

PROTECTION PRODUCTS

Description

The LC03-3.3WTDK 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).

Transient Voltage Suppressors (TVS) are ideal for use as board level protection of sensitive semiconductor components. The LC03-3.3WTDK combines a TVS diode with a rectifier bridge to provide low capacitance transient protection without signal degradation. The LC03-3.3WTDK utilizes Semtech's EPD technology for superior electrical characteristics at 3.3 volts.

The LC03-3.3WTDK meets the short-haul (intra-building) transient immunity requirements of Bellcore 1089 and the lightning immunity requirements of ITU K.20, ITU K.41, and IEC 61000-4-5.

The LC03-3.3WTDK has been tested for signal integrity and transient protection TDK's family of line interface units (LIU's).

Features

- ◆ 1800 watts peak pulse power ($t_p = 8/20\mu s$)
- ◆ Transient protection for high-speed data lines to Bellcore 1089 (Intra-Building) 100A (2/10 μs)
ITU K.20 $I_{pp}=40A$ (5/310 μs)
ITU K.41 50A (8/20 μs)
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 μs)
- ◆ Low capacitance for high-speed interfaces
- ◆ Low operating voltage (3.3V)
- ◆ Low clamping voltage
- ◆ Integrated structure saves board space and increases reliability

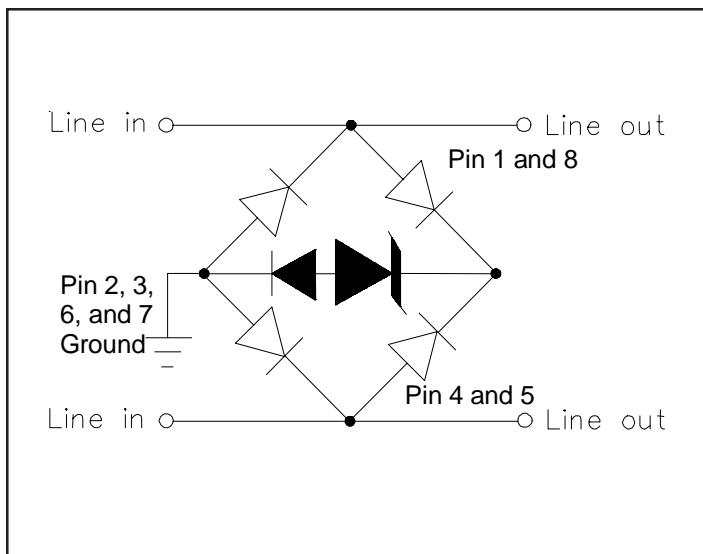
Mechanical Characteristics

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

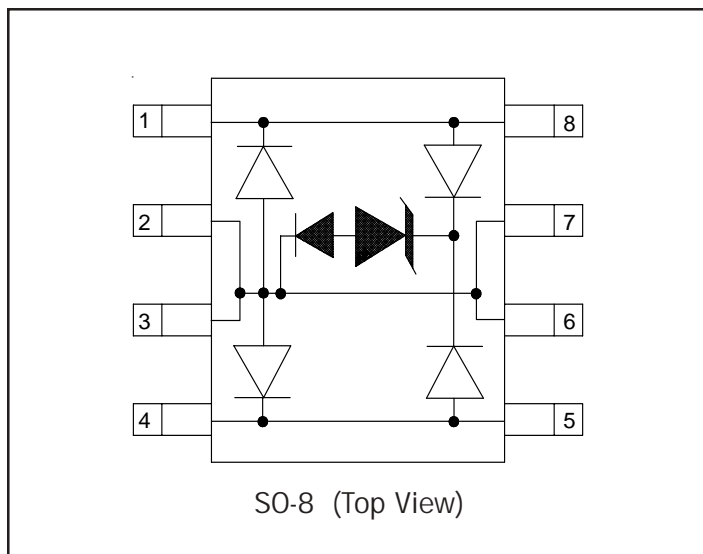
Applications

- ◆ TDK STM-1e / E4 LIU Protection
78P2253
78P2254
78P2351
78P2352
- ◆ TDK DS3/E3/STS1 LIU Protection
78P7200L 78P2241B
78P2341JAT 78P2342JAT
78P2343JAT 78P2344JAT

Circuit Diagram



Schematic & PIN Configuration



PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{pk}	1800	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{pp}	100	A
Lead Soldering Temperature	T_L	260 (10 sec.)	$^{\circ}C$
Operating Temperature	T_J	-55 to +125	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}C$

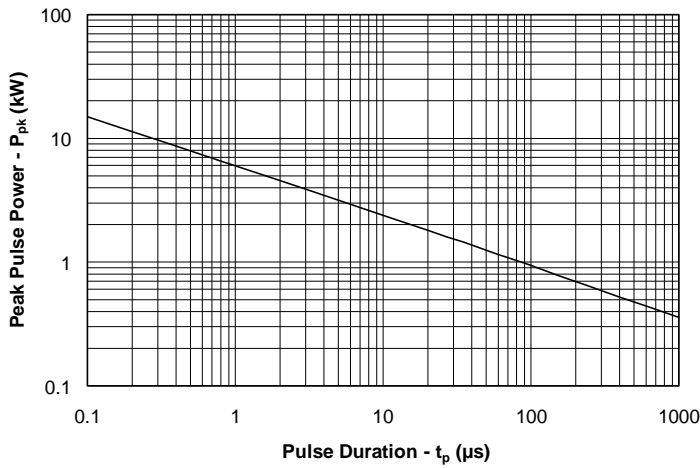
Electrical Characteristics

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				3.3	V
Punch-Through Voltage	V_{PT}	$I_{PT} = 2\mu A$	3.5			V
Snap-Back Voltage	V_{SB}	$I_{SB} = 50mA$	2.8			V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3V, T=25^{\circ}C$			1	μA
Clamping Voltage	V_C	$I_{pp} = 50A, t_p = 8/20\mu s$ Line-to-Ground			11.5	V
Clamping Voltage	V_C	$I_{pp} = 50A, t_p = 8/20\mu s$ Line-to-Line			13.5	V
Clamping Voltage	V_C	$I_{pp} = 100A, t_p = 8/20\mu s$ Line-to-Ground			15	V
Clamping Voltage	V_C	$I_{pp} = 100A, t_p = 8/20\mu s$ Line-to-Line			18	V
Junction Capacitance	C_J	Between I/O pins and Ground $V_R = 0V, f = 1MHz$		16	25	pF
		Between I/O pins $V_R = 0V, f = 1MHz$		8	12	pF

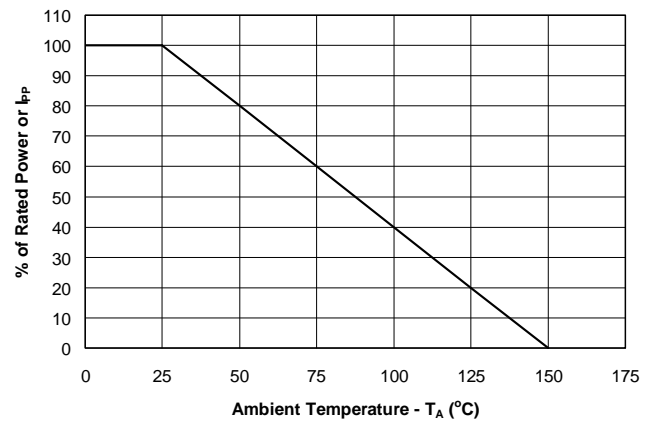
PROTECTION PRODUCTS

Typical Characteristics

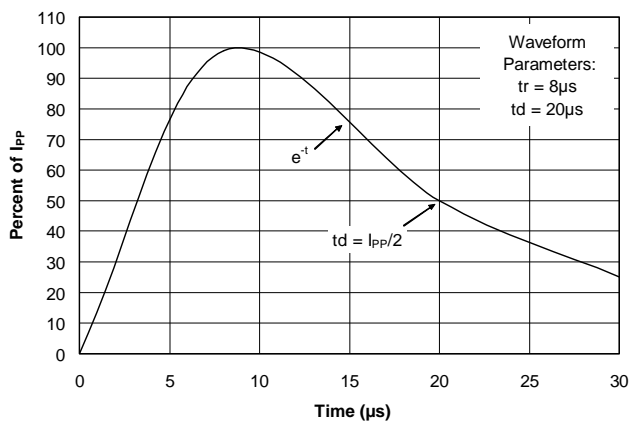
Non-Repetitive Peak Pulse Power vs. Pulse Time



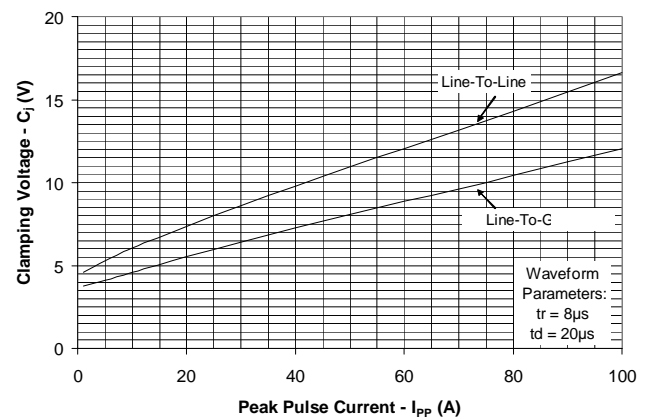
Power Derating Curve



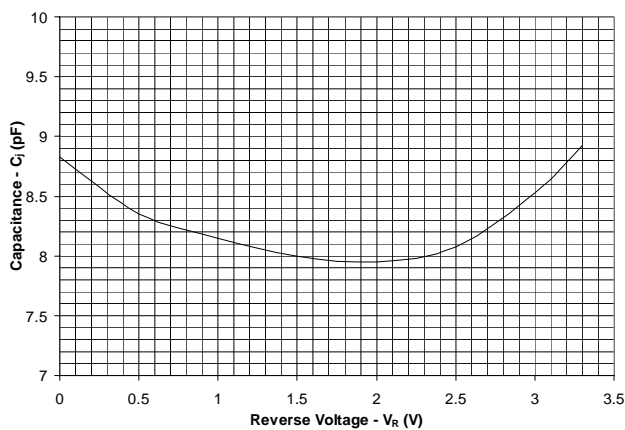
Pulse Waveform



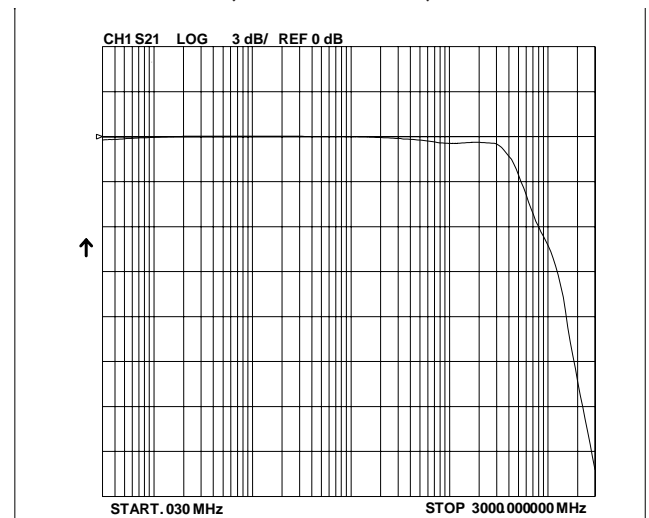
Clamping Voltage vs. Peak Pulse Current



Capacitance vs. Reverse Voltage



Insertion Loss S21 (Line to Ground)



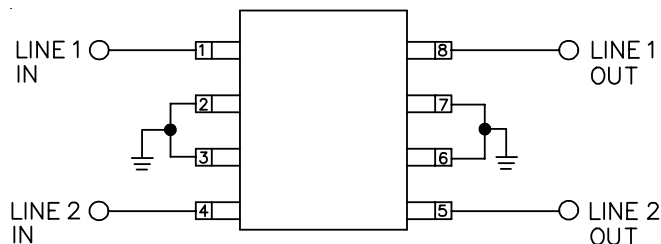
PROTECTION PRODUCTS

Applications Information

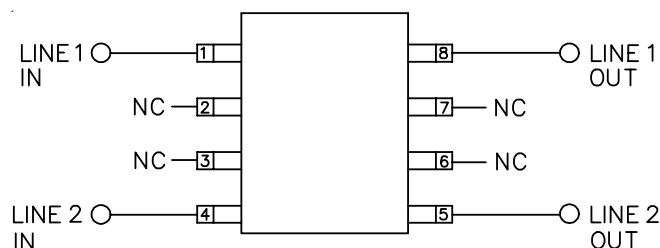
Device Connection Options for Protection of Two High-Speed Data Lines

The LC03-3.3WTDK 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 applications where high common mode voltages are present, differential protection is achieved by leaving pins 2, 3, 6, and 7 not connected.

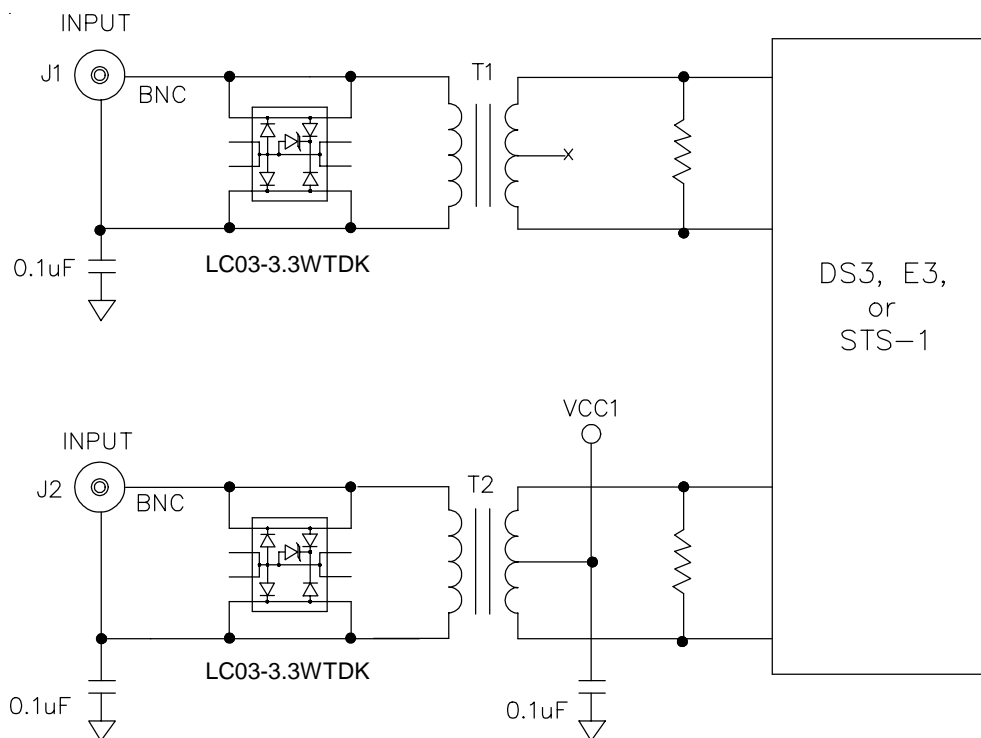
Connection for Differential (Line-to-Line) and Common Mode Protection (Line-to-Ground)



Connection for Differential Protection (Line-to-Line)



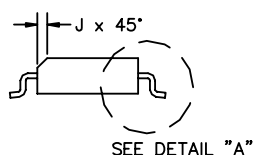
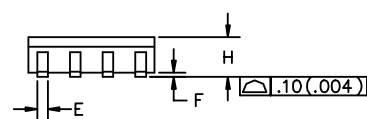
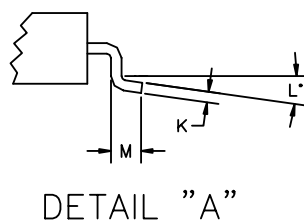
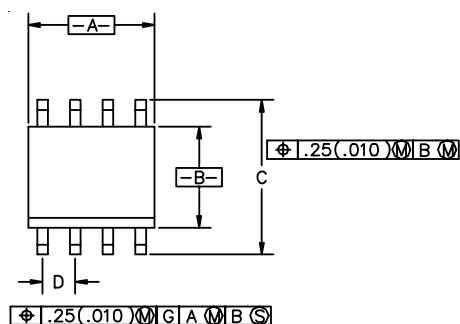
Typical Applications



DS3/E3/STS-1 Protection

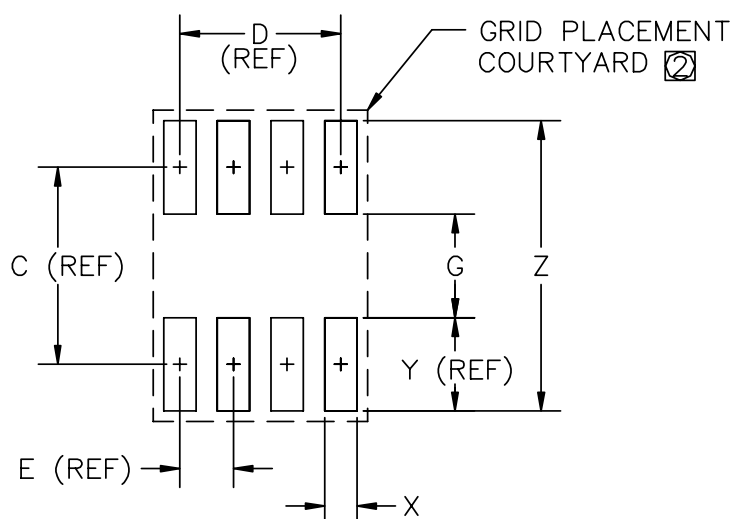
PROTECTION PRODUCTS

Outline Drawing



DIMENSIONS					NOTE
DIM ^N	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.188	.197	4.80	5.00	
B	.149	.158	3.80	4.00	
C	.228	.244	5.80	6.20	
D	.050	BSC	1.27	BSC	
E	.013	.020	0.33	0.51	
F	.004	.010	0.10	0.25	
H	.053	.069	1.35	1.75	
J	.011	.019	0.28	0.48	
K	.007	.010	.19	.25	
L	0°	8°	0°	8°	
M	.016	.050	0.40	1.27	

Land Pattern



DIMENSIONS ①					
DIM ^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
C	—	.19	—	5.00	—
D	—	.15	—	3.81	—
E	—	.05	—	1.27	—
G	.10	.11	2.60	2.80	—
X	.02	.03	.60	.80	—
Y	—	.09	—	2.40	—
Z	—	.29	7.20	7.40	—

② GRID PLACEMENT COURTYARD IS 12x16 ELEMENTS (6 mm X 8mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

① CONTROLLING DIMENSION: MILLIMETERS

PROTECTION PRODUCTS**Ordering Information**

Part Number	Working Voltage	Qty per Reel	Reel Size
LC03-3.3WTDK.TB	3.3V	500	7 Inch

Note:

(1) No suffix indicates tube pack.

Contact Information

Semtech Corporation
Protection Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804