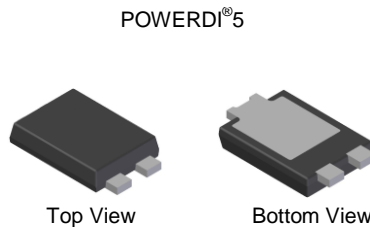


## Features

- Designed as Bypass Diodes for Solar Panels
- Selectively Rated for +200°C Maximum Junction Temperature for High Thermal Reliability
- Patented Super Barrier Rectifier Technology
- High Forward Surge Capability
- Ultra Low Forward Voltage Drop
- Excellent High Temperature Stability
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: POWERDI<sup>®</sup>5
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 <sup>(3)</sup>
- Weight: 0.093 grams (Approximate)



**Note: Pins Left & Right must be electrically connected at the printed circuit board.**

## Ordering Information (Note 4)


| Part Number    | Case                   | Packaging         |
|----------------|------------------------|-------------------|
| SBR10U45SP5-13 | POWERDI <sup>®</sup> 5 | 5,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. 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.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

POWERDI<sup>®</sup>5



S10U45S = Product Type Marking Code  
 = Manufacturer's Code Marking  
 K = Factory Designator  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 15 for 2015)  
 WW = Week Code (01 - 53)

**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<br>Working Peak Reverse Voltage<br>DC Blocking Voltage              | V <sub>RRM</sub><br>V <sub>RWM</sub><br>V <sub>RM</sub> | 45     | V    |
| RMS Reverse Voltage   | V <sub>R(RMS)</sub>                                     | 32     | V    |
| Average Rectified Output Current  | I <sub>O</sub>  | 10     | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub>  | 275    | A    |
| Repetitive Peak Avalanche Power (1μs, +25°C)  | P <sub>ARM</sub>  | 30,000 | W    |

**Thermal Characteristics**

| Characteristic                                  | Symbol                                | Value       | Unit |
|---|---------------------------------------|-------------|------|
| Thermal Resistance Junction to Ambient (Note 5) | R <sub>θJA</sub>                      | 73          | °C/W |
| Thermal Resistance Junction to Ambient (Note 6) | R <sub>θJA</sub>                      | 31          | °C/W |
| Operating Temperature Range                     | V <sub>R</sub> ≤ 80% V <sub>RRM</sub> | -65 to +150 | °C   |
|   | V <sub>R</sub> ≤ 50% V <sub>RRM</sub> | ≤180        |      |
|   | DC Forward Mode                       | ≤200        |      |
| 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                                |
|------------------------------------|--------------------|-----|------|------|------|---|
| Reverse Breakdown Voltage (Note 7) | V <sub>(BR)R</sub> | 45  | —    | —    | V    | I <sub>R</sub> = 0.3mA                        |
| Forward Voltage Drop               | V <sub>F</sub>     | —   | —    | 0.42 | V    | I <sub>F</sub> = 8A, T <sub>J</sub> = +25°C   |
|                                    |                    | —   | 0.42 | 0.47 |      | I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C  |
|                                    |                    | —   | 0.38 | 0.41 |      | I <sub>F</sub> = 10A, T <sub>J</sub> = +125°C |
| Leakage Current (Note 7)           | I <sub>R</sub>     | —   | 0.05 | 0.3  | mA   | V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C  |
|                                    |                    | —   | —    | 15   |      | V <sub>R</sub> = 45V, T <sub>J</sub> = +100°C |
|                                    |                    | —   | 28.0 | 75   |      | 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>.  
6. Polyimide PCB, 2oz. Copper. Cathode pad dimensions 18.8mm x 14.4mm. Anode pad dimensions 5.6mm x 14.4mm  
7. Short duration pulse test used to minimize self-heating effect.

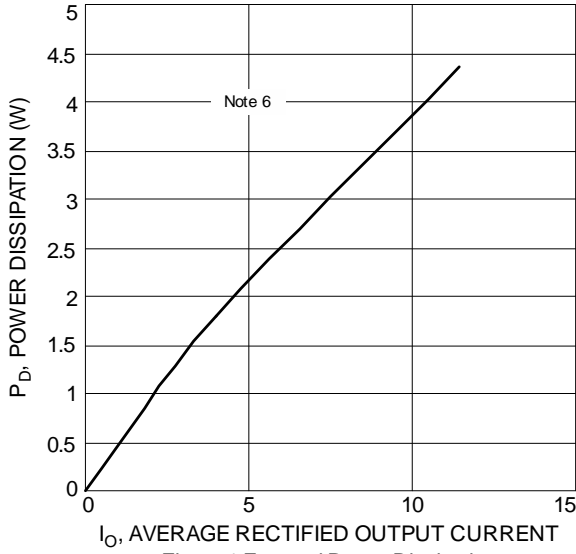


Figure 1 Forward Power Dissipation

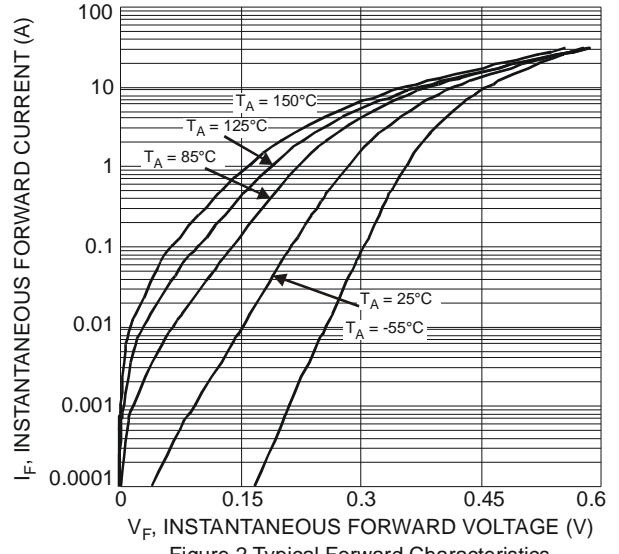


Figure 2 Typical Forward Characteristics

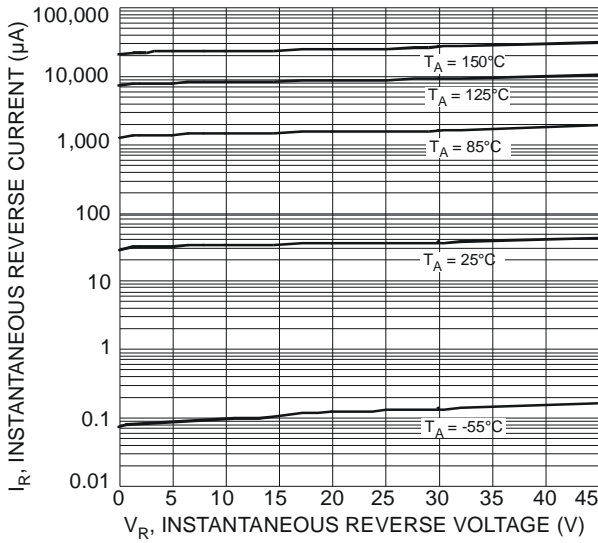


Figure 3 Typical Reverse Characteristics

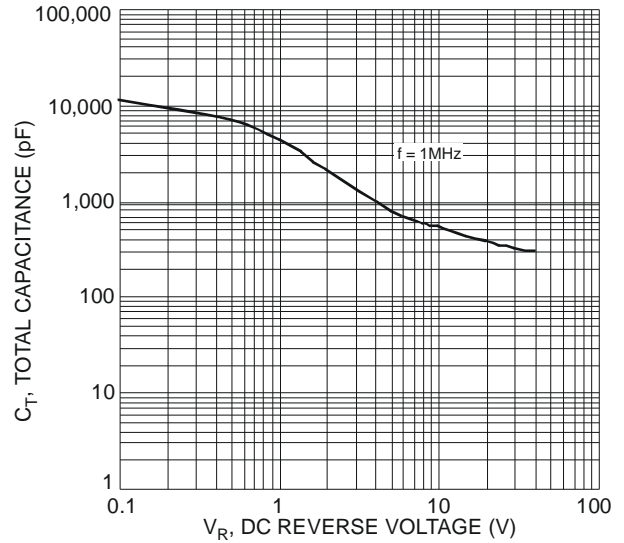


Figure 4 Total Capacitance vs. Reverse Voltage

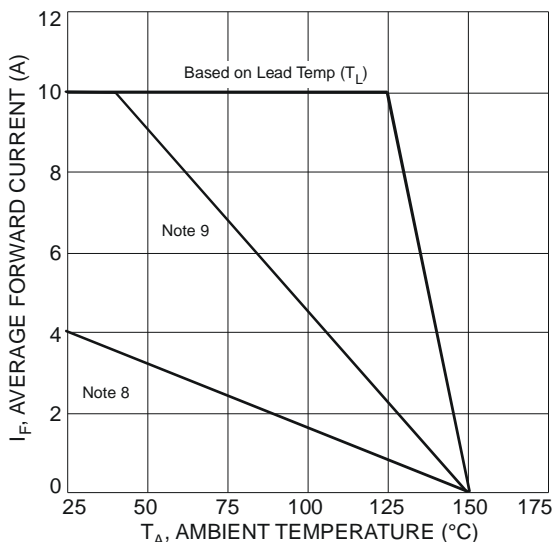


Figure 5 Forward Current Derating Curve

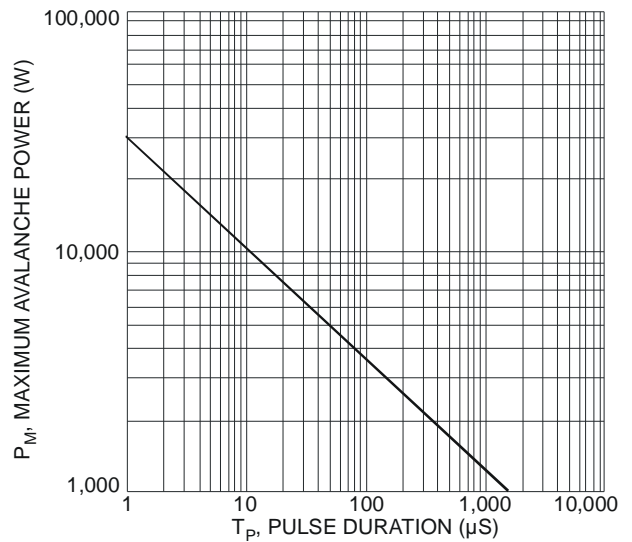


Figure 6 Maximum Avalanche Power

Notes: 8. Device mounted on FR-4 substate, 2oz copper, with minimum recommended pad layout.  
9. Device mounted on FR-4 substate, 2oz copper, with 10cm x 10cm pad layout.

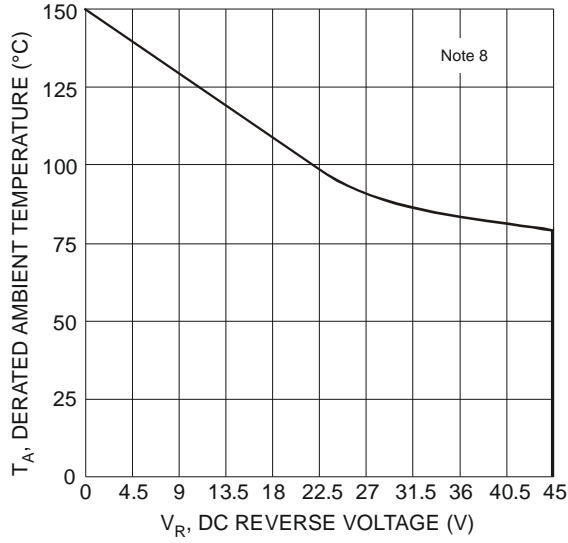
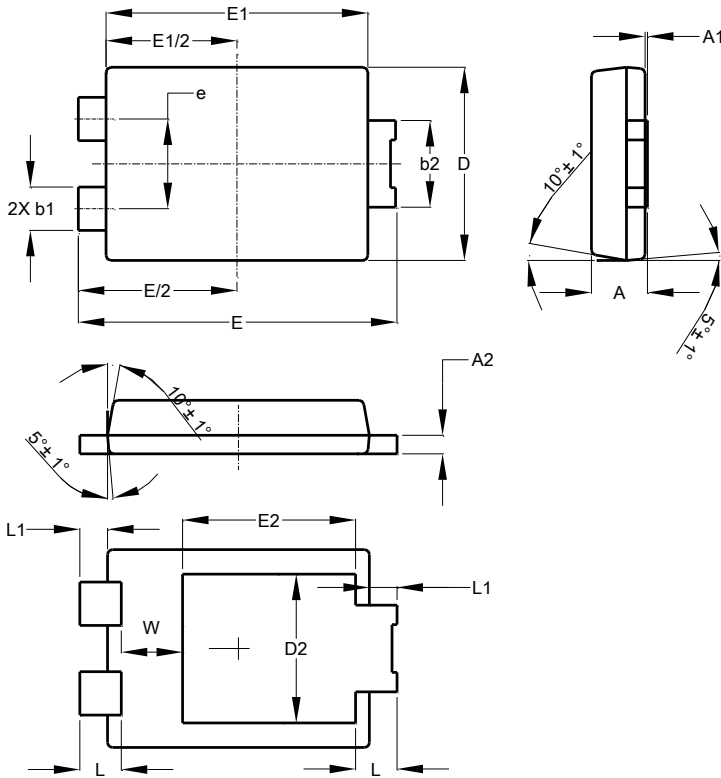


Figure 7 Operating Temperature Derating

**Package Outline Dimensions**

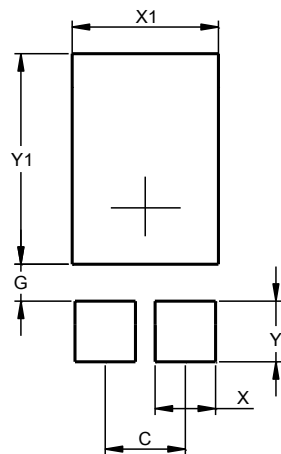
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| POWERDI <sup>®</sup> 5 |      |      |       |
|------------------------|------|------|-------|
| Dim                    | Min  | Max  | Typ   |
| A                      | 1.05 | 1.15 | 1.10  |
| A1                     | 0.00 | 0.05 | --    |
| A2                     | 0.33 | 0.43 | 0.381 |
| b1                     | 0.80 | 0.99 | 0.89  |
| b2                     | 1.70 | 1.88 | 1.78  |
| D                      | 3.90 | 4.05 | 3.966 |
| D2                     | --   | --   | 3.054 |
| E                      | 6.40 | 6.60 | 6.504 |
| e                      | --   | --   | 1.84  |
| E1                     | 5.30 | 5.45 | 5.37  |
| E2                     | --   | --   | 3.549 |
| L                      | 0.75 | 0.95 | 0.85  |
| L1                     | 0.50 | 0.65 | 0.57  |
| W                      | 1.10 | 1.41 | 1.255 |
| 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) |
|------------|---------------|
| C          | 1.840         |
| G          | 0.852         |
| X          | 1.390         |
| X1         | 3.360         |
| Y          | 1.400         |
| Y1         | 4.860         |

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