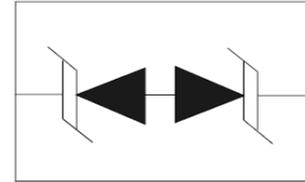


## Descriptions

The ESD9N12BA 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 ESD9N12BA 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 $\mu\text{s}$ ) according to IEC61000-4-5.

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



## 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 $\mu\text{s}$ )
- 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

## Absolute maximum ratings

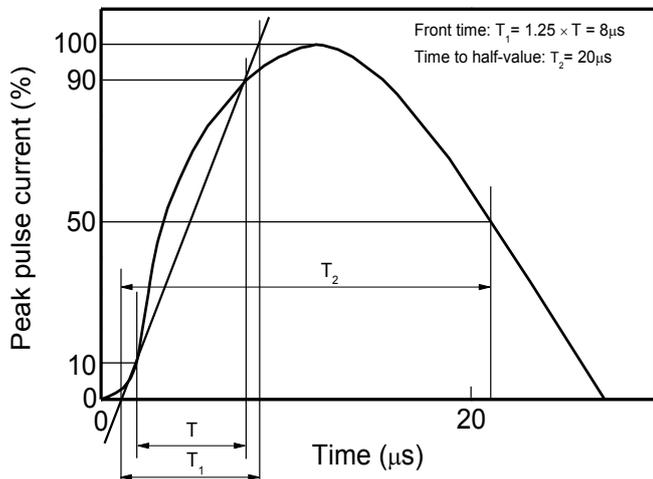
Parameter	Symbol	Rating	Unit
Peak pulse power ( $t_p = 8/20\mu\text{s}$ )	$P_{pk}$	99	W
Peak pulse current ( $t_p = 8/20\mu\text{s}$ )	$I_{PP}$	5.5	A
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	$\pm 30$	kV
ESD according to IEC61000-4-2 contact discharge		$\pm 30$	
Junction temperature	$T_J$	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<sub>A</sub>=25 °C, unless otherwise noted)**

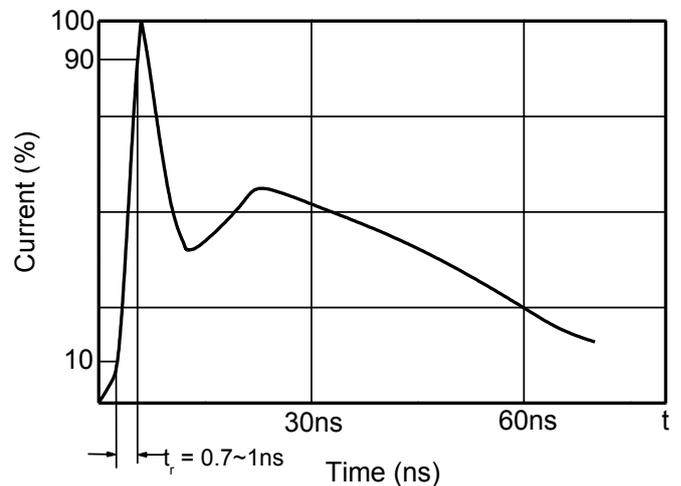
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Stand-off voltage	V <sub>RWM</sub>				±12	V
Reverse leakage current	I <sub>R</sub>	V <sub>RWM</sub> = 12V		0.1	50	nA
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>T</sub> = 1mA	13		16.5	V
Clamping voltage <sup>1)</sup>	V <sub>CL</sub>	I <sub>PP</sub> = 16A, t <sub>p</sub> = 100ns		20		V
Dynamic resistance <sup>1)</sup>	R <sub>DYN</sub>			0.35		Ω
Clamping voltage <sup>2)</sup>	V <sub>CL</sub>	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs			16	V
		I <sub>PP</sub> = 5.5A, t <sub>p</sub> = 8/20μs			18	V
Junction capacitance	C <sub>J</sub>	V <sub>R</sub> = 0V, f = 1MHz		27	35	pF
		V <sub>R</sub> = 12V, f = 1MHz		14	20	pF

- 1) TLP parameter: Z<sub>0</sub> = 50Ω, t<sub>p</sub> = 100ns, t<sub>r</sub> = 2ns, averaging window from 60ns to 80ns. R<sub>DYN</sub> is calculated from 4A to 16A.
- 2) Non-repetitive current pulse, according to IEC61000-4-5.

**Typical characteristics (T<sub>A</sub>=25°C, unless otherwise noted)**

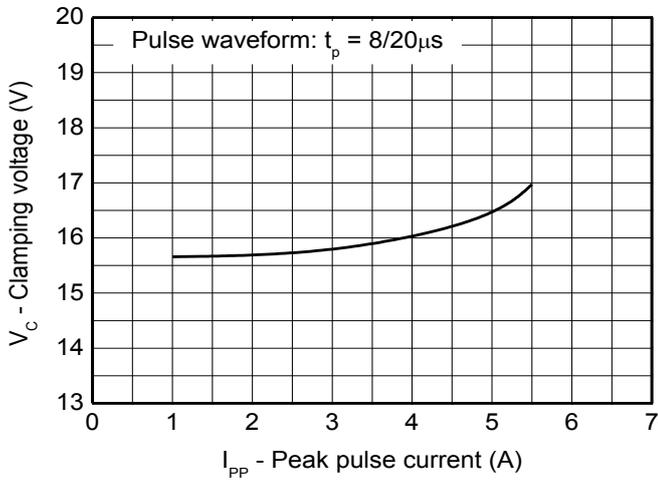


**8/20μs waveform per IEC61000-4-5**

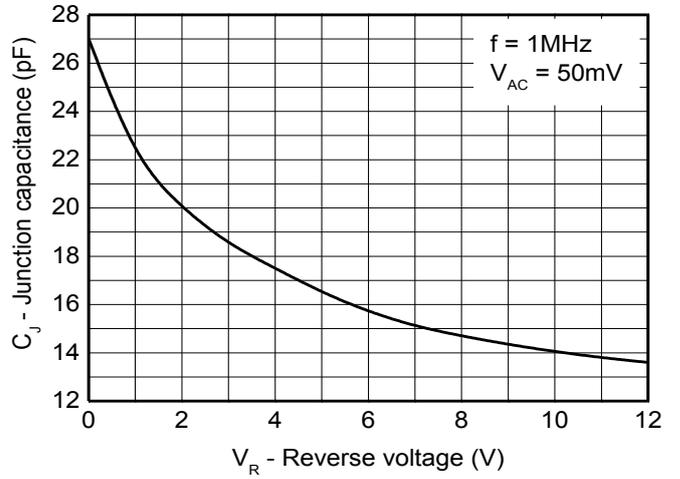


**Contact discharge current waveform per IEC61000-4-2**

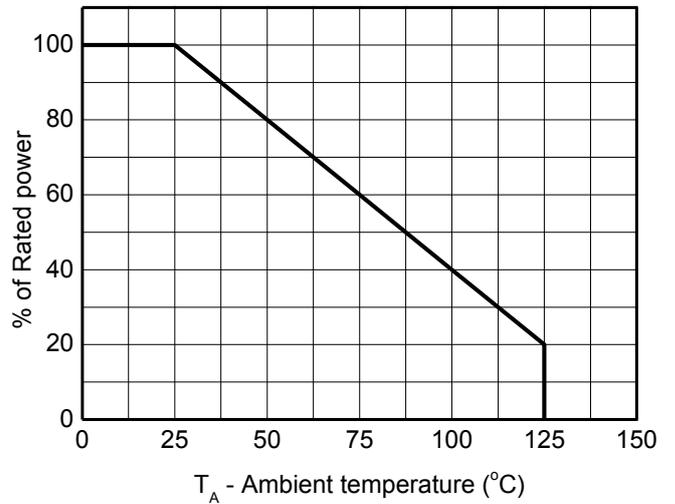
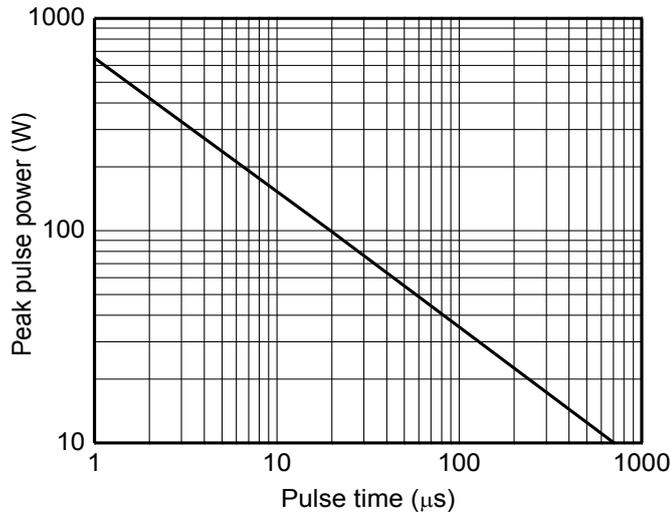
**Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**



**Clamping voltage vs. Peak pulse current**

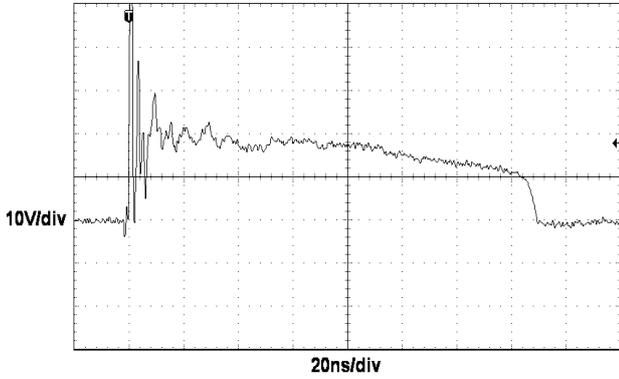


**Capacitance vs. Reverse voltage**



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

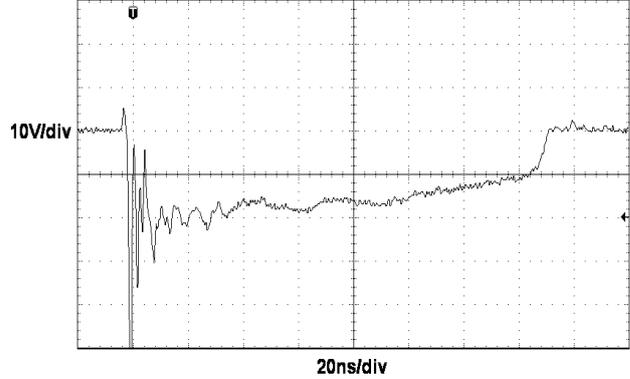
**Non-repetitive peak pulse power vs. Pulse time**



**ESD clamping**

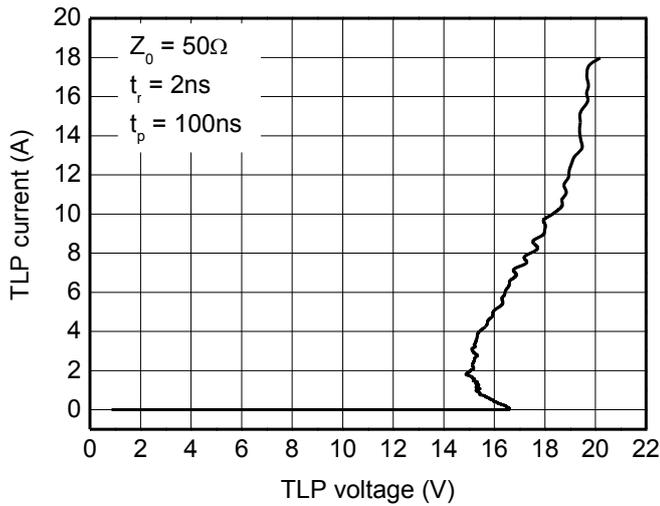
**(+8kV contact discharge per IEC61000-4-2)**

**Power derating vs. Ambient temperature**



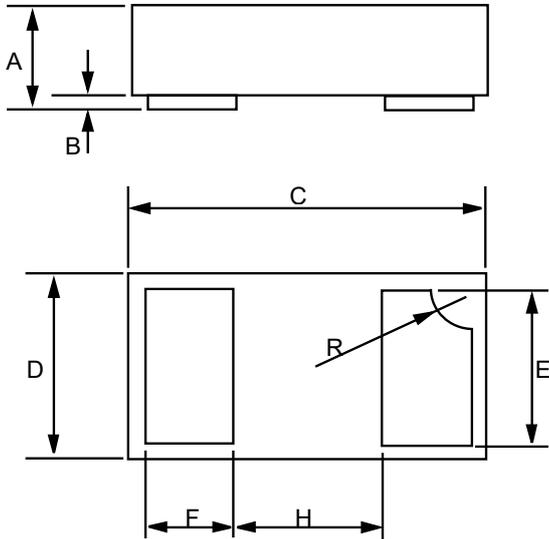
**ESD clamping**

**(-8kV contact discharge per IEC61000-4-2)**



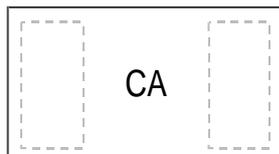
**TLP Measurement**

**DFN1006-2 PACKAGE OUTLINE DIMENSIONS**



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	0.042	0.95	1.075
D	0.021	0.026	0.55	0.675
E	0.017	0.021	0.45	0.55
F	0.007	0.011	0.20	0.30
H	0.015Typ.		0.40Typ.	
R	0.001	0.005	0.05	0.15

**Marking**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
ESD9N12BA	DFN1006-2	10000	Tape and reel