

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

V <sub>RRM</sub> (V)	I <sub>o</sub> (A)	V <sub>F</sub> Max (V)	I <sub>R</sub> Max (μA)
150	20	0.90	50

## Description

Super Barrier Rectifier (SBR<sup>®</sup>) is a proprietary and patented Diodes Incorporated technology that utilizes a Metal Oxide Semiconductor (MOS) manufacturing process to create a superior alternative to the Schottky diode. This Super Barrier Rectifier (SBR) diode has been designed to meet the stringent requirements of Automotive applications combining low forward voltage drop with low leakage current and avalanche capability.

## Benefits

- Superior System Efficiency Over Schottky Diodes even at High Temperature
- Reduces BoM Costs for Cooling Components
- High System Reliability with Lower Operating Temperature
- Reduced Time to Market for Stringent Limit Designs
- Suitable to Protect Sensitive Automotive Circuits Against Surges Defined in ISO7637-2  
Polarity (ISO7637-2 For 24V System)  
Pulse 1: US = -600V  
Pulse 2a: US = +112V  
Pulse 3a: US = -300V  
Pulse 3b: US = +300V

## Applications

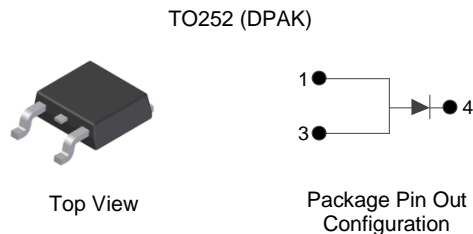
- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode
- Blocking Diode
- DC-DC Converter

## Features

- MOS Technology
- Ultra-Low Forward Voltage Drop
- Excellent High Temperature Stability
- Soft, Fast Switching Capability
- Lower Operating Temperature
- Drop-In Compatibility with Schottky Diodes
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The SBR20M150D1Q 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: TO252
- 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 Below
- Weight: 0.4 grams (Approximate)

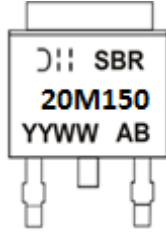


## Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
SBR20M150D1Q-13	Automotive	TO252 (DPAK)	2,500 Pieces/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/>.

## Marking Information



SBR20M150 = Product Type Marking Code  
 ⓁⓂ = Manufacturers' Code Marking  
 AB = Foundry and Assembly Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 21 = 2021)  
 WW = Week (01 to 53)

## Maximum Ratings (@T<sub>A</sub> = +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	V <sub>R</sub> RM	150	V
Working Peak Reverse Voltage	V <sub>R</sub> WM		
DC Blocking Voltage	V <sub>R</sub> M		
Average Rectified Output Current	I <sub>O</sub>	20	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	160	A

## Thermal Characteristics (Note 9)

Characteristic	Symbol	Value	Unit
Thermal Resistance Junction to Ambient (Note 5)	R <sub>θ</sub> JA	85	°C/W
Thermal Resistance Junction to Ambient (Note 6)	R <sub>θ</sub> JA	15	
Thermal Resistance Junction to Ambient (Note 7)	R <sub>θ</sub> JA	12	
Thermal Resistance Junction to Case (Note 7)	R <sub>θ</sub> JC	1.8	
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>	—	—	830	mV	I <sub>F</sub> = 10A, T <sub>J</sub> = +25°C
			830	900		I <sub>F</sub> = 20A, T <sub>J</sub> = +25°C
			—	710		I <sub>F</sub> = 10A, T <sub>J</sub> = +125°C
			660	780		I <sub>F</sub> = 20A, T <sub>J</sub> = +125°C
Leakage Current (Note 8)	I <sub>R</sub>	—	—	0.05	mA	V <sub>R</sub> = 150V, T <sub>J</sub> = +25°C
			—	10		V <sub>R</sub> = 150V, T <sub>J</sub> = +125°C
Switching Speed t <sub>RR</sub>	t <sub>RR</sub>	—	24	—	ns	I <sub>F</sub> =0.5A, I <sub>R</sub> =1A, I <sub>RR</sub> =0.25A (RG1)

- Notes:
5. 1\*MRP FR-4 PC board, 2oz.
  6. 2inch\*2inch Al board.
  7. With 2inch x 2inch Al board + 50mm x 50mm x 23mm Al heatsink.
  8. Short duration pulse test used to minimize self-heating effect.
  9. The heat generated must be less than thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θ</sub>JA.

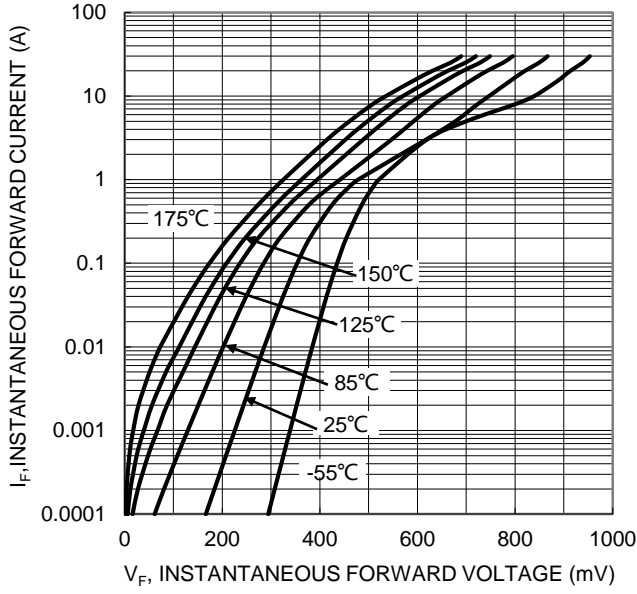


Figure 1. Typical Forward Characteristics

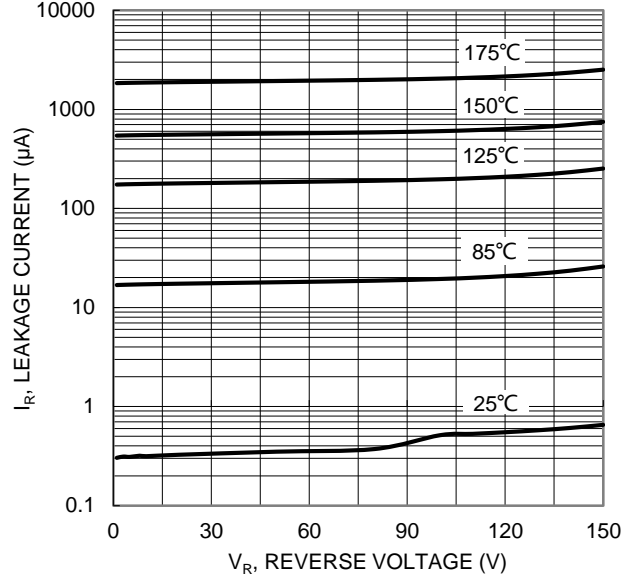


Figure 2. Typical Reverse Characteristics

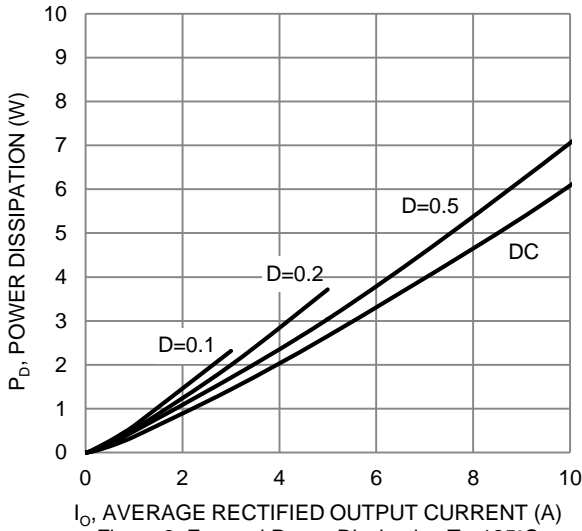


Figure 3. Forward Power Dissipation  $T_J=125^\circ\text{C}$

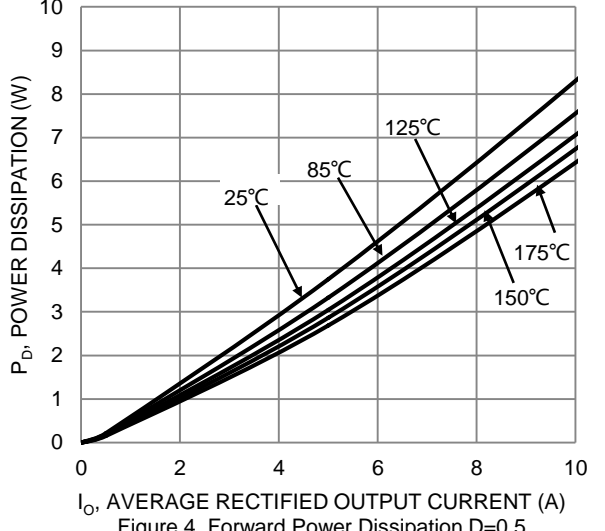


Figure 4. Forward Power Dissipation  $D=0.5$

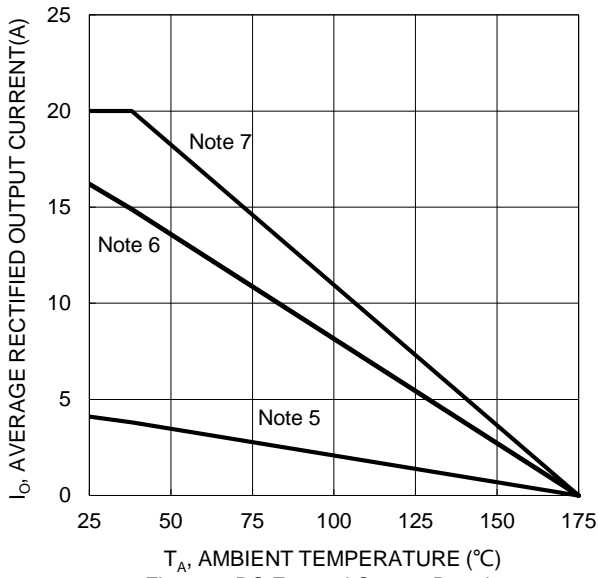


Figure 5. DC Forward Current Derating

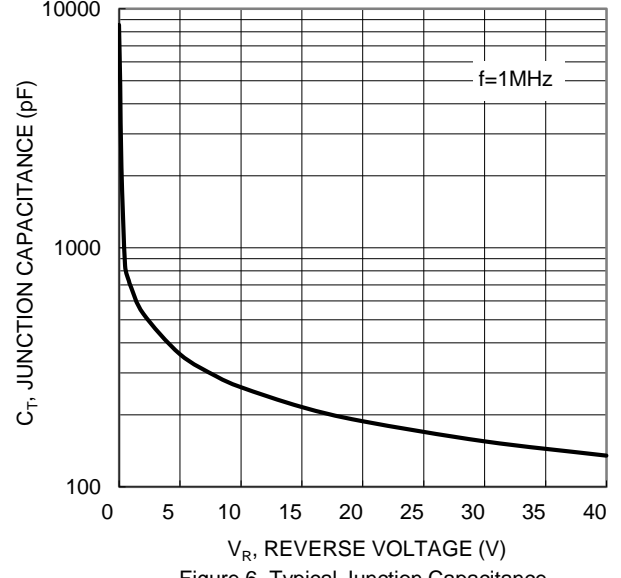
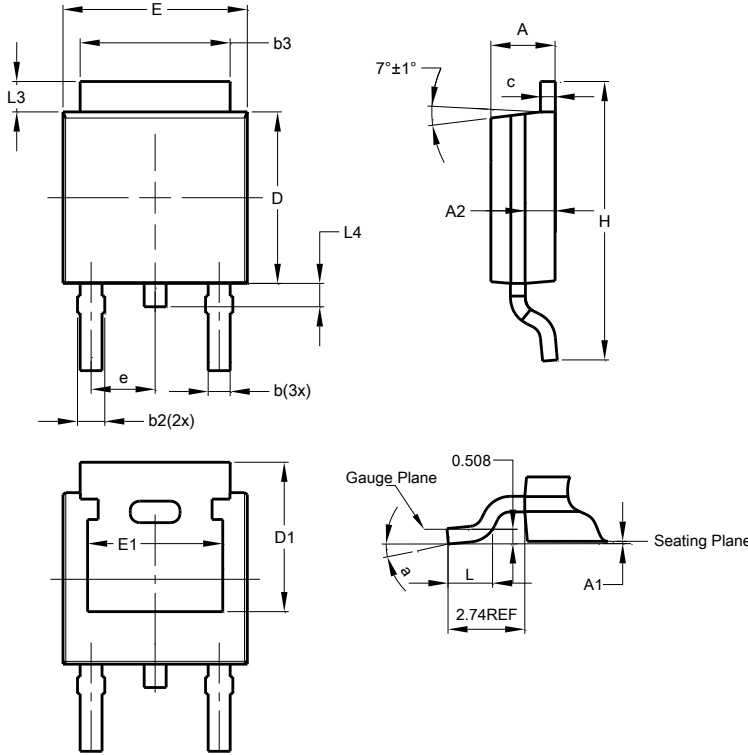


Figure 6. Typical Junction Capacitance

**Package Outline Dimensions**

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

**TO252 (DPAK)**

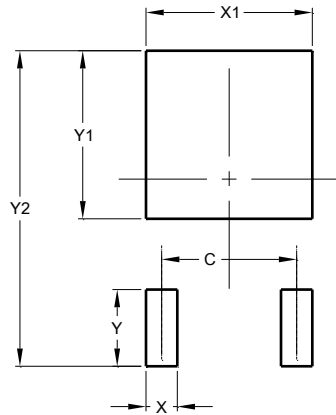


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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

**TO252 (DPAK)**



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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