

Product Summary (@T_A = +25°C)

V _{RRM} (V)	I _O (A)	V _F Max (V)	I _R Max (μA)
1,000	1.0	1.1	10

Description and Applications

The DIODES™ S1MSP1M is a rectifier packaged in the PowerDI[®] 123 package. Providing high-reverse breakdown voltage and high-current capability for standard rectification, this device is ideal for use in applications such as:

- Switching-mode power-supply applications
- DC-DC converter applications
- AC-DC adaptors/chargers
- Mobile devices
- LED lighting

Features and Benefits

- Glass Passivated Die Construction
- Ideally Suited for Automated Assembly
- Low Profile Design, Package Height Less than 1.0mm
- Low Reverse Leakage Current
- Exceptional Thermal Transfer Based on Exposed Heat Sink on the Underside of the Device
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <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: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ3
- Polarity: Cathode Band
- Weight: 0.01 grams (Approximate)

PowerDI123



Top View

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
S1MSP1M-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

PowerDI123



G20 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: J = 2022)
 M = Month (ex: 9 = September)

Date Code Key

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	J	K	L	M	N	O	P	R	S	T	U	V
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

PowerDI is a registered trademark of Diodes Incorporated.

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, 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}	1,000	V
Working Peak Reverse Voltage	V_{RWM}		
DC Blocking Voltage	V_{RM}		
RMS Reverse Voltage	$V_{R(RMS)}$	700	V
Average Rectified Output Current @ $T_A = +30^\circ\text{C}$	I_O	1.0	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I_{FSM}	25	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	25	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient (Note 5)	$R_{\theta JA}$	137	$^\circ\text{C/W}$
Typical Thermal Resistance, Junction to Lead (Note 5)	$R_{\theta JL}$	20	$^\circ\text{C/W}$
Typical Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	6	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient (Note 6)	$R_{\theta JA}$	54	$^\circ\text{C/W}$
Typical Thermal Resistance, Junction to Lead (Note 6)	$R_{\theta JL}$	5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 7)	$V_{(BR)R}$	1,000	—	—	V	$I_R = 5\mu\text{A}$
Forward Voltage Drop	V_F	—	0.98	1.1	V	$I_F = 1\text{A}, T_J = +25^\circ\text{C}$
Leakage Current (Note 7)	I_R	—	0.5 12	10 100	μA	$V_R = 1,000\text{V}, T_J = +25^\circ\text{C}$ $V_R = 1,000\text{V}, T_J = +125^\circ\text{C}$
Reverse Recovery Time	t_{rr}	—	1.2	—	μs	$I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{RR} = 0.25\text{A}$
Total Capacitance	C_T	—	2.8	—	pF	$V_R = 4.0\text{V}_{DC}, f = 1\text{MHz}$

- Notes:
- Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
 - Device mounted on 1" x 1", FR-4 PCB; 2oz. Cu pad layout as shown on Diodes Incorporated's website at <http://www.diodes.com/package-outlines.html>.
 $T_A = +25^\circ\text{C}$.
 - Short duration test pulse used to minimize self-heating effect.

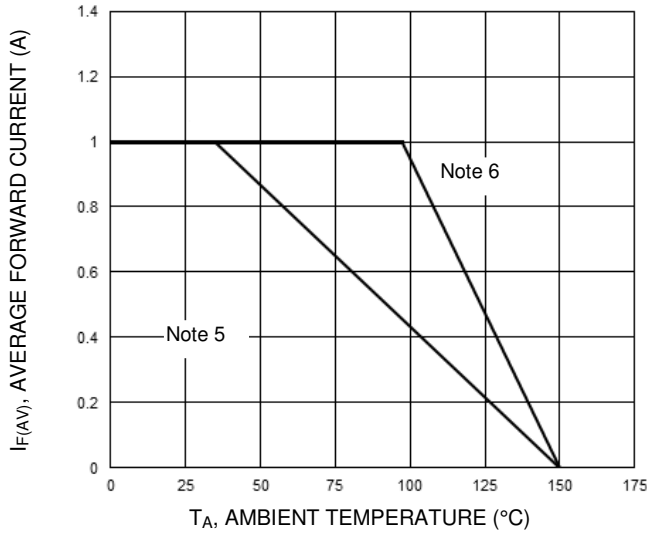


Figure 1. Forward Current Derating

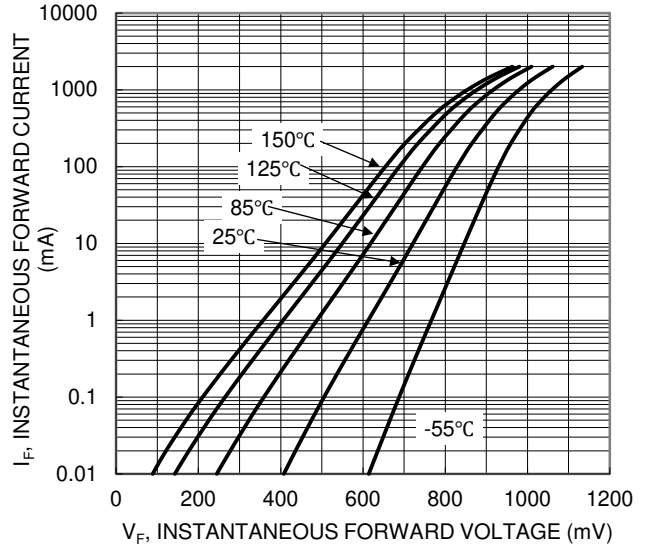


Figure 2. Typical Forward Characteristics

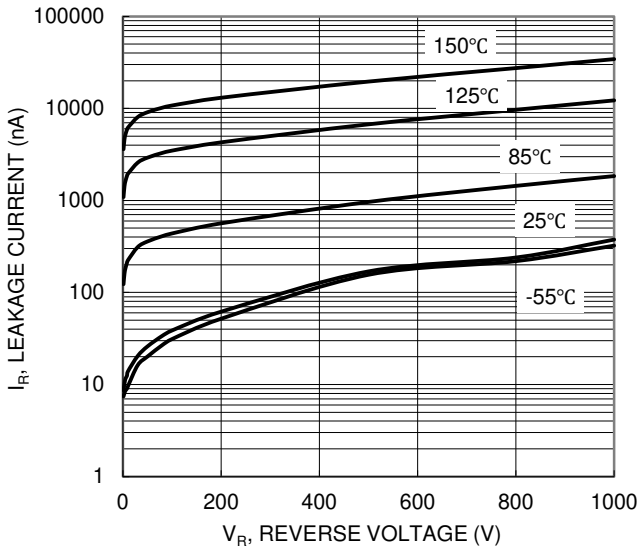


Figure 3. Typical Reverse Characteristics

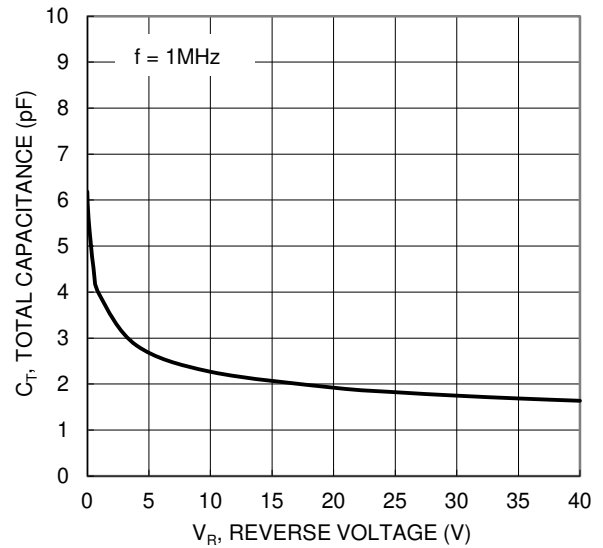


Figure 4. Typical Total Capacitance

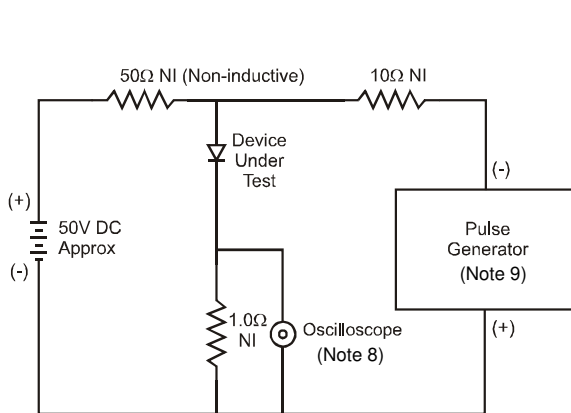


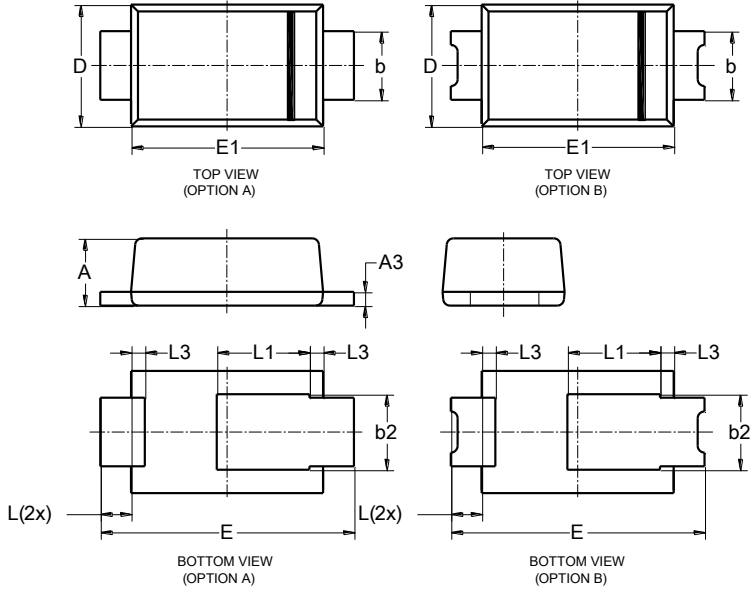
Figure 5. Reverse Recovery Time Characteristic and Test Circuit

Notes: 8. Rise time = 7.0ns max. Input impedance = 1.0MΩ, 22pF.
9. Rise time = 10ns max. Input impedance = 50Ω.

Package Outline Dimensions

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

PowerDI123

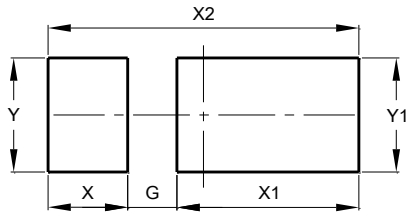


PowerDI123			
Dim	Min	Max	Typ
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

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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