

# Surface Mount Polymeric ESD Suppressor

## PE0402S12G21R

### 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.

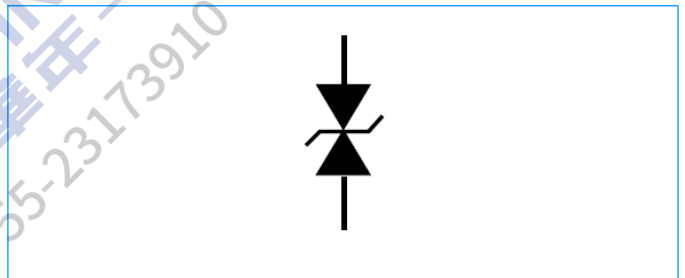
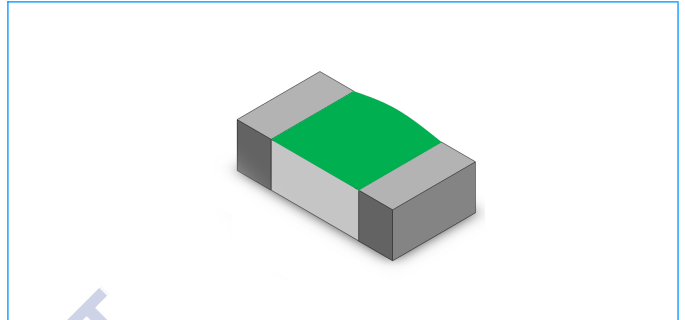
### Features

- 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

### Applications

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

### Equivalent Circuit



### 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	$V_{DC}$	--	--	12	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	0.5	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.

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### General Specifications

#### Temperature Specifications

Operating Temperature Range: -40°C to +125°C

Storage Temperature Range: -40°C to +125°C

#### Environmental Specifications

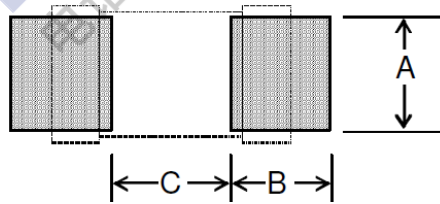
Item	Specifications	Test Condition	Reference
Bias Humidity	$I_L \leq 10 \mu A$	90%RH, 40°C, Rated Voltage, 1000hrs	MIL-STD-202, Method 103
Thermal Shock	$I_L \leq 10 \mu A$	-55°C to 125°C, 30 min. cycle, 5 cycles	JIS C 0025 (1998), Test Na
High Temperature Load Voltage	$I_L \leq 10 \mu A$	Rated voltage, 85°C, 1000 hrs	MIL-STD-202, Method 108
Solder Leach Resistance	$I_L \leq 10 \mu A$	260°C, 10s	MIL-STD-202, Method 210F

$I_L$  – 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 0.10 to 0.15 mm.



Symbol	Unit: mm
A	0.5±0.1
B	0.5±0.1
C	0.5±0.1

#### Precaution for Handling of Substrate

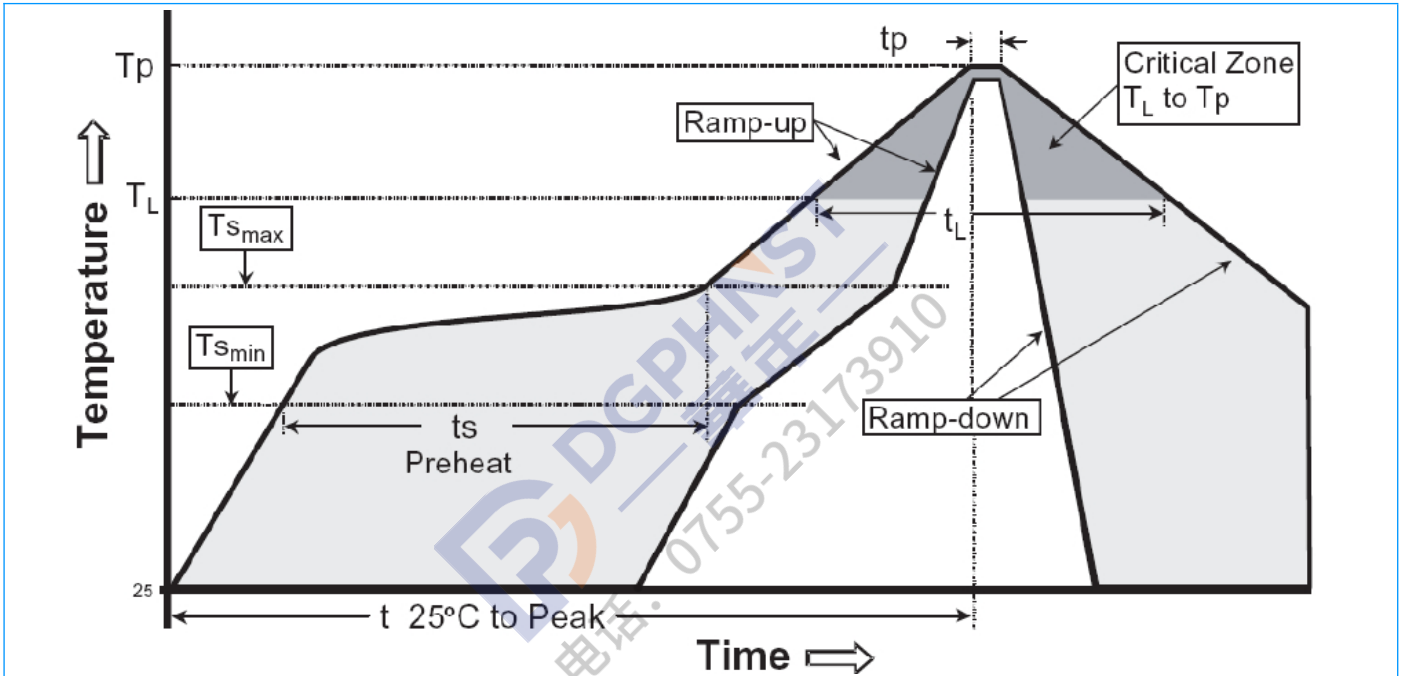
Do not exceed to bend the board after soldering this product extremely. (reference examples)

- 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.

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**PE0402S12G21R**
**Precautions for Handling (Continue)**
**U Recommendable Reflow Soldering**


Profile Feature	Pb free Assembly
Average Ramp Rate ( $T_s$ max to $T_p$ )	3 °C/second max
Preheat	
- 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
Time maintained above:	
- Temperature ( $T_L$ )	217 °C
- Time ( $t_L$ )	60-150 seconds
Peak Temperature ( $T_p$ )	260 °C +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	8 minutes max

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### 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℃ 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.

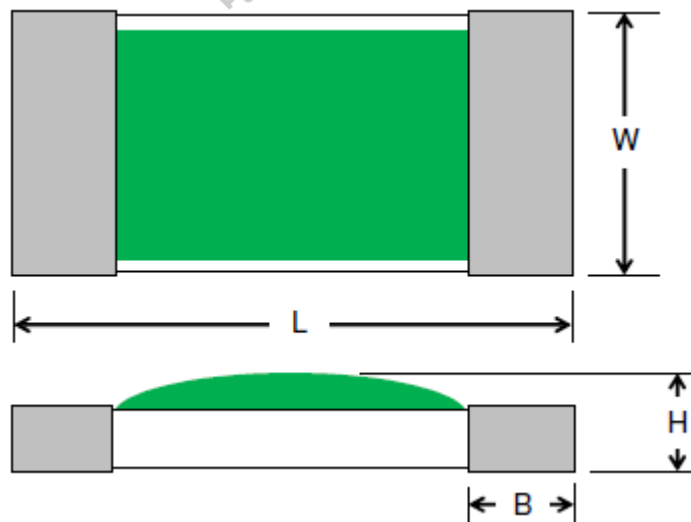
#### ⊍ Taping Package Storage Condition

Storage Temperature: 5 ℃ to 40 ℃

Relative Humidity: < 65%RH

Storage Time: 12 months max

### Construction & Dimensions

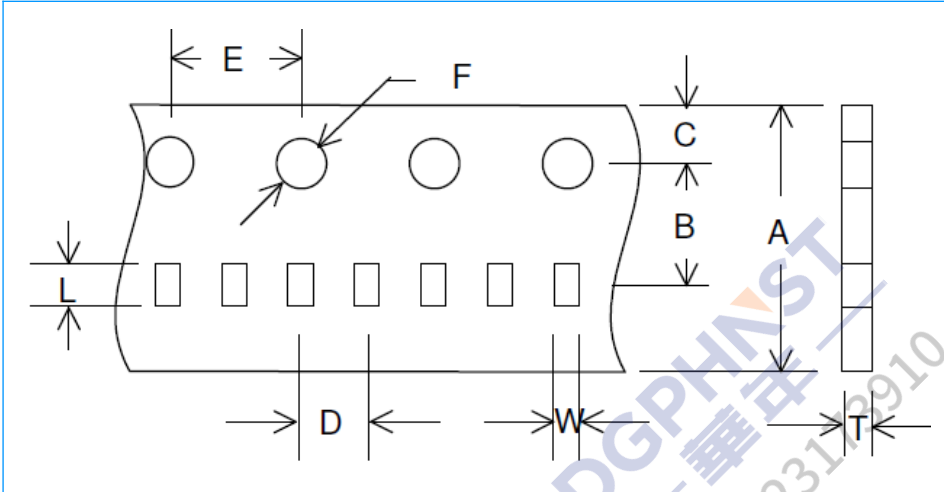


Size EIA	0402			
Symbol	L	W	H	B
Unit: mm	1.00±0.10	0.50±0.10	0.34±0.10	0.20±0.15

# Surface Mount Polymeric ESD Suppressor

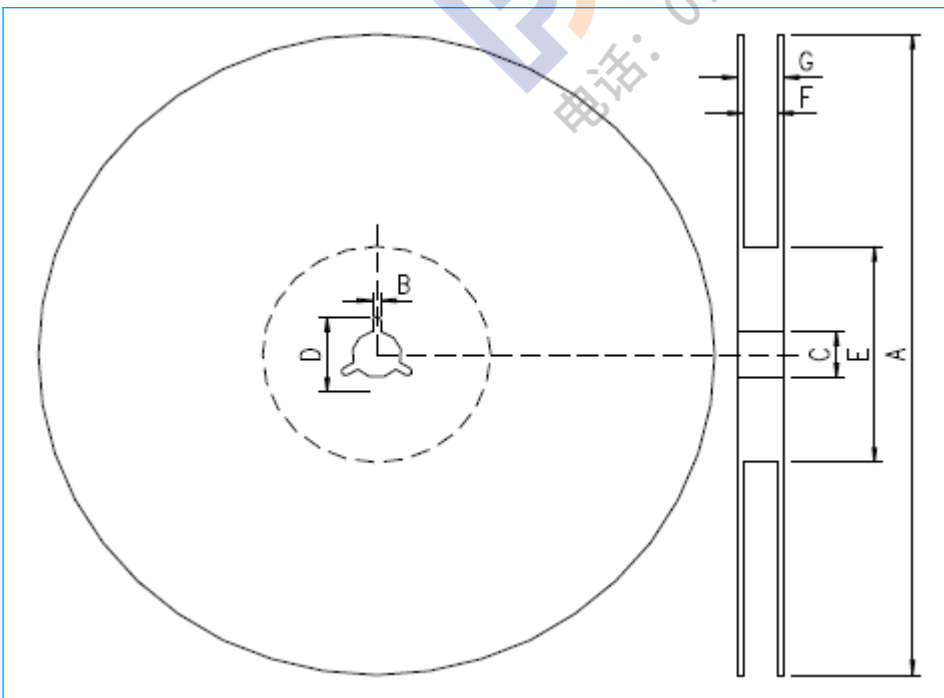
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## Carrier Tape Dimensions



Symbol	0402 (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	1.13±0.03
W	0.63±0.03
T	0.43±0.03

## Carrier Tape Dimensions



Symbol	0402 (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>0402</b>	10000 PCS / REEL