

# ESD Protector PESD0603-140

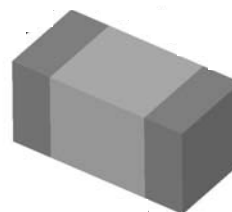
Document: SCD 26107  
Status: Released  
Rev. E Date: JULY 14, 2005

## BENEFITS

- Suitable for high speed data transmission applications
- Longer battery life, due to low leakage current
- Board space savings
- Help to protect sensitive electronic circuits against electrostatic discharge (ESD) events
- Assist equipment to pass IEC 61000-4-2, level 4 testing

## FEATURES

- Thick film technology
- Low capacitance (0.25 pF typical)
- Low leakage current
- Low trigger voltage
- Low clamping voltage
- Capable of withstanding numerous ESD strikes
- Compatible with standard reflow installation procedures
- Bi-directional protection



## APPLICATIONS

- Cellular phones
- Antennas (cell phones, GPS...)
- Portable devices (PDA, DSC, BlueTooth...)
- Printer ports
- High speed Ethernet
- USB 2.0 and IEEE 1394 interfaces
- DVI and HDMI interfaces

## MATERIALS INFORMATION

ROHS Compliant

Directive 2002/95/EC  
Compliant

ELV Compliant

Directive 2000/53/EC  
Compliant

## PART NUMBERING

Series **PESD 0603 - 140** Operating Voltage Designator  
EIA Size  $14 \times 10^0 = 14V_{DC}$

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## TYPICAL DEVICE RATINGS AND CHARACTERISTICS

|        | Continuous<br>Max<br>Operating<br>Voltage | Typical IEC<br>Trigger<br>Voltage <sup>1</sup> | Typical IEC<br>Clamping<br>Voltage <sup>1</sup><br>after 30ns | Typical<br>TLP<br>Trigger<br>Voltage <sup>2</sup> | Typical TLP<br>Clamping<br>Voltage <sup>2</sup><br>after 30ns | Typical TLP<br>Clamping<br>Voltage <sup>2</sup><br>after 60ns | Typical<br>Capacitance,<br>@ 1 MHz,<br>1V <sub>rms</sub> | Typical<br>Leakage<br>Current<br>@14V <sub>DC</sub> | Max<br>Leakage<br>Current<br>@14V <sub>DC</sub> |
|--------|-------------------------------------------|------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|
| Symbol | V <sub>DC</sub>                           | V <sub>T(IEC)</sub>                            | V <sub>C(IEC)</sub>                                           | V <sub>T(TLP)</sub>                               | V <sub>C(TLP 30)</sub>                                        | V <sub>C(TLP 60)</sub>                                        | C <sub>p</sub>                                           | I <sub>L(Typ)</sub>                                 | I <sub>L(MAX)</sub>                             |
| Unit   | V                                         | V                                              | V                                                             | V                                                 | V                                                             | V                                                             | pF                                                       | μA                                                  | μA                                              |
| Value  | 14                                        | 350                                            | 30                                                            | 320                                               | 75                                                            | 65                                                            | 0.25                                                     | <0.001                                              | 0.01                                            |

Note 1: IEC61000-4-2, level 4, 8kV contact test method

Note 2: TLP test method at 500V (refer to graph on next page)

## GENERAL CHARACTERISTICS

Storage temperature: -40°C ... +85°C

Operating temperature: -40°C ... + 85°C

ESD voltage capability (tested per IEC 61000-4-2)

- Contact discharge mode: typical 8kV, max 15kV
- Air discharge mode: typical 15kV, max 25kV

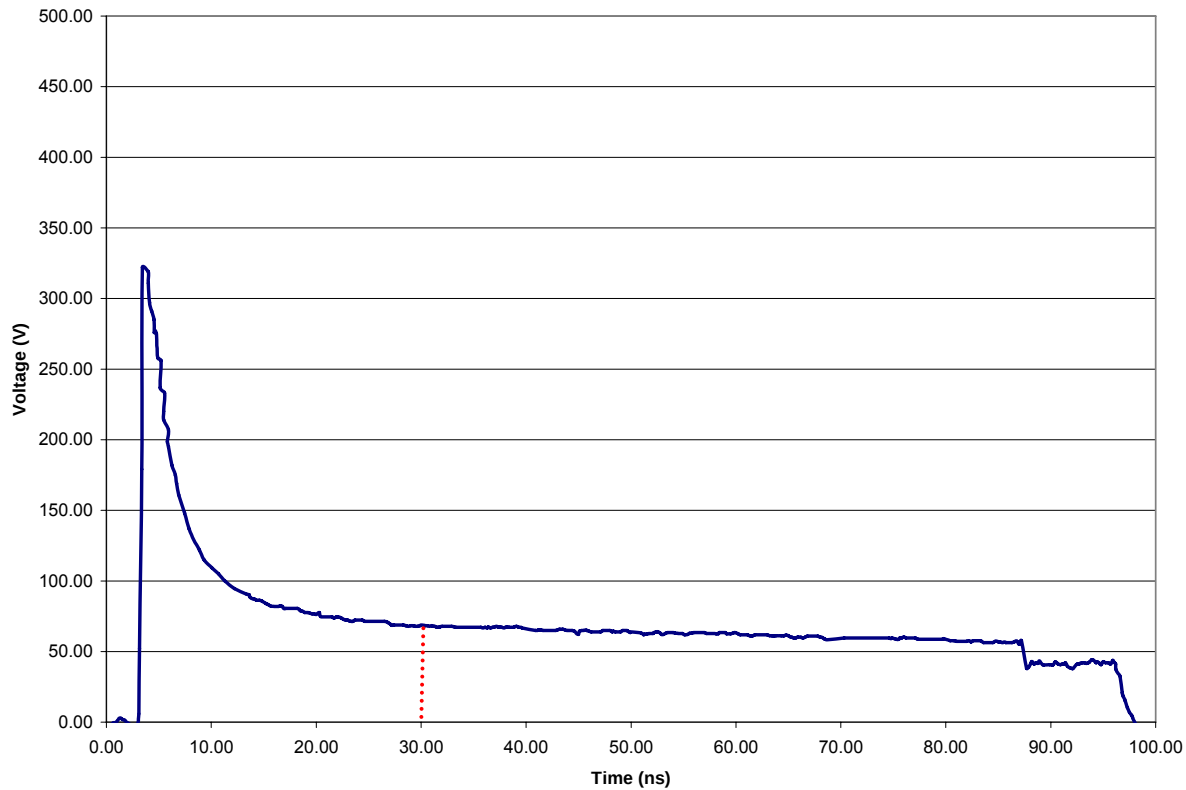
ESD pulse withstand: Typically 1,000 pulses (tested per IEC 61000-4-2, level 4, contact method)

## ENVIRONMENTAL SPECIFICATIONS

|                         | Bias Humidity<br>Test                              | Thermal Shock                               | Bias Heat Test                             | Bias Low Temp<br>Test                       | Solderability          | Solder Heat  | Vibration                                                 | Solvent<br>Resistance  |
|-------------------------|----------------------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------------------|------------------------|--------------|-----------------------------------------------------------|------------------------|
| Test Conditions         | 40°C, 90% RH,<br>MAX V <sub>DC</sub> ,<br>1000 hrs | -40°C to 85°C,<br>30 min dwell,<br>5 cycles | 85°C,<br>MAX V <sub>DC</sub> ,<br>1000 hrs | -40°C,<br>MAX V <sub>DC</sub> ,<br>1000 hrs | 230°C ± 5°C,<br>3 ± 1s | 260°C, 10s   | 10 to 50Hz, 60s<br>cycle, 2hrs each<br>in X-Y-Z-direction | IPA ultrasonic<br>300s |
| Pass / Fail<br>Criteria | I <sub>L</sub> ≤ 10 μA                             | I <sub>L</sub> ≤ 10 μA                      | I <sub>L</sub> ≤ 10 μA                     | I <sub>L</sub> ≤ 10 μA                      | 95% coverage           | 90% coverage | No Physical<br>Damage                                     | No Physical<br>Damage  |

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## TYPICAL TRANSMISSION LINE PULSE RESPONSE GRAPH

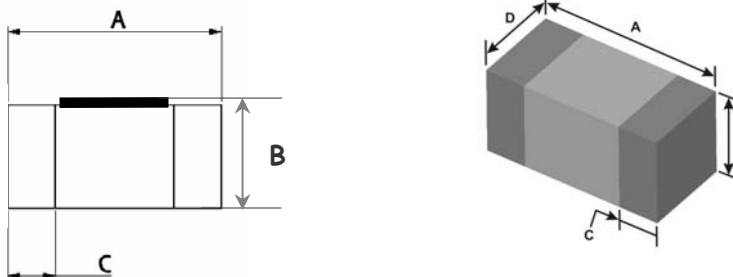


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## DIMENSIONS



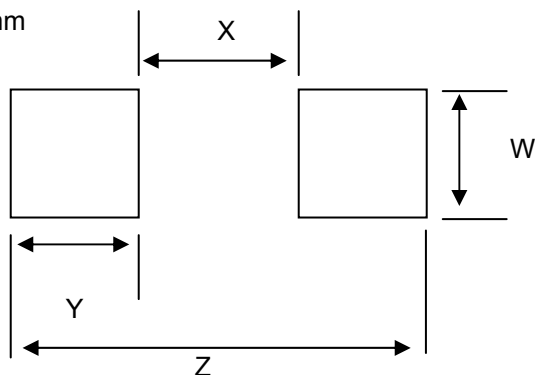
Drawing Not To Scale

|      | length A |        | Height B |        | Terminal Width C |        | Width D |        |
|------|----------|--------|----------|--------|------------------|--------|---------|--------|
|      | MIN      | MAX    | MIN      | MAX    | MIN              | MAX    | MIN     | MAX    |
| mm:  | 1.4      | 1.8    | 0.38     | 0.58   | 0.1              | 0.5    | 0.6     | 1.0    |
| in*: | (0.06)   | (0.07) | (0.01)   | (0.02) | (0.004)          | (0.02) | (0.02)  | (0.04) |

\*Rounded off approximation

## RECOMMENDED LAND PATTERN:

Solder thickness 0.15 to 0.2mm



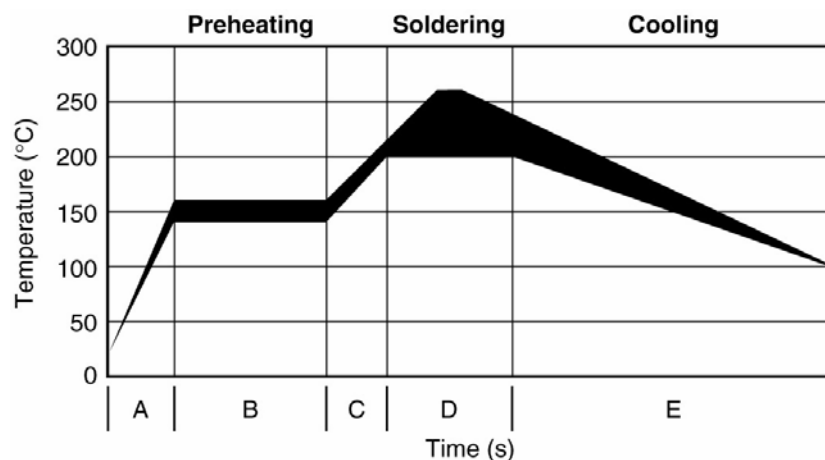
|       | W       |         | X       |         | Y (Ref) |         | Z       |         |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|
|       | Min     | Max     | Min     | Max     | Min     | Max     | Min     | Max     |
| mm:   | 0.9     | 1.0     | 0.5     | 0.6     | 1.0     | 1.1     | 2.7     | 2.8     |
| in: * | (0.035) | (0.039) | (0.020) | (0.024) | (0.039) | (0.043) | (0.106) | (0.110) |

\*Rounded off approximation.

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## SOLDER REFLOW RECOMMENDATIONS:

|   |                       |                                              |                                                 |
|---|-----------------------|----------------------------------------------|-------------------------------------------------|
| A | Temperature ramp up 1 | From ambient to Preheating temperature       | 30s to 60s                                      |
| B | Preheating            | 140°C - 160°C                                | 60s to 120s                                     |
| C | Temperature ramp up 2 | From Preheating to Main heating temperature  | 20s to 40s                                      |
| D | Main heating          | at 200°C<br>at 220°C<br>at 240°C<br>at 260°C | 60s ~ 70s<br>50s ~ 60s<br>30s ~ 40s<br>5s ~ 10s |
| E | Cooling               | From main heating temperature to 100°C       | max 4°C/s                                       |



## PACKAGING

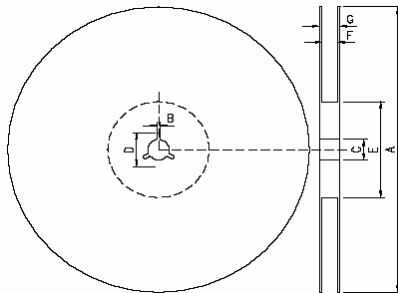
| Packaging    | Tape & Reel | Standard Box |
|--------------|-------------|--------------|
| PESD0603-140 | 5,000       | 25,000       |

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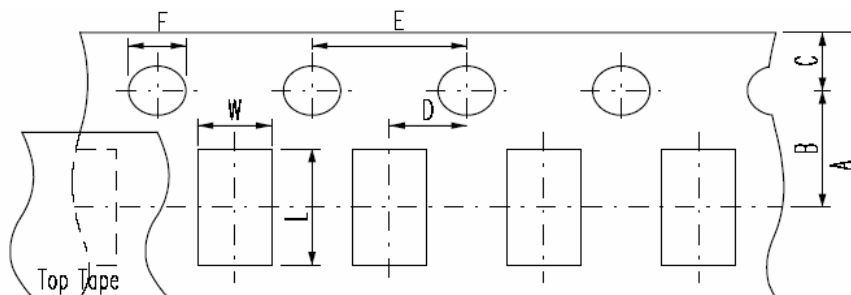
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## EIA referenced Reel Dimensions for PESD Devices



### Reel Dimensions (mm):

|              | A          | B        | C        | D        | E        | F       | G        |
|--------------|------------|----------|----------|----------|----------|---------|----------|
| 0603 Devices | 178.0 ±2.0 | 2.0 ±0.5 | 13.0±0.5 | 21.0±0.8 | 62.0±1.5 | 9.0±0.5 | 13.0±1.0 |



### Carrier Dimensions (mm):

|              | A       | B        | C        | D        | E       | F       | L       | W        | T <sup>1</sup> |
|--------------|---------|----------|----------|----------|---------|---------|---------|----------|----------------|
| 0603 Devices | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 | 4.0±0.1 | 1.5±0.1 | 1.9±0.2 | 1.1±0.20 | 0.60±0.05      |

**Product Orientation** – always face up (meaning the substrate is at the bottom), but parts do not have polarity mark.

**Leader & Trailer:** The leader is 180mm in length & consists of empty cavities with sealed cover tape.  
The trailer is 350mm in length & consists of empty cavities with sealed cover tape.

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