

**Product Summary** (@T<sub>A</sub> = +25°C)

V <sub>RRM</sub> (V)	I <sub>O</sub> (A)	V <sub>F</sub> Max (V)	I <sub>R</sub> Max (µA)
60	2	0.58	12

**Description and Application**

This Super Barrier Rectifier (SBR) diode is ideally suited for applications requiring ultra-low blocking mode. Leading to lower operation temperatures and increased system reliability. Packaged in the compact thermally efficient PowerDI<sup>®</sup>123 package. Applications are:

- Polarity protection diodes
- DC/DC converters
- AC/DC adaptors
- Flyback diodes
- Re-circulating diodes


**Features and Benefits**

- Reduced Ultra Low Forward Voltage Drop (V<sub>F</sub>) Increased Efficiency and Cooler Operation
- Patented Super Barrier Rectifier SBR<sup>®</sup> Technology
- Superior Avalanche Capability (See maximum Ratings)
- Excellent Reverse Leakage (I<sub>R</sub>) Stability in High-Temperature Circumstance. Increased Reliability Against Thermal Runaway Failure in High Temperature Operation
- <1.1mm Package Profile – Ideal for Thin Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DIODES SBRFP2M60P1Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

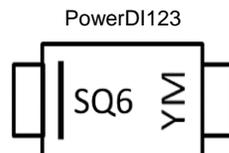
**Mechanical Data**

- Package: PowerDI123
- Package Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Polarity: Cathode Band
- Weight: 0.01 grams (Approximate)


**Ordering Information** (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
SBRFP2M60P1Q-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/>.

**Marking Information**


SQ6 = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: K = 2023)  
M = Month (ex: 6 = June)

**Date Code Key**

Year	2020	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	H	-	K	L	M	N	O	P	R	S	T	U
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<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>	60	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage	V <sub>RM</sub>		
Average Rectified Output Current	I <sub>O</sub>	2	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	50	A
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 2A, L = 50mH)	E <sub>AS</sub>	145	mJ
Non-Repetitive Avalanche Energy (T <sub>J</sub> = +25°C, I <sub>AS</sub> = 7.5A, L = 1mH)	E <sub>AS</sub>	40	mJ
Electrostatic Discharge- Human Body Model	HBM	4000	V
Electrostatic Discharge- Contact Discharge Model	CDM	1	kV

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	53	°C/W
Typical Thermal Resistance Junction to Case (Note 5)	R <sub>θJC</sub>	10	°C/W
Operating and Storage Temperature Range (Note 5)	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

Note: 5. Device mounted on 1inch<sup>2</sup> copper pad, 2oz. The heat generated must be less than the thermal conductivity from junction to case:  $dP_D/dT_J < 1/R_{\theta JC}$  or junction to ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ .

## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage Drop (Note 6)	V <sub>F</sub>	—	0.45	—	V	I <sub>F</sub> = 1A, T <sub>J</sub> = +25°C
		—	0.40	—		I <sub>F</sub> = 1A, T <sub>J</sub> = +125°C
		—	0.52	0.58		I <sub>F</sub> = 2A, T <sub>J</sub> = +25°C
		—	0.49	0.55		I <sub>F</sub> = 2A, T <sub>J</sub> = +125°C
Leakage Current (Note 6)	I <sub>R</sub>	—	1.5	12	μA	V <sub>R</sub> = 60V, T <sub>J</sub> = +25°C
		—	0.7	3		mA
Junction Capacitance	C <sub>J</sub>	—	50	—	pF	V <sub>R</sub> = 60V, T <sub>J</sub> = +25°C
Reverse Recovery Time	t <sub>RR</sub>	—	15	—	ns	I <sub>F</sub> = 0.5A, I <sub>RR</sub> = 1A, I <sub>RR</sub> = 0.25A (RG1)

Note: 6. Short duration pulse test used to minimize self-heating effect.

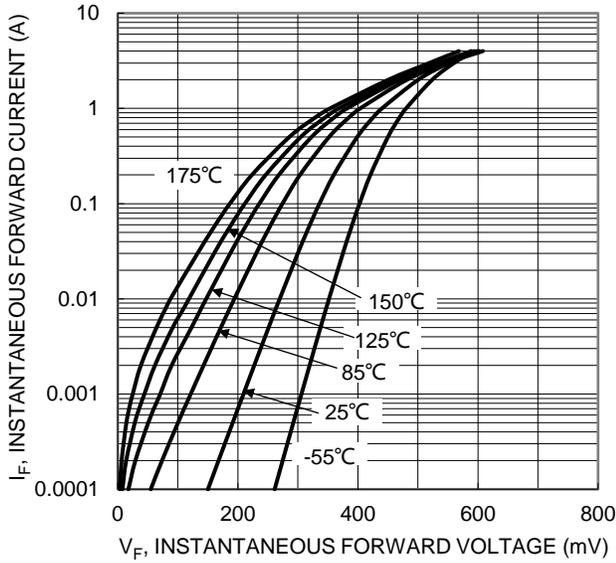


Figure 1. Typical Forward Characteristics

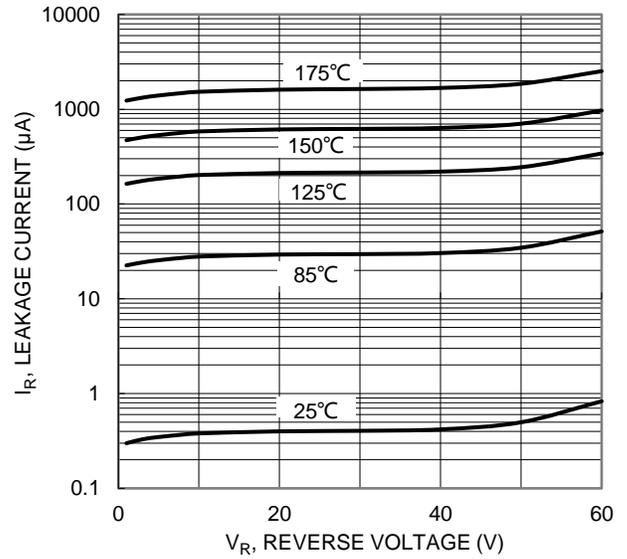


Figure 2. Typical Reverse Characteristics

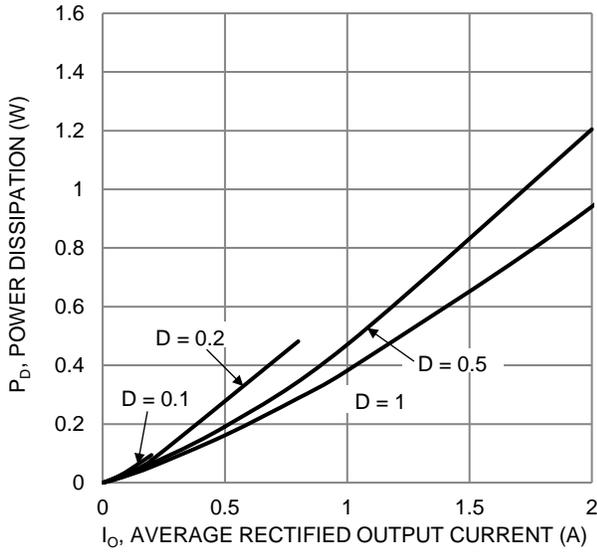


Figure 3. Forward Power Dissipation  $T_J = 125^\circ\text{C}$

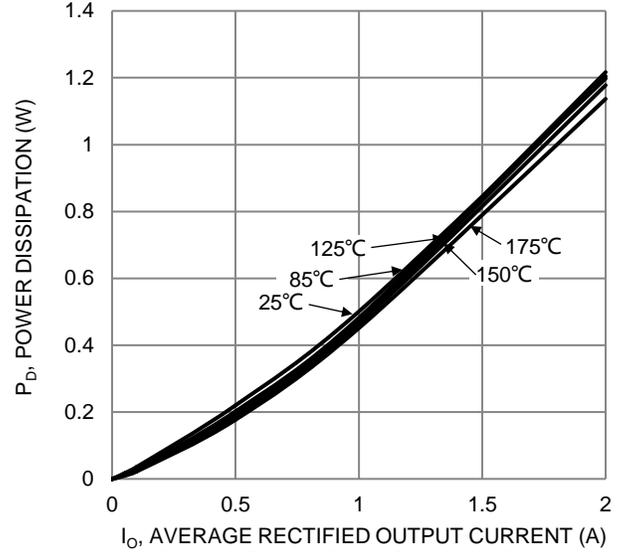


Figure 4. Forward Power Dissipation  $D = 0.5$

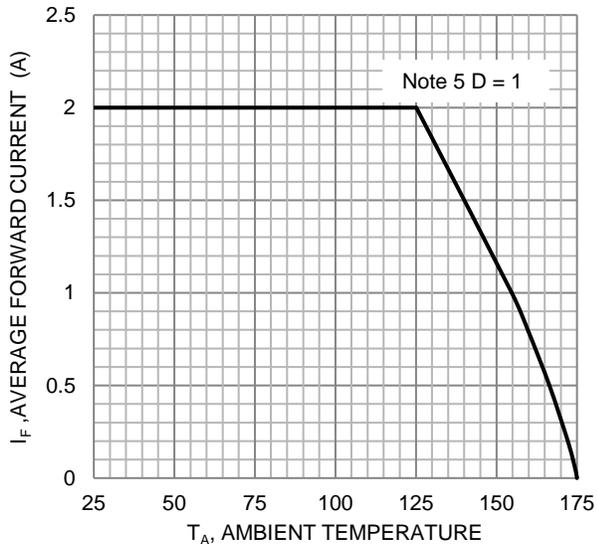


Figure 5. DC Forward Current Derating

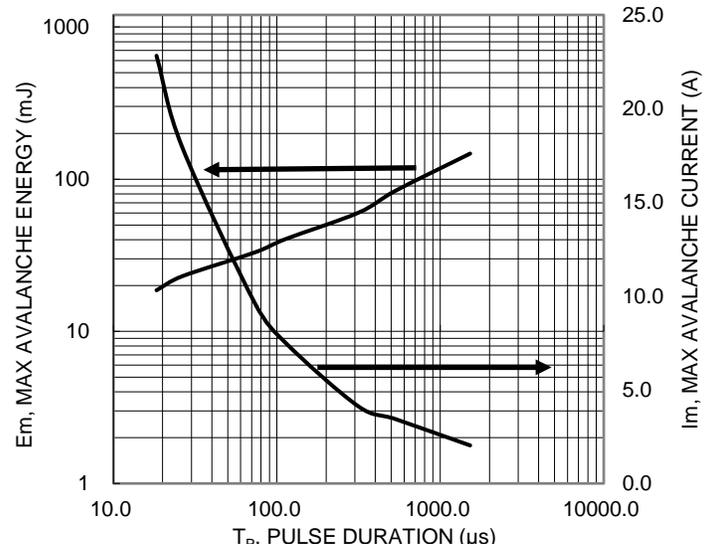


Figure 6. Single Pulse Max. Avalanche Energy and Current

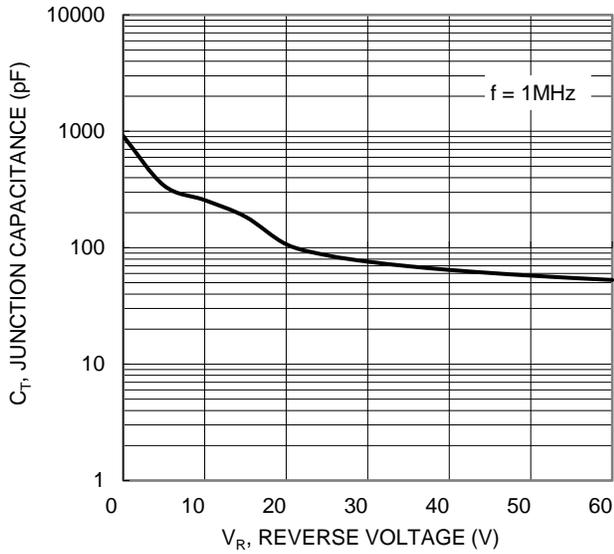
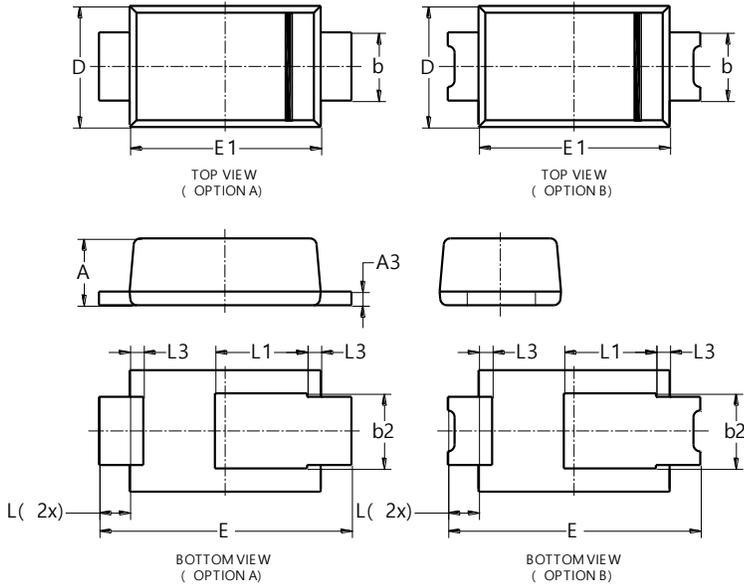


Figure 7. Typical Junction Capacitance

**Package Outline Dimensions**

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

**PowerDI123**

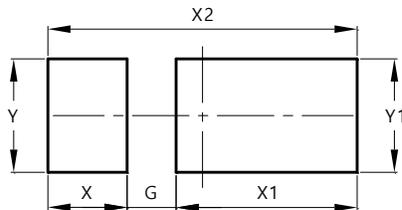


PowerDI123			
Dim	Min	Max	Typ
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

**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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