


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[®]123
- Case Material: Molded Plastic, “Green” Molding Compound. 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 
- Weight: 0.018 grams (approximate)

POWERDI[®]123



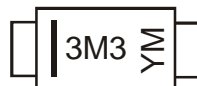
Top View

Ordering Information (Note 2)

Part Number	Case	Packaging
SBR3M30P1-7	POWERDI [®] 123	3000/Tape & Reel

Notes: 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2). All applicable RoHS exemptions applied
 2. For packaging details, go to our website at <http://www.diodes.com>.

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	2013	2014	2015	2016	2017
Code	T	U	V	W	X	Y	Z	A	B	C	D	E
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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Maximum Ratings @ $T_A = 25^\circ\text{C}$ 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_{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	3.0	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 (Per Element) ($T_J = 25^\circ\text{C}$, $I_{AS} = 5\text{A}$, $L = 8.5\text{mH}$)	E_{AS}	105	mJ
Repetitive Peak Avalanche Energy (Per Element) ($1\mu\text{s}$, 25°C)	P_{ARM}	1100	W

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance			
Thermal Resistance Junction to Soldering (Note 3)	$R_{\theta JS}$	5	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 4)	$R_{\theta JA}$	183	
Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	125	
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +175	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 6)	$V_{(BR)R}$	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		$I_F = 1.0\text{A}$, $T_J = 125^\circ\text{C}$
Leakage Current (Note 6)	I_R	-	8.5	100	μA	$V_R = 5\text{V}$, $T_J = 25^\circ\text{C}$
		-	19	200	μA	$V_R = 30\text{V}$, $T_J = 25^\circ\text{C}$
		-	1.7	15	mA	$V_R = 5\text{V}$, $T_J = 125^\circ\text{C}$
			3.1	20	mA	$V_R = 30\text{V}$, $T_J = 125^\circ\text{C}$

- Notes:
- Theoretical $R_{\theta JS}$ calculated from the top center of the die straight down to the PCB cathode tab solder junction.
 - FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.
 - Polymide PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com>.
 - Short duration pulse test used to minimize self-heating effect.

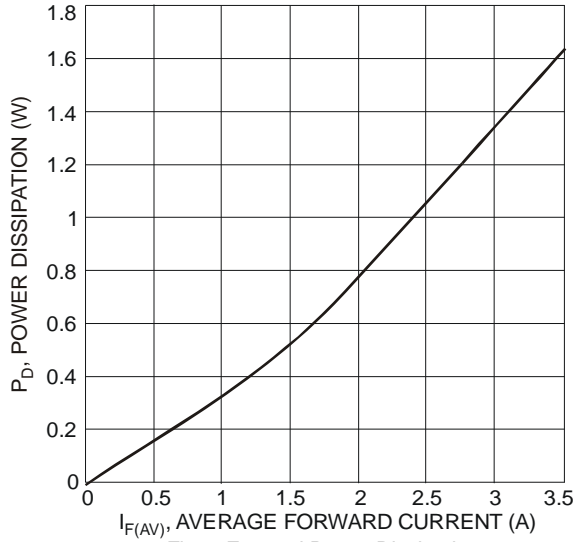


Fig. 1 Forward Power Dissipation

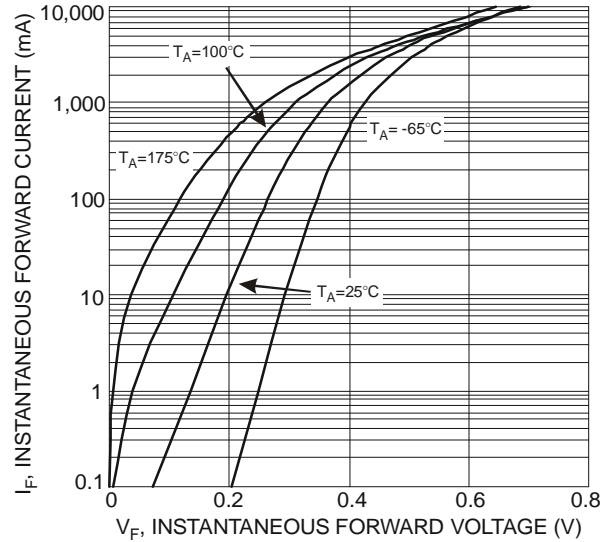


Fig. 2 Typical Forward Characteristics

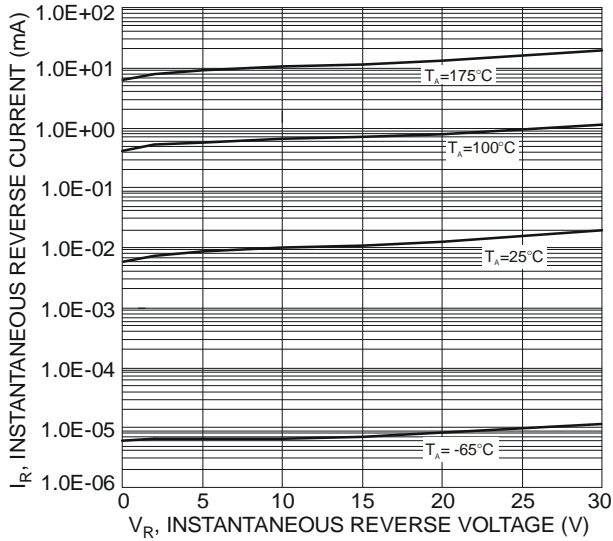


Fig. 3 Typical Reverse Characteristics

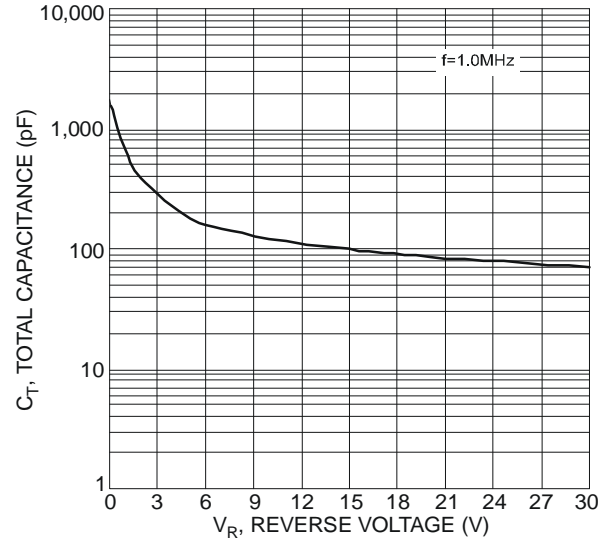


Fig. 4 Total Capacitance vs. Reverse Voltage

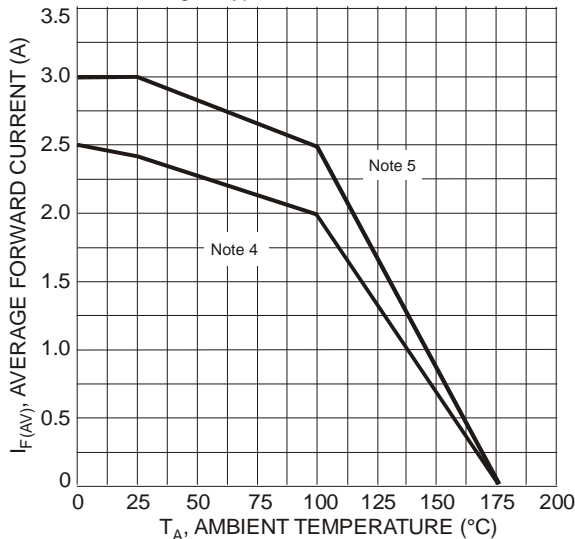


Fig. 5 Forward Current Derating Curve

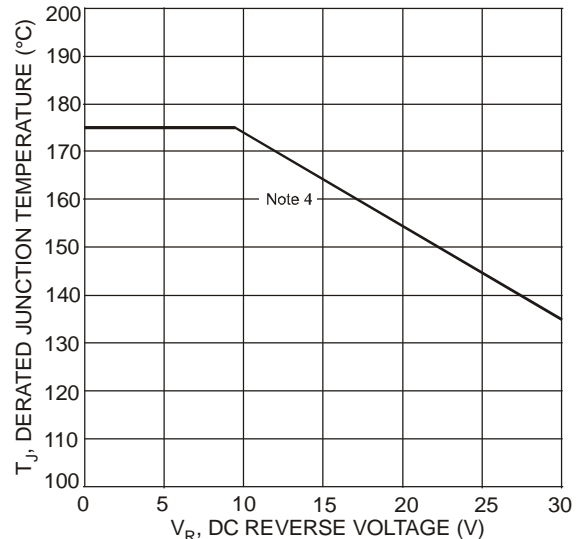


Fig. 6 Operating Temperature Derating

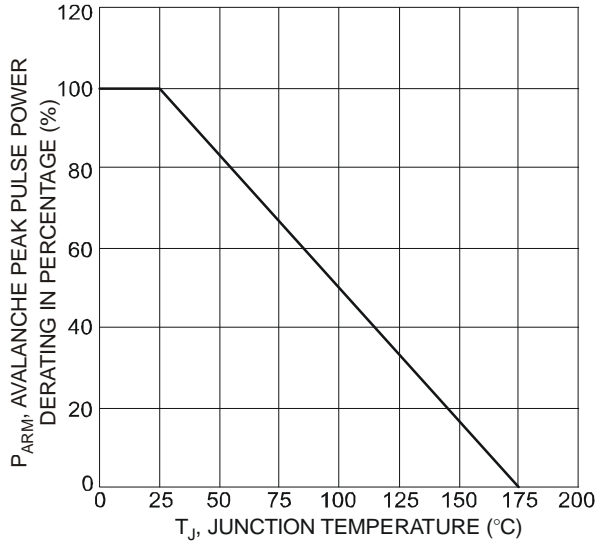


Fig. 7 Pulse Derating Curve

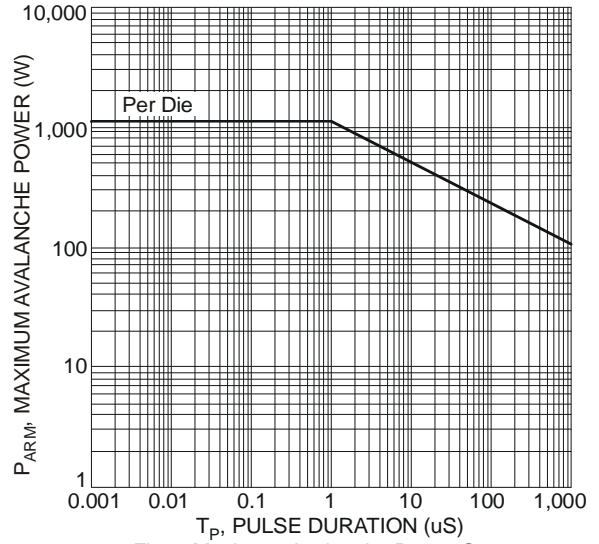


Fig. 8 Maximum Avalanche Power Curve

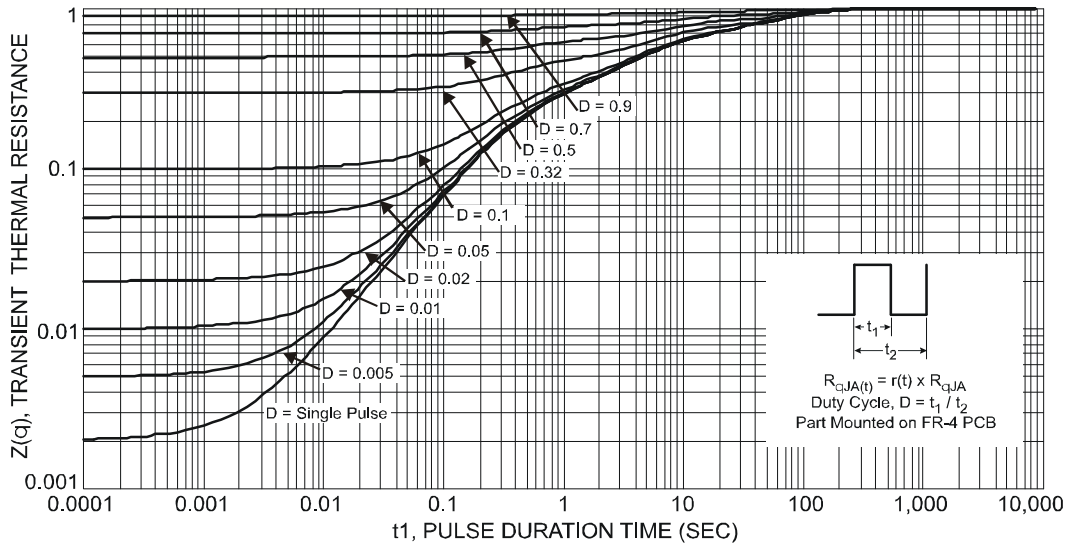
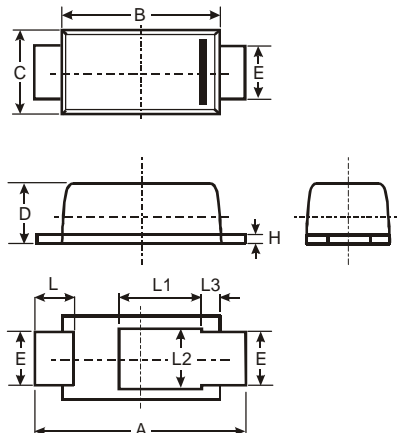


Fig. 9 Transient Thermal Resistance

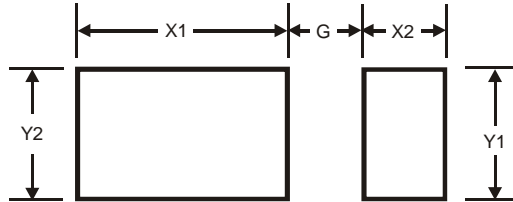
Package Outline Dimensions



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	0.40	0.50	0.45
L1	-	-	1.35
L2	-	-	1.10
L3	-	-	0.20
All Dimensions in mm			

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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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