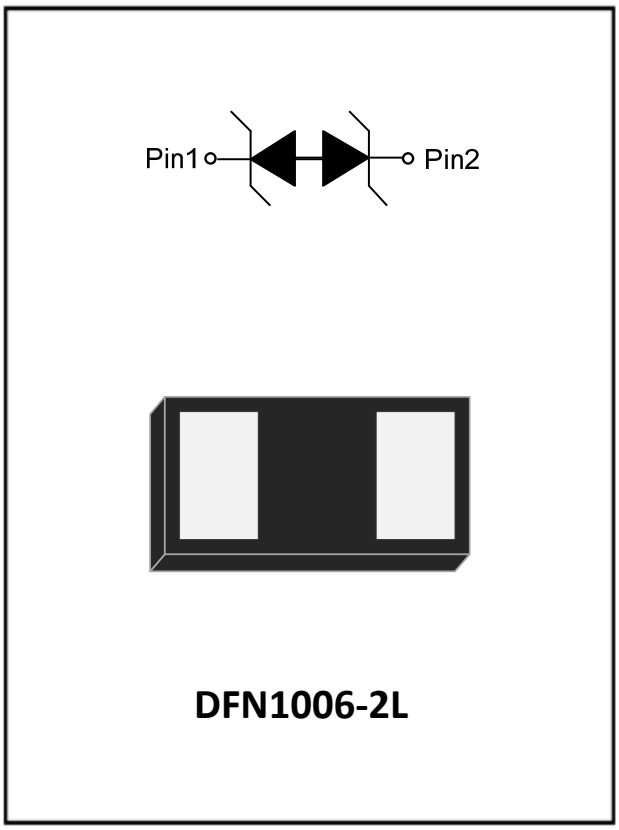
# 1-Line, Bi-directional, Ultra-low Capacitance Transient Voltage Suppressor




## Features

- Stand-off voltage: 5V Max
- Transient protection for each line according to
  IEC61000-4-2(ESD): ±20kV (contact)
  IEC61000-4-5(surge): 3.5A (8/20μs)
- Ultra-low leakage current
- Ultra low clamping voltage
- Low clamping voltage:

$V_{CL}$ = 20V typ. @ IPP = 16A (TLP)

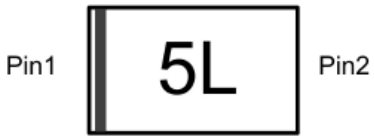
- RoHS Compliant

## Applications

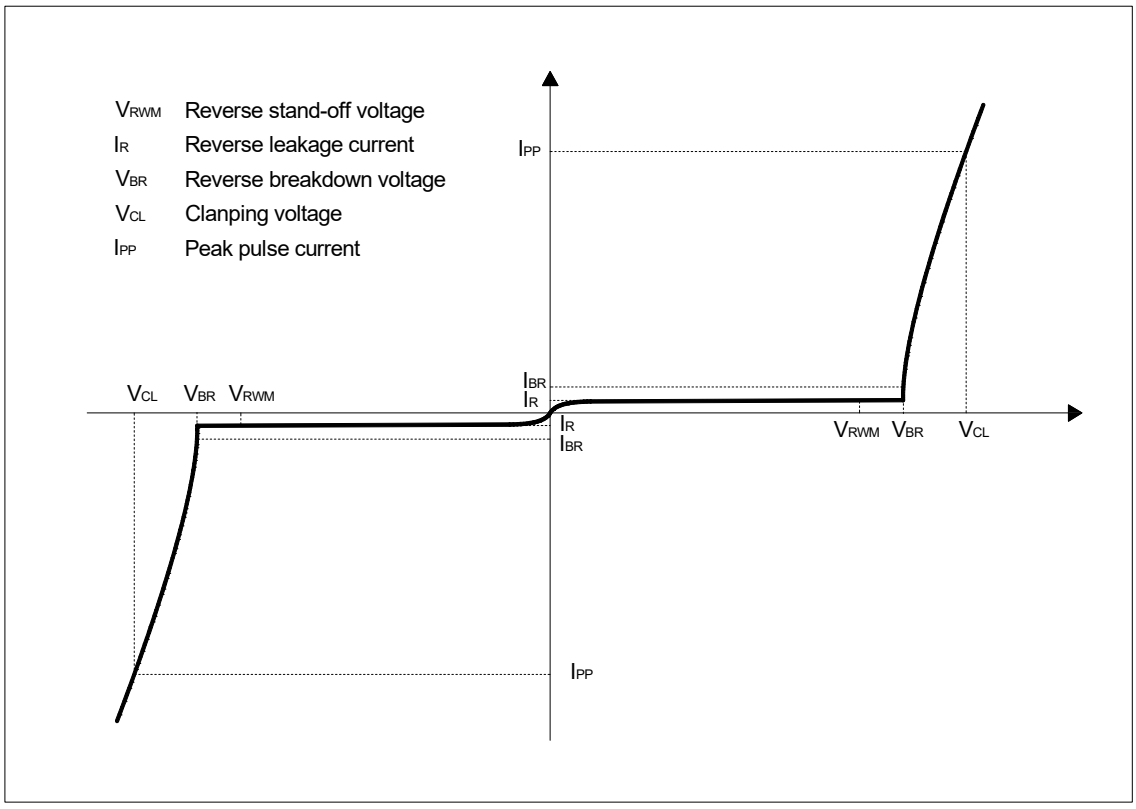
- USB 2.0 and USB 3.0
- HDMI 1.3, HDMI 1.4 and HDMI 2.0
- SATA and eSATA interface
- DVI
- IEEE 1394
- Portable Electronics and Notebooks

## Mechanical Data

- Package: DFN1006-2L
- Case Material: “Green” Molding Compound
- Marking Information: See Below




## ■Definitions of electrical characteristics



## ■Maximum Ratings

| PARAMETER | SYMBOL | LIMITS | UNIT |
|---|---|---|---|
| Peak pulse power ($t_p$ = 8/20μs) | $P_{pk}$ | 56 | W |
| Peak pulse current ($t_p$ = 8/20μs) | $I_{PP}$ | 3.5 | A |
| ESD according to IEC61000-4-2 air discharge | $V_{ESD}$ | ±20 | kV |
| ESD according to IEC61000-4-2 contact discharge | | ±20 | |
| Junction temperature | $T_J$ | 125 | °C |
| Storage temperature | $T_{STG}$ | -55~150 | °C |

## ■Electrical Characteristics（$T_a$=25℃ Unless otherwise specified）

| PARAMETER | Symbol | UNIT | Conditions | Min | Typ | Max |
|---|---|---|---|---|---|---|
| Reverse maximum working voltage | $V_{RWM}$ | V | | | | 5 |
| Reverse leakage current | $I_R$ | nA | $V_{RWM}$ = 5V | | | 50 |
| Reverse breakdown voltage | $V_{BR}$ | V | $I_{BR}$ = 1mA | 7 | 8 | 9 |
| Clamping voltage 1) | $V_{CL}$ | V | $I_{PP}$ = 16A, $t_p$ = 100ns | | 20 | |
| Dynamic resistance 1) | $R_{DYN}$ | Ω | | | 0.6 | |
| Clamping voltage 2) | $V_{CL}$ | V | $V_{ESD}$ = 8kV | | 20 | |
| Clamping voltage 3) | $V_{CL}$ | V | $I_{PP}$ = 1A, $t_p$ = 8/20μs | | 10.5 | 12 |
| | | V | $I_{PP}$ = 3.5A, $t_p$ = 8/20μs | | 14.5 | 16 |
| Junction capacitance | $C_J$ | pF | $V_R$ = 0V, f = 1MHz | | 0.3 | 0.5 |

Notes:
(1). TLP parameter: $Z_0$ = 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.

## ■Ordering Information (Example)

| PREFERED P/N | PACKING CODE | UNIT WEIGHT(mg) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| ESDSLC5V0LBS1 | F1 | Approximate 0.9 | 10000 | 100000 | 400000 | 7” reel |

## ■ Characteristics (Typical)

**Fig.1 8/20μs waveform per IEC61000-4-5**

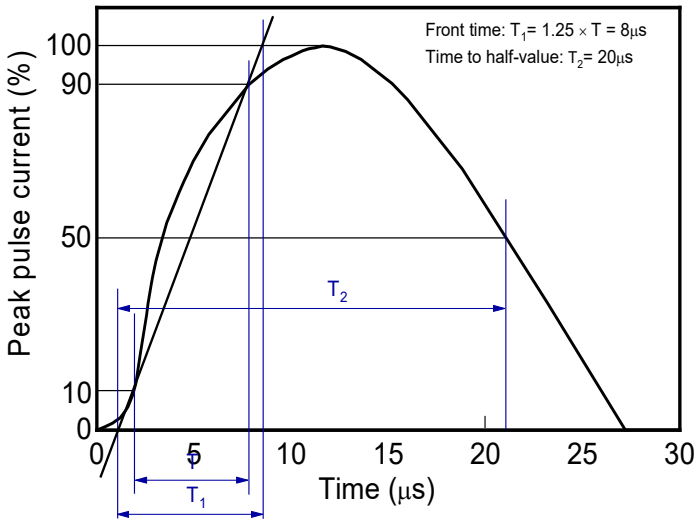



**Fig.2 Contact discharge current waveform per IEC61000-4-2**

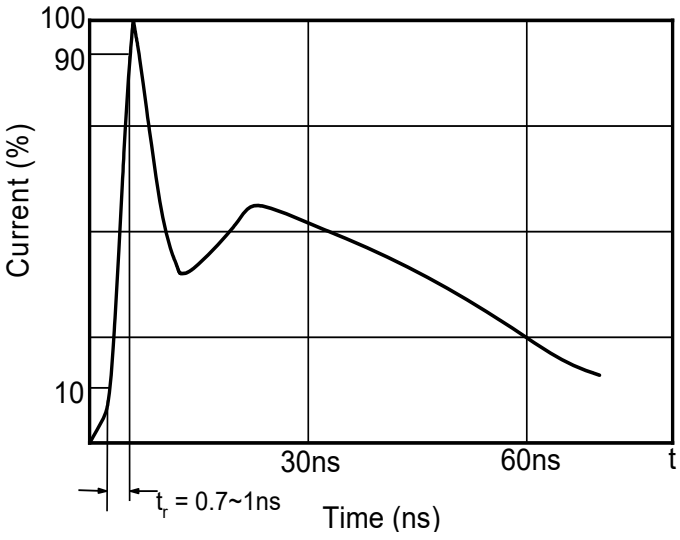



**Fig.3 Clamping voltage vs. Peak pulse current**

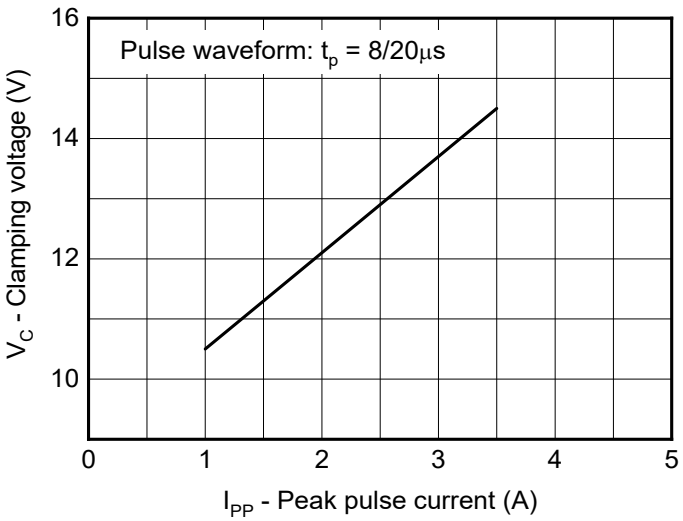



**Fig.4 Capacitance vs. Reverse voltage**

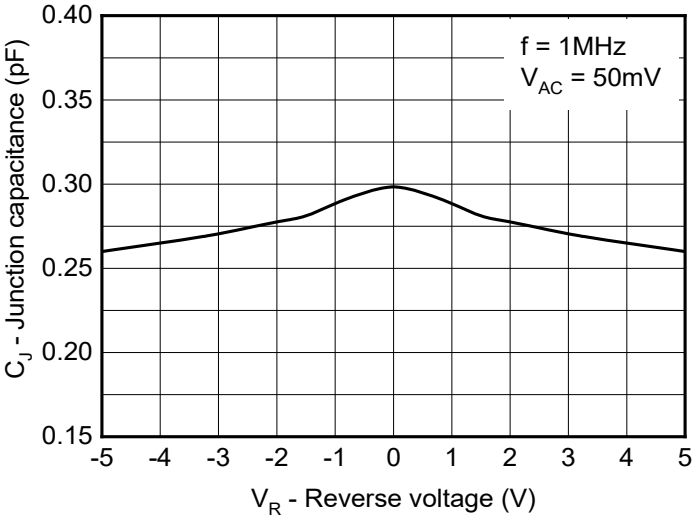



**Fig.5 Non-repetitive peak pulse power vs. Pulse time**

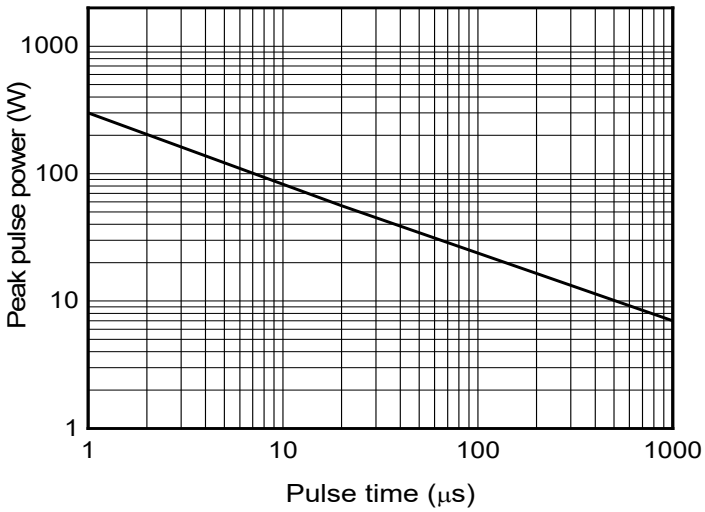



**Fig.6 Power derating vs. Ambient temperature**

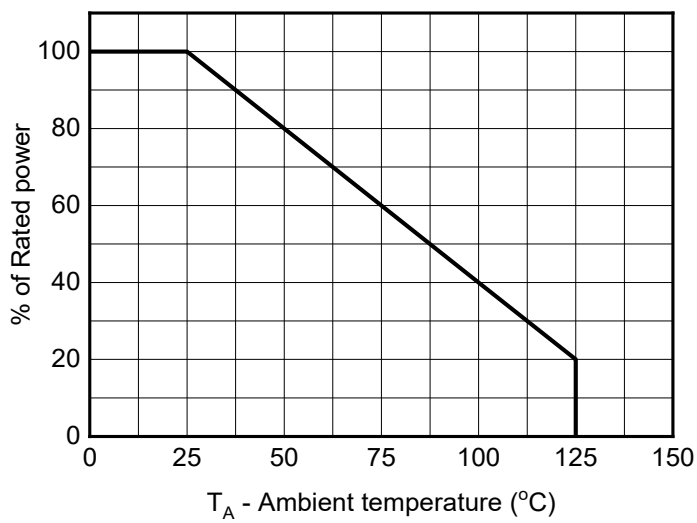


**Fig.7 ESD clamping**
**(+8kV contact discharge per IEC61000-4-2)**

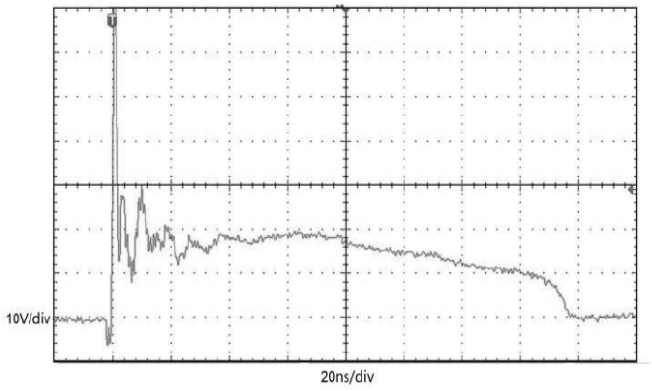



**Fig.8 ESD clamping**
**(-8kV contact discharge per IEC61000-4-2)**

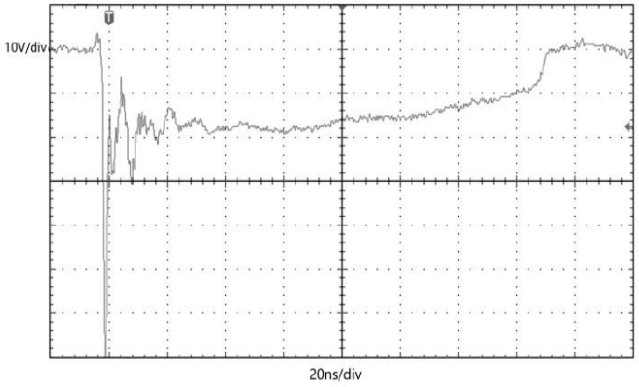
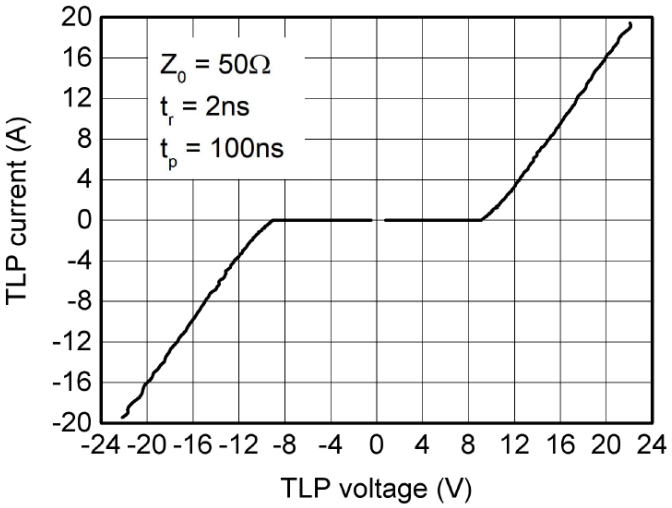
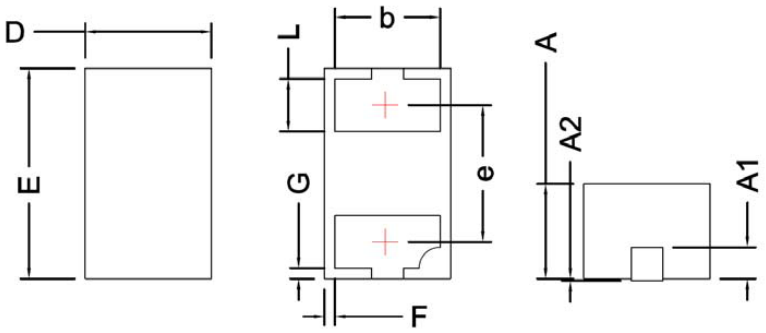



**Fig.9 TLP Measurment**

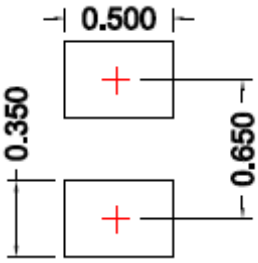



## ■ Outline Dimensions




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| D | 0.50 | 0.60 | 0.70 |
| E | 0.90 | 1.00 | 1.10 |
| A | 0.35 | 0.45 | 0.55 |
| A1 | | 0.15 BSC | |
| A2 | | | 0.10 |
| F | 0.005 | | |
| G | 0.005 | | |
| L | 0.15 | 0.25 | 0.35 |
| b | 0.41 | 0.50 | 0.59 |
| e | | 0.65 BSC | |

## ■ Recommended PCB Layout




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

Unit:mm

# Notice

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise. Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in STARSEA's terms and conditions of sale for such products, STARSEA assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of STARSEA products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.