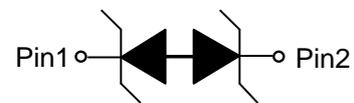


ESD56031N
4.6V, Single Li-ion Battery Port Surge Protector
<http://www.omnivision-group.com>
Descriptions

The ESD56031N is a bi-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components which are connected to power lines, from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

The ESD56031N 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 45A (8/20 μs) according to IEC61000-4-5.

The ESD56031N is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.


DFN1006-2L (Bottom View)

Circuit diagram


Q = Device code

* = Month code (A~Z)

Marking (Top View)
Features

- Reverse stand-off voltage: $\pm 4.6\text{V}$ Max
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact and air discharge)
IEC61000-4-4 (EFT): 40A (5/50ns)
IEC61000-4-5 (surge): 45A (8/20 μs)
- Capacitance: $C_J = 100\text{pF}$ typ.
- Low leakage current
- Low clamping voltage: $V_{CL} = 5.8\text{V}$ typ. @ $I_{PP} = 16\text{A}$ (TLP)
- Solid-state silicon technology

Applications

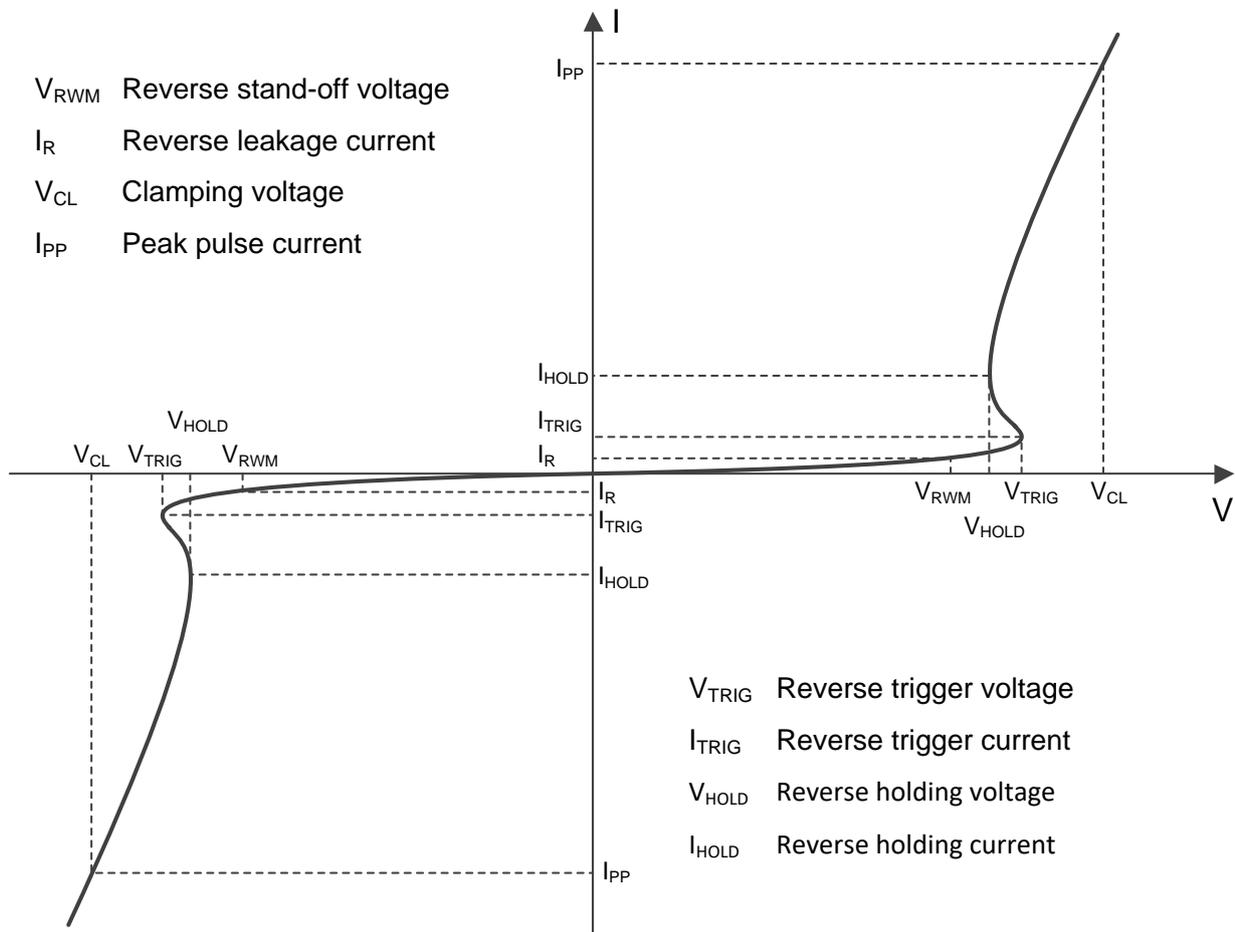
- Power lines
- Cellular handsets
- Tablets
- Microprocessors
- Portable Electronics

Order information

Device	Package	Shipping
ESD56031N-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}	540	W
Peak pulse current ($t_p = 8/20\mu s$)	I_{pp}	45	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	$^{\circ}C$

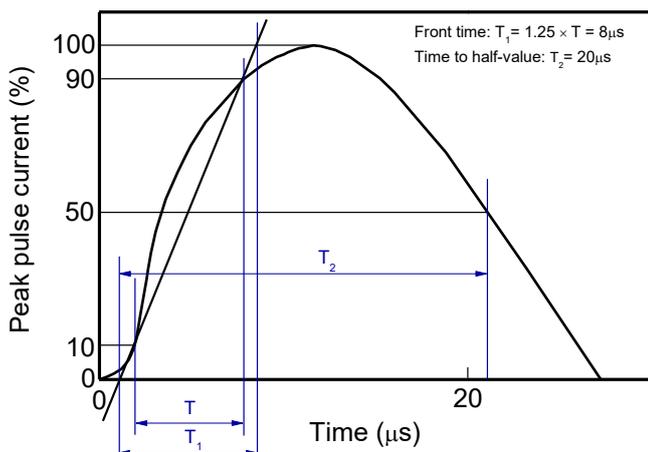
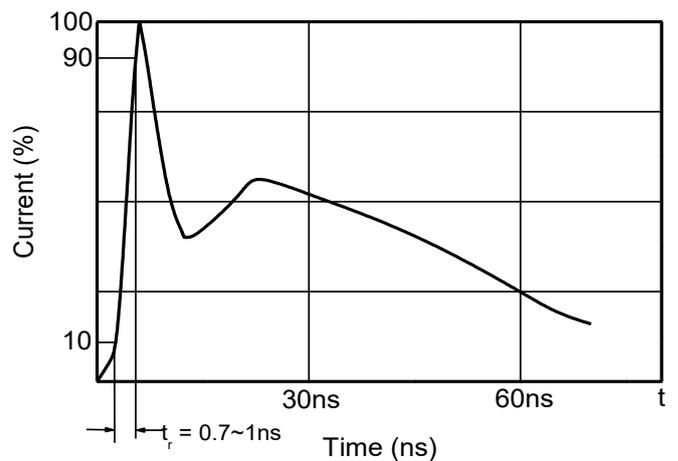
Electrical characteristics ($T_A=25^{\circ}C$, unless otherwise noted)

Definitions of electrical characteristics

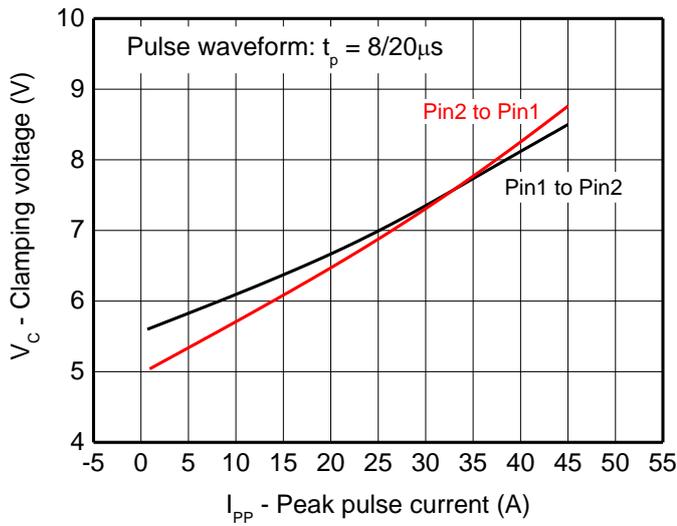
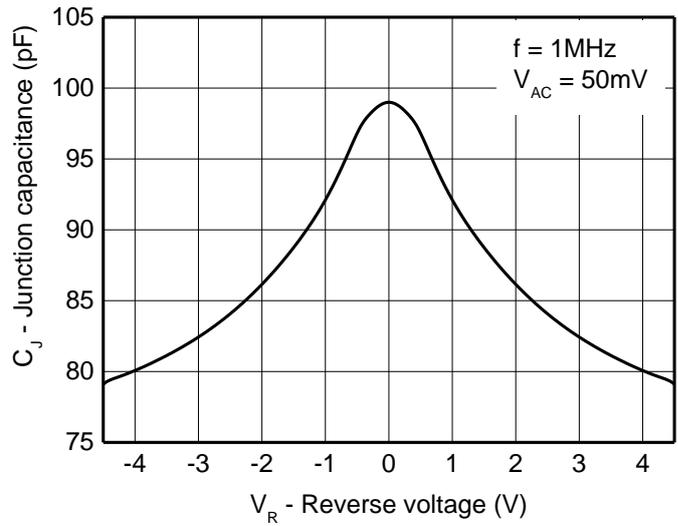
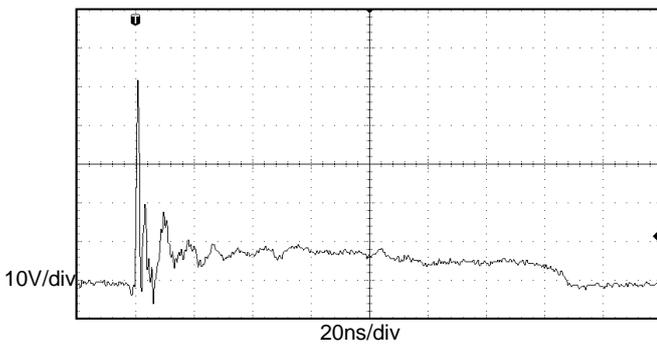
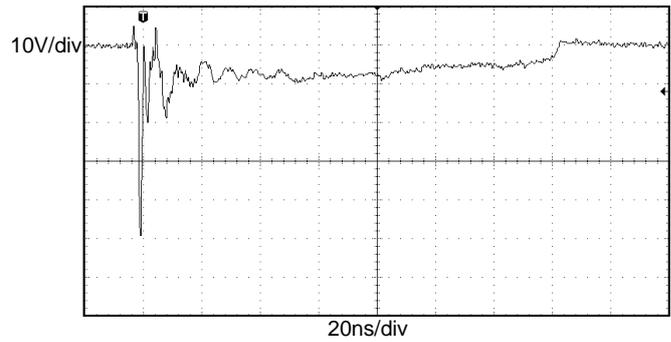
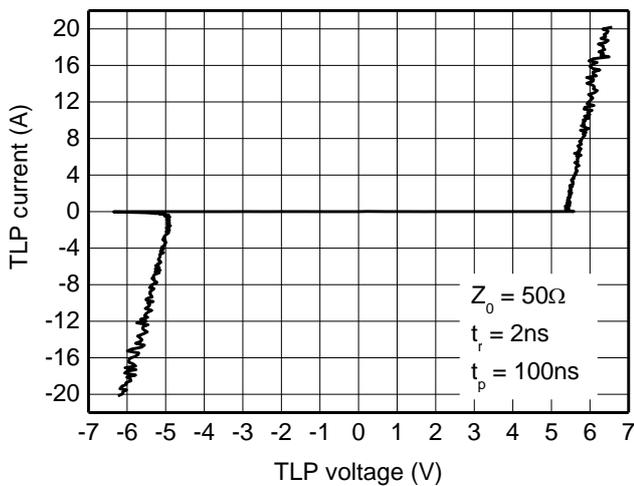
Electrical characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

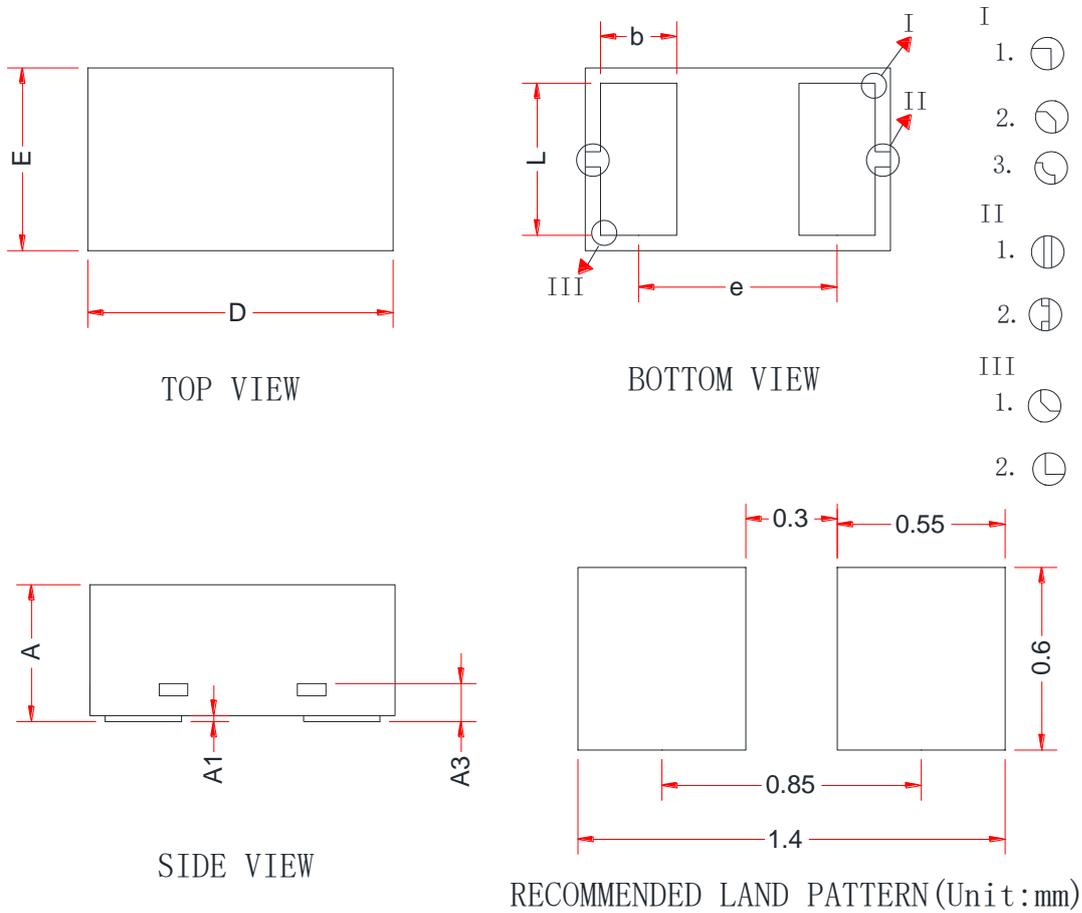
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				± 4.6	V
Reverse leakage current	I_R	$V_{RWM} = 4.6\text{V}$			1	μA
Reverse breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	4.7			V
Reverse holding voltage	V_{HOLD}	$I_{HOLD} = 50\text{mA}$	4.7			V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$		5.8		V
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8\text{kV}$		7.0		V
Clamping voltage ³⁾	V_{CL}	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$		5.5	6.5	V
		$I_{PP} = 20\text{A}$, $t_p = 8/20\mu\text{s}$		6.5	8.0	V
		$I_{PP} = 45\text{A}$, $t_p = 8/20\mu\text{s}$		8.5	10.0	V
Dynamic resistance ¹⁾	R_{DYN}			0.06		Ω
Junction capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$		100	120	pF
		$V_R = 4.6\text{V}$, $f = 1\text{MHz}$		75	90	pF

Notes:

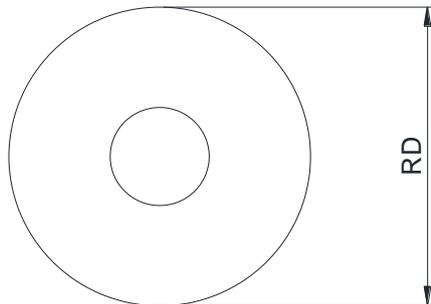
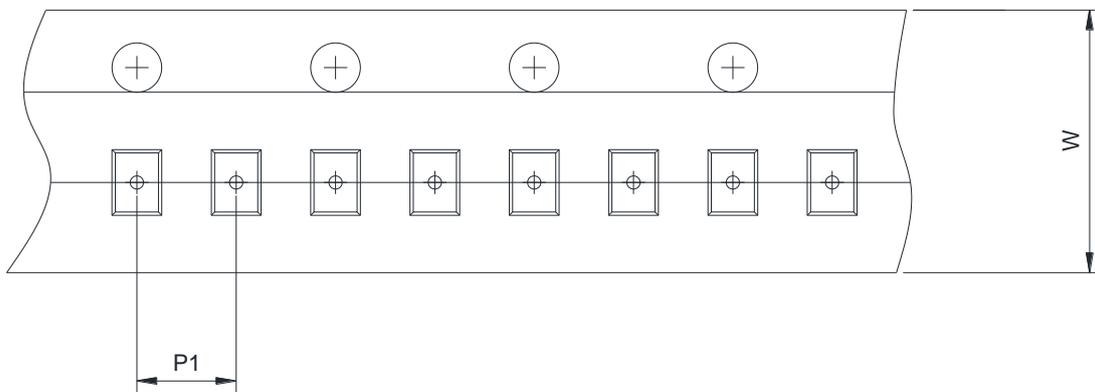
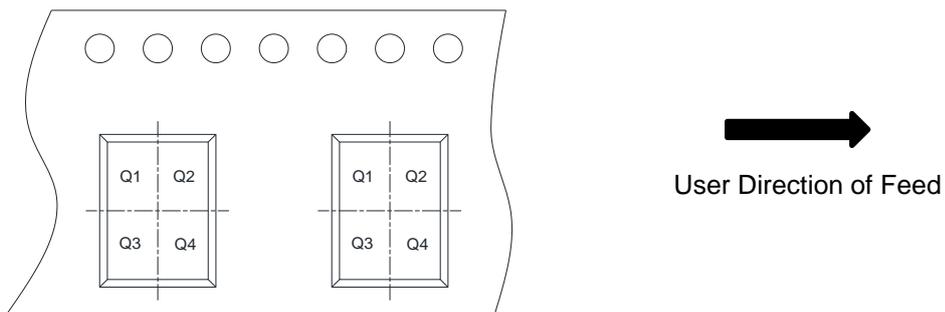
- 1) TLP parameter: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 2\text{ns}$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.
- 2) Contact discharge mode, according to IEC61000-4-2.
- 3) Non-repetitive current pulse, according to IEC61000-4-5.


8/20 μs 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

**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.	Typ.	Max.
A	0.36	0.45	0.50
A1	0.00	0.02	0.05
A3	0.125 Ref.		
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b	0.20	0.25	0.30
L	0.45	0.50	0.55
e	0.65 BSC		

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input checked="" type="checkbox"/> 2mm	<input type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input checked="" type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4