

## 1-Line, Bi-directional, Transient Voltage Suppressor



DFN1006-2L

### Features

- Stand-off voltage:  $\pm 5.5V$  Max
- Transient protection for each line according to
  - IEC61000-4-2(ESD):  $\pm 30kV$  (contact)
  - IEC61000-4-4 (EFT): 40A (5/50ns)
  - IEC61000-4-5(surge): 10A (8/20 $\mu s$ )
- Low leakage current
- Ultra-low capacitance:  $C_J = 25pF$  typ
- Low clamping voltage:
  - $V_{CL} = 8.6V$  typ. @  $I_{PP} = 16A$  (TLP)
- Compliant

### Applications

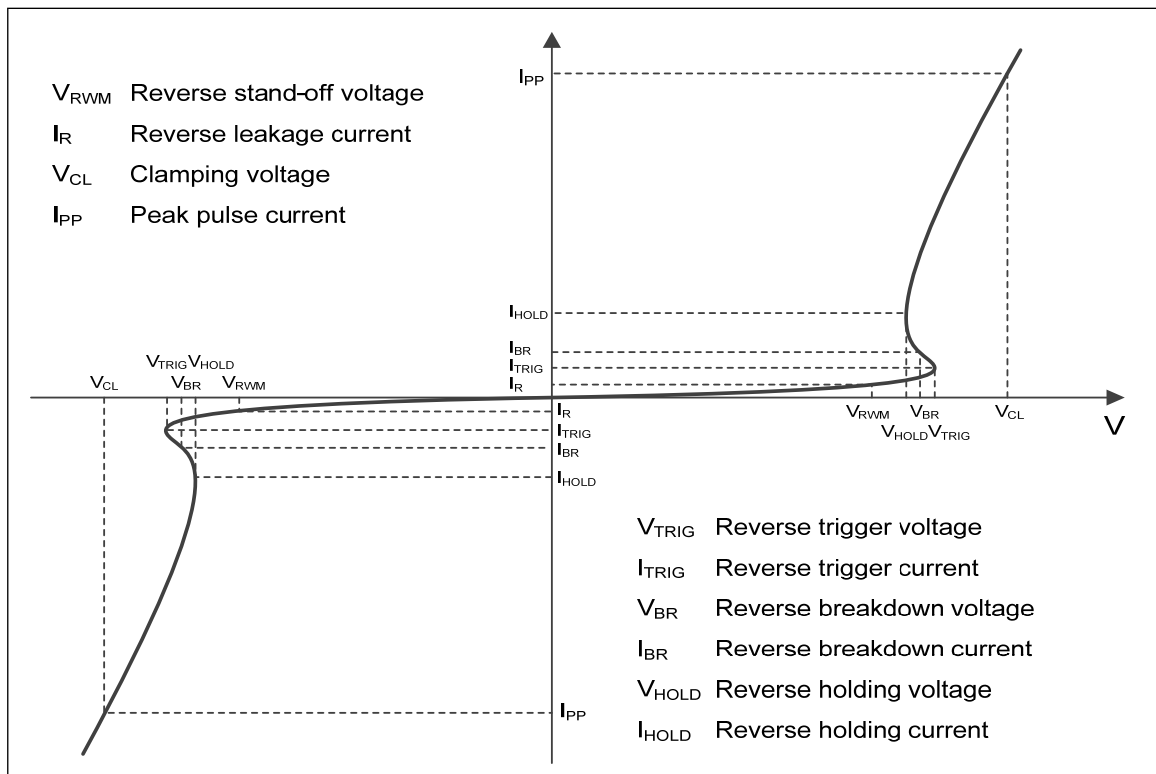
- Cellular Handsets
- Tablets
- Laptops
- Other portable devices
- Network communication devices

### Mechanical Data

- Package: DFN1006-2L
- Case Material: "Green" Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- Marking Information: See Below



### Definitions of electrical characteristics



## ■Maximum Ratings

| PARAMETER                                       | SYMBOL    | LIMITS   | UNIT        |
|-------------------------------------------------|-----------|----------|-------------|
| Peak pulse power ( $t_p = 8/20\mu s$ )          | $P_{pk}$  | 140      | W           |
| Peak pulse current ( $t_p = 8/20\mu s$ )        | $I_{PP}$  | 10       | A           |
| ESD according to IEC61000-4-2 air discharge     | $V_{ESD}$ | $\pm 30$ | kV          |
| ESD according to IEC61000-4-2 contact discharge |           | $\pm 30$ |             |
| Junction temperature                            | $T_J$     | -45~125  | $^{\circ}C$ |
| Storage temperature                             | $T_{STG}$ | -55~150  | $^{\circ}C$ |

## ■Electrical Characteristics ( $T_a=25^{\circ}C$ Unless otherwise specified)

| PARAMETER                        | Symbol    | UNIT     | Conditions                           | Min | Typ  | Max       |
|----------------------------------|-----------|----------|--------------------------------------|-----|------|-----------|
| Reverse maximum working voltage  | $V_{RWM}$ | V        |                                      |     |      | $\pm 5.5$ |
| Reverse leakage current          | $I_R$     | $\mu A$  | $V_{RWM} = 5.5V$                     |     |      | 0.1       |
| Reverse breakdown voltage        | $V_{BR}$  | V        | $I_{BR} = 1mA$                       | 6.8 | 7.3  |           |
| Clamping voltage <sup>1)</sup>   | $V_{CL}$  | V        | $I_{PP} = 16A, t_p = 0.2/100ns(TLP)$ |     | 8.6  |           |
| Dynamic resistance <sup>1)</sup> | $R_{DYN}$ | $\Omega$ |                                      |     | 0.14 |           |
| Clamping voltage <sup>2)</sup>   | $V_{CL}$  | V        | $V_{ESD} = 8kV$                      |     | 12   |           |
| Clamping voltage <sup>1)</sup>   | $V_{CL}$  | V        | $I_{PP} = 1A, t_p = 8/20\mu s$       |     | 6.9  | 7.2       |
|                                  |           | V        | $I_{PP} = 10A, t_p = 8/20\mu s$      |     | 10   | 13        |
| Junction capacitance             | $C_J$     | pF       | $V_R = 0V, f = 1MHz$                 |     | 25   | 30        |
| Junction capacitance             | $C_J$     | pF       | $V_R = 2.5V, f = 1MHz$               |     | 17   | 22        |

Notes:

(1). Non-repetitive current pulse, according to IEC61000-4-5.

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.

## ■Ordering Information (Example)

| PREFERED P/N | PACKING CODE | UNIT WEIGHT(mg) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|--------------|--------------|-----------------|----------------------|-------------------------|----------------------------|---------------|
| ESD5V5LBA    | F1           | Approximate 0.9 | 10000                | 100000                  | 400000                     | 7" reel       |

## ■ Characteristics (Typical)

Fig.1 8/20 $\mu$ s waveform per IEC61000-4-5

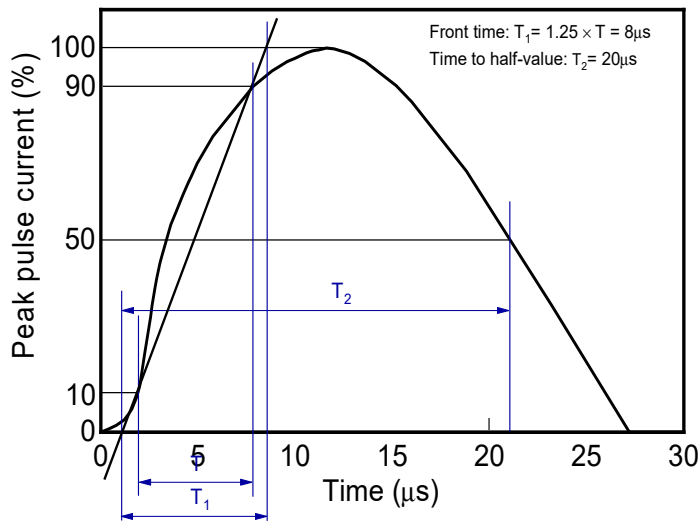


Fig.2 Contact discharge current waveform per IEC61000-4-2

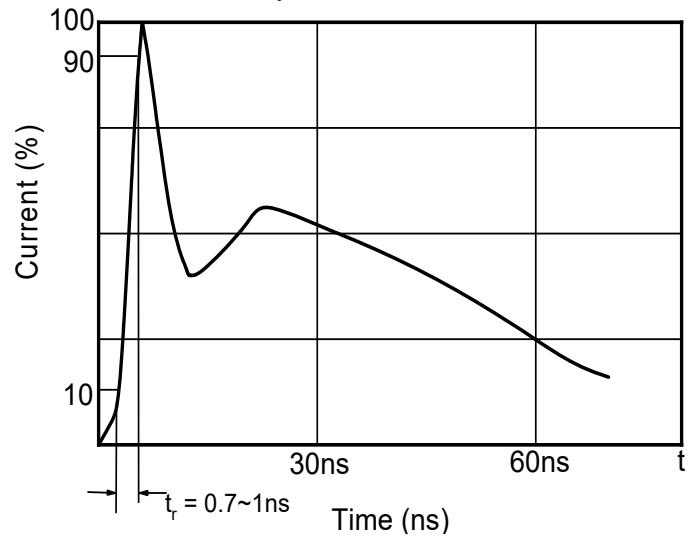


Fig.3 Clamping voltage vs. Peak pulse current

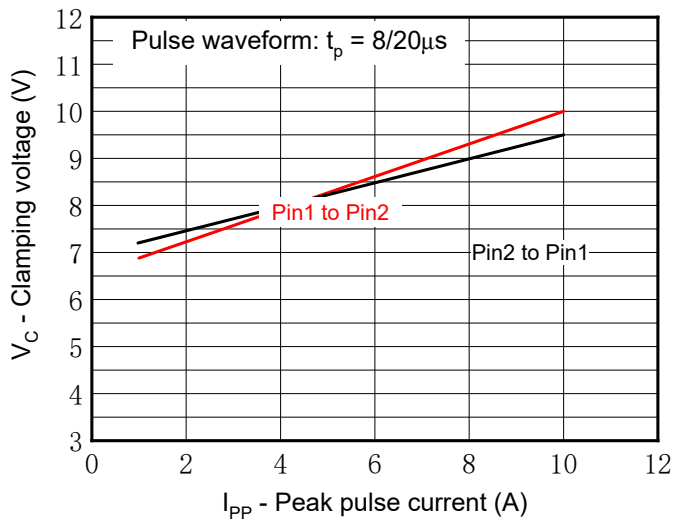


Fig.4 Capacitance vs. Reverse voltage

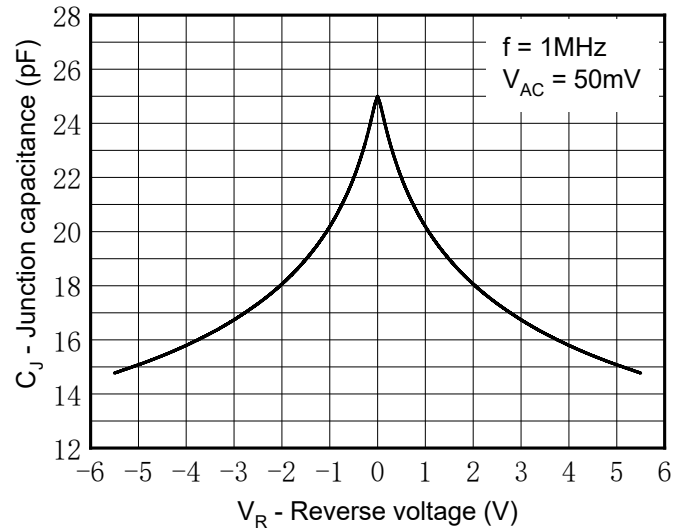


Fig.5 Non-repetitive peak pulse power vs. Pulse time

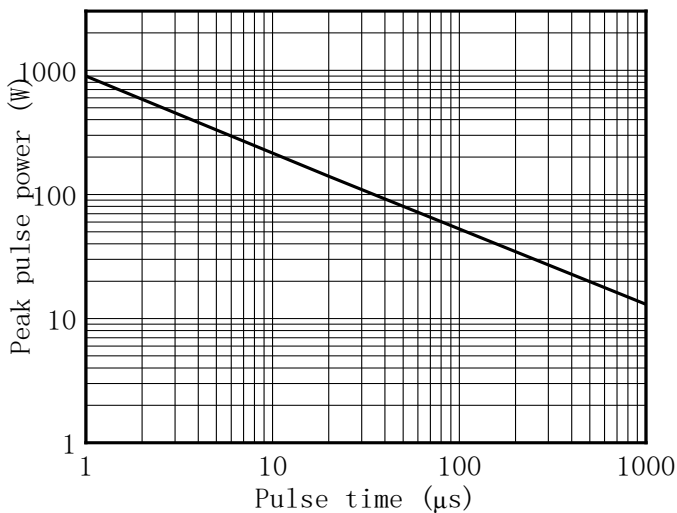
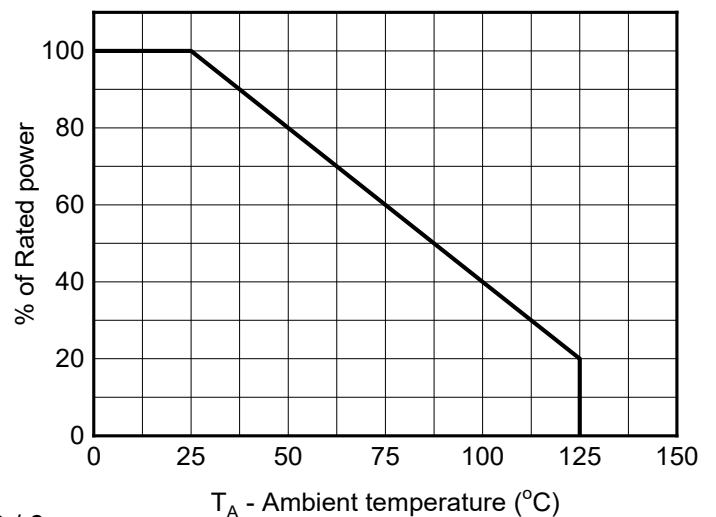
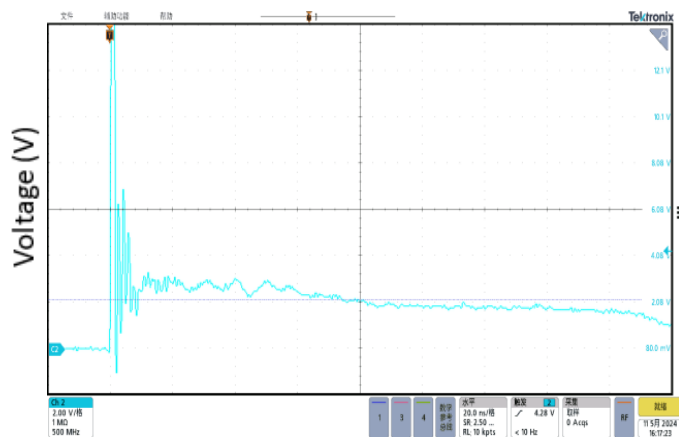


Fig.6 Power derating vs. Ambient temperature



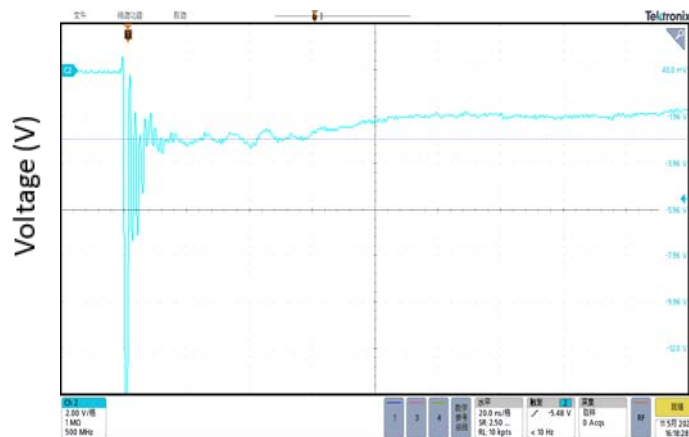
**Fig.7 ESD clamping**



Time (ns)

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

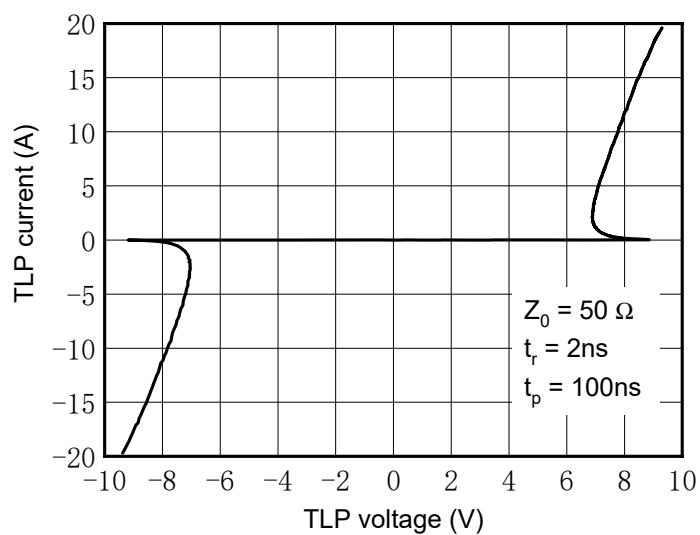
**Fig.8 ESD clamping**



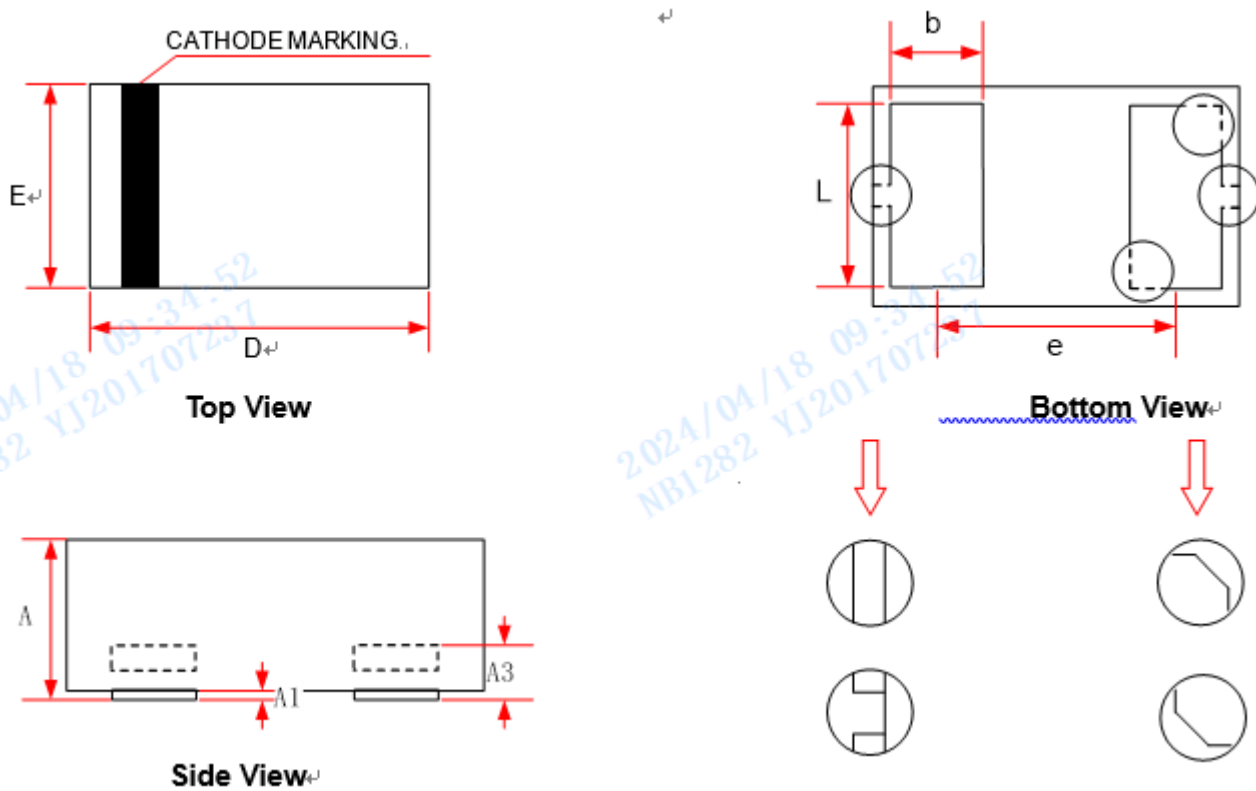
Time (ns)

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

Fig.9 TLP Measurment

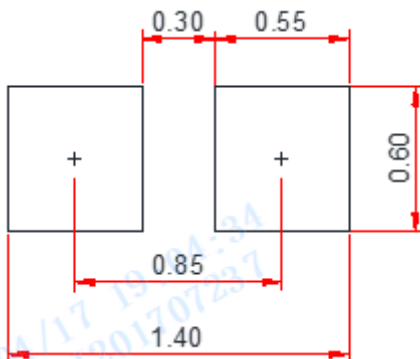


## ■ Outline Dimensions



| Symbol | Dimensions in Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | Min.                      | Typ.  | Max.  |
| A      | 0.340                     | 0.450 | 0.530 |
| A1     | 0.000                     | 0.020 | 0.050 |
| A3     | 0.125 Ref.                |       |       |
| D      | 0.950                     | 1.000 | 1.080 |
| E      | 0.550                     | 0.600 | 0.680 |
| b      | 0.200                     | 0.250 | 0.300 |
| L      | 0.450                     | 0.500 | 0.550 |
| e      | 0.650 BSC                 |       |       |

## ■ Recommended PCB Layout



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

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