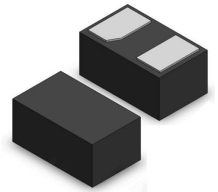


## Descriptions

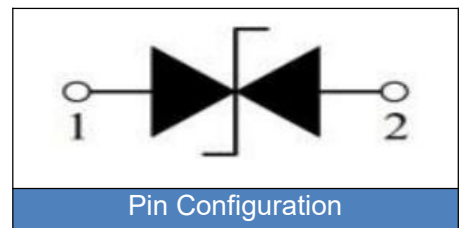
The SP1PN06 series includes back-to-back TVS diodes fabricated is an standard capacitance Transient Voltage Suppressor (TVS) designed to protect low speed data interfaces or power supply interfaces. The device has been specifically designed to protect sensitive components which are connected to low-speed data and transmission lines from over-voltage caused by ESD (electrostatic discharge), CDE (Cable Discharge Events), and EFT (electrical fast transients). They may be used to meet the ESD immunity requirements of IEC 61000-4-2. It gives the designer the flexibility to protect single lines in applications where arrays are not practical.



## Features

- ◆ IEC61000-4-2 ESD 30KV Air, 30KV contact compliance
- ◆ DFN0603-2L surface mount package
- ◆ Working voltage: 5.5V
- ◆ Low leakage current
- ◆ Low operating and clamping voltages
- ◆ Lead Free/RoHS compliant
- ◆ Flammability rating UL 94V-0
- ◆ Meets MSL level 1, per J-STD-020

## Schematic

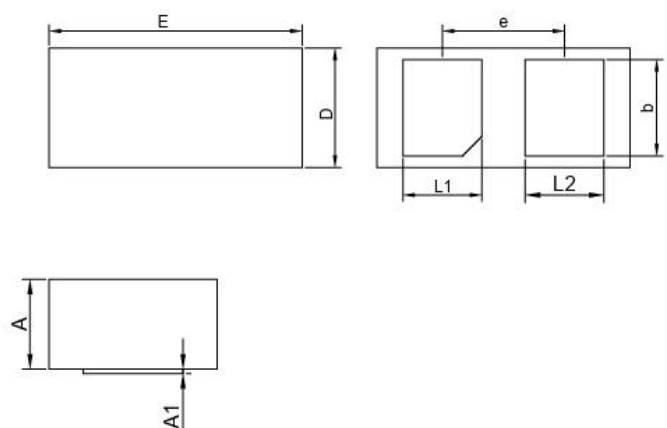


## Applications

- ◆ LED Lighting Modules
- ◆ Mobile&handhelds
- ◆ RS232&RS485
- ◆ Can Bus
- ◆ General Purpose I/O
- ◆ Portable Instrumentation
- ◆ Power Supply

## Dimensions (DFN0603-2L)

| Symbol | Dimension   |       |
|--------|-------------|-------|
|        | Millimeters |       |
|        | Min.        | Max.  |
| A      | 0.27        | 0.35  |
| D      | 0.28        | 0.35  |
| E      | 0.57        | 0.65  |
| b      | 0.22        | 0.26  |
| e      | 0.33        | 0.37  |
| L1/L2  | 0.16        | 0.20  |
| A1     | 0.00        | 0.015 |


Maximum Ratings( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

| Rating                          | Symbol           | Value         | Unit               |
|---------------------------------|------------------|---------------|--------------------|
| ESD voltage (Contact discharge) | $V_{\text{ESD}}$ | $\pm 30$      | kV                 |
| ESD voltage (Air discharge)     |                  | $\pm 30$      |                    |
| Operating temperature range     | $T_J$            | $-55\sim+125$ | $^{\circ}\text{C}$ |
| Storage temperature range       | $T_{\text{STG}}$ | $-55\sim+150$ | $^{\circ}\text{C}$ |

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

| Parameter                                    | Symbol           | Condition                    | Min. | Typ | Max. | Unit          |
|----------------------------------------------|------------------|------------------------------|------|-----|------|---------------|
| Reverse stand-off voltage                    | $V_{\text{RWM}}$ |                              |      |     | 5.5  | V             |
| Reverse breakdown voltage                    | $V_{\text{BR}}$  | $I_{\text{BR}}=1\text{mA}$   | 6.5  |     | 9.0  | V             |
| Reverse leakage current                      | $I_{\text{R}}$   | $V_{\text{R}}=5.5\text{V}$   |      |     | 0.5  | $\mu\text{A}$ |
| Clamping voltage ( $t_p=8/20\mu\text{s}$ )   | $V_{\text{C}}$   | $I_{\text{PP}}=1\text{A}$    |      | 8.0 | 10   | V             |
| Clamping voltage ( $t_p=8/20\mu\text{s}$ )   | $V_{\text{C}}$   | $I_{\text{PP}}=13\text{A}$   |      | 10  | 12   | V             |
| Peak pulse current ( $t_p=8/20\mu\text{s}$ ) | $I_{\text{PP}}$  |                              |      |     | 13   | A             |
| Off state junction capacitance               | $C_{\text{J}}$   | $0\text{Vdc}, f=1\text{MHz}$ |      | 30  | 40   | pF            |

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

Figure 1. Capacitance vs. Bias Voltage

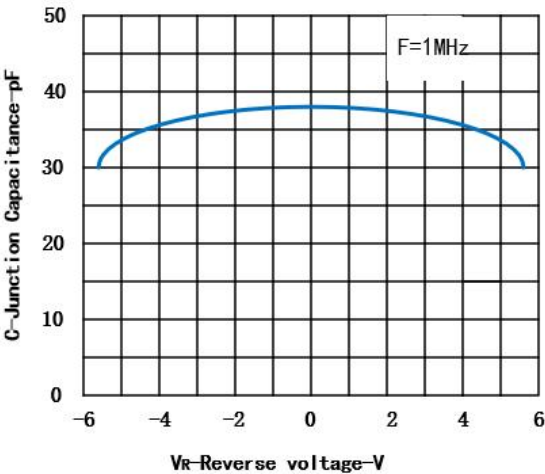


Figure 2. Power Derating Curve

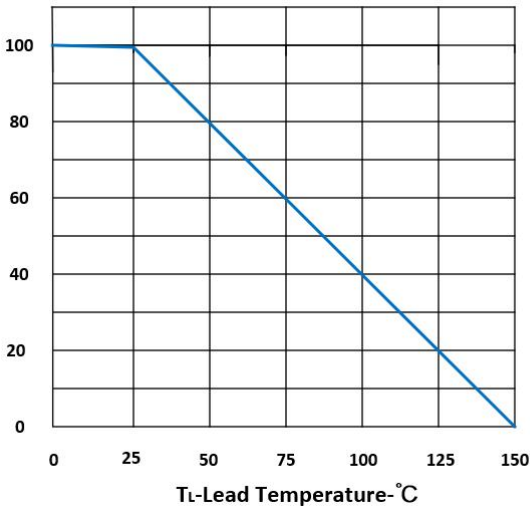


Figure 3. Pulse Waveform

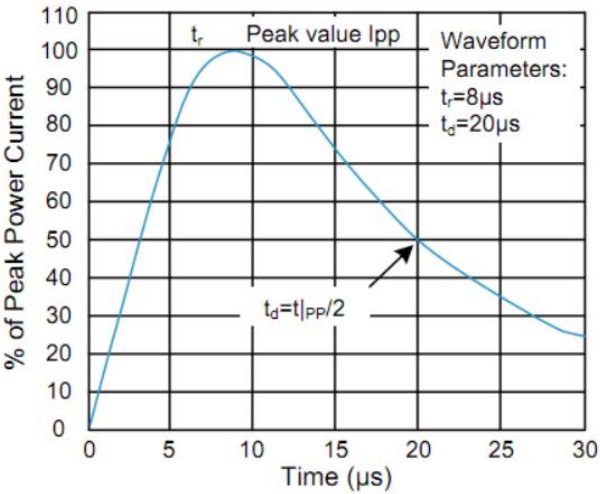
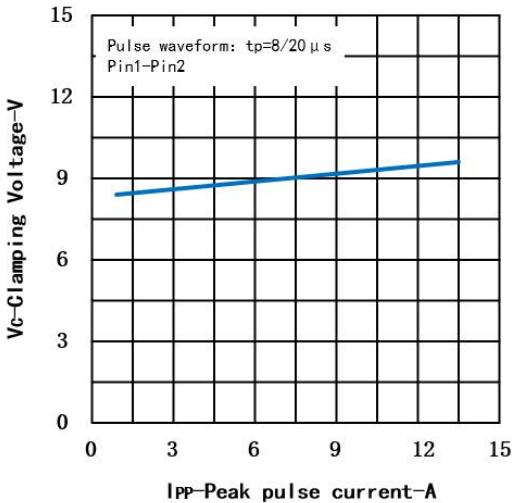
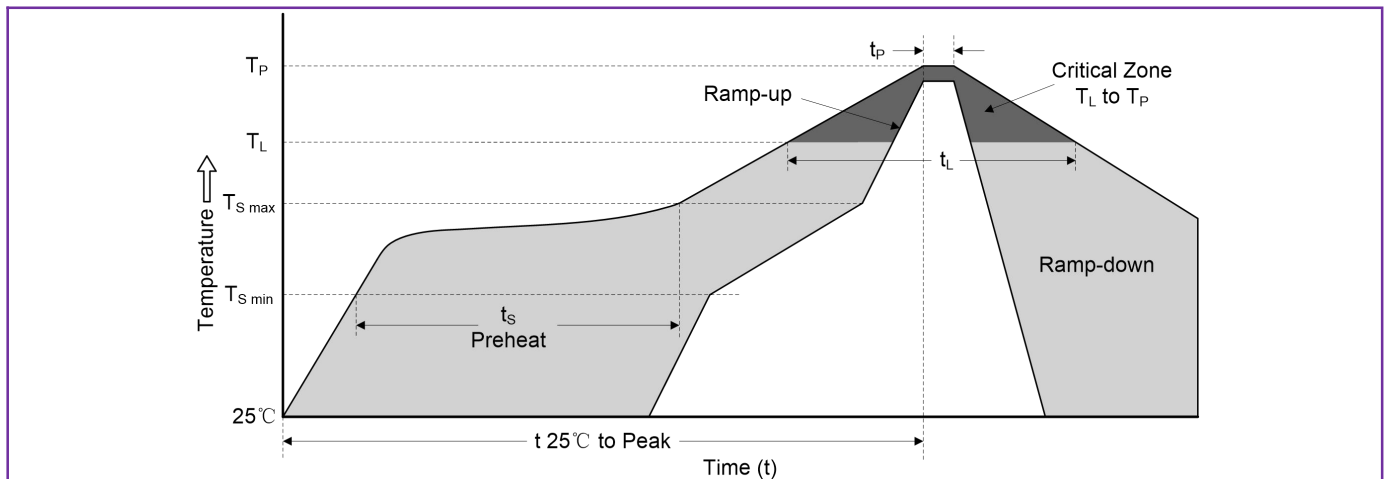


Figure 4. Clamping Voltage VS  $I_{PP}$



## Reflow Soldering Parameters



| Reflow Condition                                     |                                   | Lead-free Assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Pre heat                                             | -Temperature Min ( $T_{S\ min}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{S\ max}$ ) | 200°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-180 seconds     |
| Average ramp-up rate ( $T_L$ to $T_P$ )              |                                   | 3°C/second max.    |
| $T_{S\ max}$ to $T_L$ -Ramp-up Rate                  |                                   | 3°C/second max.    |
| Reflow                                               | -Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | -Time (min to max) ( $t_s$ )      | 60-150 seconds     |
| Peak Temperature ( $T_P$ )                           |                                   | 260(+0/-5)°C       |
| Time within 5°C of actual Peak Temperature ( $t_P$ ) |                                   | 20-40 seconds      |
| Ramp-down Rate                                       |                                   | 6°C/second max.    |
| Time 25°C to Peak Temperature( $T_P$ )               |                                   | 8 minutes max.     |
| Do not exceed                                        |                                   | 260°C              |

## Package

| Part number    | QTY/Reel | Reel Size |
|----------------|----------|-----------|
| SP1PN06C5.5P01 | 3000PCS  | 7Inch     |