


## 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-Q101 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 
- 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>	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 (Per Element) (T <sub>J</sub> = 25°C, I <sub>AS</sub> = 5A, L = 8.5mH)	E <sub>AS</sub>	105	mJ
Repetitive Peak Avalanche Energy (Per Element) (1μs, 25°C)	P <sub>ARM</sub>	1100	W

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
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)	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>

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**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> = 250μA
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
		-	0.46	0.50		I <sub>F</sub> = 3.0A, 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
Leakage Current (Note 5)	I <sub>R</sub>	-	8.5	100	μA	V <sub>R</sub> = 5V, T <sub>J</sub> = 25°C
		-	19	200	μA	V <sub>R</sub> = 30V, T <sub>J</sub> = 25°C
		-	1.7	15	mA	V <sub>R</sub> = 5V, T <sub>J</sub> = 125°C
		-	3.1	20	mA	V <sub>R</sub> = 30V, T <sub>J</sub> = 125°C

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

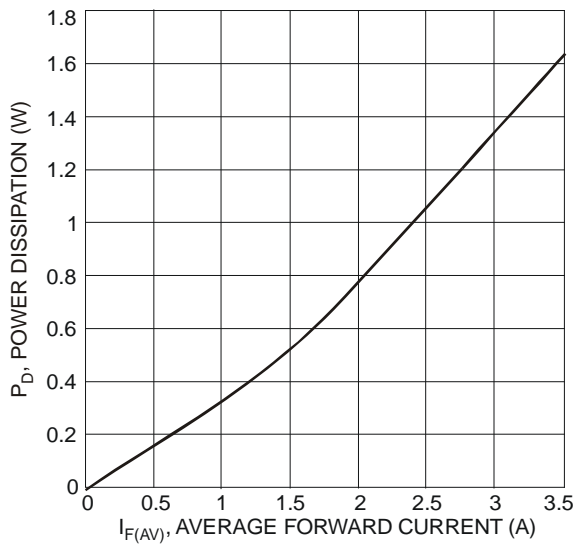


Fig. 1 Forward Power Dissipation

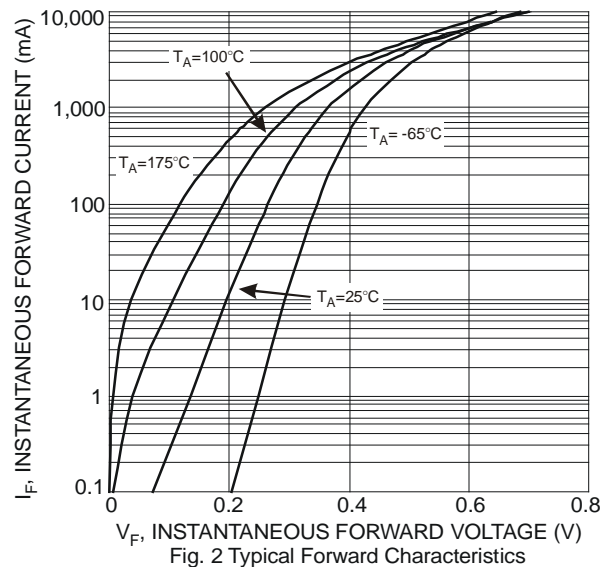


Fig. 2 Typical Forward Characteristics

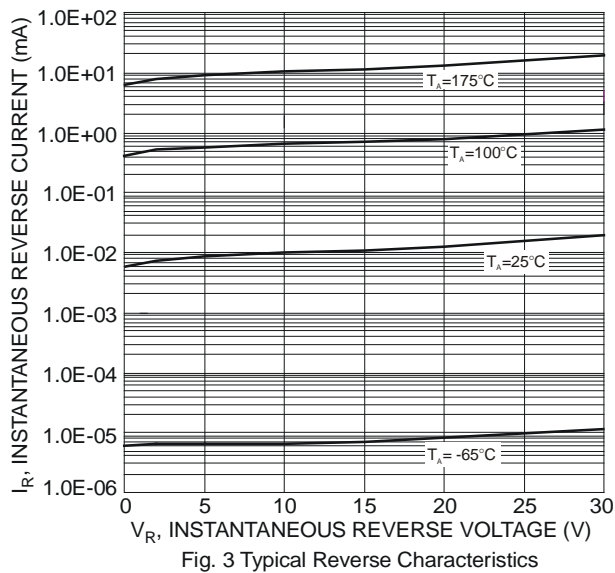


Fig. 3 Typical Reverse Characteristics

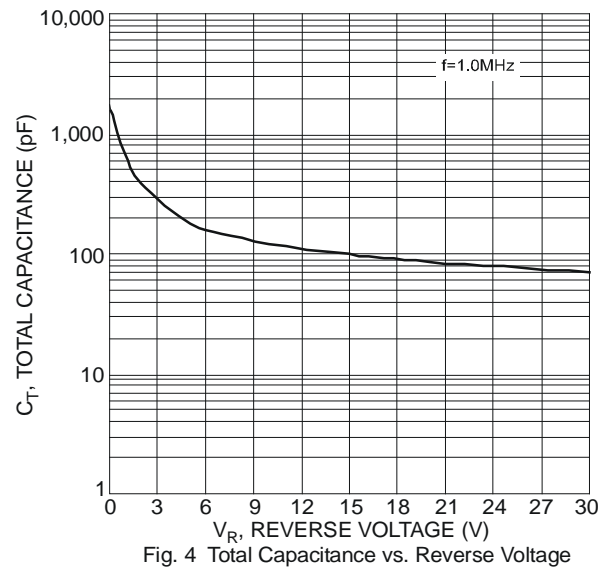


Fig. 4 Total Capacitance vs. Reverse Voltage

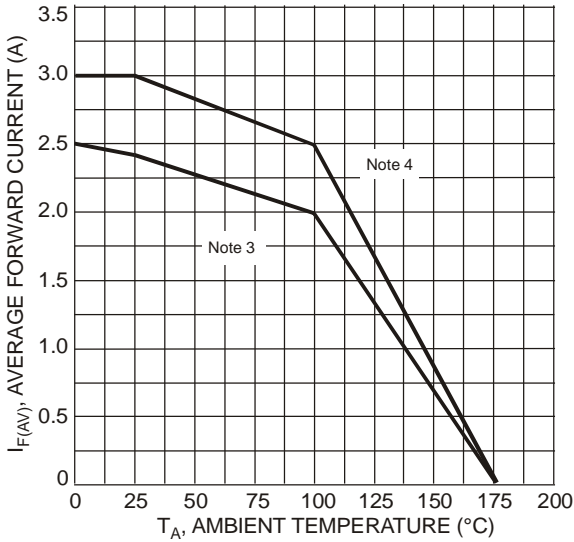


Fig. 5 Forward Current Derating Curve

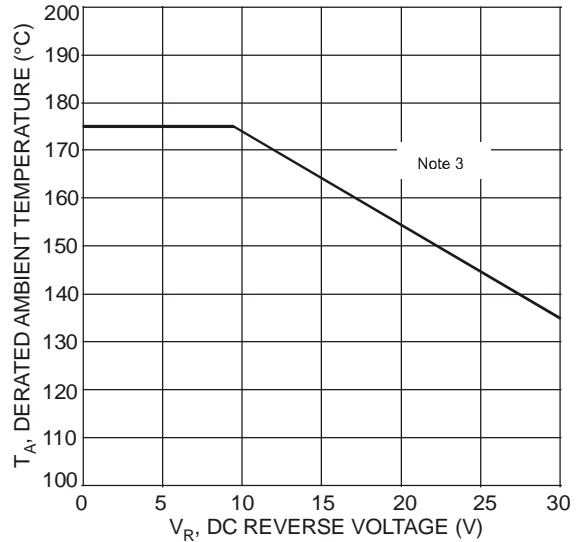


Fig. 6 Operating Temperature Derating

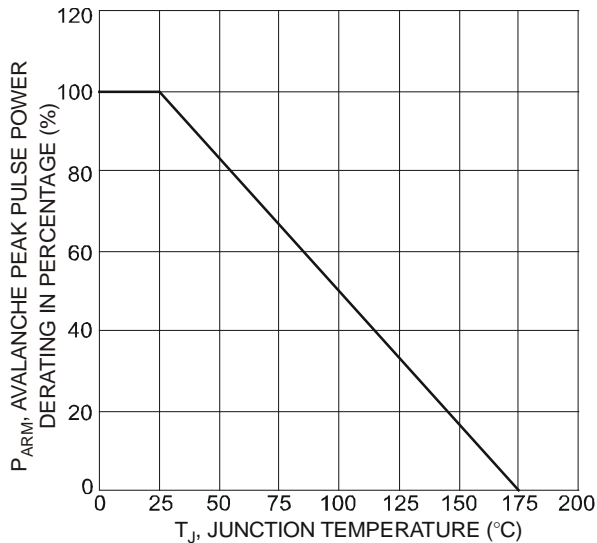


Fig. 7 Pulse Derating Curve

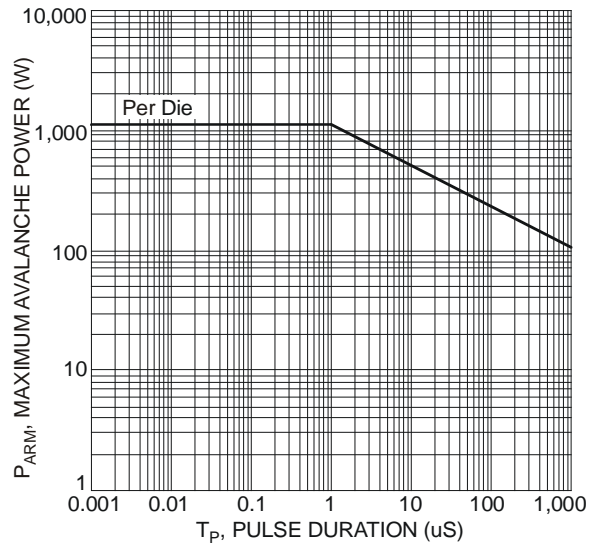


Fig. 8 Maximum Avalanche Power Curve

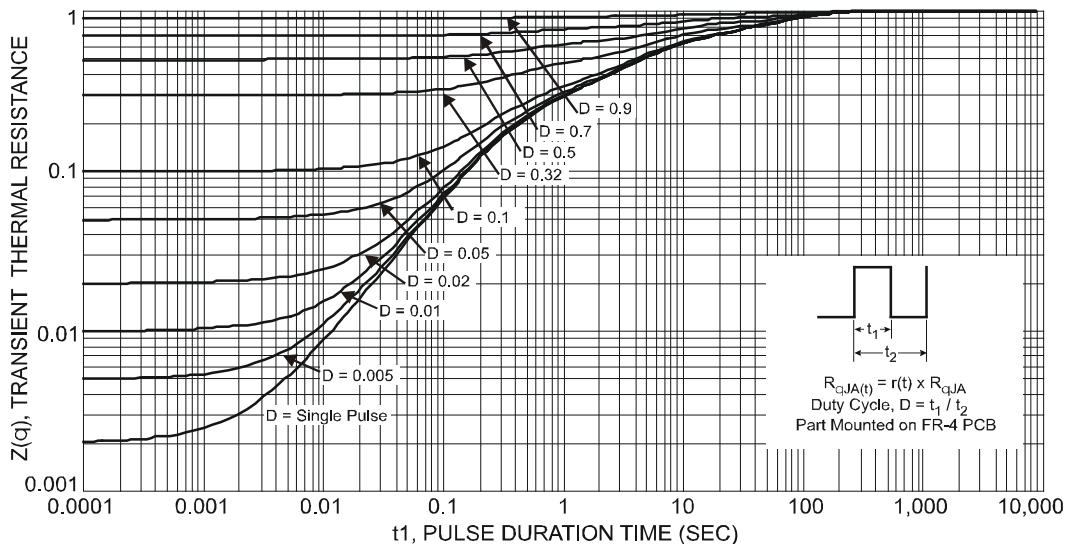


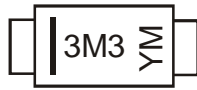
Fig. 9 Transient Thermal Resistance

### Ordering Information (Note 6)

Part Number	Case	Packaging
SBR3M30P1-7	PowerDI <sup>®</sup> 123	3000/Tape & Reel

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

### Marking Information



3M3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: T = 2006)  
 M = Month (ex: 9 = September)

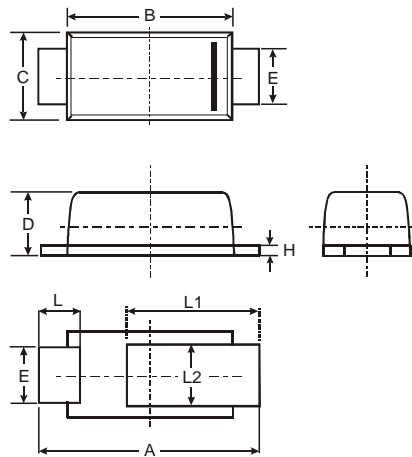
Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012
Code	T	U	V	W	X	Y	Z

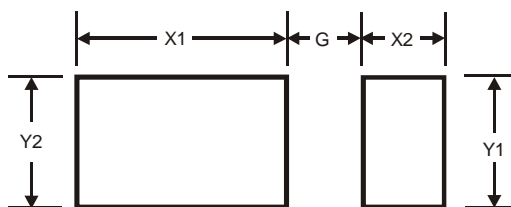
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

### Package Outline Dimensions



PowerDI <sup>®</sup> 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
<b>All Dimensions in mm</b>			

### Suggested Pad Layout



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

#### IMPORTANT NOTICE

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