

SPD91011W

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

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

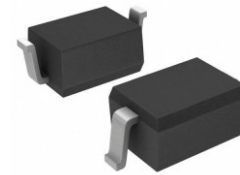
Descriptions

The SPD91011W 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.

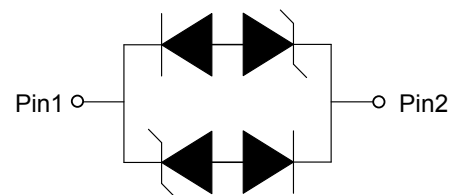
The SPD91011W incorporates low capacitance steering diodes that reduce the typical capacitance to 1.5pF per line.

The SPD91011W 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 25A (8/20 μs) according to IEC61000-4-5.

The SPD91011W is available in SOD-323 package. Standard products are Pb-free and Halogen-free.



SOD-323



Circuit diagram

Features

- Stand-off voltage: $\pm 3.3\text{V}$ 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): 25A (8/20 μs)
- Low capacitance: $C_j = 1.5\text{pF}$ typ.
- Low leakage current
- Low clamping voltage
- Solid state silicon technology



SA = Device code
* = Month code (A~Z)

Marking (Top View)

Applications

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

Order information

Device	Package	Shipping
SPD91011W-2/TR	SOD-323	3000/Tape&Reel

Absolute maximum ratings

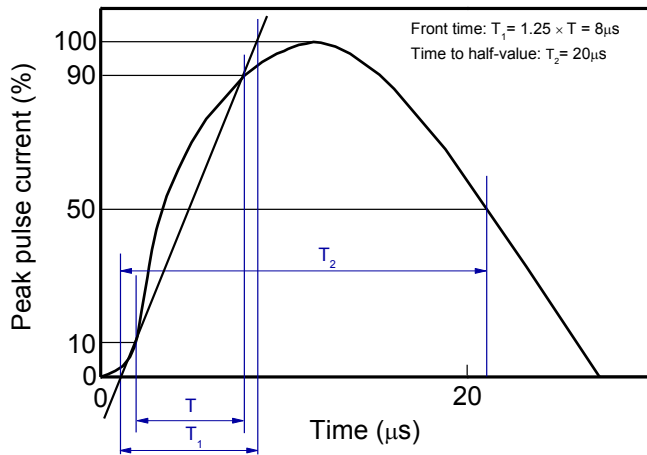
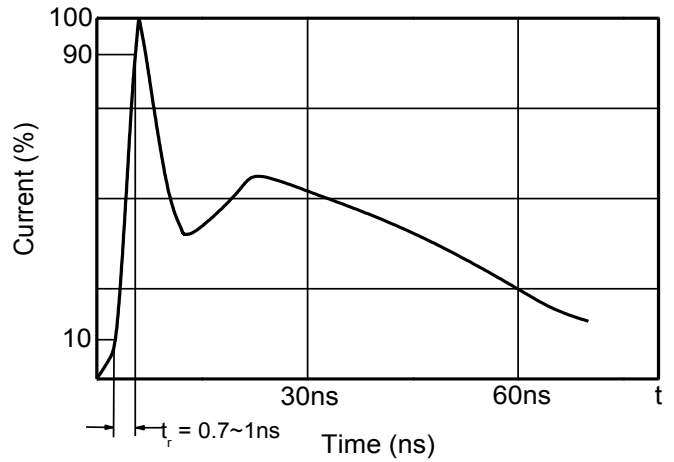
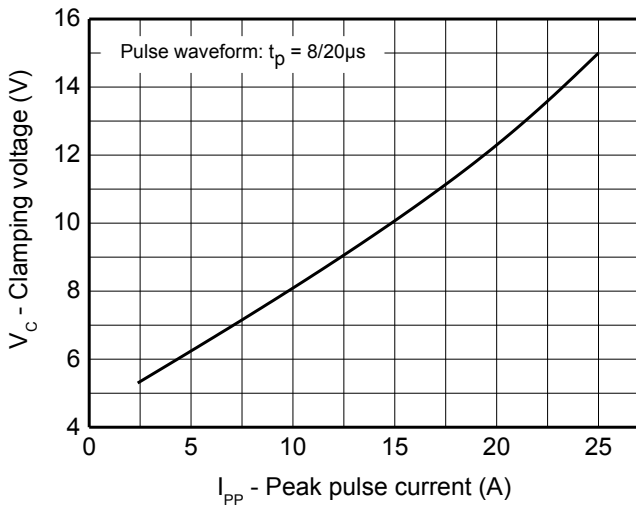
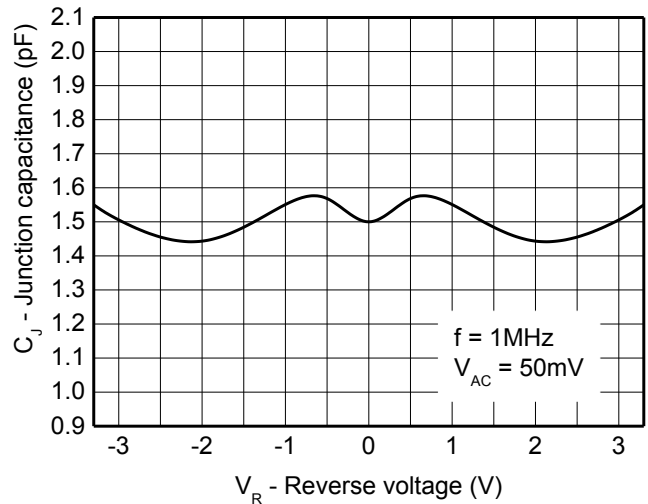
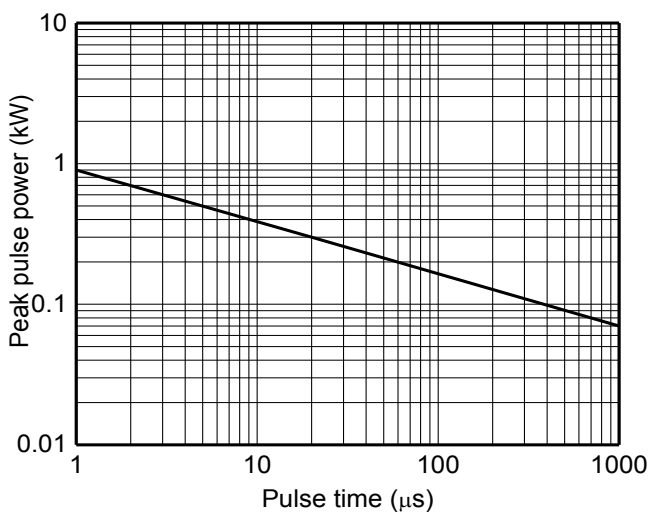
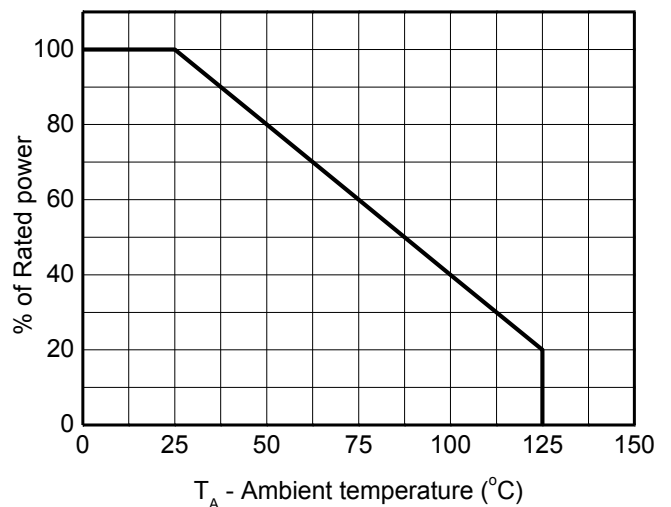
Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu\text{s}$)	P_{pk}	350	W
Peak pulse current ($t_p = 8/20\mu\text{s}$)	I_{PP}	25	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	± 30	kV
ESD according to IEC61000-4-2 contact discharge		± 30	
Junction temperature	T_J	125	$^{\circ}\text{C}$
Operating temperature	T_{OP}	-40~85	$^{\circ}\text{C}$
Lead temperature	T_L	260	$^{\circ}\text{C}$
Storage temperature	T_{STG}	-55~150	$^{\circ}\text{C}$

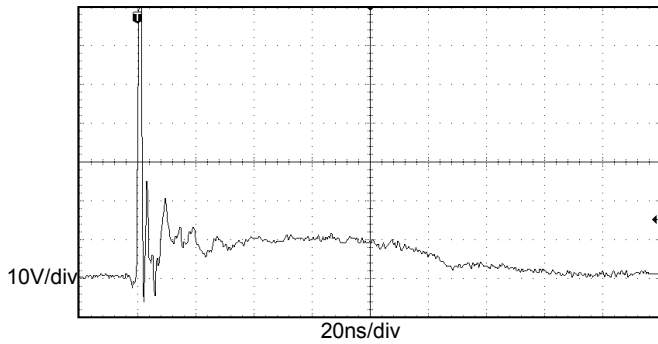
Electrical characteristics ($T_A = 25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V_{RWM}				± 3.3	V
Reverse leakage current	I_R	$V_{RWM} = 3.3\text{V}$			100	nA
Reverse breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	3.5			V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$		9.5		V
Dynamic resistance ¹⁾	R_{DYN}			0.35		Ω
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8\text{kV}$		10.0		V
Clamping voltage ³⁾	V_{CL}	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$			6	V
		$I_{PP} = 10\text{A}$, $t_p = 8/20\mu\text{s}$			10	V
		$I_{PP} = 25\text{A}$, $t_p = 8/20\mu\text{s}$			16	V
Junction capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$		1.5	2.0	pF

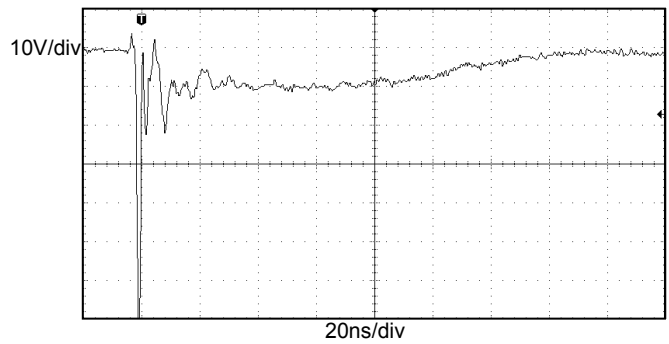
Notes:

- 1) TLP parameter: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 2\text{ns}$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.
- 2) Contact discharge mode, according to IEC61000-4-2.
- 3) Non-repetitive current pulse, according to IEC61000-4-5.

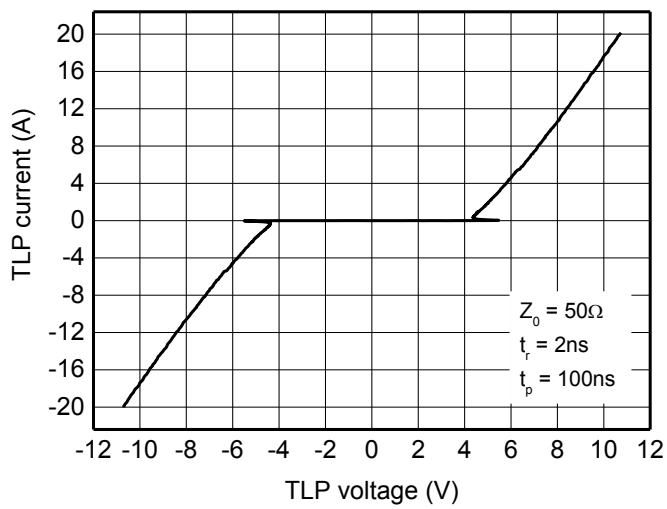
Typical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)

8/20μs 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)


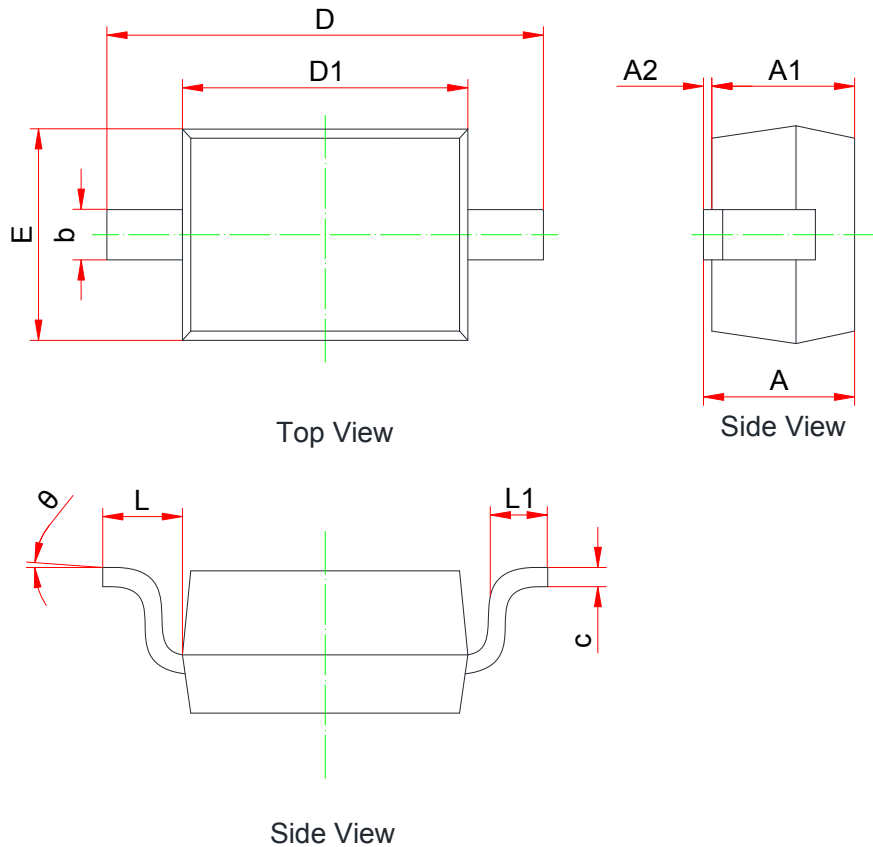
ESD clamping
 (+8kV contact discharge per IEC61000-4-2)



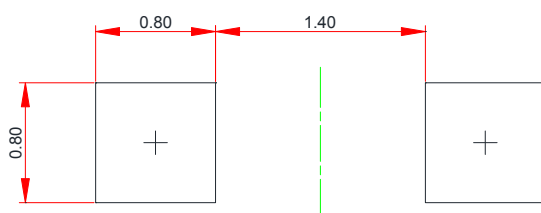
ESD clamping
 (-8kV contact discharge per IEC61000-4-2)



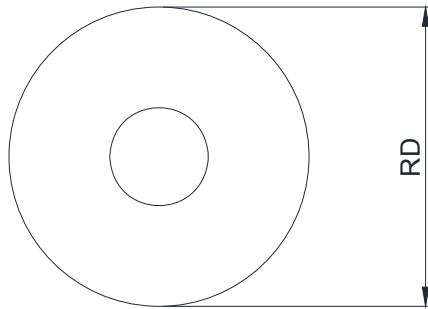
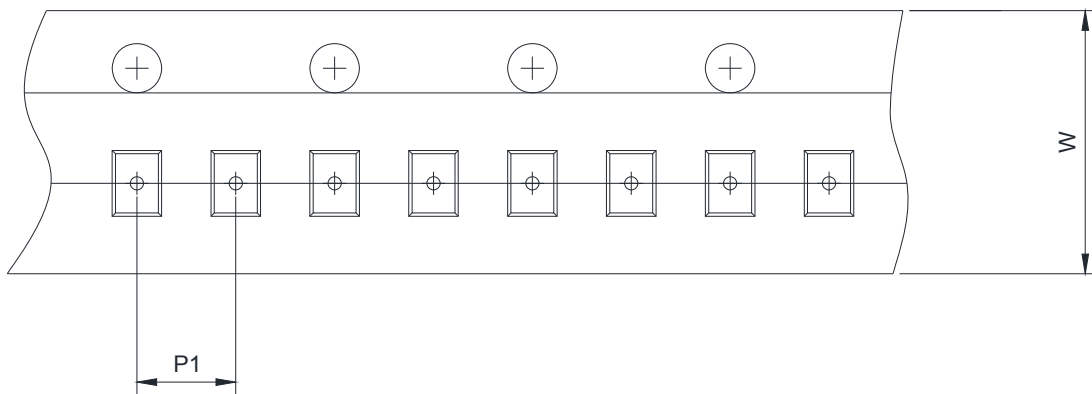
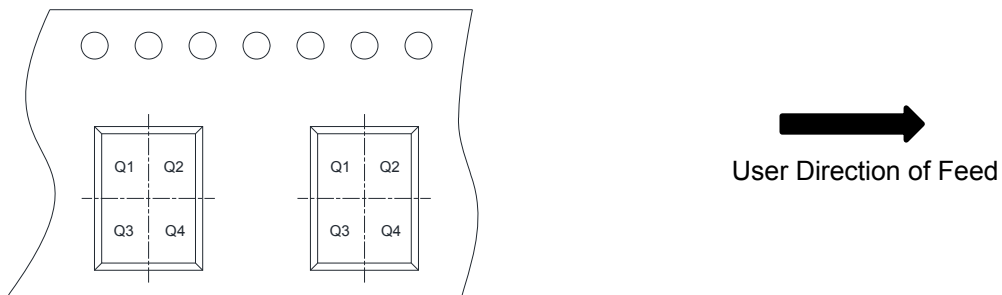
TLP Measurement

PACKAGE OUTLINE DIMENSIONS
SOD-323


Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.800	-	1.100
A1	0.800	0.850	0.900
A2	0.000	-	0.100
b	0.250	-	0.400
c	0.080	-	0.177
D1	1.600	1.700	1.800
D	2.300	-	2.800
E	1.150	-	1.400
L	0.475 Ref.		
L1	0.100	-	0.500
θ	0°	-	8°

Recommended land pattern (Unit: mm)

Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch	
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm	<input type="checkbox"/> 16mm
P	Pitch between successive cavity centers	<input type="checkbox"/> 2mm	<input checked="" type="checkbox"/> 4mm	<input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input checked="" type="checkbox"/> Q2	<input type="checkbox"/> Q3 <input type="checkbox"/> Q4

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