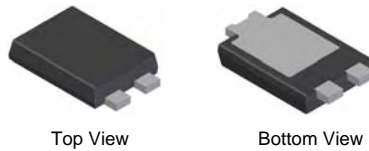


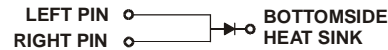
## Features

- Designed as Bypass Diodes for Solar Panels
- Selectively Rated for 200°C Maximum Junction Temperature for High Thermal Reliability
- Patented Super Barrier Rectifier Technology
- Low Forward Voltage Drop
- Excellent High Temperature Stability
- **Lead Free Finish, RoHS Compliant (Note 2)**



## Mechanical Data

- Case: PowerDI<sup>®5</sup>
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 ③
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.093 grams (approximate)



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

## 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>     |       |      |
| 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 Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub>    | 180   | A    |

## Thermal Characteristics

| Characteristic                                  | Symbol   | Value                                 | Unit        |
|---|--|---------------------------------------|-------------|
| Typical Thermal Resistance                      | R <sub>θJL</sub><br>R <sub>θJA</sub><br>R <sub>θJA</sub> | 3<br>102<br>60                        | °C/W        |
| Thermal Resistance Junction to Lead             |  |                                       |             |
| Thermal Resistance Junction to Ambient (Note 3) |  |                                       |             |
| Thermal Resistance Junction to Ambient (Note 4) |  |                                       |             |
| Operating Temperature Range                     | T <sub>J</sub>   | V <sub>R</sub> ≤ 80% V <sub>RRM</sub> | -65 to +150 |
|   |  | 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 1) | V <sub>(BR)R</sub> | 45  | -    | -    | V    | I <sub>R</sub> = 0.5mA                       |
| Forward Voltage Drop               | V <sub>F</sub>     | -   | -    | 0.51 | V    | I <sub>F</sub> = 8A, T <sub>J</sub> = 25°C   |
|                                    |                    | -   | 0.49 | 0.55 |      | I <sub>F</sub> = 10A, T <sub>J</sub> = 25°C  |
|                                    |                    | -   | 0.47 | 0.53 |      | I <sub>F</sub> = 10A, T <sub>J</sub> = 125°C |
| Leakage Current (Note 1)           | I <sub>R</sub>     | -   | 0.03 | 0.45 | mA   | V <sub>R</sub> = 45V, T <sub>J</sub> = 25°C  |
|                                    |                    | -   | -    | 18   |      | V <sub>R</sub> = 45V, T <sub>J</sub> = 100°C |
|                                    |                    | -   | 17   | 100  |      | V <sub>R</sub> = 45V, T <sub>J</sub> = 150°C |

- Notes:
1. Short duration pulse test used to minimize self-heating effect.
  2. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see *EU Directive 2002/95/EC Annex Notes*.
  3. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Polyimide PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.

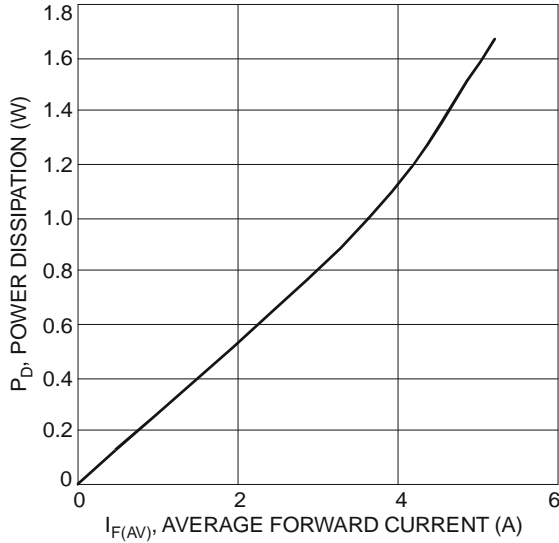


Fig. 1 Forward Power Dissipation

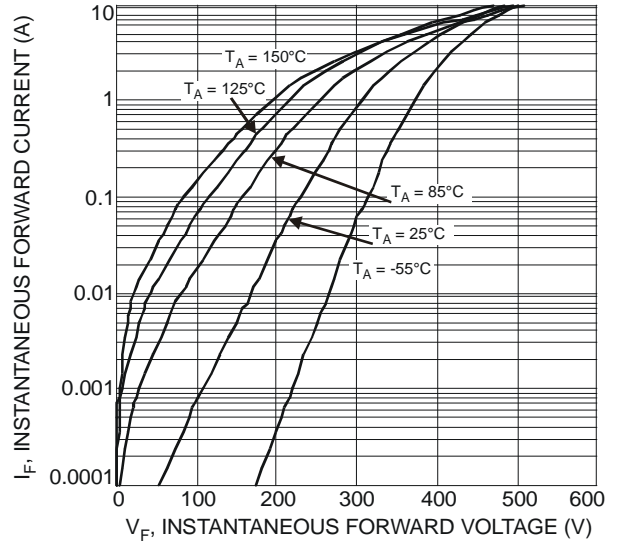


Fig. 2 Typical Forward Characteristics

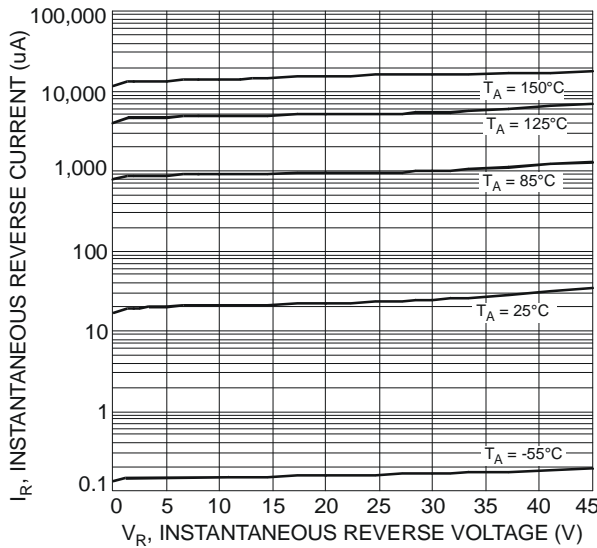


Fig. 3 Typical Reverse Characteristics

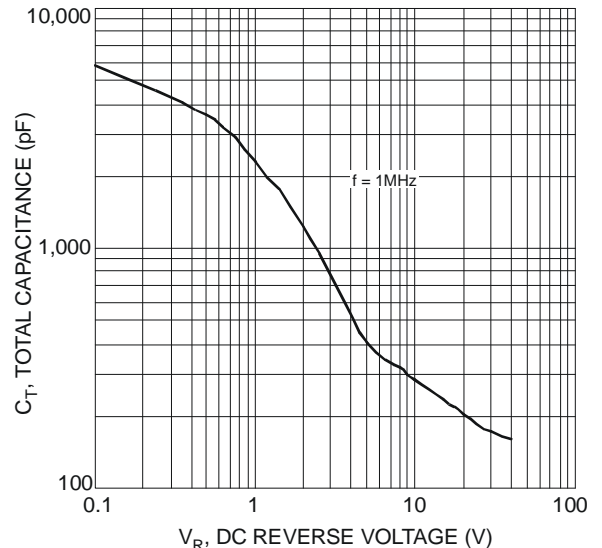


Fig. 4 Total Capacitance vs. Reverse Voltage

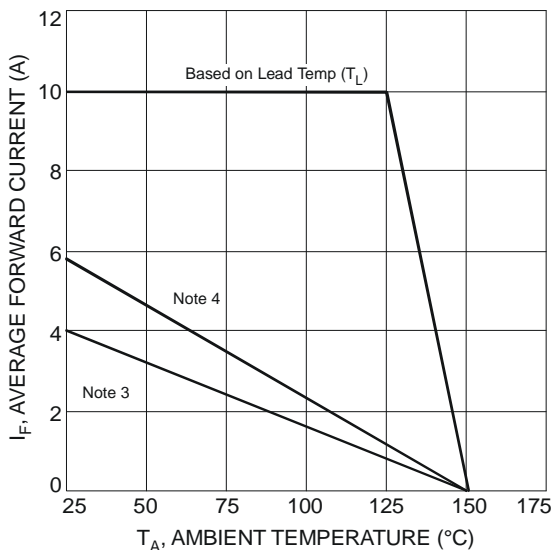


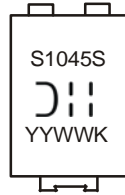
Fig. 5 Forward Current Derating Curve

### Ordering Information (Note 5)

| Part Number   | Case                   | Packaging        |
|---------------|------------------------|------------------|
| SBR1045SP5-13 | PowerDI <sup>®</sup> 5 | 5000/Tape & Reel |

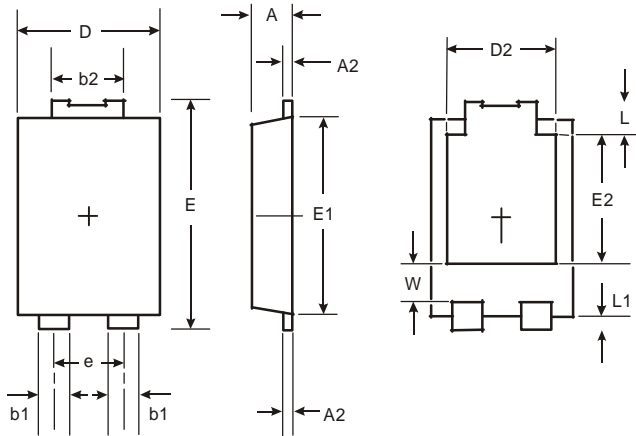
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

### Marking Information



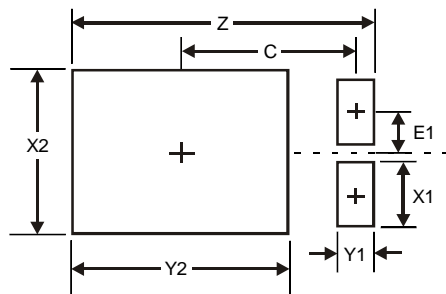
S1045S = Product Type Marking Code  
 ☺ = Manufacturers' code marking  
 K = Factory designator  
 YYWW = Date Code Marking  
 YY = Last two digits of year (ex: 08 for 2008)  
 WW = Week code 01 to 52

### Package Outline Dimensions



| PowerDI <sup>®</sup> 5      |           |      |
|-----------------------------|-----------|------|
| Dim                         | Min       | Max  |
| A                           | 1.05      | 1.15 |
| A2                          | 0.33      | 0.43 |
| b1                          | 0.80      | 0.99 |
| b2                          | 1.70      | 1.88 |
| D                           | 3.90      | 4.05 |
| D2                          | 3.054 Typ |      |
| E                           | 6.40      | 6.60 |
| e                           | 1.84 Typ  |      |
| E1                          | 5.30      | 5.45 |
| E2                          | 3.549 Typ |      |
| L                           | 0.75      | 0.95 |
| L1                          | 0.50      | 0.65 |
| W                           | 1.10      | 1.41 |
| <b>All Dimensions in mm</b> |           |      |

### Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 6.6           |
| X1         | 1.4           |
| X2         | 3.6           |
| Y1         | 0.8           |
| Y2         | 4.7           |
| C          | 3.87          |
| E1         | 0.9           |

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