

## Product Summary

V <sub>RRM</sub> (V)	I <sub>O</sub> (A)	V <sub>F(TYP)</sub> @ +125°C (V)	I <sub>R(MAX)</sub> @ V <sub>RRM</sub> (mA)
45	12	0.40	0.3

## Description

The SBR12E45LH1 uses SBR<sup>®</sup> patented technology that offers ultra-low V<sub>F</sub> to reduce forward power loss and improve efficiency. Encapsulated in the new PowerDI<sup>®</sup>5SP (Type B) package with a 0.75mm low height profile and protruding leads for easy soldering, it is especially suited for use as a bypass diode in solar panels.

## Applications

- Solar bypass diodes

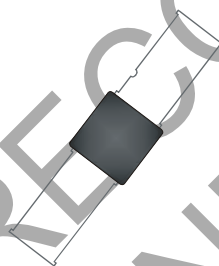
## Features

- Designed as bypass diodes for solar panels
- Low profile height (0.75mm) and 7.6mm protruding leads, enabling the package to be integrated within the solar glass panel
- Selectively rated for +200°C maximum junction temperature for high thermal reliability and excellent high temperature stability
- Patented Super Barrier Rectifier SBR technology
- Ultra low forward voltage drop to minimize forward power losses
- Very low reverse leakage to ensure maximum efficiency of solar panel
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: PowerDI5SP
- Package Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead-Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208 (e3)
- Polarity: Cathode Bar Mark on Top and Cathode Notch on Lead
- Weight: 0.199 grams (Approximate)

PowerDI5SP (Type B)



Top View



Pin Configuration

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
SBR12E45LH1-13	PowerDI5SP (Type B)	3000	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  - See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>. Device is packed with marking code side down to the pocket of 32mm carrier tape and carrier tape is wound with device facing inside of reel.

## Marking Information



12E45LH1 = Product Type Marking Code  
 = Manufacturers' Code Marking  
 YYWWK = Date Code Marking  
 YY = Last Two Digits of Year (ex: 23 for 2023)  
 WW = Week Code (01 to 53)  
 K = Factory Designator

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitive 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>	300	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	66	°C/W
Operating Temperature Range	T <sub>J</sub>	V <sub>R</sub> ≤ 80% V <sub>RRM</sub>	-65 to +150
		DC Forward Mode (Note 6)	≤ 200
Storage Temperature Range	T <sub>STG</sub>	-55 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>	—	0.42	0.50	V	I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
		—	0.44	0.52		I <sub>F</sub> = 12A, T <sub>J</sub> = +25°C
		—	0.40	0.47		I <sub>F</sub> = 12A, T <sub>J</sub> = +125°C
Leakage Current (Note 7)	I <sub>R</sub>	—	35	200	μA	V <sub>R</sub> = 40V, T <sub>J</sub> = +25°C
		—	40	300		V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C
		—	15	—	mA	V <sub>R</sub> = 45V, T <sub>J</sub> = +125°C
		—	40	—		V <sub>R</sub> = 45V, T <sub>J</sub> = +150°C

Notes: 5. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.  
6. Max junction temperature +200°C guaranteed for 2 hours at maximum output.  
7. Short duration pulse test used to minimize self-heating effect.

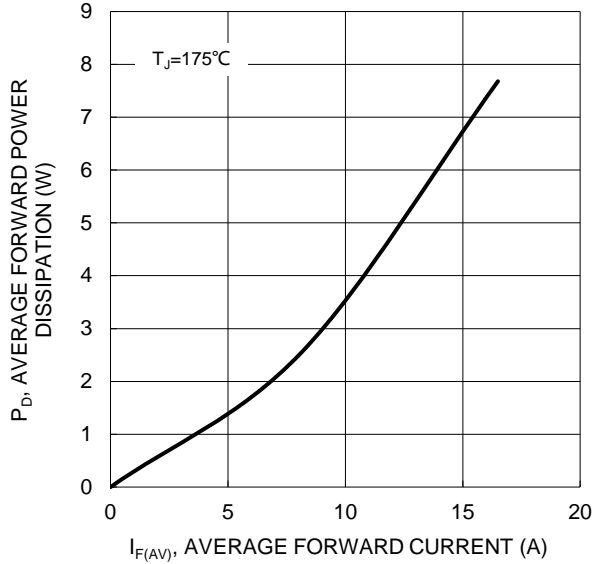


Figure 1. Forward Power Dissipation

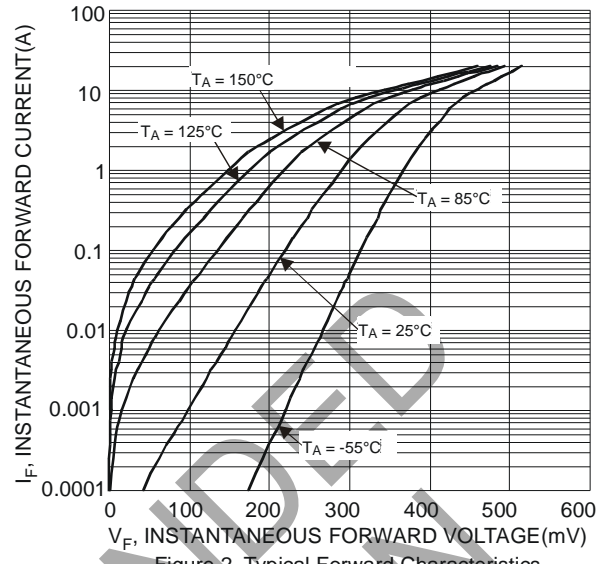


Figure 2 Typical Forward Characteristics

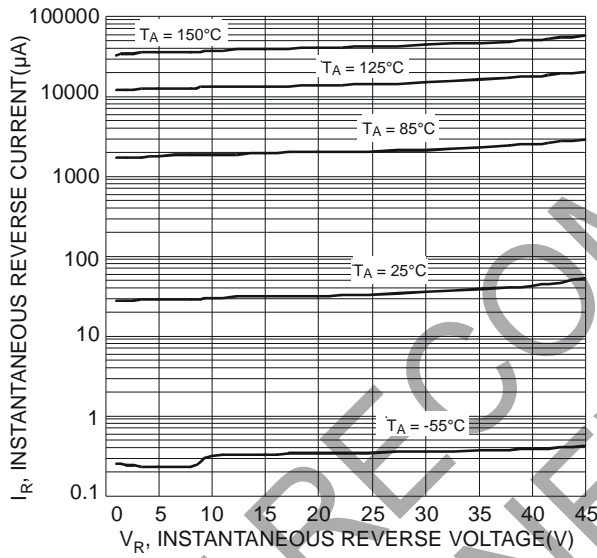


Figure 3 Typical Reverse Characteristics

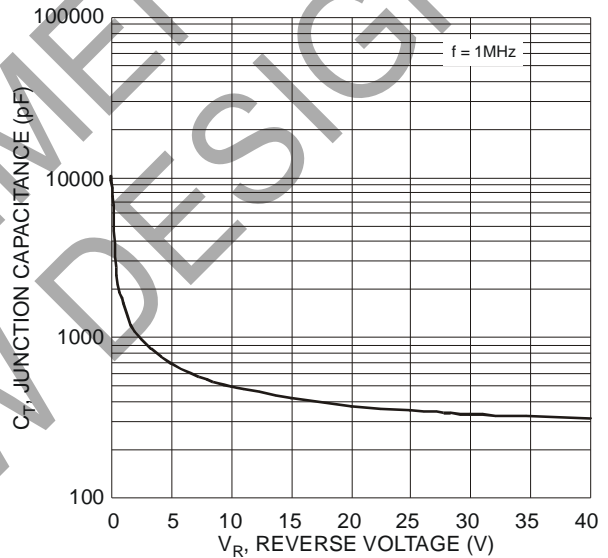


Figure 4 Typical Junction Capacitance

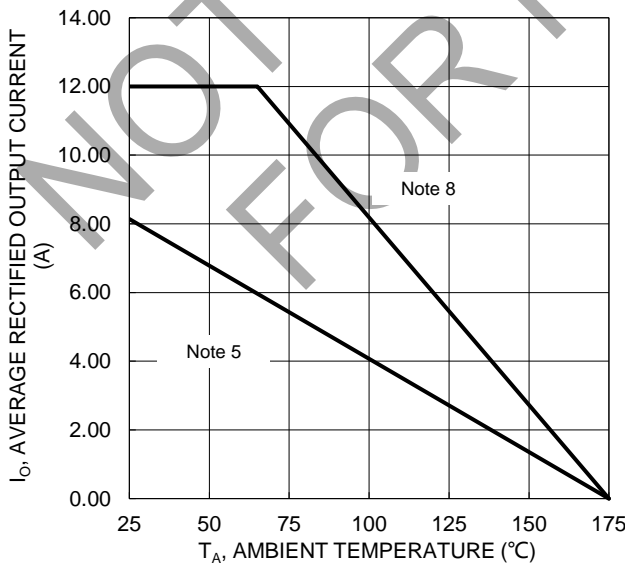


Figure 5. DC Forward Current Derating

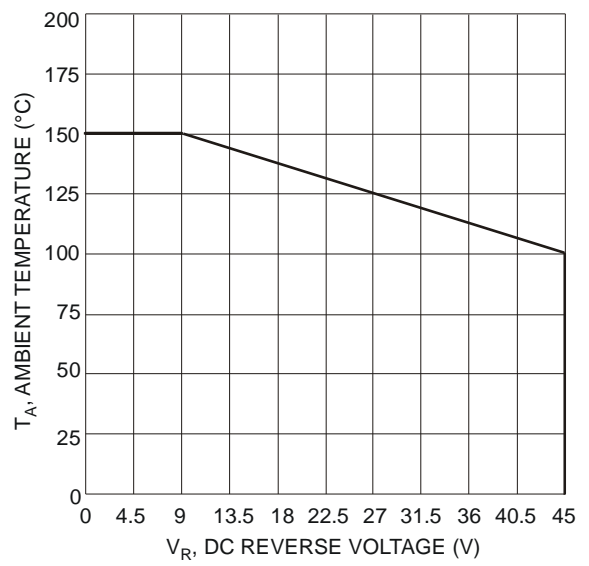


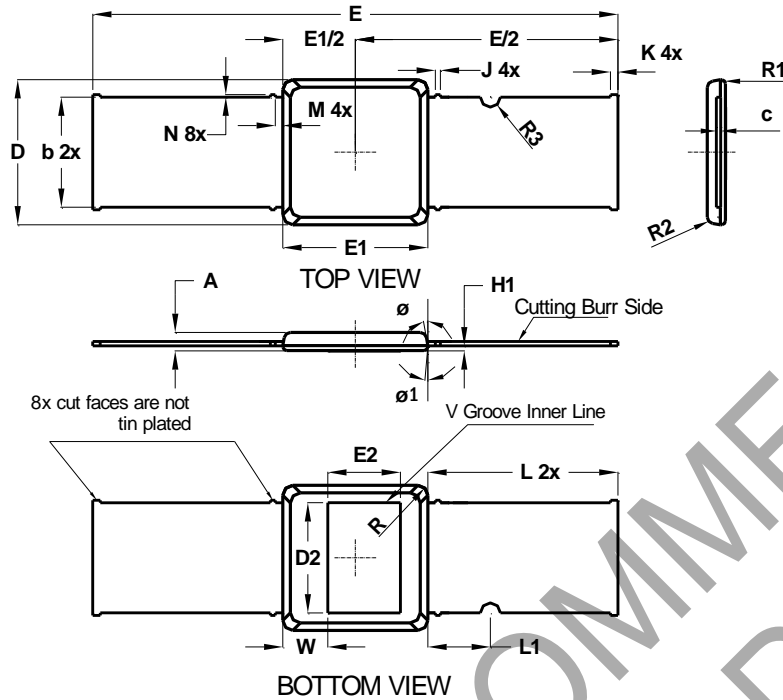
Figure 6 Operating Temperature Derating

Note: 8. Device mounted on FR-4 substrate PCB with 10cm\*10cm double-sided copper pad.

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI5SP (Type B)

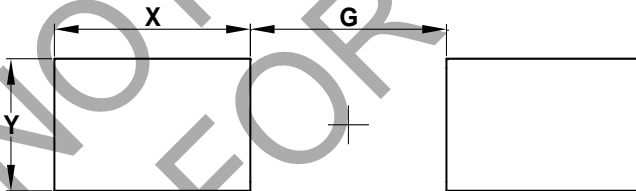


PowerDI5SP (Type B)			
Dim	Min	Max	Typ
A	-	0.75	-
b	4.30	4.50	4.40
c	0.155	0.191	-
D	5.70	5.90	5.80
D2	4.40	-	-
E	20.8	21.2	21.0
E1	5.70	5.90	5.80
E2	2.90	-	-
H1	0.19	0.21	0.20
J	-	-	0.20
K	-	-	0.30
L	-	-	7.60
L1	-	-	2.50
M	-	-	0.30
N	0	0.20	-
R	-	-	0.40
R1	-	-	0.15
R2	-	-	0.25
R3	-	-	0.40
W	1.63	1.97	1.80
Ø	8°	12°	-
Ø1	3°	7°	-
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI5SP (Type B)



Dimensions	Value (in mm)
G	8.101
X	8.100
Y	5.100

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