

ESD73031N

**1-Line, Bi-directional, Ultra-low Capacitance
Transient Voltage Suppressors**

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

Descriptions

The ESD73031N is an ultra-low capacitance TVS (Transient Voltage Suppressor) designed to protect high speed data interfaces. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge).

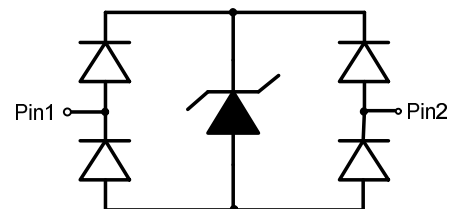
The ESD73031N incorporates one pair of ultra-low capacitance steering diodes plus a TVS diode.

The ESD73031N 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 11A (8/20 μs) according to IEC61000-4-5.

The ESD73031N is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.



DFN1006-2L (Bottom View)



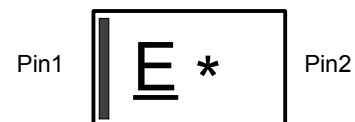
Pin configuration

Features

- Stand-off voltage: 5V Max.
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact discharge)
IEC61000-4-5 (surge): 11A (8/20 μs)
- Ultra-low capacitance: $C_J = 0.8\text{pF}$ typ.
- Ultra-low leakage current: $I_R < 1\text{nA}$ typ.
- Low clamping voltage: $V_{CL} = 7.5\text{V}$ typ. @ $I_{PP} = 16\text{A}$ (TLP)
- Solid-state silicon technology

Applications

- USB 2.0 and USB 3.0
- HDMI 1.3 and HDMI 1.4
- SATA and eSATA
- DVI
- IEEE 1394
- PCI Express
- Portable Electronics
- Notebooks



$\underline{E}$ = Device code

* = Month code (A~Z)

Marking (Top View)

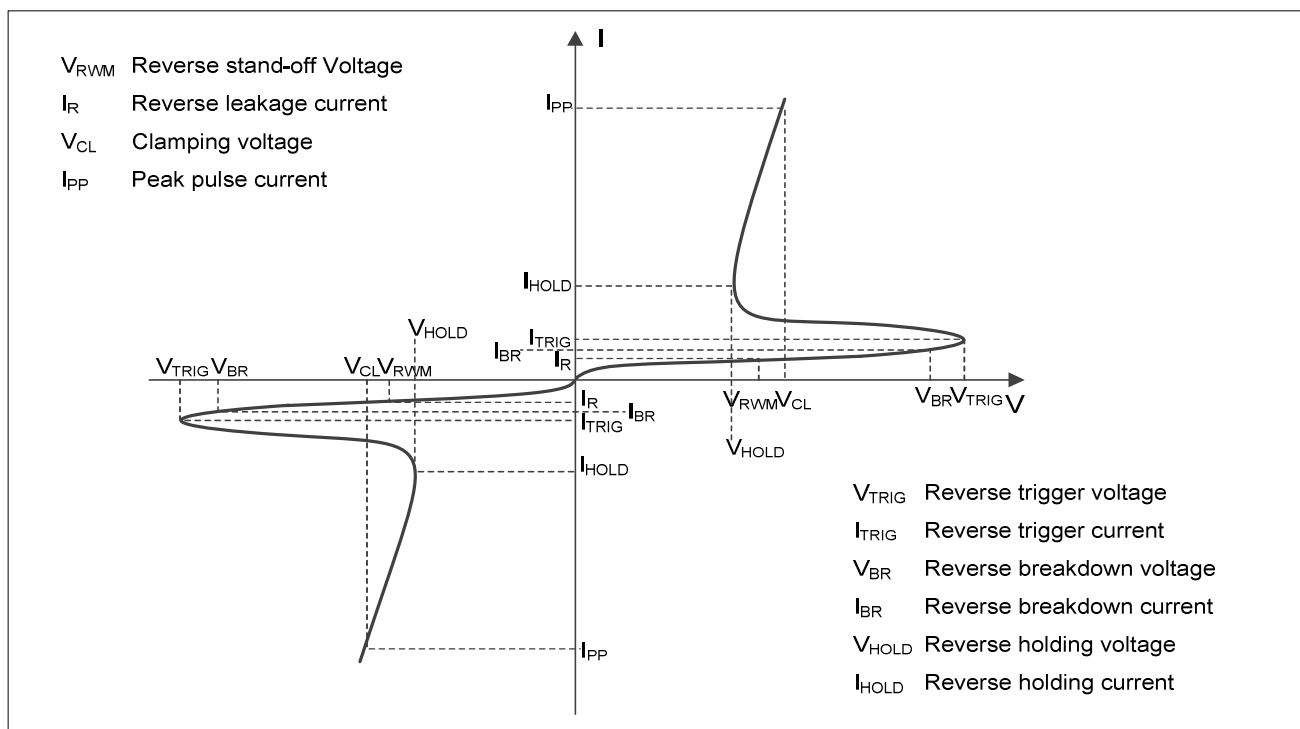
Order information

Device	Package	Shipping
ESD73031N-2/TR	DFN1006-2L	10000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu s$)	P_{pk}	105	W
Peak pulse current ($t_p = 8/20\mu s$)	I_{PP}	11	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	$^{\circ}C$
Operating temperature	T_{OP}	-40~85	$^{\circ}C$
Lead temperature	T_L	260	$^{\circ}C$
Storage temperature	T_{STG}	-55~150	$^{\circ}C$

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



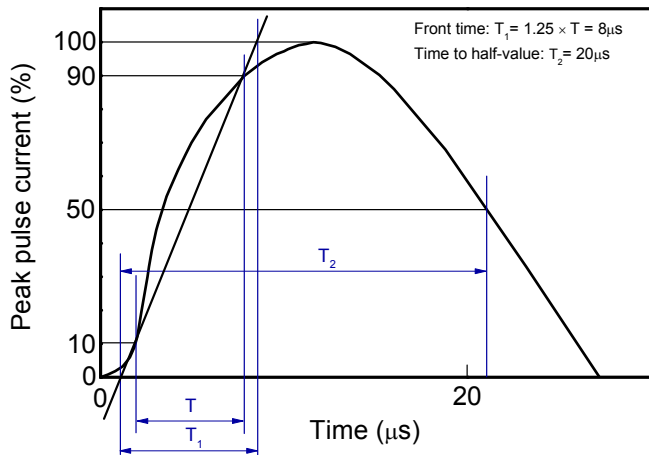
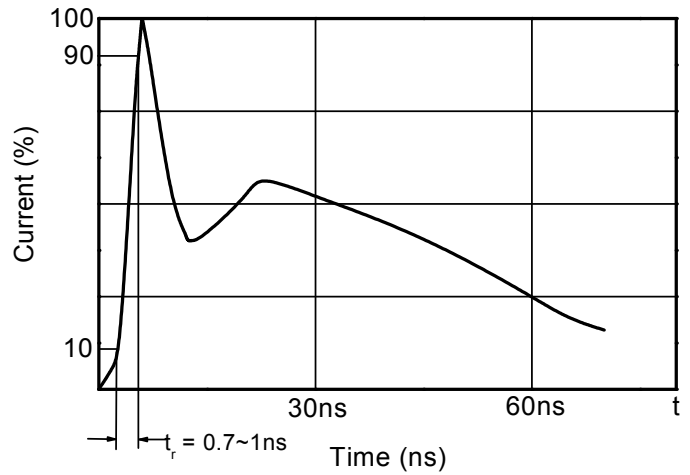
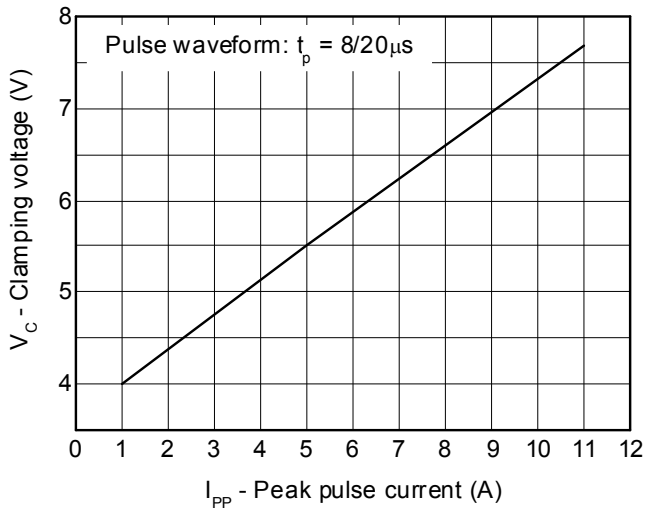
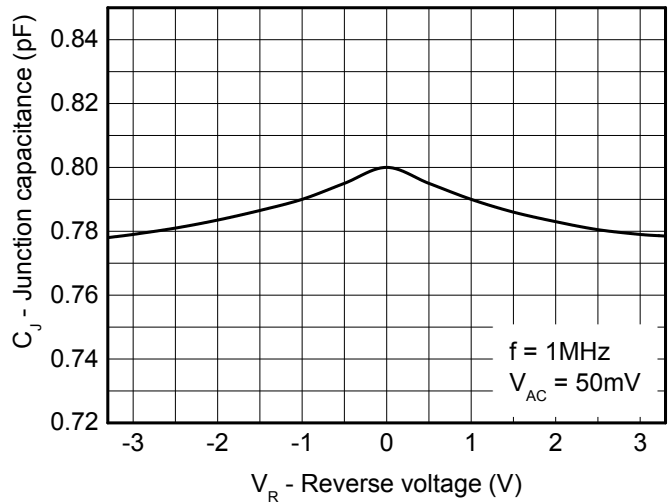
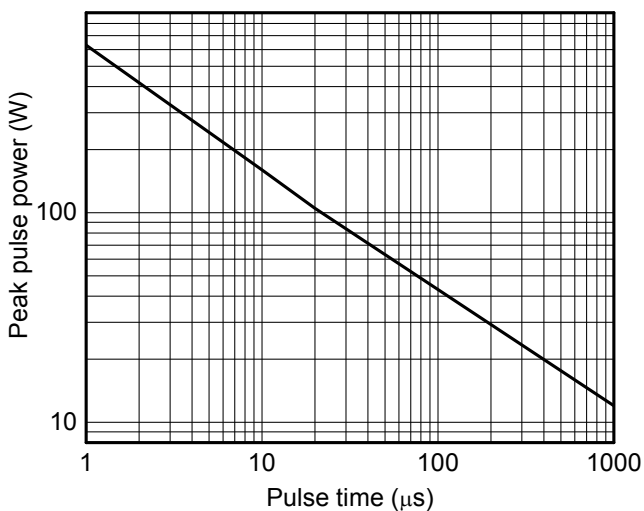
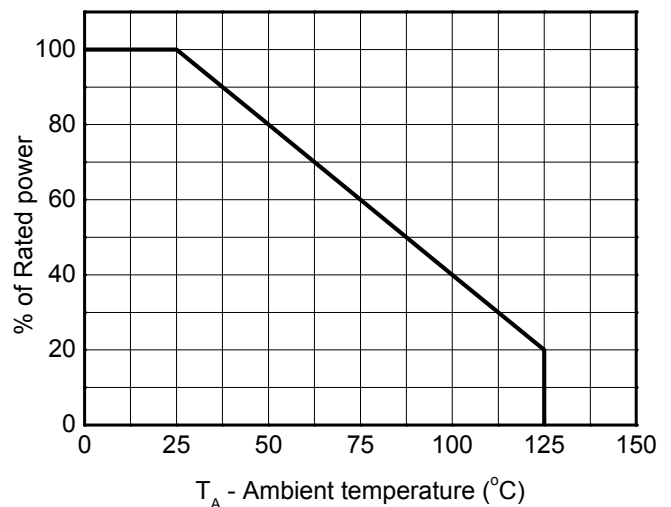
Definitions of electrical characteristics

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

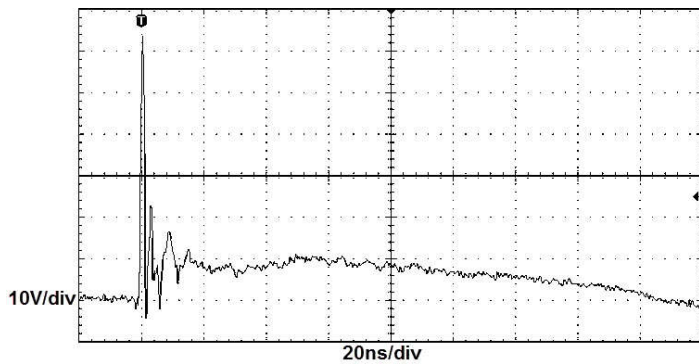
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V_{RWM}				5.0	V
Reverse leakage current	I_R	$V_{RWM} = 5\text{V}$		<1	50	nA
Reverse breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	7.0			V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$		7.5		V
Dynamic resistance ¹⁾	R_{DYN}			0.20		Ω
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8\text{kV}$		7.5		V
Clamping voltage ³⁾	V_{CL}	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$			5.0	V
		$I_{PP} = 11\text{A}$, $t_p = 8/20\mu\text{s}$			9.5	V
Junction capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$ Any I/O pin to GND		0.8	1.1	pF

Notes:

- 1) TLP parameter: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 2\text{ns}$, 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.

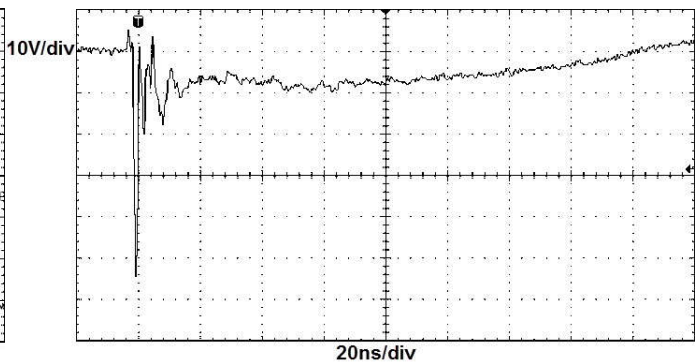
Typical characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

8/20 μs 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)



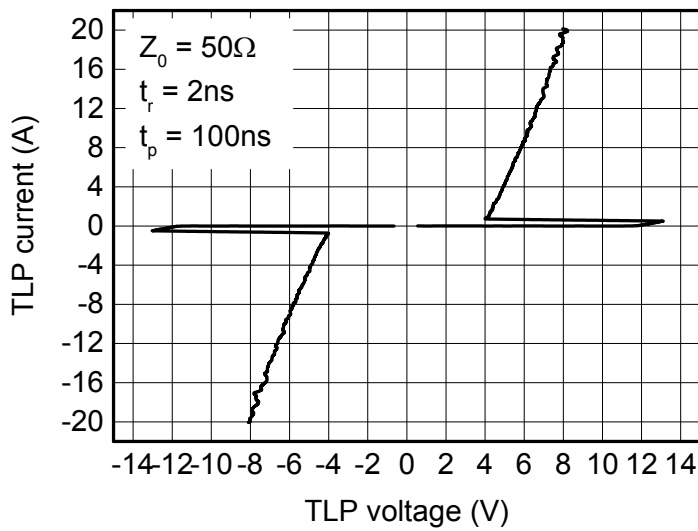
ESD clamping

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

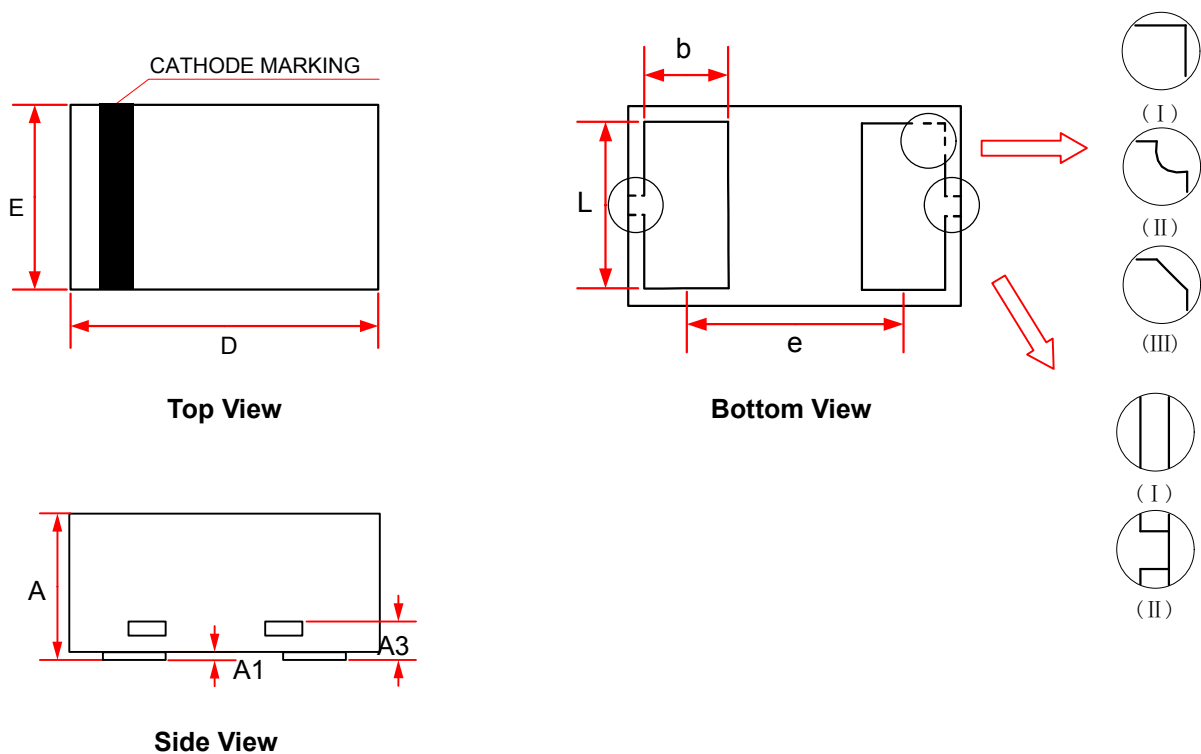


ESD clamping

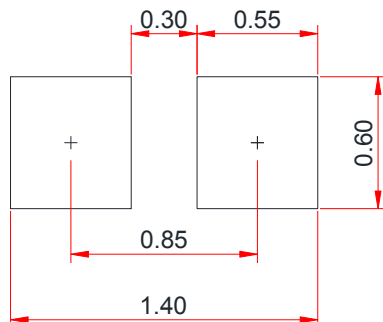
(-8kV contact discharge per IEC61000-4-2)



TLP Measurement

Package outline dimensions
DFN1006-2L


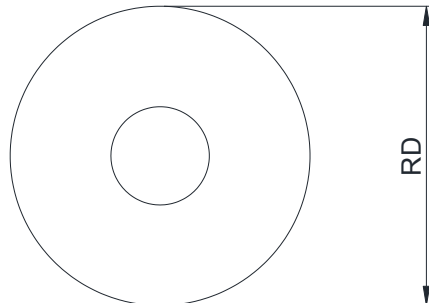
Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.340	0.530
A1	0.000	0.050
A3	0.125 Ref.	
D	0.950	1.075
E	0.550	0.675
b	0.200	0.300
L	0.450	0.550
e	0.650 BSC.	

Recommend land pattern (Unit: mm)

Notes:

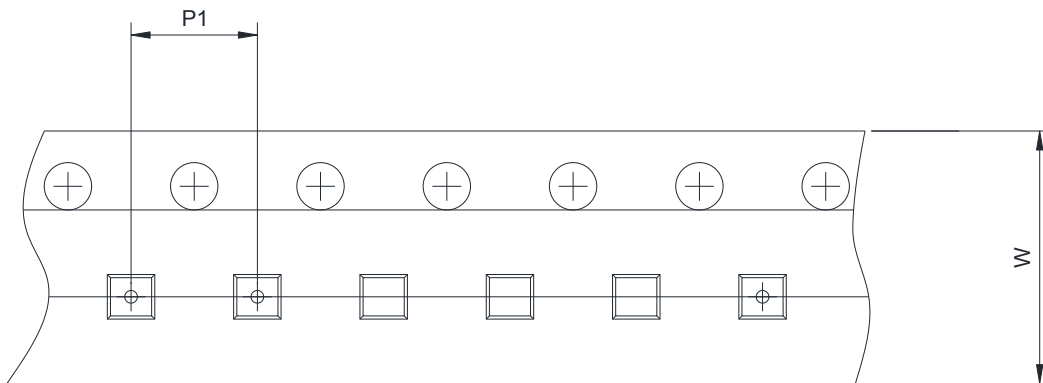
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

TAPE AND REEL INFORMATION

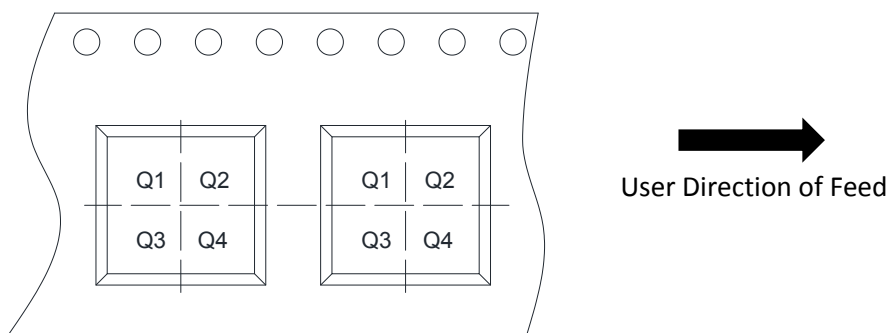
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



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