

2.0A SBR[®]
Surface Mount Super Barrier Rectifier
PowerDI[™]123

NEW PRODUCT

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[™]123
- Case Material: Molded Plastic, “Green” Molding compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- 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

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%.

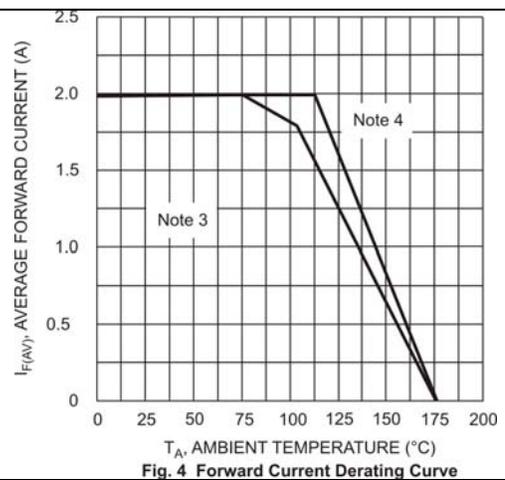
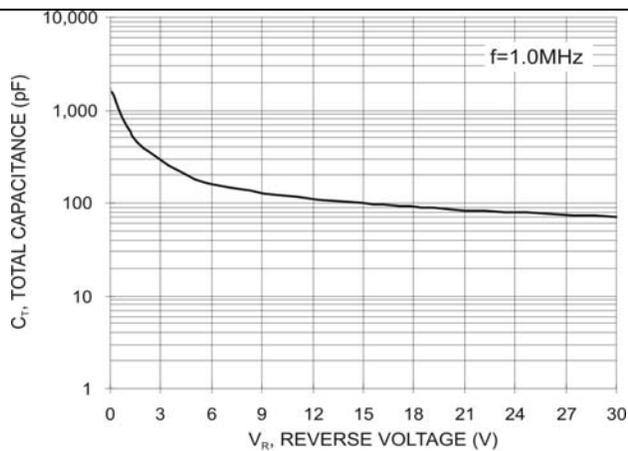
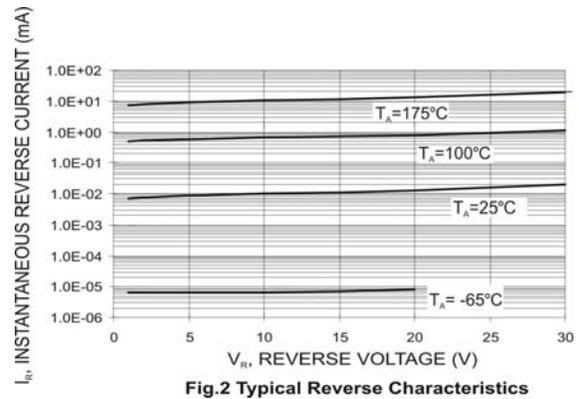
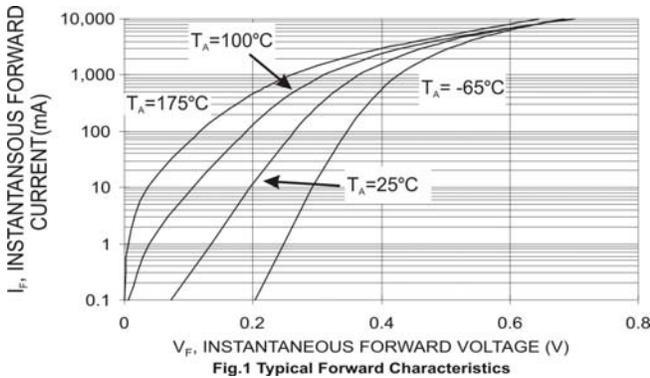
| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Peak Repetitive Reverse Voltage | V _{RRM} | 30 | V |
| Working Peak Reverse Voltage | V _{RWM} | | |
| DC Blocking Voltage | V _{RM} | | |
| RMS Reverse Voltage | V _{R(RMS)} | 21 | V |
| Average Rectified Output Current (See Figure 1) | I _O | 2.0 | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load | I _{FSM} | 75 | A |
| Non-Repetitive Avalanche Energy (T _J = 25°C, I _{AS} = 5A, L = 8.5 mH) | E _{AS} | 105 | mJ |
| Repetitive Peak Avalanche Energy (1μs, 25°C) | P _{ARM} | 1100 | W |
| Maximum Thermal Resistance | | | |
| Thermal Resistance Junction to Soldering (Note 2) | R _{θJS} | 5 | °C/W |
| Thermal Resistance Junction to Ambient (Note 3) | R _{θJA} | 183 | |
| Thermal Resistance Junction to Ambient (Note 4) | | 125 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -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_{θJS} 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 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------------------|-------------|-----|------|------|---------------|--|
| Reverse Breakdown Voltage (Note 5) | $V_{(BR)R}$ | 30 | - | - | V | $I_R = 200 \mu\text{A}$ |
| Forward Voltage Drop | V_F | - | 0.26 | 0.30 | V | $I_F = 0.1\text{A}, T_J = 25^\circ\text{C}$ |
| | | - | 0.37 | 0.41 | | $I_F = 1.0\text{A}, T_J = 25^\circ\text{C}$ |
| | | - | 0.42 | 0.46 | | $I_F = 2.0\text{A}, T_J = 25^\circ\text{C}$ |
| | | - | 0.16 | 0.19 | | $I_F = 0.1\text{A}, T_J = 125^\circ\text{C}$ |
| | | - | 0.29 | 0.32 | | $I_F = 1.0\text{A}, T_J = 125^\circ\text{C}$ |
| | | - | 0.36 | 0.39 | | $I_F = 2.0\text{A}, T_J = 125^\circ\text{C}$ |
| Leakage Current (Note 5) | I_R | - | 10 | 100 | μA | $V_R = 5\text{V}, T_J = 25^\circ\text{C}$ |
| | | - | 20 | 200 | μA | $V_R = 30\text{V}, T_J = 25^\circ\text{C}$ |
| | | - | 1.7 | 8 | mA | $V_R = 5\text{V}, T_J = 125^\circ\text{C}$ |
| | | - | 3.1 | 12 | mA | $V_R = 30\text{V}, T_J = 125^\circ\text{C}$ |

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



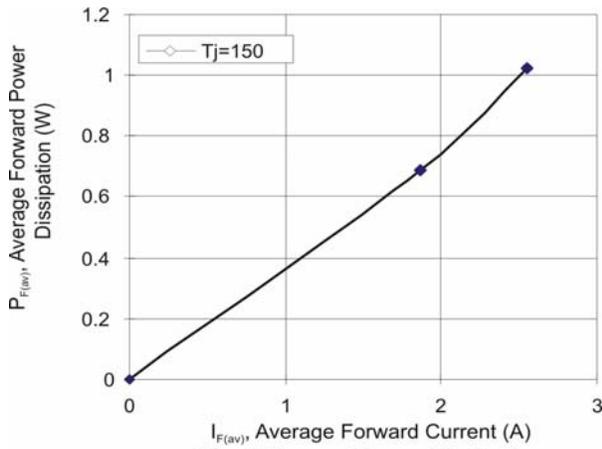


Fig. 5: Forward Power Dissipation

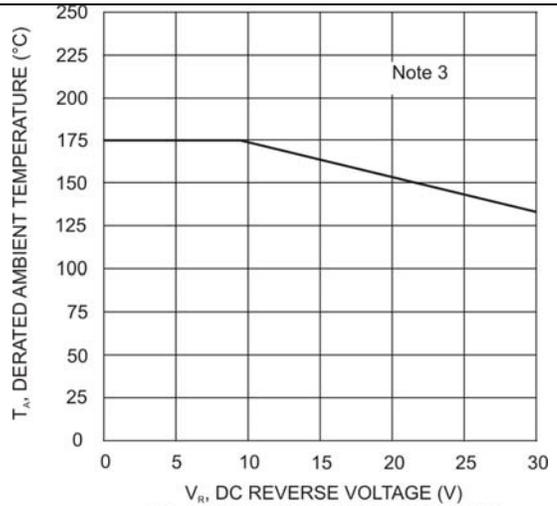


Fig. 6: Operating Temperature Derating

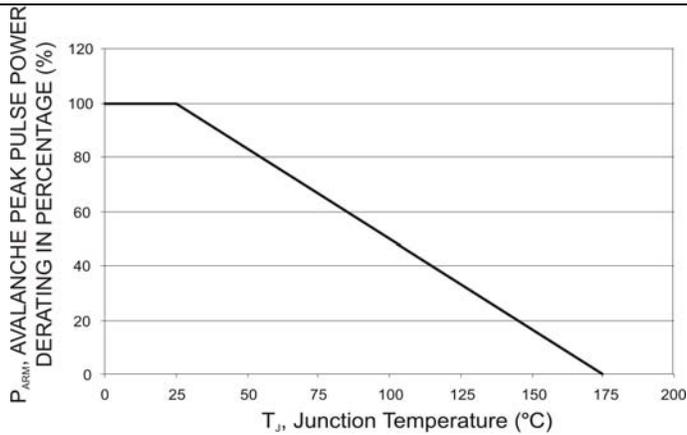


Fig. 7: Pulse Derating Curve, Per Element

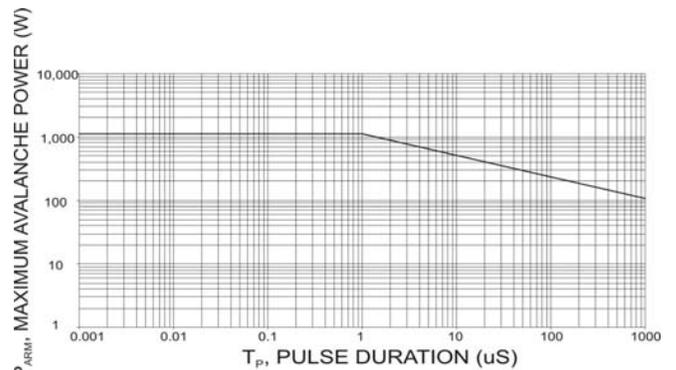
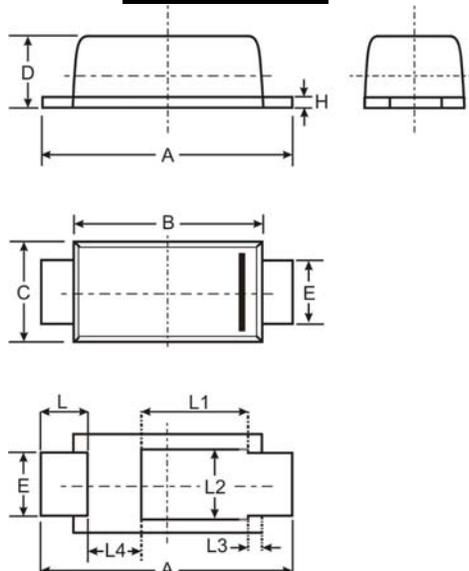


Fig. 8: Maximum Avalanche Power Curve, Per Element

Package Outline Drawings

PowerDI™123



| PowerDI™123 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 3.65 | 3.75 | 3.70 |
| B | 2.775 | 2.825 | 2.80 |
| C | 1.750 | 1.800 | 1.775 |
| D | 0.955 | 1.000 | 0.98 |
| E | 0.95 | 1.05 | 1.00 |
| H | 0.15 | 0.25 | 0.20 |
| L | 0.60 | 0.70 | 0.65 |
| L1 | — | — | 1.36 |
| L2 | — | — | 1.10 |
| L3 | — | — | 0.20 |
| L4 | 0.95 | 1.25 | 1.05 |
| All Dimensions in mm | | | |

Marking, Polarity, Weight & Ordering Information

| | | | | |
|-----------|---|--|--|------------------|
| SBR2M30P1 | Case Style | | Marking | Weight |
| |  Top View |  Back View |  | 0.096g (approx.) |

| | |
|---------------------------------|---|
| Ordering Information | Date Code |
| SBR2M30P1-7 3000/Tape & Reel | 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 |
|------|------|------|------|------|------|------|------|
| Code | T | U | V | W | X | Y | Z |

| 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 |

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