SBR2A40P1

2.0A SBR
SURFACE-MOUNT SUPER BARRIER RECTIFIER

Features

- Low-Forward Voltage Drop
- Low-Leakage Current
- Superior Reverse Avalanche Capability
- Excellent High-Temperature Stability
- Patented Interlocking Clip Design for High-Surge Current Capacity
- Patented Super Barrier Rectifier Technology (SBR®)
- Soft, Fast Switching Capability
- +150°C Operating Junction Temperature
- ±16kV ESD Protection (HBM, 3B)
- ±25kV ESD Protection (IEC61000-4-2 Level 4, Air Discharge)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An automotive-compliant part is available under separate datasheet (SBR2A40P1Q)**

Mechanical Data

- Package: PowerDI®123
- Package 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: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.018 grams (Approximate)

PowerDI123

Top View

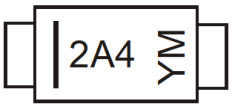
Ordering Information (Notes 4 & 5)

Part Number	Package	Packing	
		Qty.	Carrier
SBR2A40P1-7	PowerDI123	3,000	Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.
5. Product manufactured with data code 0924 (week 24, 2009) and newer are built with green molding compound.

Marking Information

PowerDI123



2A4 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: L = 2024)
M = Month (ex: 9 = September)

Date Code Key

Year	2006	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	T	-	L	M	N	P	R	S	T	U	V	W

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

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 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_{RM}	40	V
RMS Reverse Voltage	$V_{R(RMS)}$	28	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}	50	A
Repetitive Peak Avalanche Power (1µs, +25°C)	P_{ARM}	6,000	W

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance Thermal Resistance Junction to Soldering (Note 6) Thermal Resistance Junction to Ambient (Note 7) Thermal Resistance Junction to Ambient (Note 8) Thermal Resistance Junction to Lead (Note 7)	 $R_{\theta JS}$ $R_{\theta JA}$ $R_{\theta JA}$ $R_{\theta JL}$	 5 180 115 60	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	$V_{(BR)R}$	40	—	—	V	I_R = 100µA
Forward Voltage Drop	V_F	—	0.265	0.315	V	I_F = 0.1A, T_J = +25°C
		—	0.38	0.43		I_F = 1.0A, T_J = +25°C
		—	0.45	0.50		I_F = 2.0A, T_J = +25°C
		—	0.17	0.22		I_F = 0.1A, T_J = +125°C
		—	0.325	0.375		I_F = 1.0A, T_J = +125°C
		—	0.42	0.47		I_F = 2.0A, T_J = +125°C
Leakage Current (Note 9)	I_R	—	8	40	µA	V_R = 5V, T_J = +25°C
		—	16	100	µA	V_R = 40V, T_J = +25°C
		—	1.3	8	mA	V_R = 5V, T_J = +125°C
		—	2.1	10	mA	V_R = 40V, T_J = +125°C

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

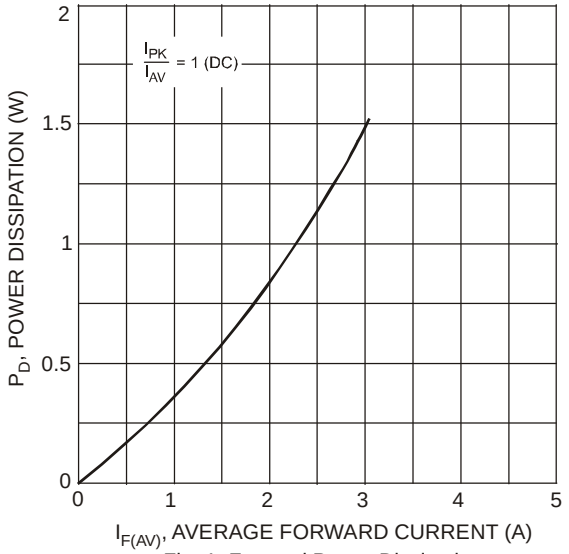


Fig. 1 Forward Power Dissipation

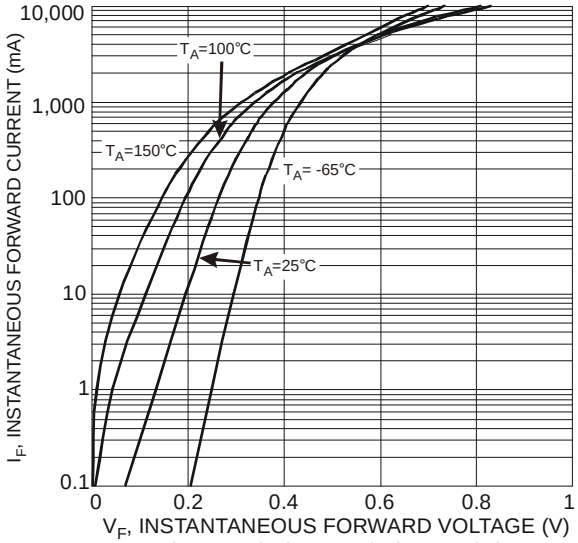


Fig. 2 Typical Forward Characteristics

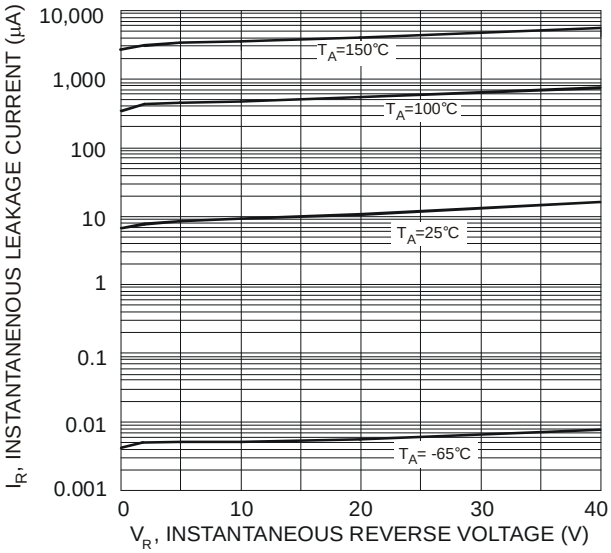


Fig. 3 Typical Reverse Characteristics

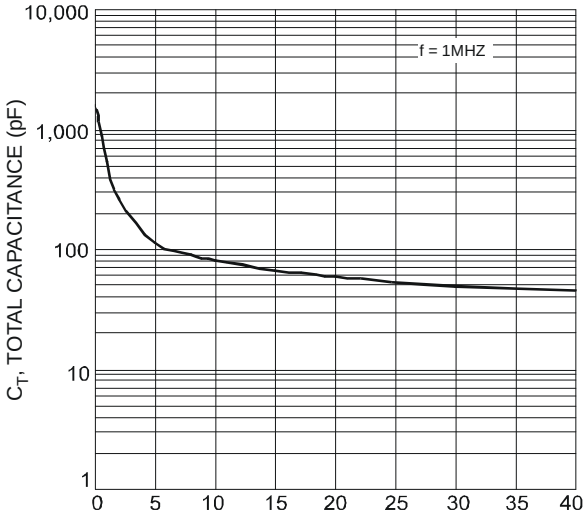


Fig. 4 Total Capacitance vs. Reverse Voltage

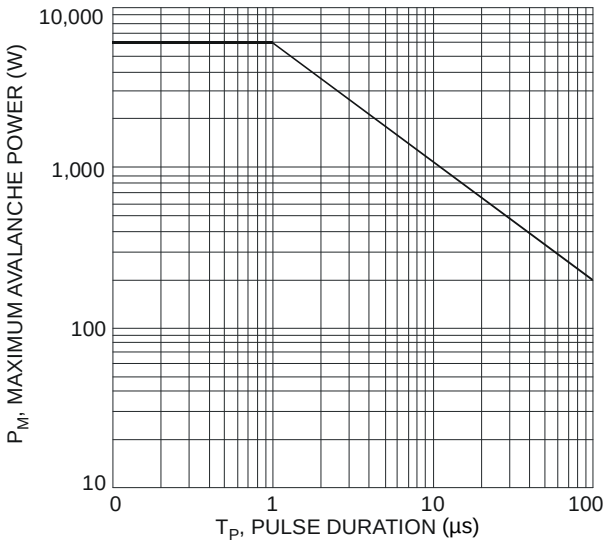


Fig. 5 Maximum Avalanche Power vs. Pulse Duration

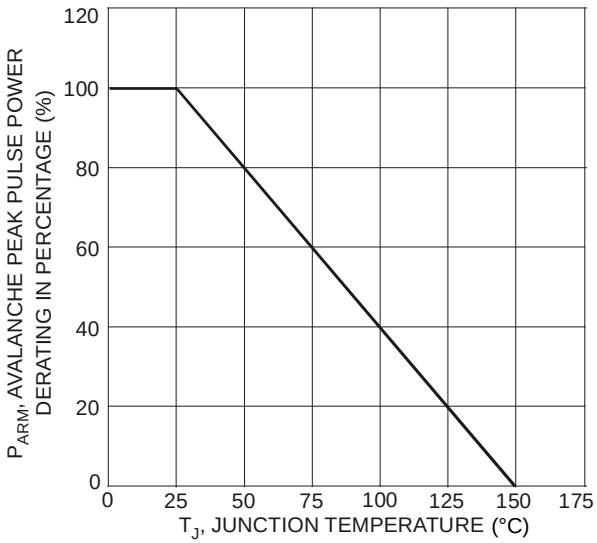


Fig. 6 Pulse Derating Curve

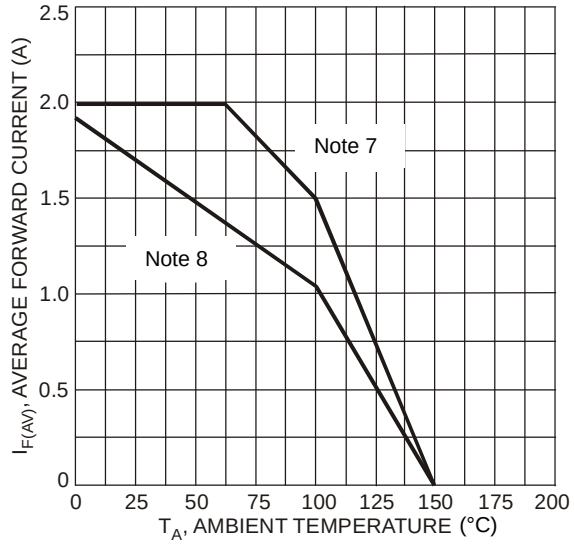


Fig. 7 Forward Current Derating Curve

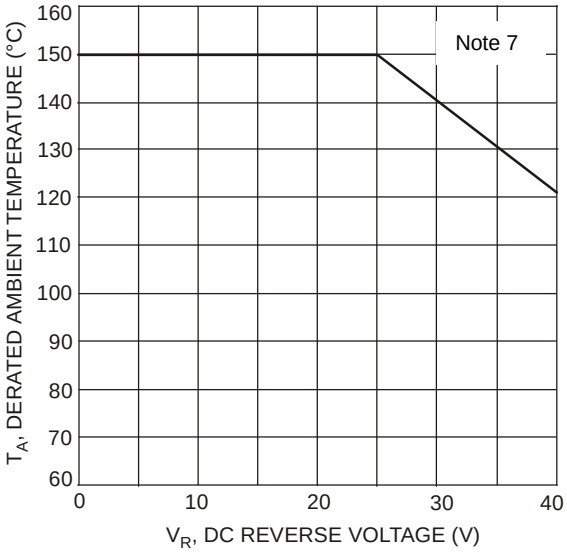


Fig. 8 Operating Temperature Derating

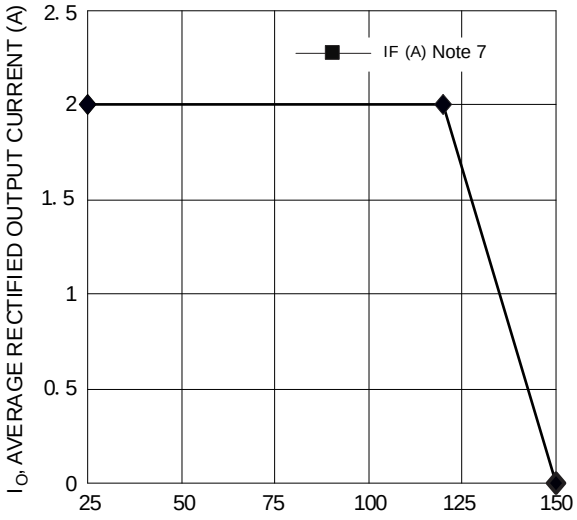


Figure 9 DC Forward Current Derating Curve

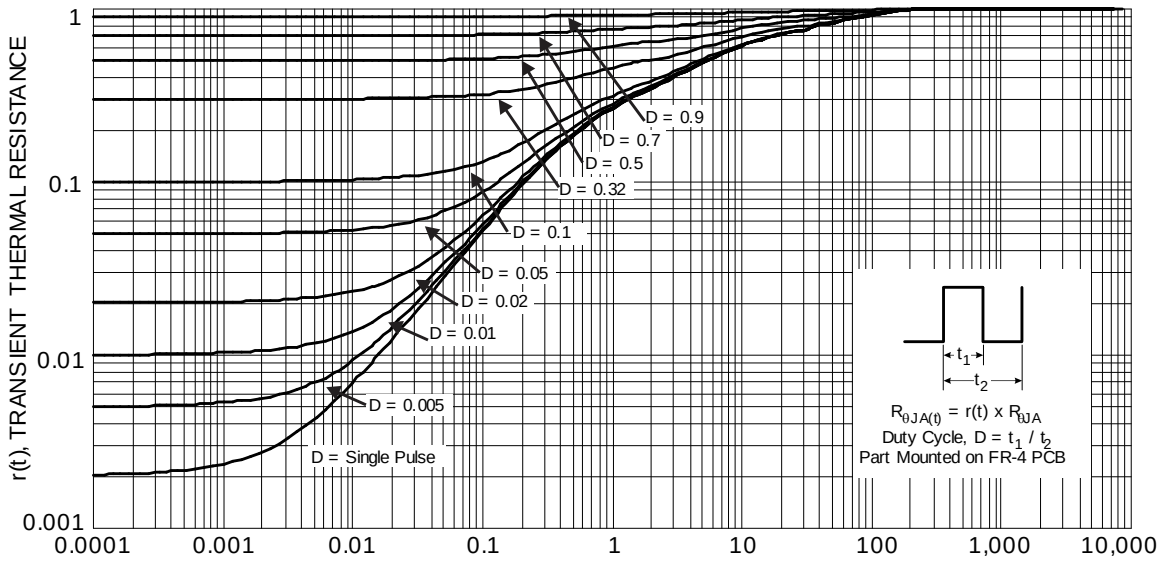
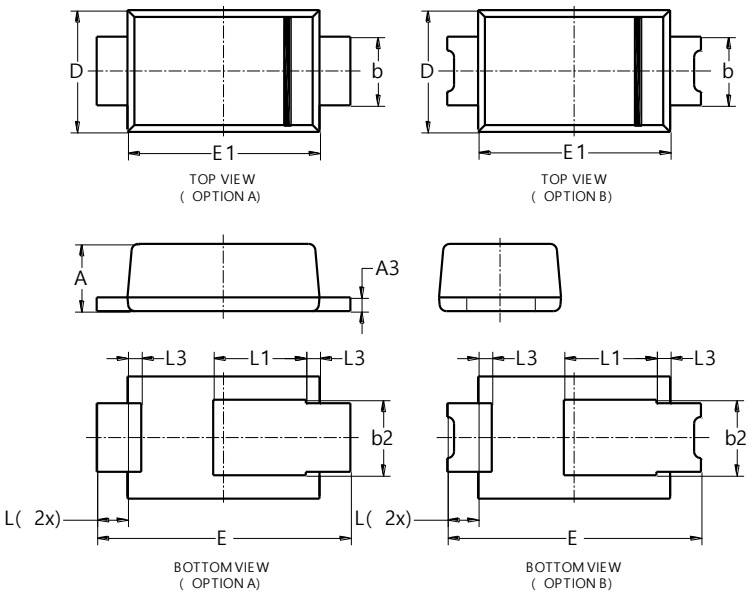


Fig. 10 Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI123

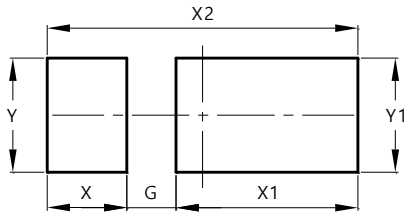


PowerDI123			
Dim	**Min**	**Max**	**Typ**
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI123



Dimensions	Value (in mm)
G	0.65
X	1.05
X1	2.40
X2	4.10
Y	1.50
Y1	1.50

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