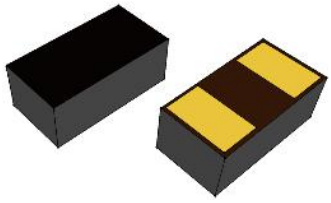
## 1. Features

- Ultra-Low capacitance:0.05pF(typ.)
- Low leakage current(<10nA)
- Fast response time(<1ns)
- Bi-directional,single line protection
- IEC 61000-4-2 (ESD Air): 15kV
  IEC 61000-4-2 (ESD Contact): 8kV

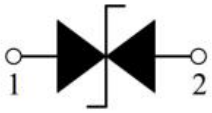
## 2. Pin Description



## 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 |
|---|---|---|---|---|
| KLXES15AAA1 | 0402 | 1.00x0.52x0.38 | 7” T&R | 10,000 |

## 6. Limiting Values($T_A$ = 25 °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 | - | -55 | 125 | ℃ |
| $T_{stg}$ | Storage Temperature Range | - | -40 | 85 | ℃ |

## 7. Electrical Characteristics($T_A$ = 25 °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 | - | - | 10 | nA |
| $C_J$ | Capacitance | Measured at 10MHz | - | 0.05 | - | pF |

## 8. Typical Characteristics

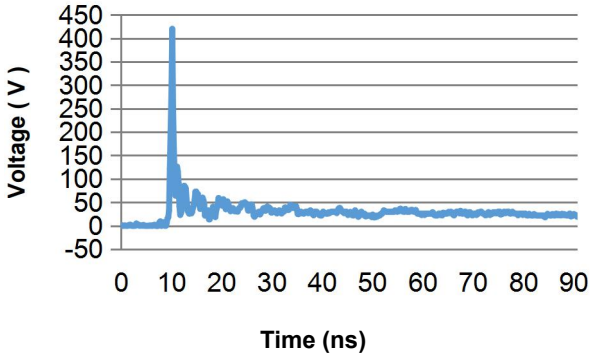



Fig.1 Typical ESD Response
（IEC 61000-4-2, 8kV contact discharge）

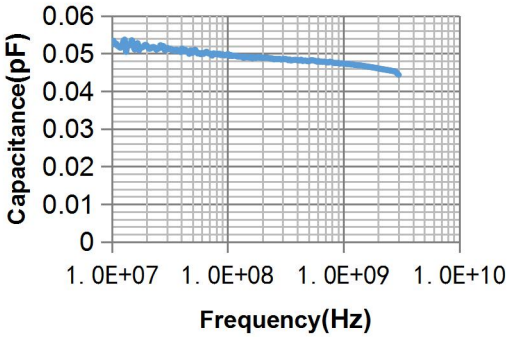



Fig.2 Typical Device Capacitance VS. Frequency

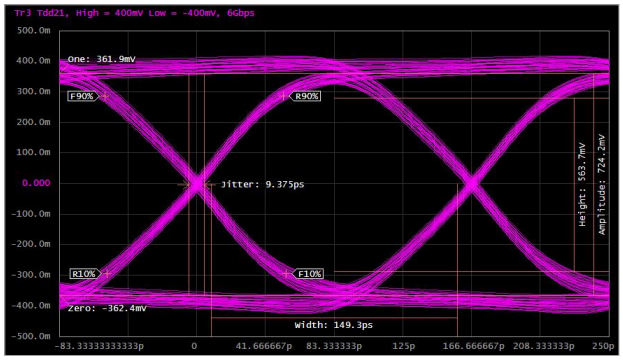
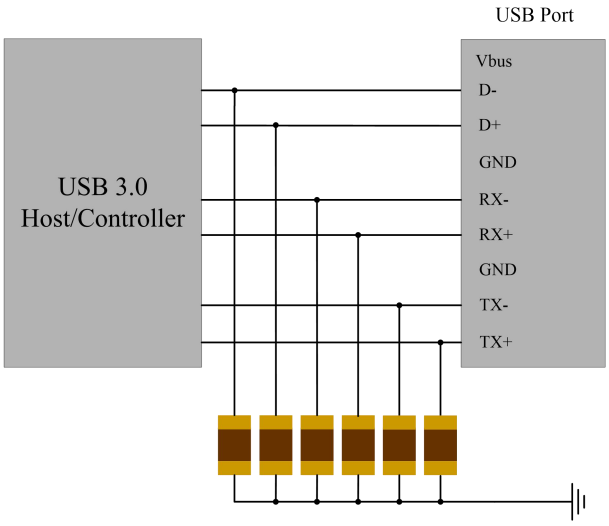


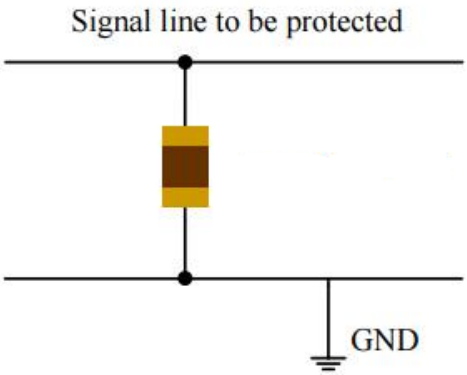

Fig.3 HDMI 2.0 Mask at 6.0 Gbps

## 9. ESD Protection for Signal Line

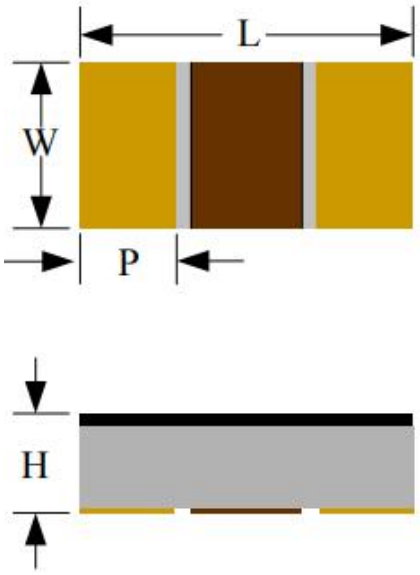
The ESD is designed for the protection of one bidirectional data line from ESD damage.

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

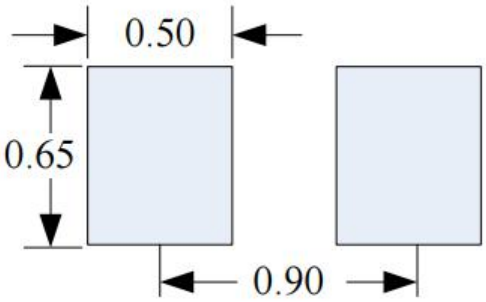


## 10. Package Dimension




**Recommended Solder Pad Footprint**



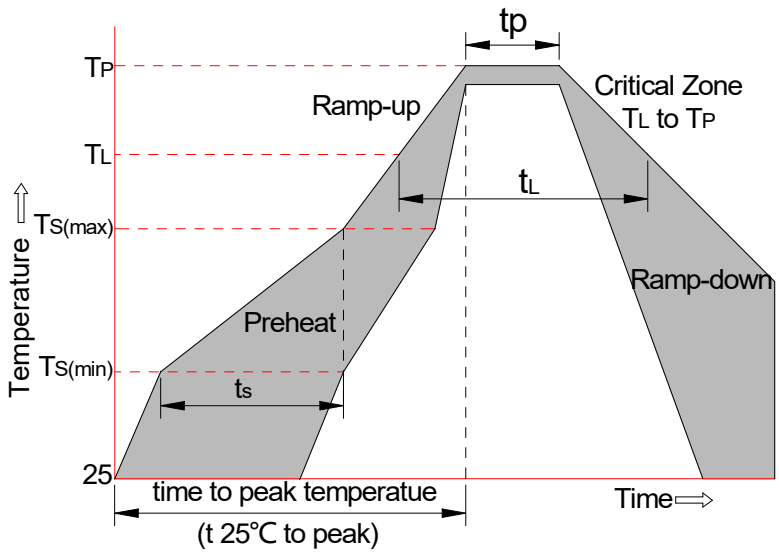

***Sizes in mm**

Notes：

This solder pad layout is for reference purposes only.

| Dimension | Unit: Millimeters | |
|---|---|---|
| | Min. | Max. |
| L | 0.90 | 1.10 |
| W | 0.42 | 0.62 |
| p | 0.15 | 0.35 |
| H | 0.25 | 0.45 |

## 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) (ts) | 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 |