





Expertise Applied | Answers Delivered

## ESD Protector Overvoltage Protection Device

**PRODUCT : PESD1206Q-240**

DOCUMENT : SCD27553

REV LETTER : F

REV DATE: JULY 26, 2016

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### TYPICAL DEVICE RATINGS AND CHARACTERISTICS

|        | Continuous<br>Max<br>Operating<br>Voltage | Typical TLP<br>Trigger<br>Voltage <sup>1</sup> | Typical TLP<br>Clamping<br>Voltage <sup>1</sup> after<br>30ns | Typical<br>Capacitance <sup>2</sup> ,<br>@ 1 MHz,<br>1V <sub>rms</sub> | Typical<br>Leakage<br>Current<br>@24V <sub>DC</sub> | Max<br>Leakage<br>Current<br>@24V <sub>DC</sub> |
|--------|-------------------------------------------|------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|
| Symbol | V <sub>DC</sub>                           | V <sub>T(TLP)</sub>                            | V <sub>C(TLP 30)</sub>                                        | C <sub>p</sub>                                                         | I <sub>L(Typ)</sub>                                 | I <sub>L(MAX)</sub>                             |
| Unit   | V                                         | V                                              | V                                                             | pF                                                                     | μA                                                  | μA                                              |
| Value  | 24                                        | 250                                            | 45                                                            | 0.25                                                                   | <0.01                                               | 10.0                                            |

Note 1: TLP test method @ 1000V (refer to Fig. 5 on page 5)

Note 2: Typical capacitance @ 0V and 24V bias

### GENERAL CHARACTERISTICS

Operating temperature: -55°C to +125°C

Storage temperature: -55°C to +125°C

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

- Contact discharge mode: 8kV (typ), 15kV (max)
- Air discharge mode: 15kV (typ), 25kV (max) [1 pulse: per customer request]

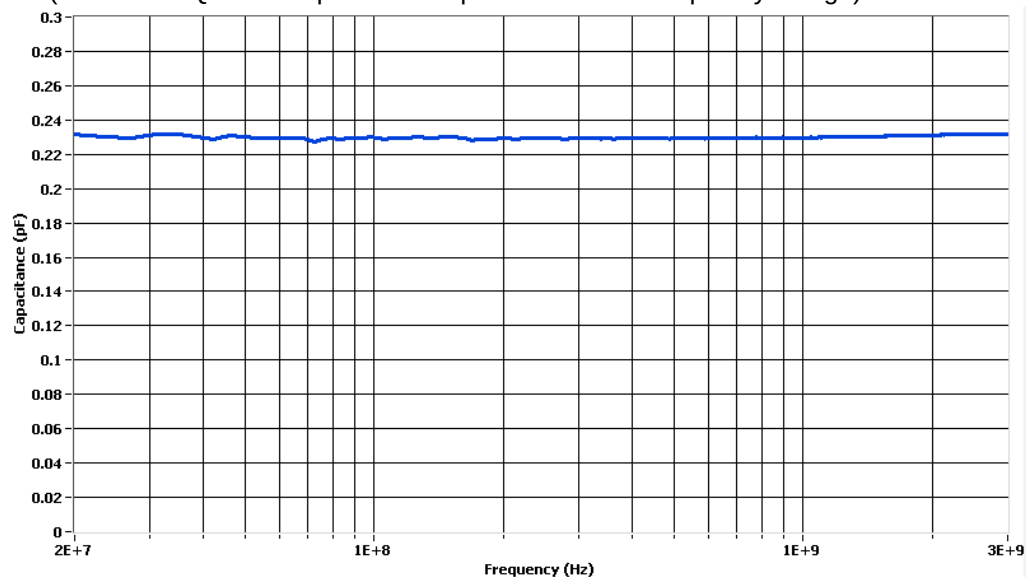
ESD pulse withstand: Typically 100 pulses (tested per IEC 61000-4-2, level 4, and contact method)

### Environmental Specifications

|                       | Bias Humidity<br>Test                                     | Thermal Shock                                | Bias Heat<br>Test                              | Bias Low<br>Temp Test                          | Solderability                | Solder Heat     | Vibration                                               | Mechanical<br>Shock                             | Solve<br>nt<br>Resist<br>ance                                 |
|-----------------------|-----------------------------------------------------------|----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------|-----------------|---------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------|
| Test<br>Conditions    | @ 85°C<br>@ 85% RH<br>V <sub>DC</sub> (max)<br>1000 hours | -55°C to 125°C<br>30min dwell<br>1000 cycles | @ 125°C<br>V <sub>DC</sub> (max)<br>1000 hours | @ -55°C<br>V <sub>DC</sub> (max)<br>1000 hours | 250 °C +/- 5 °C<br>3s +/- 1s | 260 °C, 10s     | 10 to 50Hz,<br>60s cycle, 2hrs<br>each in X-Y-Z<br>axis | 1500G, 0.5ms,<br>X-Y-Z axis<br>3 times          | IPA<br>ultras<br>onic<br>300s                                 |
| Pass/Fail<br>Criteria | I <sub>L</sub> ≤ 10μA                                     | I <sub>L</sub> ≤ 10μA                        | I <sub>L</sub> ≤ 10μA                          | I <sub>L</sub> ≤ 10μA                          | 95% coverage                 | 90%<br>coverage | No Physical<br>Damage<br>I <sub>L</sub> ≤ 10 μA         | No Physical<br>Damage<br>I <sub>L</sub> ≤ 10 μA | No<br>Physic<br>al<br>Damag<br>e<br>I <sub>L</sub> ≤ 10<br>μA |

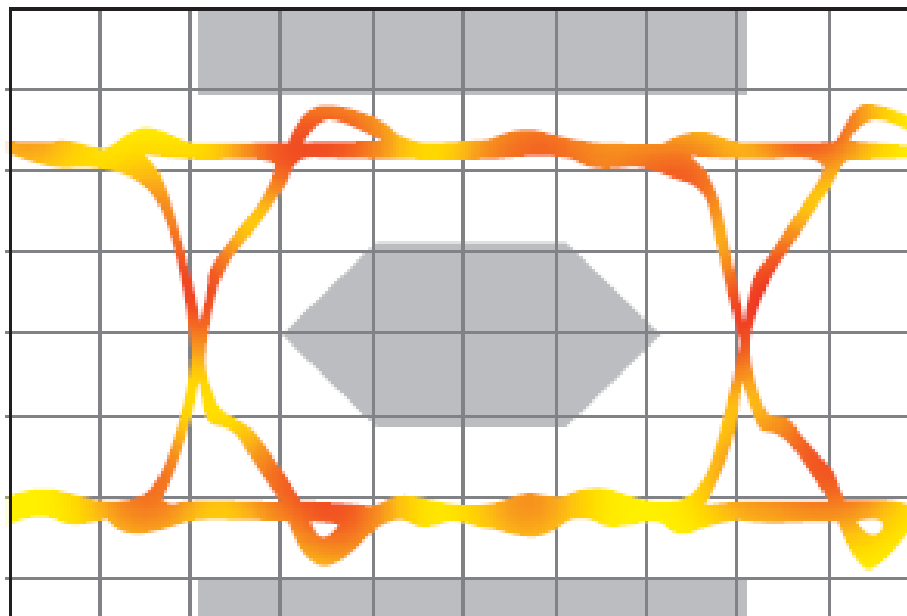
**FIG 1: CAPACITANCE VS. FREQUENCY (TYPICAL SAMPLE)**

(PESD1206Q Flat Response of Capacitance over Frequency Range)

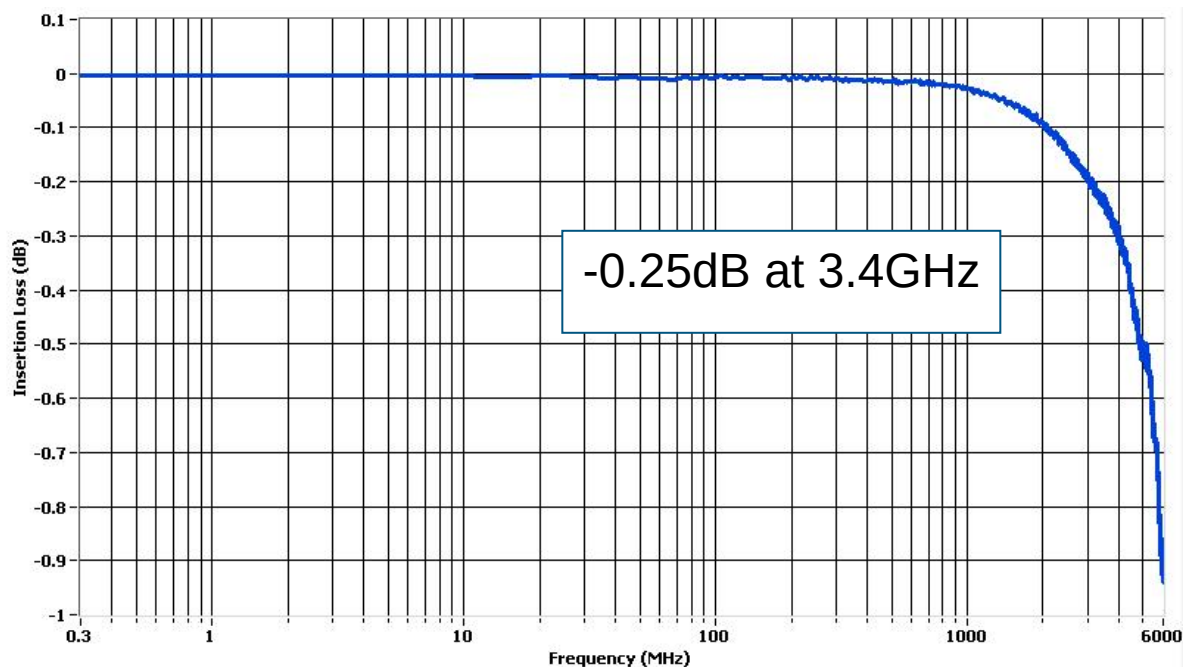


**FIG 2: EYE DIAGRAM (TYPICAL SAMPLE)**

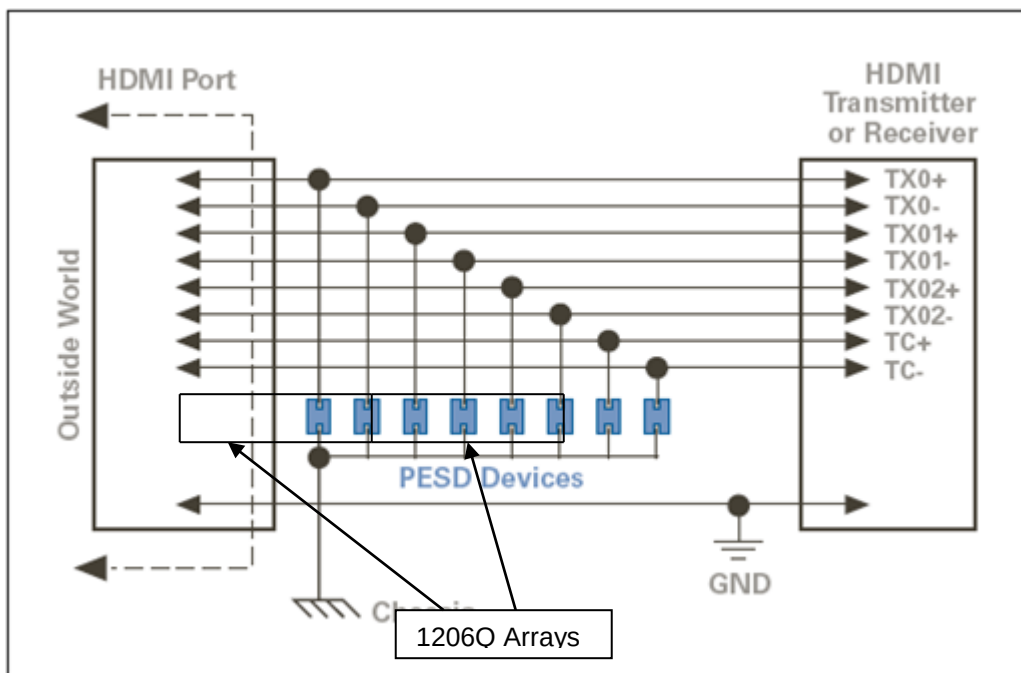
(PESD1206Q Eye Diagram Performance at 3.4 GHz)



**FIG 3: INSERTION LOSS DIAGRAM (TYPICAL SAMPLE)**  
(PESD1206Q Minimal Insertion Loss at 3.4 GHz)

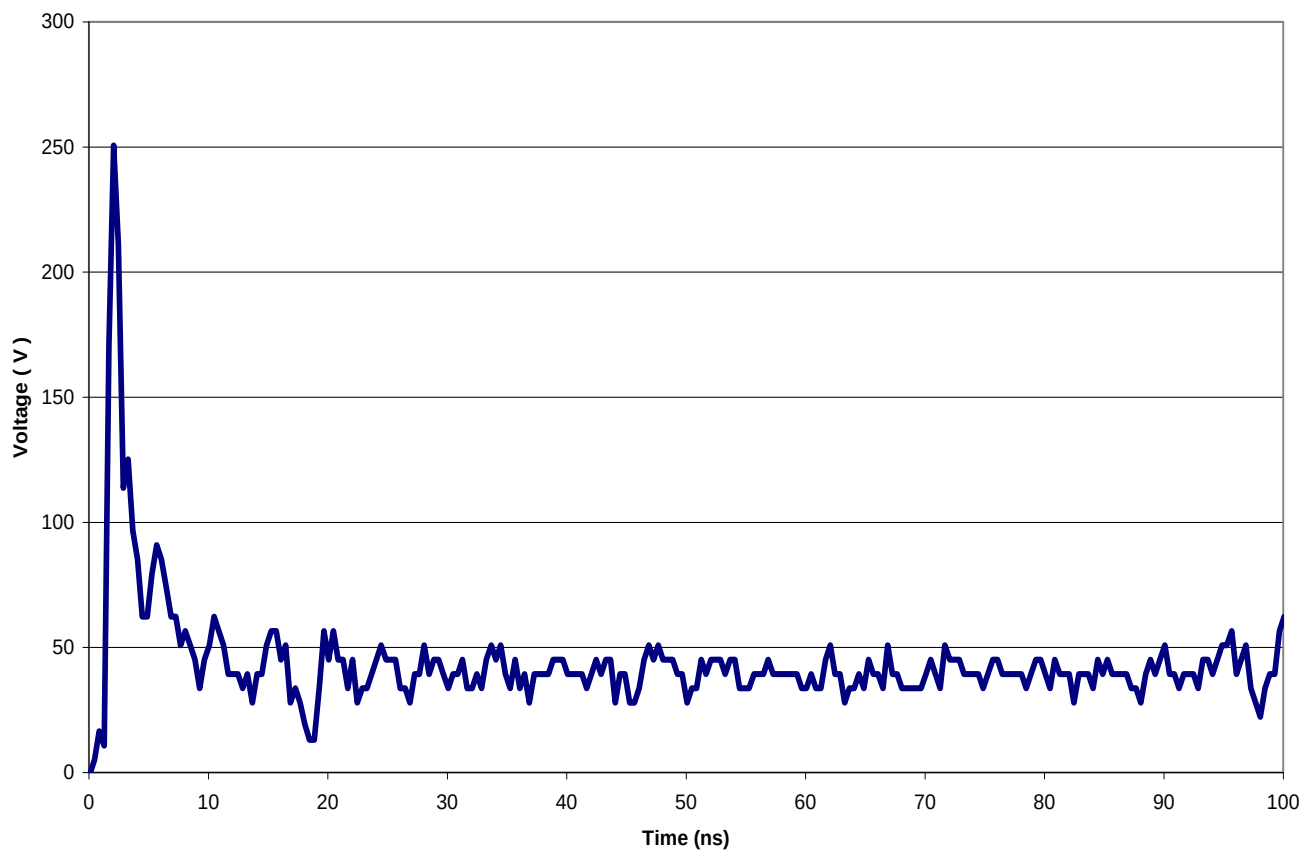


**FIG 4: ESD PROTECTION FOR HDMI**

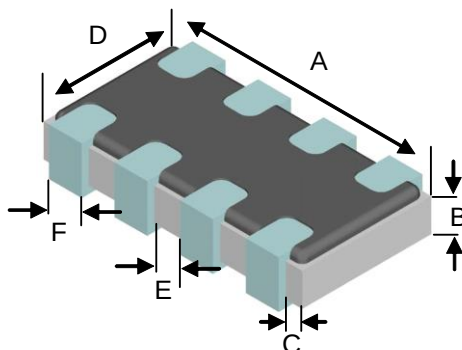


**FIG 5: TYPICAL TRANSMISSION LINE PULSE RESPONSE GRAPH**

Typical TLP Clamping Voltage



## DIMENSIONS



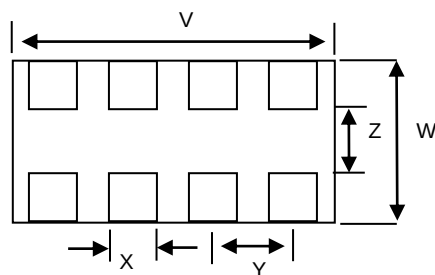
**Drawing Not To Scale**

|      | Length A |         | Height B |         | End Terminal Width C |         | Length Width D |         | Length Width E |         | Length Width F |         |
|------|----------|---------|----------|---------|----------------------|---------|----------------|---------|----------------|---------|----------------|---------|
|      | Min      | Max     | Min      | Max     | Min                  | Max     | Min            | Max     | Min            | Max     | Min            | Max     |
| mm:  | 3.1      | 3.3     | 0.4      | 0.6     | 0.1                  | 0.3     | 1.5            | 1.7     | 0.2            | 0.6     | 0.2            | 0.6     |
| in*: | (0.122)  | (0.130) | (0.016)  | (0.024) | (0.004)              | (0.012) | (0.059)        | (0.067) | (0.008)        | (0.024) | (0.008)        | (0.024) |

\* Round off approximation

## RECOMMENDED LAND PATTERN:

Solder thickness 0.15 to 0.2 mm



|      | V       | W       | X       | Y       | Z       |
|------|---------|---------|---------|---------|---------|
|      | Typ     | Typ     | Typ     | Typ     | Typ     |
| mm:  | 3.2     | 2.2     | 0.5     | 0.8     | 1.0     |
| in*: | (0.126) | (0.087) | (0.020) | (0.031) | (0.039) |

\* Round off approximation



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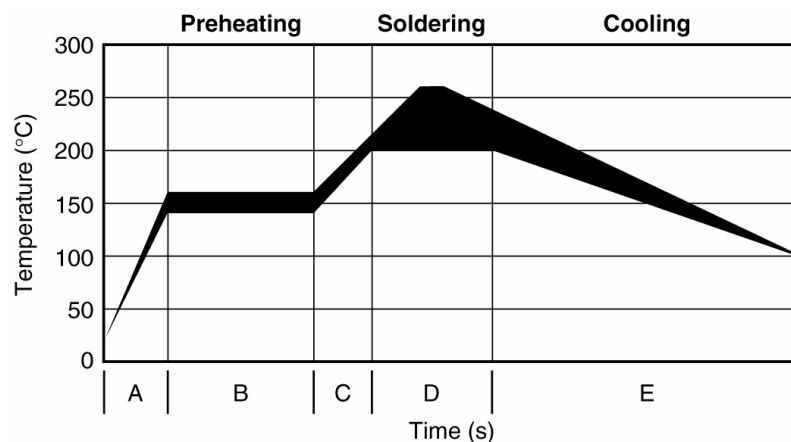
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### SOLDER REFLOW RECOMMENDATIONS:

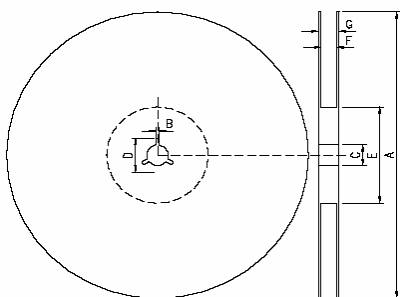
|   |                       |                                              |                                                 |
|---|-----------------------|----------------------------------------------|-------------------------------------------------|
| A | Temperature ramp up 1 | From ambient to Preheating 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

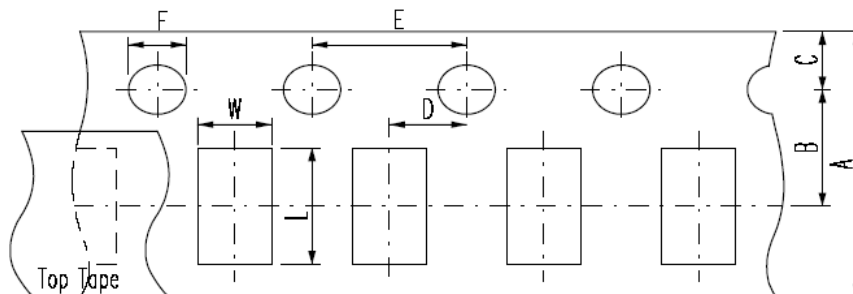
| Packaging     | Tape & Reel | Standard Box |
|---------------|-------------|--------------|
| PESD1206Q-240 | 5,000       | 25,000       |

### EIA referenced Reel Dimensions for PESD Devices



### Reel Dimensions (mm):

|                     | A          | B        | C         | D         | E         | F        | G         |
|---------------------|------------|----------|-----------|-----------|-----------|----------|-----------|
| <b>1206 Devices</b> | 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> |
|---------------------|----------|-----------|-----------|-----------|----------|----------|------------|------------|----------------|
| <b>1206 Devices</b> | 8.0 ±0.3 | 3.5 ±0.05 | 1.75 ±0.1 | 2.0 ±0.05 | 4.0 ±0.1 | 1.5 ±0.1 | 3.62 ±0.20 | 2.02 ±0.20 | 0.75 ±0.05     |

Note 1: Carrier thickness

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



## POST REFLOW, CLEANING CONDITIONS

A 5% saponifier combined with water during wash.

For the ultrasonic process water temperature should be at 50°C and board should be submerged for a minimum of one minute in the solutions, then rinse and dry.

For in-line washing, the temperature of the water sprayed should be at 110°C, rinse and drying is done in-line.



## WARNING

**Warning: Application Limitations for PESD1206Q-240. This part is not intended to be used on power lines or for power bus applications. Users should independently evaluate the suitability of and test each product selected for their own applications**

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