

**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)
1,000	1.0	1.1	10

**Description and Applications**

The S1MSP1 is a rectifier packaged in the PowerDI123 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

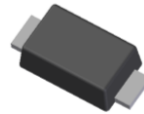
**Features and Benefits**

- 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)**

**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
- 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

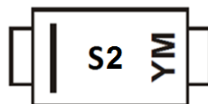
**Ordering Information** (Note 4)

Part Number	Compliance	Case	Packaging
S1MSP1-7	Commercial	PowerDI123	3,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

**Marking Information**

PowerDI123



S2 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex.: C = 2015)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022
Code	C	D	E	F	G	H	I	J

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 Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>RWM</sub> V <sub>RM</sub>	1,000	V
RMS Reverse Voltage	V <sub>R(RMS)</sub>	700	V
Average Rectified Output Current @ T <sub>A</sub> = +30°C	I <sub>O</sub>	1.0	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	25	A

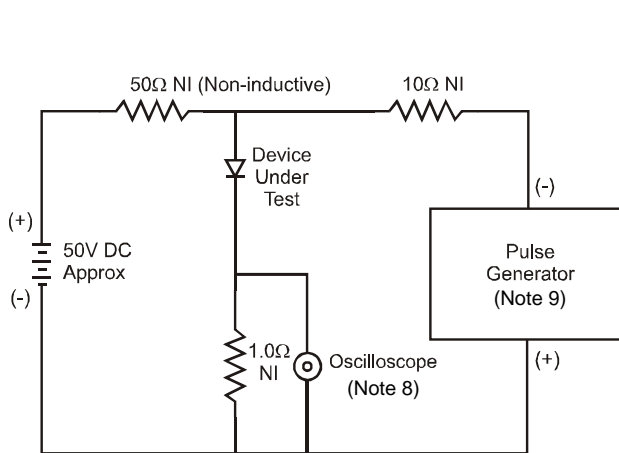
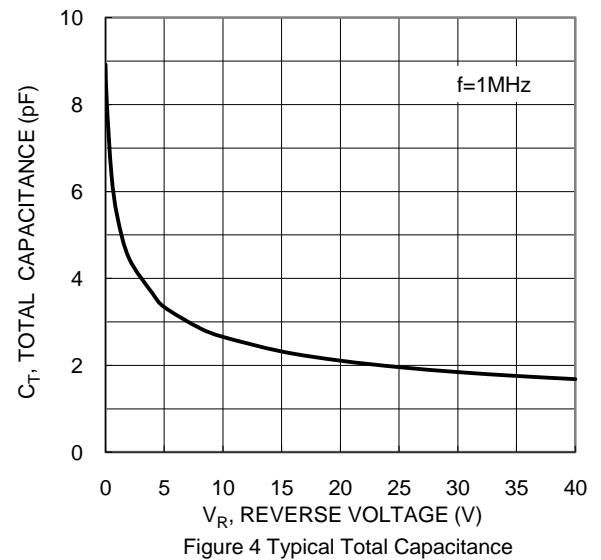
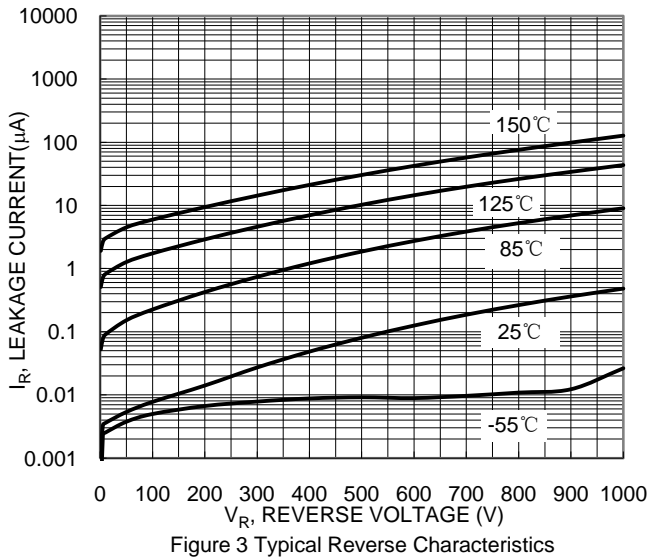
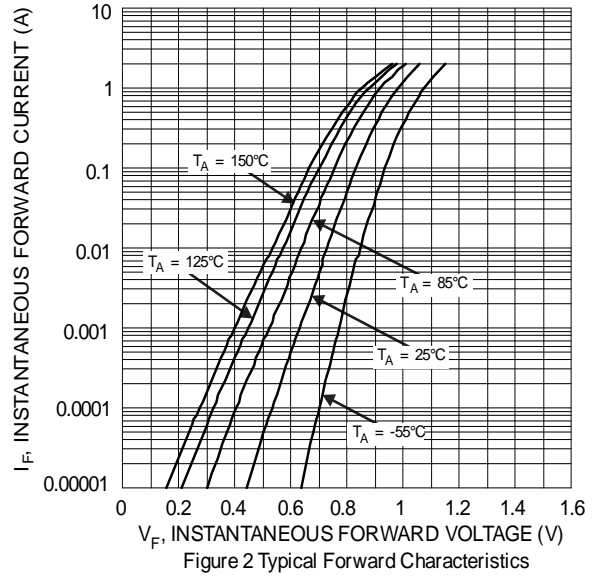
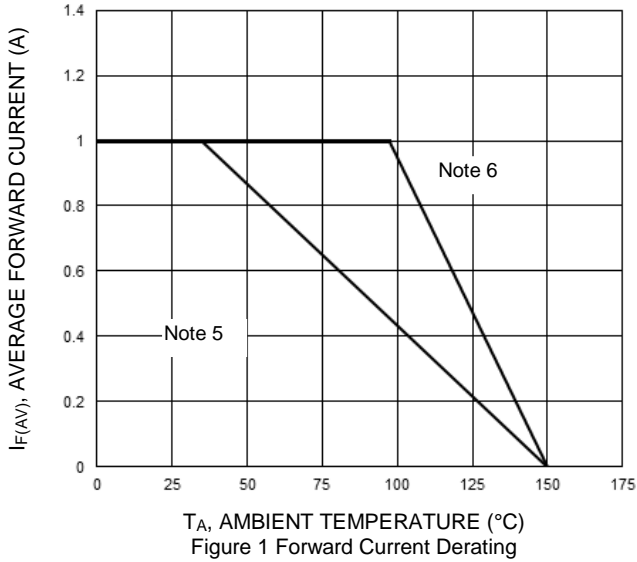
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	25	°C/W
Typical Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	137	°C/W
Typical Thermal Resistance, Junction to Lead (Note 5)	R <sub>θJL</sub>	20	°C/W
Typical Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	6	°C/W
Typical Thermal Resistance Junction to Ambient (Note 6)	R <sub>θJA</sub>	54	°C/W
Typical Thermal Resistance, Junction to Lead (Note 6)	R <sub>θJL</sub>	5	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

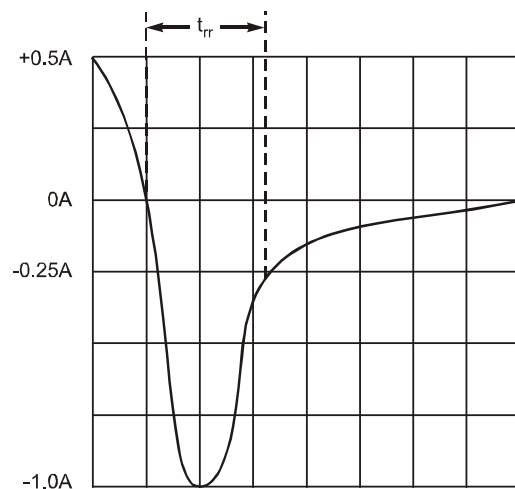
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 7)	V <sub>(BR)R</sub>	1,000	—	—	V	I <sub>R</sub> = 5μA
Forward Voltage Drop	V <sub>F</sub>	—	0.97	1.1	V	I <sub>F</sub> = 1A, T <sub>J</sub> = +25°C
Leakage Current (Note 7)	I <sub>R</sub>	—	0.5 43	10 100	μA	V <sub>R</sub> = 1,000V, T <sub>J</sub> = +25°C V <sub>R</sub> = 1,000V, T <sub>J</sub> = +125°C
Reverse Recovery Time	t <sub>RR</sub>	—	1.2	—	μs	I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1.0A, I <sub>RR</sub> = 0.25A
Total Capacitance	C <sub>T</sub>	—	4	—	pF	V <sub>R</sub> = 4.0V <sub>DC</sub> , f = 1MHz

- Notes:
- Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
  - Device mounted on 1" x 1", FR-4 PCB; 2 oz. Cu pad layout as shown on Diodes' website at <http://www.diodes.com/package-outlines.html>. T<sub>A</sub> = +25°C.
  - Short duration test pulse used to minimize self-heating effect.



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



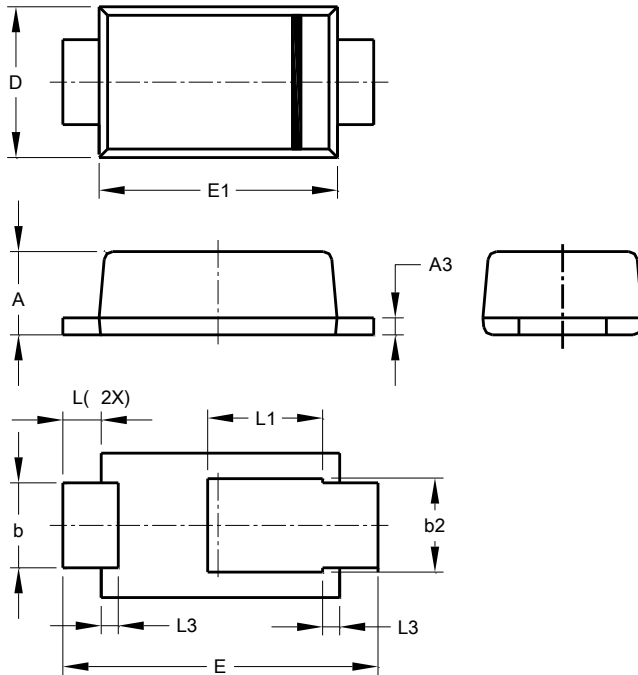
Set time base for 50/100 ns/cm

Fig. 5 Reverse Recovery Time Characteristic and Test Circuit

**Package Outline Dimensions**

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

**PowerDI123**



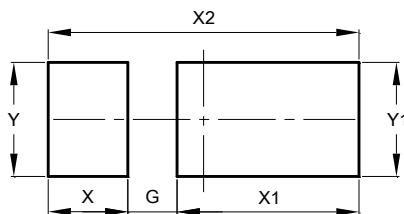
PowerDI123			
Dim	Min	Max	Typ
A	0.93	1.00	0.98
A3	0.15	0.25	0.20
b	0.85	1.25	1.00
b2	1.025	1.125	1.10
D	1.63	1.93	1.78
E	3.50	3.90	3.70
E1	2.60	3.00	2.80
L	0.40	0.50	0.45
L1	1.25	1.40	1.35
L3	0.125	0.275	0.20
All Dimensions in mm			

NEW PRODUCT

**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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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