

Product Summary

V_{RRM} (V)	I_o (A)	V_F Max (V) @ +25°C	I_R Max (μA) @ +25°C
60	10	0.52	200

Description and Applications

This Super Barrier Rectifier (SBR) diode is ideally suited for applications requiring ultra low blocking mode. Leading to lower operating temperatures and increased system reliability. Packaged in the robust industry-standard TO252 (DPAK) package. Applications are:

- Polarity Protection Diode
- DC/DC Converters
- AC/DC Adaptors
- Flyback Diode
- Re-Circulating Diode

TO252 (DPAK)



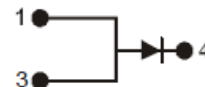
Top View

Features and Benefits

- Reduced Ultra Low Voltage Drop (V_F) Increased Efficiency and Cooler Operation
- Patented Super Barrier Rectifier SBR® Technology
- Superior Avalanche Capability (See Maximum Ratings)
- Excellent Reverse Leakage (I_R) Stability in High-Temperature Circumstance. 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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <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. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.4 grams (Approximate)



Package Pin-Out
Configuration

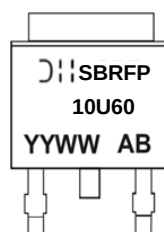
Pin 1 & 3 must be electrically connected at the PCB

Ordering Information (Note 4)

Part Number	Case	Packaging
SBRFP10U60D1-13	TO252 (DPAK)	2500 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



SBRFP = Manufacturers' Code Marking
 SBRFP10U60 = Product Type Marking Code
 AB = Foundry and Assembly Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 20 = 2020)
 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}	60	V
Working Peak Reverse Voltage	V _{RWM}		
DC Blocking Voltage	V _{RM}		
Average Rectified Output Current	I _O	10	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load (Pins 1 and 3)	I _{FSM}	190	A
Non-Repetitive Avalanche Energy (T _J = +25°C, I _{AS} = 3.5A, L=50mH)	E _{AS}	390	mJ
Non-Repetitive Avalanche Energy (T _J = +25°C, I _{AS} = 16A, L=1mH)	E _{AS}	175	mJ
Electrostatic Discharge- Human Body Model	HBM	4000	V
Electrostatic Discharge- Contact Discharge Model	CDM	1	kV

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	R _{θJA}	85	°C/W
Typical Thermal Resistance Junction to Ambient (Note 6)	R _{θJA}	18	°C/W
Typical Thermal Resistance Junction to Case (Note 6)	R _{θJC}	2	°C/W
Operating and Storage Temperature Range	T _J , T _{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	V _F	—	0.31	—	V	I _F = 1A, T _J = +25°C
		—	0.39	—		I _F = 5A, T _J = +25°C
		—	0.47	0.52		I _F = 10A, T _J = +25°C
		—	0.33	—		I _F = 5A, T _J = +125°C
		—	0.43	0.50		I _F = 10A, T _J = +125°C
Leakage Current (Note 7)	I _R	—	57	200	μA	V _R = 60V, T _J = +25°C
		—	15	55	mA	V _R = 60V, T _J = +125°C
Junction Capacitance	C _J	—	240	—	pF	V _R = 60V, T _J = +25°C
Reverse Recovery Time	t _{RR}	—	50	—	ns	I _F = 0.5A, I _{RR} = 1A, I _{RR} = 0.25A (RG1)

Notes:
 5. MRP FR-4 2oz Cu
 6. 50mm × 50mm × 23mm Al heatsink.
 7. Short duration pulse test used to minimize self-heating effect.

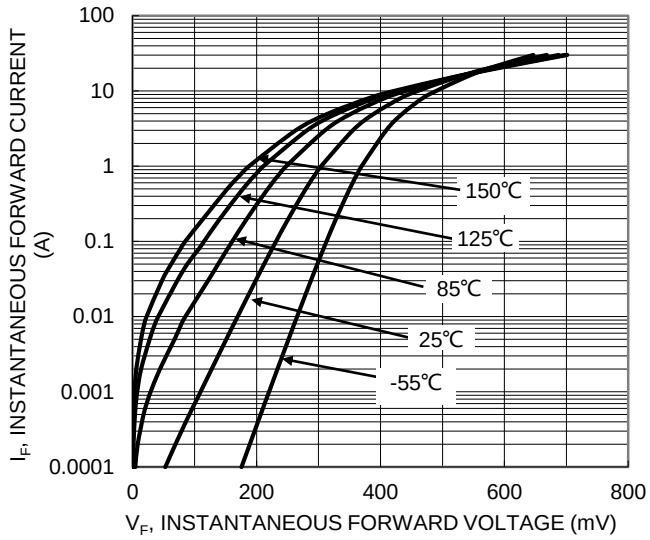


Figure 1. Typical Forward Characteristics

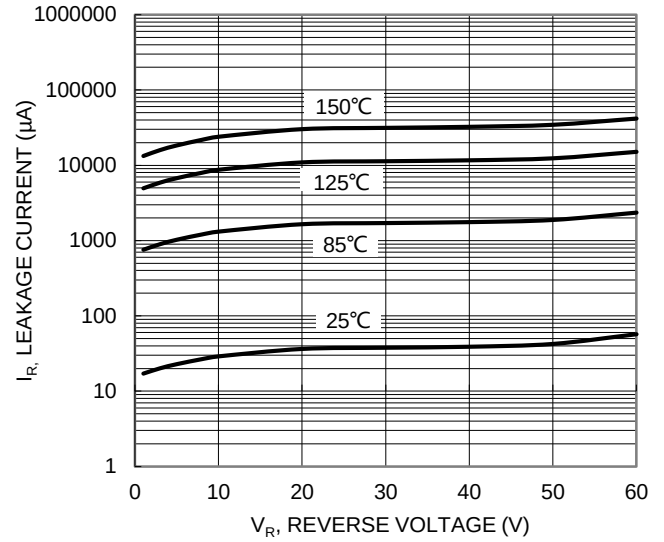


Figure 2. Typical Reverse Characteristics

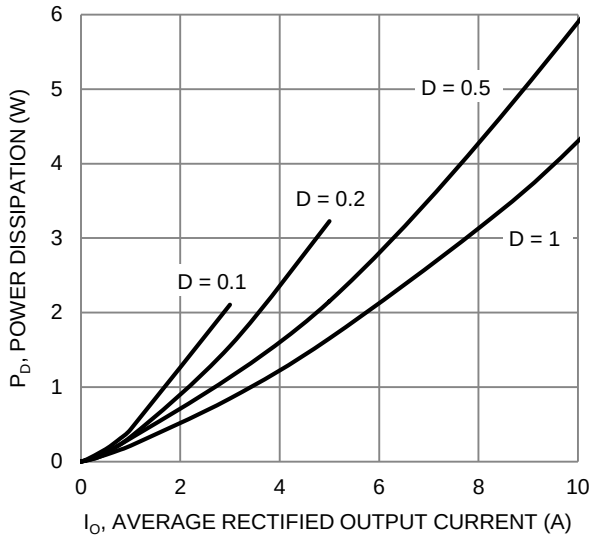


Figure 3. Forward Power Dissipation $T_J=125^\circ\text{C}$

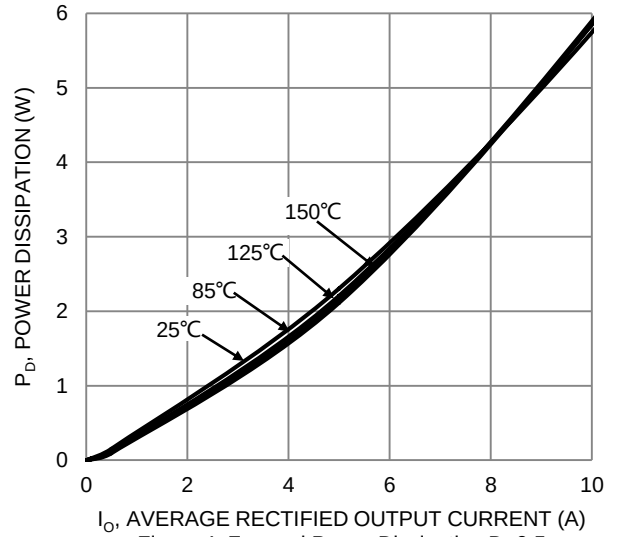


Figure 4. Forward Power Dissipation $D=0.5$

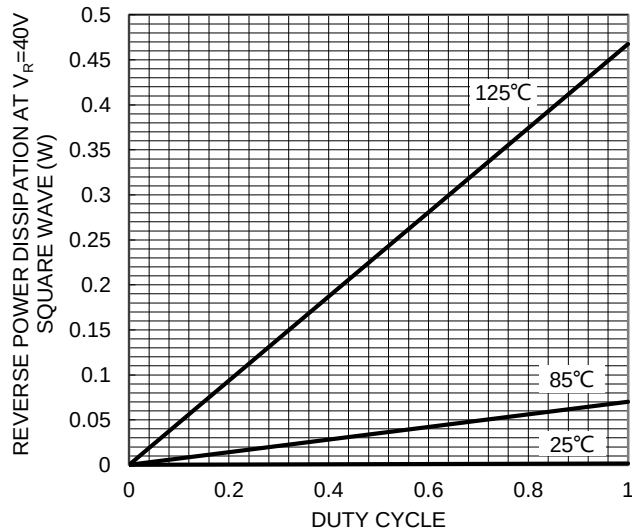


Figure 5. Typical Reverse Characteristics

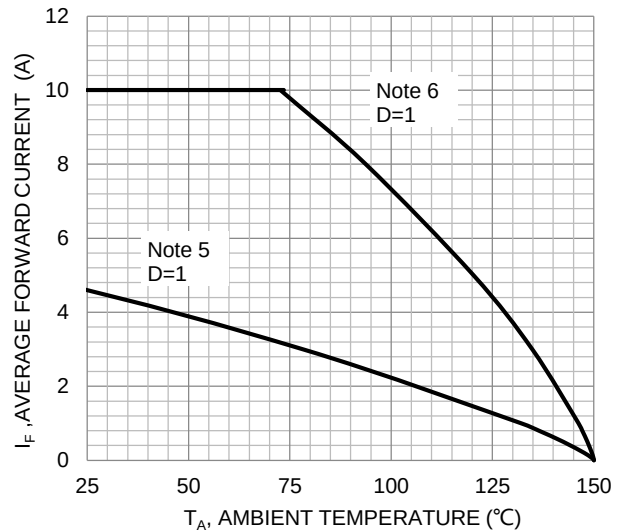


Figure 6. DC Forward Derating Curve

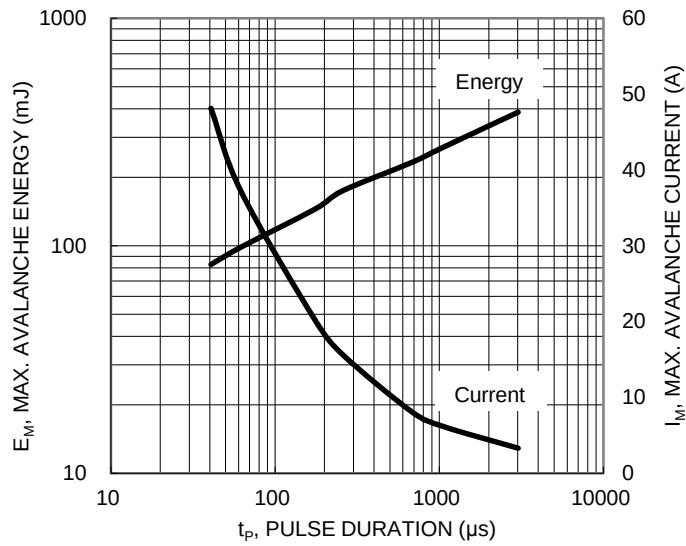


Figure 7. Single Pulse Max. Avalanche Energy and Current

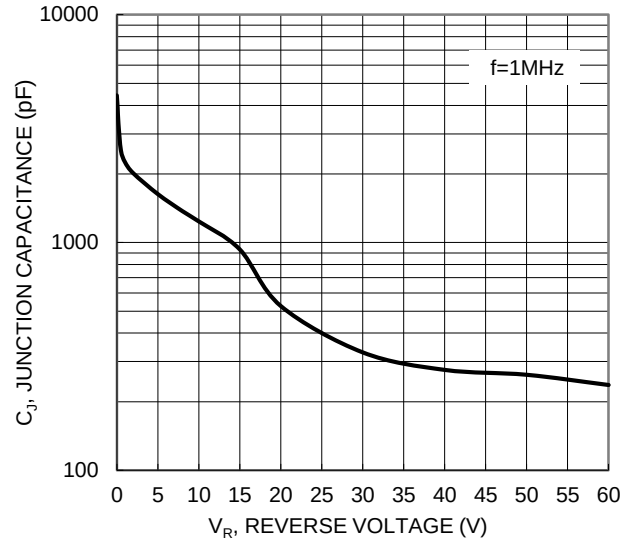


Figure 8. Typical Junction Capacitance

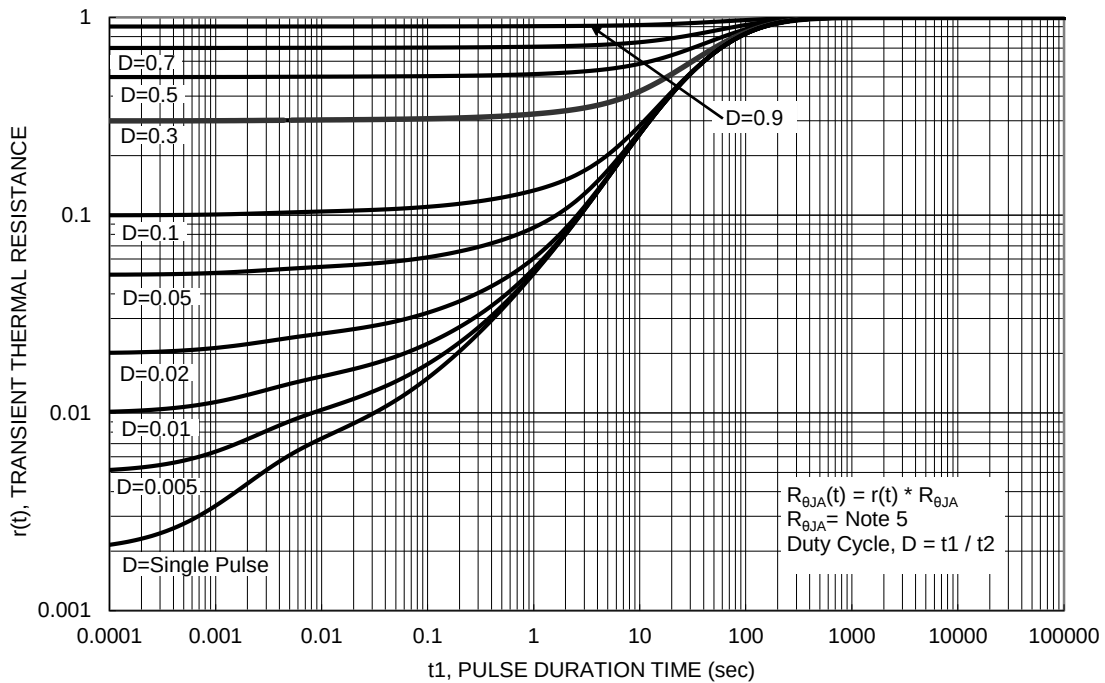
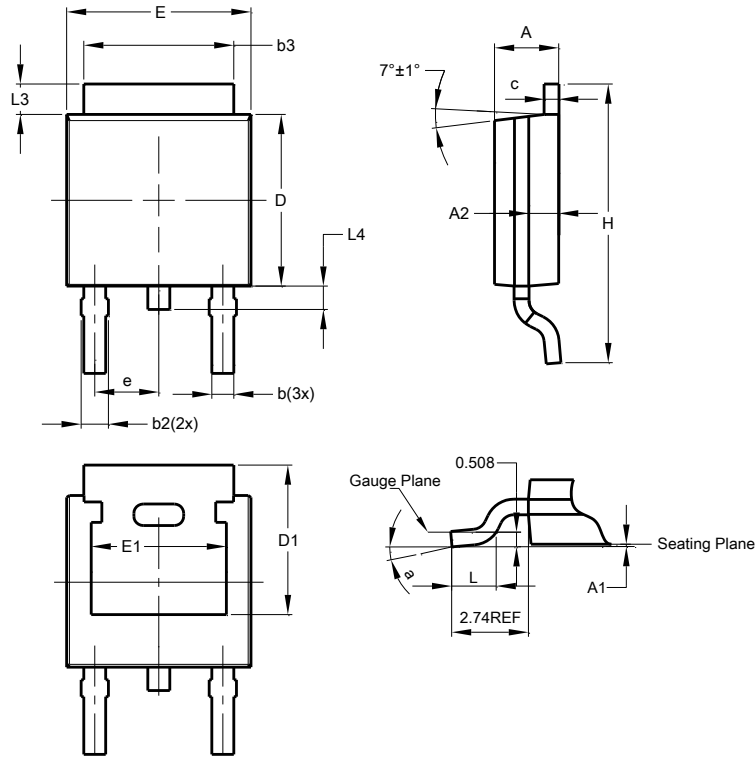


Figure 9. Transient Thermal Resistance

Package Outline Dimensions

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

TO252 (DPAK)

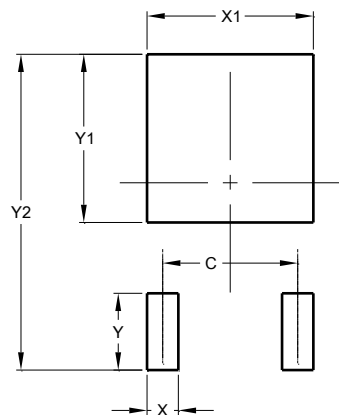


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2020, Diodes Incorporated

www.diodes.com