

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[®]) 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

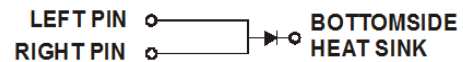
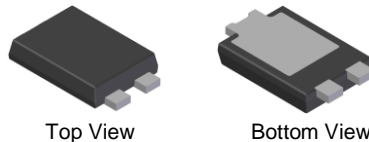
Features and Benefits

- 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[®]-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
 DII = 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_A = +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 _{RRM}	45	V
Working Peak Reverse Voltage	V _{RWM}		
DC Blocking Voltage	V _{RM}		
RMS Reverse Voltage	V _{R(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}	275	A
Repetitive Peak Avalanche Power (1μs, +25°C)	P _{ARM}	5630	W
Non-Repetitive Avalanche Energy (T _J = +25°C, I _{AS} = 12A, L = 10mH)	E _{AS}	530	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance			
Thermal Resistance Junction to Ambient (Note 6)	R _{θJA}	73	°C/W
Thermal Resistance Junction to Ambient (Note 7)	R _{θJA}	31	
Storage Temperature Range	T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 8)	V _{(BR)R}	45	—	—	V	I _R = 0.3mA
Forward Voltage Drop	V _F	—	0.41	—	V	I _F = 8A, T _J = +25°C
		—	0.44	0.47		I _F = 10A, T _J = +25°C
		—	0.38	—		I _F = 10A, T _J = +125°C
Leakage Current (Note 8)	I _R	—	0.09	0.3	mA	V _R = 45V, T _J = +25°C
		—	30	—		V _R = 45V, T _J = +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.

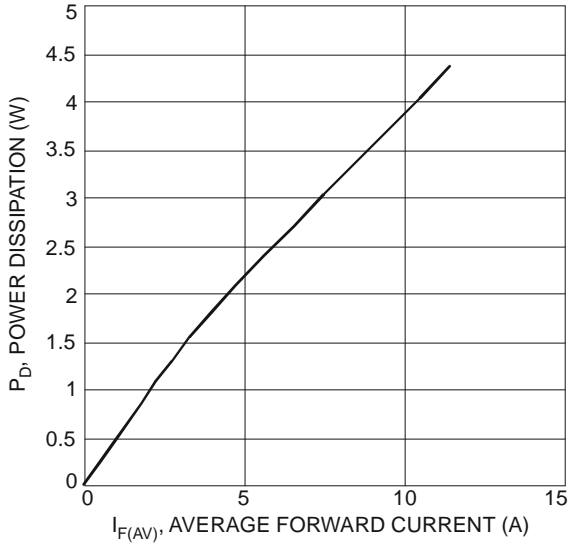


Figure 1 Forward Power Dissipation

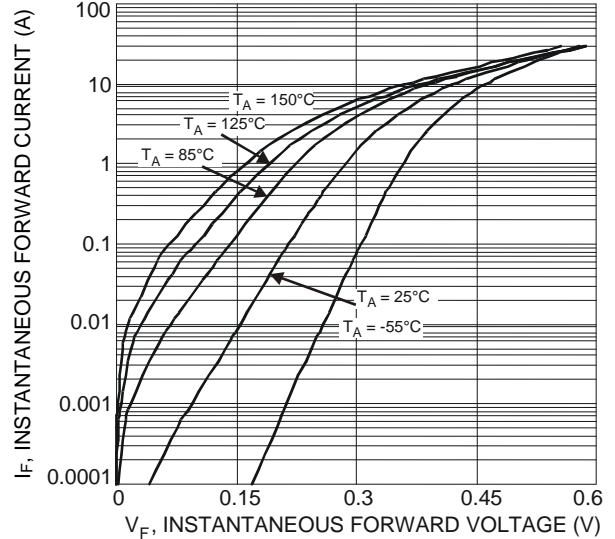


Figure 2 Typical Forward Characteristics

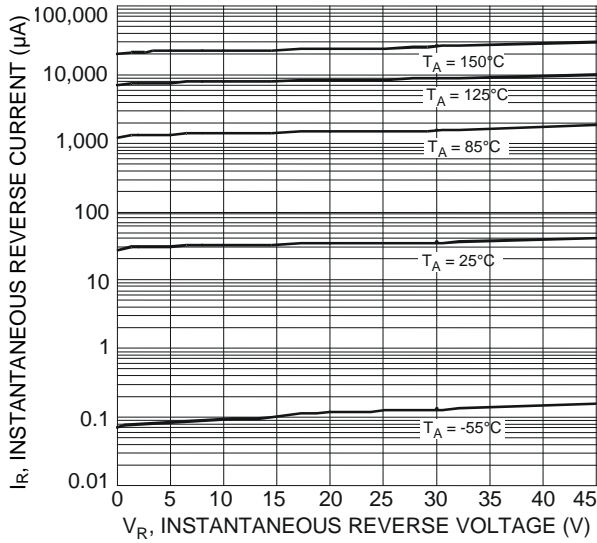


Figure 3 Typical Reverse Characteristics

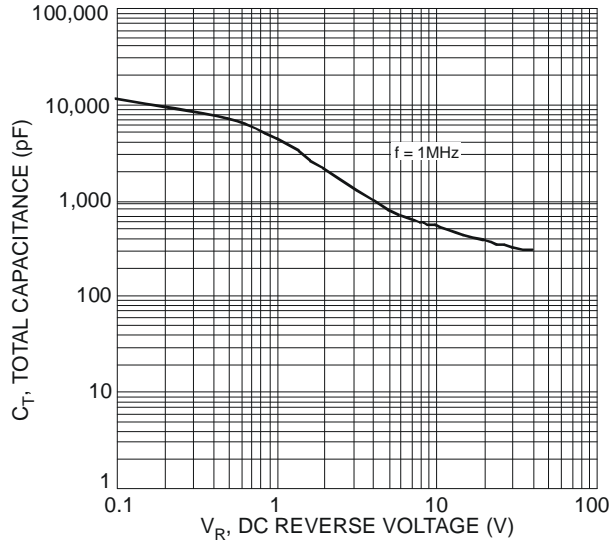


Figure 4 Total Capacitance vs. Reverse Voltage

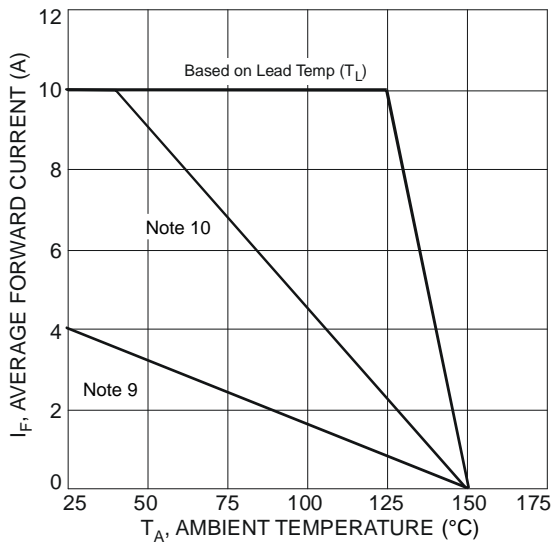


Figure 5 Forward Current Derating Curve

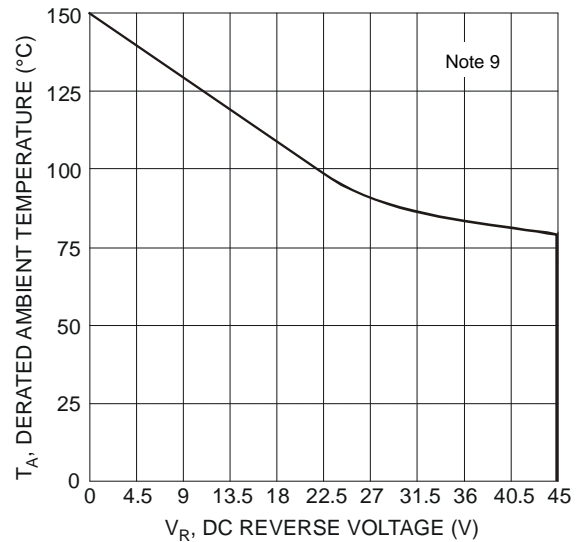


Figure 6 Operating Temperature Derating

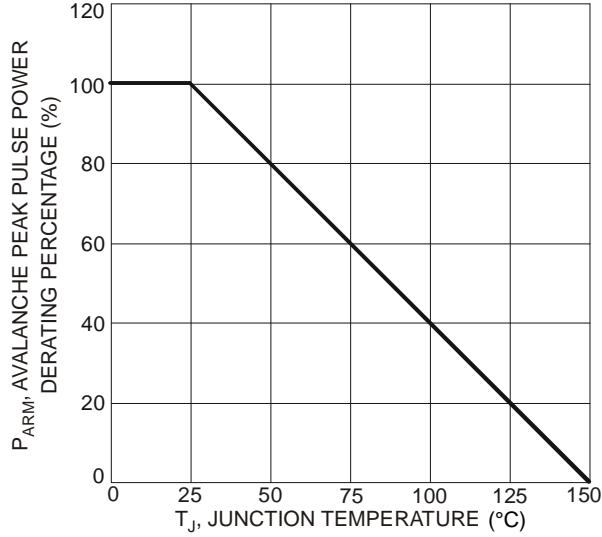


Figure 7 Pulse Derating Curve

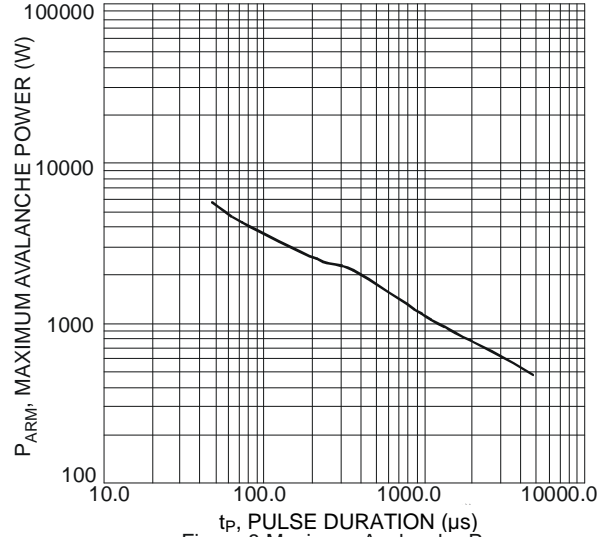


Figure 8 Maximum Avalanche Power

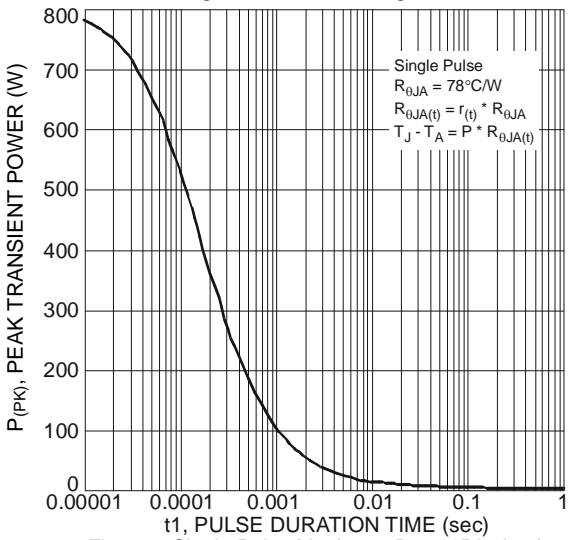


Figure 9 Single Pulse Maximum Power Dissipation

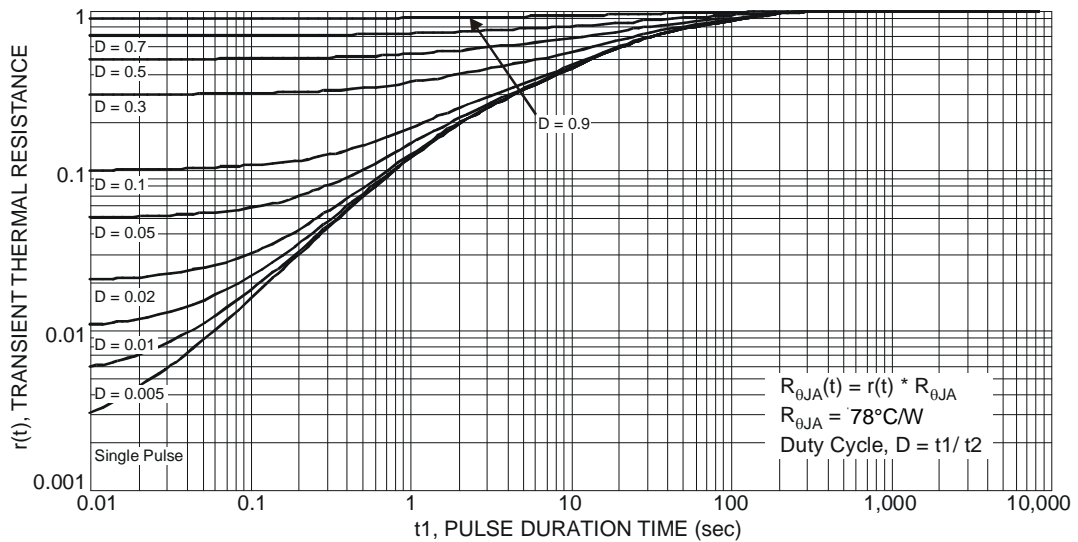


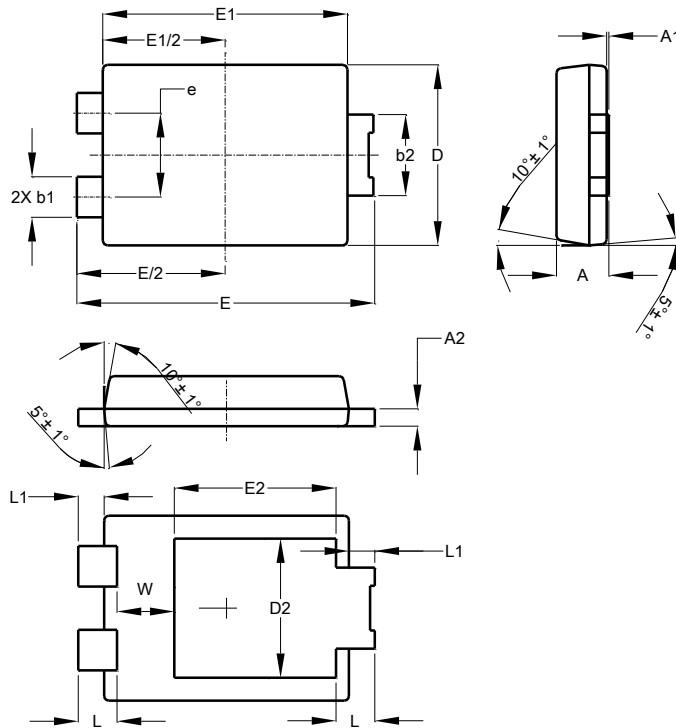
Figure 10 Transient Thermal Resistance

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

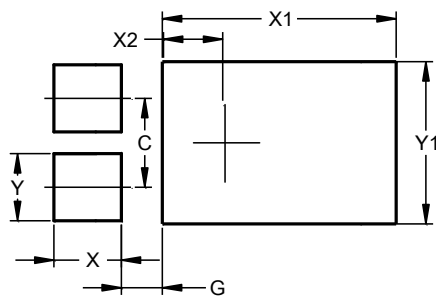


PowerDI-5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

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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