

## Product Summary

| $V_{RRM}$ (V) | $I_o$ (A) | $V_F$ Max (V) | $I_R$ Max ( $\mu$ A) |
|---------------|-----------|---------------|----------------------|
| 60            | 3         | 0.62          | 100                  |

## Description

The SBR3U60P1Q is a single rectifier in the PowerDI<sup>®</sup> 123 package, offering excellent high-temperature stability and low forward voltage.

## Applications

- Bridge Diodes
- Flyback Diodes
- Blocking Diodes
- Reverse Protection Diodes

## Features and Benefits

- Ultra Low Forward Voltage Drop
- Low Reverse Leakage Current
- Patented Super Barrier Rectifier SBR<sup>®</sup> Technology
- Patented Interlocking Clip Design for High Surge Current Capacity
- Soft, Fast Switching Capability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

- Case: PowerDI123
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Polarity Indicator: Cathode Band
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.018 grams (Approximate)

PowerDI123



Top View



Device Symbol

## Ordering Information (Note 5)

| Part Number   | Compliance | Case       | Packaging          |
|---------------|------------|------------|--------------------|
| SBR3U60P1Q-7  | Automotive | PowerDI123 | 3,000/Tape & Reel  |
| SBR3U60P1Q-13 | Automotive | PowerDI123 | 10,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



3U6 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: C = 2015)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

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

Single phase, half wave, 60Hz, resistive or inductive load.  
 For capacitance load, derate current by 20%.

| Characteristic  | Symbol              | Value | Unit |
|---|---------------------|-------|------|
| Peak Repetitive Reverse Voltage   | V <sub>RRM</sub>    | 60    | V    |
| Working Peak Reverse Voltage  | V <sub>RWM</sub>    |       |      |
| DC Blocking Voltage   | V <sub>RM</sub>     |       |      |
| RMS Reverse Voltage   | V <sub>R(RMS)</sub> | 42    | V    |
| Average Rectified Output Current  | I <sub>O</sub>      | 3.0   | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub>    | 80    | A    |
| Repetitive Peak Avalanche Energy (1μs, +25°C)   | P <sub>ARM</sub>    | 2,100 | W    |

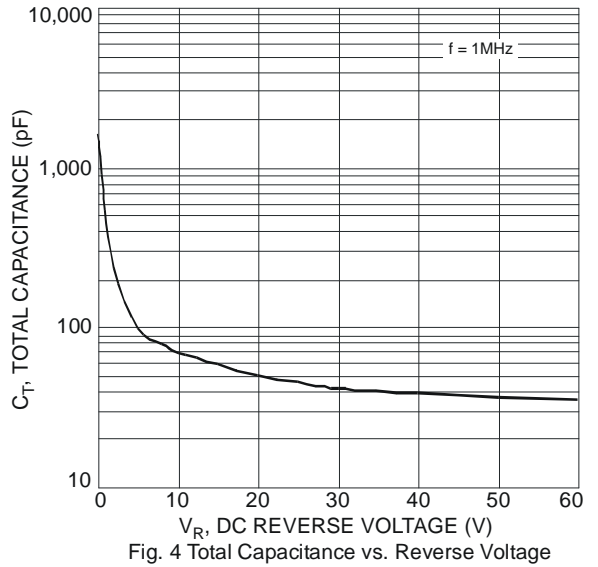
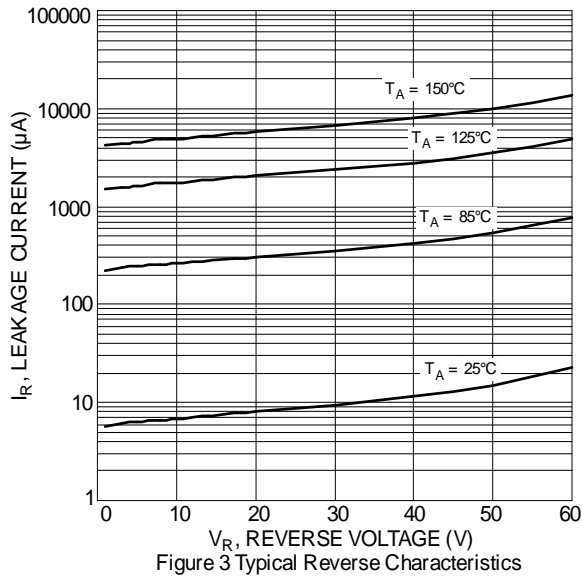
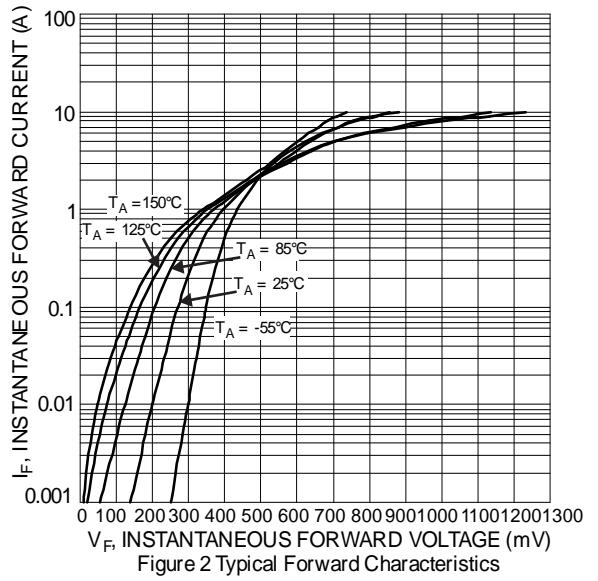
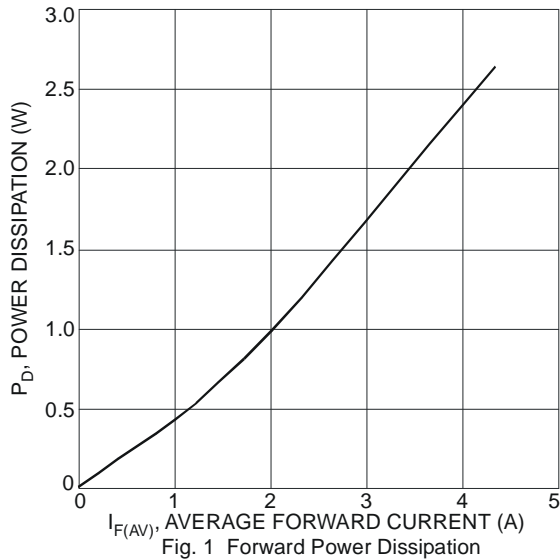
## Thermal Characteristics

| Characteristic                                    | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Thermal Resistance Junction to Soldering (Note 7) | R <sub>θJS</sub>                  | 5           | °C/W |
| Thermal Resistance Junction to Ambient (Note 6)   | R <sub>θJA</sub>                  | 175         |      |
| Operating and Storage Temperature Range           | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °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> | —   | —   | 0.62 | V    | I <sub>F</sub> = 3.0A, T <sub>J</sub> = +25°C  |
| Forward Voltage Drop     | V <sub>F</sub> | —   | —   | 0.61 | V    | I <sub>F</sub> = 3.0A, T <sub>J</sub> = +125°C |
| Leakage Current (Note 8) | I <sub>R</sub> | —   | —   | 100  | μA   | V <sub>R</sub> = 60V, T <sub>J</sub> = +25°C   |
| Leakage Current (Note 8) | I <sub>R</sub> | —   | —   | 12   | mA   | V <sub>R</sub> = 60V, T <sub>J</sub> = +125°C  |

- Notes:
- FR-4 PCB, 2 oz. copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.
  - Theoretical R<sub>θJS</sub> calculated from the top center of the die straight down to the PCB cathode tab solder junction
  - Short duration pulse test used to minimize self-heating effect.



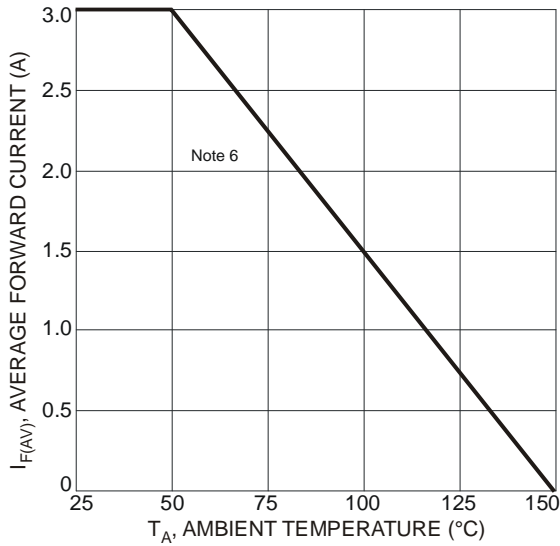


Fig. 5 Forward Current Derating Curve

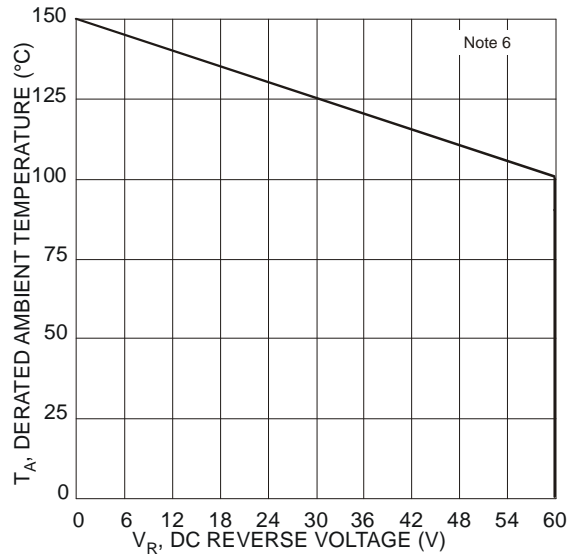


Fig. 6 Operating Temperature Derating

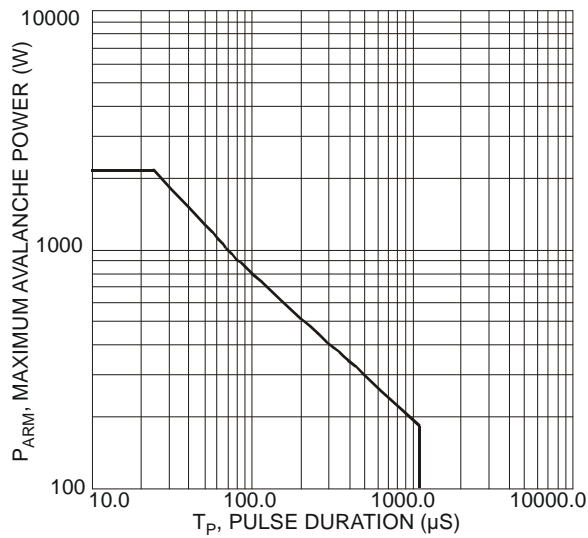
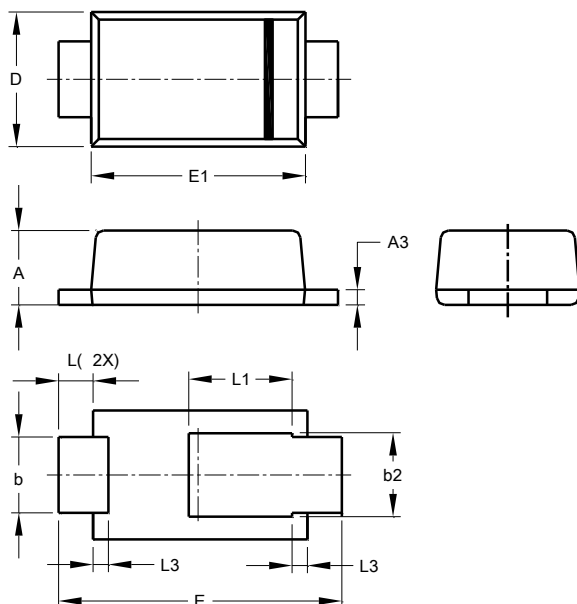


Fig. 7 Maximum Avalanche Power Curve, Per Element

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

### PowerDI123

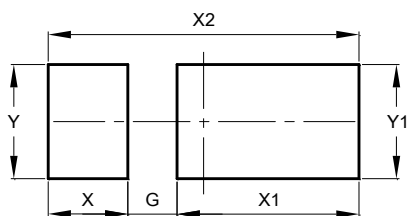


| PowerDI123           |       |       |      |
|----------------------|-------|-------|------|
| Dim                  | Min   | Max   | Typ  |
| A                    | 0.93  | 1.00  | 0.98 |
| A3                   | 0.15  | 0.25  | 0.20 |
| b                    | 0.85  | 1.25  | 1.00 |
| b2                   | 1.025 | 1.125 | 1.10 |
| D                    | 1.63  | 1.93  | 1.78 |
| E                    | 3.50  | 3.90  | 3.70 |
| E1                   | 2.60  | 3.00  | 2.80 |
| L                    | 0.40  | 0.50  | 0.45 |
| L1                   | 1.25  | 1.40  | 1.35 |
| L3                   | 0.125 | 0.275 | 0.20 |
| All Dimensions in mm |       |       |      |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

### PowerDI123



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 0.65          |
| X          | 1.05          |
| X1         | 2.40          |
| X2         | 4.10          |
| Y          | 1.50          |
| Y1         | 1.50          |

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