ESD9NS5V

2-Lines, Bi-directional, Transient Voltage Suppressors

http//:www.sh-willsemi.com

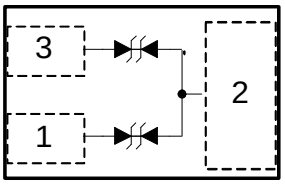
Descriptions

The ESD9NS5V is a transient voltage suppressors (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, PDA, STB, LCD TV etc.

The ESD9NS5V was past ESD transient voltage up to ±30kV (contact) according to IEC61000-4-2 and withstand peak current up to 9A for 8/20μs pulse according to IEC61000-4-5.

The ESD9NS5V is available in DFN1006-3L package. Standard products are Pb-free and Halogen-free.

DFN1006-3L



Pin configuration (Top view)

DFN1006-3L

S = Device code
*** = Month code (A~Z)**
Marking

Features

- Reverse stand-off voltage : 5V
- Peak current (tp=8/20μs) : 9A
- Transient protection
  IEC61000-4-2, Level 4 : ±30kV air
  : ±30kV contact
- Low clamping voltage
- Low leakage current
- Small package

Order information

Device	Package	Shipping
ESD9NS5V-3/TR	DFN1006-3L	10000/Tape&Reel

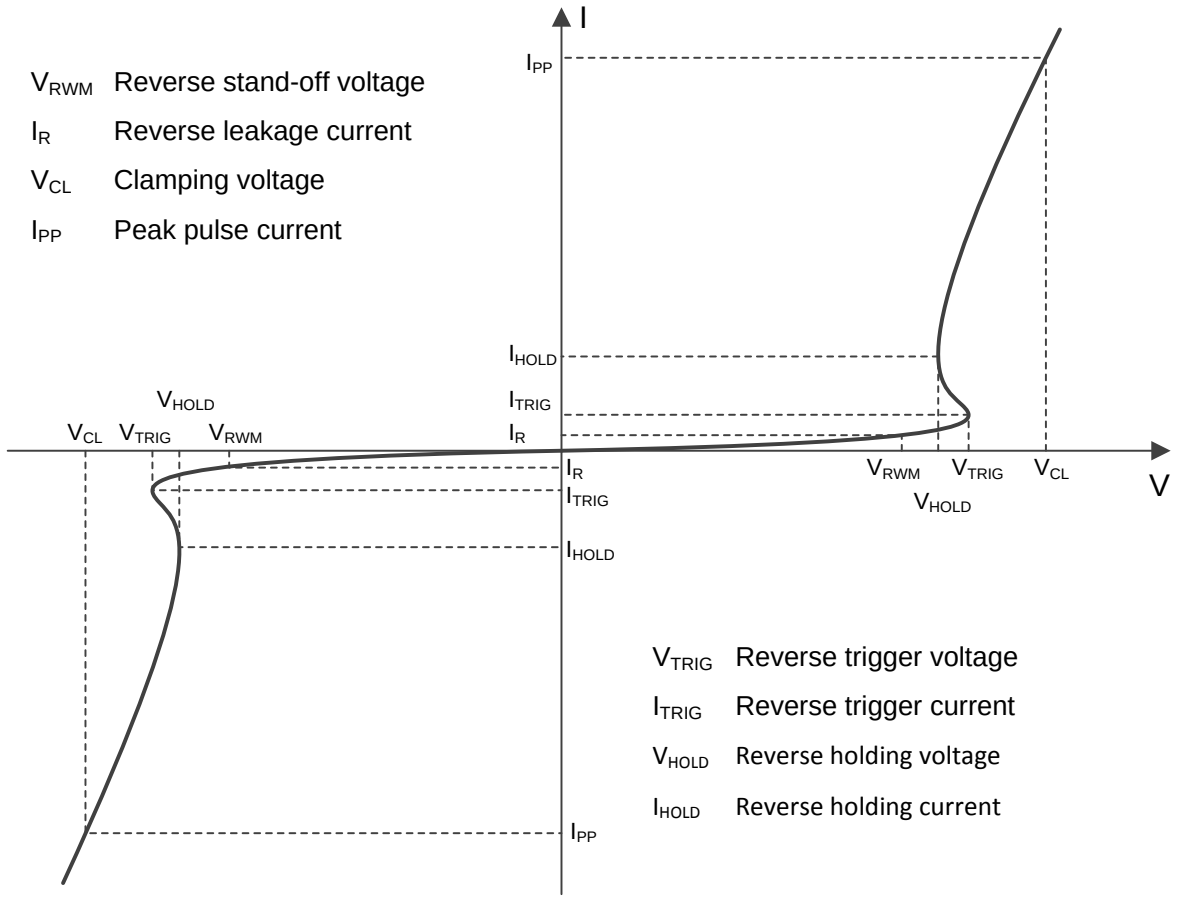
Applications

- Cell phone
- PMP
- MID
- PDA
- Digital camera
- Other electronic equipment

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power (tp=8/20μs) (pin1 or pin3 to pin2)	P_{pk}	100	W
Peak pulse power (tp=8/20μs) (pin2 to pin1 or pin3)		150	W
Peak pulse current (tp=8/20μs)	I_{pp}	9	A
ESD voltage IEC61000-4-2 air	V_{ESD}	±30	kV
ESD voltage IEC61000-4-2 contact		±30	
Junction temperature	T_J	125	°C
Operating temperature	T_{OP}	-40~85	°C
Lead temperature	T_L	260	°C
Storage temperature	T_{STG}	-55~150	°C

Electrical characteristics (T_A = 25°C, unless otherwise noted)



Definitions of electrical characteristics

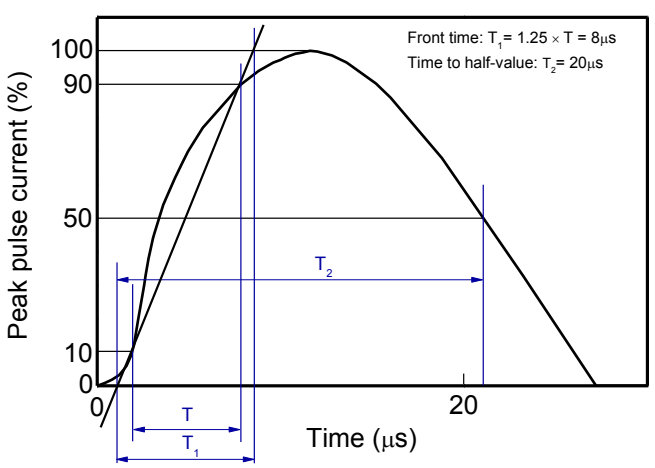
Electrical characteristics (Ta=25 °C, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				5.0	V
Reverse leakage current	I_R	V_{RWM}=5V			1	μA
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA			9.5	V
Clamping voltage 1)	V_{CL}	I_{PP} = 16A, t_p = 100ns pin1 or pin3 to pin2		6		V
		I_{PP} = 16A, t_p = 100ns pin2 to pin1 or pin3		11		V
Clamping voltage 2)	V_{CL}	V_{ESD} = 8kV pin1 or pin3 to pin2		10		V
		V_{ESD} = 8kV pin2 to pin1 or pin3		15		V
Clamping voltage3)	V_C	I_{pp}=1A, t_p = 8/20μs pin1 or pin3 to pin2			7	V
		I_{pp}=9A, t_p = 8/20μs pin1 or pin3 to pin2			11	V
Clamping voltage3)	V_C	I_{pp}=1A, t_p = 8/20μs pin2 to pin1 or pin3			11	V
		I_{pp}=9A, t_p = 8/20μs pin2 to pin1 or pin3			17	V
Dynamic resistance 1)	R_{DYN}	pin1 or pin3 to pin2		0.05		Ω
		pin2 to pin1 or pin3		0.11		Ω
Junction capacitance	C_J	f=1MHz, V_R=0V		24	30	pF

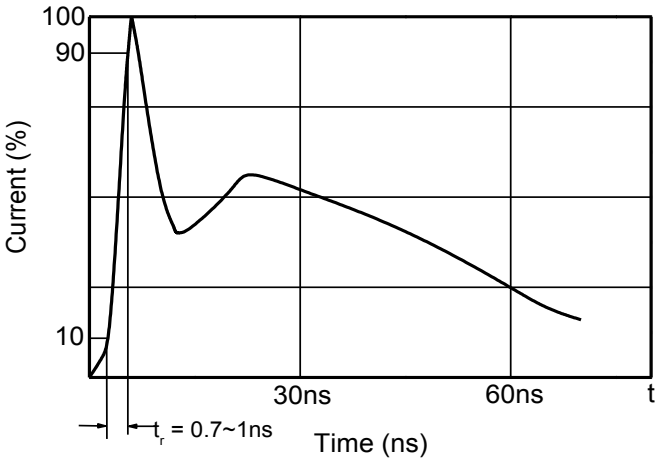
Notes:

1) *TLP parameter: Z_0 = 50Ω, 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.*

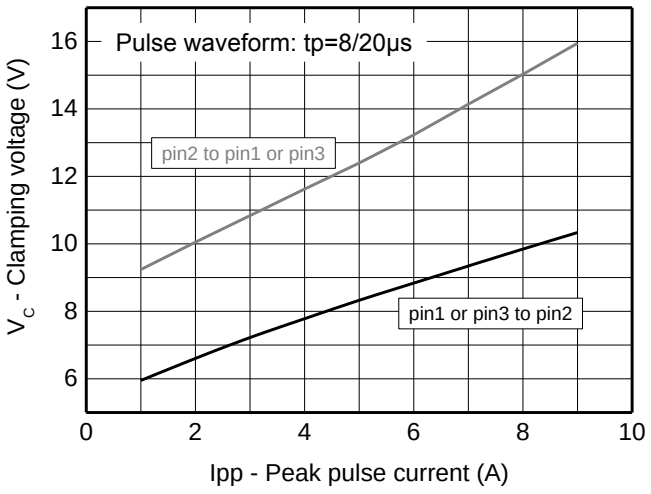
Typical characteristics (T_A=25°C, unless otherwise noted)



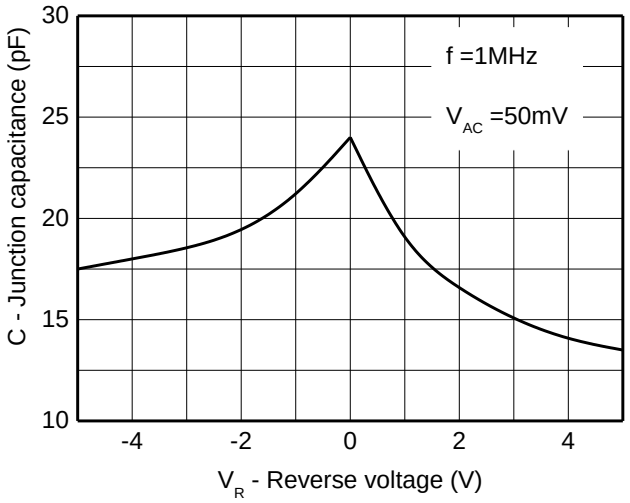
8/20μs waveform per IEC61000-4-5



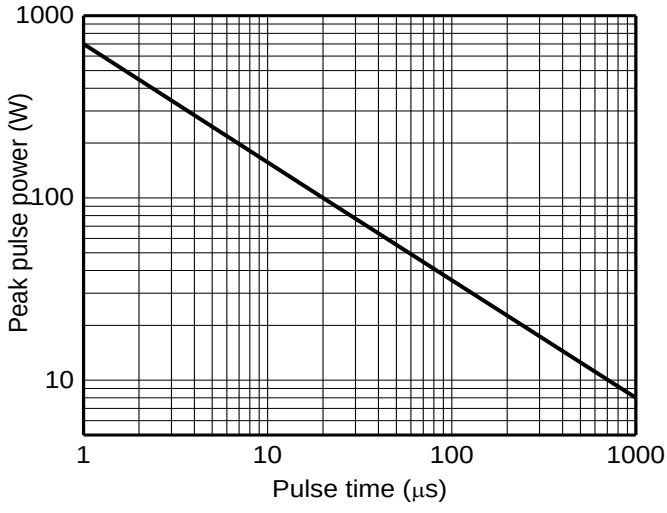
Contact discharge current waveform per IEC61000-4-2



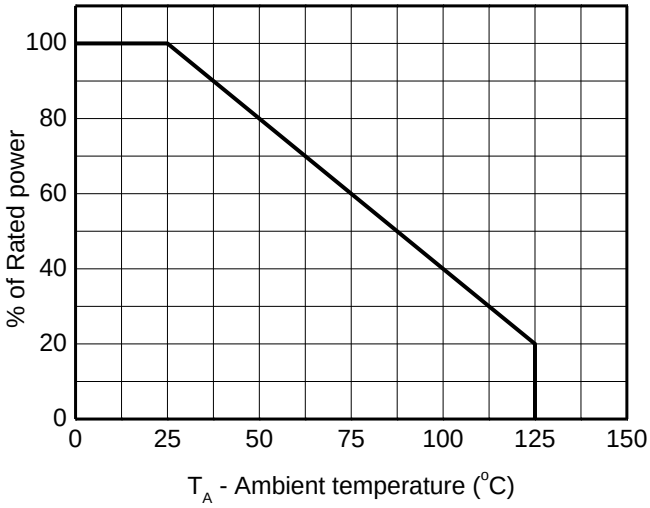
Clamping voltage vs. Peak pulse current



Capacitance vs. Reverse voltage

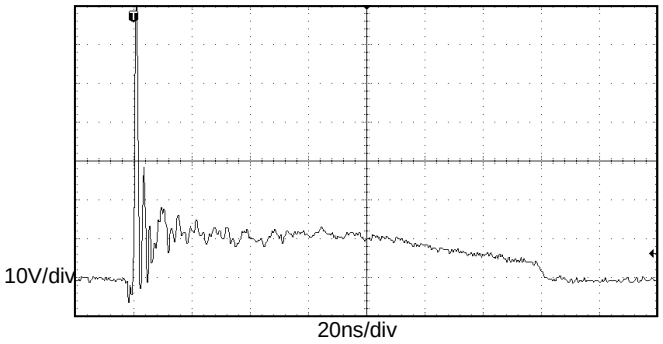


Non-repetitive peak pulse power vs. Pulse time

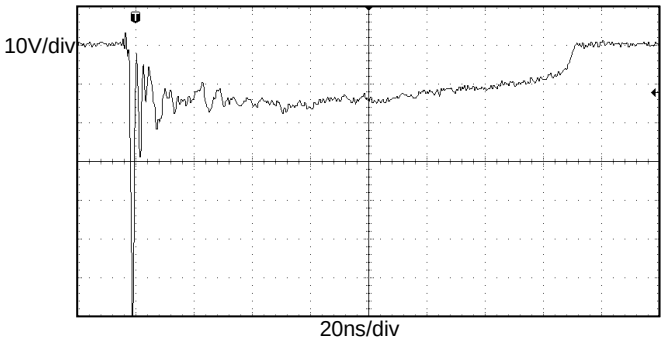


Power derating vs. Ambient temperature

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



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



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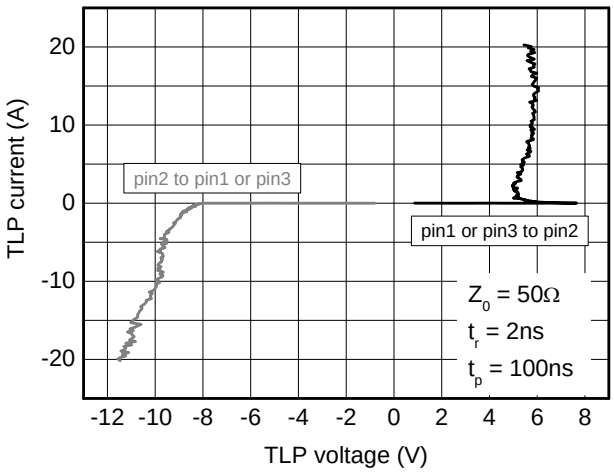
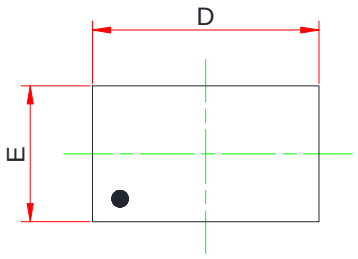


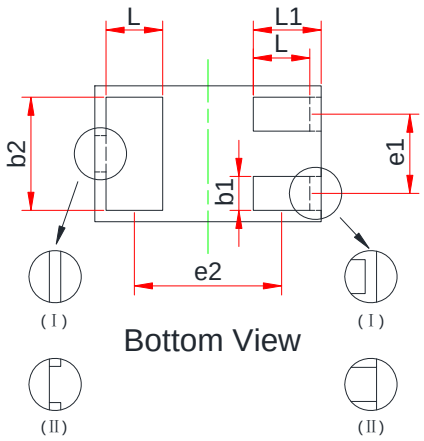
TLP Measurement

P PACKAGE OUTLINE DIMENSIONS

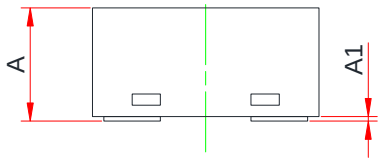
DFN1006-3L



Top View



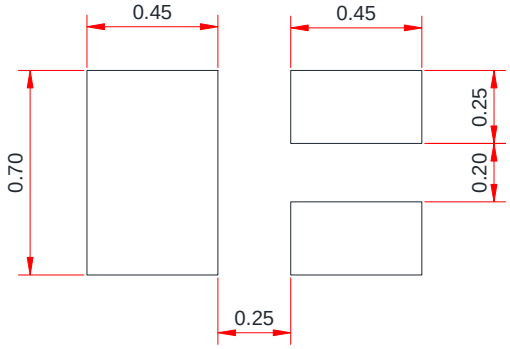
Bottom View



Side View

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.36	-	0.50
A1	0.00	-	0.05
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b1	0.10	0.15	0.20
b2	0.40	0.50	0.60
L	0.20	0.25	0.30
L1	0.20	0.30	0.40
e1	0.35 BSC		
e2	0.65 BSC		

Recommend PCB Layout (Unit: mm)

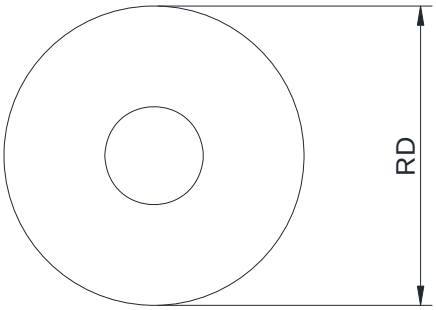


Notes:

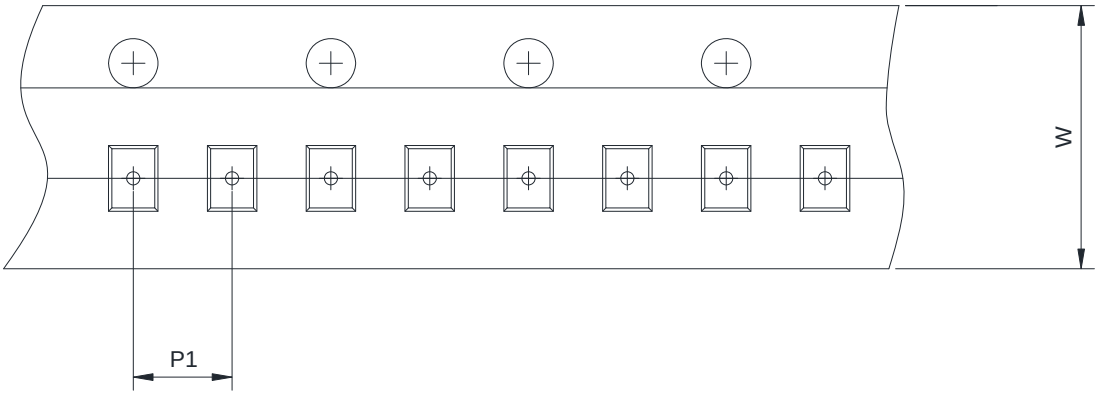
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

TAPE AND REEL INFORMATION

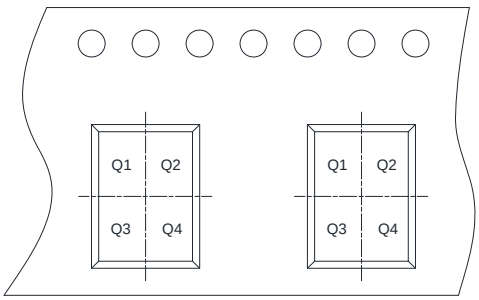
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

RD	Reel Dimension	☑ 7inch ☐ 13inch
W	Overall width of the carrier tape	☑ 8mm ☐ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☑ 2mm ☐ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4