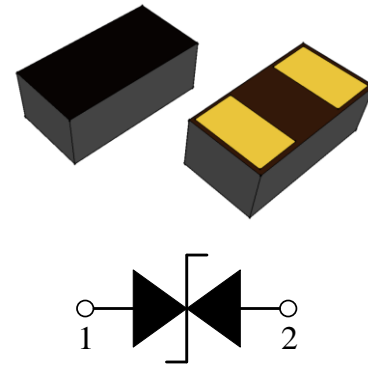


### Description

PESD0542U015 polymeric ESD suppressor help protect sensitive electronic equipment against electrostatic discharge (ESD) without distorting data signals. This protection is a result of its ultra-low capacitance of only 0.05 pF (I/O to GND), and it can be used to help equipment to pass IEC61000-4-2 level 4 test (15KV air, 8KV contact discharge).



### Features

- The best ESD protection for high speed, low voltage applications
- RoHS compliant and halogen free
- Ultra low capacitance, 0.05 pF (typ.)
- Low leakage current (<10nA)
- Fast response time (<1ns)
- Bi-directional, single line protection
- Surface mount
- MSL 1

### Materials Information

RoHS Compliant

Halogen Free

**RoHS**



### Applications

- Smart Phone/Mobile Internet Device
- Laptop/Desktop Computer
- Antennas (Cell Phones, GPS...)
- High Speed Ethernet
- USB 2.0 and USB 3.0
- Lightning and Thunder Bolt Interface

**Caution: This component is designed for signal line protection only, not intended to be used on power lines or for power bus applications.**

### General Characteristics

| Parameter                                  | Value       | Unit |
|--|-------------|------|
| Contact Discharge Voltage Per IEC61000-4-2 | 8K          | V    |
| Air Discharge Voltage Per IEC61000-4-2     | 15K         | V    |
| Operating Temperature                      | -55 to +125 | °C   |
| Storage Temperature                        | -40 to +85  | °C   |

### Electrical Characteristics (T<sub>A</sub> =25°C)

| Parameter                    | Symbol          | Test Conditions                     | Min. | Typ. | Max. | Units |
|------------------------------|-----------------|-------------------------------------|------|------|------|-------|
| Continuous Operating Voltage | V <sub>DC</sub> | ---                                 | ---  | ---  | 5    | V     |
| Trigger Voltage              | V <sub>T</sub>  | IEC61000-4-2 8KV contact discharge  | ---  | 450  | ---  | V     |
| Clamping Voltage             | V <sub>C</sub>  | IEC61000-4-2 8KV contact discharge  | ---  | 40   | ---  | V     |
| Leakage Current              | I <sub>L</sub>  | DC 5V shall be applied on component | ---  | ---  | 10   | nA    |
| Capacitance                  | C <sub>P</sub>  | Measured at 10MHz                   | ---  | 0.05 | ---  | pF    |
| ESD Pulse Withstand          | Pulses          | IEC61000-4-2 8KV contact discharge  | 1000 | ---  | ---  | ---   |

Notes:

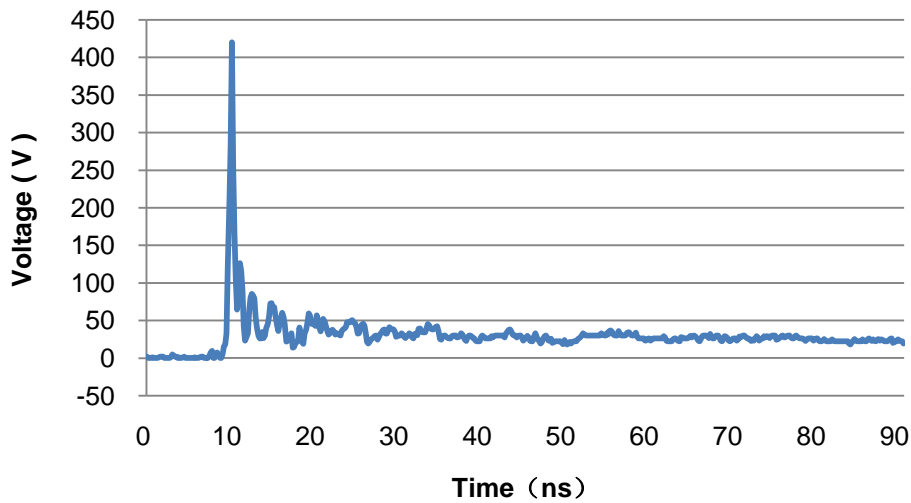
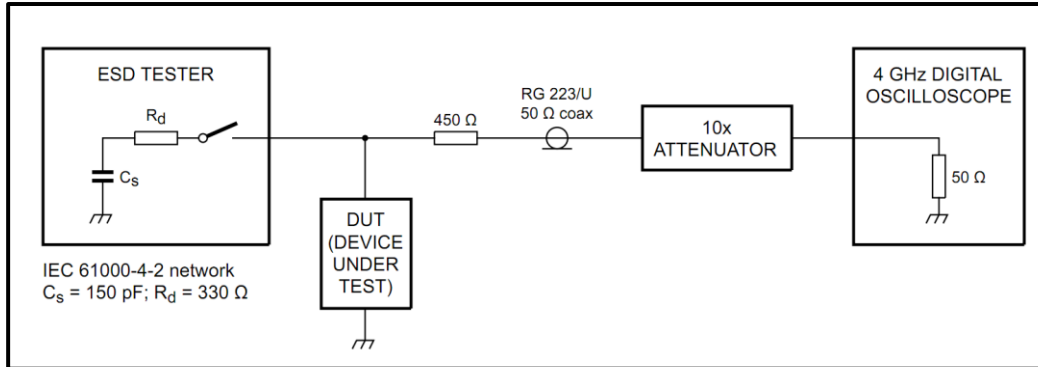
Trigger and clamping voltage are measured per IEC 61000-4-2, 8KV contact discharge method.

### Environmental Specifications

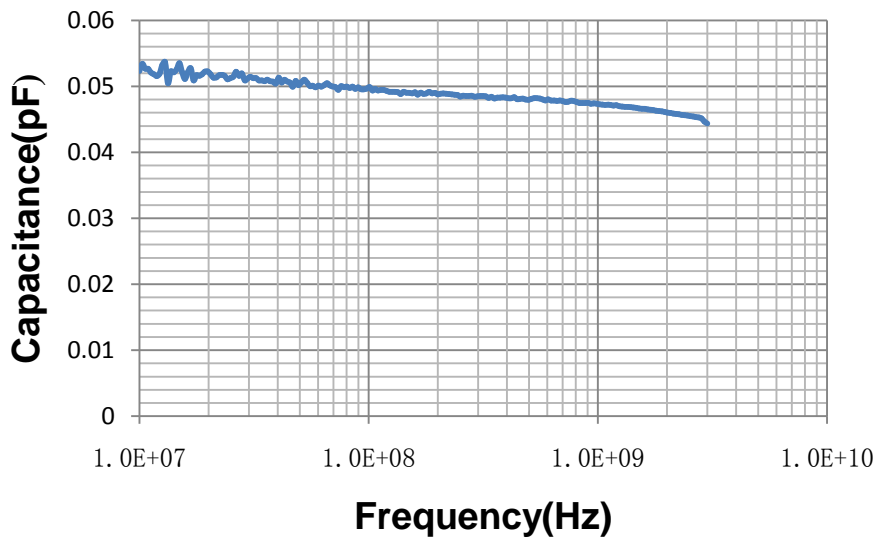
|                    | Solder Heat                             | Solderability | Preconditioning   | Thermal Shock                              | Bias Humidity Test                      |
|--------------------|---|---------------|---|--|---|
| Test Conditions    | 1. 150°C, 4H;<br>2. 260°C, 10s, 1 Times | 245°C, 5s     | 1. 125°C, 24H;<br>2. 85°C, 85%RH, 162H;<br>3. 260°C Reflow, 3 Times | -55°C—125°C,<br>30min dwell,<br>1000cycles | 85°C, 85%RH,<br>V <sub>DC</sub> , 1000H |
| Pass/Fail Criteria | 90% Coverage                            | 95% Coverage  | I <sub>L</sub> ≤10nA  | I <sub>L</sub> ≤10nA                       | I <sub>L</sub> ≤10nA                    |

|                    | Bias Heat Test                    | Bias Low Temp Test                | Vibration                                  | Mechanical Shock                              | Solvent Resistance                            |
|--------------------|-----------------------------------|-----------------------------------|--|---|---|
| Test Conditions    | 125°C, V <sub>DC</sub> ,<br>1000H | -55°C, V <sub>DC</sub> ,<br>1000H | 10Hz-50Hz-10HZ, 2hrs<br>each in X-Y-Z axis | 1500G, 0.5ms,<br>X-Y-Z axis 3 times           | IPA, ultrasonic<br>300s                       |
| Pass/Fail Criteria | I <sub>L</sub> ≤10nA              | I <sub>L</sub> ≤10nA              | No Physical Damage<br>I <sub>L</sub> ≤10nA | No Physical<br>Damage<br>I <sub>L</sub> ≤10nA | No Physical<br>Damage<br>I <sub>L</sub> ≤10nA |

Typical ESD Response (IEC 61000-4-2, 8KV contact discharge)

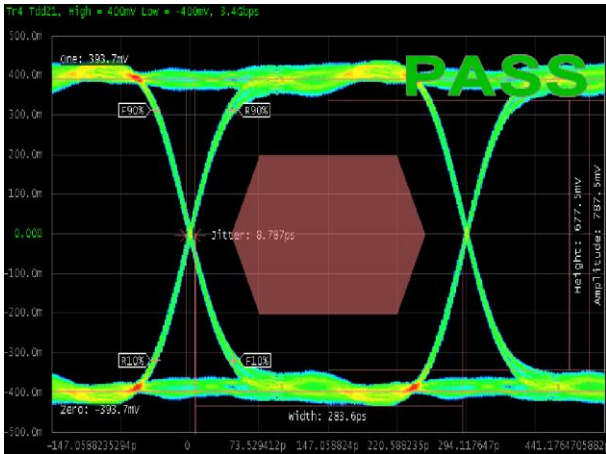


Typical Device Capacitance VS. Frequency

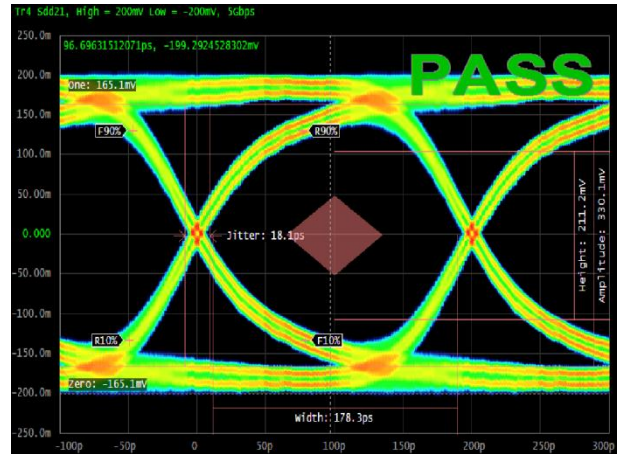


## Eye Diagram Measurement

HDMI Mask at 3.4 Gbps



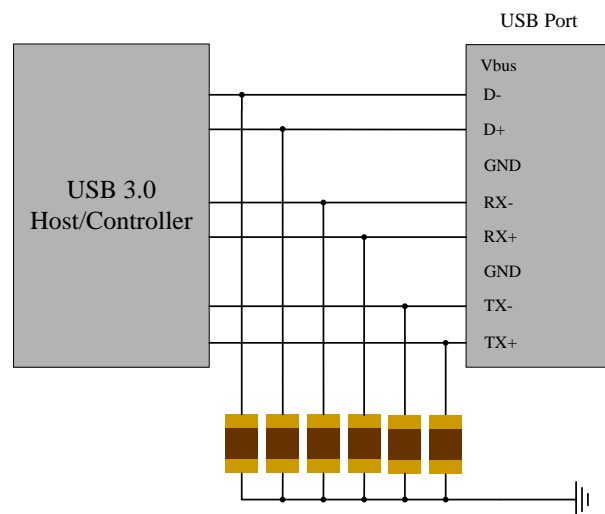
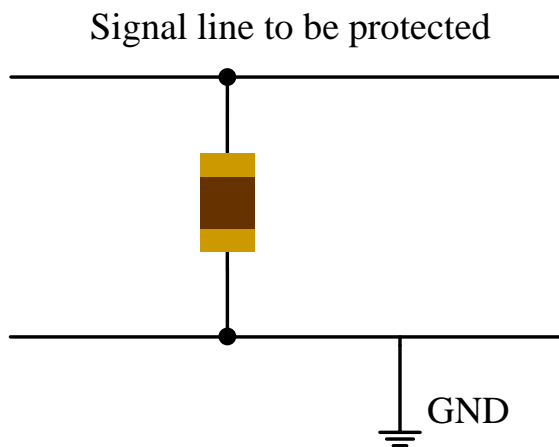
USB3.0 Mask at 5.0 Gbps



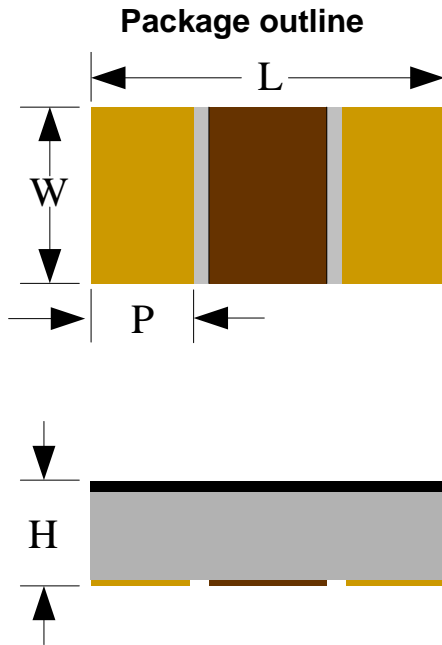
## ESD Protection for Signal Line

The PESD is designed for the protection of one bidirectional data line from ESD damage.

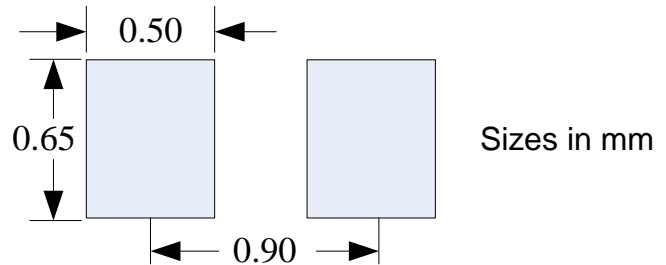
- Place the PESD as close to the input terminal or connector as possible.
- Minimize the path length between the PESD and the protected signal line.
- Use ground planes whenever possible.



## Package Dimension



## Recommended Solder Pad Footprint



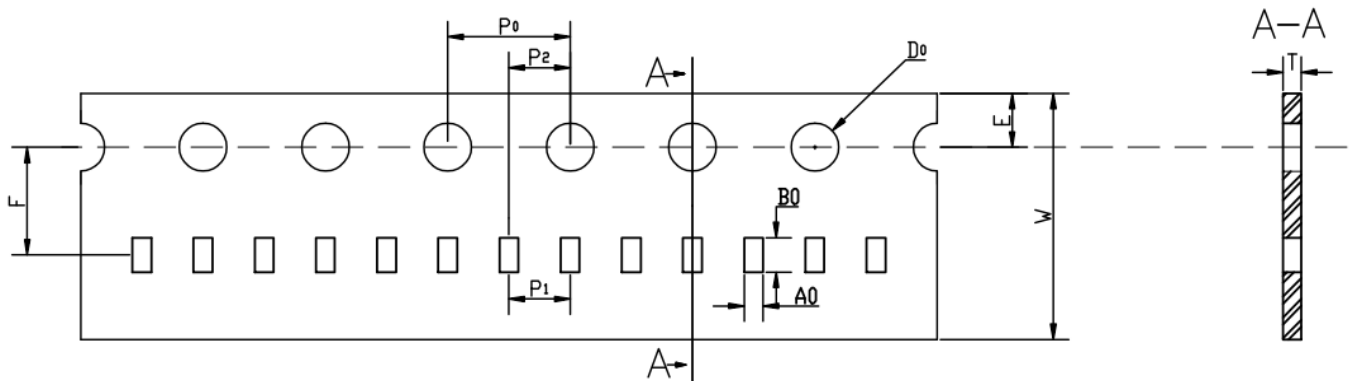
| Dimension | Unit: Millimeters |      |      |
|-----------|-------------------|------|------|
|           | Min.              | Typ. | Max. |
| L         | 0.90              | 1.00 | 1.10 |
| W         | 0.42              | 0.52 | 0.62 |
| P         | 0.15              | 0.25 | 0.35 |
| H         | 0.25              | 0.38 | 0.45 |

## Taping Specification

### 1. Tape Dimension Unit: Millimeters

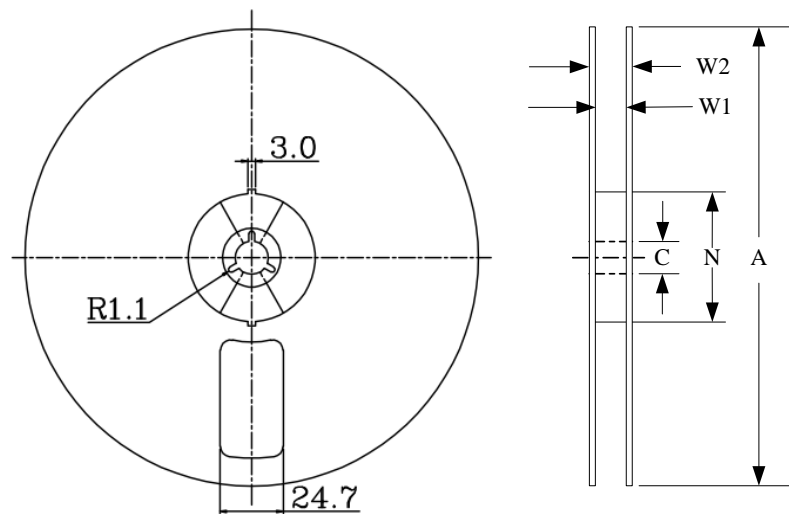
### Packaging

10,000 pieces in paper tape on 7" (178mm) reel



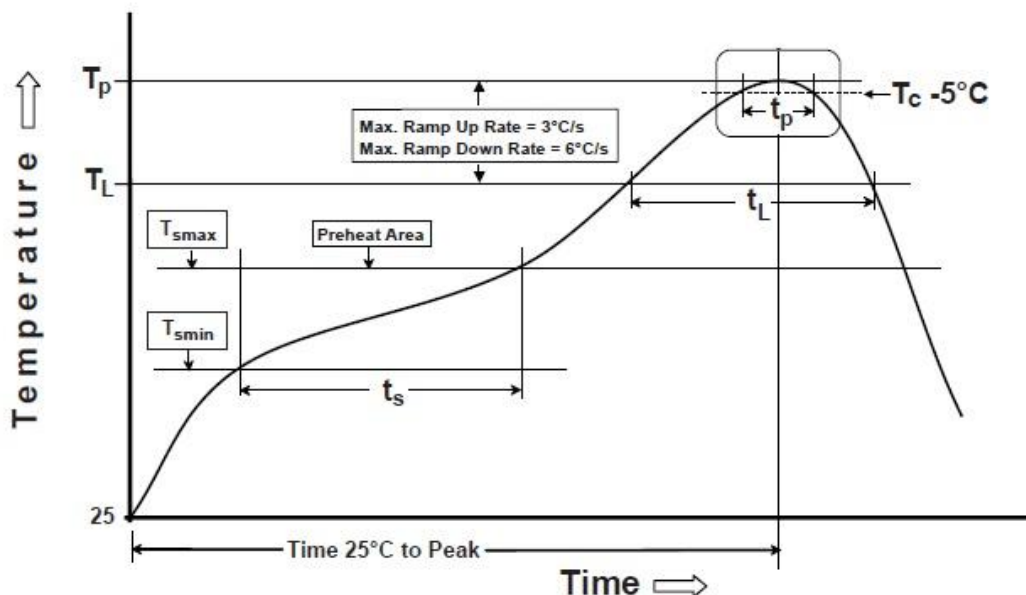
|                |                |           |           |           |                |                |                |                |           |
|----------------|----------------|-----------|-----------|-----------|----------------|----------------|----------------|----------------|-----------|
| A <sub>0</sub> | B <sub>0</sub> | W         | F         | E         | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub> | T         |
| 0.68±0.03      | 1.17±0.03      | 8.00±0.10 | 3.50±0.05 | 1.75±0.10 | 2.00±0.05      | 2.00±0.05      | 4.00±0.10      | 1.55±0.05      | 0.43±0.03 |

**2. Reel Dimension**  
Unit: Millimeters



| A          | N Min. | C        | W2 Max. | W1 Min. | W1 Max. |
|------------|--------|----------|---------|---------|---------|
| 178.0 ±2.0 | 50.0   | 13.0±0.2 | 14.4    | 8.4     | 9.9     |

## Soldering Parameters



| Profile Feature   | Pb-Free Assembly        |
|---|-------------------------|
| <b>Pre Heat</b>   |                         |
| Temperature Min ( $T_{smin}$ )  | 150 °C                  |
| Temperature Max ( $T_{smax}$ )  | 200 °C                  |
| Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )  | 60-120 seconds          |
| Ramp-up Rate ( $T_L$ to $T_p$ )   | 3 °C/second max.        |
| Liquidus temperature ( $T_L$ )  | 217 °C                  |
| Time ( $t_L$ ) maintained above $T_L$   | 60-150 seconds          |
| Peak package body temperature ( $T_p$ )   | 260 <sup>+0/-5</sup> °C |
| Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_c$ )                       | 30* seconds             |
| Ramp-down Rate ( $T_p$ to $T_L$ )   | 6 °C/second max.        |
| Time 25 °C to peak temperature  | 8 minutes max.          |
| * Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum. |                         |