

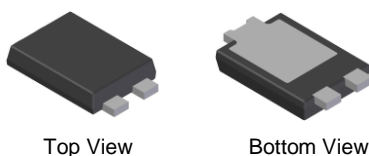
## Features

- 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



LEFT PIN ○  
RIGHT PIN ○

BOTTOMSIDE  
HEAT SINK

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

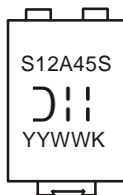
## Ordering Information (Note 4)

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

- Notes:
- 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

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<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 Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	280	A
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 2A, L = 8.5 mH)	E <sub>AS</sub>	30	mJ

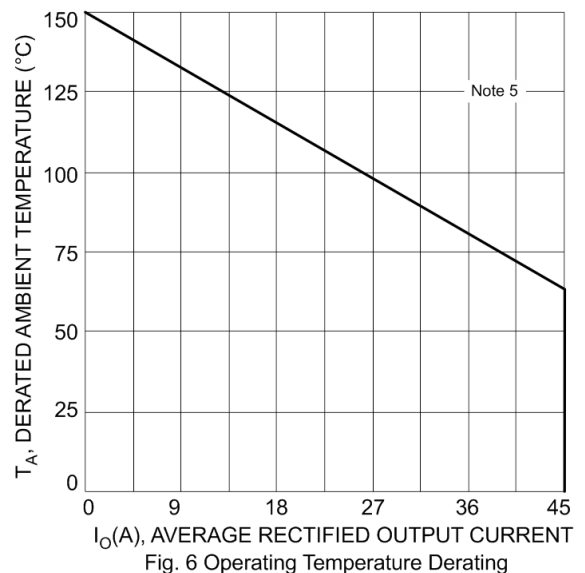
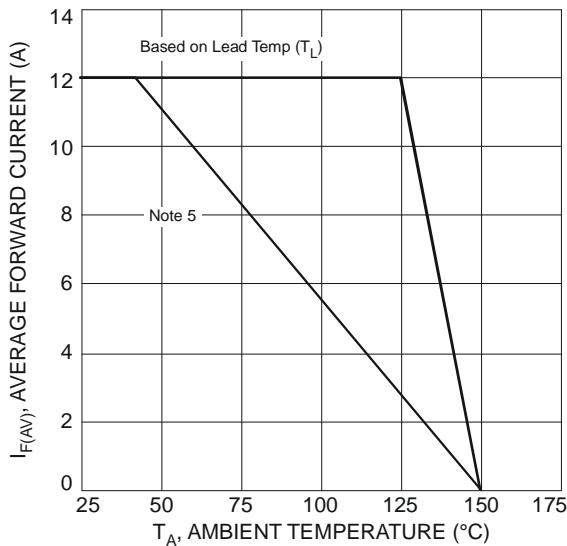
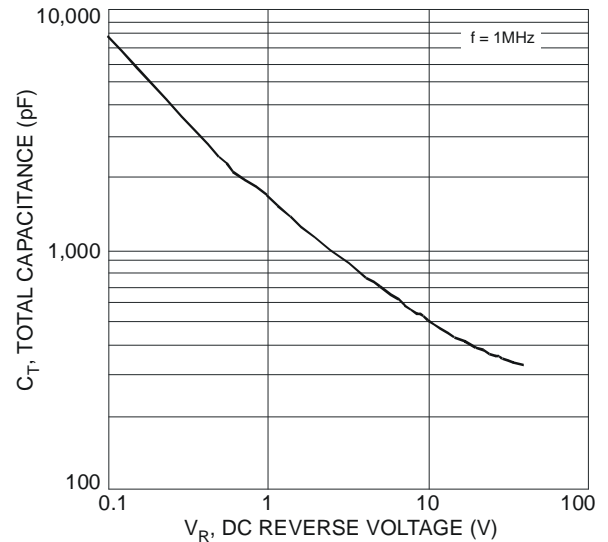
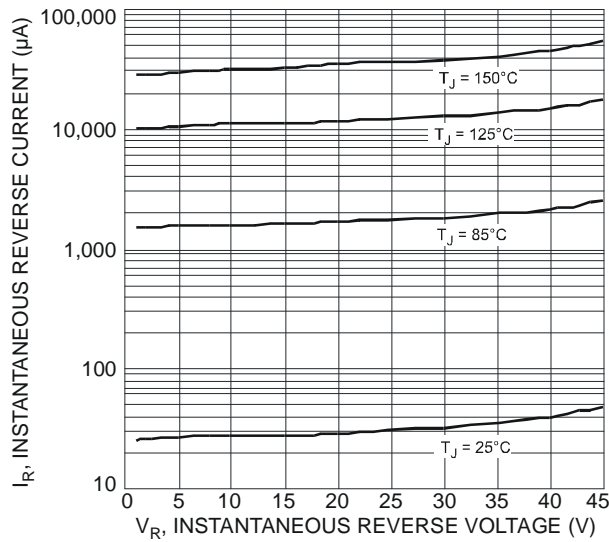
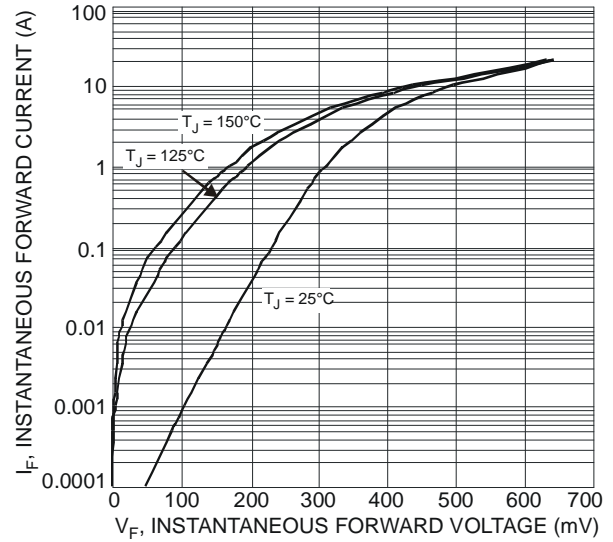
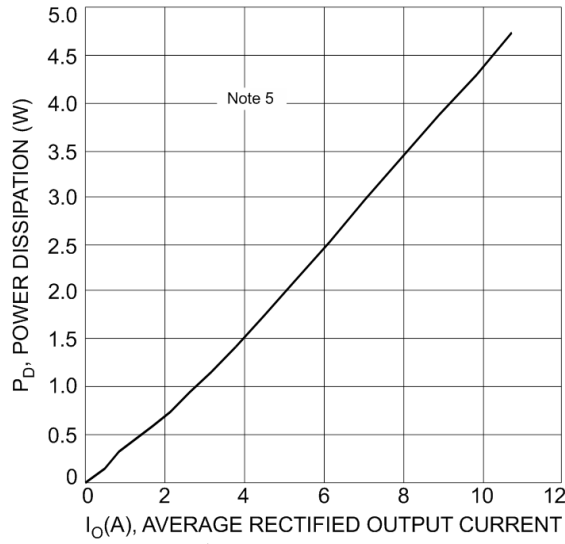
## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Case (Note 5)	R <sub>θJC</sub>	3	°C/W
Typical Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	27	°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.)

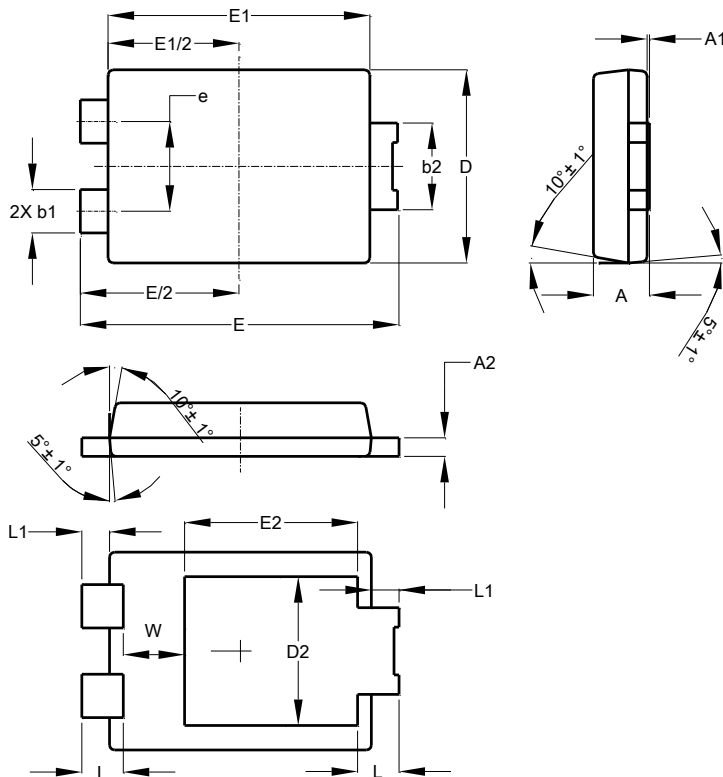
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop	V <sub>F</sub>	-	0.43	-	V	I <sub>F</sub> = 6A, T <sub>J</sub> = +25°C
		-	0.50	0.60		I <sub>F</sub> = 12A, T <sub>J</sub> = +25°C
		-	0.33	-		I <sub>F</sub> = 6A, T <sub>J</sub> = +125°C
		-	0.43	0.52		I <sub>F</sub> = 12A, T <sub>J</sub> = +125°C
Leakage Current (Note 6)	I <sub>R</sub>	-	0.05	0.3	mA	V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C
		-	17	75		V <sub>R</sub> = 45V, T <sub>J</sub> = +125°C
Typical Junction Capacitance	C <sub>J</sub>	-	1000	-	pF	4.0V, 1MHz

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



## Package Outline Dimensions

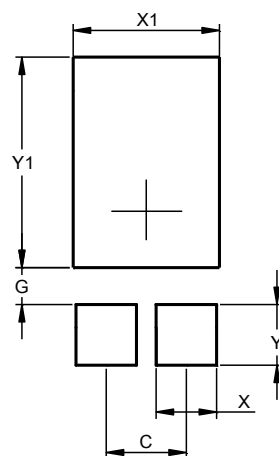
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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