



## 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 SBR12U45LH uses SBR<sup>®</sup> 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

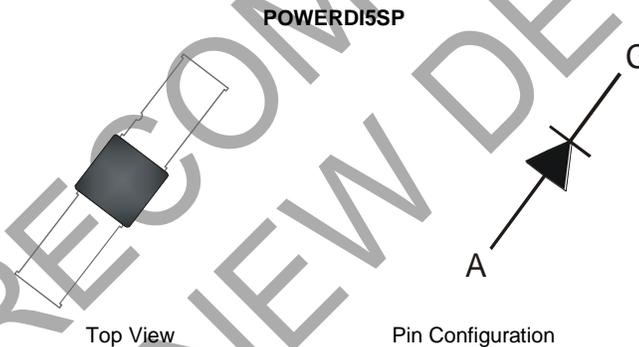
- Solar Bypass Diode

## Features

- Designed as bypass diodes for solar panels
- Low profile height (0.75mm) and 9mm 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 ensure maximum efficiency of solar panel
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: POWERDI<sup>®</sup>5SP
- 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)



## Ordering Information (Note 4)

| Part Number   | Case       | Packaging         |
|---------------|------------|-------------------|
| SBR12U45LH-13 | POWERDI5SP | 3,500 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



SBR12U45 = Product Type Marking Code  
 311 = 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<sub>A</sub> = +25°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 <sub>RRM</sub> | 45    | V    |
| Working Peak Reverse Voltage  | V <sub>RWM</sub> |       |      |
| DC Blocking Voltage   | V <sub>RM</sub>  |       |      |
| Average Rectified Output Current  | I <sub>O</sub>   | 12    | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub> | 300   | A    |

## Thermal Characteristics

| Characteristic  | Symbol                                | Value       | Unit |
|---|---------------------------------------|-------------|------|
| Typical Thermal Resistance Junction to Ambient (Note 5) | R <sub>θJA</sub>                      | 66          | °C/W |
| Operating Temperature Range                             | V <sub>R</sub> ≤ 80% V <sub>RRM</sub> | -65 to +150 | °C   |
|   | DC Forward Mode (Note 7)              | ≤200        | °C   |
| Storage Temperature Range                               | T <sub>STG</sub>                      | -65 to +175 | °C   |

## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic           | Symbol         | Min | Typ  | Max  | Unit | Test Condition                                |
|--------------------------|----------------|-----|------|------|------|---|
| Forward Voltage Drop     | V <sub>F</sub> | —   | 0.40 | 0.48 | V    | I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C  |
|                          |                | —   | 0.42 | 0.50 |      | I <sub>F</sub> = 12A, T <sub>J</sub> = +25°C  |
|                          |                | —   | 0.38 | 0.45 |      | I <sub>F</sub> = 12A, T <sub>J</sub> = +125°C |
| Leakage Current (Note 6) | I <sub>R</sub> | —   | 70   | 200  | μA   | V <sub>R</sub> = 40V, T <sub>J</sub> = +25°C  |
|                          |                | —   | 90   | 300  |      | V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C  |
|                          |                | —   | 19   | —    | mA   | V <sub>R</sub> = 45V, T <sub>J</sub> = +125°C |
|                          |                | —   | 60   | —    |      | V <sub>R</sub> = 45V, T <sub>J</sub> = +150°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 +200°C guaranteed for 2 hours at maximum output.

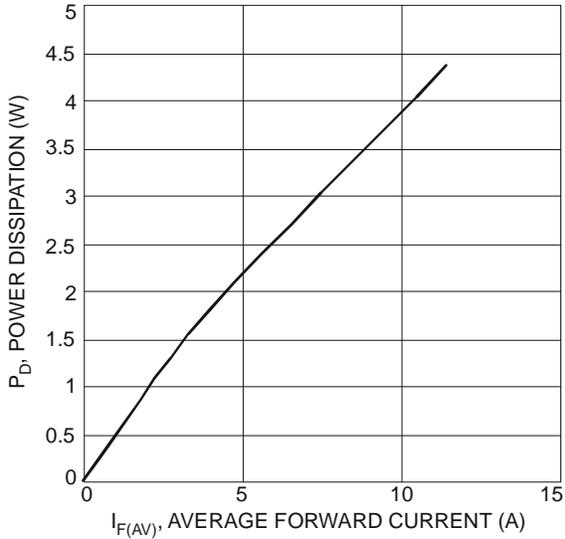


Fig. 1 Forward Power Dissipation

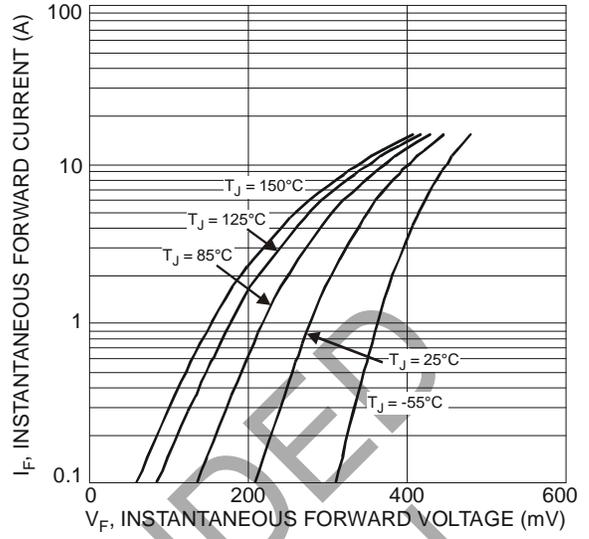


Fig. 2 Typical Forward Characteristics

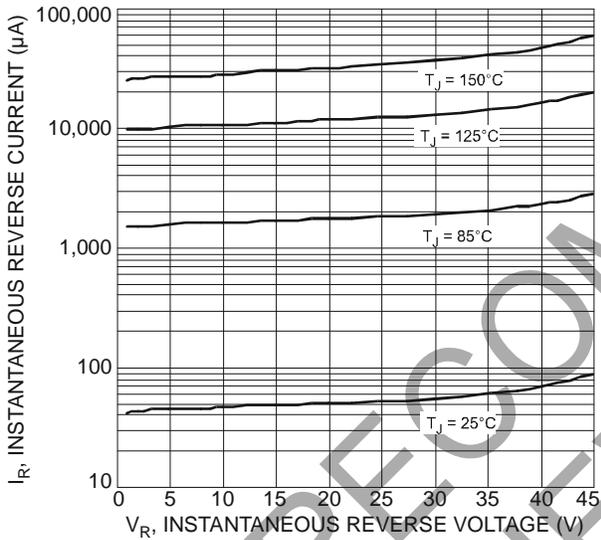


Fig. 3 Typical Reverse Characteristics

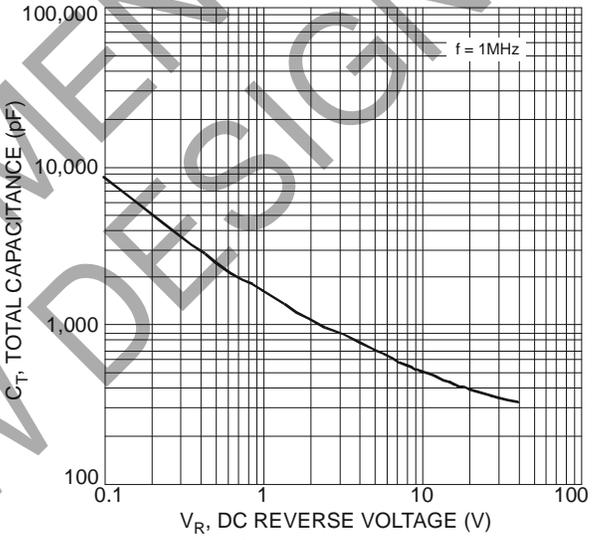


Fig. 4 Total Capacitance vs. Reverse Voltage

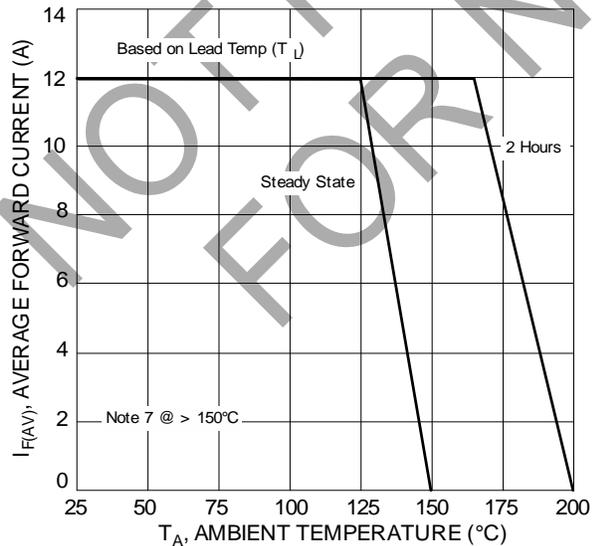


Fig. 5 Forward Current Derating Curve

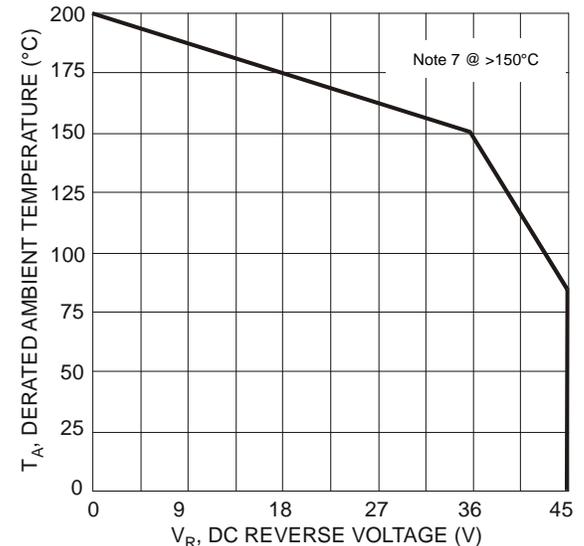
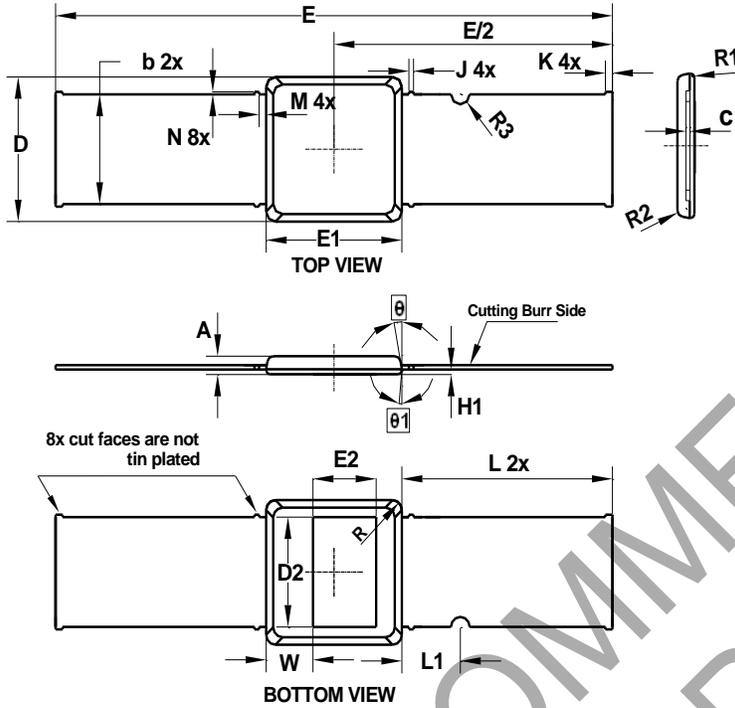


Fig. 6 Operating Temperature Derating

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**POWERDI5SP**

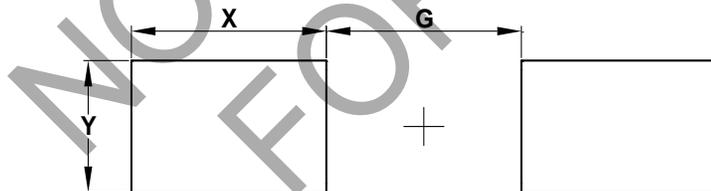


| POWERDI5SP           |       |       |      |
|----------------------|-------|-------|------|
| Dim                  | Min   | Max   | Typ  |
| A                    | -     | 0.75  | -    |
| b                    | 4.30  | 4.50  | 4.40 |
| c                    | 0.155 | 0.195 | -    |
| D                    | 5.70  | 5.90  | 5.80 |
| D2                   | 4.40  | -     | -    |
| E                    | 23.6  | 24.0  | 23.8 |
| E1                   | 5.70  | 5.90  | 5.80 |
| E2                   | 2.74  | -     | -    |
| H1                   | 0.19  | 0.21  | 0.20 |
| J                    | -     | -     | 0.20 |
| K                    | -     | -     | 0.30 |
| L                    | -     | -     | 9.00 |
| L1                   | -     | -     | 2.50 |
| M                    | -     | -     | 0.30 |
| N                    | 0     | 0.20  | -    |
| R                    | -     | -     | 0.40 |
| R1                   | -     | -     | 0.15 |
| R2                   | -     | -     | 0.25 |
| R3                   | -     | -     | 0.40 |
| W                    | 1.66  | 2.06  | -    |
| θ                    | 8°    | 12°   | -    |
| θ1                   | 3°    | 7°    | -    |
| All Dimensions in mm |       |       |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**POWERDI5SP**



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

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