

ESD9N5B

**1-Line, Bi-directional, Normal-Capacitance,
Transient Voltage Suppressor**

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

Descriptions

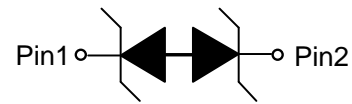
The ESD9N5B is a Bi-directional transient voltage suppressor (TVS) to protect sensitive electronic components from electrostatic discharge (ESD). It is particularly well-suited for cellular phones, PMP, MID, PDA, digital cameras and other electronic equipment.

The ESD9N5B may be used to provide ESD protection up to $\pm 30\text{kV}$ (contact and air discharge) according to IEC61000-4-2, and withstand peak pulse current up to 8A (8/20 μs) according to IEC61000-4-5.

The ESD9N5B is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.



DFN1006-2L (Bottom View)



Pin configuration

Features

- Reverse stand-off voltage: $\pm 5\text{V}$ Max
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (Contact and Air)
IEC61000-4-4 (EFT): 40A (5/50ns)
IEC61000-4-5 (surge): 8A (8/20 μs)
- Capacitance: $C_J = 17.5\text{pF}$ typ.
- Low leakage current: $I_R < 1\text{nA}$ typ.
- Low clamping voltage
- Solid-state silicon technology



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

Applications

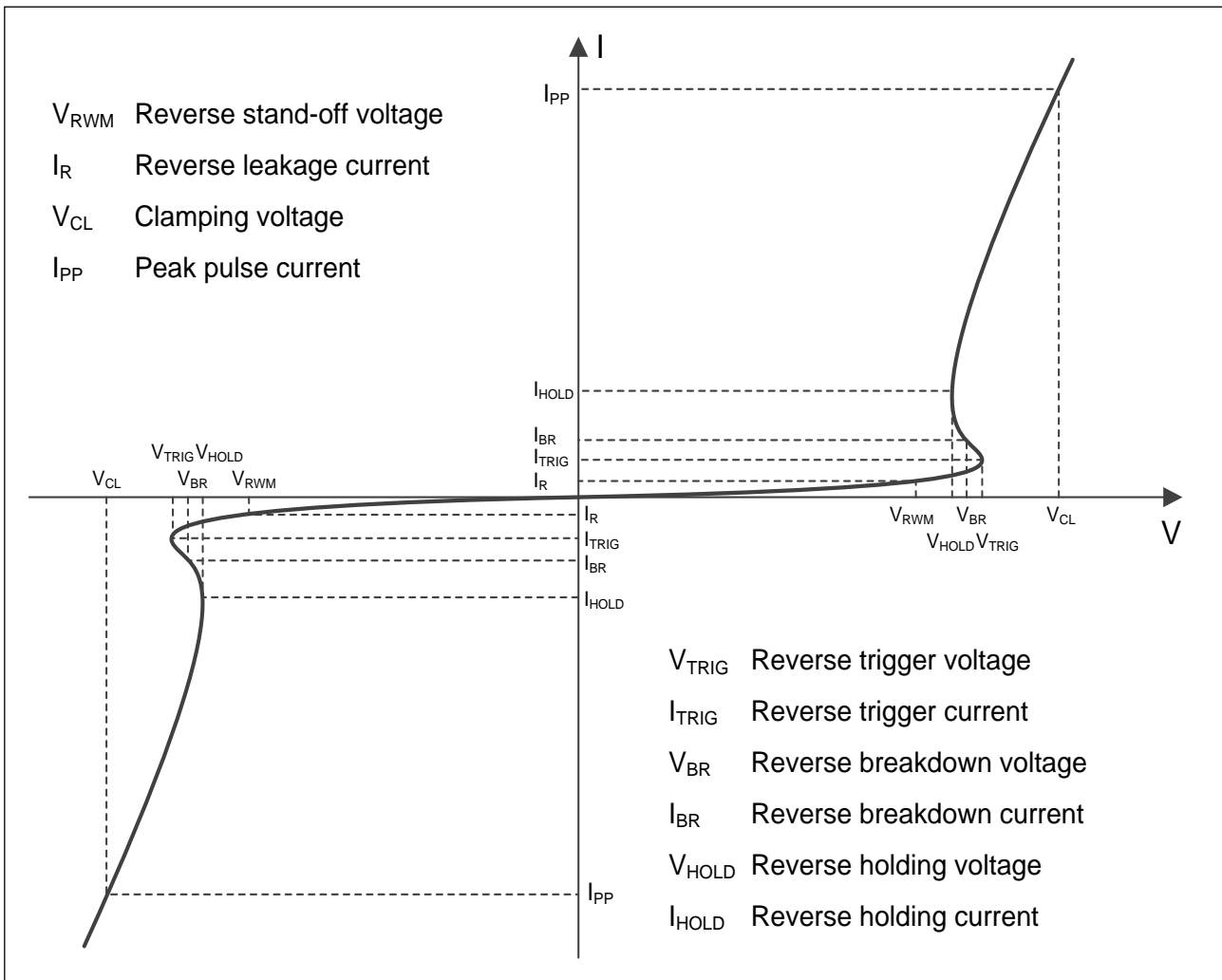
- Cell phone
- PMP
- MID
- PDA
- Digital camera
- Other electronics equipment

Order information

Device	Package	Shipping
ESD9N5B-2/TR	DFN1006-2L	10000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p=8/20\mu s$)	Ppk	96	W
Peak pulse current ($t_p=8/20\mu s$)	Ipp	8	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	°C
Operating temperature	T _{OP}	-40~85	°C
Lead temperature	T _L	260	°C
Storage temperature	T _{STG}	-55~150	°C

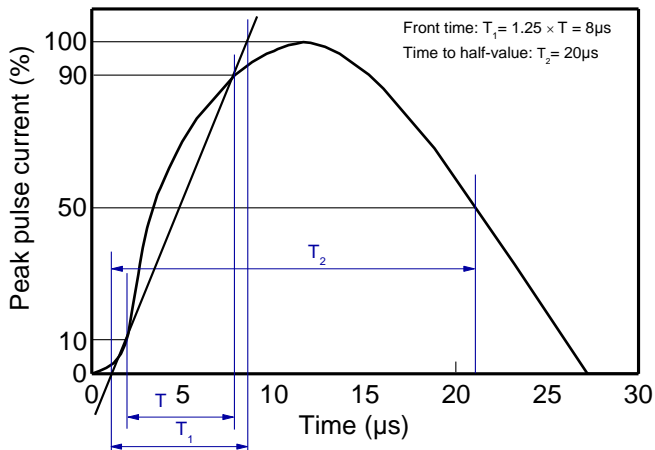
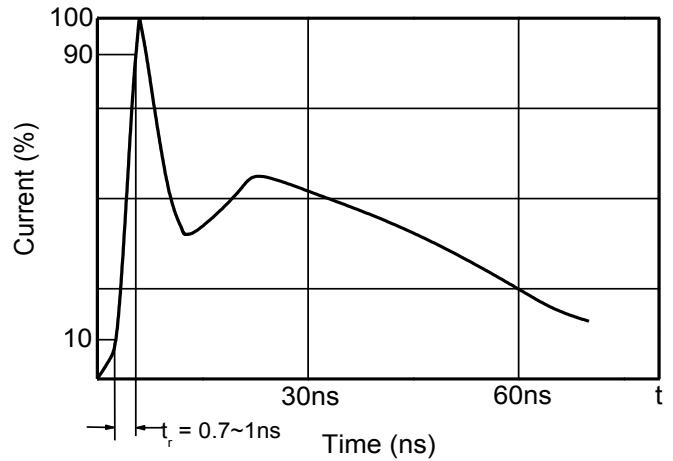
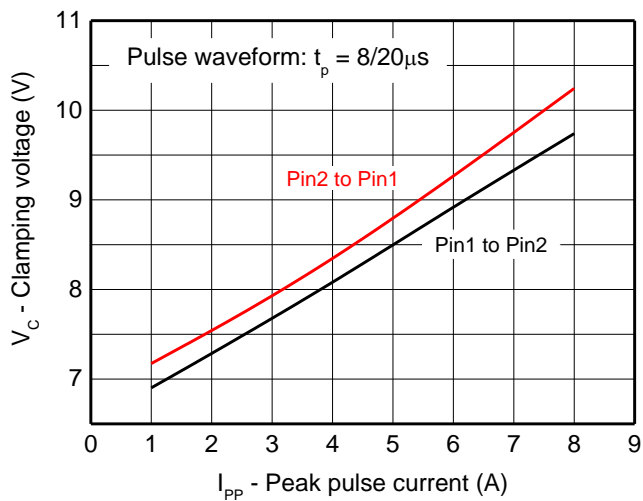
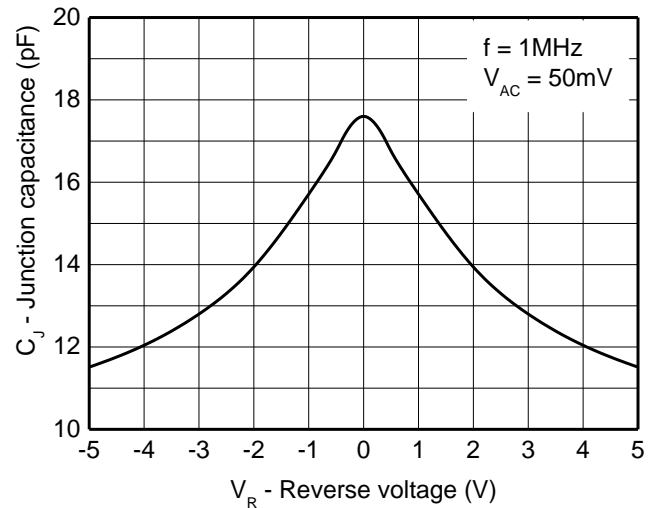
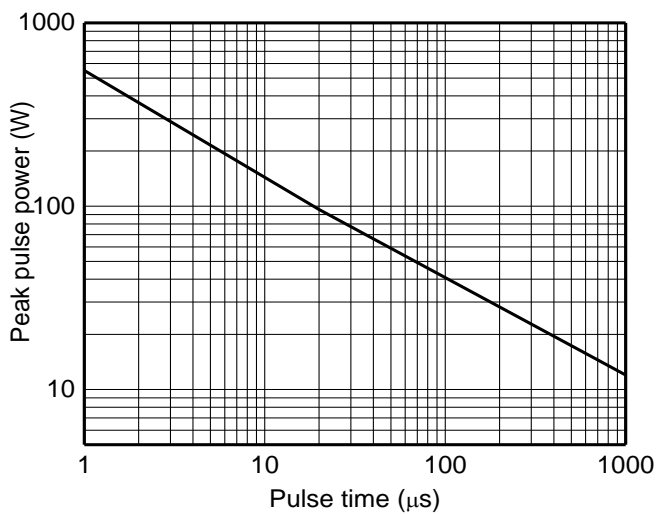
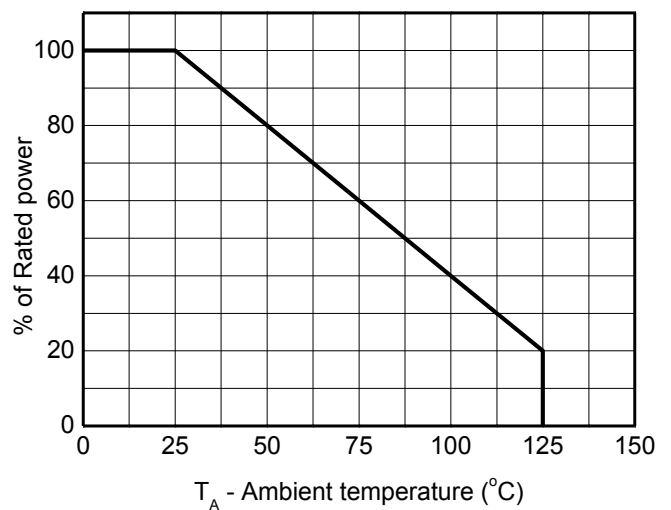
Electrical characteristics (T_A=25 °C, unless otherwise noted)

Definitions of electrical characteristics

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

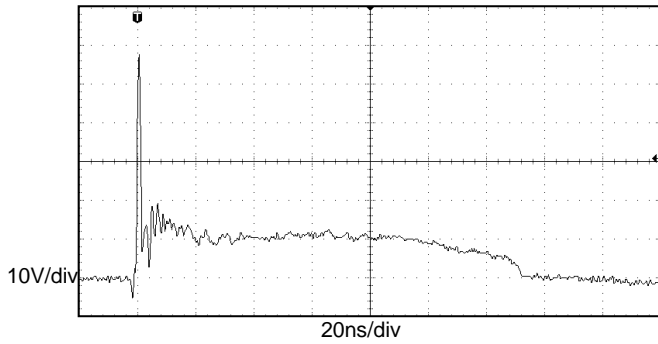
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				±5.0	V
Reverse leakage current	I_R	$V_{RWM} = 5.0V$			1	μA
Reverse breakdown voltage	V_{BR}	$I_{BR} = 1mA$	5.6		8.5	V
Reverse holding voltage	V_{HOLD}	$I_{HOLD} = 50mA$	5.6		8.5	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16A, t_p = 100ns$		11		V
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8kV$		11		V
Clamping voltage ³⁾	V_{CL}	$I_{PP} = 1A, t_p = 8/20\mu s$			9	V
		$I_{PP} = 8A, t_p = 8/20\mu s$			12	V
Junction capacitance	C_J	$V_R = 0V, f = 1MHz$		17.5	22	pF
		$V_R = 5.0V, f = 1MHz$		11.5	15	pF

Notes:

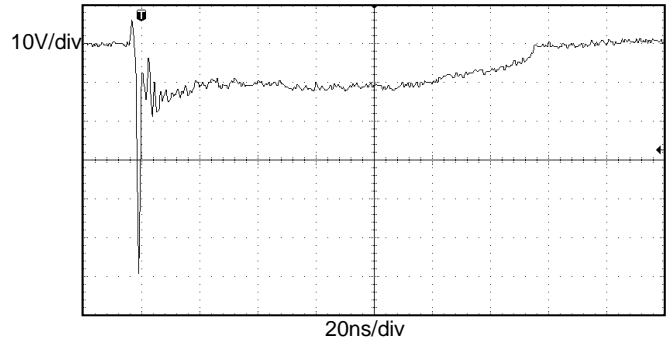
- 1) TLP parameter: $Z_0 = 50\Omega, t_p = 100ns, t_r = 2ns$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.
- 2) Contact discharge mode, according to IEC61000-4-2.
- 3) Non-repetitive current pulse, according to IEC61000-4-5.

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

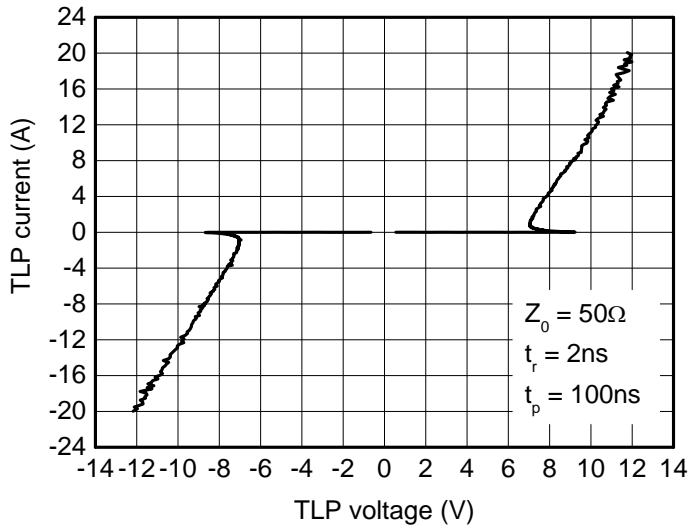
Typical characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)



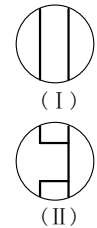
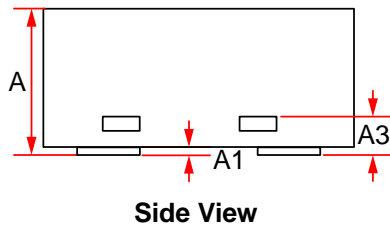
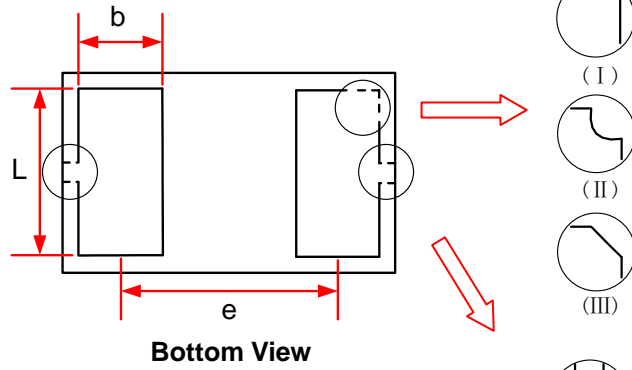
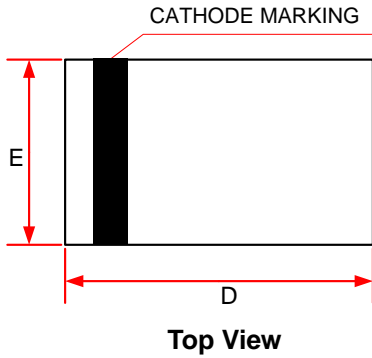
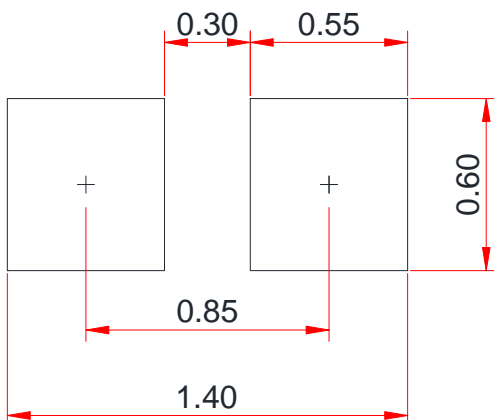
ESD clamping
 (+8kV contact discharge per IEC61000-4-2)



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



TLP Measurement

Package outline dimensions
DFN1006-2L

Recommend land pattern (Unit: mm)


Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.340	-	0.530
A1	0.000	-	0.050
A3	0.125 REF.		
D	0.950	1.000	1.075
E	0.550	0.600	0.675
b	0.200	0.250	0.300
L	0.450	0.500	0.550
e	0.650 Typ.		

Notes:

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

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