

Product Summary (@ T_A = +25°C)

V _{RRM} (V)	I _o (A)	V _F Max (V)	I _R Max (μA)
150	20	0.90	50

Description

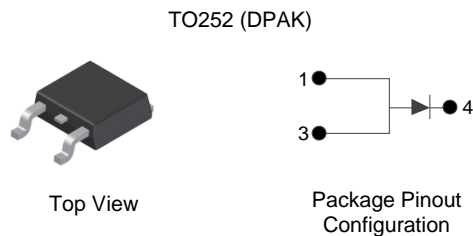
Super Barrier Rectifier (SBR[®]) is a proprietary and patented Diodes Incorporated technology that utilizes a Metal Oxide Semiconductor (MOS) manufacturing process to create a superior alternative to the Schottky diode. This Super Barrier Rectifier (SBR) diode has been designed to meet the stringent 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 diodes
- Re-circulating diodes
- Switching diodes
- Blocking diodes
- DC-DC converters



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

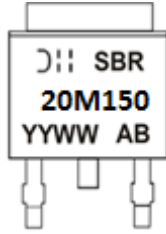
- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Polarity: See Below
- Weight: 0.4 grams (Approximate)

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
SBR20M150D1Q-13	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: 24 = 2024)
 WW = Week (01 to 53)

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	V _{RRM}	150	V
Working Peak Reverse Voltage	V _{RWM}		
DC Blocking Voltage	V _{RM}		
Average Rectified Output Current	I _O	20	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine Wave Superimposed on Rated Load	I _{FSM}	160	A

Thermal Characteristics (Note 9)

Characteristic	Symbol	Value	Unit
Thermal Resistance Junction to Ambient (Note 5)	R _{θJA}	85	°C/W
Thermal Resistance Junction to Ambient (Note 6)	R _{θJA}	15	
Thermal Resistance Junction to Ambient (Note 7)	R _{θJA}	12	
Thermal Resistance Junction to Case (Note 7)	R _{θJC}	1.8	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop	V _F	—	—	830	mV	I _F = 10A, T _J = +25°C
			830	900		I _F = 20A, T _J = +25°C
			—	710		I _F = 10A, T _J = +125°C
			660	780		I _F = 20A, T _J = +125°C
Leakage Current (Note 8)	I _R	—	—	0.05	mA	V _R = 150V, T _J = +25°C
				10		V _R = 150V, T _J = +125°C
Switching Speed	t _{RR}	—	24	—	ns	I _F = 0.5A, I _R = 1A, I _{RR} = 0.25A (RG1)
Junction Capacitance	C _J	—	400	—	pF	V _R = 4V, T _J = +25°C

- 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: $dP_D/dT_J < 1/R_{\theta JA}$.

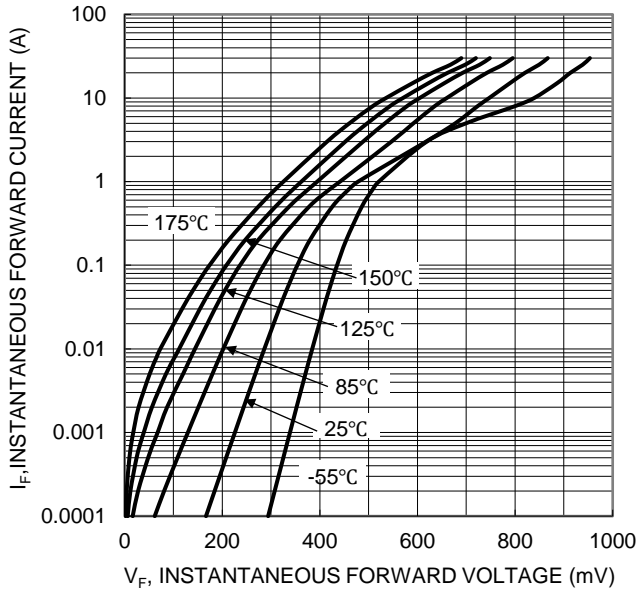


Figure 1. Typical Forward Characteristics

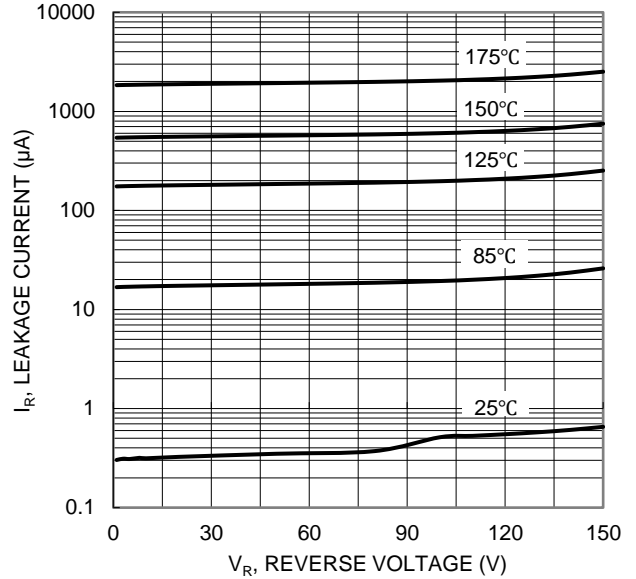


Figure 2. Typical Reverse Characteristics

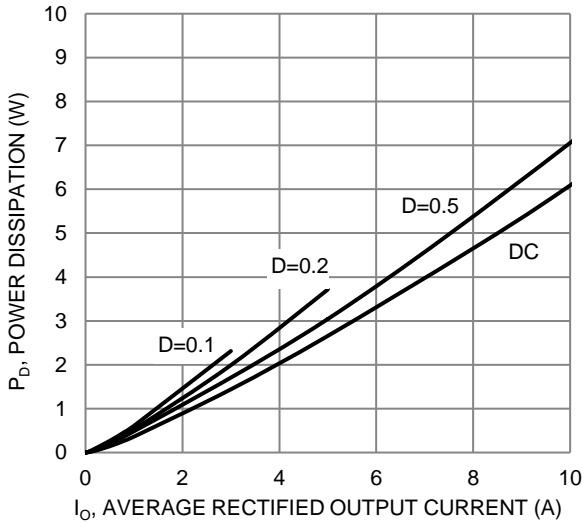


Figure 3. Forward Power Dissipation $T_J=125^\circ\text{C}$

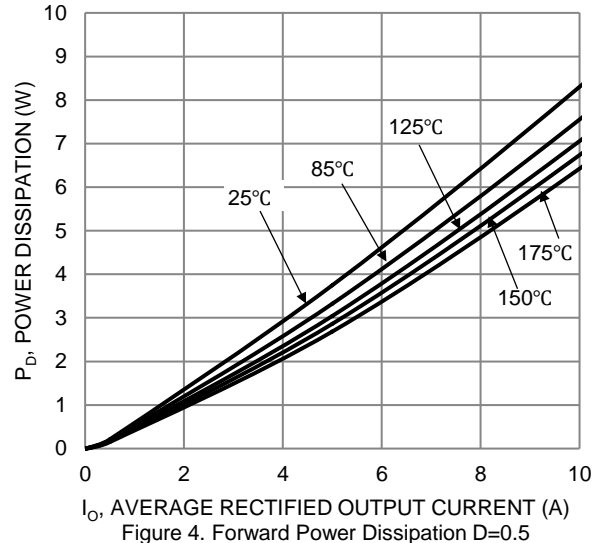


Figure 4. Forward Power Dissipation $D=0.5$

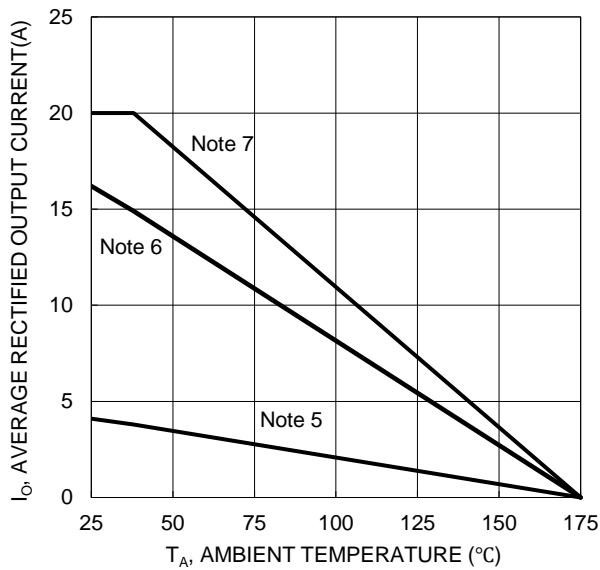


Figure 5. DC Forward Current Derating

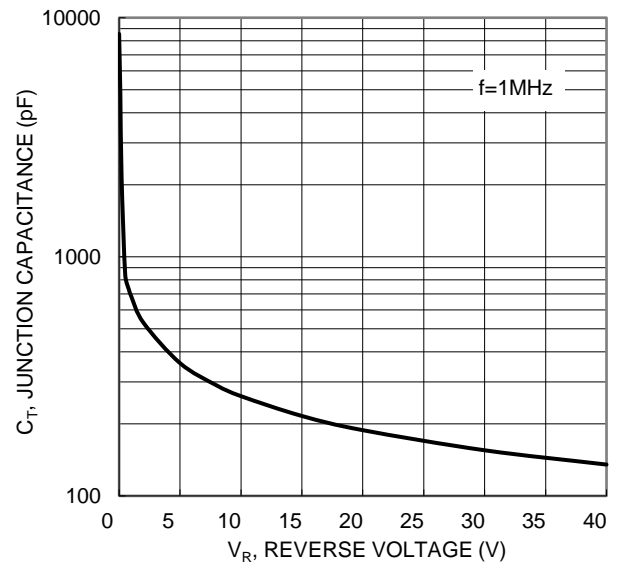


Figure 6. Typical Junction Capacitance

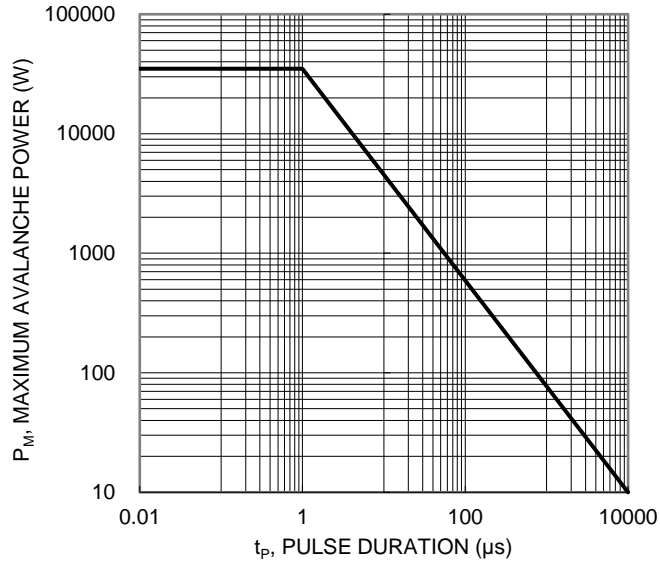
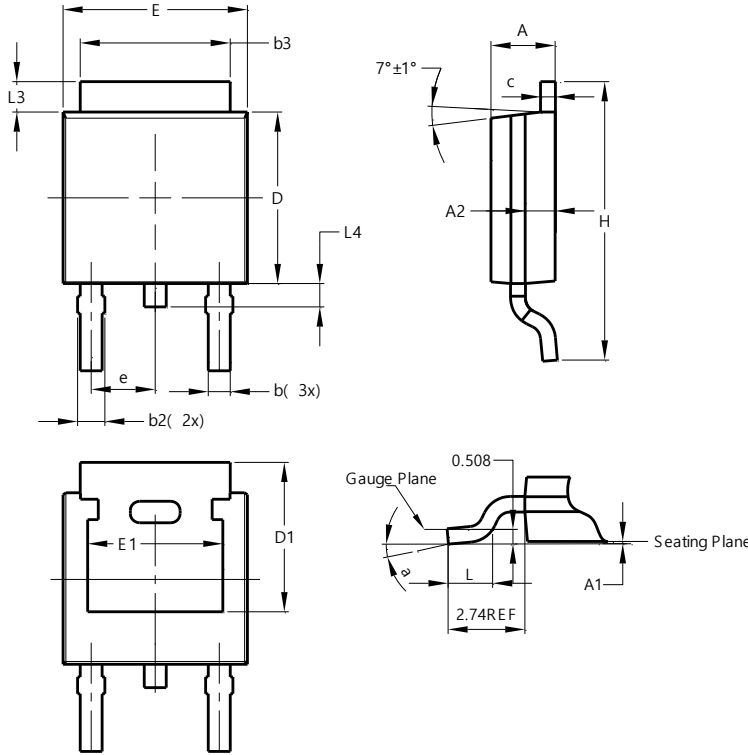


Figure 7. Maximum Avalanche Power

Package Outline Dimensions

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

TO252 (DPAK)

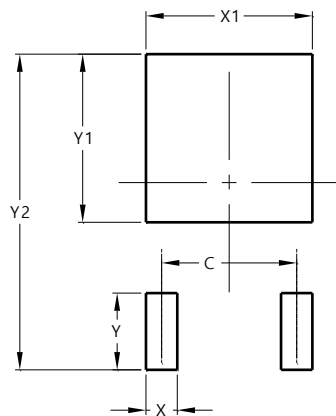


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	--
All Dimensions in mm			

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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