

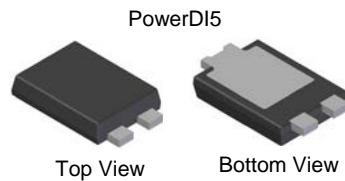
## Product Summary

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
100	12	0.78	0.25

## Description and Applications

This super barrier rectifier (SBR<sup>®</sup>) diode is designed to meet the stringent requirements of automotive applications. It is ideally suited to use as:

- Polarity Protection Diode
- Recirculating Diode
- Switching Diode

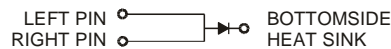


## Features

- 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 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: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>Ⓔ3</sup>
- Polarity: See Diagram
- Weight: 0.093 grams (Approximate)



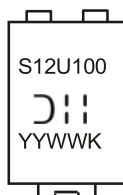
Note: Pins Left & Right must be electrically connected at the printed circuit

## Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
SBR12U100P5Q-13	Automotive	PowerDI5	5000/Tape & Reel
SBR12U100P5Q-13D (Note 6)	Automotive	PowerDI5	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 <https://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/>.
  6. "D" suffix designates for the 12mm Tape and Reel option.

## Marking Information



S12U100 = Product Type Marking Code  
 ⌋⌋⌋ = Manufacturers' Code Marking  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 17 for 2017)  
 WW = Week Code (01 to 53)  
 K = Factory Designator

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , 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	$V_{RRM}$	100	V
Working Peak Reverse Voltage	$V_{RWM}$		
DC Blocking Voltage	$V_{RM}$		
Average Rectified Output Current	$I_O$	12	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	$I_{FSM}$	250	A
Non-Repetitive Avalanche Energy ( $T_J = +25^\circ\text{C}$ , $I_{AS} = 12\text{A}$ , $L = 10\text{mH}$ )	$E_{AS}$	592	mJ
Repetitive Peak Avalanche Energy (1 $\mu\text{s}$ , $+25^\circ\text{C}$ )	$P_{ARM}$	12,000	W

Characteristic	Symbol	Ratings	Unit
Human Body Mode ESD Protection	ESD HBM	4	KV
Machine Model ESD Protection	ESD MM	400	V
Charged Device Model	ESD CDM	1	KV

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 7)	$R_{\theta JA}$	27	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient (Note 8)	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	3	$^\circ\text{C/W}$
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 (Note9)	$V_F$	—	0.49	—	V	$I_F = 5\text{A}$ , $T_J = +25^\circ\text{C}$
		—	0.67	0.78		$I_F = 12\text{A}$ , $T_J = +25^\circ\text{C}$
		—	0.58	—		$I_F = 12\text{A}$ , $T_J = +125^\circ\text{C}$
Leakage Current (Note 9)	$I_R$	—	0.06	0.25	mA	$V_R = 100\text{V}$ , $T_J = +25^\circ\text{C}$
		—	11	40		$V_R = 100\text{V}$ , $T_J = +125^\circ\text{C}$
Switching Speed $t_{RR}$	$t_{RR}$	—	24	—	ns	$I_F = 0.5\text{A}$ , $I_R = 1\text{A}$ , $I_{RR} = 0.25\text{A}$ (RG1)

Notes: 7. Polyimide, 2oz. Copper 16x minimum recommended pad layout per <http://www.diodes.com/package-outlines.html> for the latest version.  
8. MRP FR-4 PC board, 2oz.  
9. Short duration pulse test used to minimize self-heating effect.

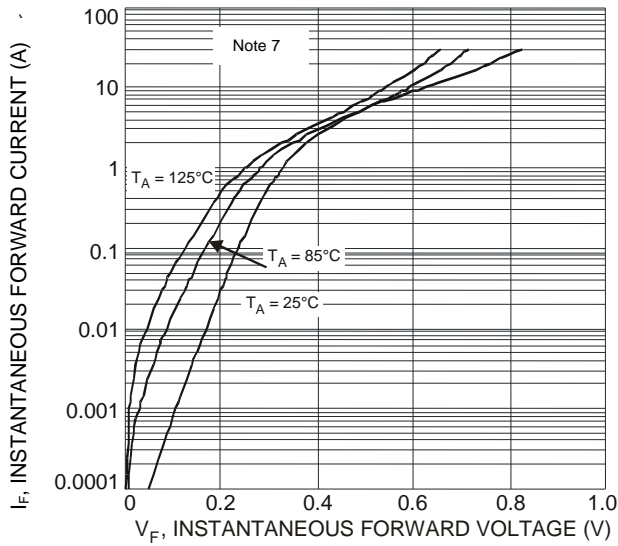


Figure 1 Typical Forward Characteristics

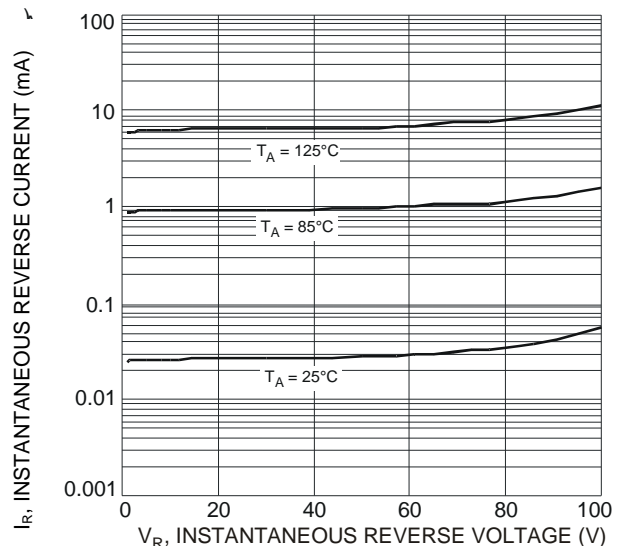


Figure 2 Typical Reverse Characteristics

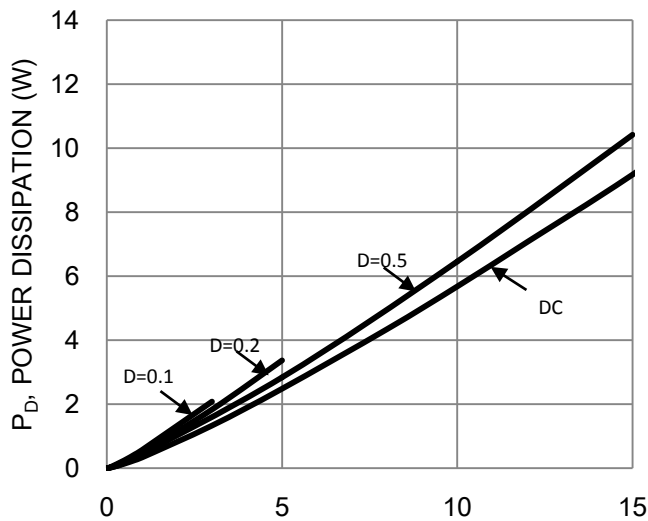


Figure 3. Forward Power Dissipation  $T_J=125^\circ\text{C}$

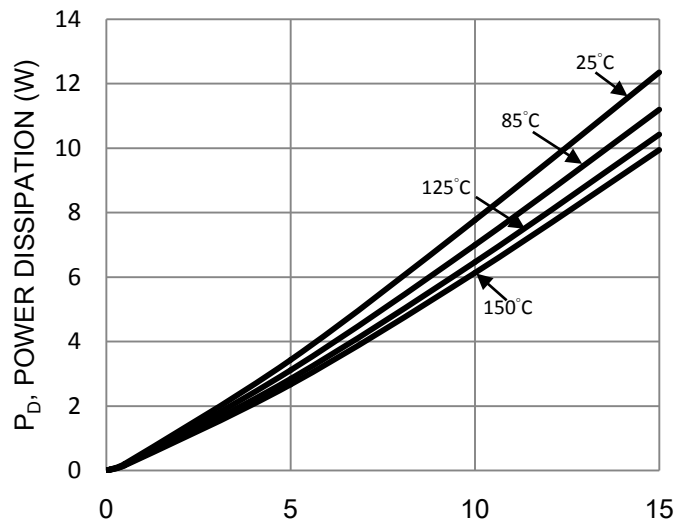


Figure 4. Forward Power Dissipation  $D=0.5$

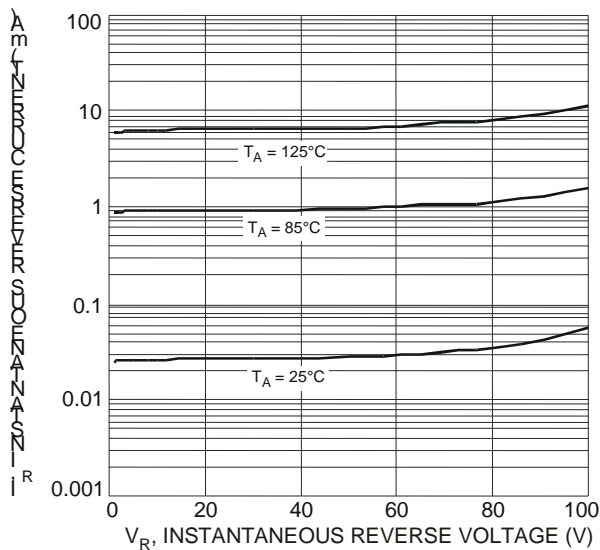


Figure 5 Typical Reverse Characteristics

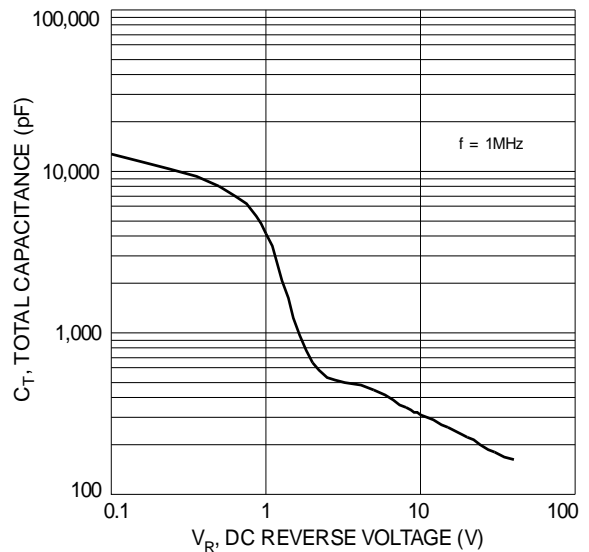


Figure 6 Total Capacitance vs. Reverse Voltage

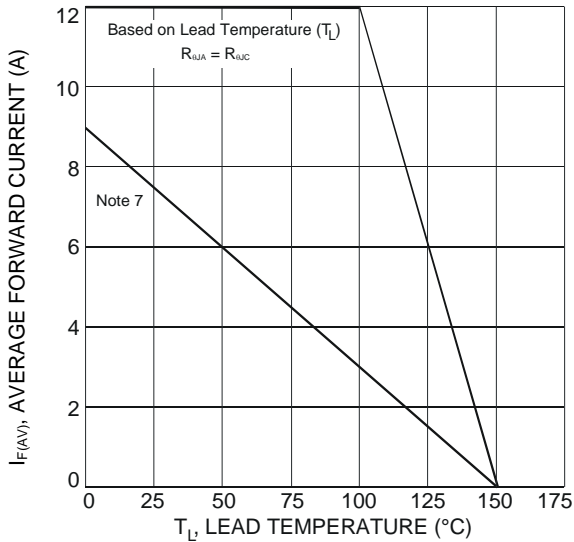


Figure 7 Forward Current Derating Curve

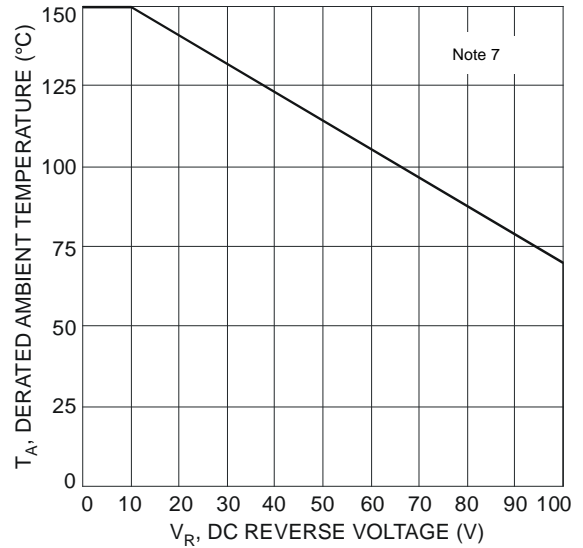


Figure 8 Operating Temperature Derating

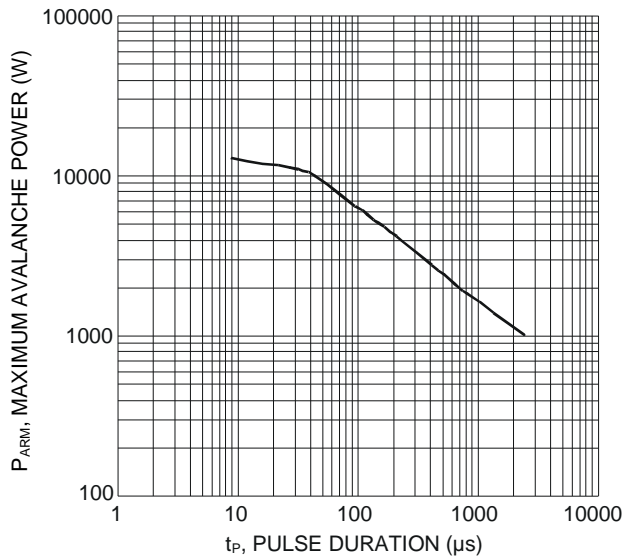


Figure 9 Maximum Avalanche Power Curve

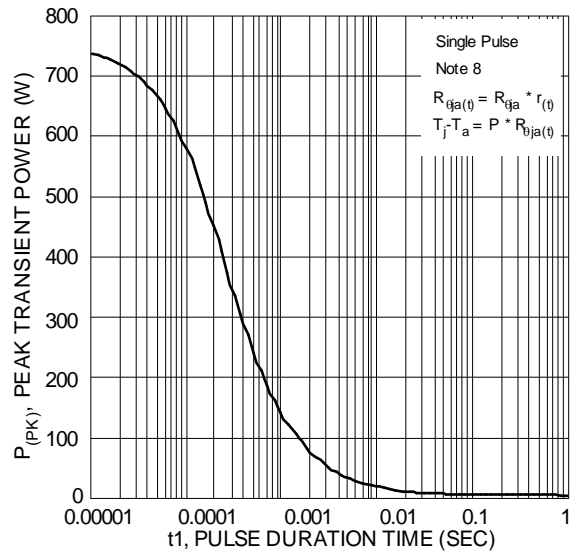
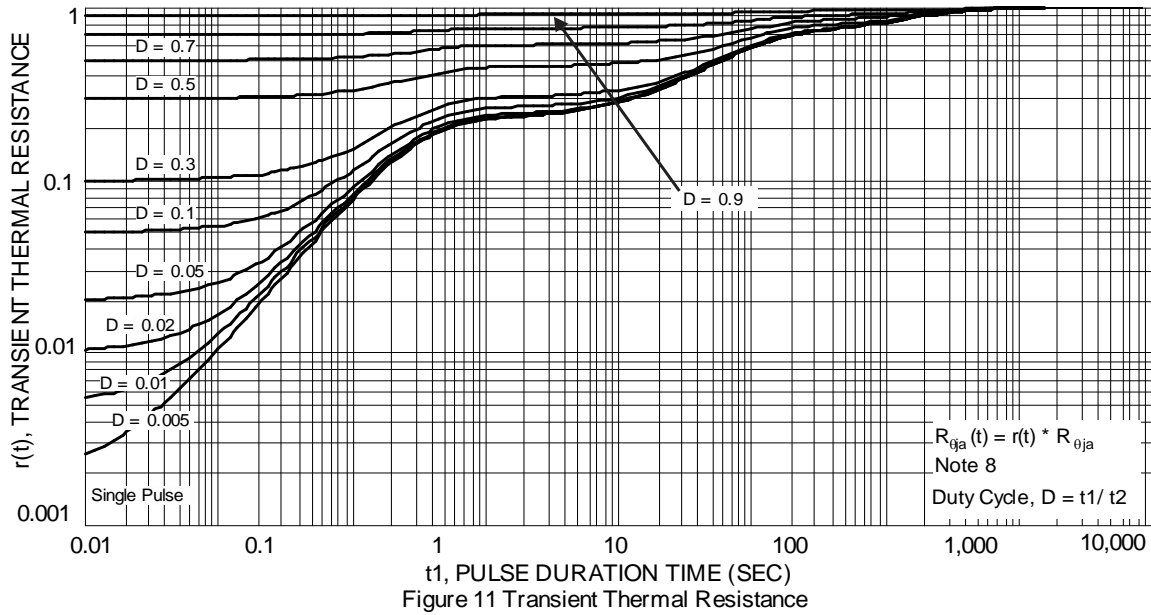
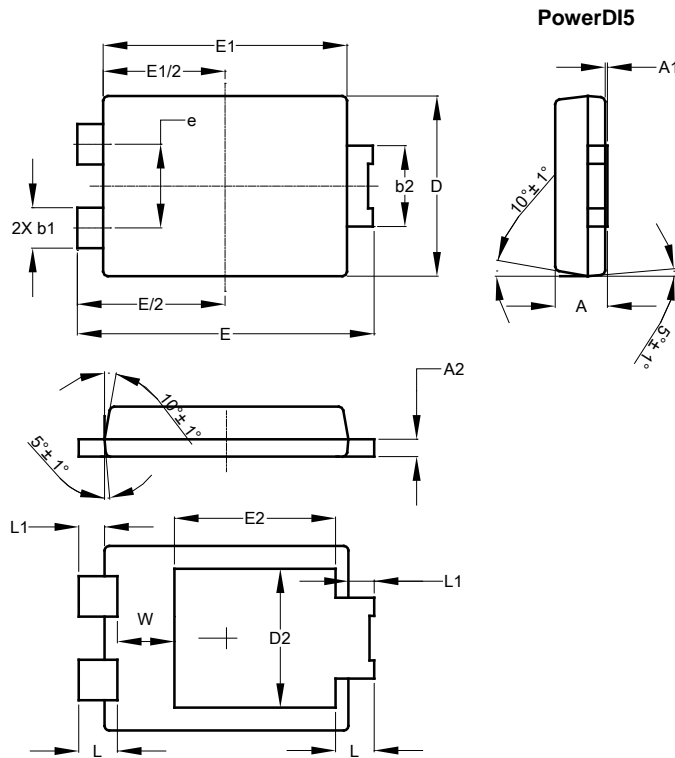


Figure 10 Single Pulse Maximum Power Dissipation



**Package Outline Dimensions**

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

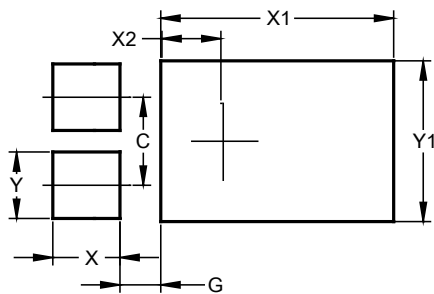


PowerDI5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

**Suggested Pad Layout**

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

**PowerDI5**



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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