## Uni-directional ESD protection de-vices

## Features

- 40 Watts peak pulse power(tp=8/20μs)
- ESD Protect for 4 high-speed I/O channels with Uni-directional
- Flow thru design for easy layout for high-speed differential signaling channels
- Ultra low capacitance 0.3pF typ.
- Low clamping voltage
- Stand−off voltage: 3.3V
- Low leakage current
- Response time is typically < 1 ns
- Protection high-speed data line to:
  IEC61000-4-2 ±8kV contact ±15kV air
  IEC61000-4-4 (EFT) 40A (5/50ns)
  IEC61000-4-5(lightning) 6A (8/20μs)
- Solid-state silicon-avalanche technology
- These are Pb−free devices

## Product Description

LT10A034UUR is an Uni-directional ESD protection de-vices. It has been specifically designed to protect sensitive electronic components which are connected to high speed data lines and control lines from over-stress caused by ESD (electrostatic discharge), EFT (electrical fast transients) and lightning.
The "flow-thru" design of the device results in enhanced ESD performance due to reduced board trace inductance. The result is lower clamping voltage and higher level of protection when compared to conventional TVS devices.

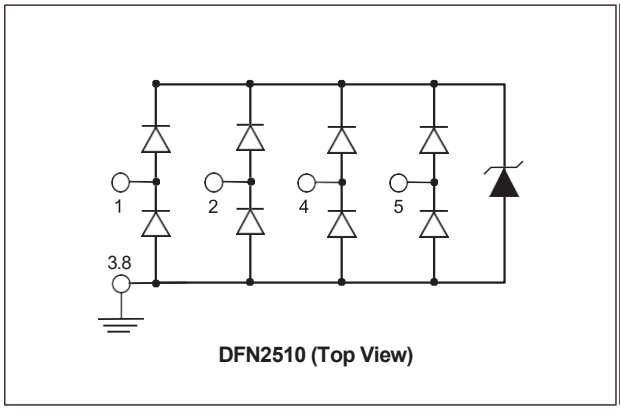
## Applications

- HDMI2.0
- USB 3.0 / 3.1
- Display ports
- Digital visual interface (DVI)
- MDDI ports
- PCI express
- V-By-One
- Desktop and notebooks PCs
- Cellular handsets & accessories
- Personal digital assistants (PDAs)
- Portable instrumentation
- Digital cameras
- Peripherals
- MP3 players
- Set top box

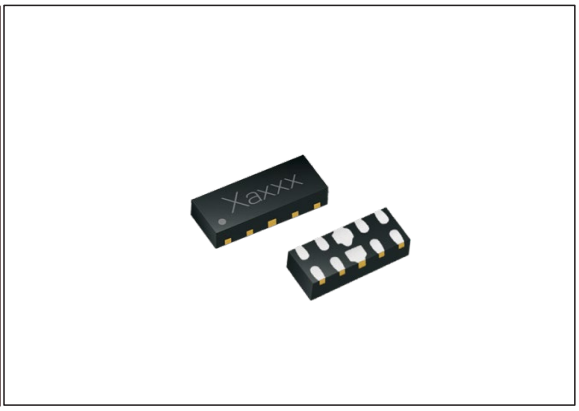
## Mechanical Characteristics

- DFN2510 package
- Marking: marking code
- Molding compound flammability rating: UL 94V-0
- RoHS compliant
- Packaging: tape and reel

## Circuit Diagram




DFN2510 (Top View)



## Absolute Maximum Rating

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power (tp = 8/20μs) | $P_{PP}$ | 40 | Watts |
| Peak Pulse Current (tp = 8/20μs) (note1) | $I_{PP}$ | 6.0 | A |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $V_{ESD}$ | 15<br>8 | kV |
| Lead Soldering Temperature | $T_L$ | 260(10 sec) | ℃ |
| Junction Temperature | $T_J$ | - 55 to +125 | ℃ |
| Storage Temperature | $T_{STG}$ | - 55 to +125 | ℃ |

## Electrical Characteristics

| Parameter | Symbol | Conditions | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|---|
| Reverse working Voltage | $V_{RWM}$ | I/O to GND | | | 3.3 | V |
| Reverse leakage current | $I_R$ | I/O to GND @ $V_{RWM}$ = 3.3V | | 0.1 | 5.0 | uA |
| Reverse triggering Voltage | $V_{t1}$ | I/O to GND @ $I_{t1}$ = 1mA | 3.7 | | | V |
| Reverse holding Voltage | $V_h$ | I/O to GND @ $I_h$ = 100mA | 0.8 | 2.0 | | V |
| Clamping Voltage | $V_C$① | $I_{PP}$ = 4A, $t_P$ = 100ns | | 3.0 | | V |
| | | $I_{PP}$ = 16A, $t_P$ = 100ns | | 6.3 | | |
| Clamping Voltage | $V_C$② | $I_{PP}$ = 1A, $t_P$ = 8/20μs | | 2.0 | 3.5 | V |
| | | $I_{PP}$ = 6A, $t_P$ = 8/20μs | | 5.0 | 7.0 | |
| Dynamic resistance | $R_{DYN}$① | $t_P$ = 100ns | | 0.35 | | Ω |
| Junction capacitance | $C_J$ | I/O to GND $V_{RWM}$ = 3.3V, f =1MHz | | 0.30 | 0.6 | pF |
| | | I/O to I/O $V_{RWM}$ = 3.3V, f =1MHz | | 0.15 | 0.3 | |

① TLP parameter: Z0=50Ω, $t_P$=100ns, tr=2ns, averaging window from 60ns to 80ns. RDYN is calculated from 4A to 16A.

② Non-repetitive current pulse, according to IEC61000-4-5.

## Typical Characteristics

**Figure.1 V- I curve characteristics (Uni-directional)**

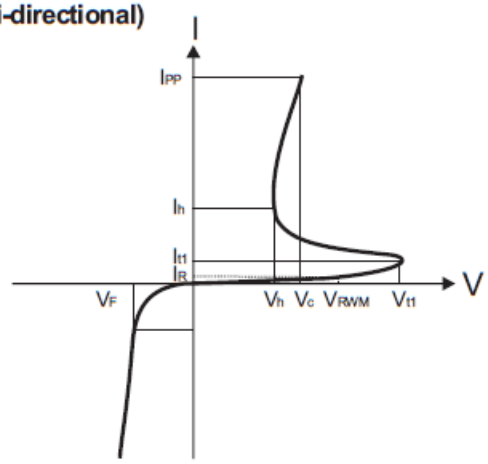



**Figure.2 Pulse waveform (8/20μs)**

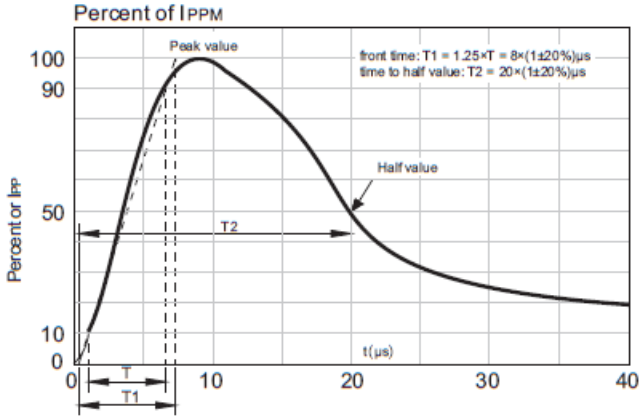



**Figure.3 Pulse derating curve**

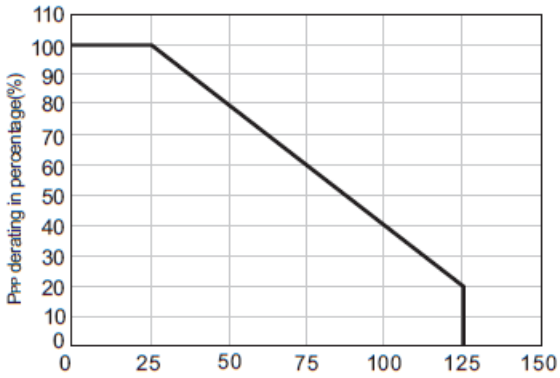



**Figure.4 ESD waveform**

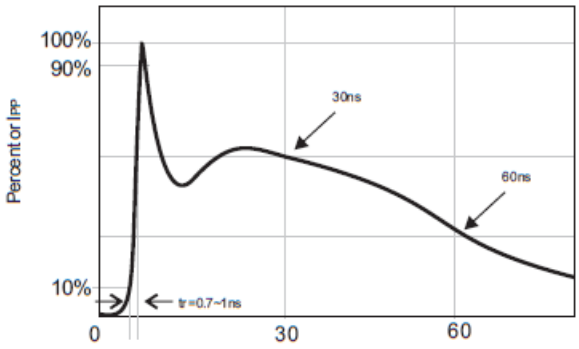



**Figure.5 Transmission Line Pulsing(TLP) Measurement**

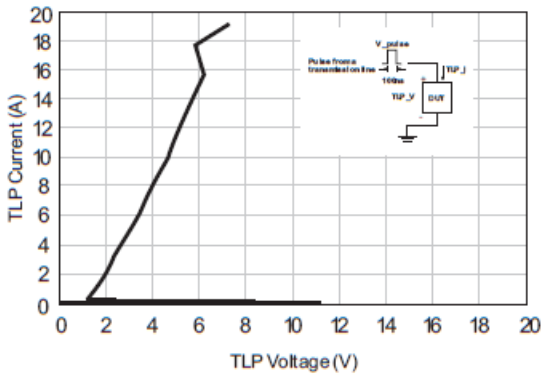
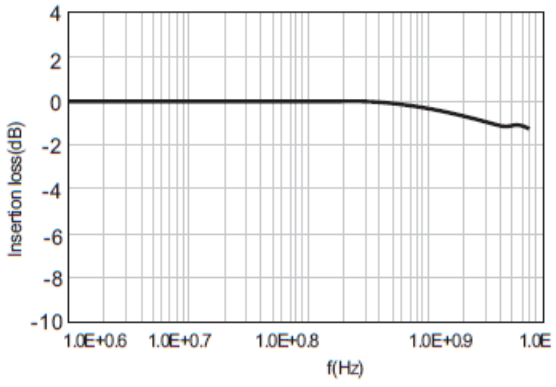
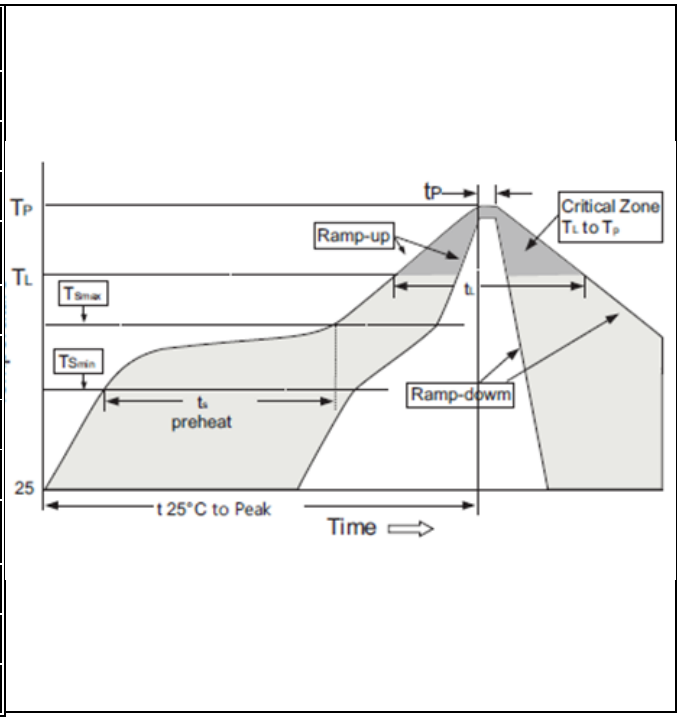



**Figure.6 Insertion loss S21 of I/O to GND**

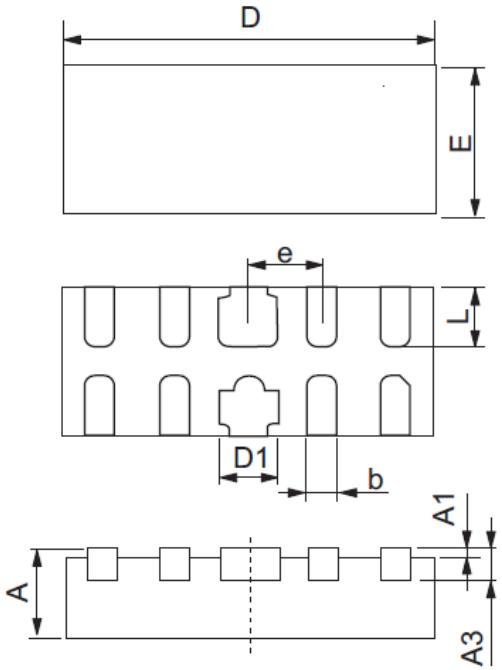


## Soldering Parameters

| Reflow Condition | | Fb-Free assembly |
|---|---|---|
| Pre Heat | - Temperature Min ($T_{S(Min)}$) | 150°C |
| | - Temperature Max ($T_{S(Max)}$) | 200°C |
| | - Temperature Max ($T_S$) | 60-180 secs |
| Average ramp up rate (Liquidus)Temp ($T_L$) To peak | | 3°C/second Max |
| $T_{S(Max)}$ to TL-Ramp-up Rate | | 3°C/second Max |
| Reflow | - Temperature ($T_L$)(Liquidus) | 217°C |
| | - Temperature ($t_L$) | 60-150 seconds |
| Peak Temperature ($T_P$) | | $260^{+0/-5}$°C |
| Time within 5°C of actual peak Temperature ($T_P$) | | 20-40 seconds |
| Ramp-dowm Rate | | 6°C/second Max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes Max |
| Do not exceed | | 260°C |

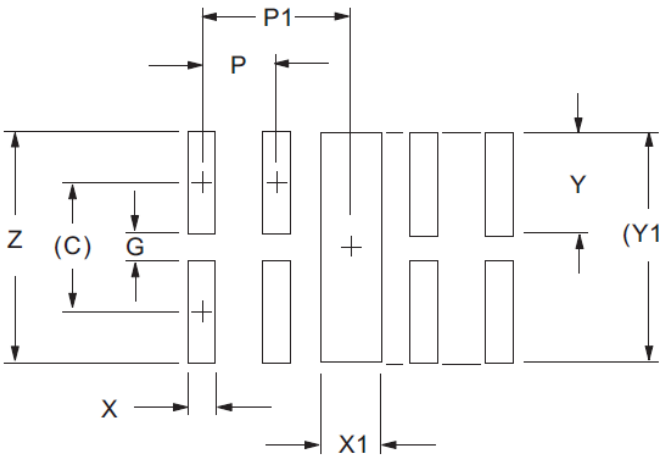



## Outline Drawing – DFN2510



| SYMBOL | Millimeters | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.45 | 0.50 | 0.55 |
| A1 | - | 0.02 | 0.05 |
| A3 | 0.10 | 0.15 | 0.20 |
| D | 2.45 | 2.50 | 2.55 |
| E | 0.95 | 1.00 | 1.05 |
| D1 | 0.35 | 0.40 | 0.45 |
| b | 0.15 | 0.20 | 0.25 |
| e | 0.50BSC | | |
| L | 0.35 | 0.40 | 0.45 |

NOTES: 1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).




| DIMENSIONS | | |
|---|---|---|
| DIM | INCHES | MILLIMETERS |
| C | (.034) | (0.875) |
| G | .008 | 0.20 |
| P | .020 | 0.50 |
| P1 | .039 | 1.00 |
| X | .008 | 0.20 |
| X1 | .016 | 0.40 |
| Y | .027 | 0.675 |
| Y1 | (.061) | (1.55) |
| Z | .061 | 1.55 |

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

## Marking Codes


## Ordering Information

| Part number | Package | MPQ (PCS) | Packaging Option |
|---|---|---|---|
| LT10A034UUR | DFN2510 | 3000 | Tape and reel |