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)**
- **The SBR12U100P5Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

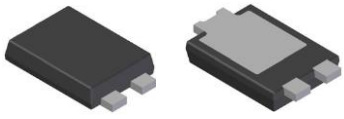
This super barrier rectifier (SBR®) diode is designed to meet the stringent requirements of automotive applications. It is ideally suited to use as:

- Polarity protection diodes
- Recirculating diodes
- Switching diodes

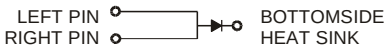
Mechanical Data

- Package: PowerDI®5
- Package 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



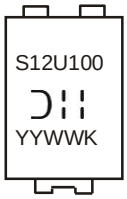
Note: Pins Left & Right must be electrically connected at the printed circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
SBR12U100P5Q-13	PowerDI5	5000	Tape & Reel
SBR12U100P5Q-13D (Note 5)	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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.
5. "D" suffix designates for the 12mm Tape and Reel option.

Marking Information



S12U100 = Product Type Marking Code
= Manufacturer's Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 24 for 2024)
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 6)	$R_{\theta JA}$	27	°C/W
Typical Thermal Resistance Junction to Ambient (Note 7)	$R_{\theta JA}$	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 (Note 8)	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 8)	I_R	— —	0.06 11	0.25 40	mA	V_R = 100V, T_J = +25°C V_R = 100V, T_J = +125°C
Junction Capacitance	C_J	—	490	—	pF	V_R = 4V, T_J = +25°C
Switching Speed t_{RR}	t_{RR}	—	24	—	ns	I_F = 0.5A, I_R = 1A I_{RR} = 0.25A (RG1)

Notes: 6. Polymide, 2oz. copper 16x minimum recommended pad layout per http://www.diodes.com/package-outlines.html for the latest version.
7. MRP FR-4 PC board, 2oz.
8. Short duration pulse test used to minimize self-heating effect.

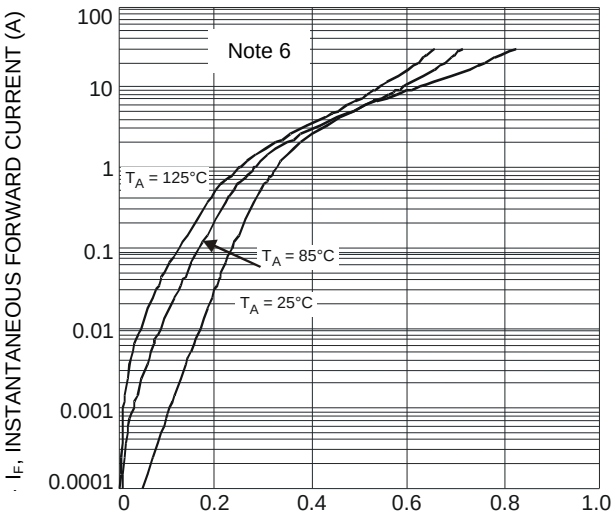


Figure 1. Typical Forward Characteristics

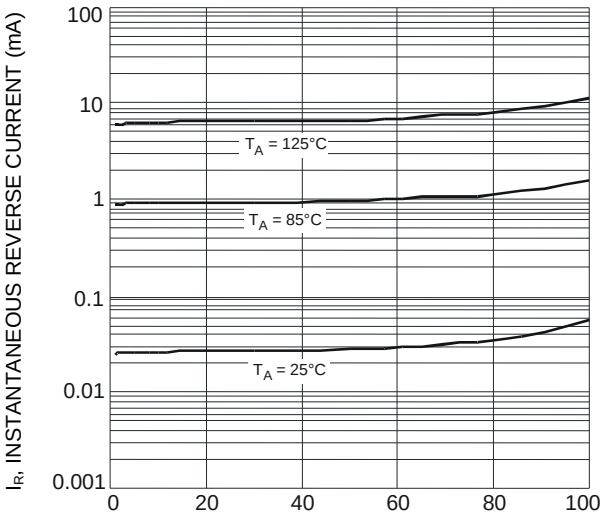


Figure 2. Typical Reverse Characteristics

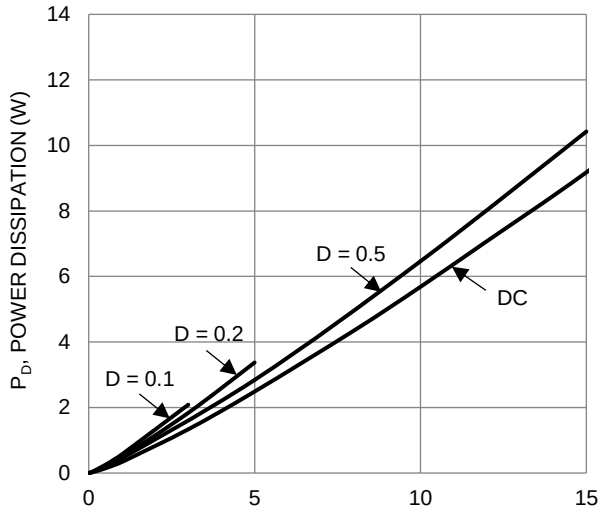


Figure 3. Forward Power Dissipation T_J = 125ºC

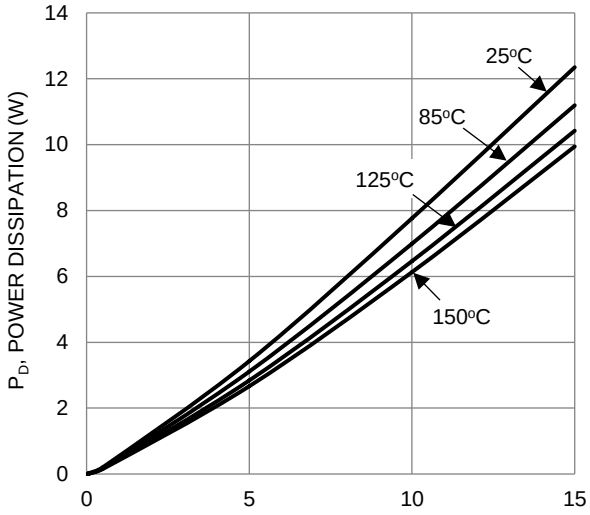


Figure 4. Forward Power Dissipation D = 0.5

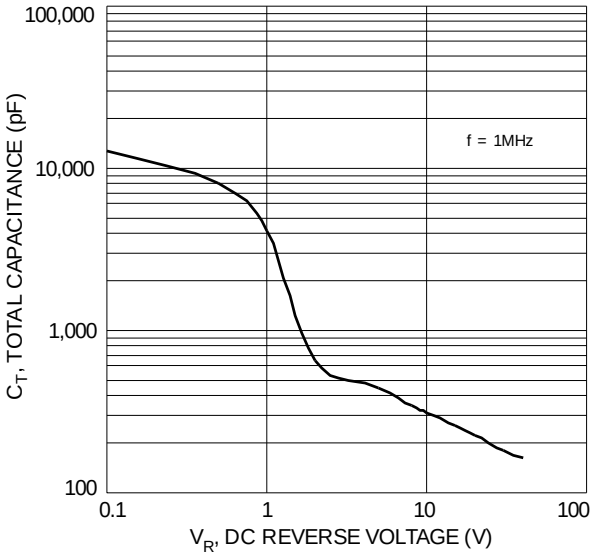


Figure 5. Total Capacitance vs. Reverse Voltage

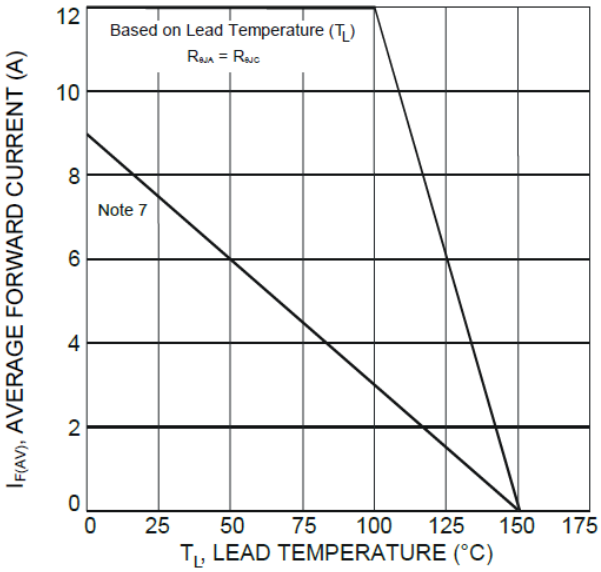


Figure 6. Forward Current Derating Curve

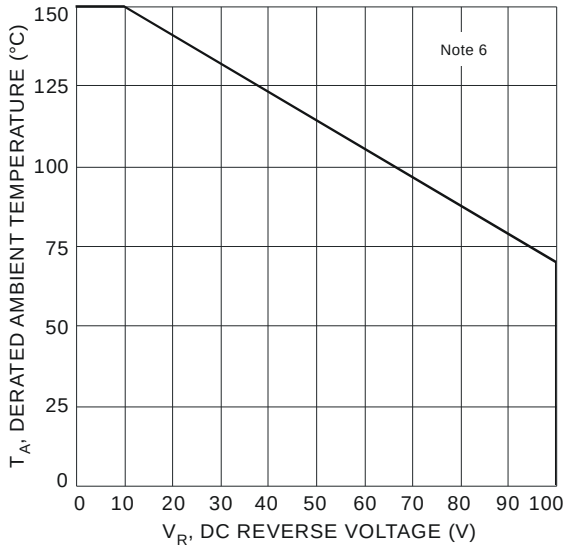


Figure 7. Operating Temperature Derating

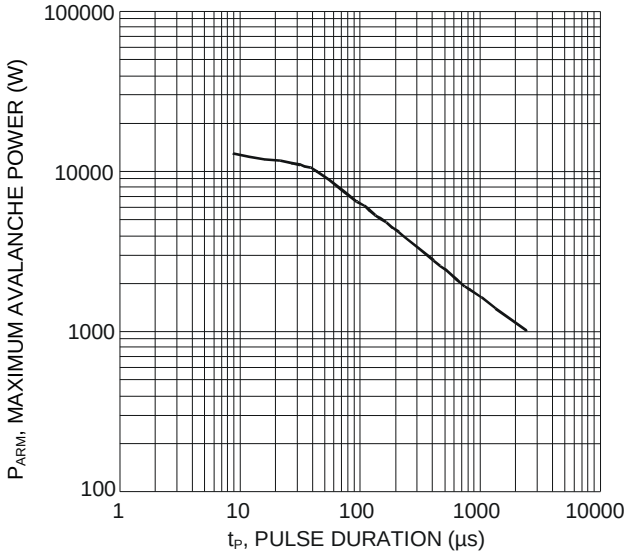


Figure 8. Maximum Avalanche Power Curve

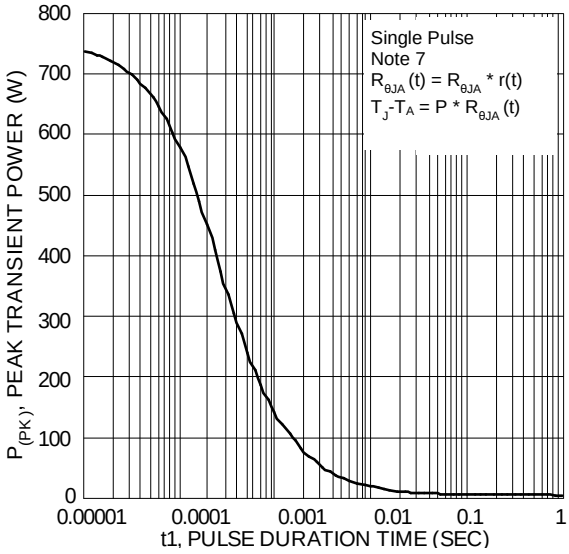


Figure 9. Single Pulse Maximum Power Dissipation

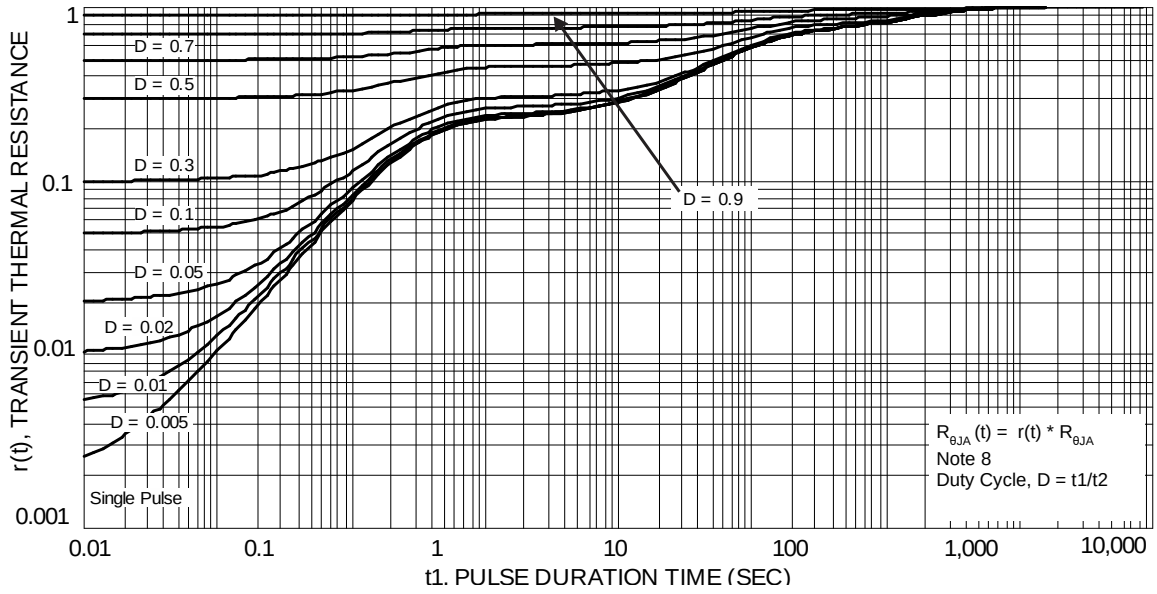
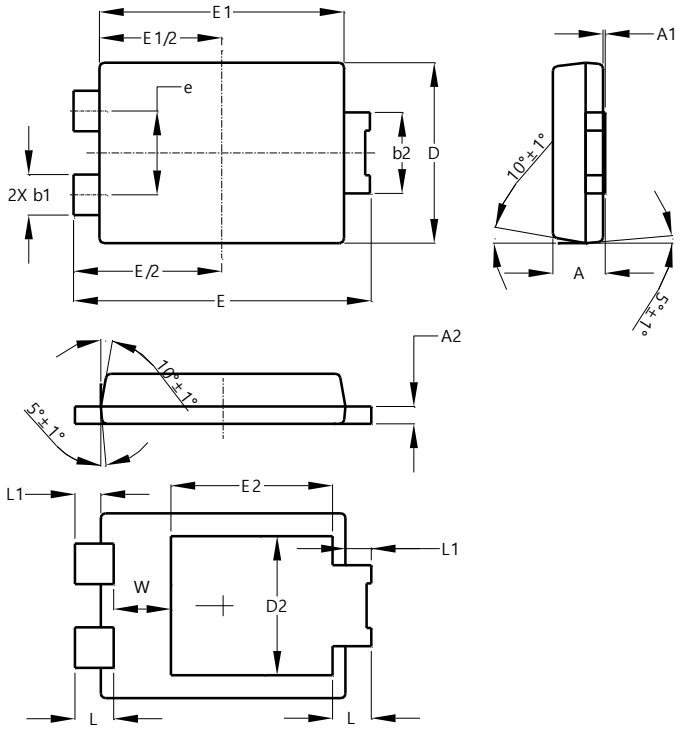


Figure 10. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5

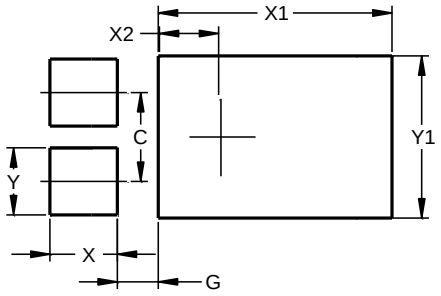


PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

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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