Description

The ULC03-3.3 is a 3.3V low capacitance TVS array, combining a TVS diode with a rectifier bridge to provide both common and differential transient protection in one package, The ULC03-3.3 complies with the IEC 61000-4-2 (ESD) with ±30kV air and ±30kV contact discharge. It is assembled into a 8-pin lead-free SO-8 package, the ULC03-3.3 is rated for GR-1089,intra-building transient immunity requirements for telecommunication installations and provide overvoltage protection for applications such as 10/100/1000 BaseT Ethernet and T3/E3 interfaces.

Features

- Low capacitance for high speed interfaces
- Protects two line in common and differential mode
- Ultra low leakage：nA level
- Low operating voltage：3.3V
- Ultra low clamping voltage
- JEDEC SO-8 package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    Air discharge: ±30kV
    Contact discharge: ±30kV
  - IEC61000-4-5 (Lightning) 100A (8/20μs)
- RoHS Compliant

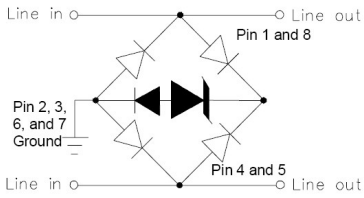
Mechanical Characteristics

- Package: SO-8
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

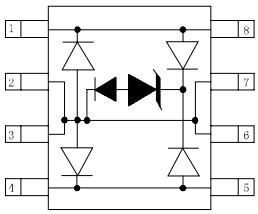
Applications

- 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

Dimensions and Pin Configuration

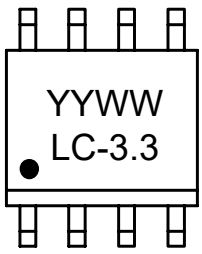


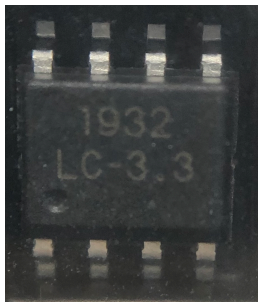
Circuit and Pin Schematic



SO-8 Outline

Marking Information





LC-3.3 = Device Marking Code
YYWW=Date Code
Dot denotes Pin1

Ordering Information

Part Number	Marking	Packaging	Reel Size
ULC03-3.3	LC-3.3	2500/Tape & Reel	13 inch

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

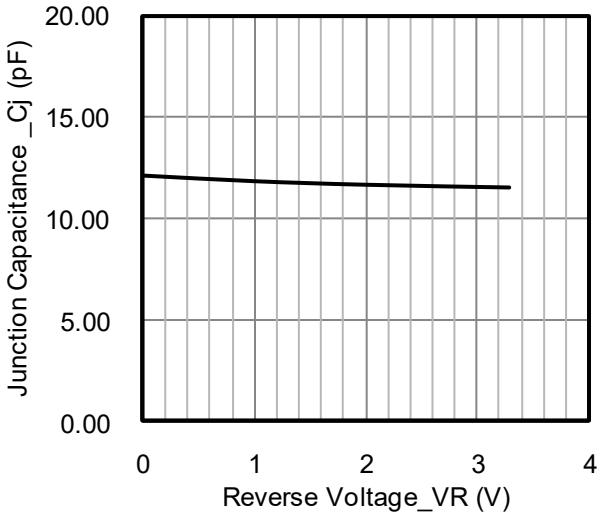
Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20μs)	Ppk	1800	W
Peak Pulse Current(8/20μs)	I_{PP}	100	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	V_{ESD}	±30 ±30	kV
Operating Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +125	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

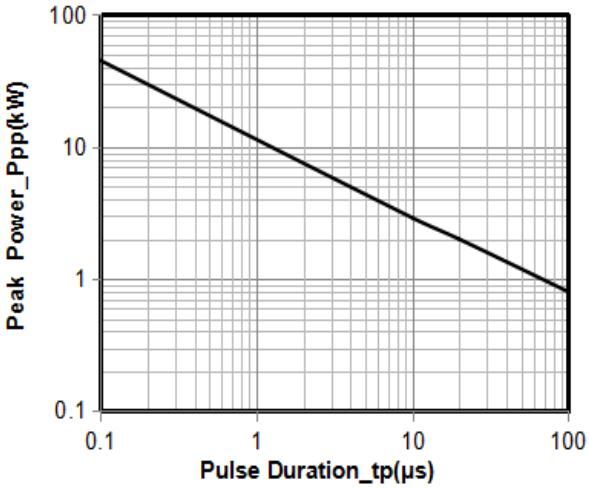
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			3.3	V	
Punch-Through Voltage	V_{PT}	3.5			V	I_T = 2μA
Snap-Back Voltage	V_{SB}	2.8			V	I_T = 50mA
Reverse Leakage Current	I_R			0.5	μA	V_{RWM} = 3.3V
Clamping Voltage	V_C			11	V	I_{PP} = 50A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	V_C			13	V	I_{PP} = 50A (8 x 20μs pulse), between I/O pins
Clamping Voltage	V_C			15	V	I_{PP} = 100A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	V_C			18	V	I_{PP} = 100A (8 x 20μs pulse), between I/O pins
Junction Capacitance	C_J		16	25	pF	VR = 0V, f = 1MHz, between I/O pins and ground
Junction Capacitance	C_J		8	12	pF	VR = 0V, f = 1MHz, between I/O pins

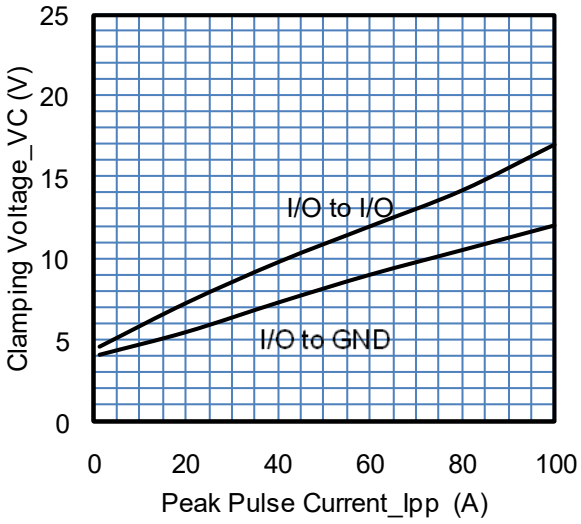
Note 1: I/O pins are Pin 1, 4, 5 and 8

Typical Performance Characteristics (T_A=25℃ unless otherwise Specified)

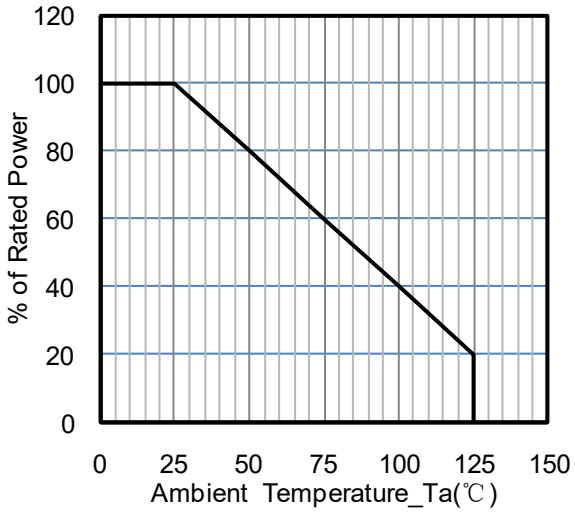


Junction Capacitance vs. Reverse Voltage

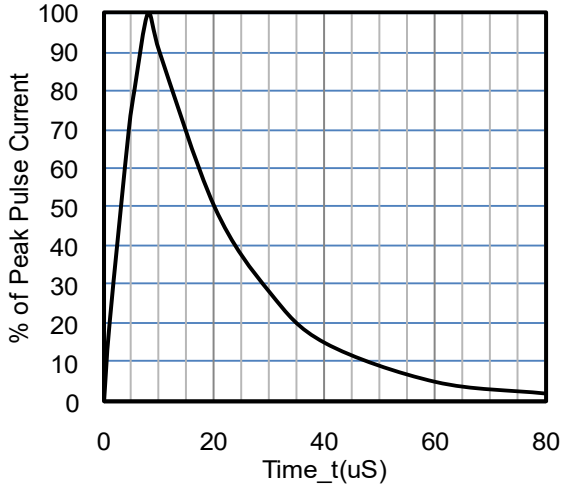




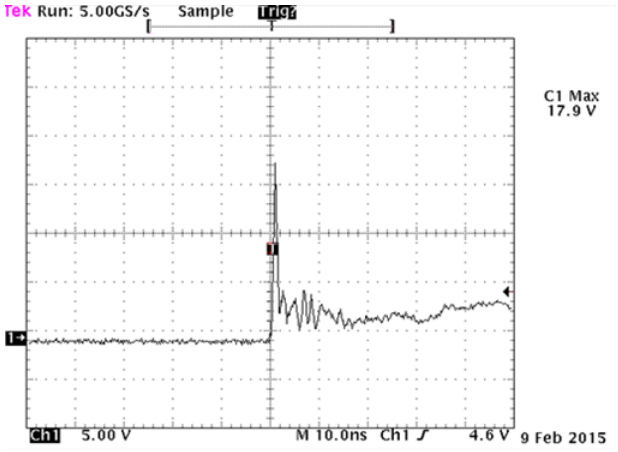
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20μs Pulse Waveform



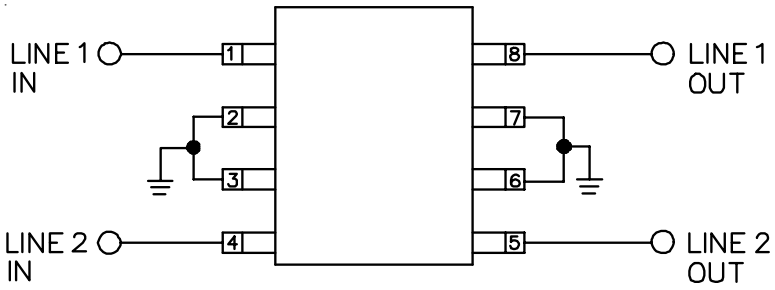
Note：Data is taken with a 10x attenuator

ESD Clamping Voltage

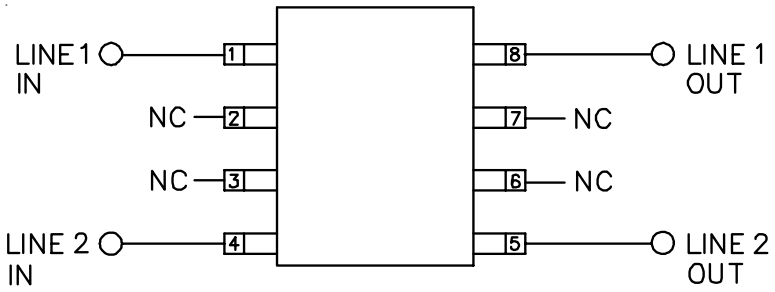
+8 kV Contact per IEC61000−4−2

Typical Applications

The ULC03-3.3 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.

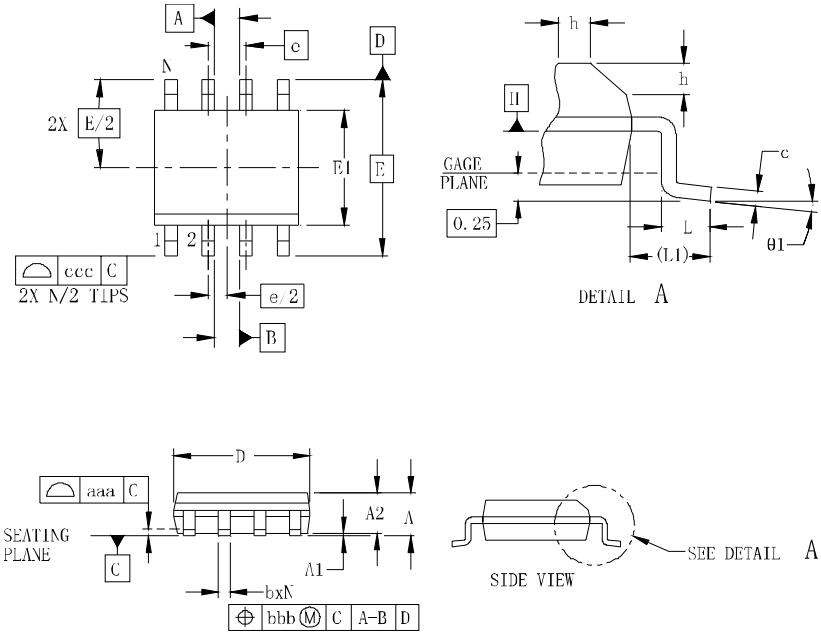


Connection for differential (Line to Line) and common mode protection (Line to Ground)



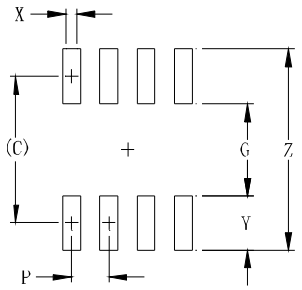
Connection for differential protection (Line to Line)

SO-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