a bypass diode in solar panels.

## Applications

- Solar Bypass Diode

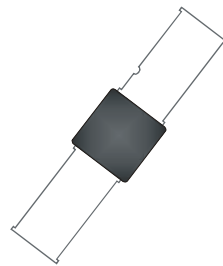
## Features

- Designed as bypass diodes for solar panels
- Low profile height (0.75mm) and 7.6mm protruding leads, enabling the package to be integrated within the solar glass panel
- Selectively rated for +200°C maximum junction temperature for high thermal reliability and excellent high temperature stability
- Patented Super Barrier Rectifier technology
- Ultra low forward voltage drop to minimize forward power losses
- Very low reverse leakage to ensures maximum efficiency of solar panel
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

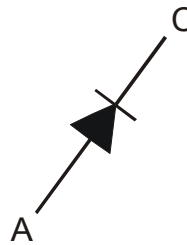
## Mechanical Data

- Case: POWERDI5SP-B
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Polarity: Cathode bar mark on top and cathode notch on lead
- Weight: 0.199 grams (approximate)

POWERDI5SP



Top View



Pin Configuration

## Ordering Information (Note 4)

Part Number	Case	Packaging
SBR12U45LH1-13	POWERDI5SP-B	3000 / Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



12U45LH1 = Product Type Marking Code  
 JII = Manufacturers' Code Marking  
 YYWWK = Date Code Marking  
 YY = Last Two Digits of Year (ex: 14 for 2014)  
 WW = Week Code (01 ~ 53)  
 K = Factory Designator

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitance load, derate current by 20%.

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	$V_{RRM}$	45	V
Working Peak Reverse Voltage	$V_{RWM}$		
DC Blocking Voltage	$V_{RM}$		
Average Rectified Output Current	$I_O$	12	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	$I_{FSM}$	300	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	66	$^\circ\text{C}/\text{W}$
Operating Temperature Range	$T_J$	$V_R \leq 80\% V_{RRM}$	-65 to +150
		DC Forward Mode (Note 7)	$\leq 175$
		DC Forward Mode (Note 8)	$\leq 200$
Storage Temperature Range	$T_{STG}$	-65 to +175	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop	$V_F$	—	0.40	0.48	V	$I_F = 10\text{A}, T_J = +25^\circ\text{C}$
		—	0.42	0.50		$I_F = 12\text{A}, T_J = +25^\circ\text{C}$
		—	0.38	0.45		$I_F = 12\text{A}, T_J = +125^\circ\text{C}$
Leakage Current (Note 6)	$I_R$	—	70	200	$\mu\text{A}$	$V_R = 40\text{V}, T_J = +25^\circ\text{C}$
		—	90	300		$V_R = 45\text{V}, T_J = +25^\circ\text{C}$
		—	19	—	mA	$V_R = 45\text{V}, T_J = +125^\circ\text{C}$
		—	60	—		$V_R = 45\text{V}, T_J = +150^\circ\text{C}$

- Notes:
5. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com/pdf>.
  6. Short duration pulse test used to minimize self-heating effect.
  7. Max junction temperature  $+175^\circ\text{C}$  guaranteed for 2 hours at maximum output.
  8. Max junction temperature  $+200^\circ\text{C}$  guaranteed for 2 hours at maximum output.

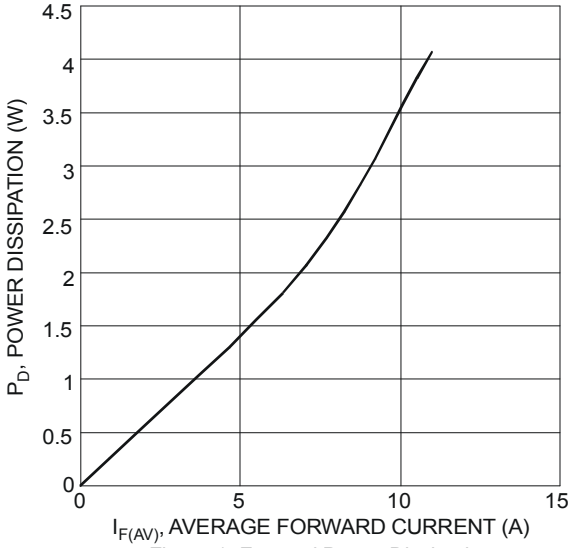


Figure 1 Forward Power Dissipation

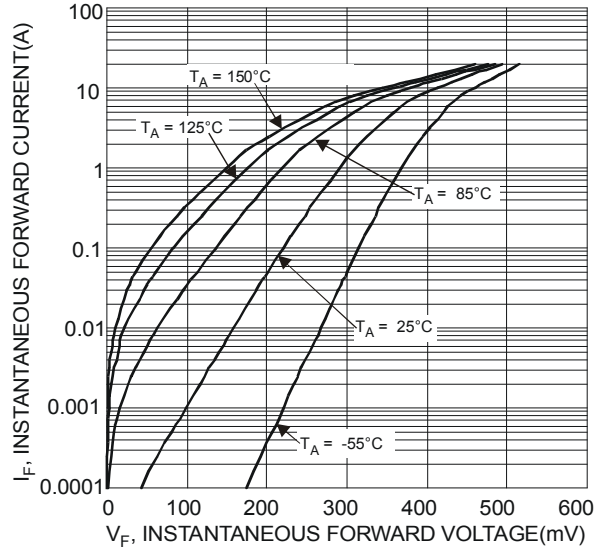


Figure 2 Typical Forward Characteristics

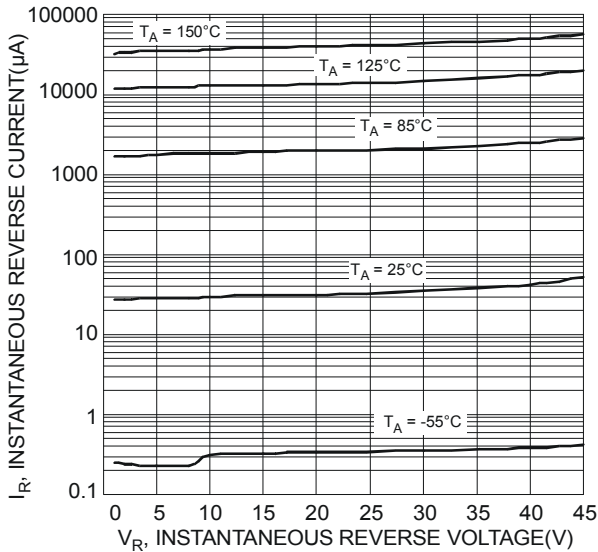


Figure 3 Typical Reverse Characteristics

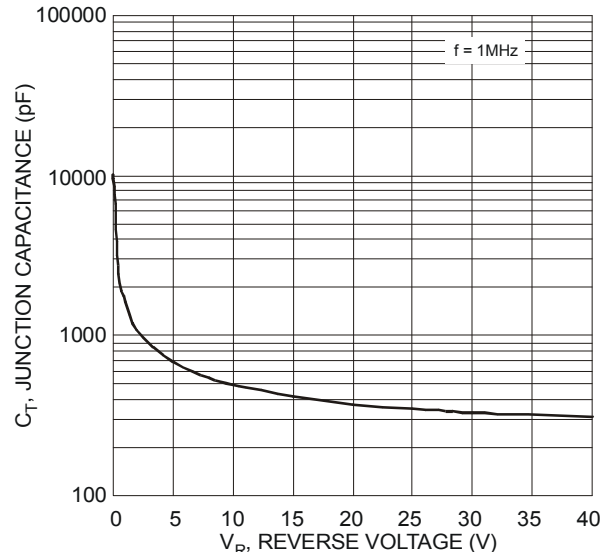


Figure 4 Typical Junction Capacitance

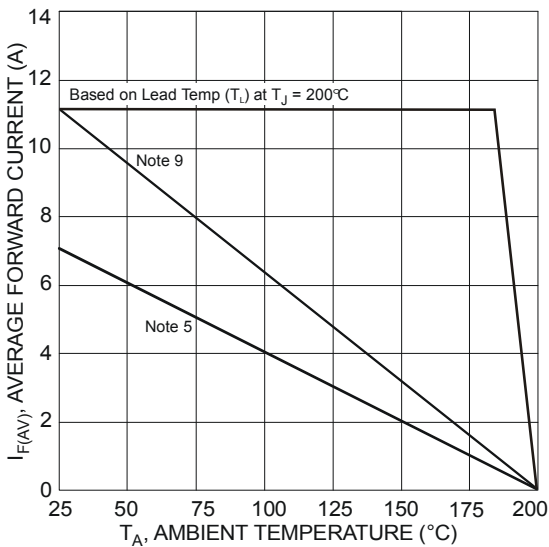


Figure 5 Forward Current Derating Curve

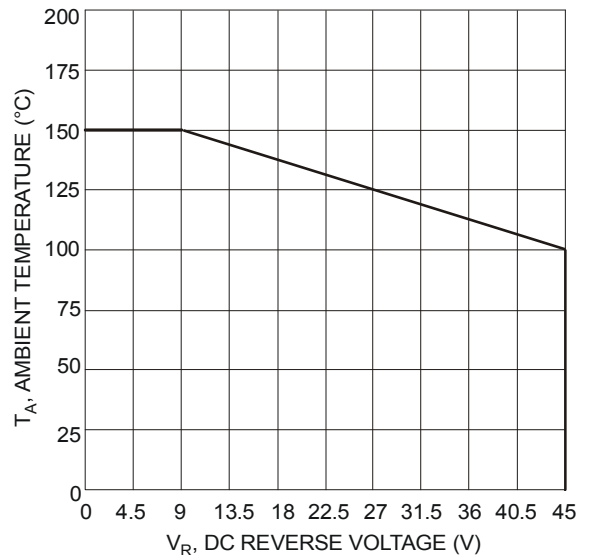
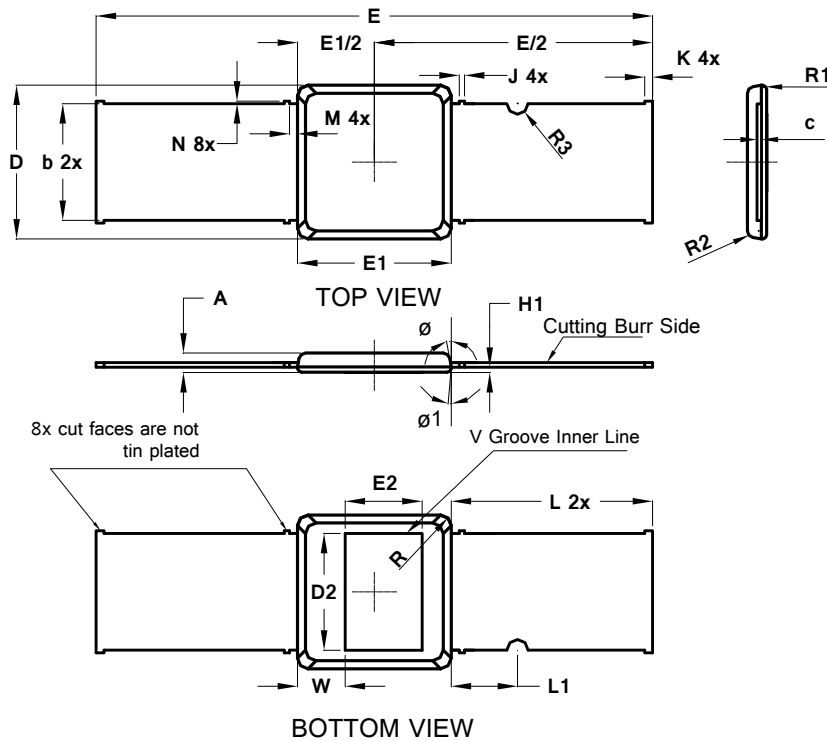


Figure 6 Operating Temperature Derating

## Package Outline Dimensions

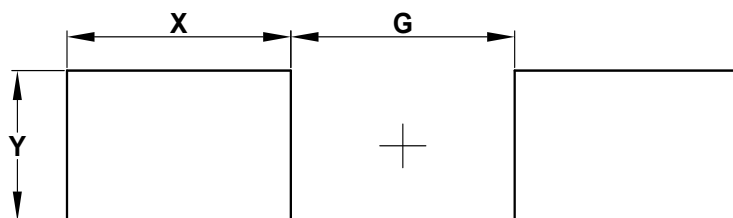
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI <sup>®</sup> 5SP Type B			
Dim	Min	Max	Typ
A	—	0.75	—
B	4.30	4.50	4.40
C	0.155	0.191	—
D	5.70	5.90	5.80
D2	4.40	—	—
E	20.8	21.2	21.0
E1	5.70	5.90	5.80
E2	2.90	—	—
H1	0.19	0.21	0.20
J	—	—	0.20
K	—	—	0.30
L	—	—	7.60
L1	—	—	2.50
M	—	—	0.30
N	0	0.20	—
R	—	—	0.40
R1	—	—	0.15
R2	—	—	0.25
R3	—	—	0.40
W	1.63	1.97	1.80
Ø	8°	12°	—
Ø 1	3°	7°	—
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
G	8.101
X	8.100
Y	5.100

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