

Description

The LC03-3.3 transient voltage suppressor is designed to protect components which are connected to high speed data and telecommunication lines from voltage surges caused by lightning, electrostatic discharge(ESD), and electrical fast transients(EFT). TVS Diodes are ideal for use as board level protection of sensitive semiconductor components. The LC03-3.3 combines a TVS diode with a rectifier bridge to provide transient protection in both common and differential mode with a single device. The LC03-3.3 utilizes EPD technology for superior electrical characteristics at 3.3 v. The capacitance of the device is minimized to ensure correct signal transmission on high speed lines. The LC03-3.3 meets the short-haul(intra-building) transient immunity requirements of Bellcore 1089 for telecommunications applications.

Features

- ◆ 1800W peak pulse power(8/20 μ s)
- ◆ Transient protection for high-speed data lines to Bellcore 1089(Intra-Building)100A(2/10 μ s)
ITU K.20 IPP=40A(5/310 μ s)
IEC 61000-4-2(ESD) \pm 15KV(air), \pm 8KV(contact)
IEC 61000-4-4(EFT) 40A(5/50ns)
IEC 61000-4-5(Lightning)100A(8/20 μ s)
- ◆ Protects two lines in common and differential mode
- ◆ Low capacitance for high-speed interfaces
- ◆ Low operating voltage(3.3V)
- ◆ Low clamping voltage
- ◆ Integrated structure saves board space and Increases reliability
- ◆ Solid-state EPD technology

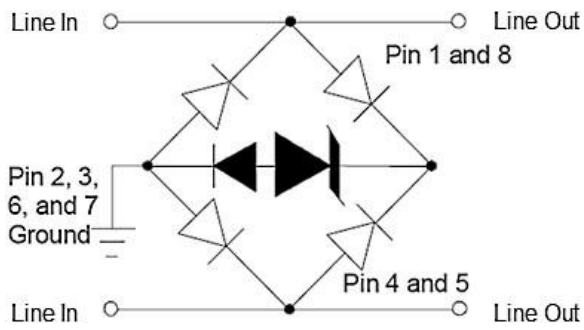
Mechanical Characteristics

- ◆ JEDEC SO-8 package
- ◆ ROHS/WEEE Compliant
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking: Part number, date code
- ◆ Packaging: Tube or Tape and Reel per EIA 481

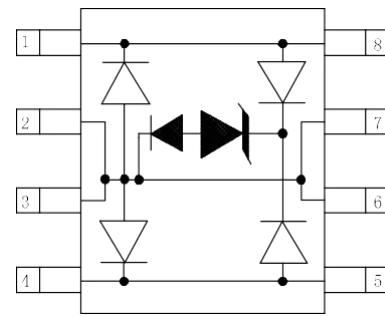
Applications

- ◆ Base Station
- ◆ Analog Inputs
- ◆ Switch Systems
- ◆ 10/100/1000 Ethernet
- ◆ WAN/LAN Equipment

Dimensions and Pin Configuration



Circuit and Pin Schematic



SO-8 Outline

Ordering Information

Part Number	Marking	Packaging	Reel Size
LC03-3.3	SC YYWW LC03-3.3	2500/Tape & Reel	13 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

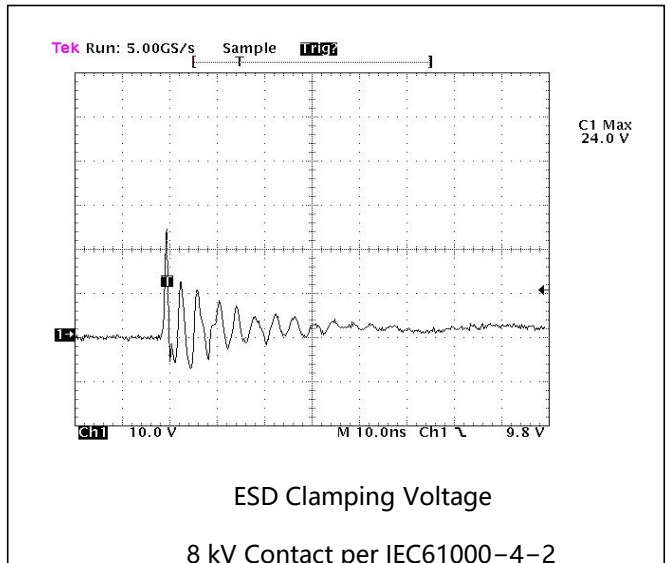
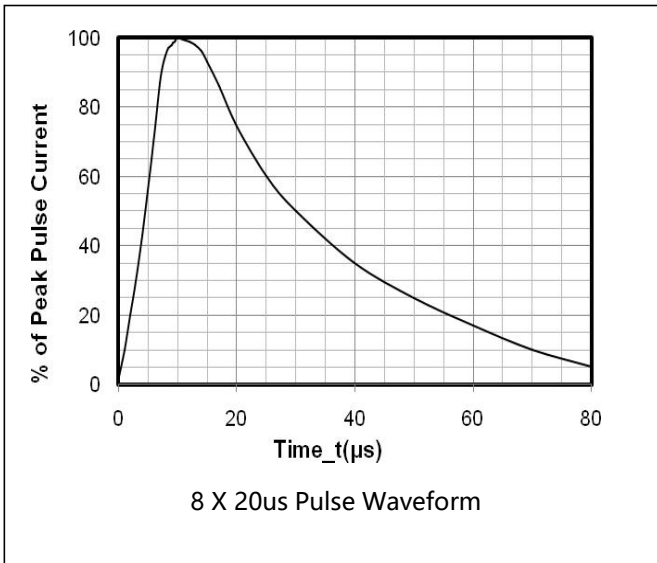
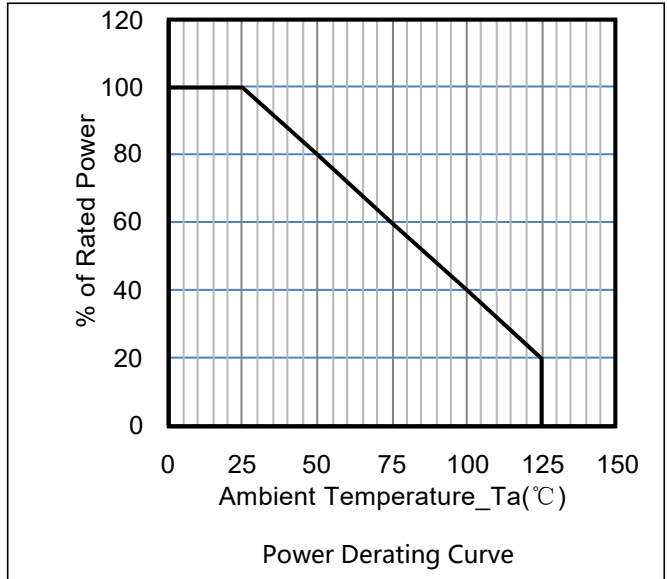
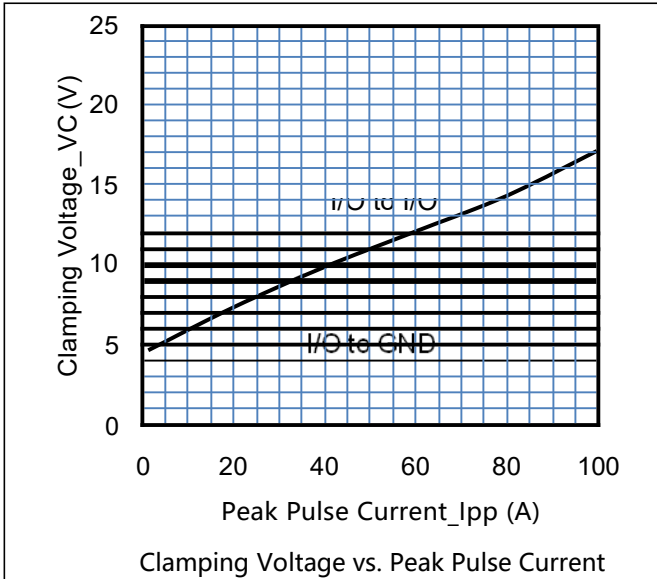
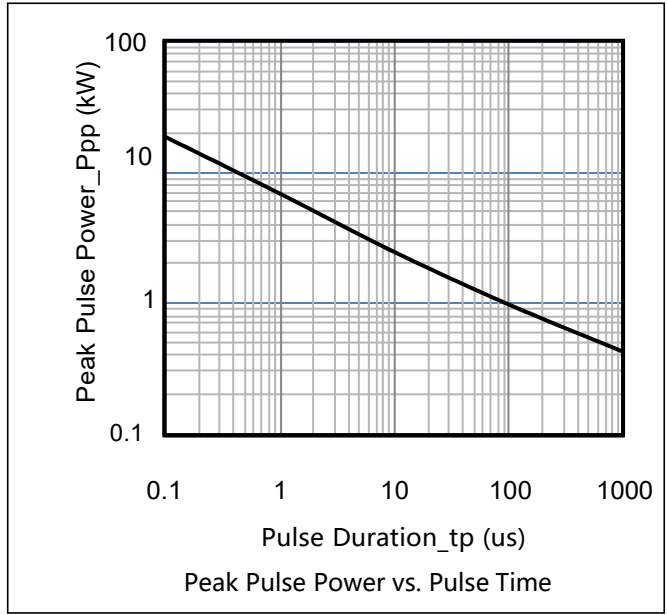
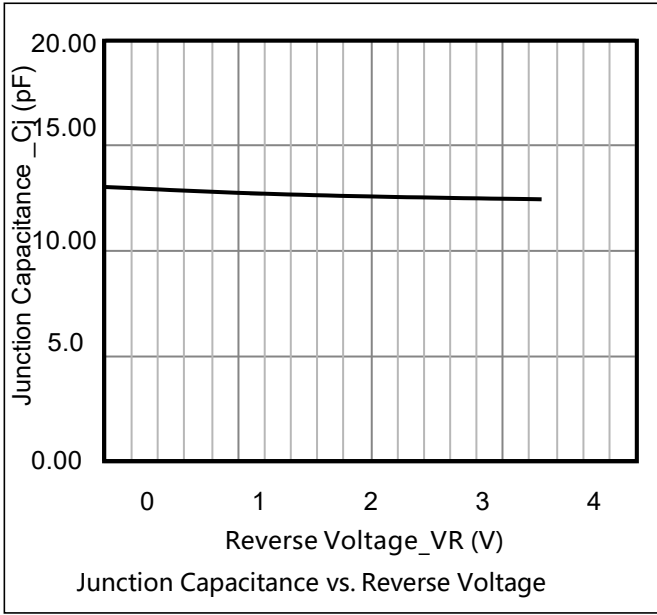
Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20 μs)	Ppk	1800	W
Peak Pulse Current(8/20 μs)	IPP	100	A
Lead Soldering Temperature	TL	260(10 sec.)	$^{\circ}\text{C}$
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			3.3	V	
Punch-Through Voltage	VSB	2.8			V	ISB = 50mA
Reverse Leakage Current	IR			1.0	μA	VRWM = 3.3V, $T=25^{\circ}\text{C}$
Clamping Voltage	VC			11.5	V	IPP = 50A (8 x 20 μs pulse) Line to Ground
Clamping Voltage	VC			13.5	V	IPP = 50A (8 x 20 μs pulse) Line to Line
Clamping Voltage	VC			15	V	IPP = 100A (8 x 20 μs pulse) Line to Ground
Clamping Voltage	VC			18	V	IPP = 100A (8 x 20 μs pulse) Line to Line
Junction Capacitance	CJ			15	pF	VR = 0V, f = 1MHz Between I/O pins and Ground
				7.5	pF	VR = 0V, f = 1MHz Between I/O pins



Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless otherwise Specified)



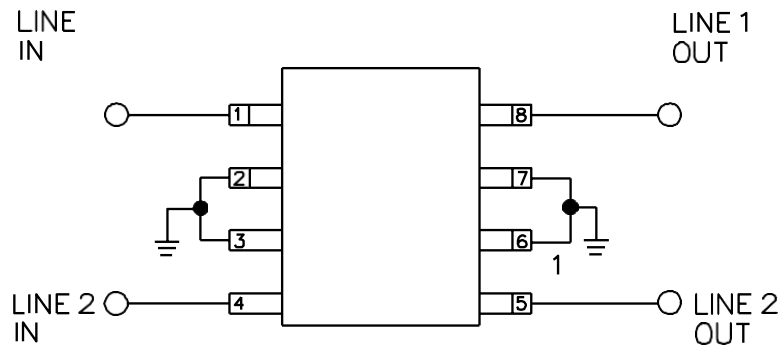
Applications Information

Device Connection Options for Protection of Two High-Speed Data Lines

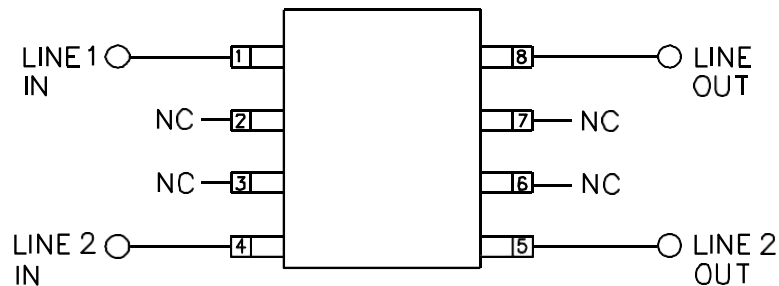
The LC03-3.3 is designed to protect two high-speed data lines(one differential pair) from transient over-voltages which result from lightning and ESD. The device can be configured to protect in differential(Line-to-line) and common (Line-to- Ground) mode. Data line inputs/outputs are connected at pins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

Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead- free compositions, matte tin dose not have any added alloys that can cause degradation of the solder joint.

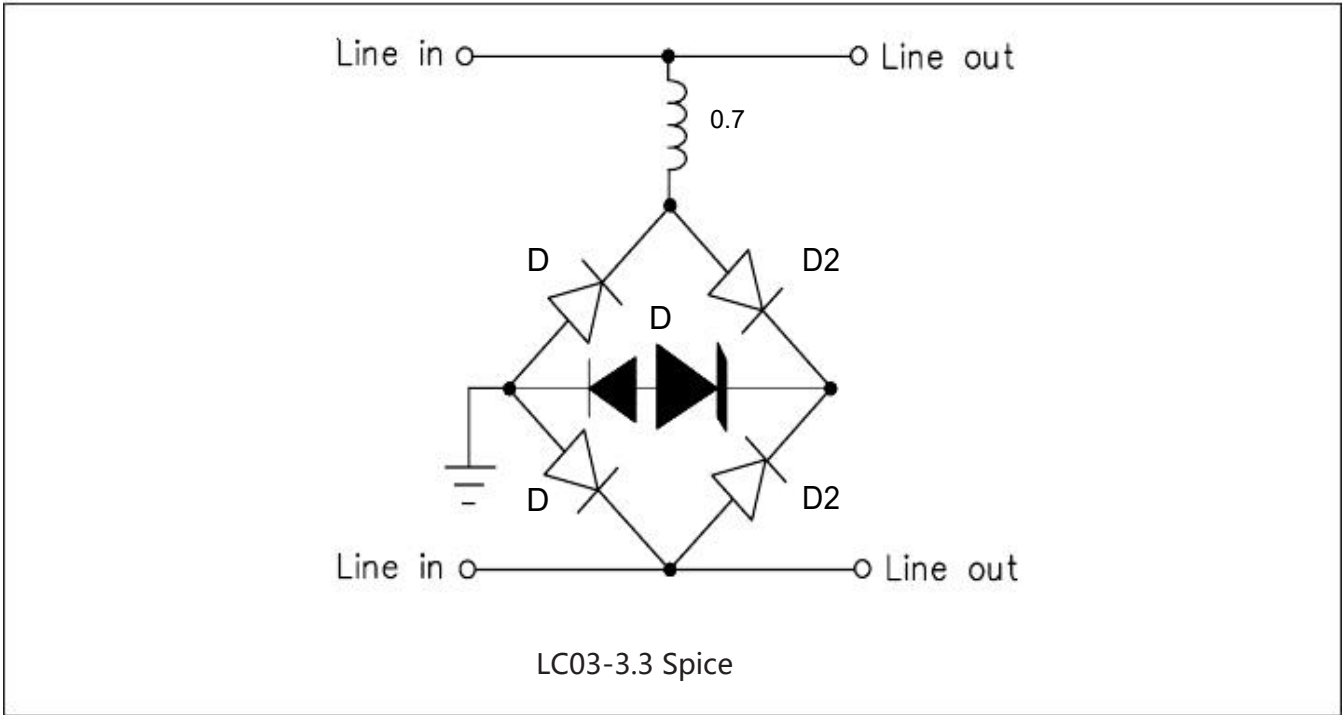


Connection for differential (Line to Line) and common mode protection (Line to Ground)



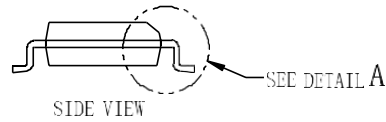
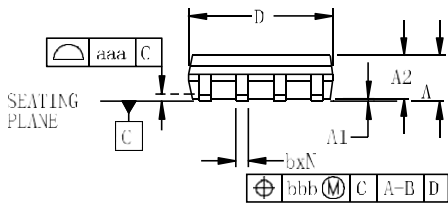
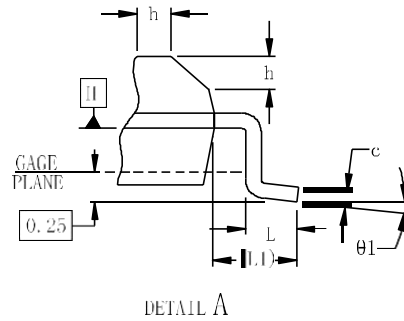
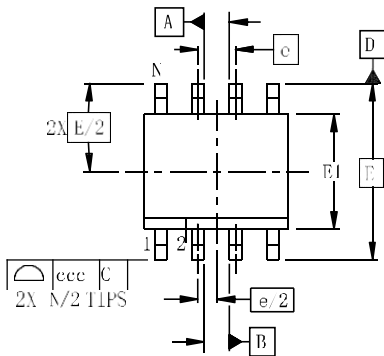
Connection for differential protection (Line to Line)

Applications Information – SPICE Model



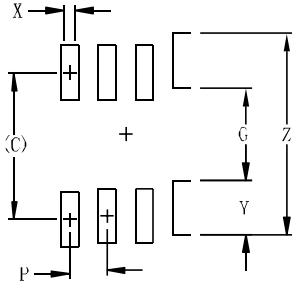
Parameter	Unit	D1 (TVS)	D2 (LCRD)
IS	Amp	1.0E-20	3.98E-13
BV	Volt	3.5	240
VJ	Volt	13.8	0.64
RS	Ohm	0.0257	0.048
IBV	Amp	1E-3	1E-3
CJO	Farad	3.4e-9	8.0E-12
TT	sec	2.541E-9	2.541E-9
M	--	0.145	0.022
N	--	1.1	1.1
EG	eV	1.11	1.11

SO-8 Package Outline Drawing



SY M	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

Marking Information



YYWW=Date Code Dot
denotes Pin1

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