

## Product Summary

$V_{RRM}$ (V)	$I_O$ (A)	$V_F$ MAX (V) @+25°C	$I_R$ MAX (mA) @+25°C
45	10	0.47	0.3

## Description and Applications

This Super Barrier Rectifier (SBR<sup>®</sup>) diode has been designed to meet the stringent requirements of Automotive Applications. It is ideally suited to use as :

- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode

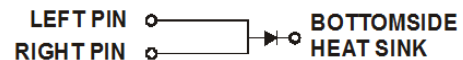
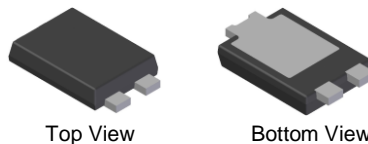
## Features and Benefits

- 100% Avalanche Tested
- Patented SBR technology provides a superior avalanche capability than Schottky diodes ensuring more rugged and reliable end applications
- Reduced ultra-low forward voltage drop ( $V_F$ ); better efficiency and cooler operation
- Reduced high temperature reverse leakage; increased reliability against thermal runaway failure at high temperature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

- Case: PowerDI<sup>®</sup>-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 (3)
- Weight: 0.093 grams (Approximate)

PowerDI-5



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

## Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
SBR10U45SP5Q-13	Automotive	PowerDI-5	5000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <http://www.diodes.com/quality/lead-free/> 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



S10U45S = Product Type Marking Code  
 011 = Manufacturers' Code Marking  
 K = Factory Designator  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 18 for 2018)  
 WW = Week Code (01 to 53)

**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>		
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>	275	A
Repetitive Peak Avalanche Power (1μs, +25°C)	P <sub>ARM</sub>	5630	W
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 12A, L = 10mH)	E <sub>AS</sub>	530	mJ

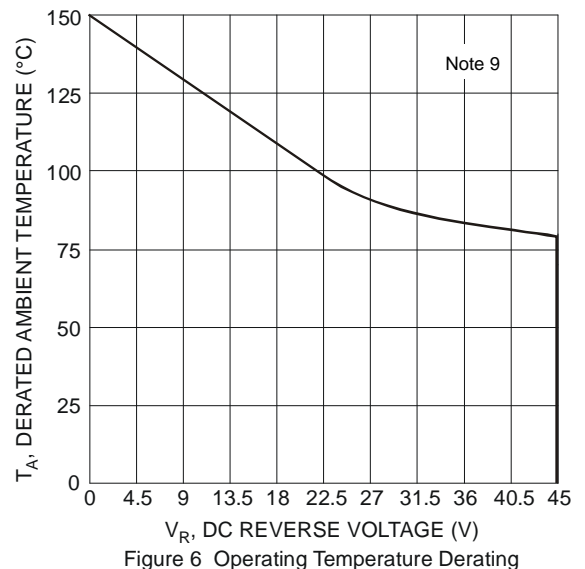
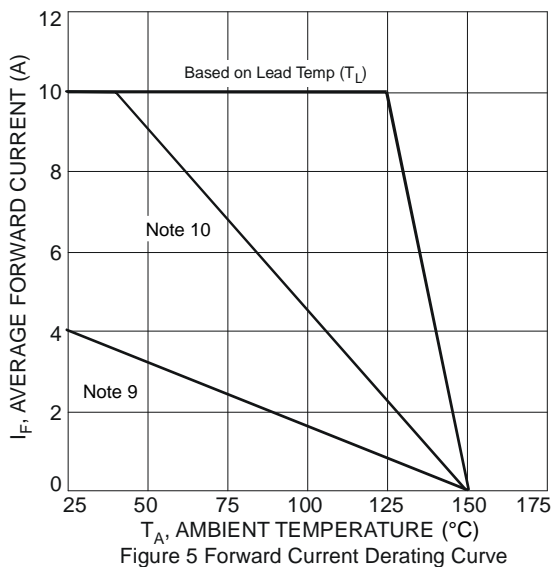
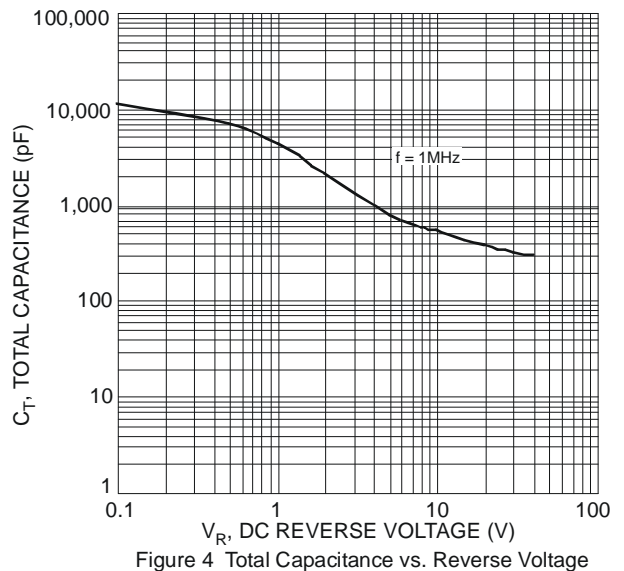
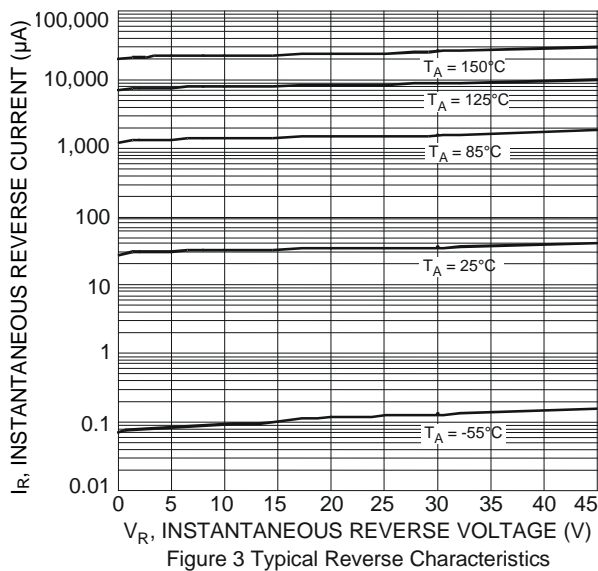
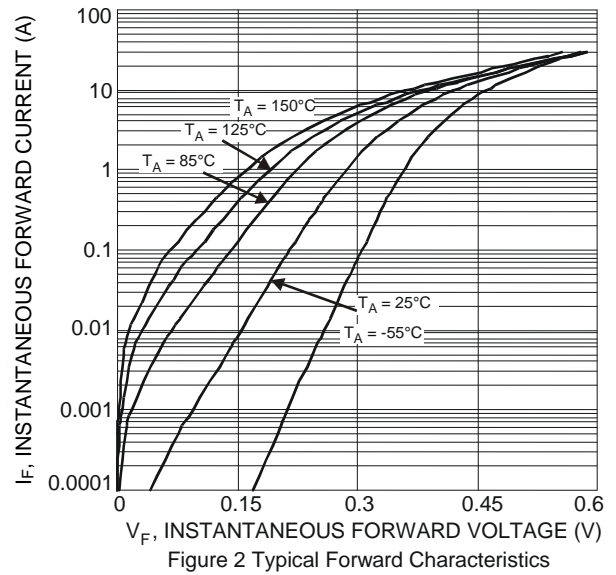
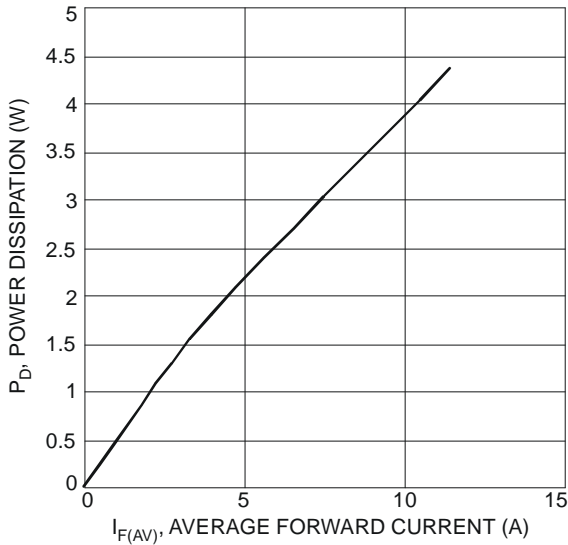
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance	R <sub>θJA</sub>	73	°C/W
Thermal Resistance Junction to Ambient (Note 6)			
Thermal Resistance Junction to Ambient (Note 7)			
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°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> = 0.3mA
Forward Voltage Drop	V <sub>F</sub>	—	0.41	—	V	I <sub>F</sub> = 8A, T <sub>J</sub> = +25°C
		—	0.44	0.47		I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
		—	0.38	—		I <sub>F</sub> = 10A, T <sub>J</sub> = +125°C
Leakage Current (Note 8)	I <sub>R</sub>	—	0.09	0.3	mA	V <sub>R</sub> = 45V, T <sub>J</sub> = +25°C
		—	30	—		V <sub>R</sub> = 45V, T <sub>J</sub> = +125°C

Notes: 6. FR-4 PCB, 2oz. Copper. Minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.  
7. Polyimide PCB, 2oz. Copper. Cathode pad dimensions 18.8mm x 14.4mm. Anode pad dimensions 5.6mm x 14.4mm.  
8. Short duration pulse test used to minimize self-heating effect.



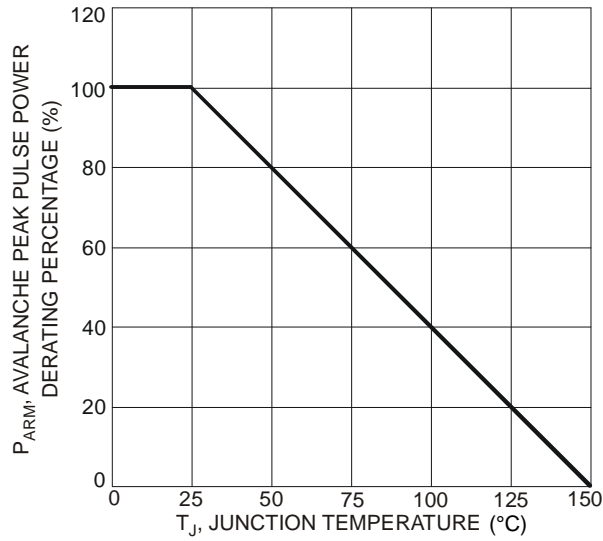


Figure 7 Pulse Derating Curve

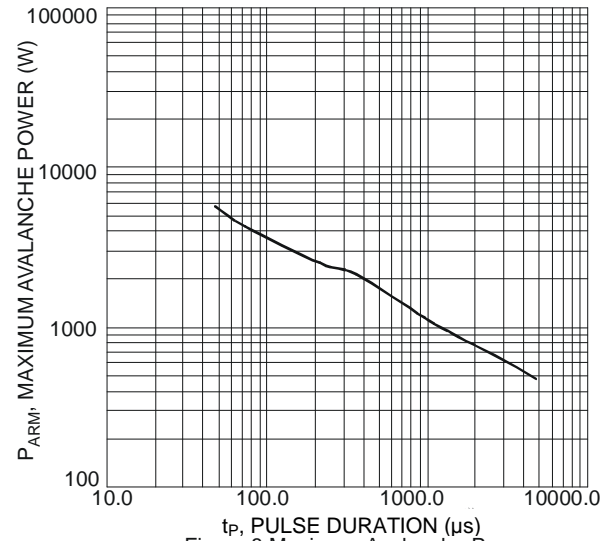


Figure 8 Maximum Avalanche Power

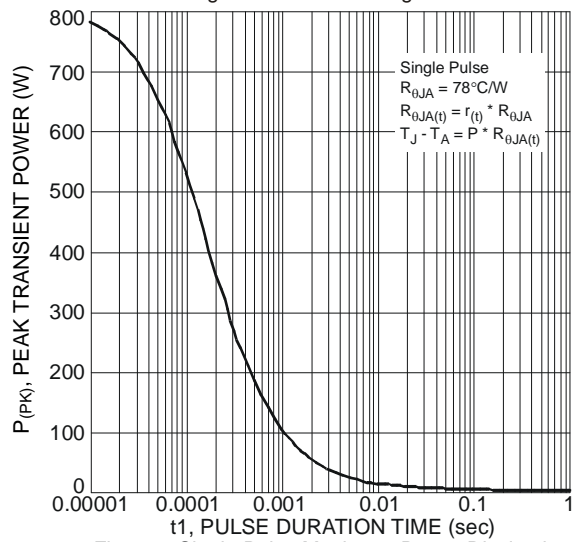


Figure 9 Single Pulse Maximum Power Dissipation

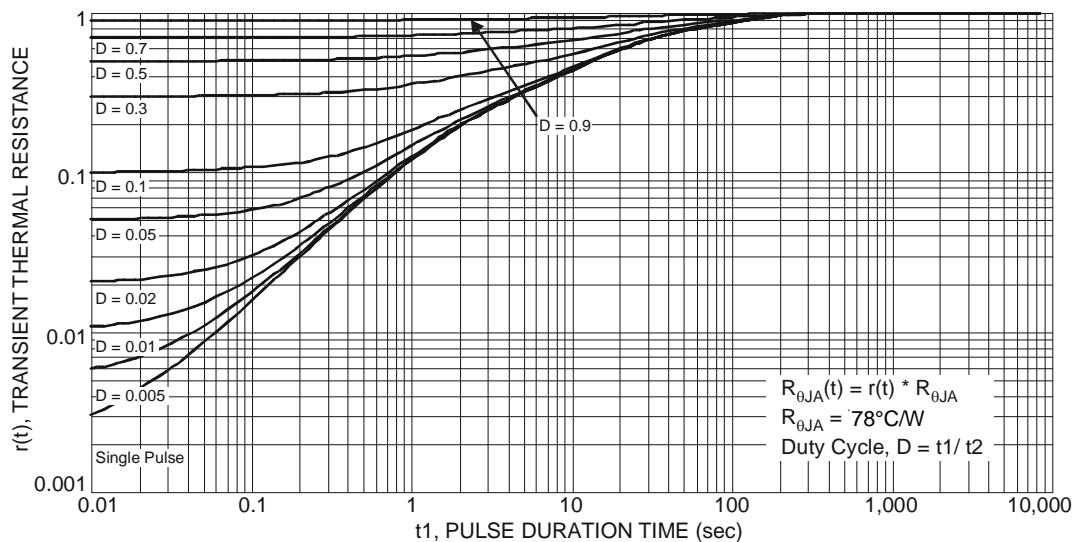


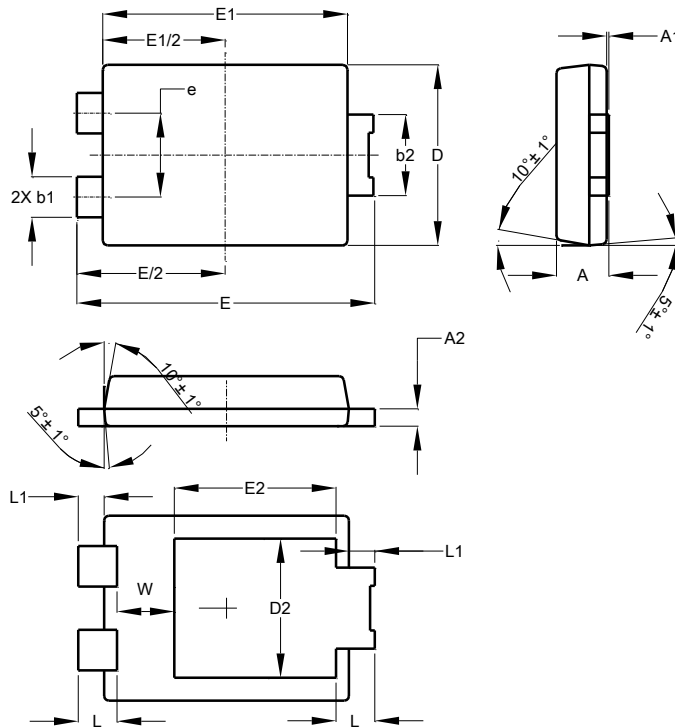
Figure 10 Transient Thermal Resistance

Notes: 9. Device mounted on FR-4 substrate, 2oz copper, with minimum recommended pad layout.  
 10. Device mounted on FR-4 substrate, 2oz copper, with 10cm x 10cm pad layout.

## Package Outline Dimensions

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

**PowerDI-5**

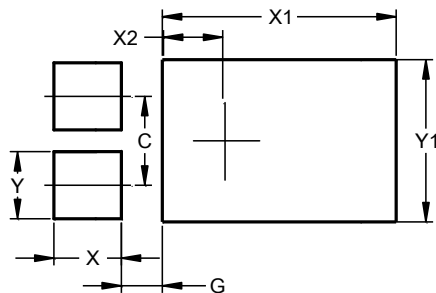


PowerDI-5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

## Suggested Pad Layout

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

**PowerDI-5**



Dimensions	Value (in mm)
C	1.840
G	0.852
X	1.400
X1	4.860
X2	1.310
Y	1.390
Y1	3.360

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