

SPD9103W

**1 Lines, Bi-directional, Low Capacitance
Transient Voltage Suppressors**

<http://www.sh-willsemi.com>

Descriptions

The SPD9103W is a low capacitance TVS (Transient Voltage Suppressor) array designed to protect high speed data interfaces. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by Electrostatic Discharge (ESD), cable discharge events (CDE), lightning and other induced voltage surges.

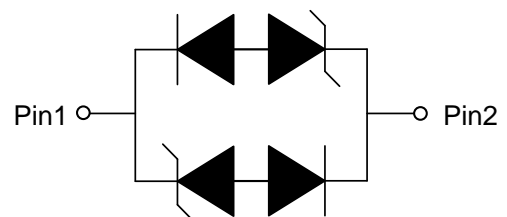
The SPD9103W incorporates low capacitance steering diodes that reduce the typical capacitance to 1pF per line.

The SPD9103W may be used to provide ESD protection up to $\pm 30\text{kV}$ (contact discharge) according to IEC61000-4-2, and withstand peak pulse current up to 20A (8/20 μs) according to IEC61000-4-5.

The SPD9103W is available in SOD-323 package. Standard products are Pb-free and Halogen-free.



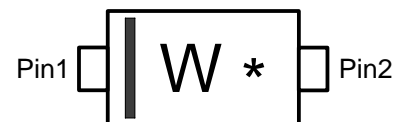
SOD-323



Circuit diagram

Features

- Stand-off voltage: 3.3V Max.
- Transient protection for each line according to
IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact discharge)
IEC61000-4-4 (EFT): 40A - 5/50ns
IEC61000-4-5 (surge): 20A (8/20 μs).
- Low capacitance: $C_J = 1\text{pF}$ typ.
- Ultra-low leakage current: $I_R = 0.1\text{nA}$ typ.
- Low clamping voltage.
- Solid-state silicon technology



W = Device code

* = Month code (A~Z)

Marking (Top View)

Applications

- 10/100/1000 Ethernet
- STB
- Router
- Networking
- Modem

Order information

Device	Package	Shipping
SPD9103W-2/TR	SOD-323	3000/Tape&Reel

Absolute maximum ratings

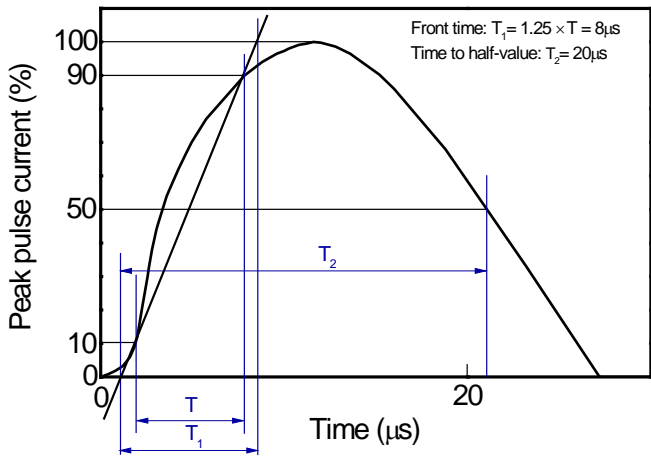
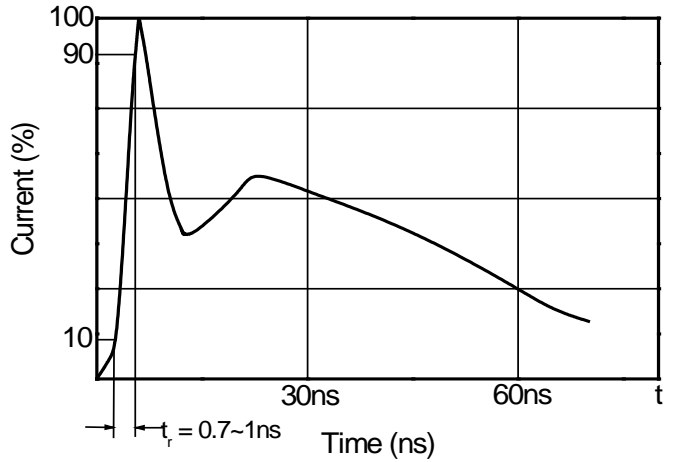
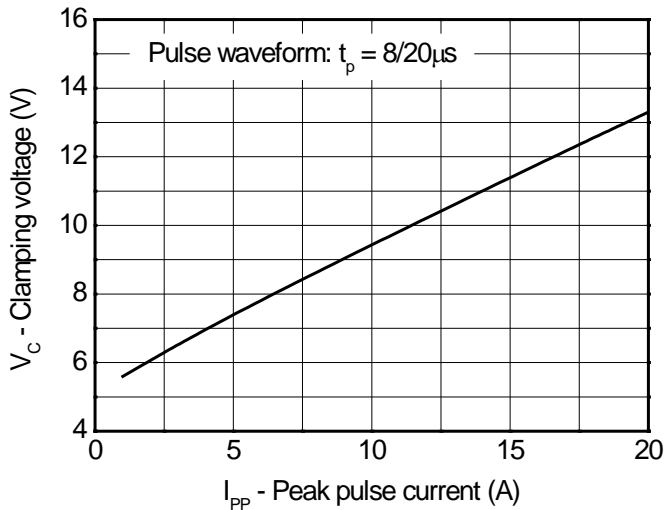
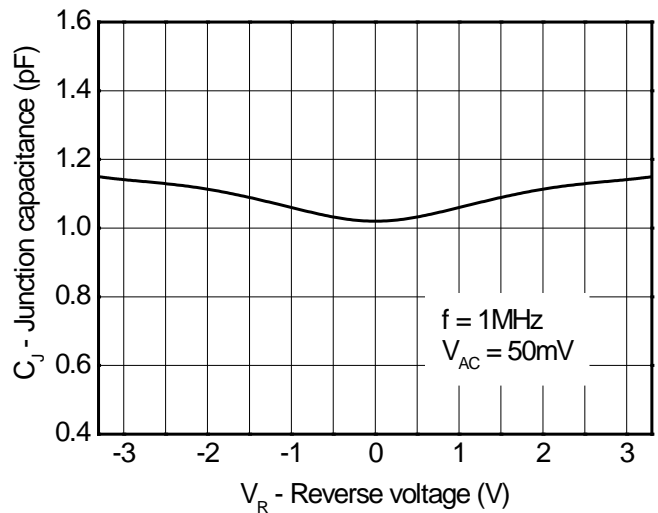
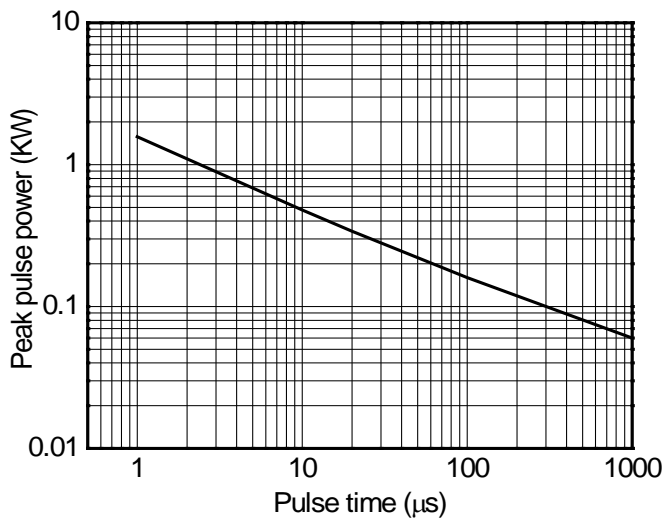
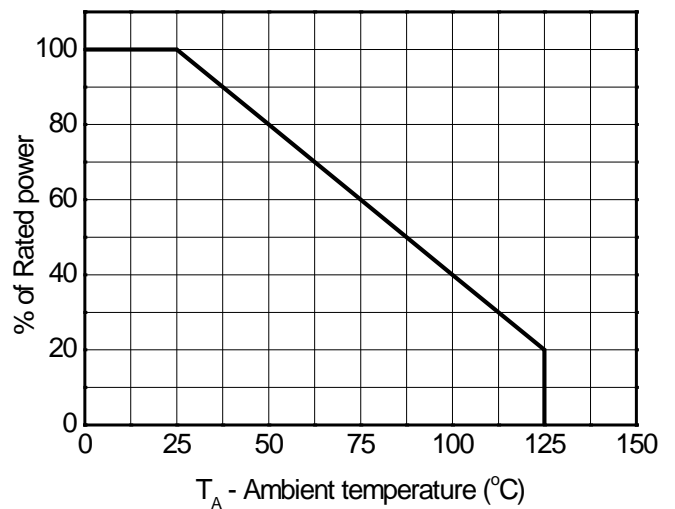
Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu s$)	P_{pk}	340	W
Peak pulse current ($t_p = 8/20\mu s$)	I_{PP}	20	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	± 30	kV
ESD according to IEC61000-4-2 contact discharge		± 30	
Junction temperature	T_J	125	$^{\circ}C$
Operating temperature	T_{OP}	-40~85	$^{\circ}C$
Lead temperature	T_L	260	$^{\circ}C$
Storage temperature	T_{STG}	-55~150	$^{\circ}C$

Electrical characteristics ($T_A = 25^{\circ}C$, unless otherwise noted)

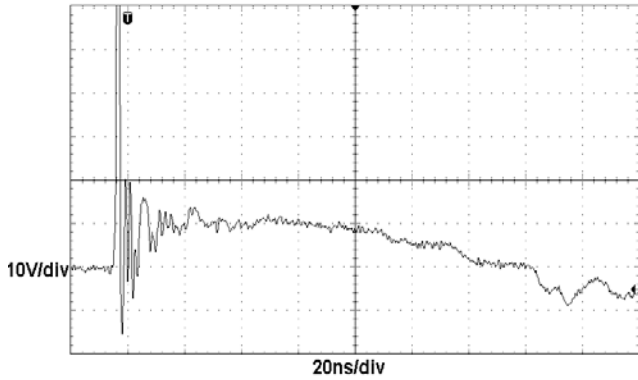
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Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V_{RWM}				3.3	V
Reverse leakage current	I_R	$V_{RWM} = 3.3V$		0.1	100	nA
Reverse breakdown voltage	V_{BR}	$I_T = 1mA$	4.0			V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 1A, t_p = 8/20\mu s$			8	V
		$I_{PP} = 5A, t_p = 8/20\mu s$			10	V
		$I_{PP} = 20A, t_p = 8/20\mu s$			17	V
Junction capacitance	C_J	$V_R = 0V, f = 1MHz$ I/O to I/O		1.0	1.5	pF

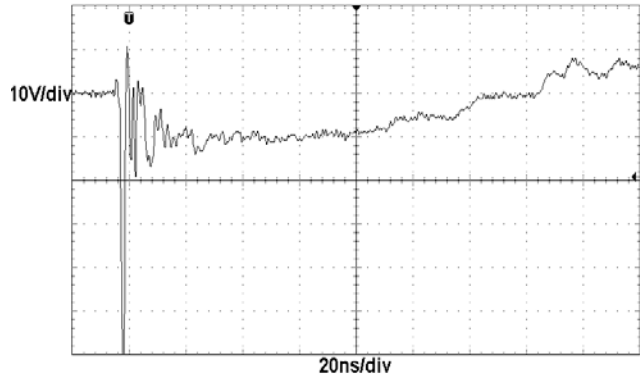
1) According to IEC61000-4-5.

Typical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)

8/20 μs waveform per IEC61000-4-5

Contact discharge current waveform per IEC61000-4-2

Clamping voltage vs. Peak pulse current

Capacitance vs. Reverse voltage

Non-repetitive peak pulse power vs. Pulse time

Power derating vs. Ambient temperature

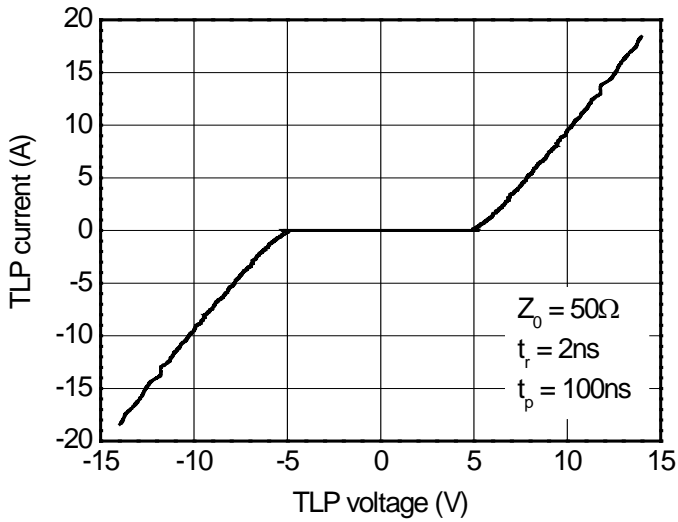
Typical characteristics ($T_A=25^{\circ}\text{C}$, unless otherwise noted)



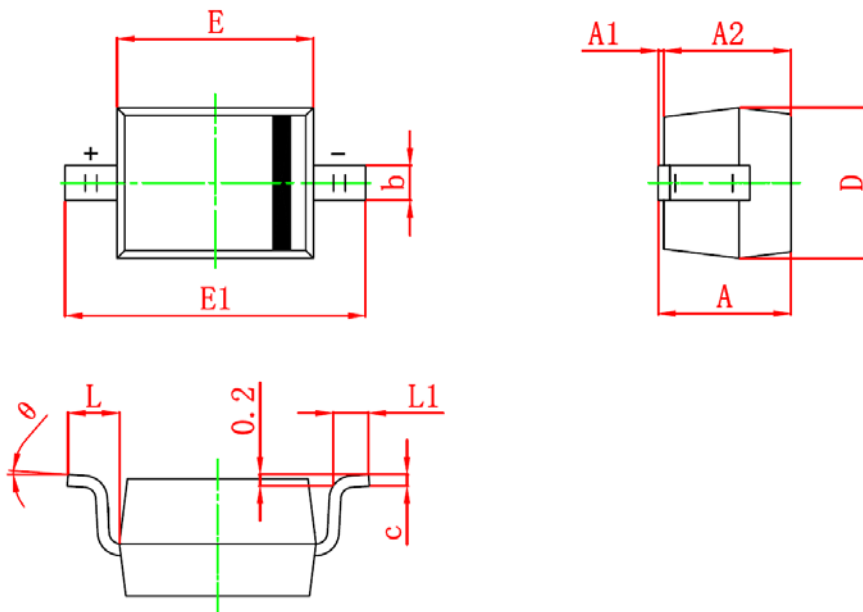
ESD clamping
 (+8kV contact discharge per IEC61000-4-2)



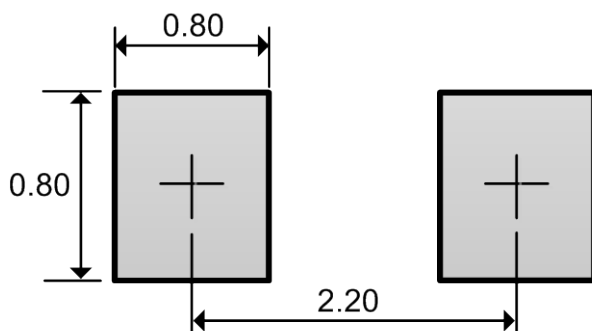
ESD clamping
 (-8kV contact discharge per IEC61000-4-2)



TLP Measurement

Package outline dimensions
SOD-323


Symbol	Dimensions in millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.800	1.000	0.031	0.039
A1	0.000	0.100	0.000	0.004
A2	0.800	0.900	0.031	0.035
b	0.250	0.350	0.010	0.014
c	0.080	0.150	0.003	0.006
D	1.200	1.400	0.047	0.055
E	1.600	1.800	0.063	0.071
E1	2.500	2.700	0.098	0.106
L	0.475 REF		0.019 REF	
L1	0.250	0.400	0.010	0.016
θ	0°	8°	0°	8°

Recommend land pattern (Unit: mm)


Note: This land pattern is for your reference only. Actual pad layouts may vary depending on application.