

Product Summary (@ T_A = +25°C)

V _{RRM} (V)	I _O (A)	V _F Max (V) @ 2A	I _R Max (μA) @ 40V
40	2	0.50	100

Description & Applications

Packaged in the compact thermally efficient PowerDI[®] 123, SBR2A40P1Q provides low V_F and low reverse leakage at high temperatures. It is ideal for use in the following applications:

- Bridge Diodes
- Freewheeling Diodes
- Blocking Diodes
- Reverse Protection Diodes

Features and Benefits

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: PowerDI123
- 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: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.018 grams (Approximate)



PowerDI123

Top View

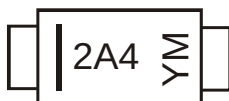
Ordering Information (Notes 5 & 6)

Part Number	Compliance	Case	Packaging
SBR2A40P1Q-7	Automotive	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. Product manufactured with Date Code F7 (July, 2018) and newer are built with Green Molding Compound.
 6. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

PowerDI123



2A4 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

Year	2006	~	2015	2016	2017	2018	2019	2020	2021	2022	2023
Code	T	~	C	D	E	F	G	H	I	J	K

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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SBR2A40P1Q

Document number: DS41199 Rev. 1 - 2

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}	40	V
Working Peak Reverse Voltage	V _{RWM}		
DC Blocking Voltage	V _{RM}		
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 7)	R _{θJS}	5	°C/W
Thermal Resistance Junction to Ambient (Note 8)	R _{θJA}	180	
Thermal Resistance Junction to Ambient (Note 9)	R _{θJA}	115	
Thermal Resistance Junction to Lead (Note 8)	R _{θJL}	60	
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 10)	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: 7. Theoretical R_{θJS} calculated from the top center of the die straight down to the PCB cathode tab solder junction.
8. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.
9. Polyimide PCB, 2 oz. Copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.
10. Short duration pulse test used to minimize self-heating effect.

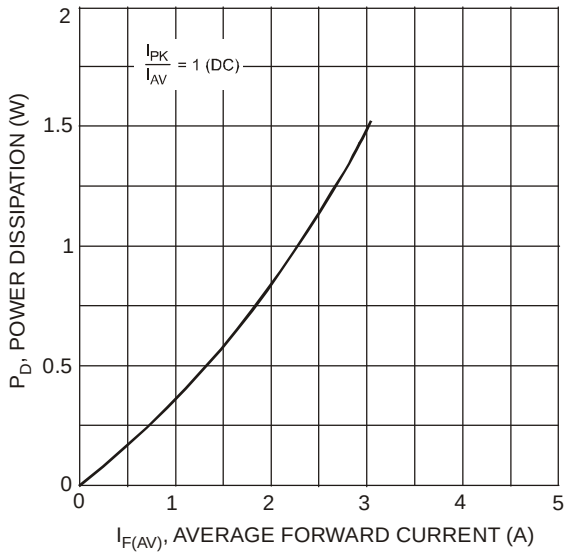


Fig. 1 Forward Power Dissipation

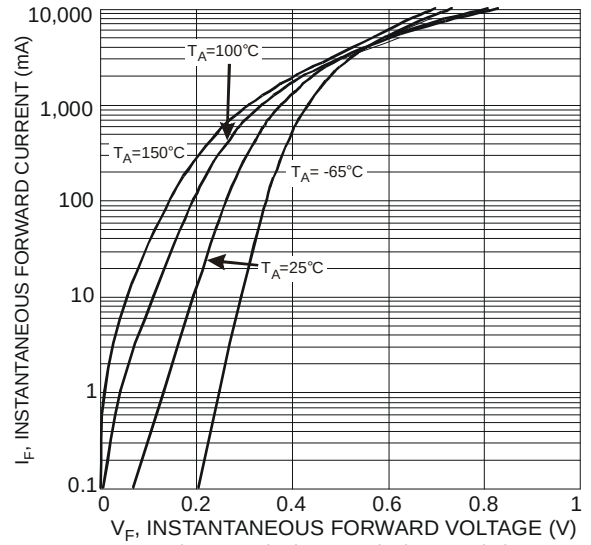


Fig. 2 Typical Forward Characteristics

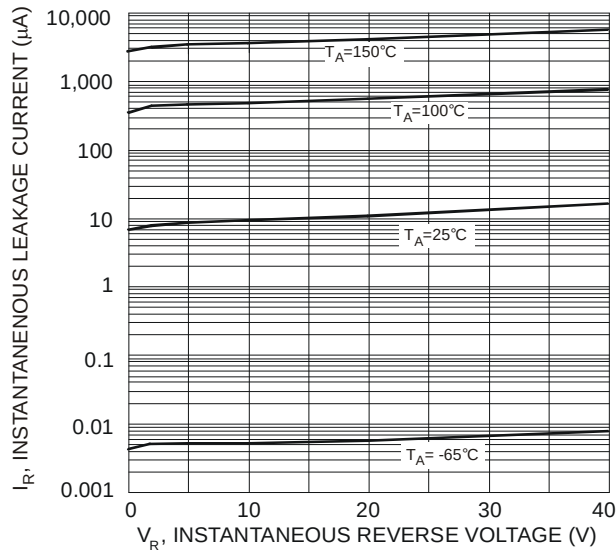


Fig. 3 Typical Reverse Characteristics

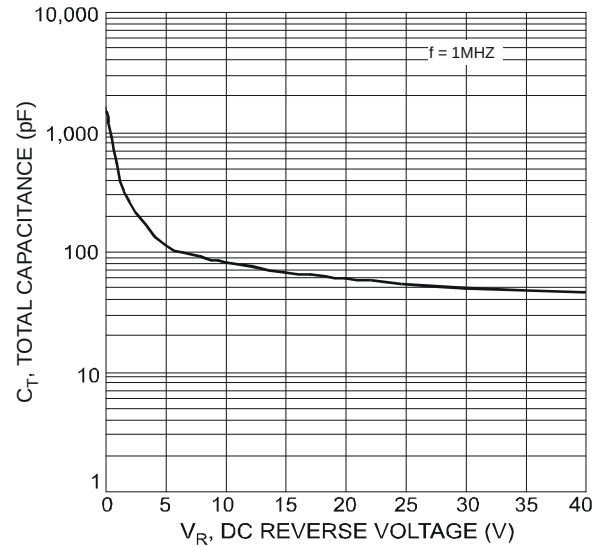


Fig. 4 Total Capacitance vs. Reverse Voltage

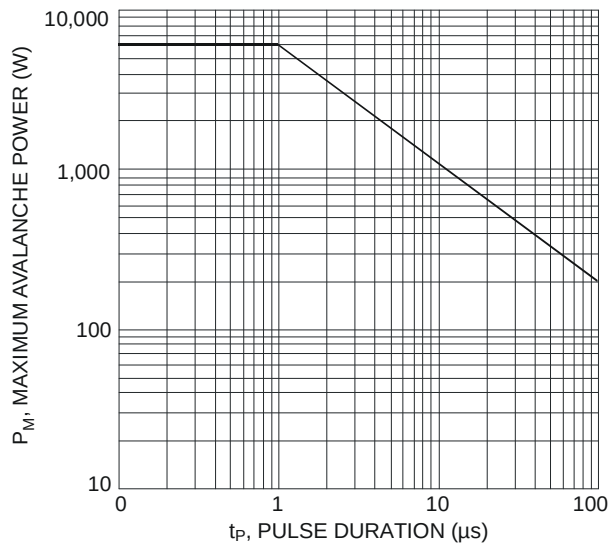


Fig. 5 Maximum Avalanche Power vs. Pulse Duration

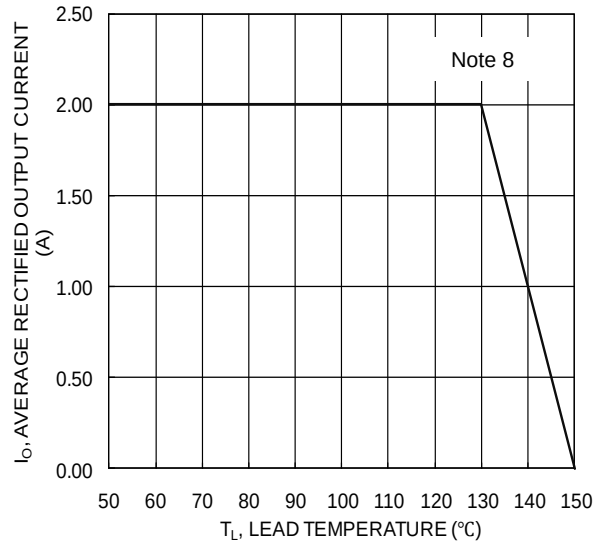


Figure 6. DC Forward Current Derating

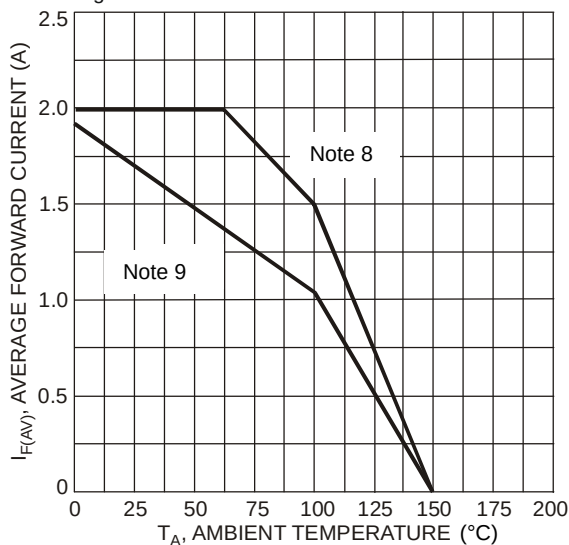


Fig. 7 Forward Current Derating Curve

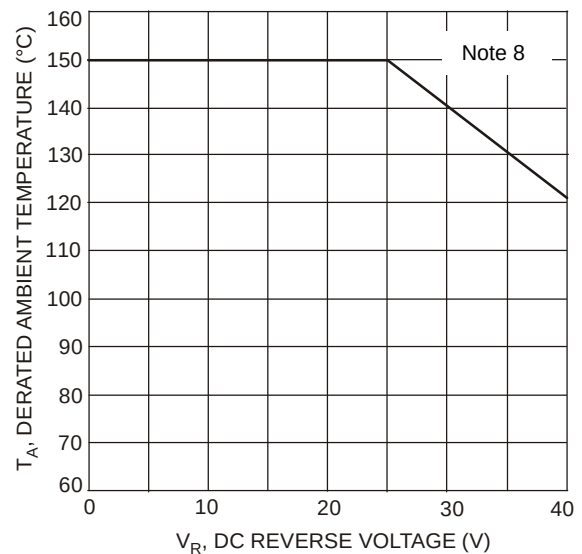


Fig. 8 Operating Temperature Derating

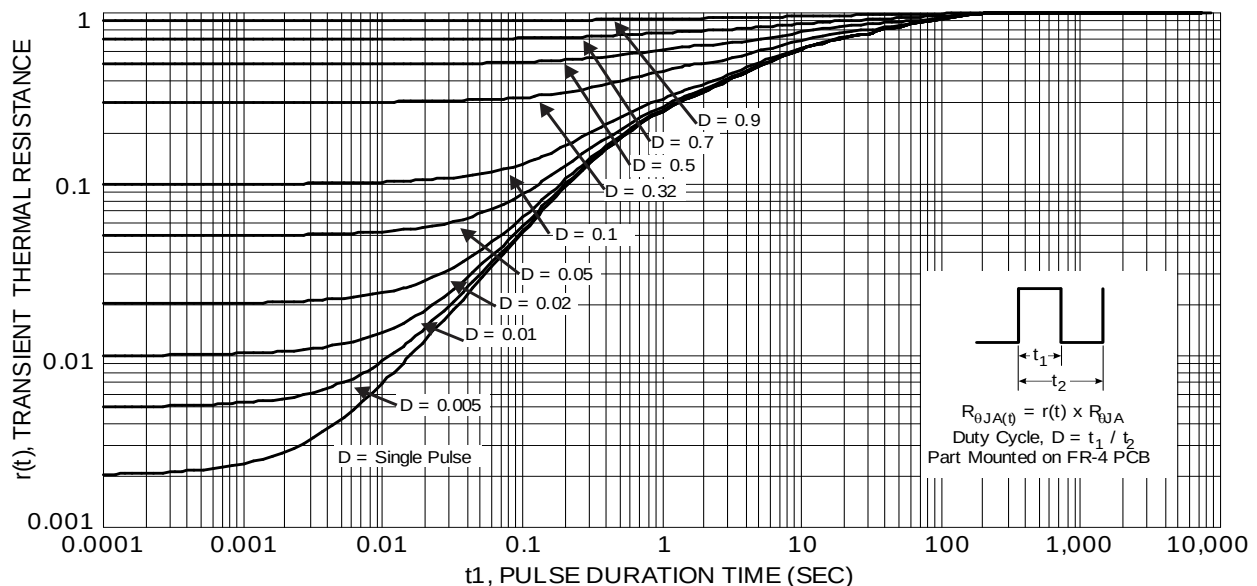
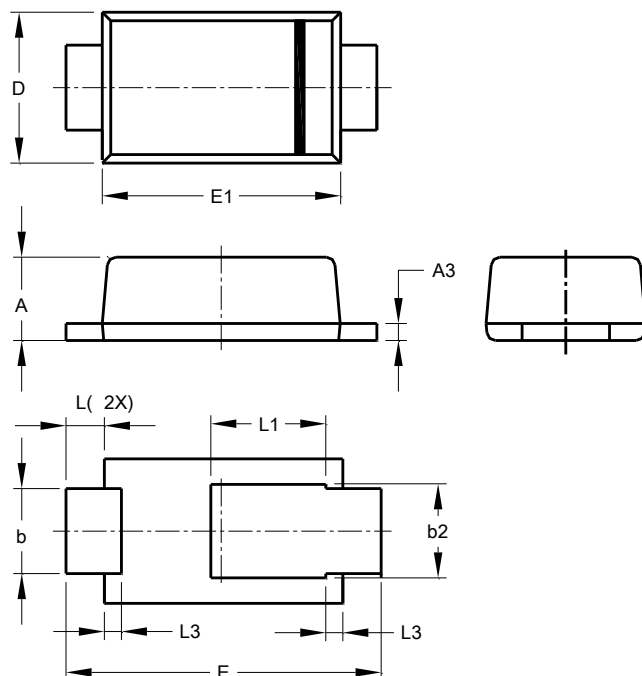


Fig. 9 Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI123

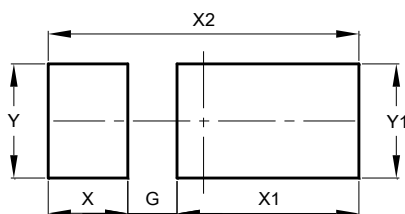


PowerDI123			
Dim	Min	Max	Typ
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

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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