

## Features

- Ultra Low Leakage Current
- Excellent High Temperature Stability
- Superior Reverse Avalanche Capability
- Patented Interlocking Clip Design for High Surge Current Capacity
- Patented Super Barrier Rectifier Technology
- Soft, Fast Switching Capability
- 175°C Operating Junction Temperature
- ±16KV ESD Protection (HBM, 3B)
- ±25KV ESD Protection (IEC61000-4-2 Level 4, Air Discharge)
- **Lead Free Finish, RoHS Compliant (Note 1)**
- **“Green” Molding Compound (No Br, Sb)**
- **Qualified to AEC-Q 101 Standards for High Reliability**

## Mechanical Data

- Case: PowerDI<sup>®</sup>123
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Polarity Indicator: Cathode Band
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.018 grams (approximate)



Top View

## 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>    | 30    | V    |
| Working Peak Reverse Voltage                                                                        | V <sub>RWM</sub>    |       |      |
| DC Blocking Voltage                                                                                 | V <sub>RM</sub>     |       |      |
| RMS Reverse Voltage                                                                                 | V <sub>R(RMS)</sub> | 21    | V    |
| Average Rectified Output Current (See Figure 1)                                                     | I <sub>O</sub>      | 2.0   | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub>    | 75    | A    |
| Non-Repetitive Avalanche Energy<br>(T <sub>J</sub> = 25°C, I <sub>AS</sub> = 5A, L = 8.5 mH)        | E <sub>AS</sub>     | 105   | mJ   |
| Repetitive Peak Avalanche Energy<br>(1μs, 25°C)                                                     | P <sub>ARM</sub>    | 1100  | W    |

## Thermal Characteristics

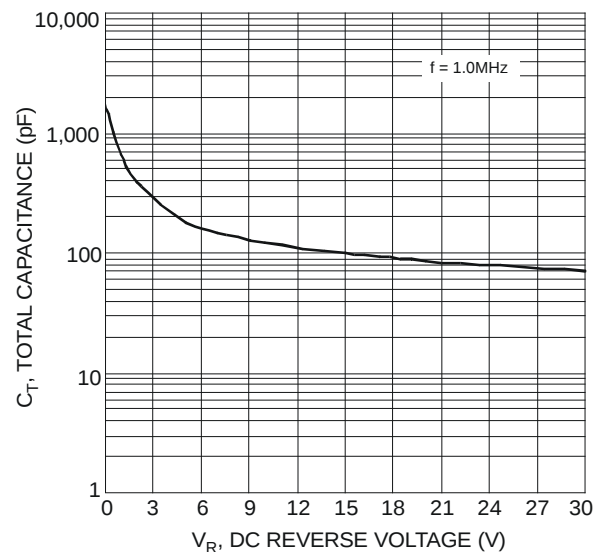
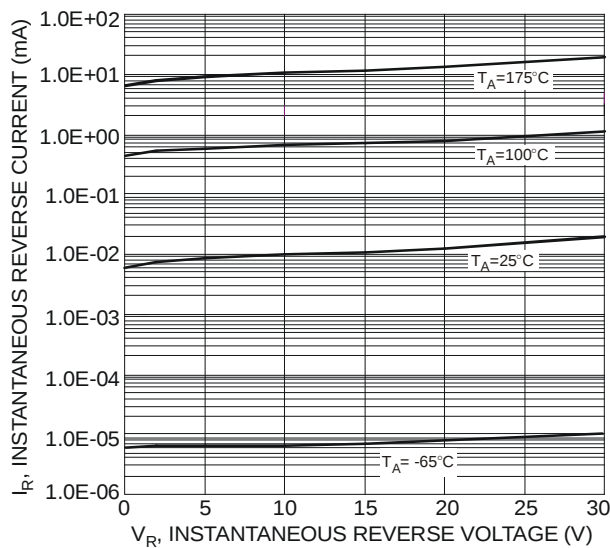
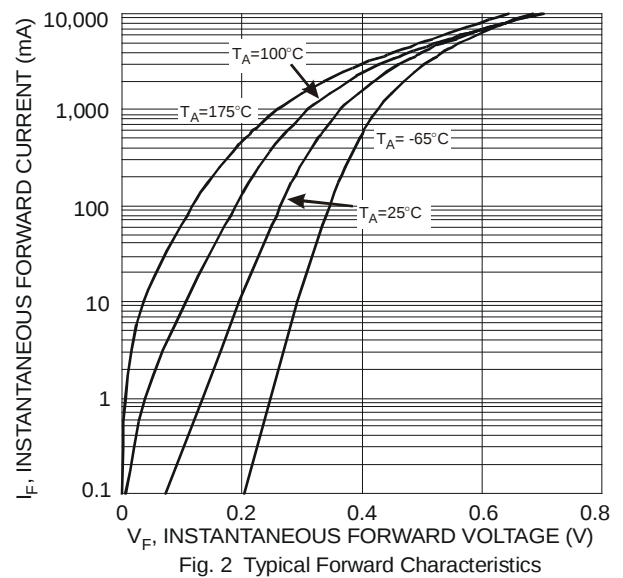
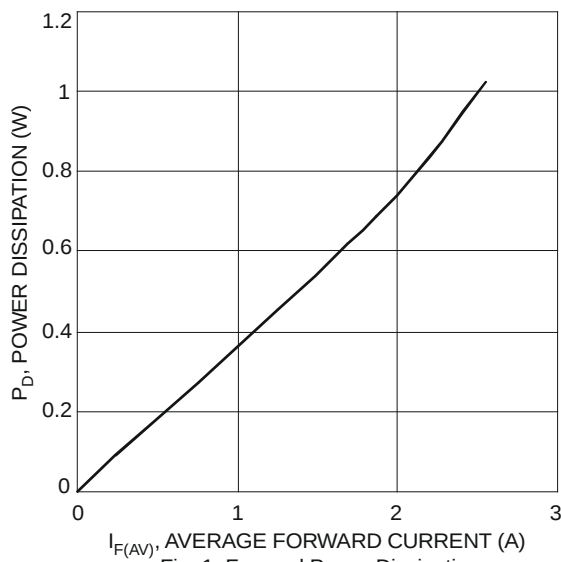
| Characteristic                                    | Symbol                            | Value       | Unit |
|---------------------------------------------------|-----------------------------------|-------------|------|
| Maximum Thermal Resistance                        | R <sub>θJS</sub>                  | 5           | °C/W |
| Thermal Resistance Junction to Soldering (Note 2) | R <sub>θJA</sub>                  |             |      |
| Thermal Resistance Junction to Ambient (Note 3)   | R <sub>θJA</sub>                  | 183         |      |
| Thermal Resistance Junction to Ambient (Note 4)   | R <sub>θJA</sub>                  | 125         |      |
| Operating and Storage Temperature Range           | T <sub>J</sub> , T <sub>STG</sub> | -65 to +175 | °C   |

- Notes:
1. RoHS revision 13.2.2003. High temperature solder exemption applied, see *EU Directive Annex Note 7*.
  2. Theoretical R<sub>θJS</sub> calculated from the top center of the die straight down to the PCB cathode tab solder junction.
  3. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Polyimide PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/datasheets/ap02001.pdf>

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                     | Symbol             | Min | Typ  | Max  | Unit | Test Condition                                |
|------------------------------------|--------------------|-----|------|------|------|-----------------------------------------------|
| Reverse Breakdown Voltage (Note 5) | V <sub>(BR)R</sub> | 30  | -    | -    | V    | I <sub>R</sub> = 200μA                        |
| Forward Voltage Drop               | V <sub>F</sub>     | -   | 0.26 | 0.30 | V    | I <sub>F</sub> = 0.1A, T <sub>J</sub> = 25°C  |
|                                    |                    | -   | 0.37 | 0.41 |      | I <sub>F</sub> = 1.0A, T <sub>J</sub> = 25°C  |
|                                    |                    | -   | 0.42 | 0.46 |      | I <sub>F</sub> = 2.0A, T <sub>J</sub> = 25°C  |
|                                    |                    | -   | 0.16 | 0.19 |      | I <sub>F</sub> = 0.1A, T <sub>J</sub> = 125°C |
|                                    |                    | -   | 0.29 | 0.32 |      | I <sub>F</sub> = 1.0A, T <sub>J</sub> = 125°C |
|                                    |                    | -   | 0.36 | 0.39 |      | I <sub>F</sub> = 2.0A, T <sub>J</sub> = 125°C |
| Leakage Current (Note 5)           | I <sub>R</sub>     | -   | 10   | 100  | μA   | V <sub>R</sub> = 5V, T <sub>J</sub> = 25°C    |
|                                    |                    |     | 20   | 200  | μA   | V <sub>R</sub> = 30V, T <sub>J</sub> = 25°C   |
|                                    |                    |     | 1.7  | 8    | mA   | V <sub>R</sub> = 5V, T <sub>J</sub> = 125°C   |
|                                    |                    |     | 3.1  | 12   | mA   | V <sub>R</sub> = 30V, T <sub>J</sub> = 125°C  |

Notes: 5. Short duration pulse test used to minimize self-heating effect.



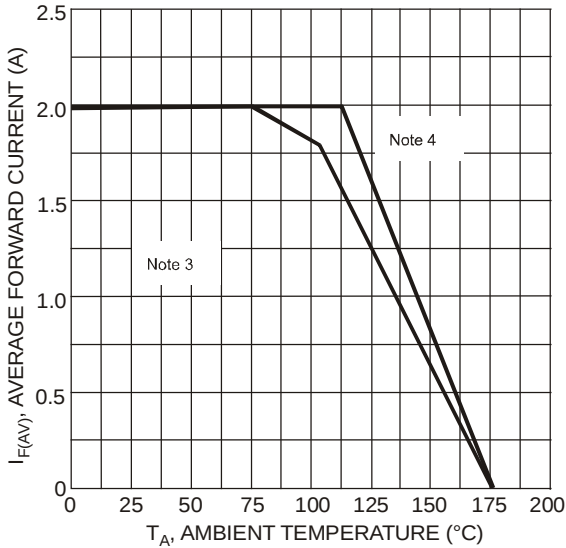


Fig. 5 Forward Current Derating Curve

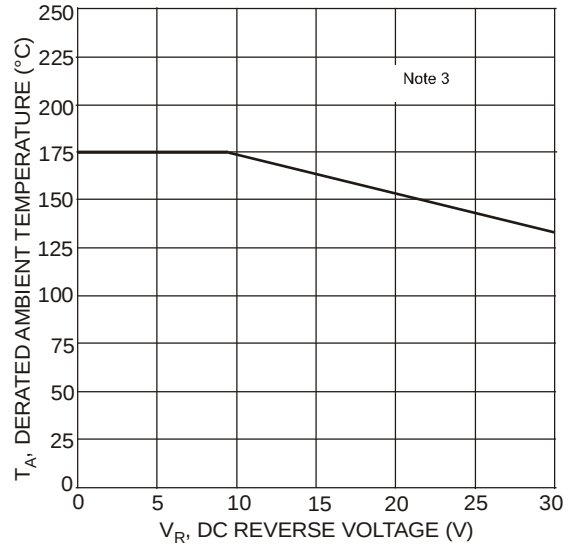


Fig. 6 Operating Temperature Derating

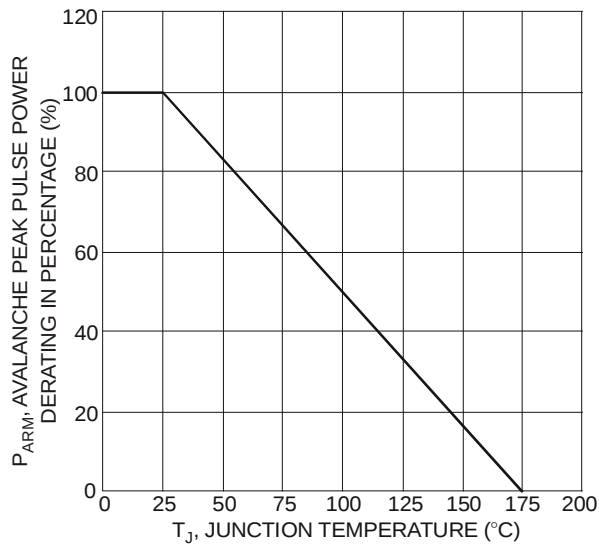


Fig. 7 Pulse Derating Curve

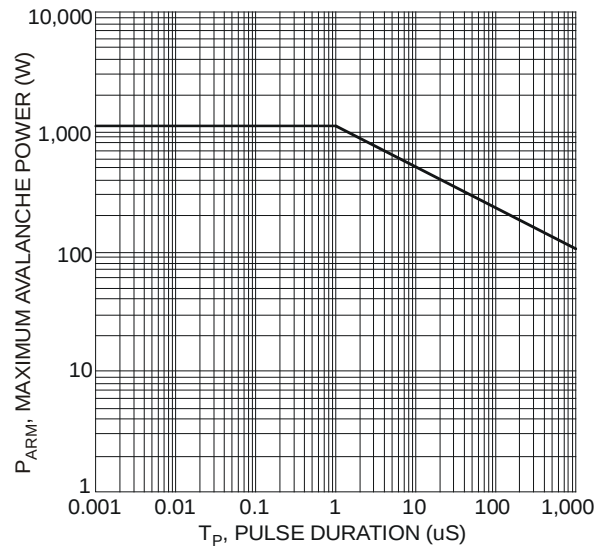


Fig. 8 Maximum Avalanche Power Curve

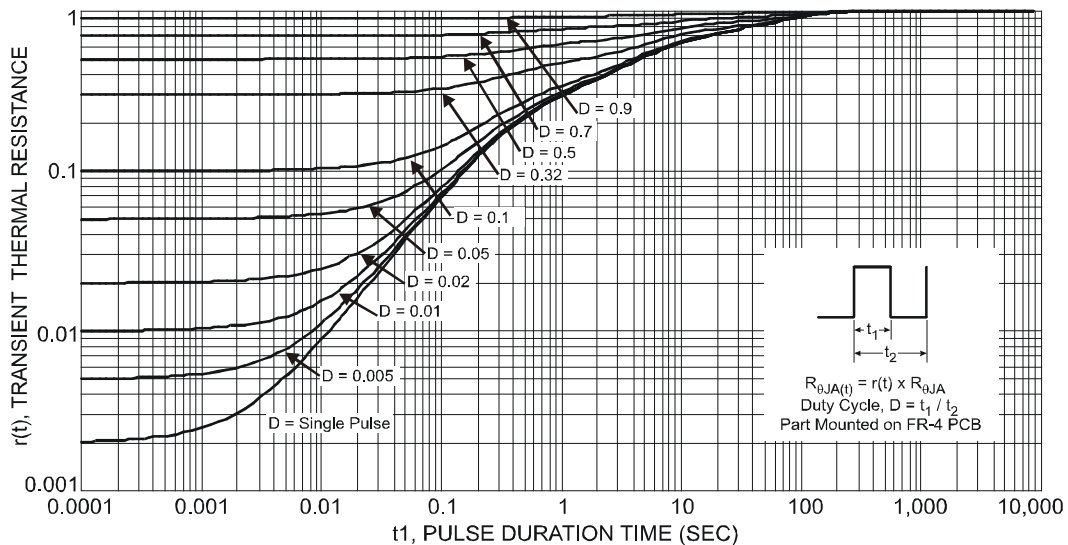


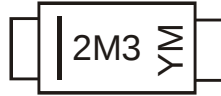
Fig. 9 Transient Thermal Resistance

## Ordering Information (Note 6)

| Part Number | Case        | Packaging        |
|-------------|-------------|------------------|
| SBR2M30P1-7 | PowerDI®123 | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



2M3 = Product Type Marking Code

YM = Date Code Marking

Y = Year (ex: T = 2006)

M = Month (ex: 9 = September)

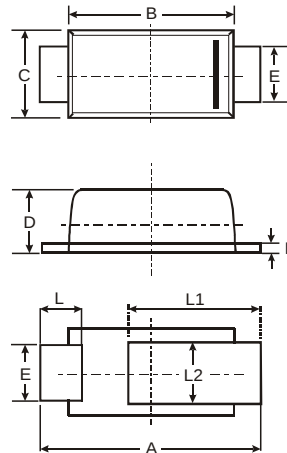
Date Code Key

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | T    | U    | V    | W    | X    | Y    | Z    | A    | B    | C    |

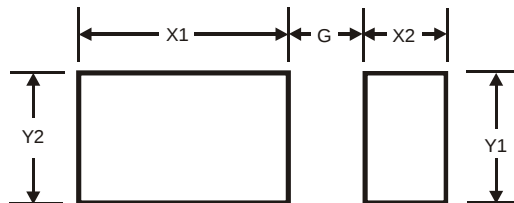
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

## Package Outline Dimensions



| PowerDI®123          |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 3.50 | 3.90 | 3.70 |
| B                    | 2.60 | 3.00 | 2.80 |
| C                    | 1.63 | 1.93 | 1.78 |
| D                    | 0.93 | 1.00 | 0.98 |
| E                    | 0.85 | 1.25 | 1.00 |
| H                    | 0.15 | 0.25 | 0.20 |
| L                    | 0.55 | 0.75 | 0.65 |
| L1                   | 1.80 | 2.20 | 2.00 |
| L2                   | 0.95 | 1.25 | 1.10 |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 1.0           |
| X1         | 2.2           |
| X2         | 0.9           |
| Y1         | 1.4           |
| Y2         | 1.4           |

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