

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)



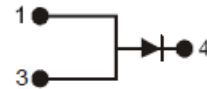
Top View

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

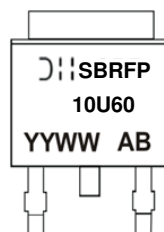
Pin 1 & 3 must be electrically connected at the PCB

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



- D = 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 |
| 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.

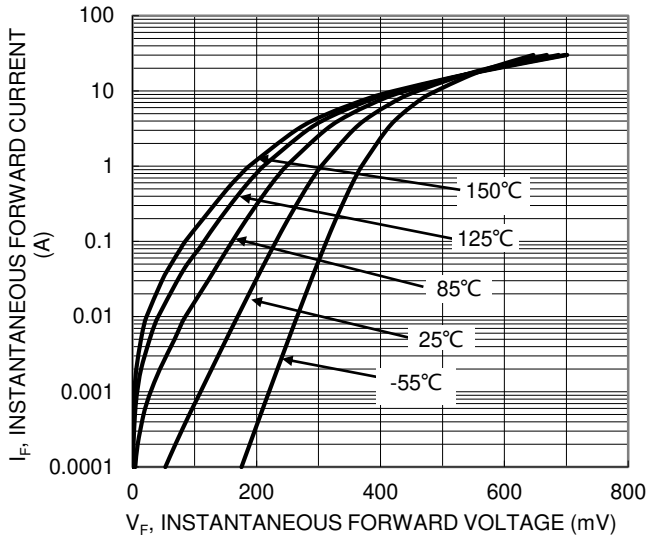


Figure 1. Typical Forward Characteristics

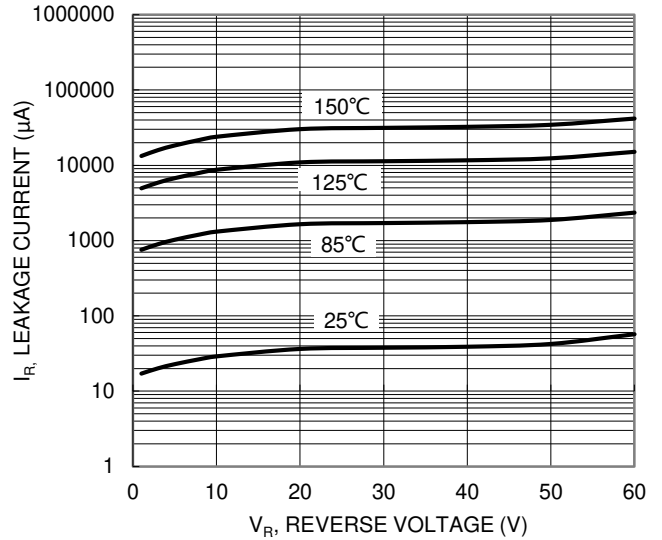


Figure 2. Typical Reverse Characteristics

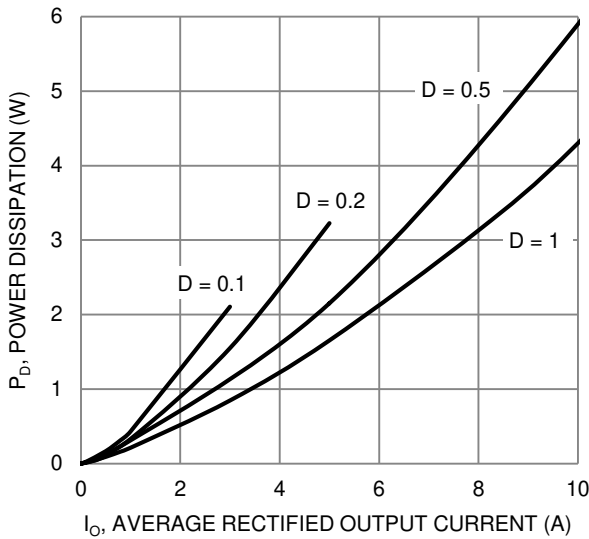


Figure 3. Forward Power Dissipation $T_J=125^\circ\text{C}$

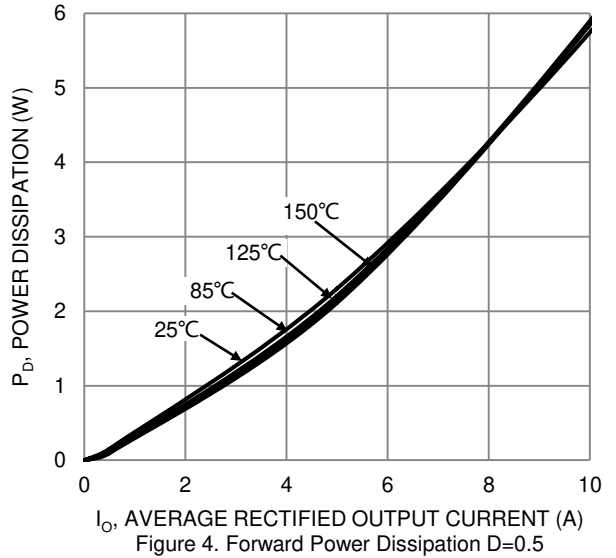


Figure 4. Forward Power Dissipation $D=0.5$

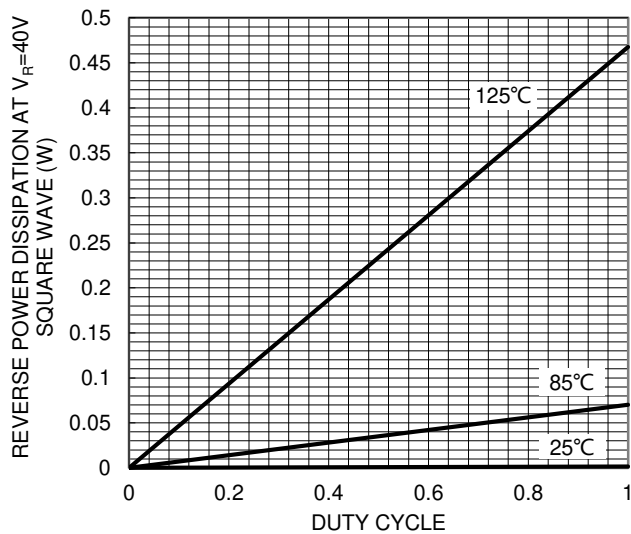


Figure 5. Typical Reverse Characteristics

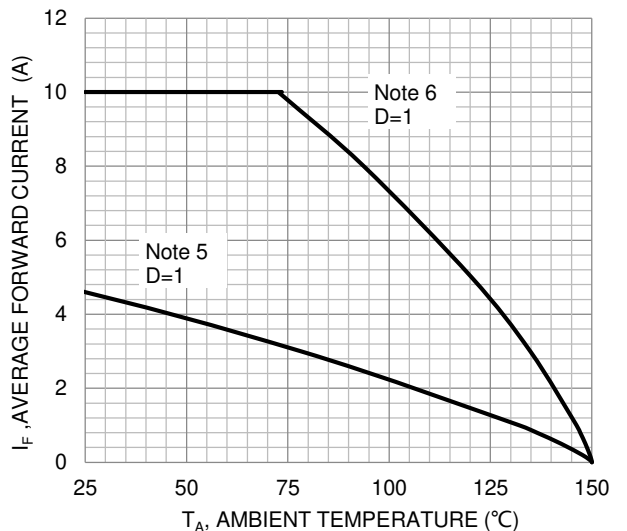


Figure 6. DC Forward Derating Curve

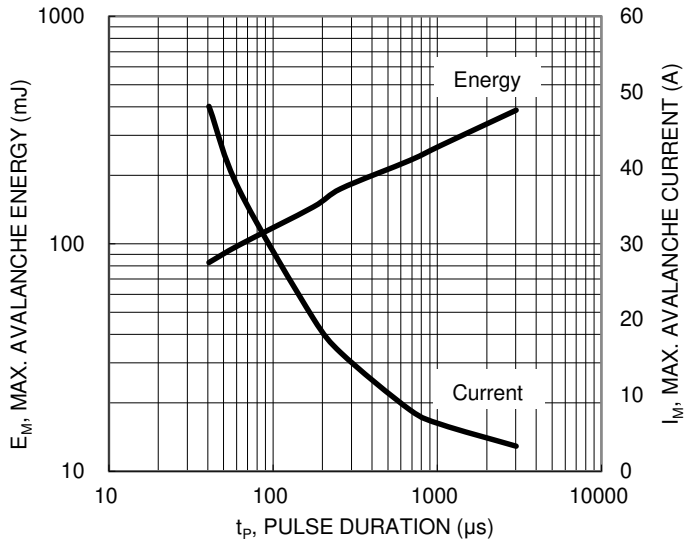


Figure 7. Single Pulse Max. Avalanche Energy and Current

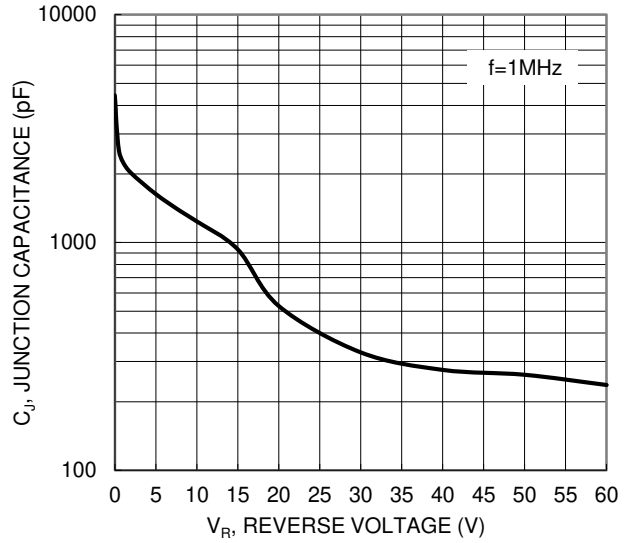


Figure 8. Typical Junction Capacitance

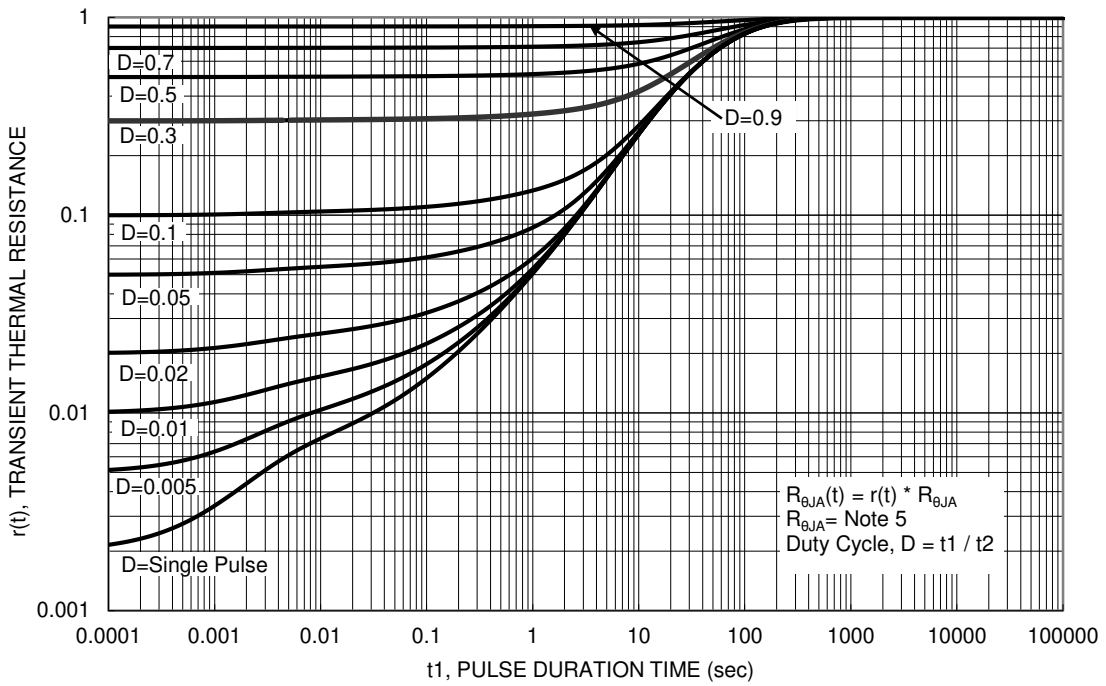
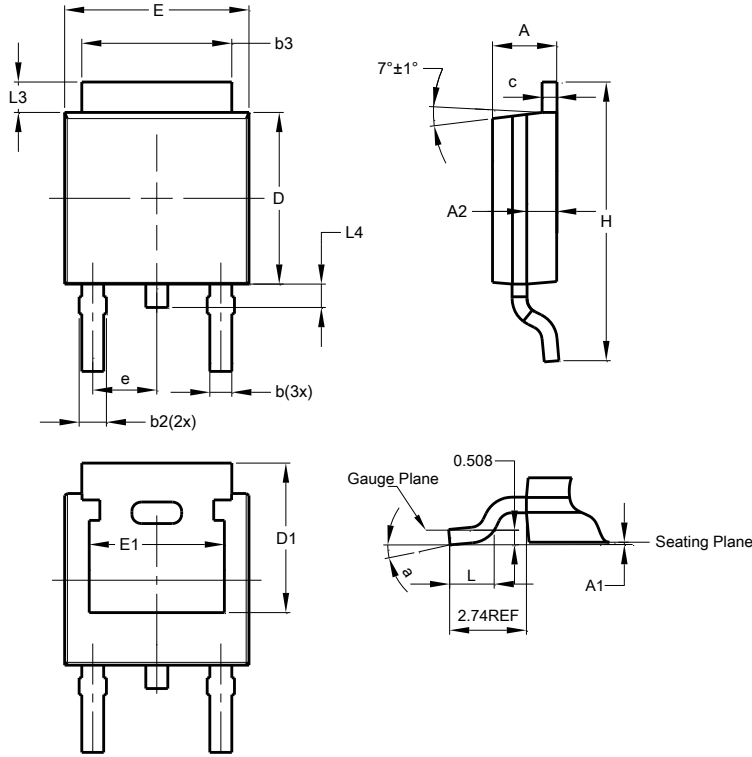


Figure 9. Transient Thermal Resistance

Package Outline Dimensions

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

TO252 (DPAK)

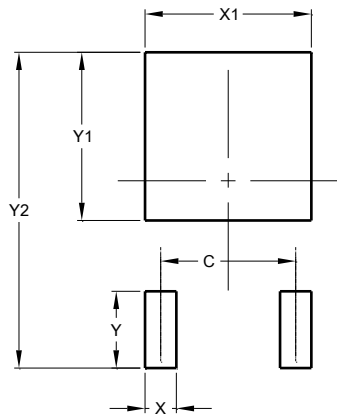


| TO252 (DPAK) | | | |
|-----------------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 2.19 | 2.39 | 2.29 |
| A1 | 0.00 | 0.13 | 0.08 |
| A2 | 0.97 | 1.17 | 1.07 |
| b | 0.64 | 0.88 | 0.783 |
| b2 | 0.76 | 1.14 | 0.95 |
| b3 | 5.21 | 5.46 | 5.33 |
| c | 0.45 | 0.58 | 0.531 |
| 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 |

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