

## Product Summary

V <sub>RRM</sub> (V)	I <sub>O</sub> (A)	V <sub>F</sub> max(V)@+25°C	I <sub>R</sub> max (mA)@+25°C
20	8	0.51	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:

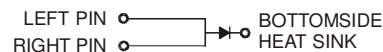
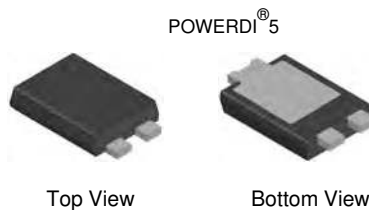
- Polarity Protection Diode
- Re-circulating Diode
- Switching Diode

## 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<sub>F</sub>); better efficiency and cooler operation.
- Reduced high temperature reverse leakage; Increased reliability against thermal runaway failure in high temperature operation
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AECQ101**

## 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 <sup>(E3)</sup>
- Weight: 0.093 grams (approximate)



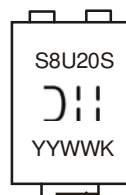
Note: Pins Left & Right must be electrically connected at the printed circuit board.

## Ordering Information (Note 4)

Part Number	Case	Packaging
SBR8U20SP5Q-13	POWERDI <sup>®</sup> 5	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>

## Marking Information



☺ = Manufacturers' Code Marking  
 K = Factory Designator  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 13 for 2013)  
 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	$V_{RRM}$	20	V
Working Peak Reverse Voltage	$V_{RWM}$		
DC Blocking Voltage	$V_{RM}$		
Average Rectified Output Current	$I_O$	8	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	$I_{FSM}$	180	A
Non-Repetitive Avalanche Energy ( $T_J = +25^\circ\text{C}$ , $I_{AS} = 6\text{A}$ , $L = 10\text{mH}$ )	$E_{AS}$	146	mJ
Repetitive Peak Avalanche Energy (1 $\mu\text{s}$ , +25 $^\circ\text{C}$ )	$P_{ARM}$	1000	W

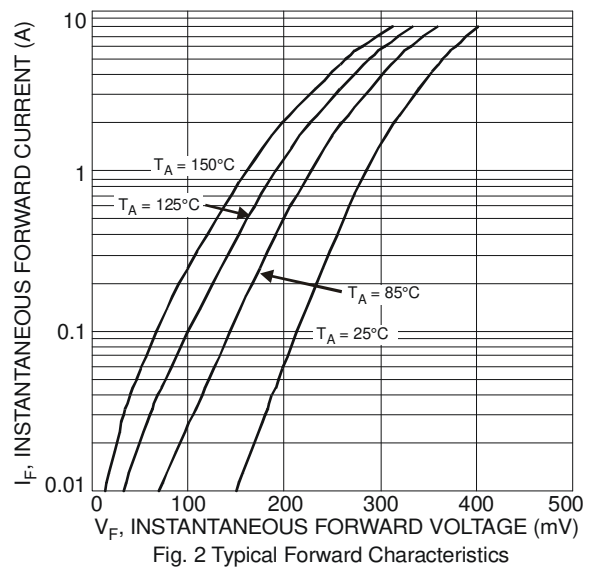
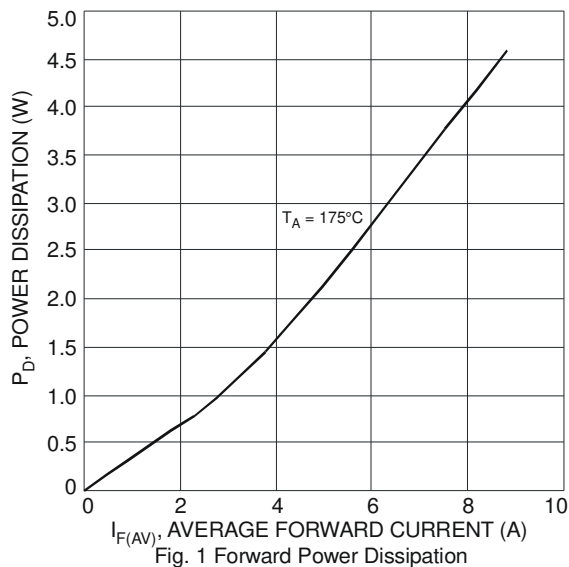
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	102	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	60	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_{J, STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop	$V_F$	-	0.41	0.51	V	$I_F = 8\text{A}$ , $T_J = +25^\circ\text{C}$
		-	0.33	-		$I_F = 8\text{A}$ , $T_J = +125^\circ\text{C}$
Leakage Current (Note 5)	$I_R$	-	0.04	0.2	mA	$V_R = 4\text{V}$ , $T_J = +25^\circ\text{C}$
		-	0.1	0.3		$V_R = 20\text{V}$ , $T_J = +25^\circ\text{C}$
Total Capacitance	$C_T$	-	360	-	pf	$V_r = 20\text{V}$ , $F = 1\text{MHz}$

- Notes: 3. FR-4 PCB, 2oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.  
4. Polyimide PCB, 2oz. Copper. Cathode pad dimensions 18.8mm x 14.4mm. Anode pad dimensions 5.6mm x 14.4mm.  
5. Short duration pulse test used to minimize self-heating effect.



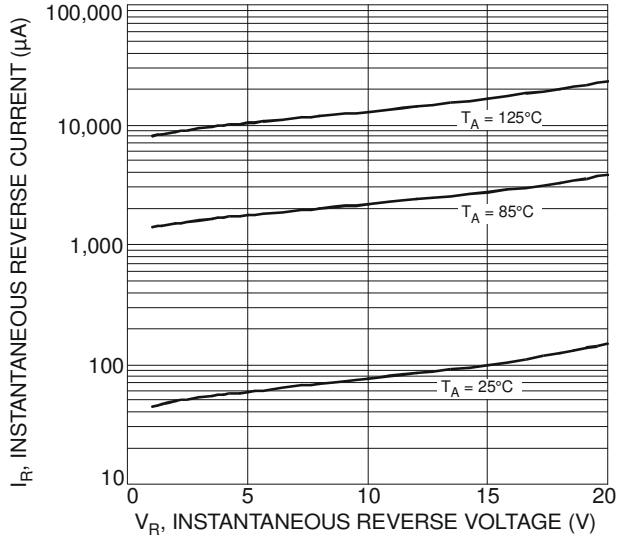


Fig. 3 Typical Reverse Characteristics

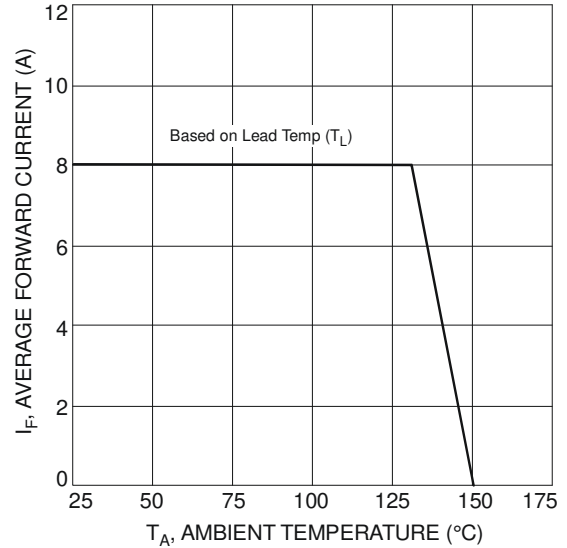


Fig. 4 Forward Current Derating Curve

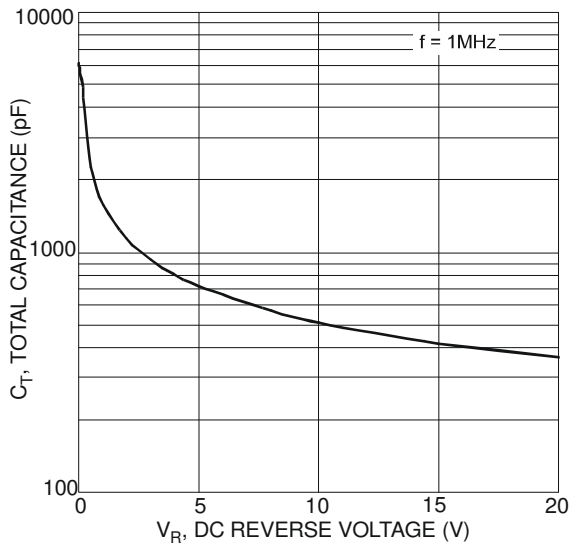


Fig. 5 Total Capacitance vs. Reverse Voltage

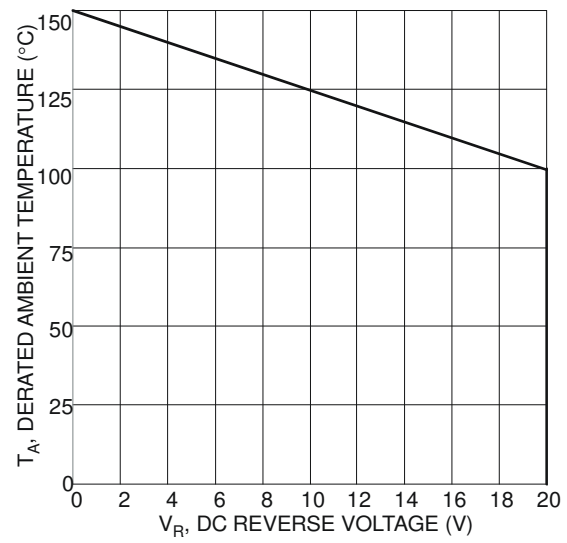


Fig. 6 Operating Temperature Derating

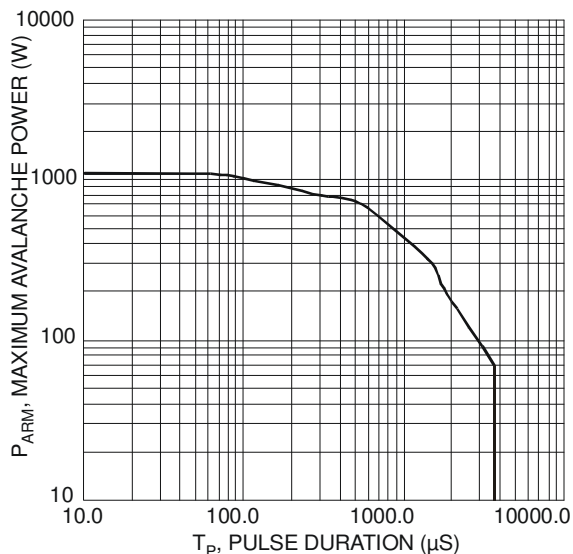


Figure 7 Maximum Avalanche Power Curve, Per Element

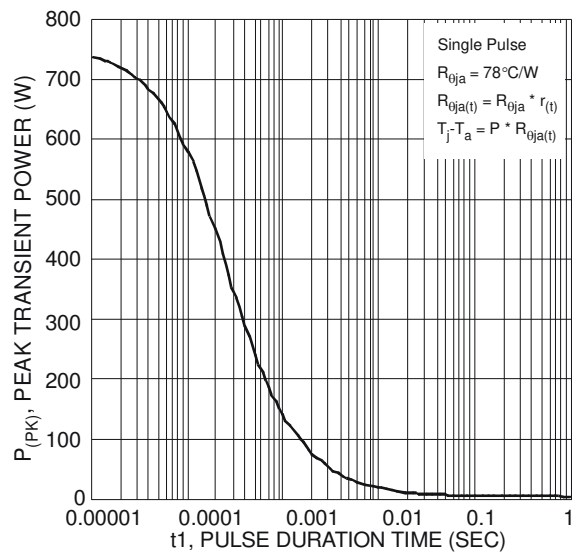


Fig 8 Single Pulse Maximum Power Dissipation

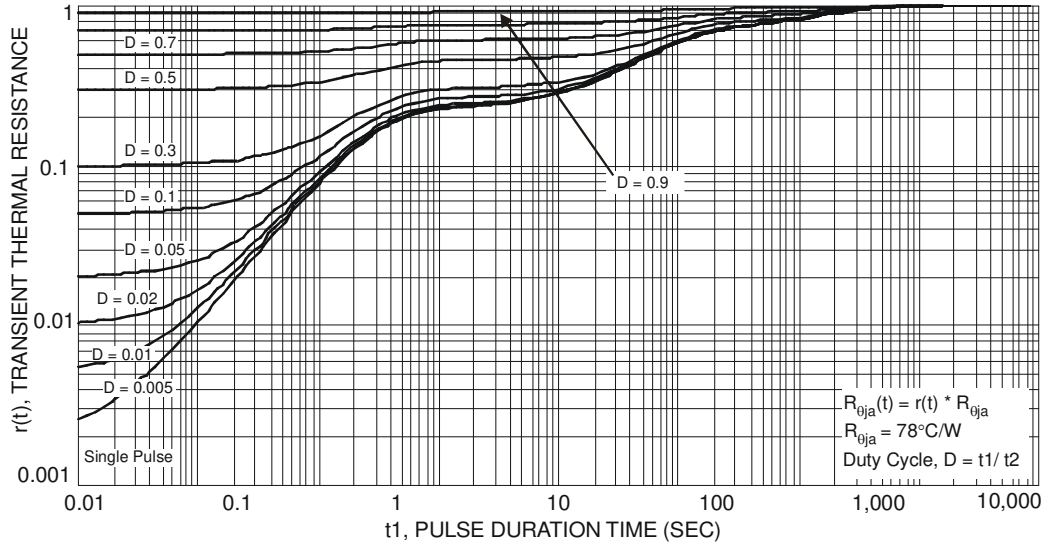
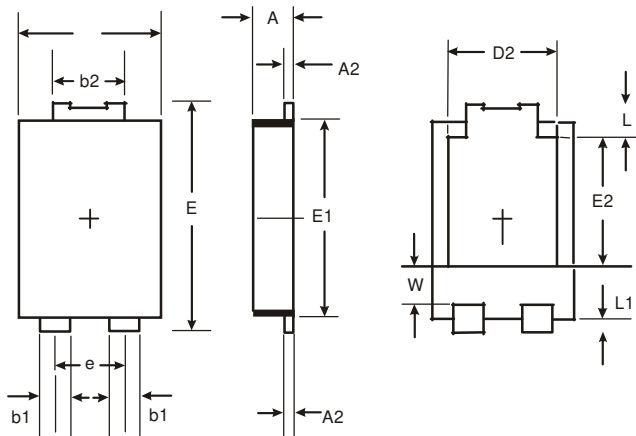


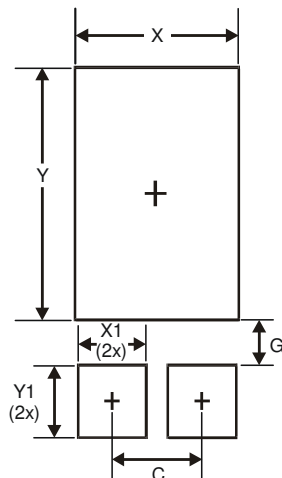
Figure 9 Transient Thermal Resistance

**Package Outline Dimensions**



POWERDI <sup>®</sup> 5		
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**



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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