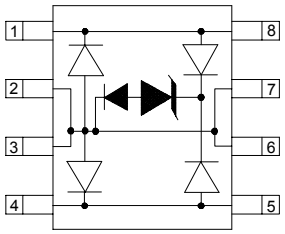
# LC03-3.3

## Low Capacitance 3.3V TVS

## Features

- Ultra low leakage: nA level
- Operating voltage: 3.3V
- Low clamping voltage
- Complies with following standards:
  - – IEC 61000-4-2 (ESD) immunity test
    - Air discharge: ±30kV
    - Contact discharge: ±30kV
  - – IEC61000-4-4 (EFT) 40A (5/50ns)
  - – IEC61000-4-5 (Lightning) 100A (8/20μs)
- RoHS Compliant

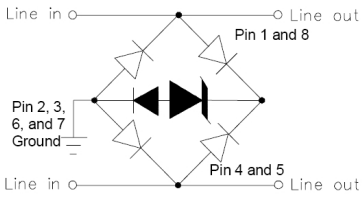
## Dimensions SOP-8




## Applications

- T1/E1 Line Cards
- T3/E3 and DS3 Interfaces
- STS-1 Interfaces
- 10/100/1000 BaseT Ethernet
- Set Top Box
- ISDN Interfaces
- Low Voltage Interfaces

## Pin Configuration




## Mechanical Characteristics

- Package: SOP-8
- Lead Finish: Matte Tin
- UL Flammability Classification Rating 94V-0
- Quantity Per Reel:2,500 pcs
- Reel Size:13 inch
- Device Marking: LC-3.3

## Absolute Maximum Ratings(Tamb=25°C unless otherwise specified)

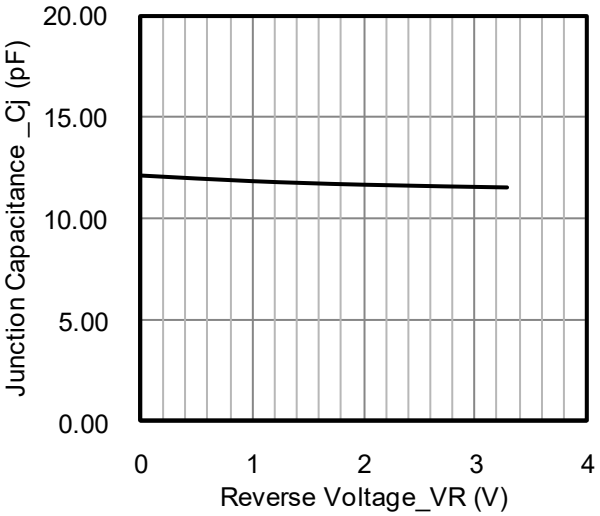
| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak Pulse Power (8/20μs) | Ppp | 1800 | W |
| ESD per IEC 61000−4−2 (Air) | $V_{ESD}$ | ± 30 | kV |
| ESD per IEC 61000−4−2 (Contact) | | ± 30 | |
| Operating Temperature Range | $T_J$ | -55 to +125 | ℃ |
| Storage Temperature Range | $T_{STJ}$ | -55 to +150 | ℃ |

## Electrical Characteristics(TA=25°C unless otherwise specified)

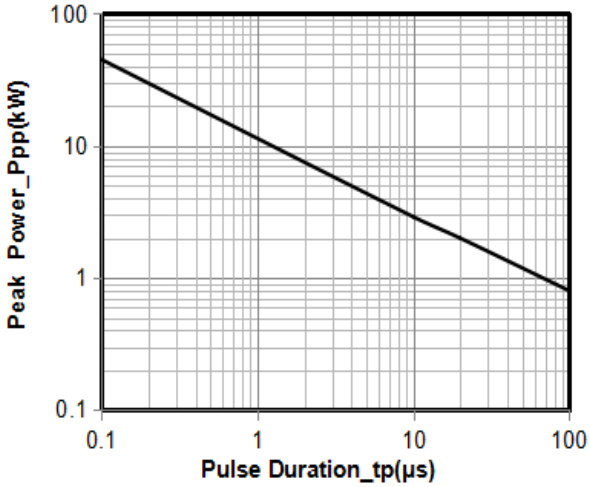
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse Working Voltage | $V_{RWM}$ | Any I/O Pin to GND | | | 3.3 | V |
| Punch-Through Voltage | $V_{PT}$ | $I_T$ = 2μA, any I/O Pin to GND | 3.5 | | | V |
| Snap-Back Voltage | $V_{SB}$ | $I_T$ = 50mA, any I/O Pin to GND | 2.8 | | | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 3.3V, any I/O Pin to GND | | | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 50A (8 x 20μs pulse), any I/O Pin to GND | | | 11 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 50A (8 x 20μs pulse), between I/O Pins | | | 13 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 100A (8 x 20μs pulse), any I/O Pin to GND | | | 15 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 100A (8 x 20μs pulse), between I/O Pins | | | 18 | V |
| Junction Capacitance | $C_J$ | VR = 0V, f = 1MHz, any I/O Pin to GND | | 16 | 25 | pF |
| Junction Capacitance | $C_J$ | VR = 0V, f = 1MHz, between I/O Pins | | 8 | 12 | pF |

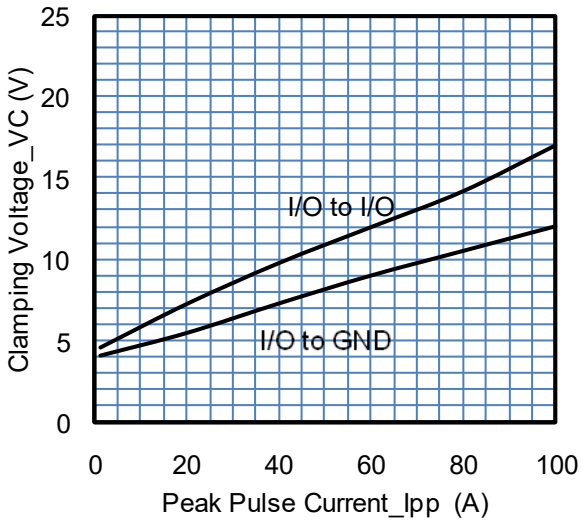
Note 1: I/O Pins are Pin 1, 4, 5 and 8

## Typical Performance Characteristics(TA=25°C unless otherwise specified)

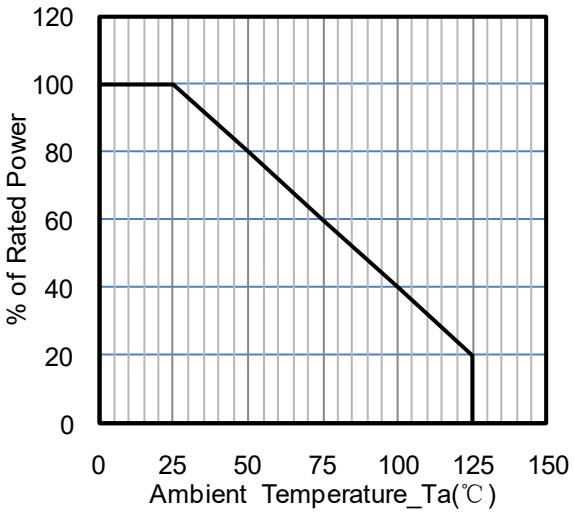



**Junction Capacitance vs. Reverse Voltage**

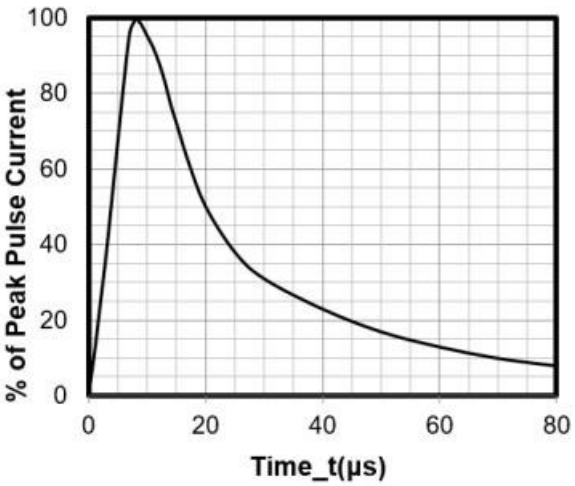


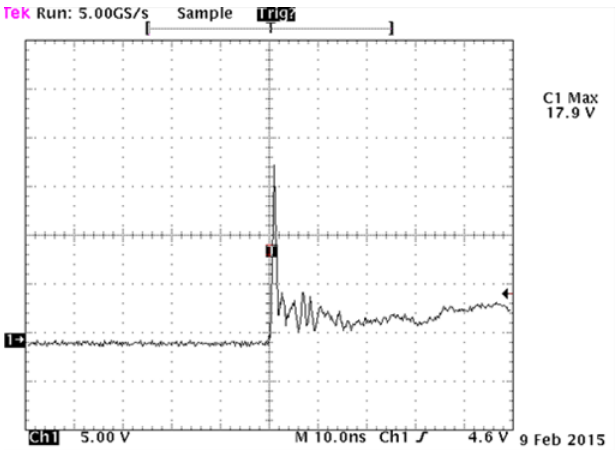

**Clamping Voltage vs. Peak Pulse Current**




**Power Derating Curve**




**8 X 20μs Pulse Waveform**



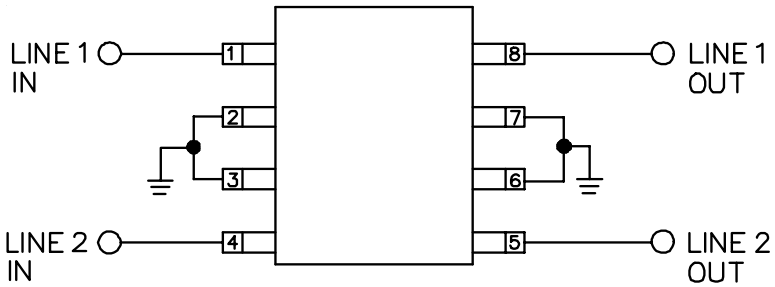

**Note：Data is taken with a 10x attenuator**

**ESD Clamping Voltage**

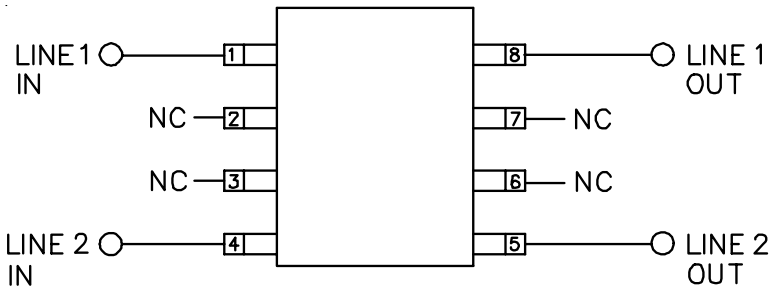
**+8 kV Contact per IEC61000−4−2**

## Typical Application

The LC03-3.3 is designed to protect two high speed data lines (one differential pair) from transient over-voltages which result from lightning and ESD. The device can be configured to protect in differential (Line to Line) and common (Line to Ground) mode. Data line inputs/outputs are connected at pins 1 to 8, and 4 to 5 as shown below. Pins 2, 3, 6, 7 are connected to ground. These pins should be connected directly to a ground plane on the board for the best results, the path length is kept as short as possible to minimize parasitic inductance. In applications where high common voltages are present, differential protection is achieved by leaving pins 2, 3, 6, and 7 not connected.

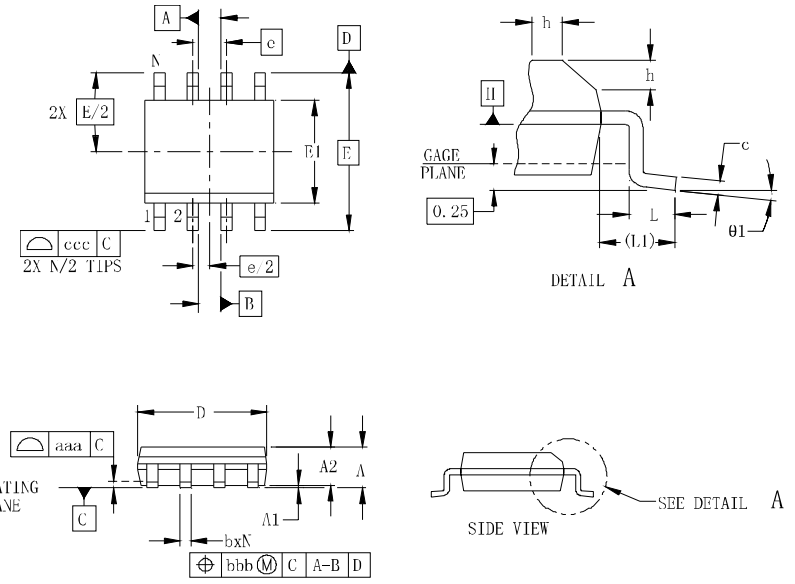



**Connection for differential (Line to Line) and common mode protection (Line to Ground)**



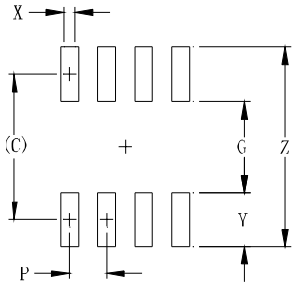

**Connection for differential  protection (Line to Line)**

## SOP-8 Package Outline Drawing




| SYM | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|
| | MILLIMETERS | | | INCHES | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.35 | | 1.75 | 0.053 | | 0.069 |
| A1 | 0.10 | | 0.25 | 0.004 | | 0.010 |
| A2 | 1.25 | | 1.65 | 0.049 | | 0.065 |
| b | 0.31 | | 0.51 | 0.012 | | 0.020 |
| c | 0.17 | | 0.25 | 0.007 | | 0.010 |
| D | 4.80 | 4.90 | 5.00 | 0.189 | 0.193 | 0.197 |
| E1 | 3.80 | 3.90 | 4.00 | 0.150 | 0.154 | 0.157 |
| E | 6.00 BSC | | | 0.236 BSC | | |
| e | 1.27 BSC | | | 0.050 BSC | | |
| h | 0.25 | | 0.50 | 0.010 | | 0.020 |
| L | 0.40 | 0.72 | 1.04 | 0.016 | 0.028 | 0.041 |
| L1 | (1.04) | | | (0.041) | | |
| N | 8 | | | 8 | | |
| θ1 | 0° | | 8° | 0° | | 8° |
| aaa | 0.10 | | | 0.004 | | |
| bbb | 0.25 | | | 0.010 | | |
| ccc | 0.20 | | | 0.008 | | |

## Suggested Land Pattern




| SYM | DIMENSIONS | |
|---|---|---|
| | MILLIMETERS | INCHES |
| C | (5.20) | 0.205 |
| G | 3.00 | 0.118 |
| P | 1.27 | 0.050 |
| X | 0.60 | 0.024 |
| Y | 2.20 | 0.087 |
| Z | 7.40 | 0.291 |

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