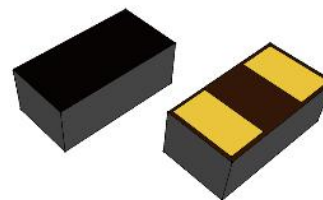


## 1. Features

- Ultra-Low capacitance:0.05pF(typ.)
- Low leakage current(<100nA)
- Fast response time(<1ns)
- Bi-directional, single line protection
- IEC 61000-4-2 (ESD Air): 15kV  
IEC 61000-4-2 (ESD Contact): 8kV

## 2. Pin Description



## 3. Applications

- USB 3.0/3.1
- HDMI 1.3/1.4/2.0
- RF Antenna
- SATA and eSATA Interface

## 4. Schematic Diagram



## 5. Order Information

| Type      | Package | Size (mm)      | Delivery Form | Delivery Quantity |
|-----------|---------|----------------|---------------|-------------------|
| KESD5311X | 0402    | 1.00x0.52x0.38 | 7" T&R        | 10,000            |

## 6. Limiting Values( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| Symbol    | Parameter                       | Conditions                       | Min | Max | Unit               |
|-----------|---------------------------------|----------------------------------|-----|-----|--------------------|
| $V_{ESD}$ | Electrostatic Discharge Voltage | IEC 61000-4-2; Contact Discharge | -   | 8   | kV                 |
|           |                                 | IEC 61000-4-2; Air Discharge     | -   | 15  | kV                 |
| $T_A$     | Operating Temperature Range     | -                                | -40 | 90  | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage Temperature Range       | -                                | -55 | 125 | $^{\circ}\text{C}$ |

## 7. Electrical Characteristics( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

| Symbol   | Parameter                    | Conditions                          | Min | Typ. | Max | Unit |
|----------|------------------------------|-------------------------------------|-----|------|-----|------|
| $V_{DC}$ | Continuous Operating Voltage | -                                   | -   | -    | 5.0 | V    |
| $V_T$    | Trigger Voltage              | IEC61000-4-2 8kV contact discharge  | -   | 450  | -   | V    |
| $V_C$    | Clamping Voltage             | IEC61000-4-2 8kV contact discharge  | -   | 40   | -   | V    |
| $I_L$    | Leakage Current              | DC 5V shall be applied on component | -   | -    | 100 | nA   |
| $C_J$    | Capacitance                  | Measured at 10MHz                   | -   | 0.05 | -   | pF   |

## 8. Typical Characteristics

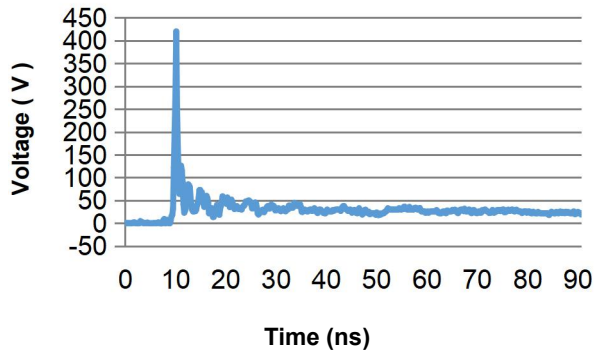


Fig.1 Typical ESD Response  
(IEC 61000-4-2, 8kV contact discharge)

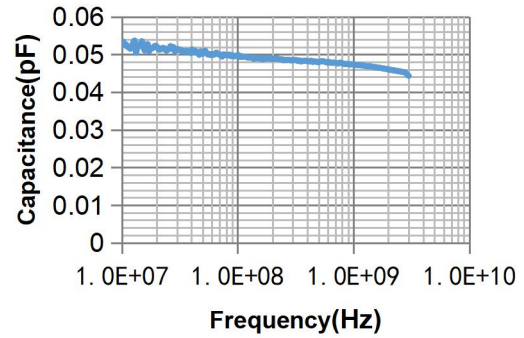


Fig.2 Typical Device Capacitance VS. Frequency

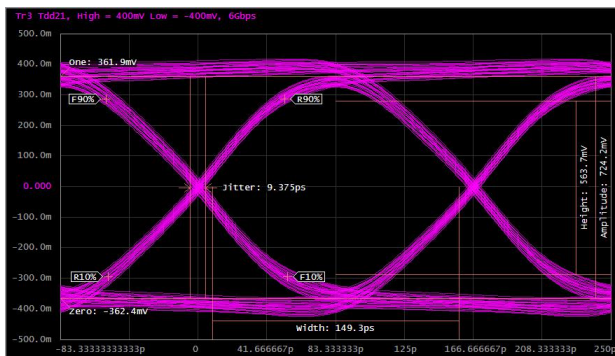
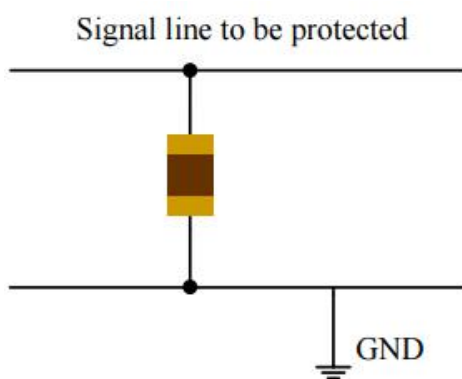
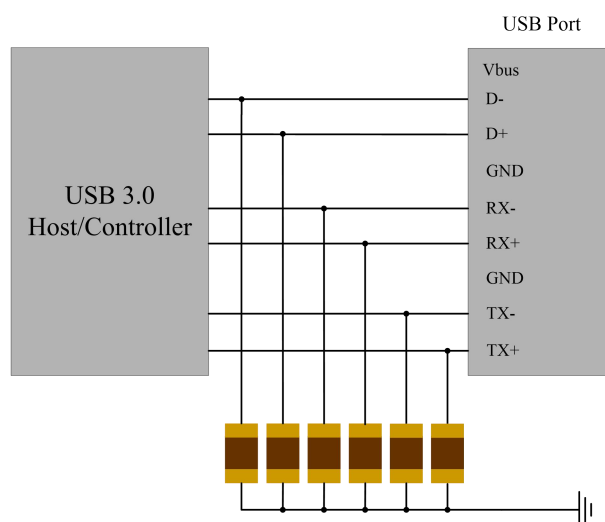


Fig.3 HDMI 2.0 Mask at 6.0 Gbps

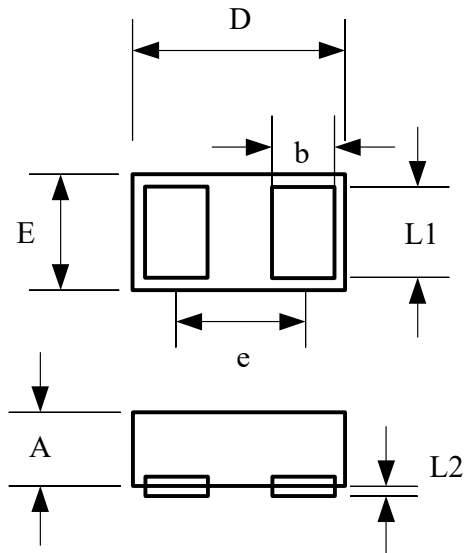
## 9. ESD Protection for Signal Line

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

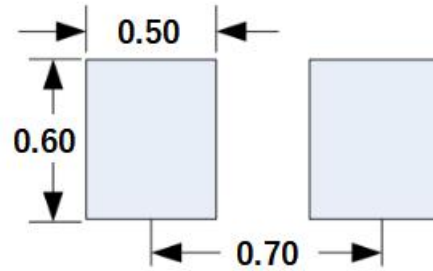
- Place the PESD as close to the input terminal or connector as possible.
- Minimize the path length between the PESD and the protected signal line.
- Use ground planes whenever possible.



## 10. Package Dimension



### Recommended Solder Pad Footprint



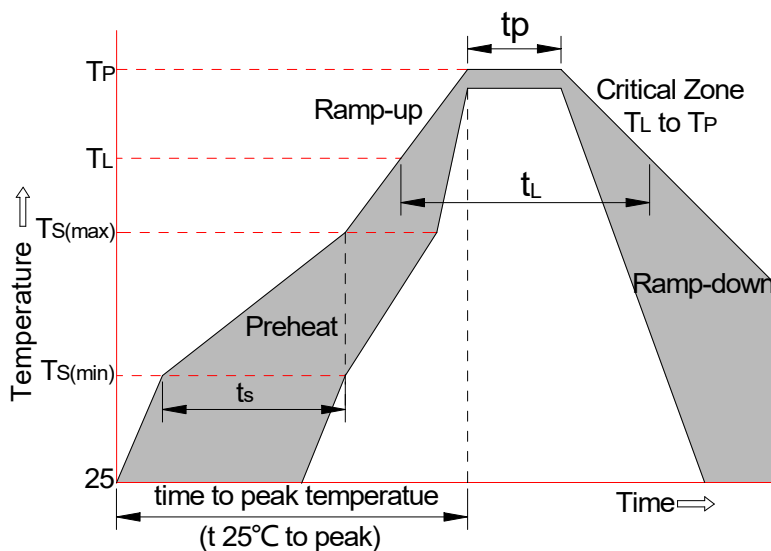
**\*Sizes in mm**

Notes:

This solder pad layout is for reference purposes only.

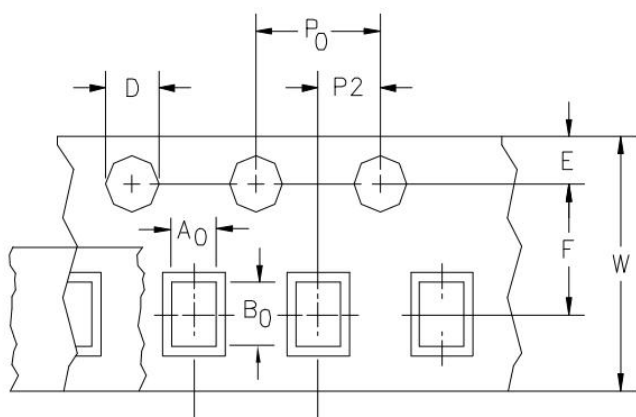
| Dimension | Unit: Millimeters |      |
|-----------|-------------------|------|
|           | Min.              | Max. |
| A         | 0.25              | 0.45 |
| b         | 0.20              | 0.40 |
| D         | 0.90              | 1.10 |
| E         | 0.40              | 0.60 |
| e         | 0.65BSC           |      |
| L1        | 0.30              | 0.50 |
| L2        | 0.00              | 0.05 |

## 11. Soldering Parameters

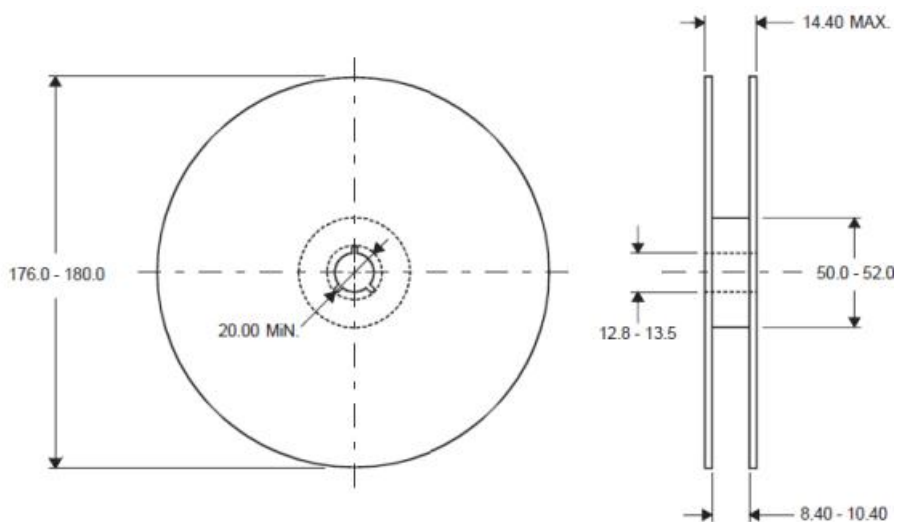


| Reflow Condition                                        |                                   | Pb-Free Assembly |
|---------------------------------------------------------|-----------------------------------|------------------|
| Pre-heat                                                | -Temperature Min ( $T_{s(min)}$ ) | +150°C           |
|                                                         | -Temperature Max( $T_{s(max)}$ )  | +200°C           |
|                                                         | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.     |
| Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                    |                                   | 3°C/sec. Max     |
| Reflow                                                  | -Temperature( $T_L$ )(Liquid us)  | +217°C           |
|                                                         | -Temperature( $t_L$ )             | 60-150 secs.     |
| Peak Temp ( $T_P$ )                                     |                                   | +260(+0/-5)°C    |
| Time within 5°C of actual Peak Temp ( $t_p$ )           |                                   | 30 secs. Max     |
| Ramp-down Rate                                          |                                   | 6°C/sec. Max     |
| xTime 25°C to Peak Temp ( $T_P$ )                       |                                   | 8 min. Max       |
| Do not exceed                                           |                                   | +260°C           |

## 12. Package Information



| Dimension | Typical | Unit |
|-----------|---------|------|
| A0        | 0.75    | mm   |
| B0        | 1.22    |      |
| D         | 1.55    |      |
| P0        | 4.00    |      |
| P1        | 2.00    |      |
| P2        | 2.00    |      |
| E         | 1.75    |      |
| F         | 3.50    |      |
| W         | 8.00    |      |



DIMENSIONS ARE: MILLIMETERS