12A SBR SUPER BARRIER RECTIFIER POWERDI5

Product Summary

V_{RRM} (V)	I_O (A)	V_F max (V) @ +25°C	I_R max (mA) @ +25°C
100	12	0.78	0.25

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_F); 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)**

Description and Applications

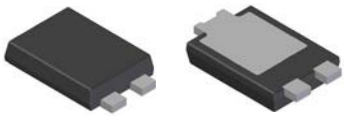
This super barrier rectifier (SBR®) diode is designed to meet the stringent requirements of automotive applications. It is ideally suited to use as:

- Polarity Protection Diode
- Recirculating Diode
- Switching Diode

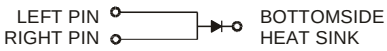
Mechanical Data

- 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: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Polarity: See Diagram
- Weight: 0.093 grams (Approximate)

PowerDI5



Top View Bottom View



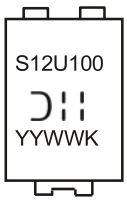
Note: Pins Left & Right must be electrically connected at the printed circuit

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°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 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_{RM}	100	V
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°C, I_{AS} = 12A, L = 10mH)	E_{AS}	592	mJ
Repetitive Peak Avalanche Energy (1µs, +25°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	°C/W
Typical Thermal Resistance Junction to Ambient (Note 8)	$R_{\Theta JA}$	80	°C/W
Typical Thermal Resistance Junction to Lead	$R_{\Theta JL}$	3	°C/W
Operating and Storage Temperature Range	$T_{J, STG}$	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop (Note9)	V_F	— — —	0.49 0.67 0.58	— 0.78 —	V	I_F = 5A, T_J = +25°C I_F = 12A, T_J = +25°C I_F = 12A, T_J = +125°C
Leakage Current (Note 9)	I_R	— —	0.06 11	0.25 40	mA	V_R = 100V, T_J = +25°C V_R = 100V, T_J = +125°C
Switching Speed t_{RR}	t_{RR}	—	24	—	ns	I_F=0.5A, I_R=1A, I_{RR}=0.25A (RG1)

Notes: 7. Polymide, 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.

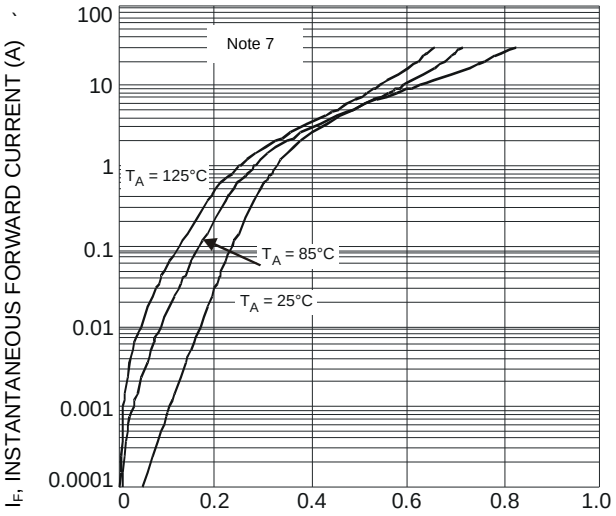


Figure 1 Typical Forward Characteristics

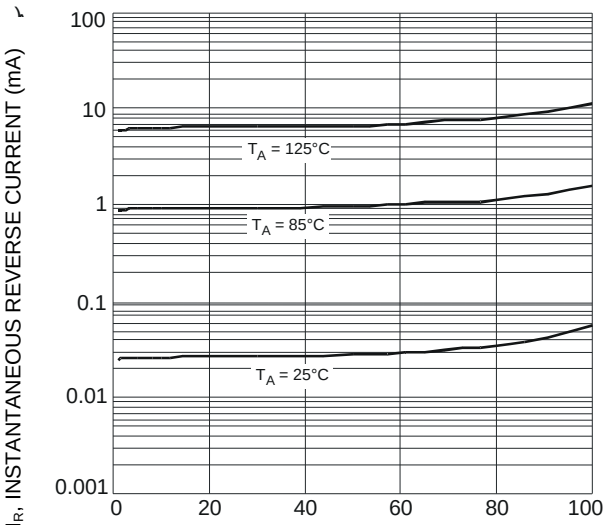


Figure 2 Typical Reverse Characteristics

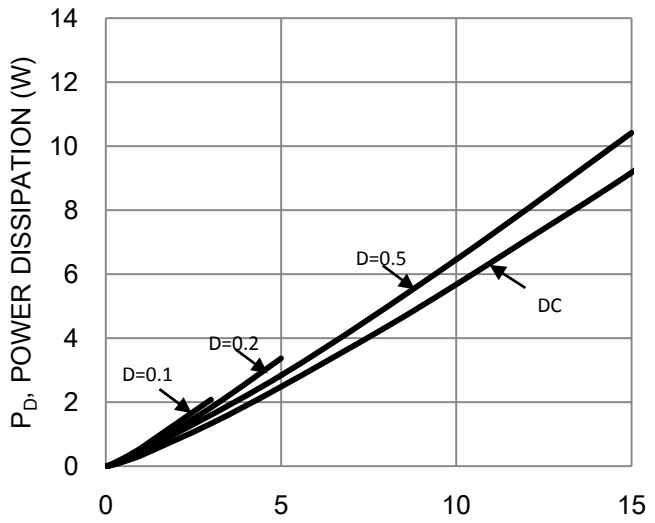


Figure 3. Forward Power Dissipation T_J=125ºC

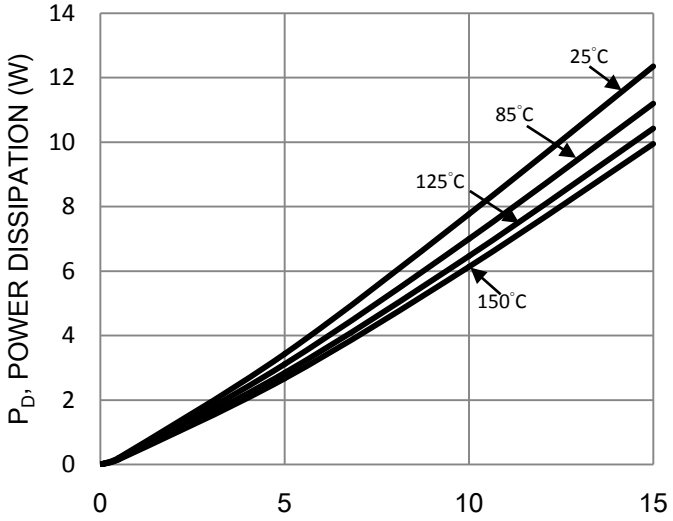


Figure 4. Forward Power Dissipation D=0.5

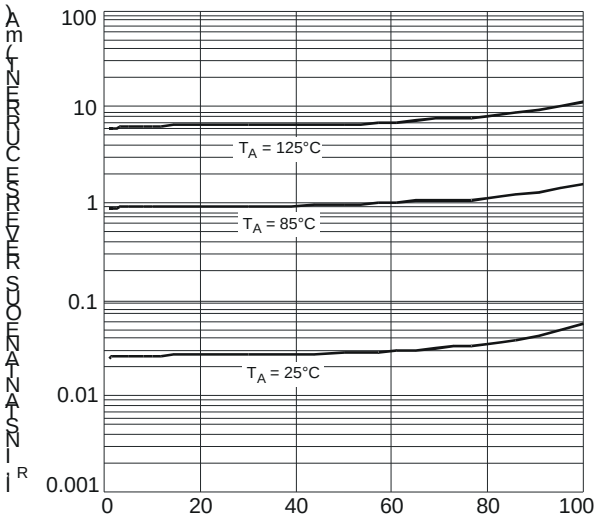


Figure 5 Typical Reverse Characteristics

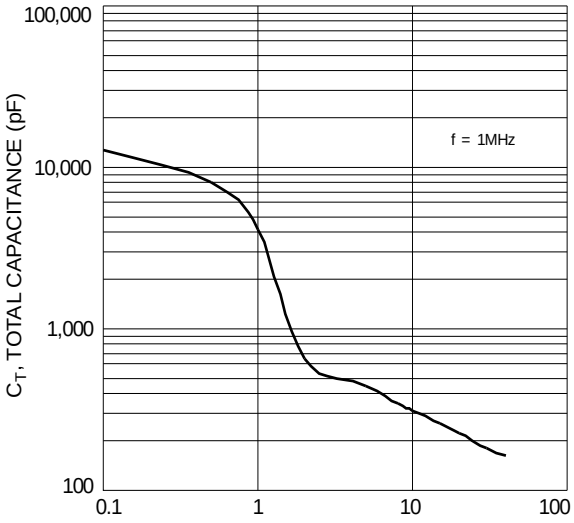


Figure 6 Total Capacitance vs. Reverse Voltage

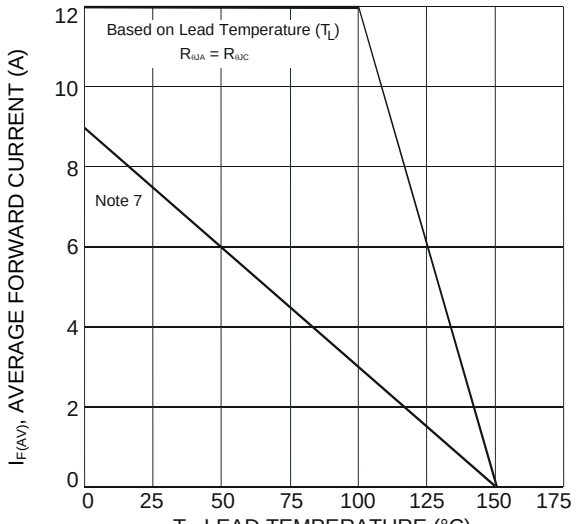


Figure 7 Forward Current Derating Curve

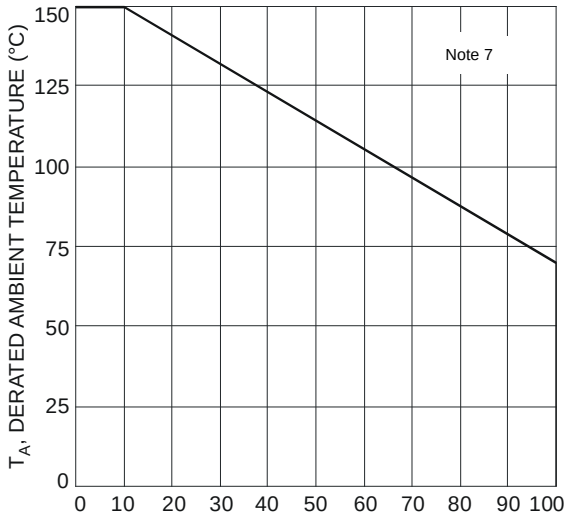


Figure 8 Operating Temperature Derating

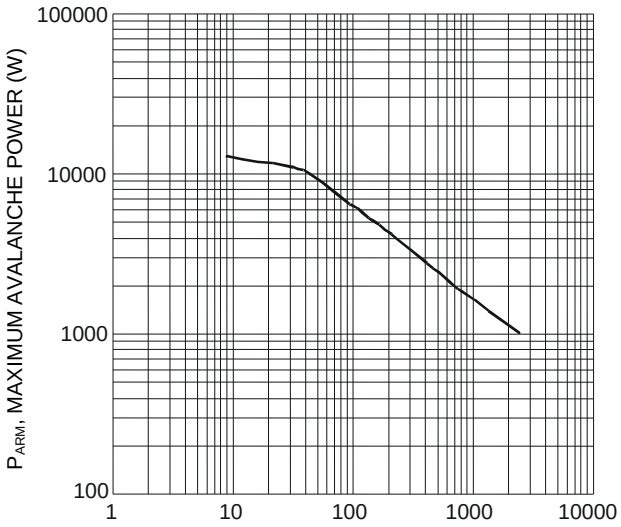


Figure 9 Maximum Avalanche Power Curve

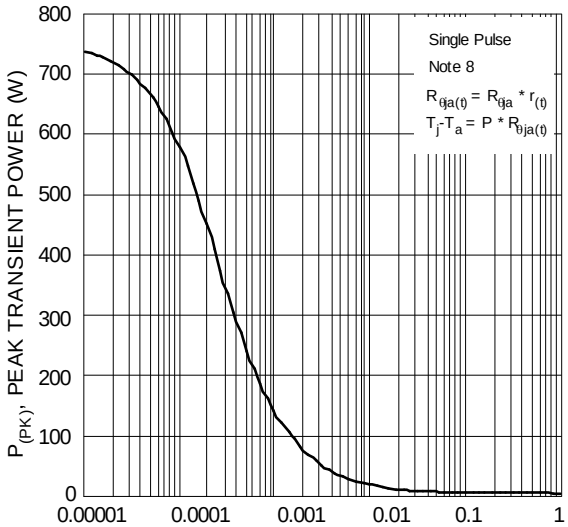


Figure 10 Single Pulse Maximum Power Dissipation

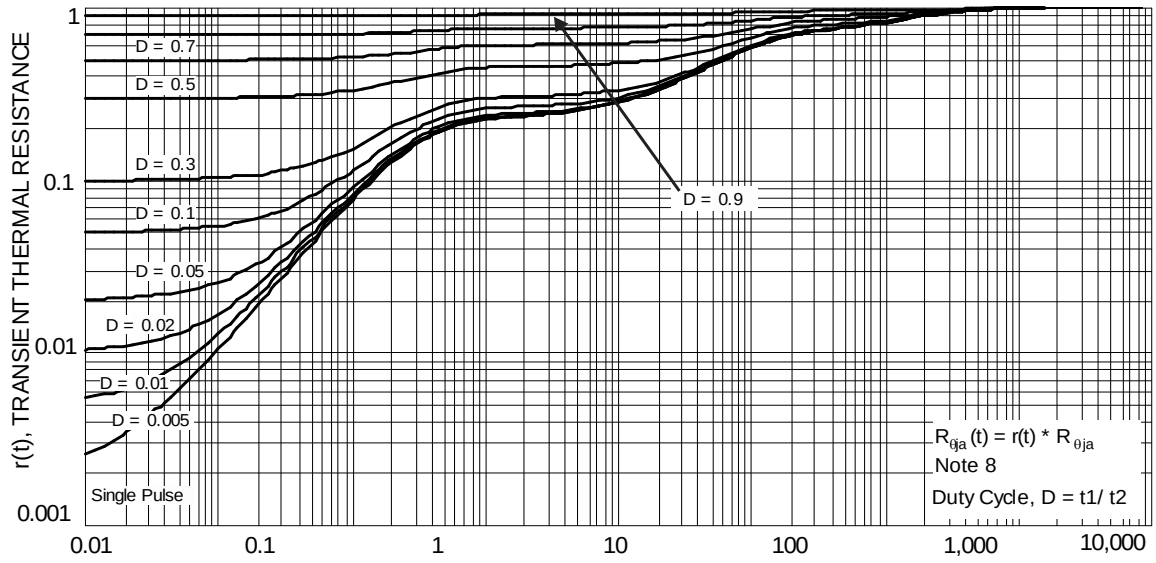
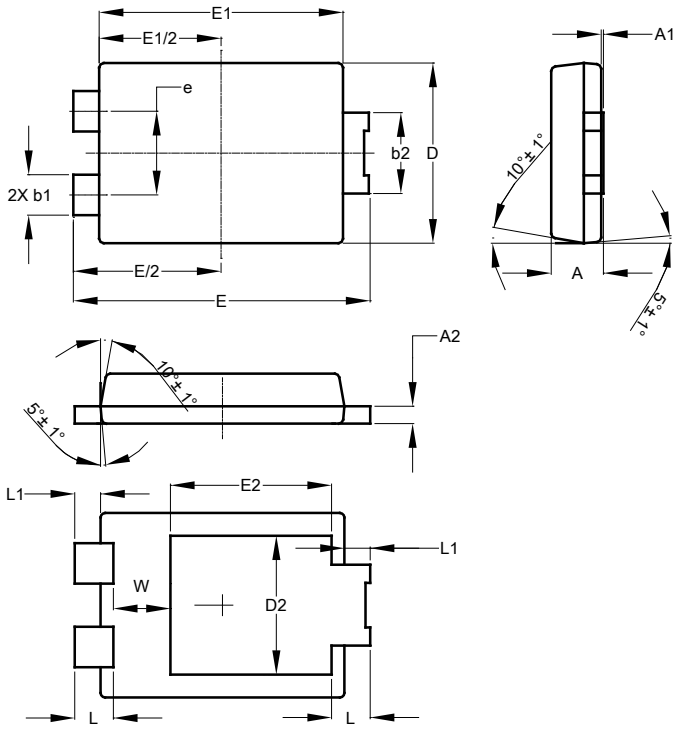


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5

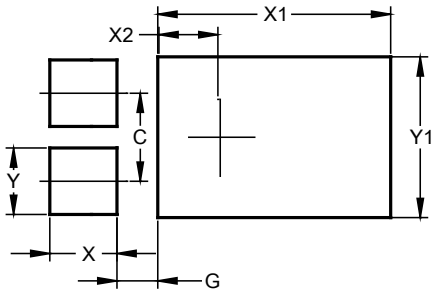


PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

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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