

ESD9B5VDA

**1-Line, Low capacitance, Bi-directional
Transient Voltage Suppressors**

Descriptions

The ESD9B5VDA is a transient voltage suppressor (TVS) which provide a very high level protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). It is designed to replace multilayer varistors (MLV) in consumer equipment applications such as mobile phone, notebook, PAD, STB, LCD TV etc.

The ESD9B5VDA may be used to provide ESD protection up to $\pm 20\text{kV}$ (contact and air discharge) according to IEC61000-4-2 and withstand peak pulse current up to 5A (8/20 μs) according to IEC61000-4-5.

The ESD9B5VDA is available in SOD-923 package. Standard products are Pb-free and Halogen-free.

Features

- Reverse stand-off voltage: $\pm 5\text{V}$ Max.
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 20\text{kV}$ (Contact and Air)
IEC61000-4-4 (EFT): 40A (5/50ns)
IEC61000-4-5 (surge): 5A (8/20 μs)
- Capacitance: $C_J = 13\text{pF}$ typ.
- Leakage current: $I_R < 1\mu\text{A}$ typ.
- Low clamping voltage
- Small Package SOD-923

Applications

- Mobile phone
- PAD
- Notebook
- LCD TV
- Other electronics equipment

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



SOD-923



Circuit Diagram



**9C = Device code
Marking**

Order information

Device	Package	Shipping
ESD9B5VDA-2/TR	SOD-923	10000/Tape&Reel

Absolute maximum ratings

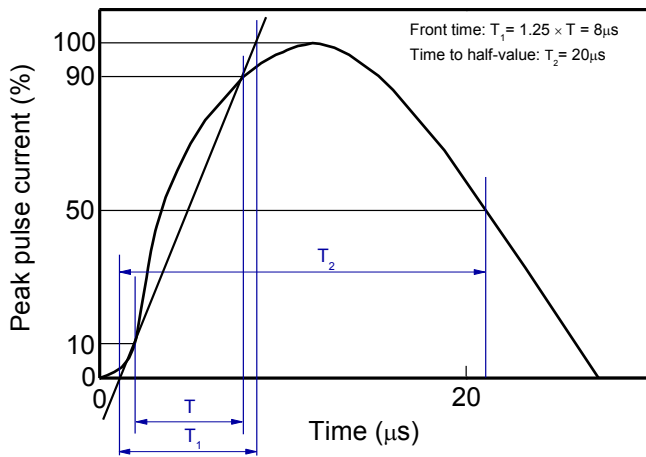
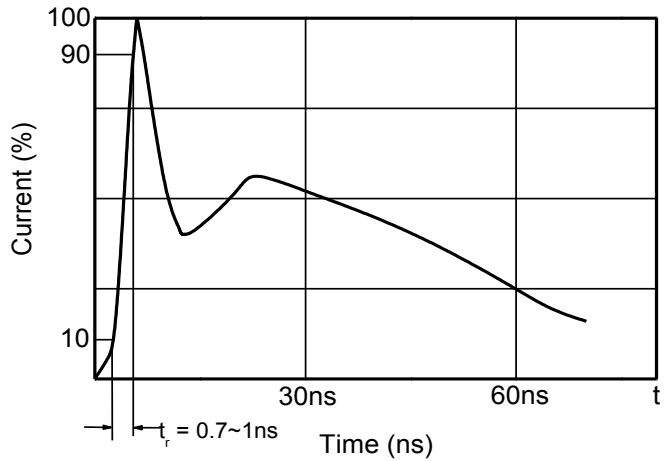
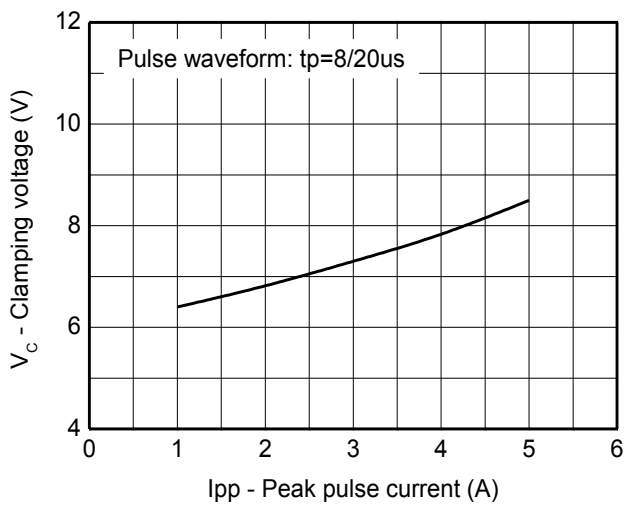
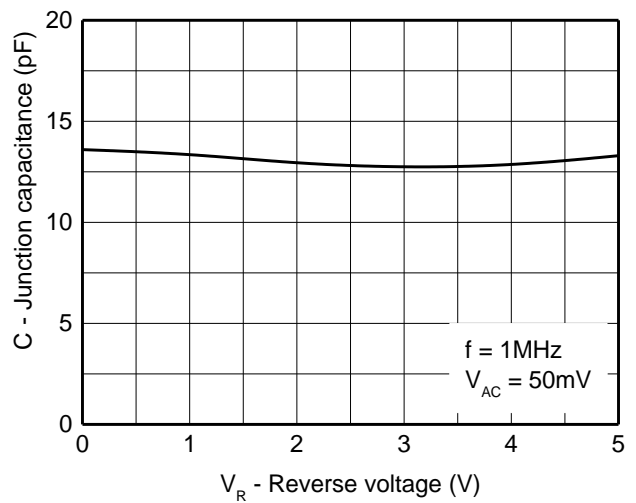
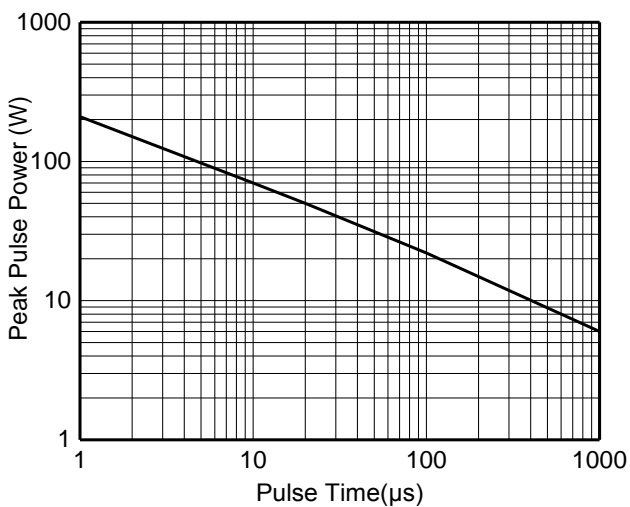
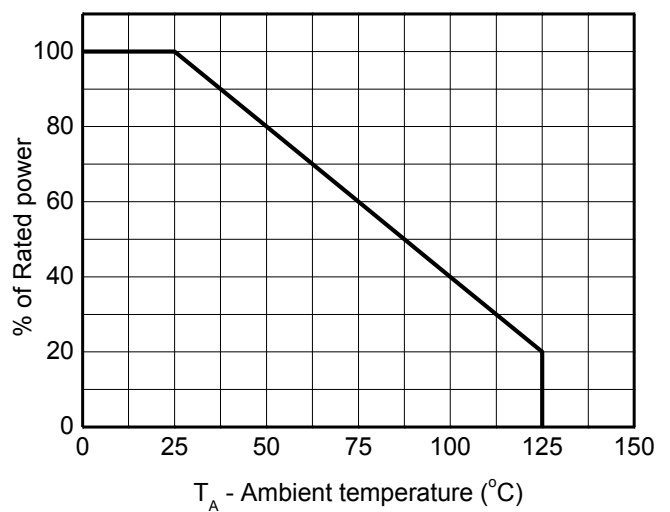
Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu s$)	P_{pk}	50	W
Peak pulse current ($t_p = 8/20\mu s$)	I_{PP}	5	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	± 20	KV
ESD according to IEC61000-4-2 contact discharge		± 20	
Junction temperature	T_J	125	$^{\circ}C$
Operating temperature	T_{OP}	-40~85	$^{\circ}C$
Lead temperature	T_L	260	$^{\circ}C$
Storage temperature	T_{STG}	-55~150	$^{\circ}C$

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

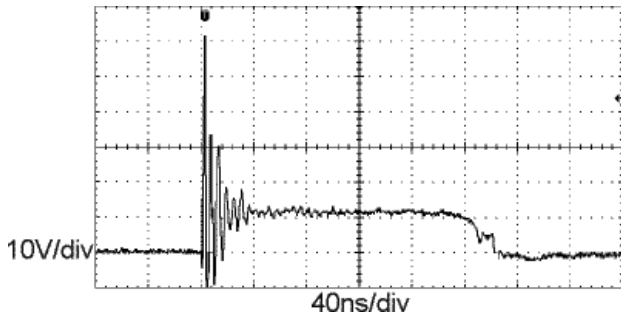
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				± 5	V
Reverse leakage current	I_R	$V_{RWM} = 5V$			1	μA
Reverse breakdown voltage	V_{BR}	$I_{BR} = 1mA$	5.8	7.5	9.0	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16A, t_p = 100ns$		10		V
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8kV$		11		V
Clamping voltage ³⁾	V_{CL}	$I_{pp} = 1A, t_p = 8/20\mu s$			7.5	V
		$I_{pp} = 5A, t_p = 8/20\mu s$			10	V
Dynamic resistance ¹⁾	R_{DYN}			0.2		Ω
Junction capacitance	C_J	$V_R = 0V, f = 1MHz$		13	16	pF

Notes:

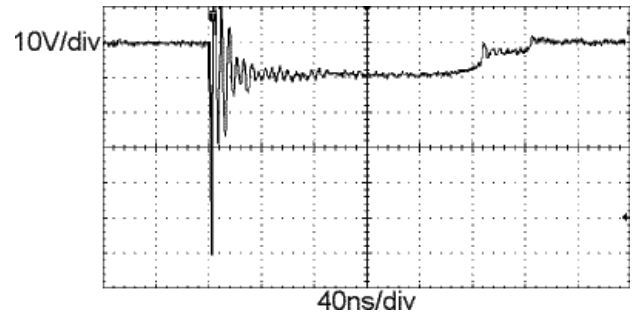
- 1) TLP parameter: $Z_0 = 50\Omega, t_p = 100ns, t_r = 2ns$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.
- 2) Contact discharge mode, according to IEC61000-4-2.
- 3) Non-repetitive current pulse, according to IEC61000-4-5.

Typical characteristics (Ta=25°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

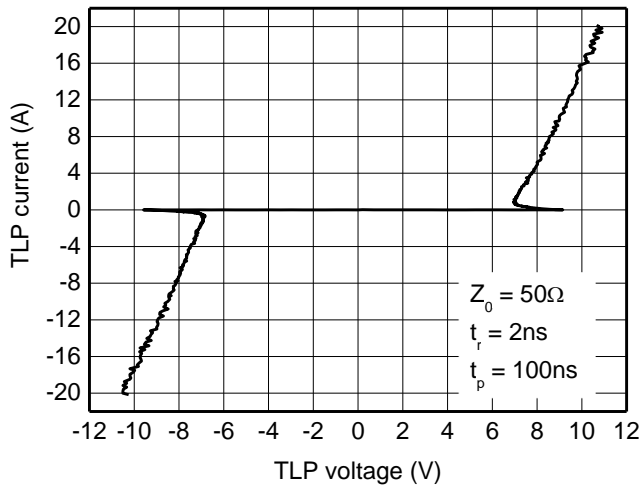
Typical characteristics (Ta=25°C, unless otherwise noted)



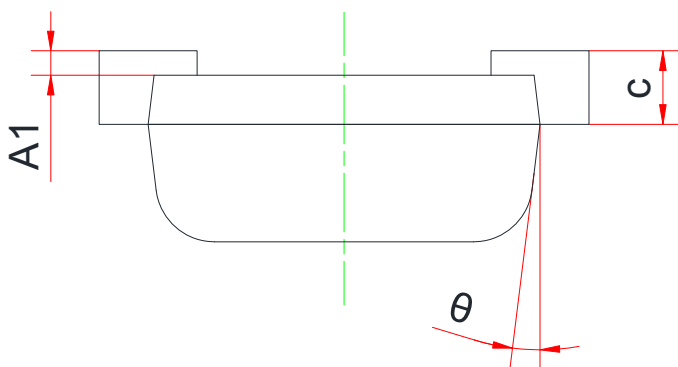
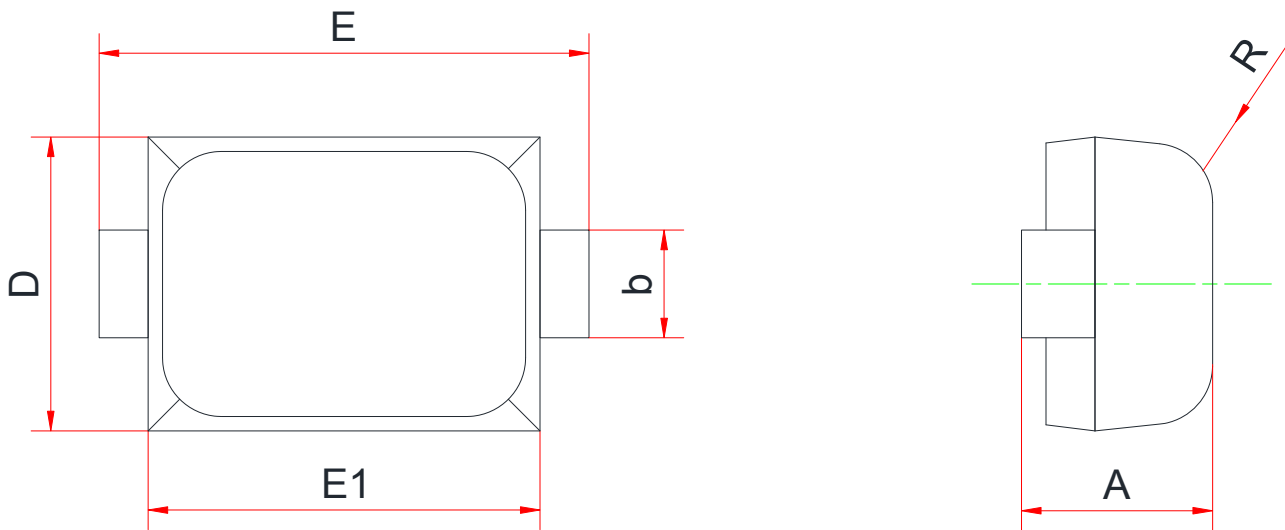
ESD clamping
(+8kV contact discharge per IEC61000-4-2)



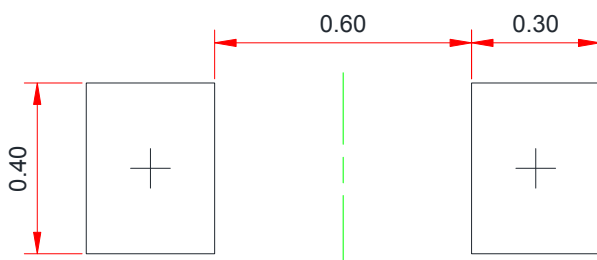
ESD clamping
(-8kV contact discharge per IEC61000-4-2)



TLP Measurement

Package outline dimensions
SOD-923


Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	-	0.42	0.45
A1	0.00	-	0.05
b	0.15	0.20	0.25
c	0.07	0.12	0.17
D	0.55	0.60	0.65
E	0.95	1.00	1.05
E1	0.75	0.80	0.85
θ	6° Ref.		
R	-	-	0.12

Recommend PCB Layout (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.