

ESD56371N
<http://www.sh-willsemi.com>
1-Line, Bi-directional, Transient Voltage Suppressors
Descriptions

The ESD56371N 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 ESD56371N 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 22A (8/20 μs) according to IEC61000-4-5.

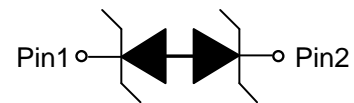
The ESD56371N is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.

Features

- Reverse stand-off voltage: $\pm 15\text{V}$ Max.
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact and air discharge)
IEC61000-4-5 (surge): 22A (8/20 μs)
- Capacitance: $C_j = 31\text{pF}$ Typ.
- Low leakage current
- Low clamping voltage: $V_{CL} = 16\text{V}$ Typ. $I_{PP} = 16\text{A}$ (TLP)
- Solid-state silicon technology

Applications

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


DFN1006-2L (Bottom View)

Circuit diagram


A = Device code

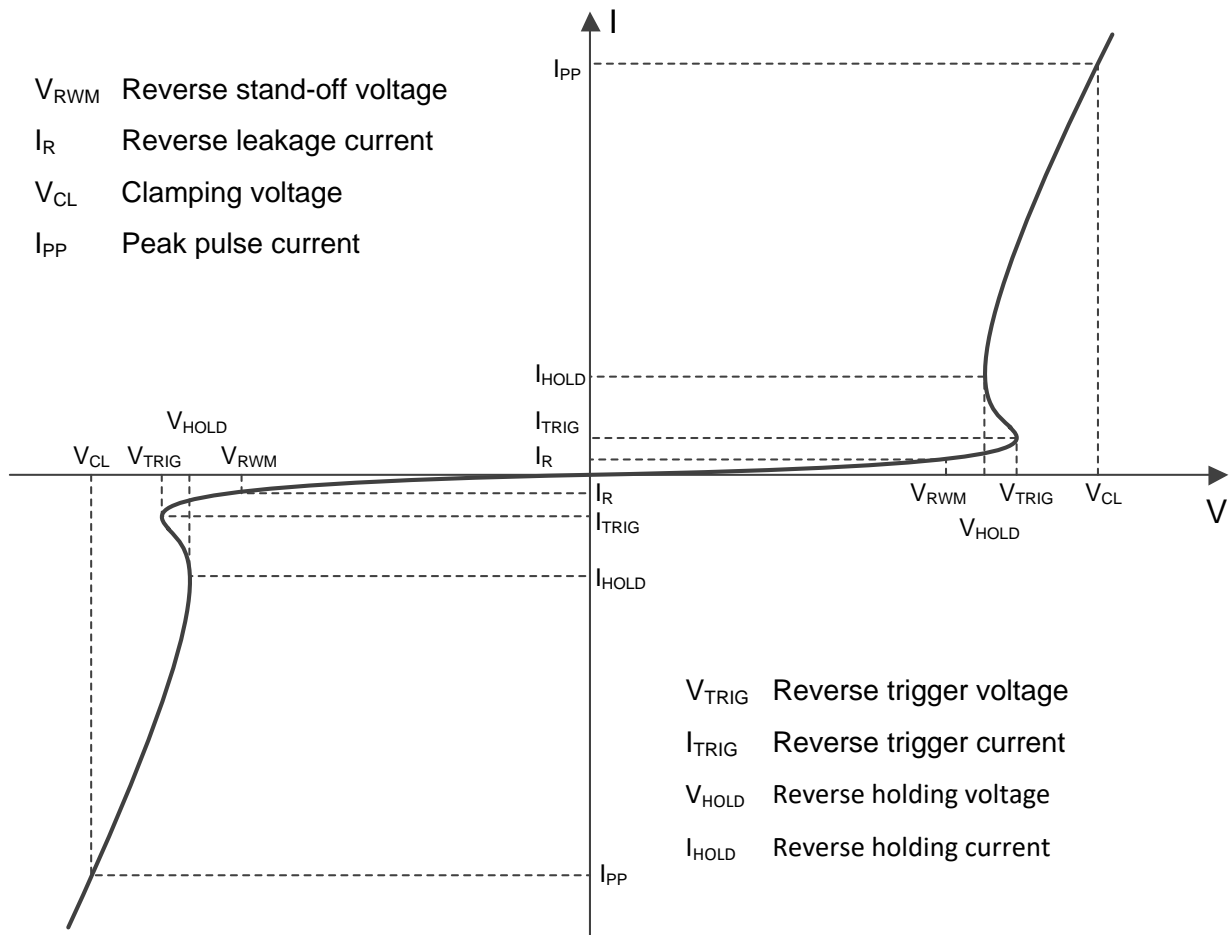
M = Month code (A-Z)

Marking (Top View)
Order information

| Device | Package | Shipping |
|----------------|------------|-----------------|
| ESD56371N-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} | 470 | W |
| Peak pulse current ($t_p = 8/20\mu s$) | I_{PP} | 22 | 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 | $^{\circ}C$ |

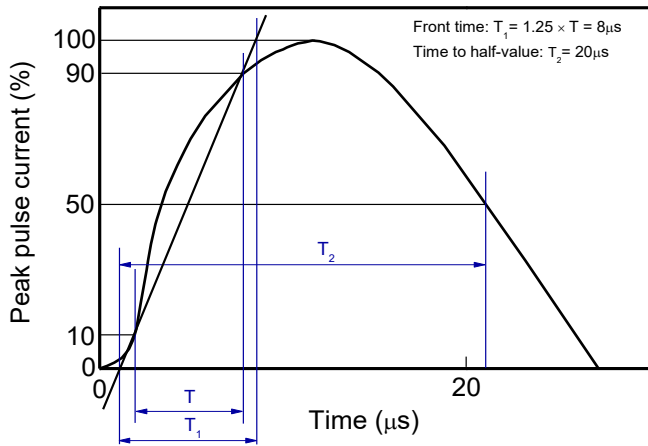
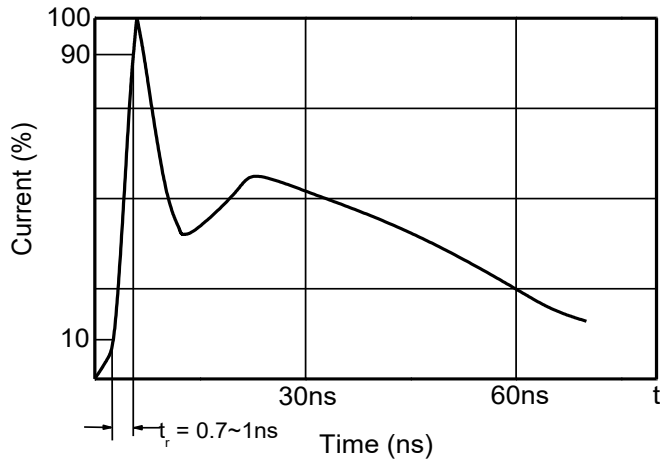
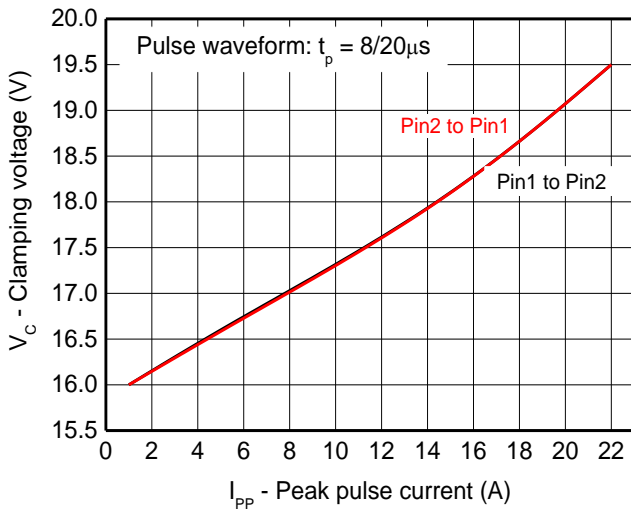
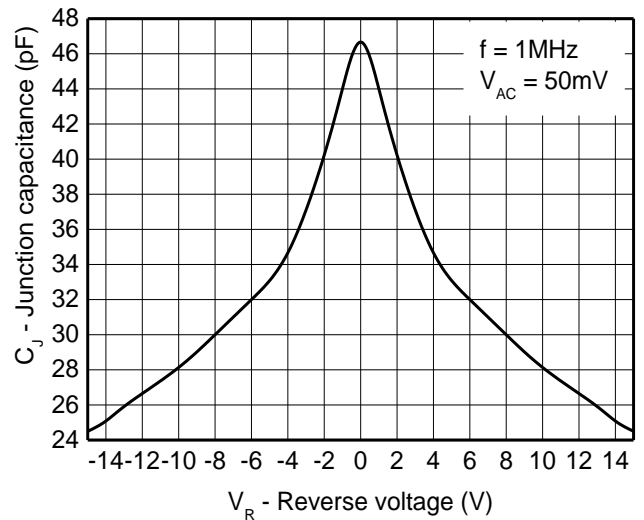
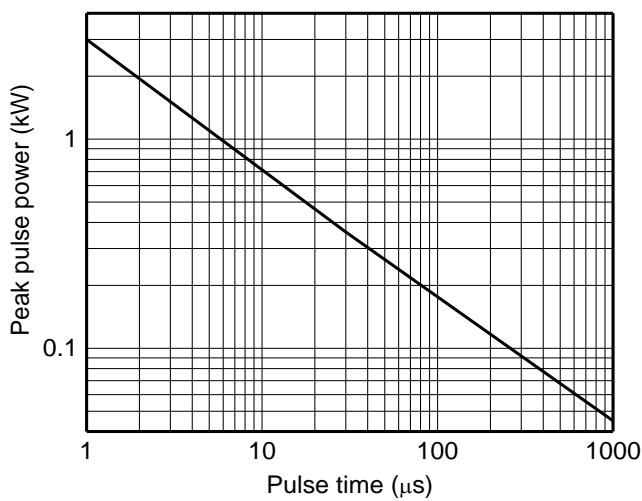
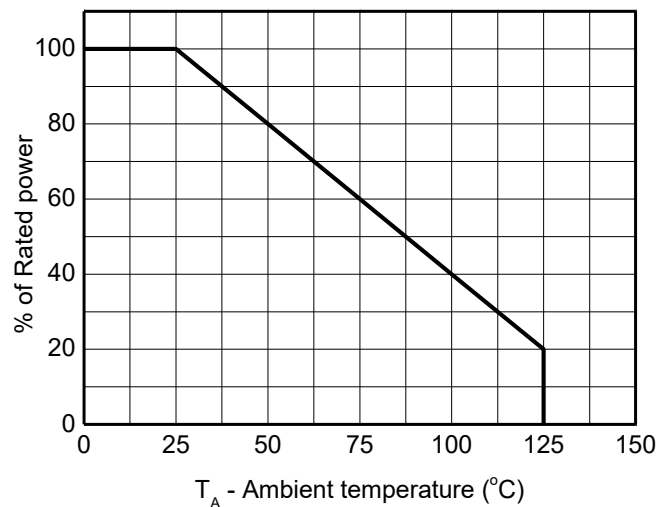
Electrical characteristics ($T_A=25^{\circ}C$, unless otherwise noted)

Definitions of electrical characteristics

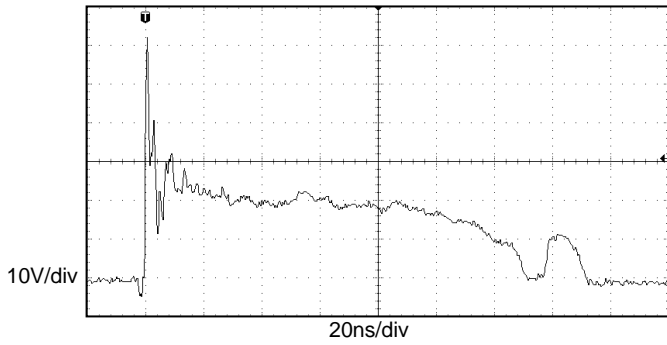
Electrical characteristics (T_A=25 °C, unless otherwise noted)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|----------------------------------|------------------|------------------------------------------------|------|------|------|------|
| Reverse stand-off voltage | V _{RWM} | | | | ±15 | V |
| Reverse leakage current | I _R | V _{RWM} = 15V | | 1 | 50 | nA |
| Reverse breakdown voltage | V _{BR} | I _T = 1mA | 16 | | | V |
| Clamping voltage ¹⁾ | V _{CL} | I _{PP} = 16A, t _p = 100ns | | 16 | | V |
| Clamping voltage ³⁾ | V _{CL} | I _{PP} = 1A, t _p = 8/20μs | | 16 | 18 | V |
| | | I _{PP} = 22A, t _p = 8/20μs | | 19.5 | 21.5 | V |
| Dynamic resistance ¹⁾ | R _{DYN} | | | 0.03 | | Ω |
| Junction capacitance | C _J | V _R = 0V, f = 1MHz | | 31 | 40 | pF |

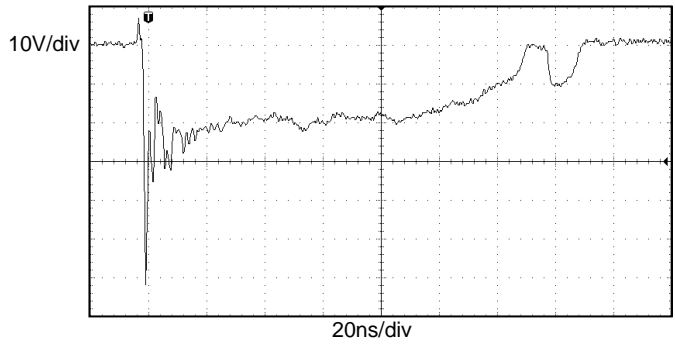
Notes:

- 1) TLP parameter: Z₀ = 50Ω, 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.

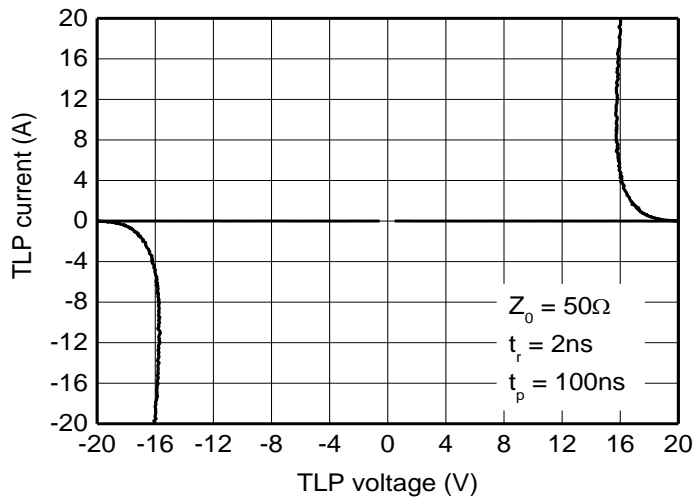
Typical characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

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)


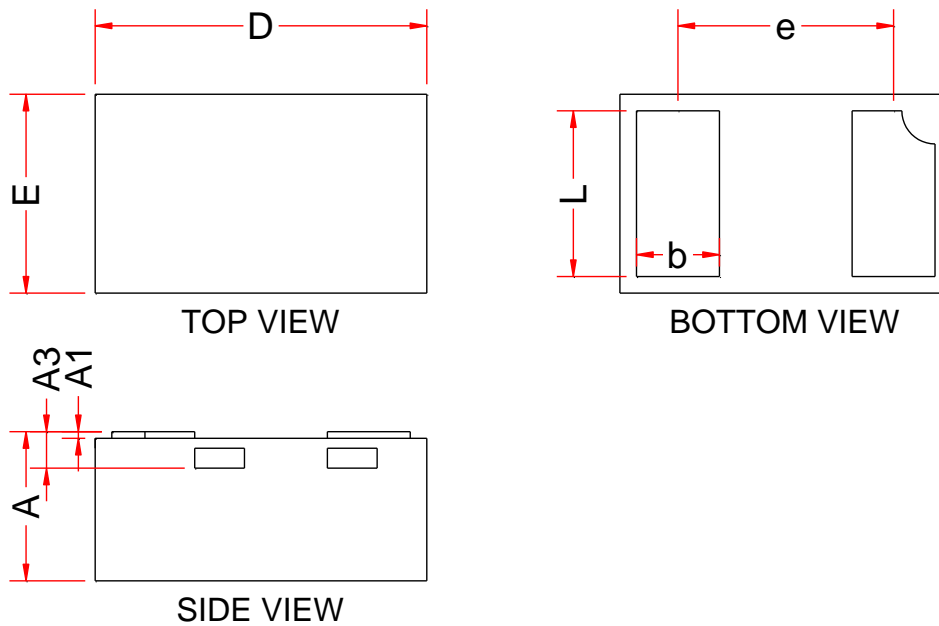
ESD clamping
 (+8kV contact discharge per IEC61000-4-2)



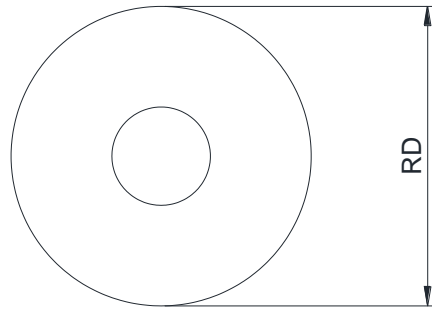
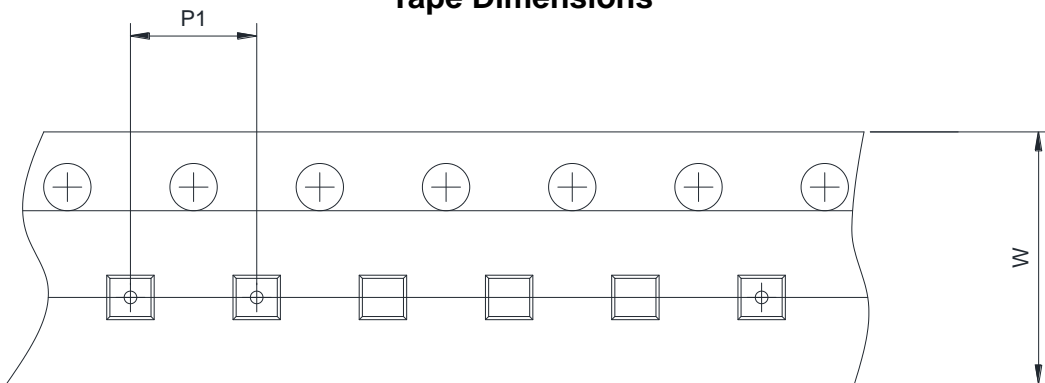
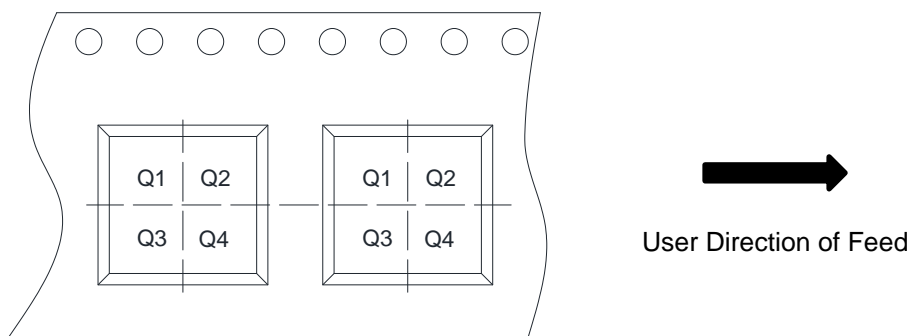
ESD clamping
 (-8kV contact discharge per IEC61000-4-2)



TLP Measurement

PACKAGE OUTLINE DIMENSIONS
DFN1006-2L


| Symbol | Dimensions in Millimeters | | |
|--------|---------------------------|------|------|
| | Min. | Typ. | Max. |
| A | 0.41 | 0.45 | 0.50 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | 0.127 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 |