

**3.0A SBR<sup>®</sup>**  
**Surface Mount Super Barrier Rectifier**  
**PowerDI<sup>™</sup>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<sup>™</sup>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<sub>A</sub> = 25°C unless otherwise specified

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

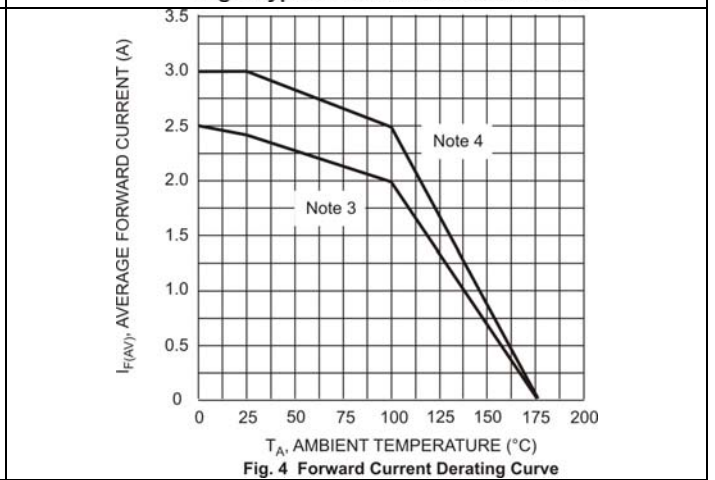
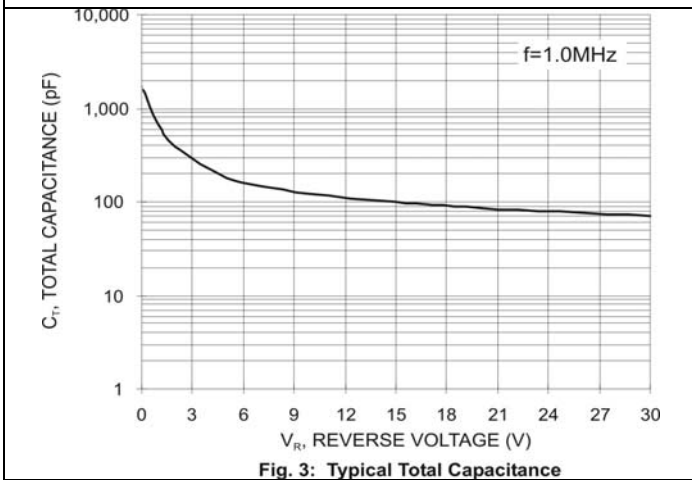
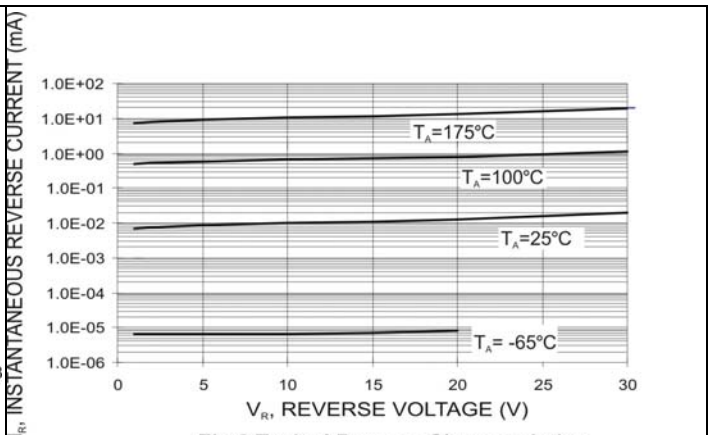
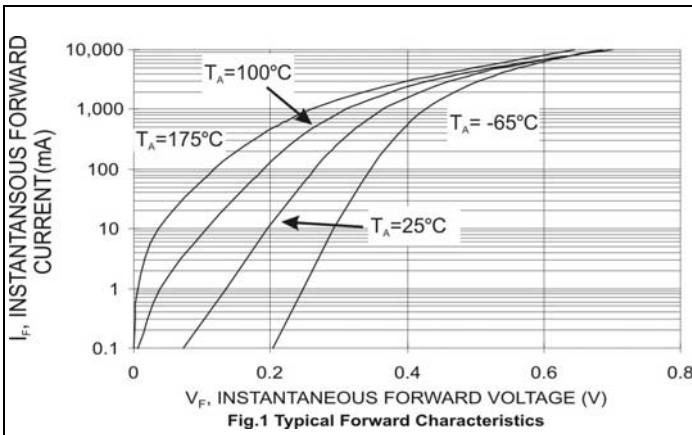
Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	30	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage	V <sub>RM</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	21	V
Average Rectified Output Current (See Figure 1)	I <sub>O</sub>	3.0	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	75	A
Non-Repetitive Avalanche Energy (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 (1μs, 25°C)	P <sub>ARM</sub>	1100	W
Maximum Thermal Resistance			
Thermal Resistance Junction to Soldering (Note 2)	R <sub>θJS</sub>	5	°C/W
Thermal Resistance Junction to Ambient (Note 3)	R <sub>θJA</sub>	183	
Thermal Resistance Junction to Ambient (Note 4)		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>

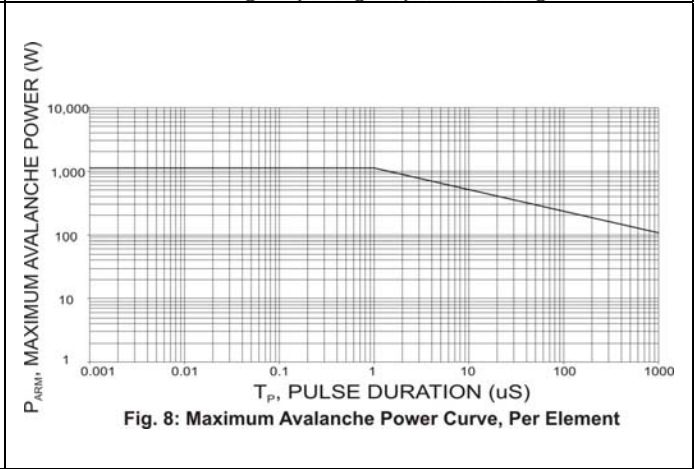
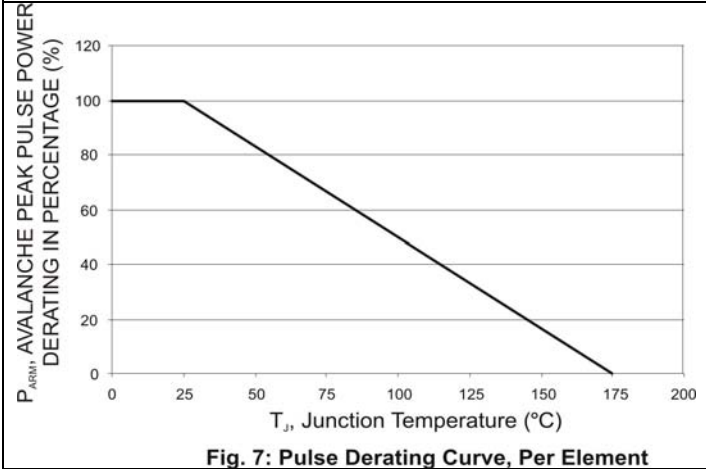
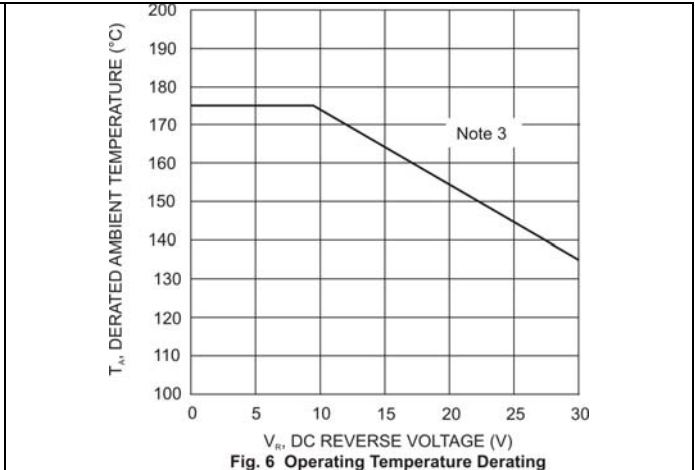
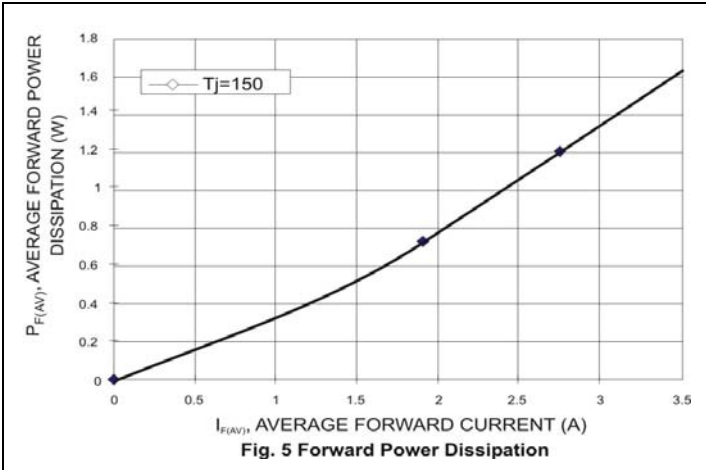
**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 5)	$V_{(BR)R}$	30	-	-	V	$I_R = 250 \mu\text{A}$
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		$I_F = 1.0\text{A}, T_J = 25^\circ\text{C}$
		-	0.46	0.50		$I_F = 3.0\text{A}, T_J = 25^\circ\text{C}$
		-	0.16	0.19		$I_F = 0.1\text{A}, T_J = 125^\circ\text{C}$
		-	0.29	0.32		$I_F = 1.0\text{A}, T_J = 125^\circ\text{C}$
		-	0.42	0.45		$I_F = 3.0\text{A}, T_J = 125^\circ\text{C}$
Leakage Current (Note 5)	$I_R$	-	8.5	100	$\mu\text{A}$	$V_R = 5\text{V}, T_J = 25^\circ\text{C}$
		-	19	200	$\mu\text{A}$	$V_R = 30\text{V}, T_J = 25^\circ\text{C}$
		-	1.7	15	$\text{mA}$	$V_R = 5\text{V}, T_J = 125^\circ\text{C}$
		-	3.1	20	$\text{mA}$	$V_R = 30\text{V}, T_J = 125^\circ\text{C}$

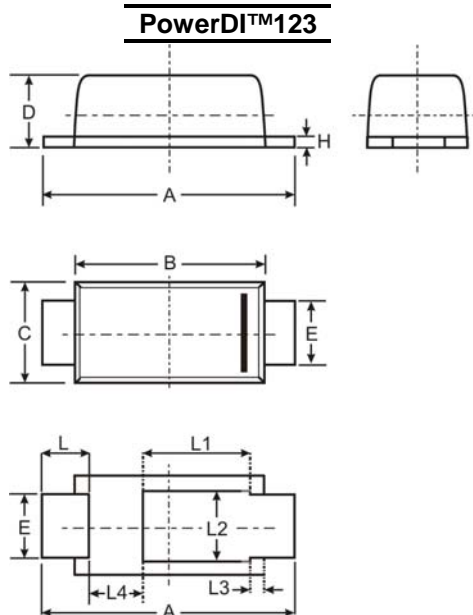
Notes: 5. Short duration pulse test used to minimize self-heating effect.



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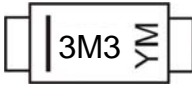
**Package Outline Drawings**



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

SBR3M30P1	Case Style		Marking	Weight
	 Top View	 Back View		0.096g (approx.)

Ordering Information	Date Code
SBR3M30P1-7 3000/Tape & Reel	3M3 = 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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