

**Product Summary** (@ T<sub>A</sub> = +25°C)

V <sub>RRM</sub> (V)	I <sub>O</sub> (A)	V <sub>F(MAX)</sub> (V)	I <sub>R(MAX)</sub> (mA)
45	10	0.55	0.45

**Applications**

- SMPS
- DC-DC Converter
- Freewheeling Diodes

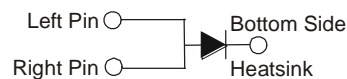
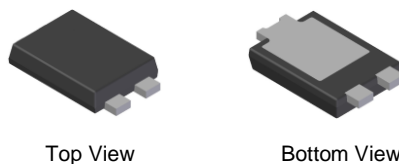
**Features and Benefits**

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: POWERDI5
- 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 (63)
- Weight: 0.093 grams (Approximate)

POWERDI5



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

**Ordering Information** (Note 4)

Part Number	Case	Packaging
SBR1045SP5-13	POWERDI5	5000/Tape & Reel
SBR1045SP5-13D (Note 5)	POWERDI5	5000/Tape & Reel
SBR1045SP5-7	POWERDI5	1500/Tape & Reel
SBR1045SP5-7D (Note 5)	POWERDI5	1500/Tape & Reel
SBR1045SP5Q-13	POWERDI5	5000/Tape & Reel
SBR1045SP5Q-13D (Note 5)	POWERDI5	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>.
  5. POWERDI5 available in 5K quantity on 13in. reel & 12mm tape, part number suffix "13D". 1.5K quantity on 7in. reel also, part number suffix "7". Diodes also provide 12mm tape with 7in. reel, part number suffix "7D".

## Marking Information



S1045S = Product Type Marking Code  
 = Manufacturers' Code Marking  
 K = Factory Designator  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 14 for 2014)  
 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>		
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
Repetitive Peak Avalanche Power (1μs, +25°C)	P <sub>ARM</sub>	10,000	W

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance	R <sub>θJL</sub>	3	°C/W
Thermal Resistance Junction to Lead			
Thermal Resistance Junction to Case (Note 6)			
Thermal Resistance Junction to Ambient (Note 6)			
Thermal Resistance Junction to Ambient (Note 7)			
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 8)	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 8)	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
Typical Junction Capacitance	C <sub>J</sub>	-	500	-	pF	f = MHz, I <sub>R</sub> = 4V

Notes: 6. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.  
 7. Polyimide PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.  
 8. Short duration pulse test used to minimize self-heating effect.

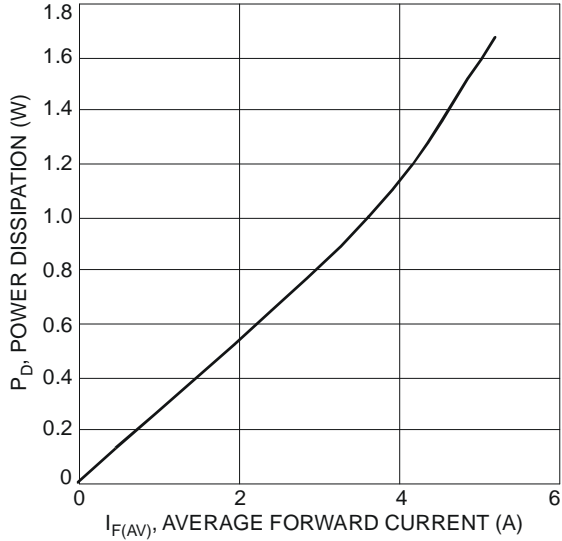


Fig. 1 Forward Power Dissipation

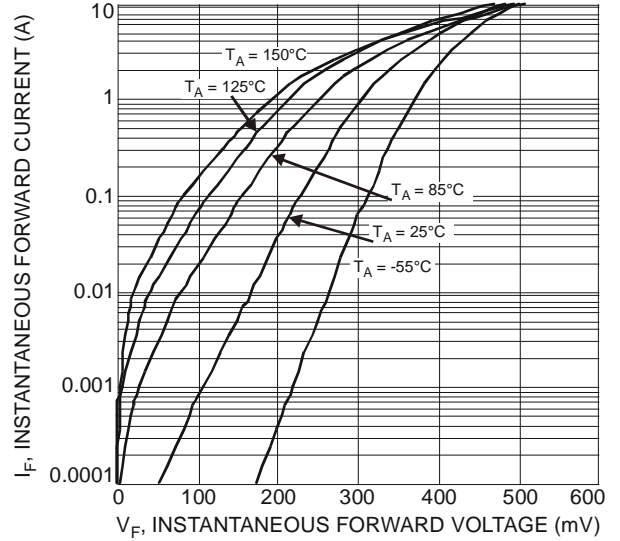


Fig. 2 Typical Forward Characteristics

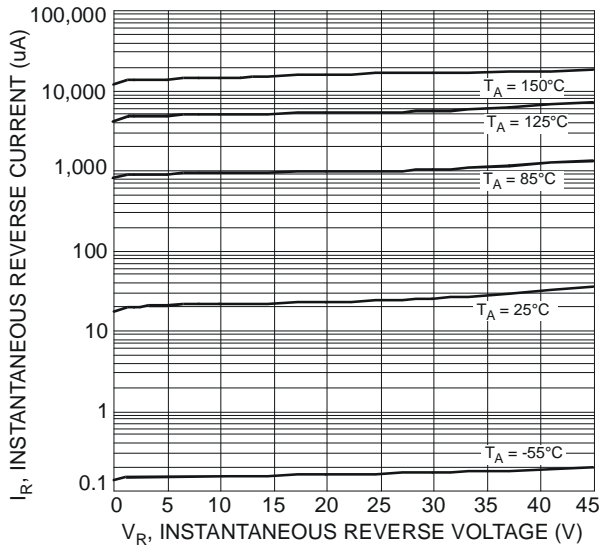


Fig. 3 Typical Reverse Characteristics

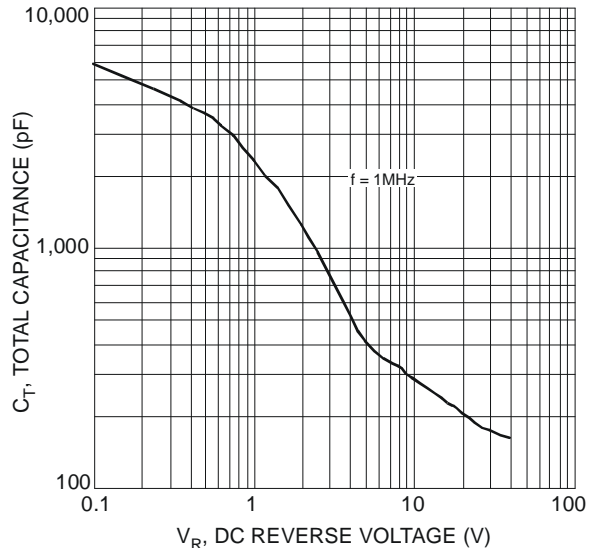


Fig. 4 Total Capacitance vs. Reverse Voltage

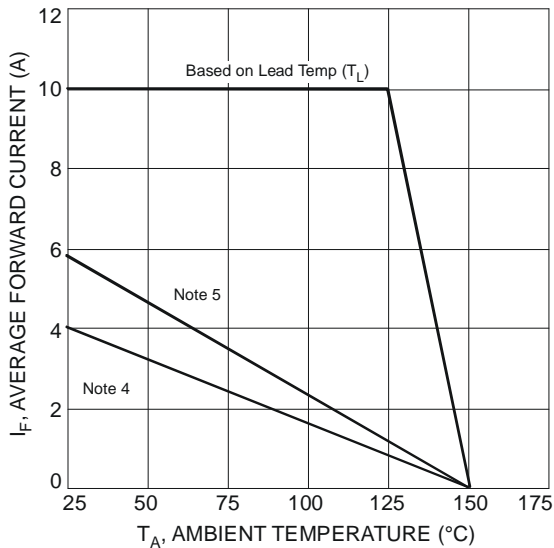


Fig. 5 Forward Current Derating Curve

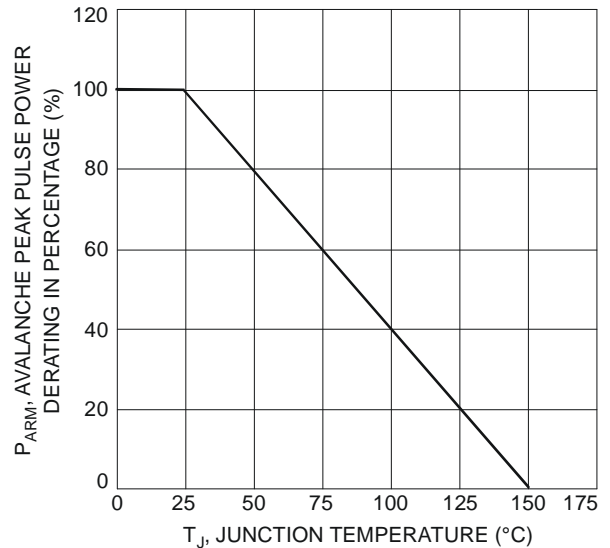


Fig. 6 Pulse Derating Curve

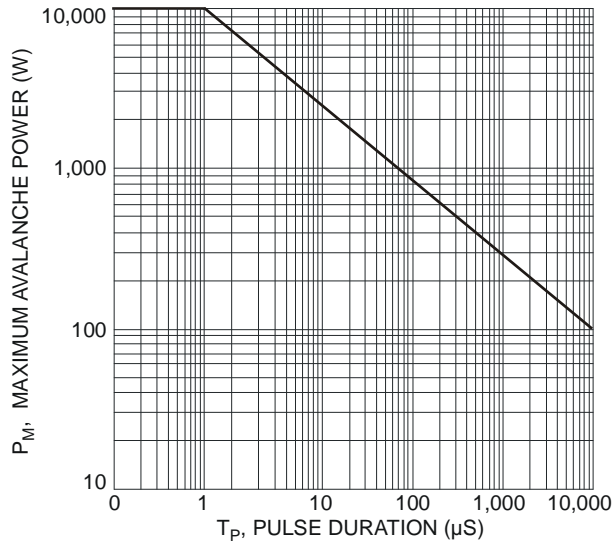
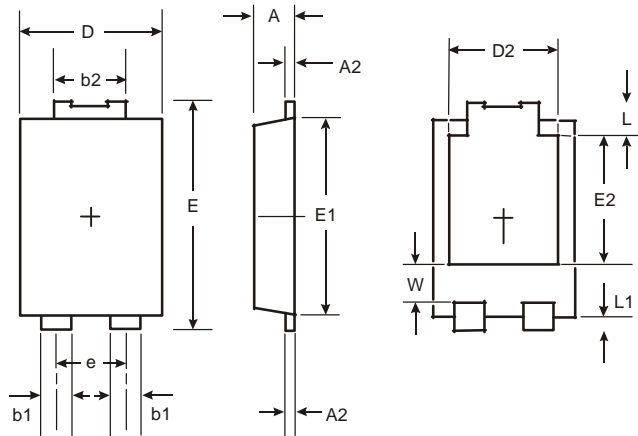


Fig. 7 Maximum Avalanche Power vs. Pulse Duration

### Package Outline Dimensions

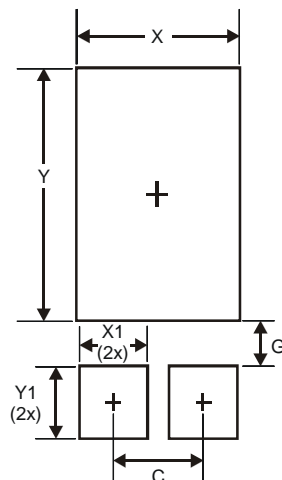
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI5		
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

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	3.360
X1	1.390
Y	4.860
Y1	1.400

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