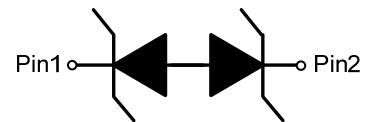


1-Line, Bi-directional, Transient Voltage Suppressors**Descriptions**

The VES9N12BA is a TVS (Transient Voltage Suppressor) designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and lightning.

The VESD9N12BA 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 5.5A (8/20 μs) according to IEC61000-4-5.

The ESD9N12BA is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.

**DFN1006-2L (Bottom View)****Circuit diagram****Features**

- Stand-off voltage: $\pm 12\text{V}$ Max
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact discharge)
IEC61000-4-5 (surge): 5.5A (8/20 μs)
- Capacitance: $C_J = 27\text{pF}$ typ.
- Ultra-low leakage current: $I_R = 0.1\text{nA}$ typ.
- Low clamping voltage: $V_{CL} = 20\text{V}$ typ. @ $I_{PP} = 16\text{A}$ (TLP)
- Solid-state silicon technology

Applications

- Computers and peripherals
- Cellular handsets
- Portable Electronics
- Notebooks

Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu s$)	P_{pk}	99	W
Peak pulse current ($t_p = 8/20\mu s$)	I_{PP}	5.5	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	± 30	kV
ESD according to IEC61000-4-2 contact discharge		± 30	
Operation junction temperature	T_J	125	$^{\circ}C$
Lead temperature	T_L	260	$^{\circ}C$
Storage temperature	T_{STG}	-55~150	$^{\circ}C$

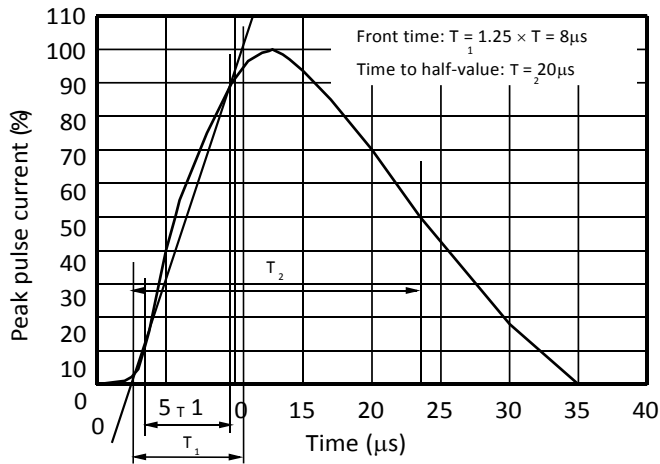
Electrical characteristics ($T_A=25^{\circ}C$, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Stand-off voltage	V_{RWM}				± 12	V
Reverse leakage current	I_R	$V_{RWM} = 12V$		0.1	50	nA
Reverse breakdown voltage	V_{BR}	$I_T = 1mA$	13		16.5	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16A, t_p = 100ns$		20		V
Dynamic resistance ¹⁾	R_{DYN}			0.35		Ω
Clamping voltage ²⁾	V_{CL}	$I_{PP} = 1A, t_p = 8/20\mu s$			16	V
		$I_{PP} = 5.5A, t_p = 8/20\mu s$			18	V
Junction capacitance	C_J	$V_R = 0V, f = 1MHz$		27	35	pF
		$V_R = 12V, f = 1MHz$		14	20	pF

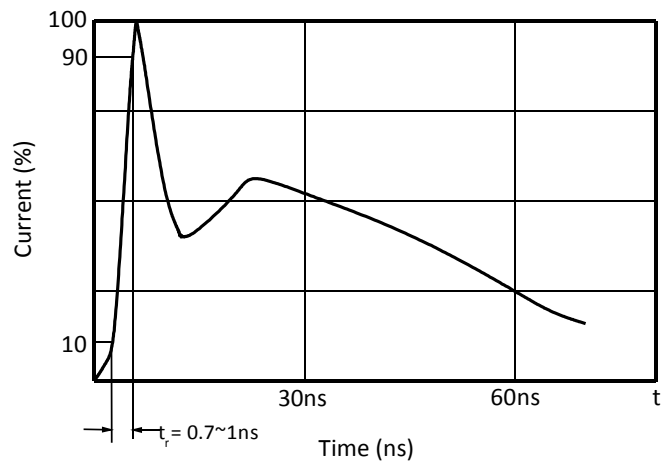
1) TLP parameter: $Z_0 = 50\Omega$, $t_p = 100ns$, $t_r = 2ns$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.

2) According to IEC61000-4-5.

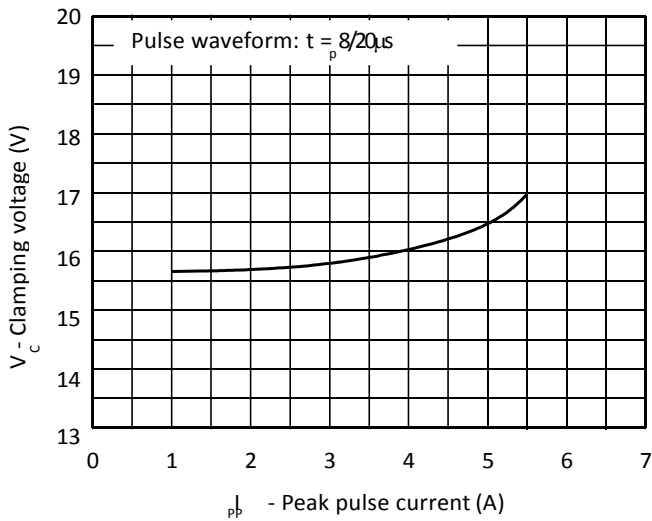
Typical characteristics (T_A=25°C, unless otherwise noted)



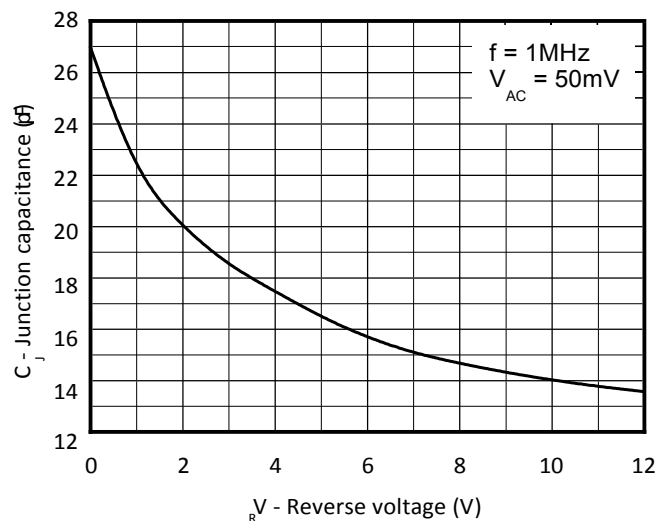
8/20μs waveform per IEC61000-4-5



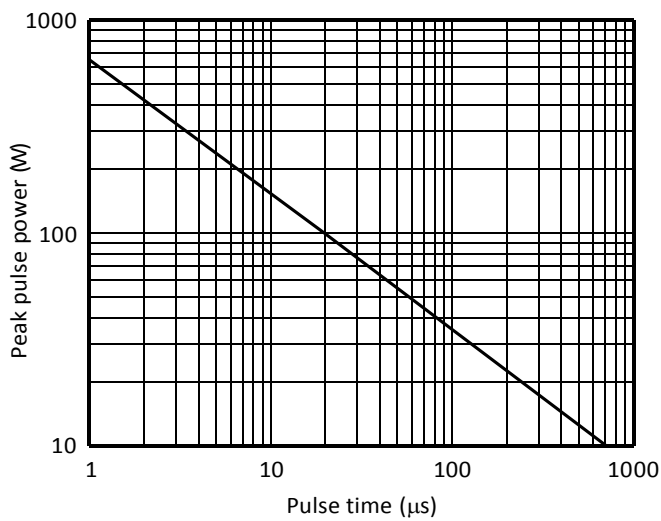
Contact discharge current waveform per IEC61000-4-2



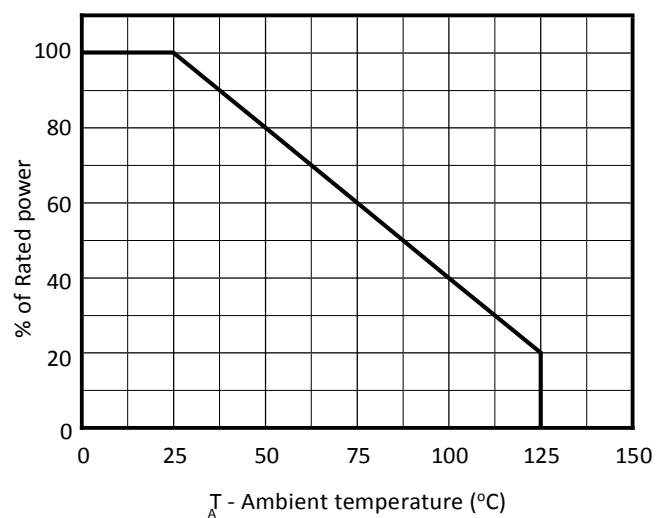
Clamping voltage vs. Peak pulse current



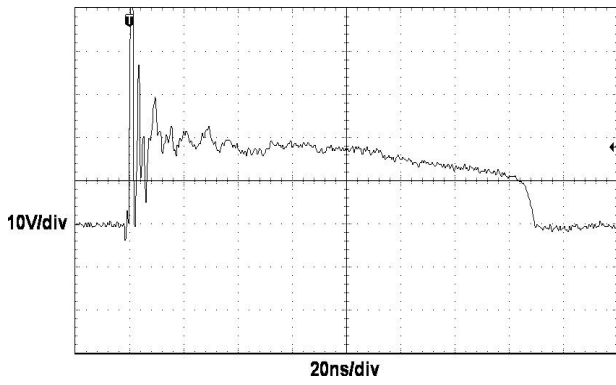
Capacitance vs. Reverse voltage



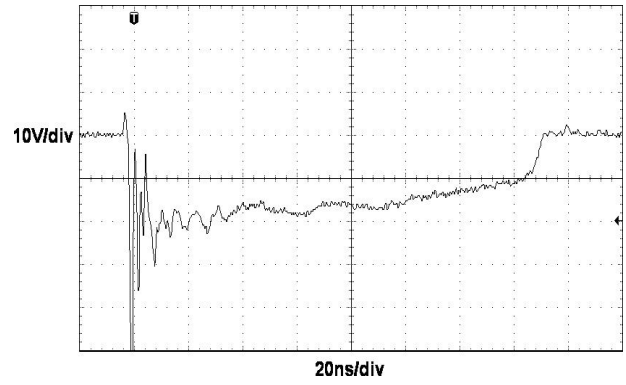
Non-repetitive peak pulse power vs. Pulse time



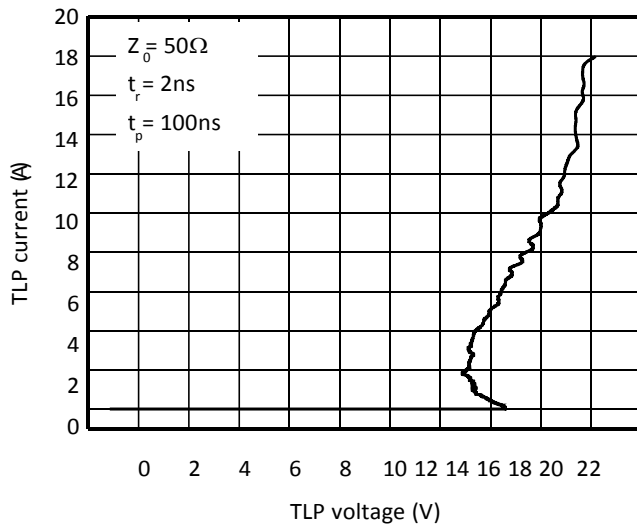
Power derating vs. Ambient temperature



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



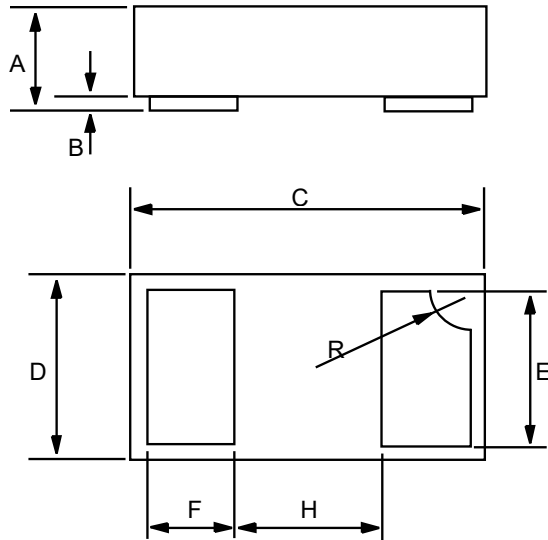
ESD clamping
(-8kV contact discharge per IEC61000-4-2)



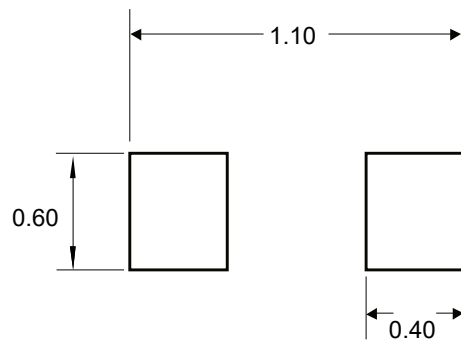
TLP Measurement

Package outline dimensions

DFN1006-2L



Dim	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.013	0.020	0.34	0.50
B	0.000	0.002	0.00	0.05
C	0.037	0.043	0.95	1.080
D	0.022	0.027	0.55	0.680
E	0.016	0.024	0.40	0.60
F	0.008	0.012	0.20	0.30
H	0.015Typ.		0.40Typ.	
R	0.001	0.005	0.05	0.15



Suggested PCB Layout

Unit:mm