

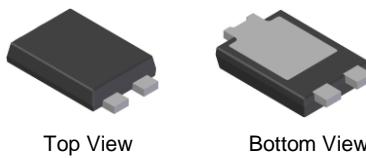
## Features

- 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 (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: POWERDI®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 e3
- Weight: 0.093 grams (Approximate)

POWERDI®5



Top View

Bottom View

LEFT PIN    o ——————> o    BOTTOMSIDE  
RIGHT PIN    o ——————> o    HEAT SINK

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

## Ordering Information (Note 4)

Part Number	Case	Packaging
SBR12A45SP5-13	POWERDI®5	5000/Tape & Reel

Notes:

1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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®5



S12A45S = Product Type Marking Code  
DII = 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** (@ $T_A = +25^\circ\text{C}$ , 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	$V_{RRM}$		
Working Peak Reverse Voltage	$V_{RWM}$	45	V
DC Blocking Voltage	$V_{RM}$		
Average Rectified Output Current	$I_o$	12	A
Non-Repetitive Peak Forward Surge Current 8.3ms	$I_{FSM}$	280	A
Single Half Sine-Wave Superimposed on Rated Load			
Non-Repetitive Avalanche Energy ( $T_J = +25^\circ\text{C}$ , $I_{AS} = 2\text{A}$ , $L = 8.5\text{ mH}$ )	$E_{AS}$	30	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Case (Note 5)	$R_{\theta JC}$	3	$^\circ\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	27	$^\circ\text{C}/\text{W}$
Operating Temperature Range	$V_R \leq 80\% V_{RRM}$	$T_J$	$^\circ\text{C}$
	$V_R \leq 50\% V_{RRM}$		
	DC Forward Mode		
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	$V_F$	-	0.43	-	V	$I_F = 6\text{A}$ , $T_J = +25^\circ\text{C}$
		-	0.50	0.60		$I_F = 12\text{A}$ , $T_J = +25^\circ\text{C}$
		-	0.33	-		$I_F = 6\text{A}$ , $T_J = +125^\circ\text{C}$
		-	0.43	0.52		$I_F = 12\text{A}$ , $T_J = +125^\circ\text{C}$
Leakage Current (Note 6)	$I_R$	-	0.05	0.3	mA	$V_R = 45\text{V}$ , $T_J = +25^\circ\text{C}$
		-	17	75		$V_R = 45\text{V}$ , $T_J = +125^\circ\text{C}$
Typical Junction Capacitance	$C_J$	-	1000	-	pF	4.0V, 1MHz

Notes: 5. Polymide PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.  
 6. Short duration pulse test used to minimize self-heating effect.

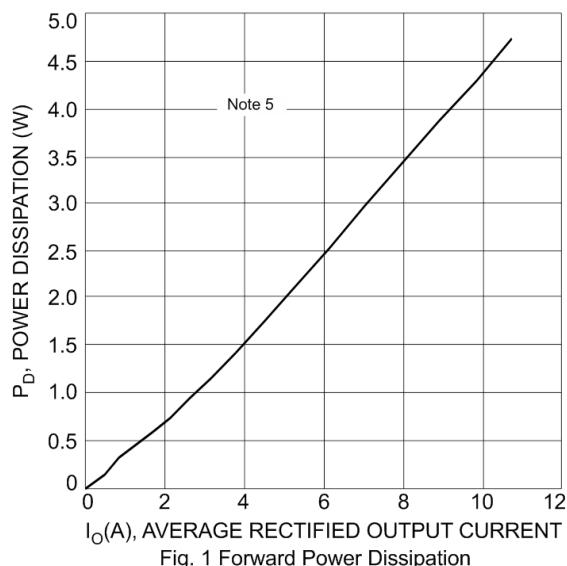


Fig. 1 Forward Power Dissipation

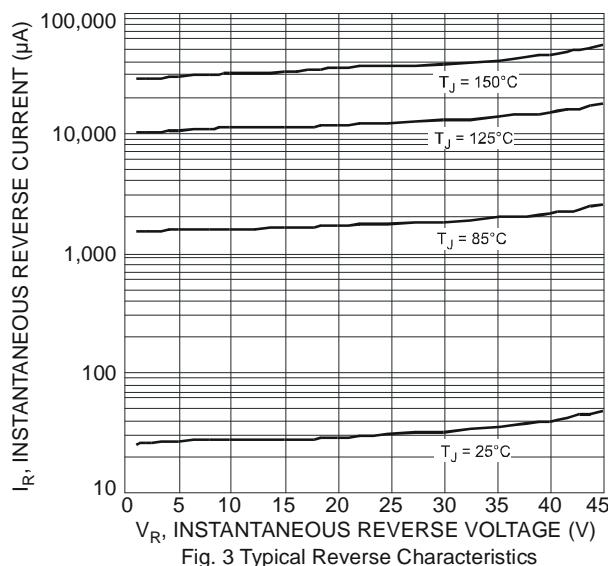


Fig. 3 Typical Reverse Characteristics

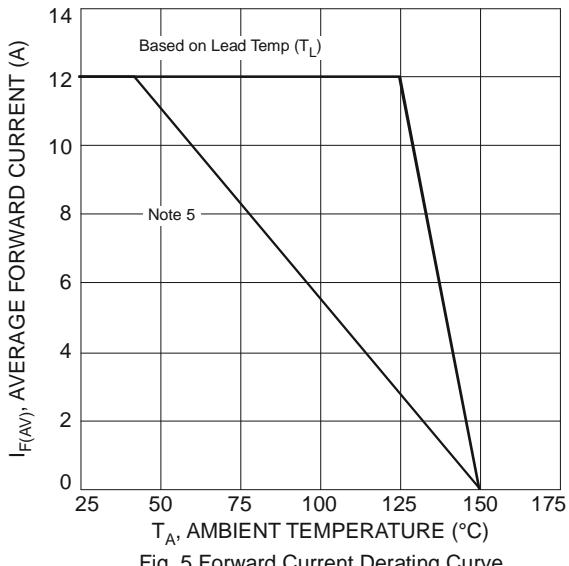


Fig. 5 Forward Current Derating Curve

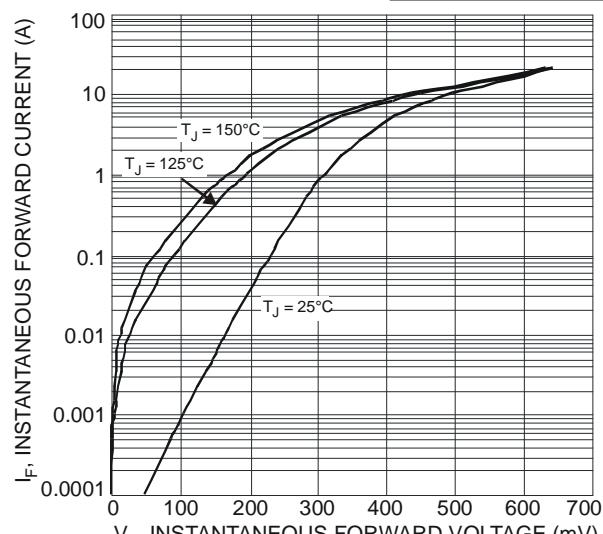


Fig. 2 Typical Forward Characteristics

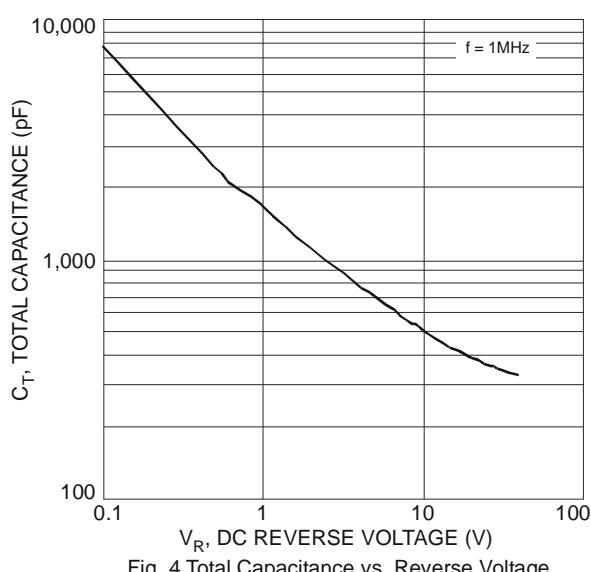


Fig. 4 Total Capacitance vs. Reverse Voltage

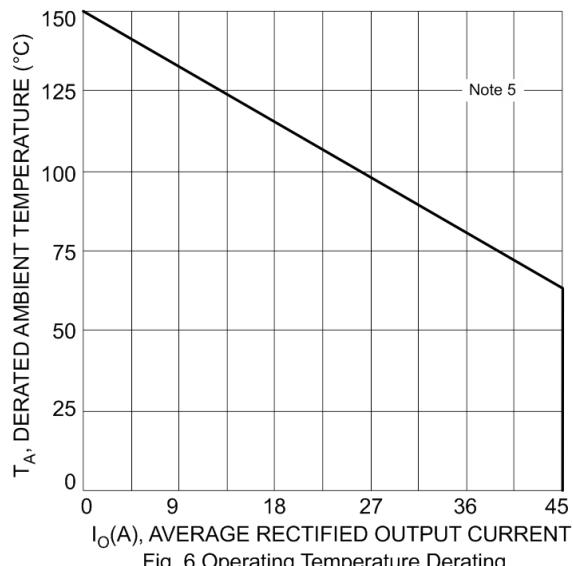
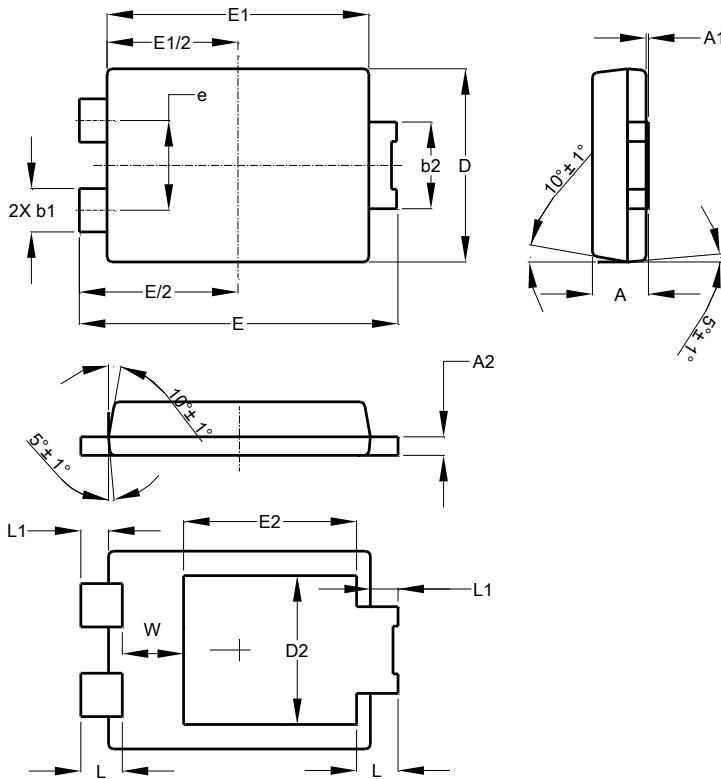


Fig. 6 Operating Temperature Derating

## Package Outline Dimensions

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

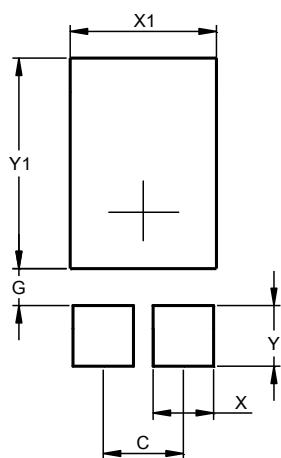


POWERDI® 5			
Dim	Min	Max	Typ
<b>A</b>	1.05	1.15	1.10
<b>A1</b>	0.00	0.05	--
<b>A2</b>	0.33	0.43	0.381
<b>b1</b>	0.80	0.99	0.89
<b>b2</b>	1.70	1.88	1.78
<b>D</b>	3.90	4.05	3.966
<b>D2</b>	--	--	3.054
<b>E</b>	6.40	6.60	6.504
<b>e</b>	--	--	1.84
<b>E1</b>	5.30	5.45	5.37
<b>E2</b>	--	--	3.549
<b>L</b>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

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