

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

V <sub>RRM</sub> (V)	I <sub>o</sub> (A)	V <sub>F(Max)</sub> (V)	I <sub>R(Max)</sub> (μA)
40	3	0.47	400

**Features and Benefits**

- Ultra Low-Forward Voltage Drop
- Superior Reverse Avalanche Capability
- Patented Interlocking Clip Design for High Surge Current Capacity
- Patented Super Barrier Rectifier (SBR<sup>®</sup>) Technology
- Soft, Fast Switching Capability
- +150°C Operating Junction Temperature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The SBR3U40P1Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

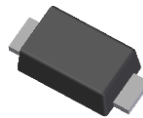
**Applications**

- DC-DC converters
- AC-DC rectifiers
- SMPS

**Mechanical Data**

- Package: PowerDI<sup>®</sup>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
- Weight: 0.018 grams (Approximate)

PowerDI123

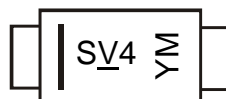


Top View

**Ordering Information** (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
SBR3U40P1Q-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**


SV4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: L = 2024)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2018	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	F	-	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<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>	40	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage	V <sub>RM</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	28	V
Average Rectified Output Current	I <sub>O</sub>	3	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 Energy at I <sub>AS</sub> = 1.9A, L = 50mH	E <sub>AS</sub>	60	mJ

**ESD Ratings**

Characteristic	Symbol	Ratings	Unit
Human Body Mode ESD Protection	ESD HBM	4000	V
Machine Model ESD Protection	ESD MM	400	V
Charged Device Model	ESD CDM	1	kV

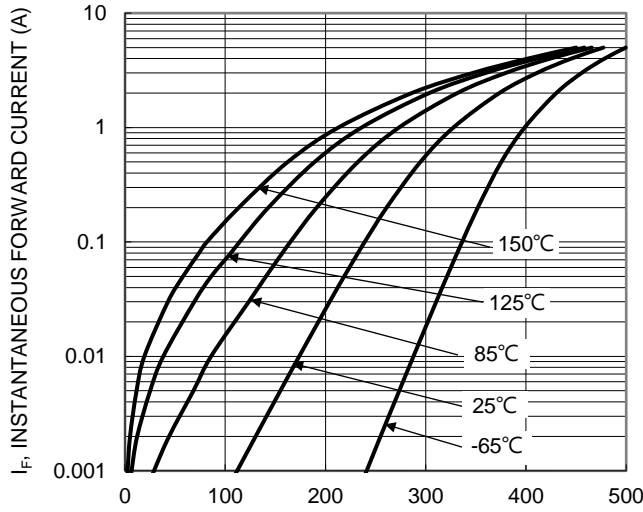
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance Junction to Soldering (Note 5)	R <sub>θJS</sub>	5	°C/W
Thermal Resistance Junction to Ambient (Note 6)	R <sub>θJA</sub>	145	
Thermal Resistance Junction to Ambient (Note 7)	R <sub>θJA</sub>	125	
Thermal Resistance Junction to Ambient (Note 8)	R <sub>θJA</sub>	75	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

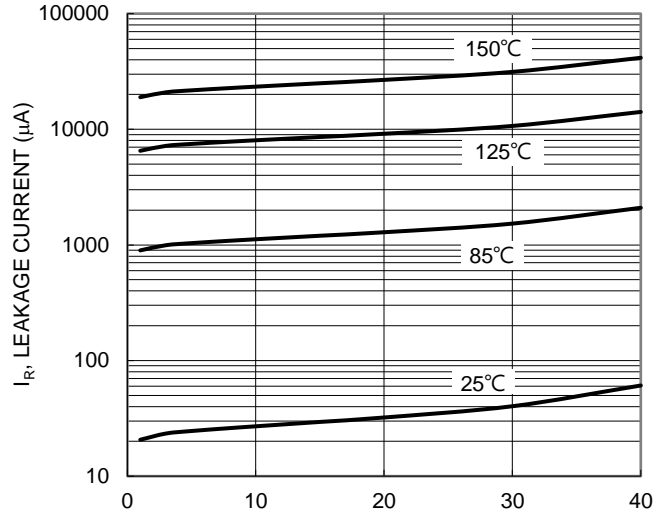
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 9)	V <sub>(BR)R</sub>	40	—	—	V	I <sub>R</sub> = 400μA
Forward Voltage Drop	V <sub>F</sub>	—	0.30	0.34	V	I <sub>F</sub> = 0.5A, T <sub>J</sub> = +25°C
		—	0.34	0.39		I <sub>F</sub> = 1.0A, T <sub>J</sub> = +25°C
		—	0.42	0.47		I <sub>F</sub> = 3.0A, T <sub>J</sub> = +25°C
Leakage Current (Note 9)	I <sub>R</sub>	—	70	400	μA	V <sub>R</sub> = 40V, T <sub>J</sub> = +25°C
		—	8	40	mA	V <sub>R</sub> = 40V, T <sub>J</sub> = +125°C
Switching Speed	t <sub>RR</sub>	—	12	—	ns	I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1A, I <sub>RR</sub> = 0.25A (RG1)
Junction Capacitance	C <sub>J</sub>	—	165	—	pF	V <sub>R</sub> = 4V, T <sub>J</sub> = +25°C

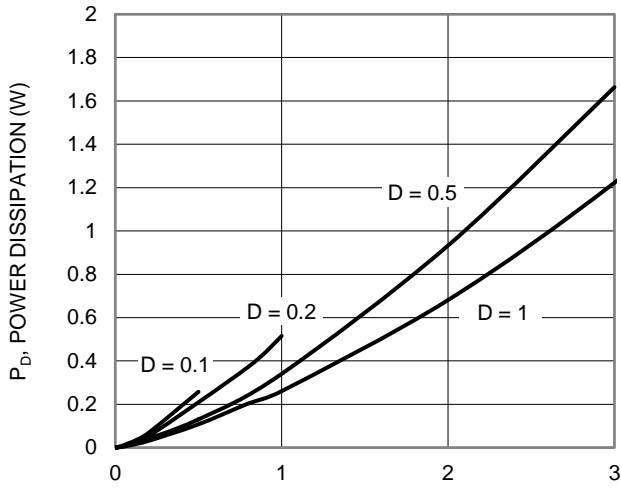
- Notes:
- Theoretical R<sub>θJS</sub> calculated from the top center of the die straight down to the PCB cathode tab solder junction.
  - FR-4 PCB, 2oz. copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.
  - Polymide PCB, 2oz. copper, minimum recommended pad layout per <http://www.diodes.com/package-outlines.html>.
  - Part mounted on 1inch by 1inch FR-4 PCB, 2oz.
  - Short duration pulse test used to minimize self-heating effect.



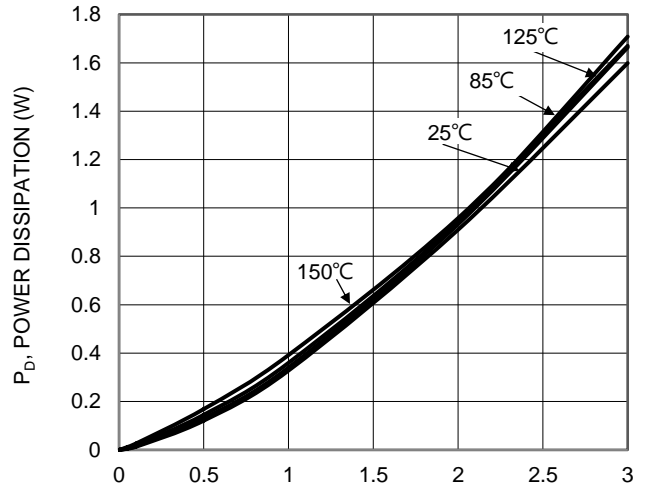
$V_F$ , INSTANTANEOUS FORWARD VOLTAGE (mV)  
Figure 1. Typical Forward Characteristics



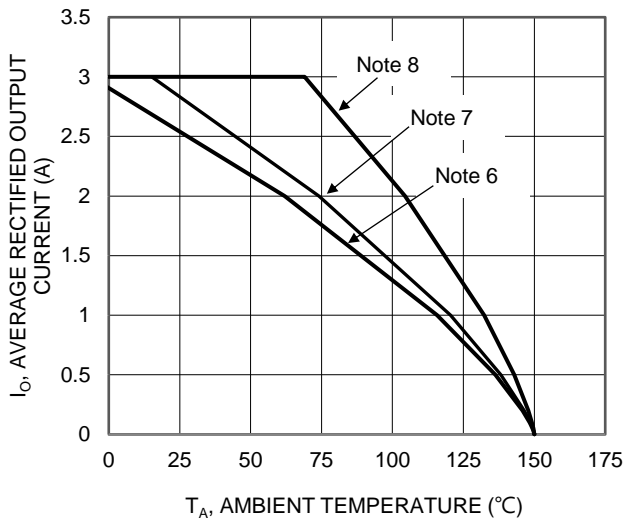
$V_R$ , REVERSE VOLTAGE (V)  
Figure 2. Typical Reverse Characteristics



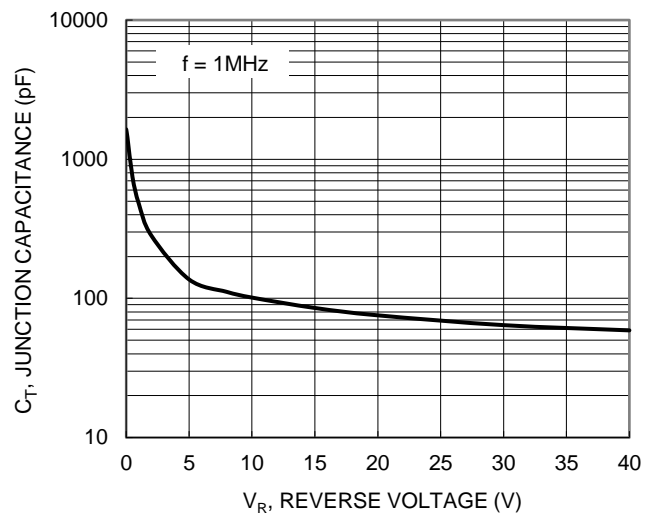
$I_O$ , AVERAGE RECTIFIED OUTPUT CURRENT (A)  
Figure 3. Forward Power Dissipation  $T_J = 125^\circ\text{C}$



$I_O$ , AVERAGE RECTIFIED OUTPUT CURRENT (A)  
Figure 4. Forward Power Dissipation  $D = 0.5$



$T_A$ , AMBIENT TEMPERATURE ( $^\circ\text{C}$ )  
Figure 5. DC Forward Current Rating



$V_R$ , REVERSE VOLTAGE (V)  
Figure 6. Typical Junction Capacitance

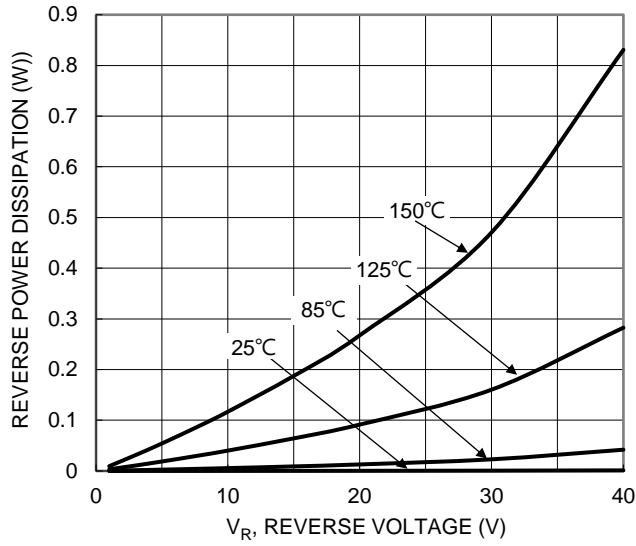


Figure 7. Typical Reverse Power Dissipation D = 0.5

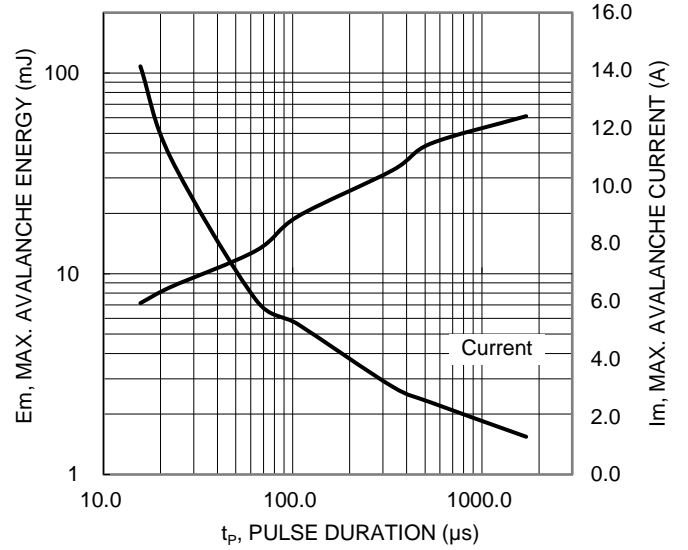


Figure 8. Typical Single Pulse Max. Avalanche Energy and Current

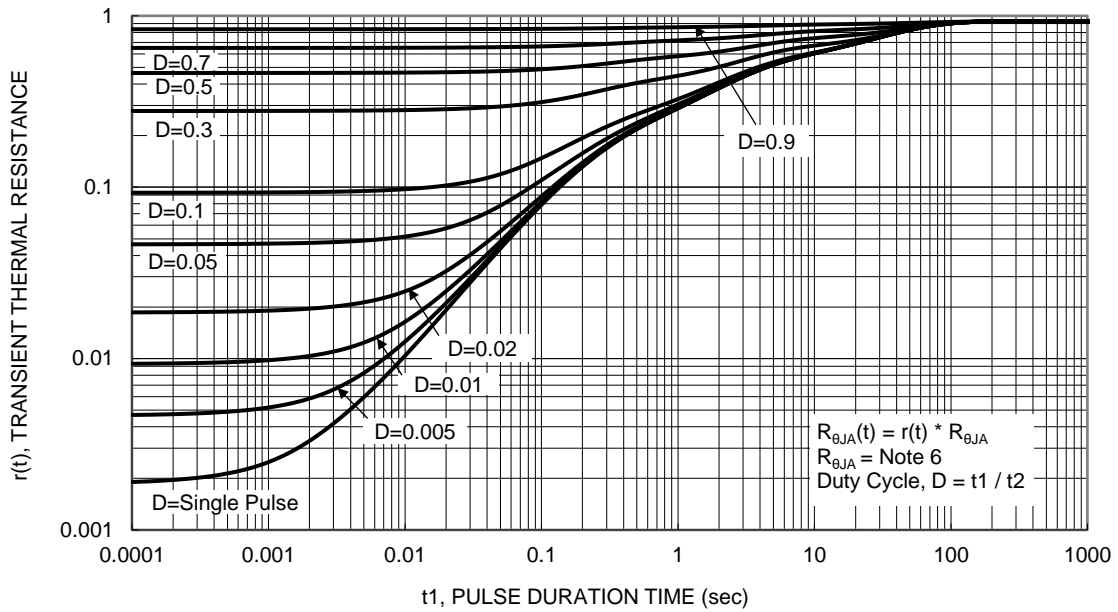
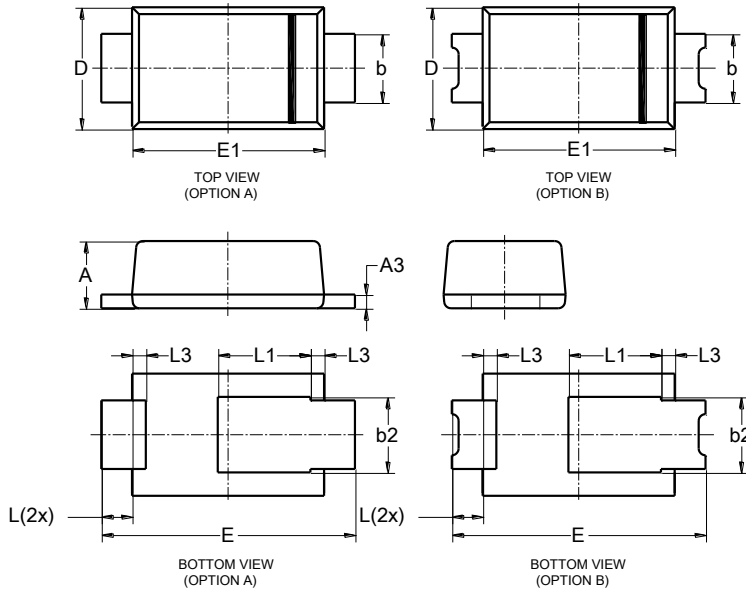


Figure 9. Transient Thermal Resistance

## Package Outline Dimensions

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

### PowerDI123

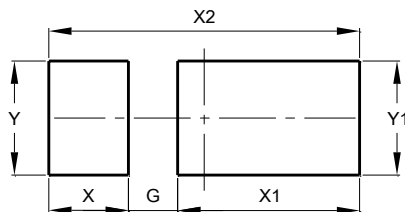


PowerDI123			
Dim	Min	Max	Typ
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

## 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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