

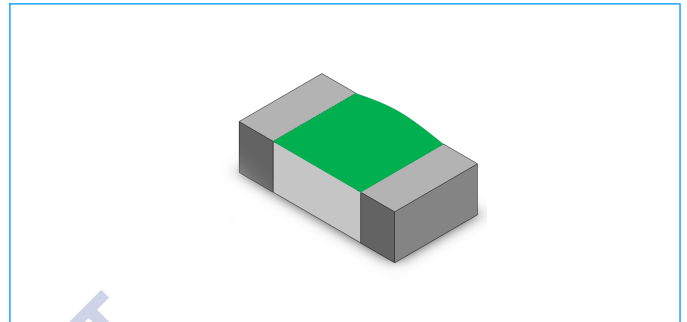
## Surface Mount Polymeric ESD Suppressor

### PE0603S24G21R

#### Description

This specification is applied to electrostatic discharge (ESD) protection. It is designed to protect the high-speed data lines against ESD transients. It has very low capacitance and fast turn on times makes it ideal for data and transmission lines with high data rates.

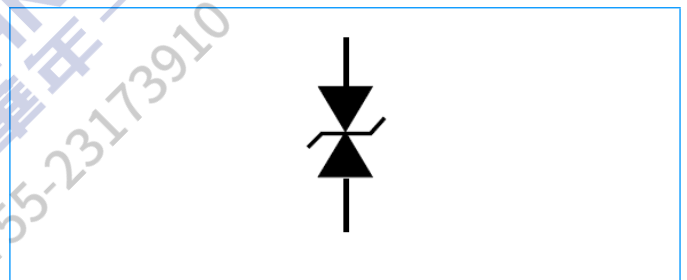
According to the special property of device, we recommend not to use on such application as: DC/AC power line.



#### Features

- u Protection against ESD voltages and currents (IEC61000-4-2 Level 4)
- u Extremely quick response time (<1ns) present ideal ESD protection
- u Extremely low capacitance (0.2pF typical)
- u Extremely low leakage current
- u Bi-directional device
- u SMD (Surface Mount Device)
- u Zero signal distortion
- u For RoHS Compliance

#### Equivalent Circuit



#### Applications

- u Antenna circuit
- u USB2.0 / USB3.0
- u IEEE-1394
- u DVI
- u HDMI

#### Product Model

- u Digital Video Equipment
- u Mobil Phone
- u GPS Antenna
- u Bluetooth Communication Equipment

#### Electrical Characteristics

| Parameter                                     | Symbol   | Min. | Typ. | Max. | Unit    |
|-----------------------------------------------|----------|------|------|------|---------|
| Rated voltage                                 | $V_{DC}$ | --   | --   | 24   | V       |
| Leakage current                               | $I_L$    | --   | 0.01 | --   | $\mu A$ |
| Peak voltage                                  | $V_P$    | --   | 300  | --   | V       |
| Trigger voltage                               | $V_t$    | --   | 300  | --   | V       |
| Clamping voltage                              | $V_C$    | --   | 30   | --   | V       |
| Capacitance,@1MHz                             | $C_P$    | --   | 0.2  | --   | pF      |
| Response time                                 | --       | --   | --   | 1    | ns      |
| ESD voltage capability,Contact discharge mode | --       | --   | 8    | --   | kV      |
| ESD voltage capability,Air discharge mode     | --       | --   | 15   | --   | kV      |
| ESD pulse withstand                           | --       | --   | 1000 | --   | pulses  |

Rated voltage –  $I_L$  measurement rated voltage.

$V_P$  – The peak voltage value shall be measured under the following conditions. ESD test conditions : IEC61000-4-2, 8 kV contact discharge.

$V_t$  – measurement by using Transmission Line Pulse (TLP).

$V_C$  – measurement by using Transmission Line Pulse (TLP).

$C_P$  – Device capacitance measured with 1Vrms.

# Surface Mount Polymeric ESD Suppressor

## PE0603S24G21R

### General Specifications

#### Temperature Specifications

Operating Temperature Range: -40°C to +85°C

Storage Temperature Range: -40°C to +85°C

#### Environmental Specifications

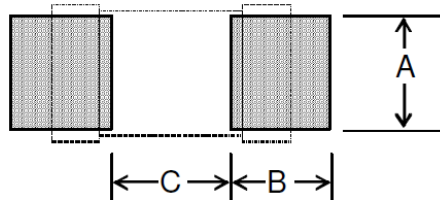
| Item                                 | Specifications      | Test Condition                                                                                   | Reference                 |
|--------------------------------------|---------------------|--------------------------------------------------------------------------------------------------|---------------------------|
| <b>Bias Humidity</b>                 | $I_L \leq 10 \mu A$ | 90%RH, 40°C, Rated Voltage, 1000hrs                                                              | MIL-STD-202,Method 103    |
| <b>Thermal Shock</b>                 | $I_L \leq 10 \mu A$ | -40°C to 85°C, 30 min. cycle, 5 cycles                                                           | JIS C 0025 (1998),Test Na |
| <b>High Temperature Load Voltage</b> | $I_L \leq 10 \mu A$ | Rated voltage , 85°C, 1000 hrs                                                                   | MIL-STD-202G,Method 108   |
| <b>Solder Leach Resistance</b>       | $I_L \leq 10 \mu A$ | 260°C, 10s                                                                                       | MIL-STD-202G,Method 210F  |
| <b>Vibration</b>                     | $I_L \leq 10 \mu A$ | The entire frequency range:10~55Hz<br>1.5mm amplitude;<br>2 hours for each of X, Y, Z directions | MIL-STD-202G,Method 201A  |

$I_L$  – Leakage current at rated voltage, the maximum leakage current was measured after reliability test.

### Precautions for Handling

#### Solder Cream in Reflow Soldering

Refer to the recommendable land pattern as printing mask pattern for solder cream. Print solder in a thickness of 0.15 to 0.20 mm.



| Symbol | Unit: mm(inch)        |
|--------|-----------------------|
| A      | 0.75±0.1 (0.03±0.004) |
| B      | 0.75±0.1 (0.03±0.004) |
| C      | 0.75±0.1 (0.03±0.004) |

#### Precaution for Handling of Substrate

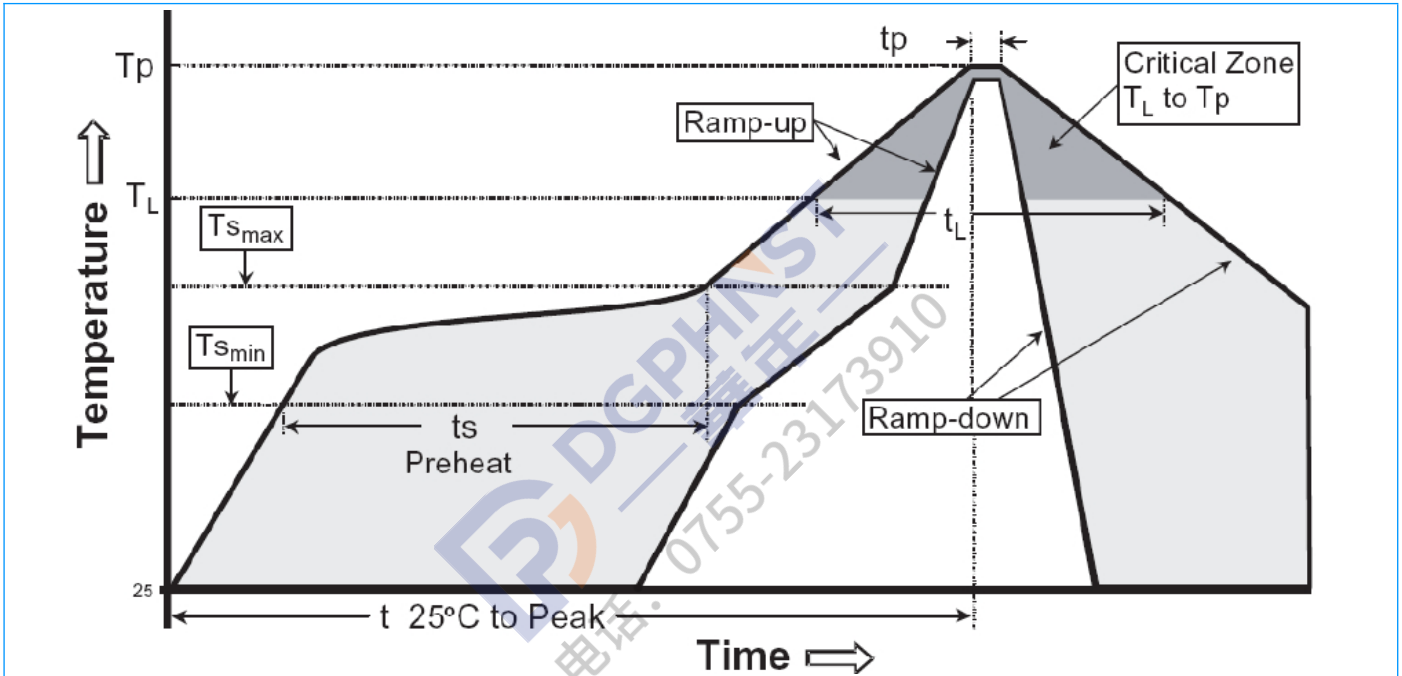
Do not exceed to bend the board after soldering this product extremely. (reference examples)

- Mounting place must be as far as possible from the position, which is close to the break line of board, or on the line of large holes of board.
- Do not bend extremely the board, in mounting another components. If necessary, use back-up pin (support pin) to prevent from bending extremely.
- Do not break the board by hand. We recommend to use the machine or the jig to break it.

#### Precaution for Soldering

Note that this product will be easily damaged by rapid heating, rapid cooling or local heating.

Do not give heat shock over 100°C in the process of soldering. We recommend to take preheating and gradual cooling.

**Surface Mount Polymeric ESD Suppressor**
**PE0603S24G21R**
**Precautions for Handling (Continue)**
**U Recommendable Reflow Soldering**


|                                                                       |                  |
|-----------------------------------------------------------------------|------------------|
| <b>Profile Feature</b>                                                | Pb free Assembly |
| <b>Average Ramp Rate (<math>T_s</math> max to <math>T_p</math>)</b>   | 3 °C/second max  |
| <b>Preheat</b>                                                        |                  |
| - Temperature Min ( $T_{s_{min}}$ )                                   | 150 °C           |
| - Temperature Min ( $T_{s_{max}}$ )                                   | 200 °C           |
| - Time( $t_{s_{min}}$ to $t_{s_{min}}$ )                              | 60-180 seconds   |
| <b>Time maintained above:</b>                                         |                  |
| - Temperature ( $T_L$ )                                               | 217 °C           |
| - Time ( $t_L$ )                                                      | 60-150 seconds   |
| <b>Peak Temperature (<math>T_p</math>)</b>                            | 260 °C +0/-5 °C  |
| <b>Time within 5 °C of actual Peak Temperature (<math>T_p</math>)</b> | 20-40 seconds    |
| <b>Ramp-Down Rate</b>                                                 | 6 °C/second max. |
| <b>Time 25 °C to Peak Temperature</b>                                 | 8 minutes max    |

## Surface Mount Polymeric ESD Suppressor

**PE0603S24G21R**

### Precautions for Handling (Continue)

#### ⊍ Soldering Gun Procedure

Note the follows, in case of using solder gun for replacement.

- (1) The tip temperature must be less than 280°C for the period within 3 seconds by using soldering gun under 30 W.
- (2) The soldering gun tip shall not touch this product directly.

#### ⊍ Soldering Volume

Note that excess of soldering volume will easily get crack the body of this product.

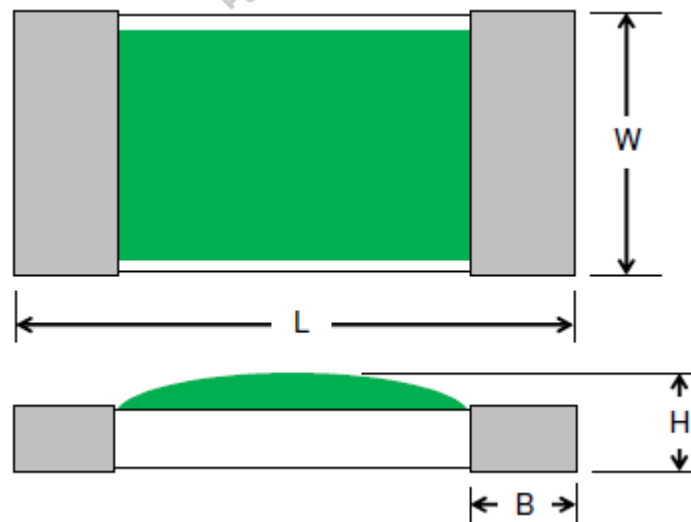
#### ⊍ Taping Package Storage Condition

Storage Temperature: 5 °C to 40 °C

Relative Humidity: < 65%RH

Storage Time: 12 months max

### Construction & Dimensions

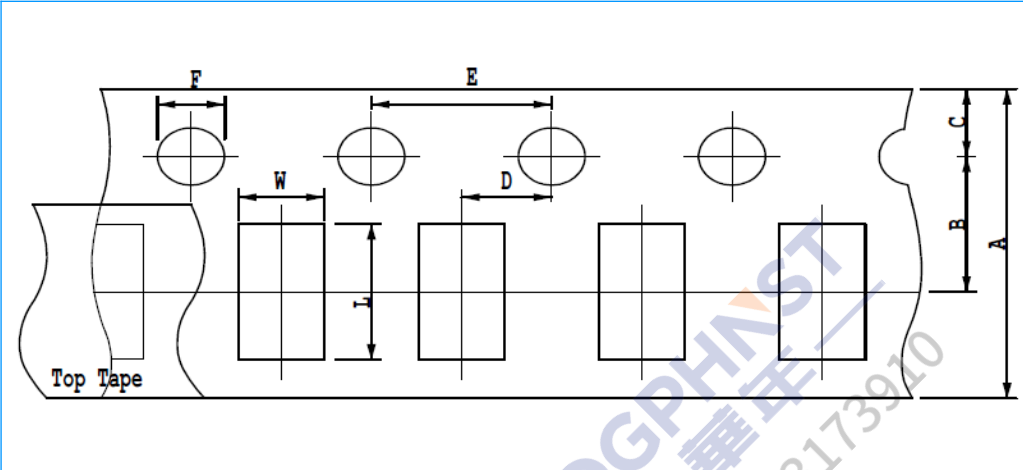


| Size EIA | 0603      |           |           |           |
|----------|-----------|-----------|-----------|-----------|
| Symbol   | L         | W         | H         | B         |
| Unit: mm | 1.60±0.10 | 0.85±0.15 | 0.51±0.05 | 0.30±0.20 |

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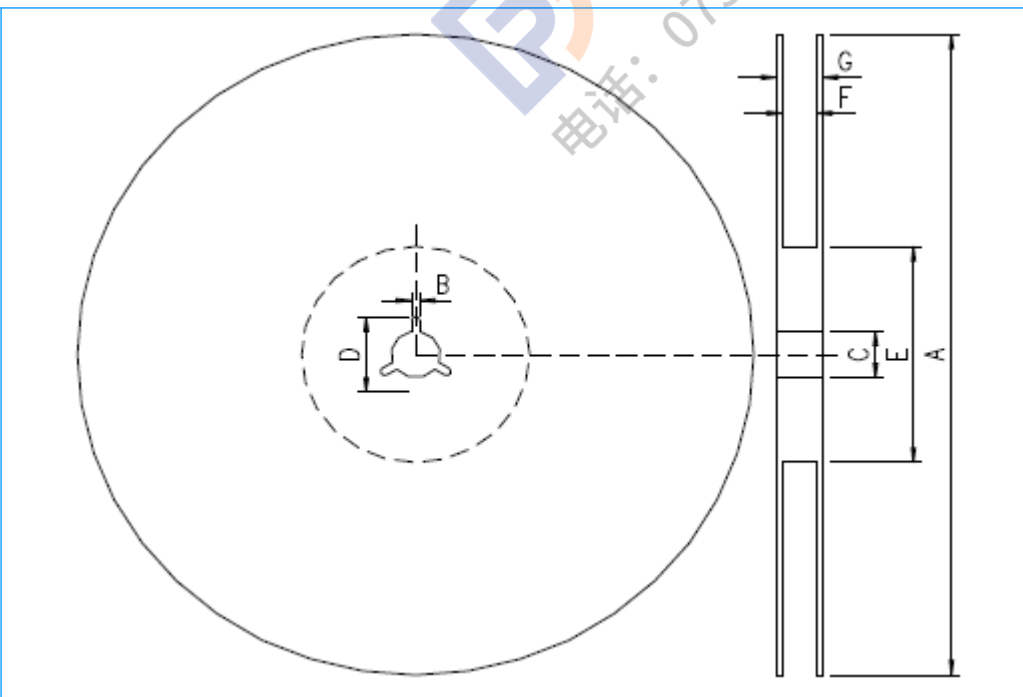
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## Carrier Tape Dimensions



| Symbol | 0603<br>(Unit: mm) |
|--------|--------------------|
| A      | 8.00±0.30          |
| B      | 3.50±0.05          |
| C      | 1.75±0.10          |
| D      | 2.00±0.05          |
| E      | 4.00±0.10          |
| F      | 1.50±0.10          |
| L      | 1.90±0.20          |
| W      | 1.05±0.20          |

## Carrier Tape Dimensions



| Symbol | 0603<br>(Unit: mm) |
|--------|--------------------|
| A      | 178.0±2.0          |
| B      | 2.0±0.5            |
| C      | 13.0±0.5           |
| D      | 21.0±0.8           |
| E      | 62.0±1.5           |
| F      | 9.0±0.5            |
| G      | 13.0±1.0           |

## Standard Packaging

| Size EIA    | Quantity        |
|-------------|-----------------|
| <b>0603</b> | 5000 PCS / REEL |