

**Product Summary** (@  $T_A = +25^\circ\text{C}$ )

$V_{RRM}$ (V)	$I_o$ (A)	$V_F(\text{MAX})$ (V)	$I_R(\text{MAX})$ (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  $+200^\circ\text{C}$  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 (3)
- Weight: 0.093 grams (Approximate)

POWERDI5



Top View



Bottom View



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 "7D". Diodes also provide 12mm tape with 7in. reel, part number suffix "7D".

## Marking Information



S1045S = Product Type Marking Code  
 DII = 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 (@ $T_A = +25^\circ\text{C}$ , 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	$V_{RM}$		
RMS Reverse Voltage	$V_{R(\text{RMS})}$	32	V
Average Rectified Output Current	$I_O$	10	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	$I_{FSM}$	180	A
Repetitive Peak Avalanche Power (1μs, +25°C)	$P_{ARM}$	10,000	W

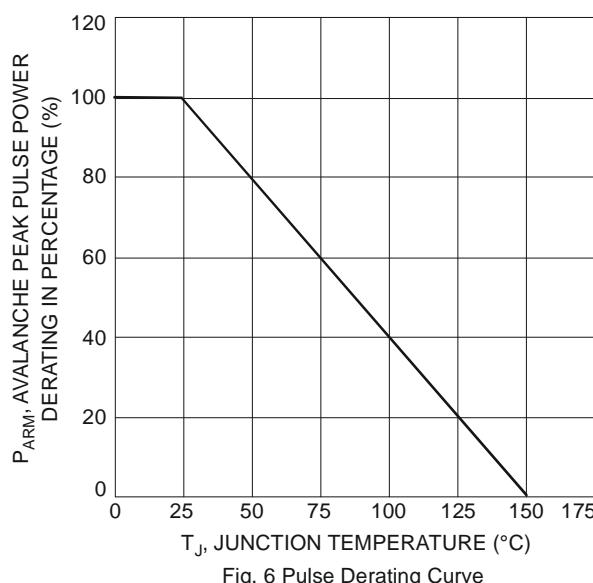
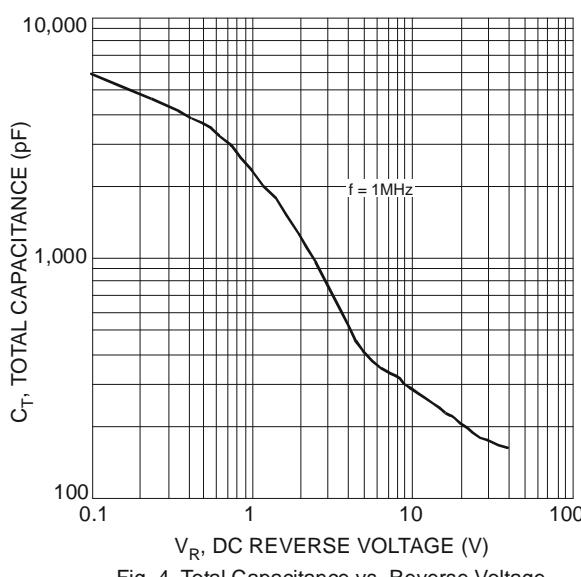
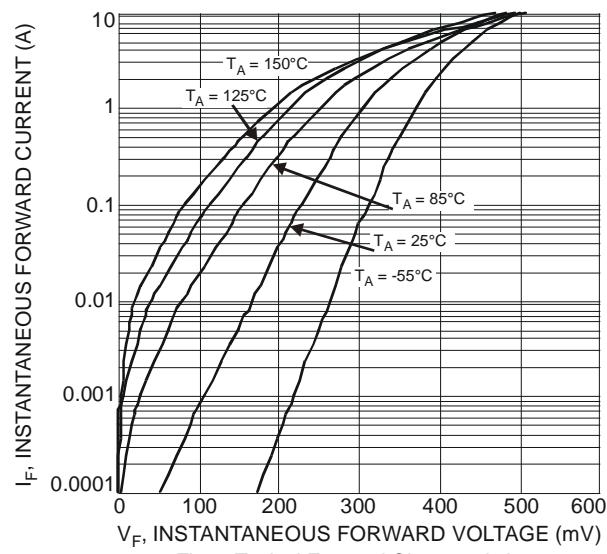
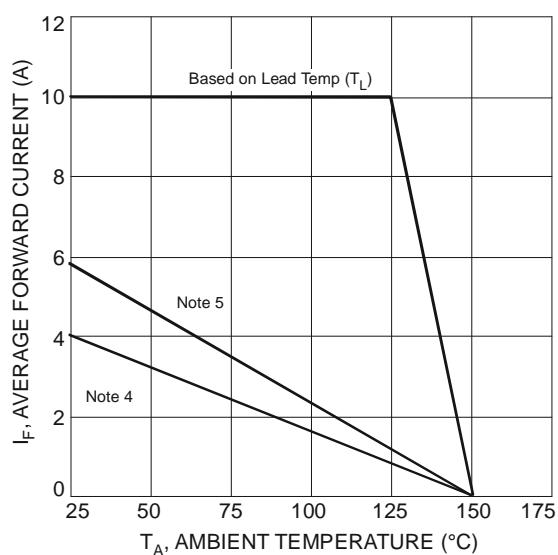
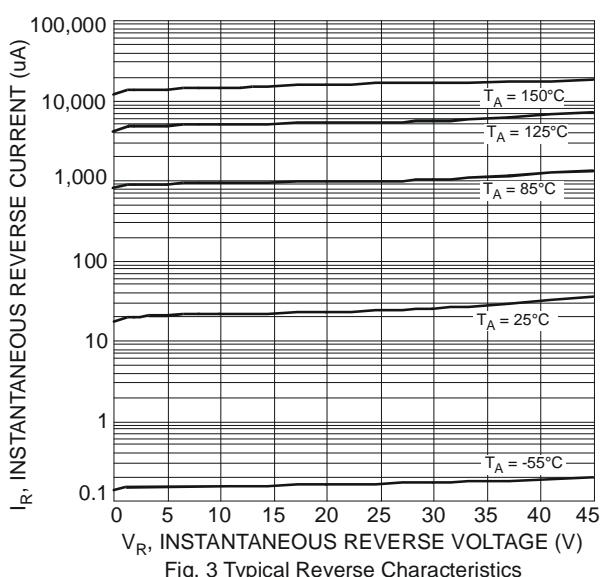
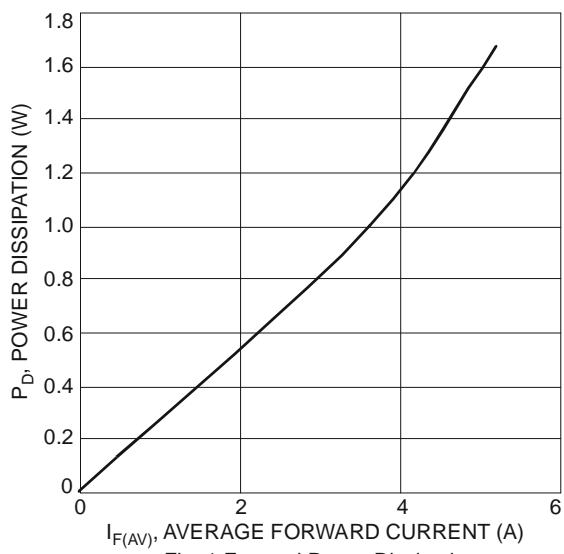
## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance			
Thermal Resistance Junction to Lead	$R_{\theta JL}$	3	°C/W
Thermal Resistance Junction to Case (Note 6)	$R_{\theta JC}$	6	
Thermal Resistance Junction to Ambient (Note 6)	$R_{\theta JA}$	102	
Thermal Resistance Junction to Ambient (Note 7)	$R_{\theta JA}$	60	
Operating Temperature Range	$T_J$	-65 to +150	°C
		≤180	
		≤200	
Storage Temperature Range	$T_{STG}$	-65 to +175	°C

## Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 8)	$V_{(BR)R}$	45	-	-	V	$I_R = 0.5\text{mA}$
Forward Voltage Drop	$V_F$	-	0.49	0.51	V	$I_F = 8\text{A}, T_J = +25^\circ\text{C}$
		-	0.47	0.55		$I_F = 10\text{A}, T_J = +25^\circ\text{C}$
Leakage Current (Note 8)	$I_R$	-	0.03	0.45	mA	$V_R = 45\text{V}, T_J = +25^\circ\text{C}$
		-	-	18		$V_R = 45\text{V}, T_J = +100^\circ\text{C}$
		-	17	100		$V_R = 45\text{V}, T_J = +150^\circ\text{C}$
Typical Junction Capacitance	$C_J$	-	500	-	pF	$f = \text{MHz}, I_R = 4\text{V}$

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.



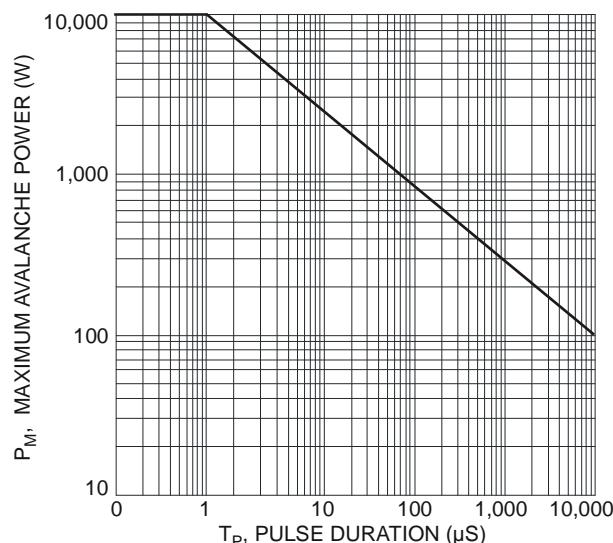
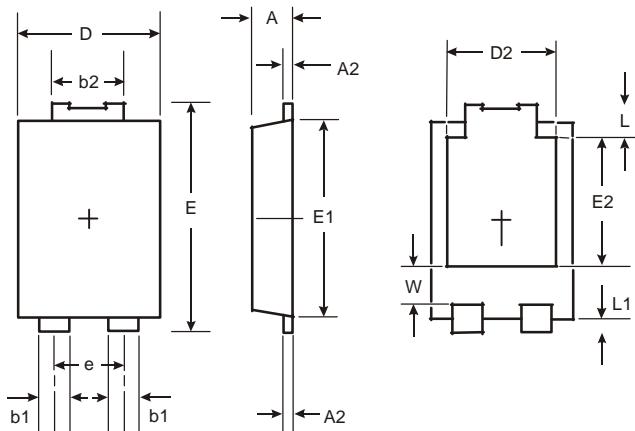


Fig. 7 Maximum Avalanche Power vs. Pulse Duration

## Package Outline Dimensions

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

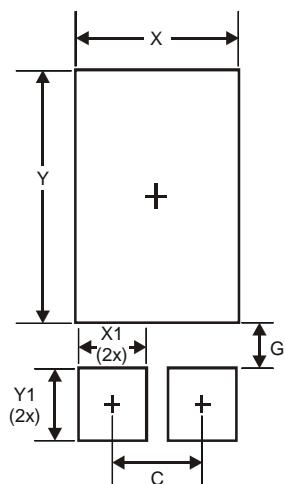


POWERDI5		
Dim	Min	Max
A	1.05	1.15
A2	0.33	0.43
b1	0.80	0.99
b2	1.70	1.88
D	3.90	4.05
D2	3.054 Typ	
E	6.40	6.60
e	1.84 Typ	
E1	5.30	5.45
E2	3.549 Typ	
L	0.75	0.95
L1	0.50	0.65
W	1.10	1.41

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	3.360
X1	1.390
Y	4.860
Y1	1.400

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