

## Product Summary (@T<sub>A</sub> = +25°C)

V <sub>RRM</sub> (V)	I <sub>F</sub> (A)	V <sub>F(MAX)</sub> (V)	I <sub>R(MAX)</sub> (μA)
100	10	0.88	2

## Description and Applications

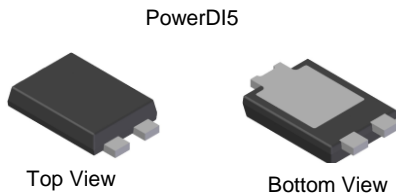
This Super Barrier Rectifier (SBR) diode has been designed to meet the stringent requirements of Automotive Application combining low forward voltage drop with unrivalled ultra low leakage current and avalanche capability. It is ideally suited to such as:

- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode
- Blocking Diode
- DC-DC Converter
- AC-DC Converter

This device is suitable to protect sensitive automotive circuits against surges defined in ISO7637-2 (Note 5)

- Polarity (ISO7637-2 for 24V System)

Pulse 1: US = -600V  
Pulse 2a: US = +112V  
Pulse 3a: US = -300V  
Pulse 3b: US = +300V



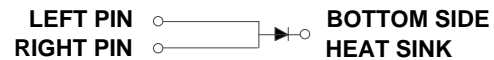
## Features and Benefits

- Low Forward Voltage Drop, Ultra Low Leakage
- T<sub>J(MAX)</sub> = +175°C
- Excellent High Temperature Stability
- Unrivalled Avalanche Capability
- Patented Super Barrier Rectifier SBR<sup>®</sup> Technology
- Soft, Fast Switching Capability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The SBR10M100P5Q 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/>

## 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 (E3)
- Terminal Connections: See Diagram Below
- Weight: 0.093 grams (Approximate)



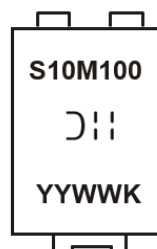
**Note: Pins Left & Right must be electrically connected at the printed circuit board.**

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
SBR10M100P5Q-13	Automotive	PowerDI5	5000/Tape & Reel
SBR10M100P5Q-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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
  5. Not applicable to parts with stand-off voltage lower than the average battery voltage (13.5V)
  6. Suffix -13D is designated for 12mm tape width.

## Marking Information



S10M100 = Product Type Marking Code  
 )|| = Manufacturers' Code Marking  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 21 for 2021)  
 WW = Week Code (01 to 53)  
 K = Factory Designator

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub>	100	V
Average Rectified Output Current	I <sub>O</sub>	10	A
Non-Repetitive Peak Forward Surge Current 8.3mS	I <sub>FSM</sub>	220	A
Non-Repetitive Avalanche Energy at I <sub>AS</sub> = 5.0A, L = 50mH	E <sub>AS</sub>	400	mJ
Non-Repetitive Avalanche Energy at I <sub>AS</sub> = 20.0A, L = 1mH	E <sub>AS</sub>	150	mJ

Characteristic	Symbol	Ratings	Unit
Human Body Model ESD Protection	ESD HBM	4000	V
Machine Model ESD Protection	ESD MM	400	V
Charged Device Model	ESD CDM	1	kV

**Thermal Characteristics** (Note 10)

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Lead (Cathode)	R <sub>θJL</sub>	3	°C/W
Typical Thermal Resistance Junction to Ambient (Note 7)	R <sub>θJA</sub>	20	°C/W
Typical Thermal Resistance Junction to Ambient (Note 8)	R <sub>θJA</sub>	90	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop	V <sub>F</sub>	—	0.56	—	V	I <sub>F</sub> = 1A, T <sub>J</sub> = +25°C
		—	0.71	—		I <sub>F</sub> = 5A, T <sub>J</sub> = +25°C
		—	0.78	0.88		I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
		—	0.59	—		I <sub>F</sub> = 5A, T <sub>J</sub> = +125°C
		—	0.65	0.74		I <sub>F</sub> = 10A, T <sub>J</sub> = +125°C
Leakage Current (Note 9)	I <sub>R</sub>	—	100	2000	nA	V <sub>R</sub> = 100V, T <sub>J</sub> = +25°C
		—	0.015	0.1	mA	V <sub>R</sub> = 100V, T <sub>J</sub> = +125°C
		—	0.060	—	mA	V <sub>R</sub> = 100V, T <sub>J</sub> = +150°C
Junction Capacitance	C <sub>J</sub>	—	245	—	pF	V <sub>R</sub> = 4V, T <sub>J</sub> = +25°C
Switching Speed t <sub>RR</sub>	t <sub>RR</sub>	—	18	—	ns	I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1A, I <sub>RR</sub> = 0.25A (RG1)

- Notes:
- 7. 2inch sq. Al board.
  - 8. MRP FR-4 PC board, 2oz.
  - 9. Short duration pulse test used to minimize self-heating effect.
  - 10. The heat generated must be less than thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>.

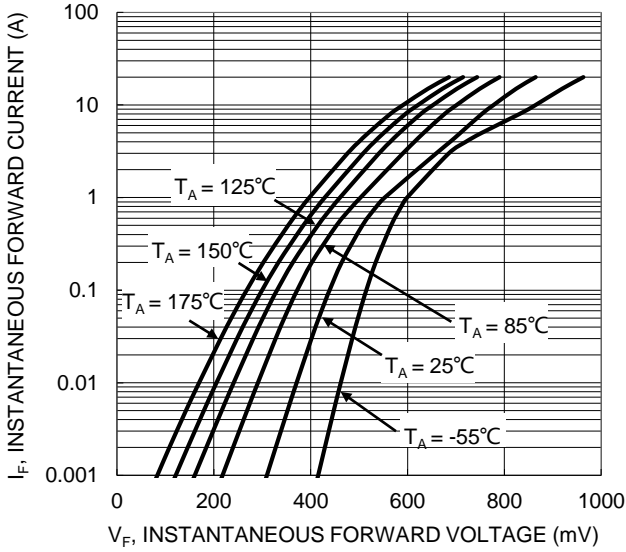


Figure 1. Typical Forward Characteristics

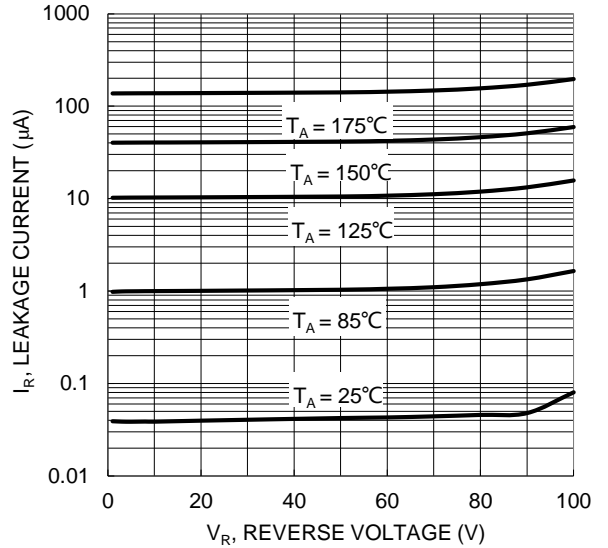


Figure 2. Typical Reverse Characteristics

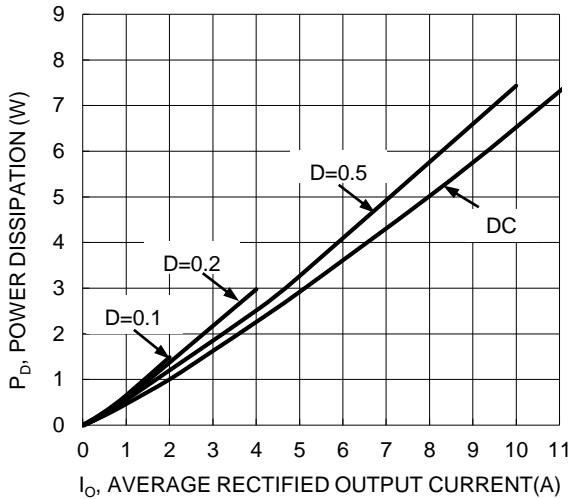


Figure 3. Forward Power Dissipation  $T_J=125^\circ\text{C}$

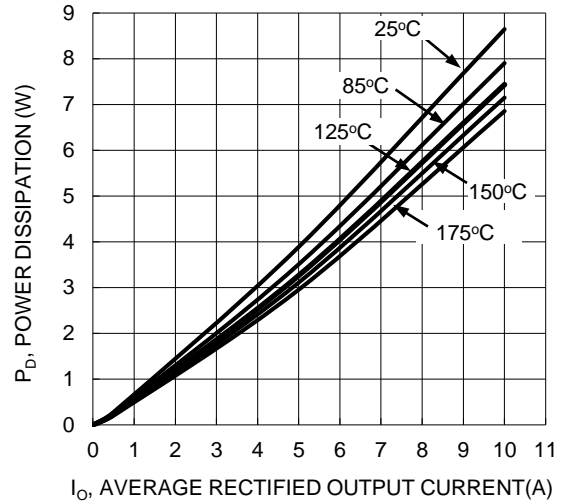


Figure 4. Forward Power Dissipation  $D=0.5$

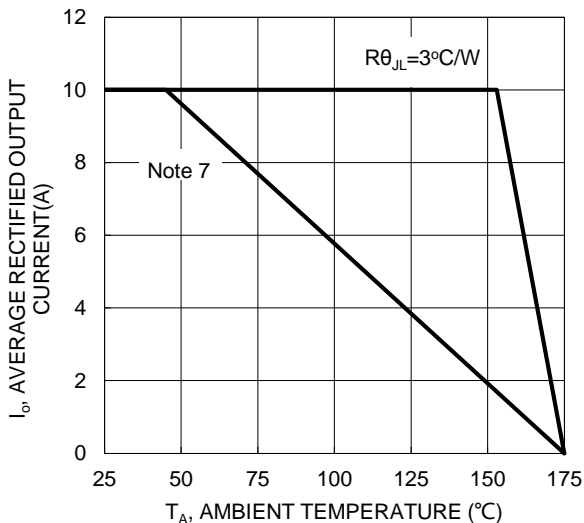


Figure 5. Forward Current Derating Curve

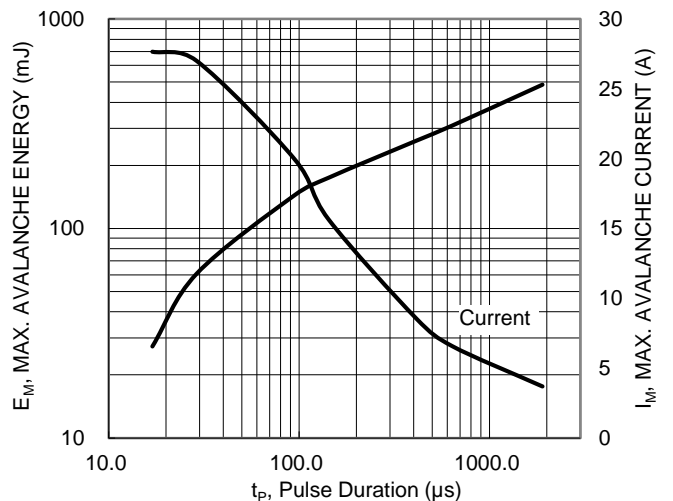


Figure 6. Single pulse Max. Avalanche Energy and Current

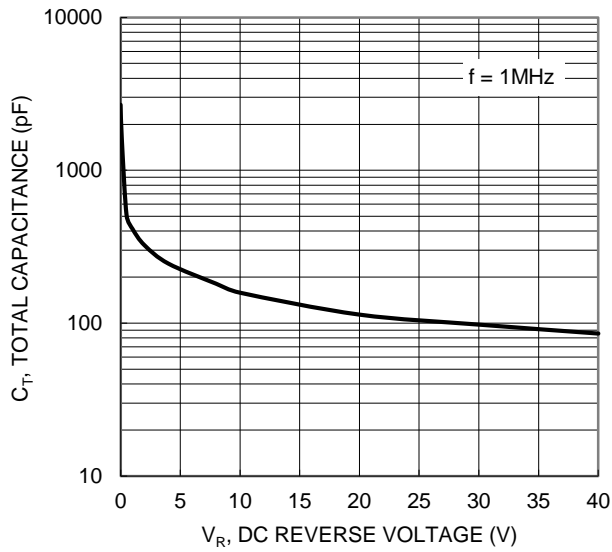


Figure 7. Typical Junction Capacitance

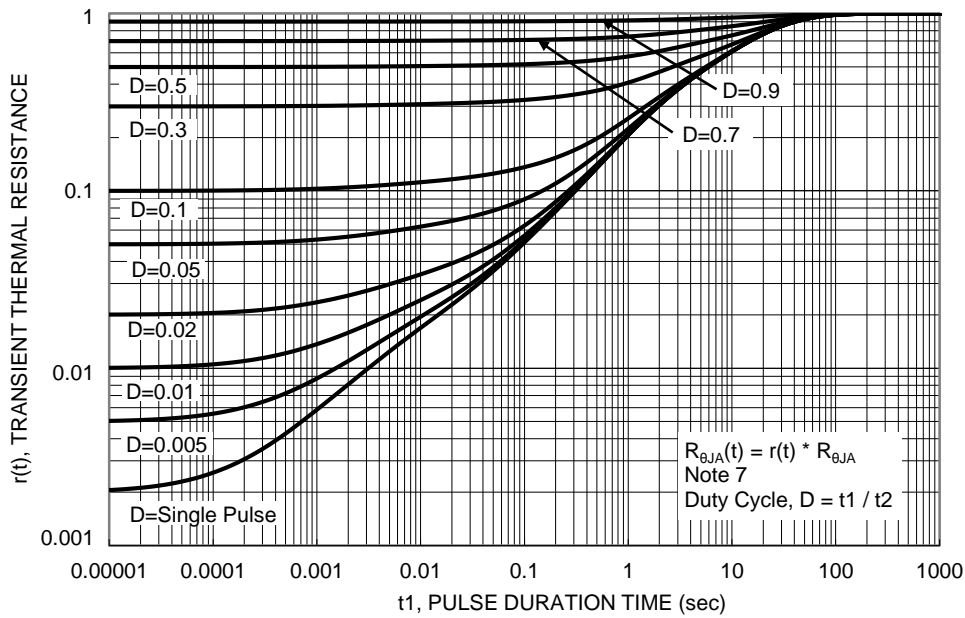
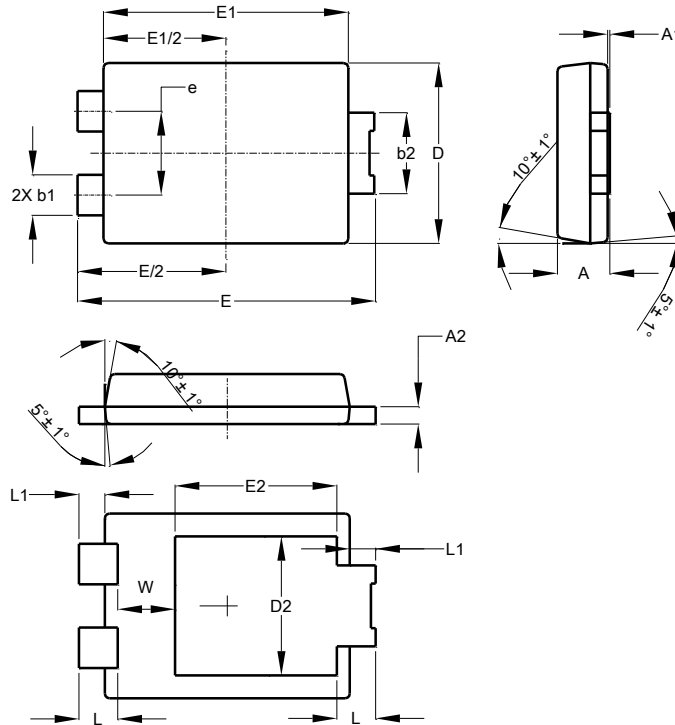


Figure 8. Transient Thermal Resistance MRP

## Package Outline Dimensions

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

PowerDI5

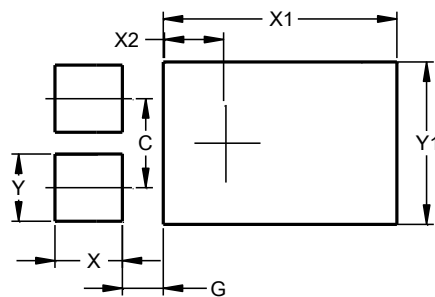


PowerDI5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

## 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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