

## Bi-directional ESD protection Devices

### Features

- 40 Watts peak pulse power( $t_p=8/20\mu s$ )
- Ultra low capacitance 0.2pF typ.
- Low clamping voltage
- Small body outline dimensions: "0.039 \* 0.024" (1.0mm x 0.60mm)
- Low body height: "0.019" (0.5 mm)
- Stand-off voltage: 3.3V
- Low leakage current
- Response time is typically < 1 ns
- Protection high-speed data line to:  
IEC61000-4-2  $\pm 15kV$  contact  $\pm 20kV$  air  
IEC61000-4-4 (EFT) 40A (5/50ns)  
IEC61000-4-5(lightning) 6A (8/20 $\mu s$ )
- Solid-state silicon-avalanche technology
- These are Pb-free devices

### Product Description

LT2C031UUER is a Bi-directional ESD protection Devices. 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.

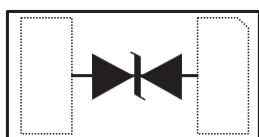
### Applications

- 10/100/1000 mbits/s ethernet
- USB ports
- HDMI ports
- Display ports
- Digital visual interface (DVI)
- MDDI ports
- PCI express
- Firewire
- Serial ATA
- Antenna applications
- Cellular handsets & accessories
- Computer and peripherals

### Mechanical Characteristics

- DFN1006 package
- Marking: marking code
- Molding compound flammability rating: UL 94V-0
- RoHS compliant

### Circuit Diagram



DFN1006 (Top View)



## Absolute Maximum Rating

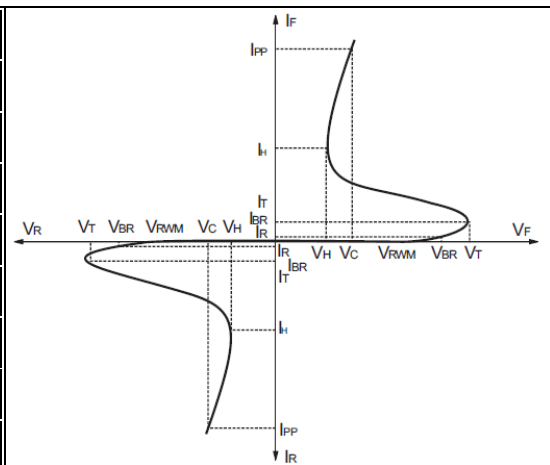
| Rating                                                      | Symbol    | Value        | Units |
|-------------------------------------------------------------|-----------|--------------|-------|
| Peak Pulse Power ( $t_p = 8/20\mu s$ )                      | $P_{PP}$  | 40           | Watts |
| Peak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

## Electrical Characteristics

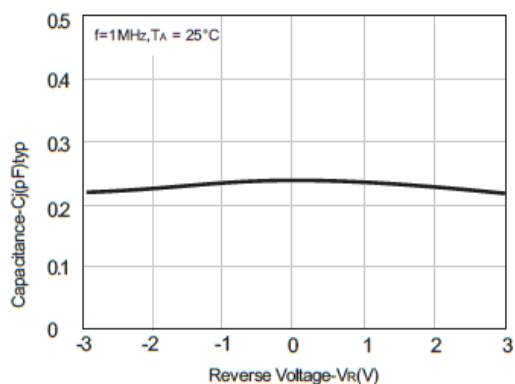
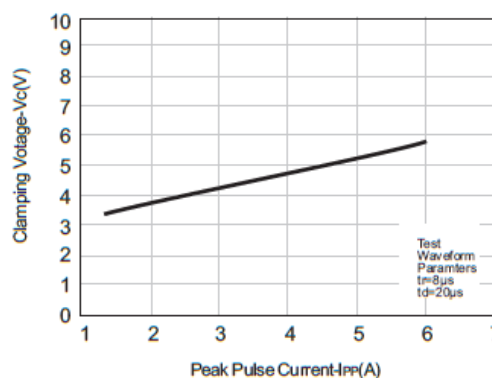
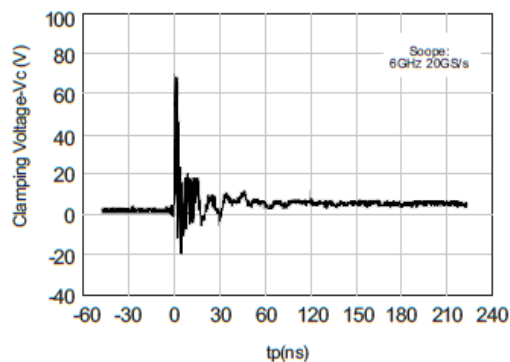
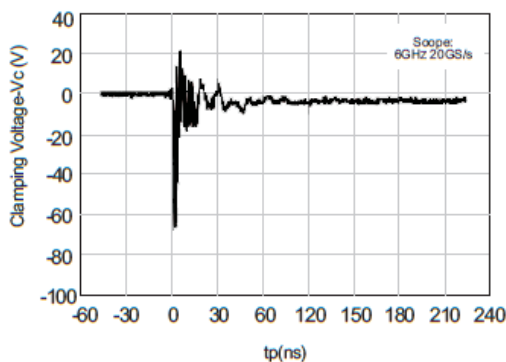
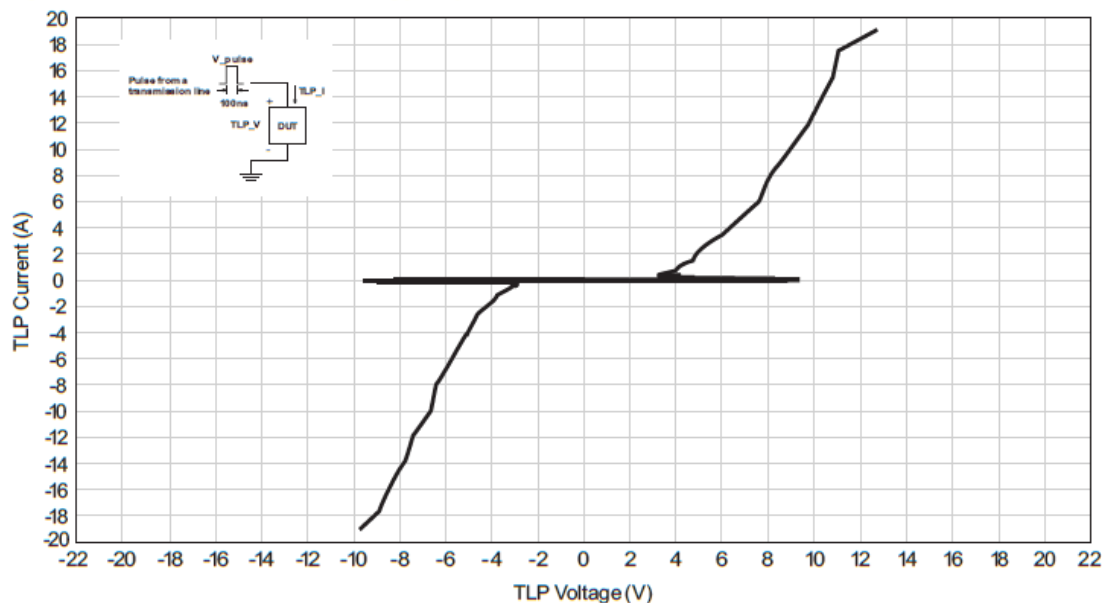
| Parameter                 | Symbol    | Conditions                         | Minimum | Typical | Maximum | Units    |
|---------------------------|-----------|------------------------------------|---------|---------|---------|----------|
| Reverse Stand-Off Voltage | $V_{RWM}$ |                                    |         |         | 3.3V    | V        |
| Holding Voltage           | $V_H$     |                                    | 2.0     |         | 3.3V    | V        |
| Reverse Leakage Current   | $I_R$     | $V_{RWM} = 3.3V, T_A = 25^\circ C$ |         | 5.0     | 200     | nA       |
| Clamping Voltage          | $V_C$     | $I_{PP} = 16A, t_p = 100ns$        |         | 10.8    |         | V        |
| Clamping Voltage          | $V_{CL}$  | $I_{PP} = 6A, t_p = 8/20\mu s$     |         | 6.5     | 7.5     | V        |
| Dynamic resistance        | $R_{dyn}$ | $T_{amb} = 25^\circ C, I_R = 10A$  |         | 0.3     | 0.4     | $\Omega$ |
| Junction Capacitance      | $C_J$     | $VR = 0V, f = 1MHz$                |         | 0.2     | 0.32    | pF       |

## Electrical Parameters ( $T_A = 25^\circ C$ unless otherwise noted)

| Symbol    | Parameter                                   |
|-----------|---------------------------------------------|
| $V_{RWM}$ | Reverse Working Voltage Max                 |
| $V_C$     | Clamping Voltage @ $I_{PP}$                 |
| $I_R$     | Maximum Reverse Leakage Current @ $V_{RWM}$ |
| $V_T$     | Trigger voltage                             |
| $V_{BR}$  | Reverse Breakdown Voltage                   |
| $V_H$     | Holding voltage                             |
| $I_H$     | Holding Current                             |
| $I_{PP}$  | Maximum Reverse Peak Pulse Current          |

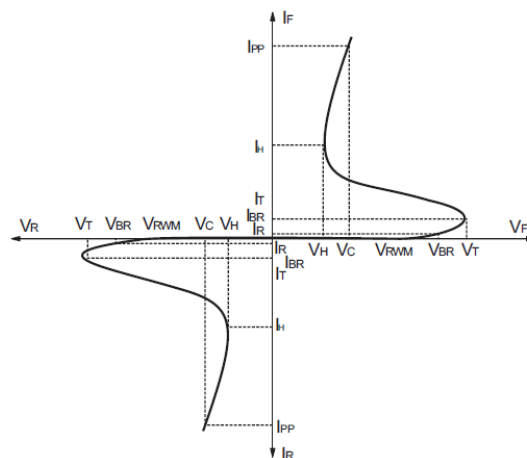


## Typical Characteristics

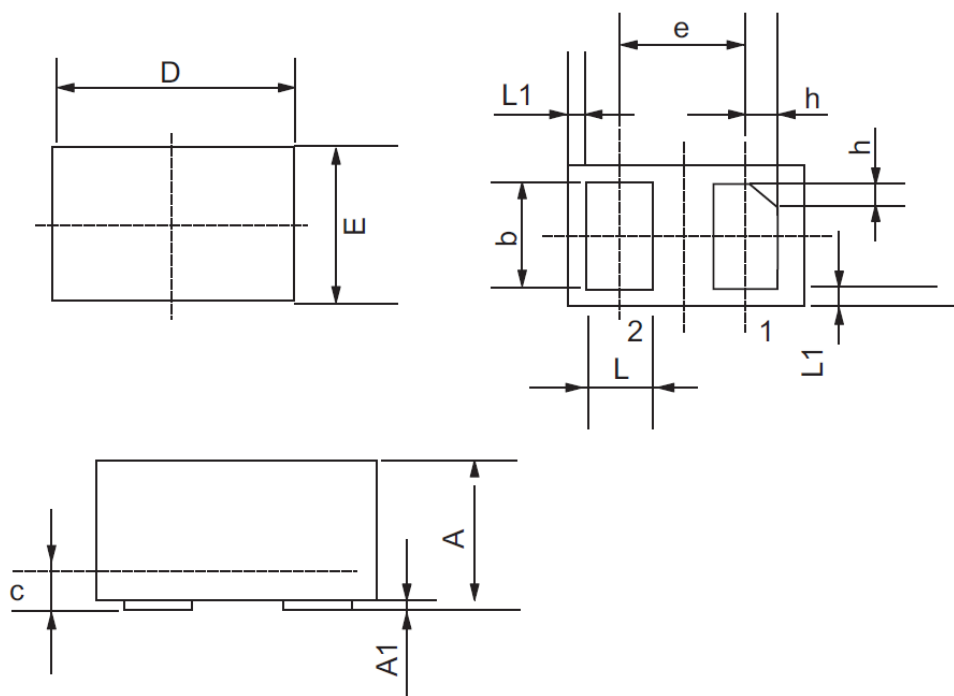
**Figure.1 Capacitance vs.Reverse Voltage**

**Figure.2 Reverse Clamping Voltage VS.Peak Pulse Current**

**Figure.3 IEC6100-4-2: +8kv pulse(pin 1 to pin 2)**

**Figure.4 IEC6100-4-2:-8kv pulse (pin 2 to pin 1)**

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


## 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 $T_L$ -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 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $T_P$ )  |                                    | 20-40 seconds           |
| Ramp-down Rate                                        |                                    | 6°C/second Max          |
| Time 25°C to peak Temperature ( $T_P$ )               |                                    | 8 minutes Max           |
| Do not exceed                                         |                                    | 260°C                   |

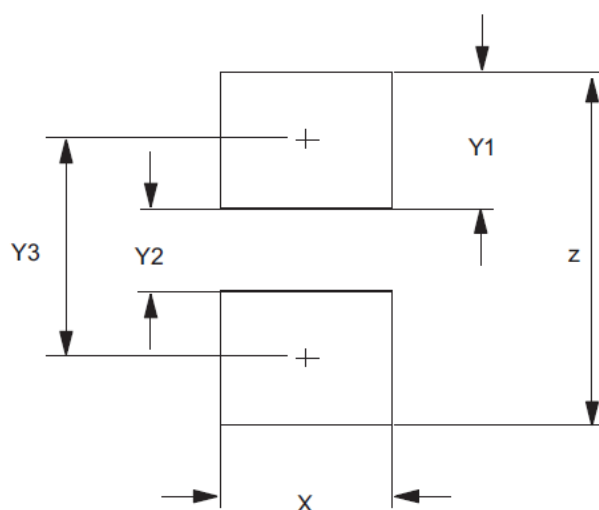


## Outline Drawing - DFN1006



| SYMBOL | Millimeters |      |      |
|--------|-------------|------|------|
|        | MIN         | NOM  | MAX  |
| A      | 0.40        | 0.50 | 0.55 |
| A1     | 0           | 0.02 | 0.05 |
| b      | 0.45        | 0.50 | 0.55 |
| C      | 0.12        | 0.15 | 0.18 |
| D      | 0.95        | 1.00 | 1.05 |
| E      | 0.55        | 0.60 | 0.65 |
| e      | 0.65BSC     |      |      |
| L      | 0.20        | 0.25 | 0.30 |
| L1     | 0.05REF     |      |      |
| h      | 0.07        | 0.12 | 0.17 |

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



| SYMBOL | DIMENSIONS |        |
|--------|------------|--------|
|        | MILIMETERS | INCHES |
| X      | 0.60       | 0.024  |
| Y1     | 0.50       | 0.020  |
| Y2     | 0.30       | 0.012  |
| Y3     | 0.80       | 0.030  |
| Z      | 1.30       | 0.052  |

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 |
|-------------|---------|-----------|------------------|
| LT2C031UUER | DFN1006 | 10,000    | Tape and reel    |