

## 500 WATT ULTRA LOW CAPACITANCE TVS ARRAY



### DESCRIPTION

The PLC496 is an ultra low capacitance TVS array that provides two lines of protection. This device protects high-frequency applications such as voice and data related systems and is designed to minimize the effects of high overshoot voltage experienced during and ESD event.

The PLC496 has a peak pulse power rating of 500 Watts for an 8/20 $\mu$ s waveshape. This device meets the IEC 61000-4-2, IEC 61000-4-4 and IEC 61000-4-5 requirements.

### FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- Compatible with IEC 61000-4-4 (EFT): 40A - 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 24A, 8/20 $\mu$ s - Level 2(Line-Gnd) & Level 3(Line-Line)
- 500 Watts Peak Pulse Power per Line (tp = 8/20 $\mu$ s)
- Bidirectional Configuration
- Low Clamping Voltage < 5 Volts
- Ultra Low Capacitance: 1.25pF
- RoHS Compliant
- REACH Compliant

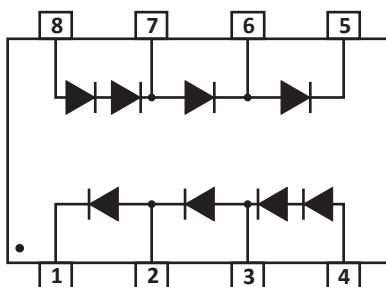
### APPLICATIONS

- Sensor & Control Circuits
- FireWire
- Ethernet - 10/100/1000 Base T
- Portable Electronics
- RF Applications

### MECHANICAL CHARACTERISTICS

- Molded JEDEC SO-8 Package
- Approximate Weight: 70 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:  
Pure-Tin - Sn, 100: 260-270°C
- 12mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

### PIN CONFIGURATION



**TYPICAL DEVICE CHARACTERISTICS**
**MAXIMUM RATINGS @ 25°C Unless Otherwise Specified**

PARAMETER	SYMBOL	VALUE	UNITS
Operating Temperature	$T_L$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Peak Pulse Power (tp = 8/20μs) - See Figure 1	$P_{PP}$	500	Watts

**ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified**

PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE (Note 1) @1mA $V_{(BR)}$ VOLTS	MAXIMUM REVERSE LEAKAGE CURRENT (Note 1) @ $V_{WM}$ $I_D$ μA	MAXIMUM CLAMPING VOLTAGE (Note 1) (Fig. 2) @ 8/20μs $V_C @ I_{PP}$	WORKING INVERSE BLOCKING VOLTAGE (Note 2) @ $V_{WB}$ VOLTS	INVERSE BLOCKING LEAKAGE CURRENT (Note 2) @ $V_{WB}$ $I_R$ μA	MAXIMUM CAPACITANCE (Note 3) @0V, 1MHz C pF
PLC496	VEC	1.0	2.5	20	12.5V @ 30A	75	1.0	1.25

**NOTE**

1. Apply positive voltage from pin 4 to 1 and pin 8 to 5.
2. Apply positive voltage from pin 1 to 4 and 5 to 8.
3. Capacitance from pin 1 to 4 < 1.25pF. Capacitance from pin 8 to 5 < 1.25pF.

## TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
PEAK PULSE POWER VS PULSE TIME

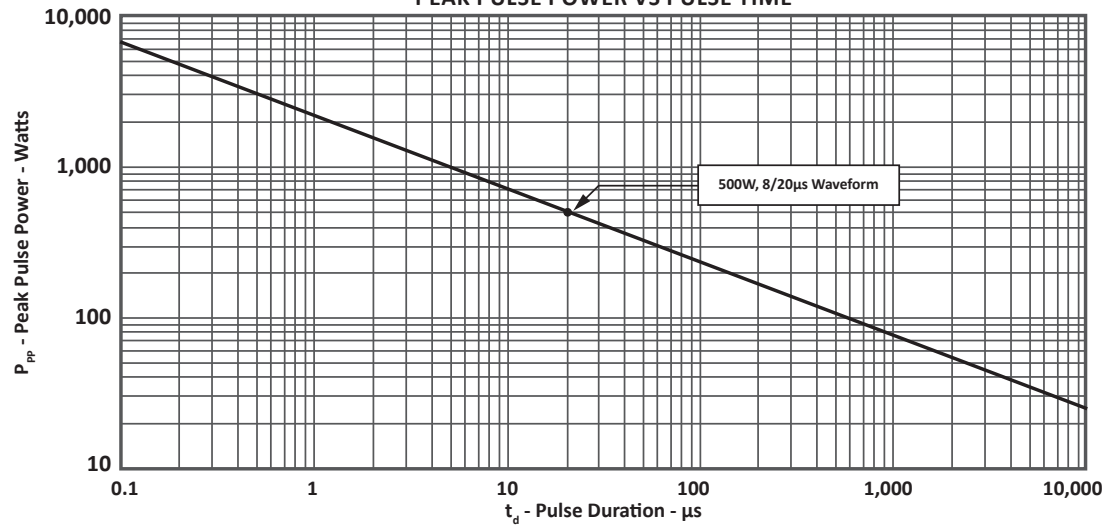
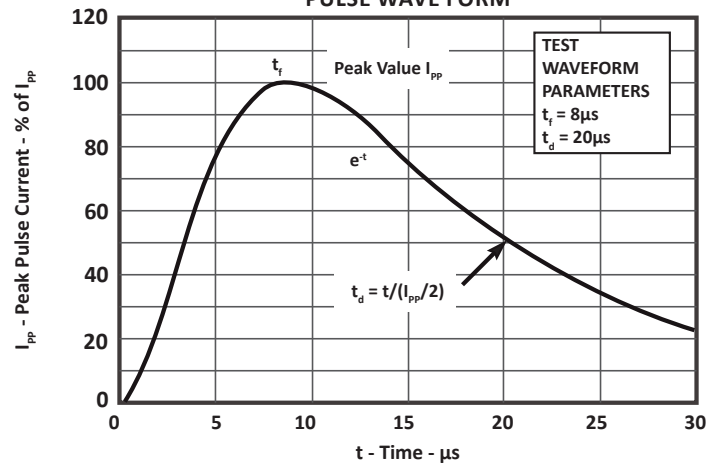
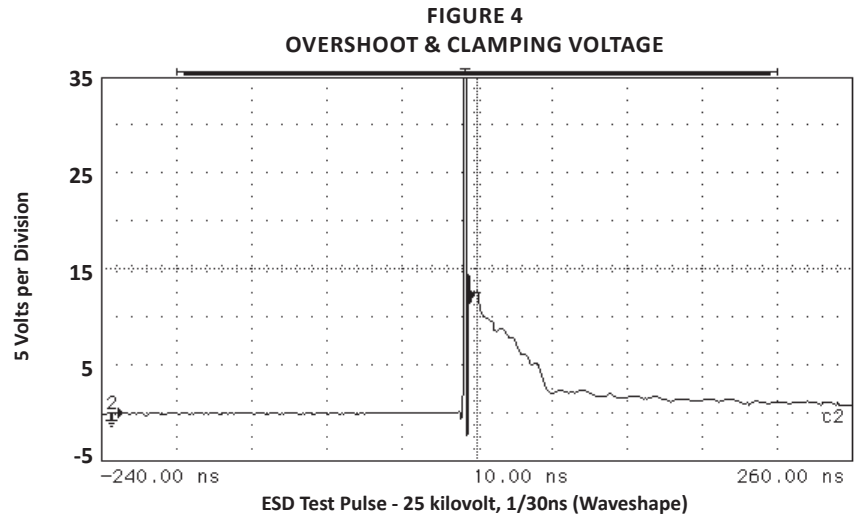
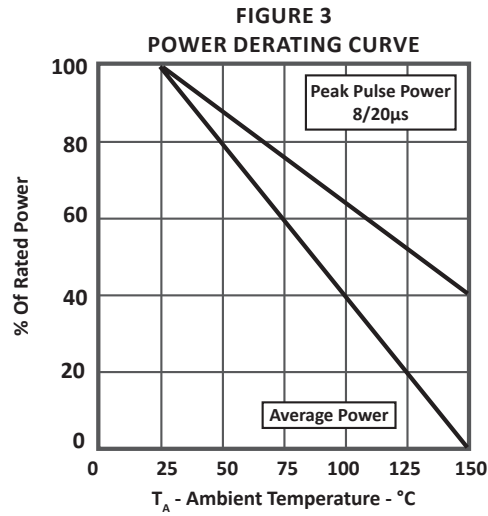


FIGURE 2  
PULSE WAVE FORM

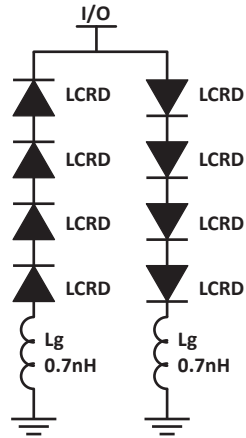


TYPICAL DEVICE CHARACTERISTICS



## SPICE MODEL

FIGURE 1  
SPICE MODEL



LCRD: Low Capacitance Rectifier Diode  
Lg - Lead Inductance

TABLE 1 - SPICE PARAMETERS

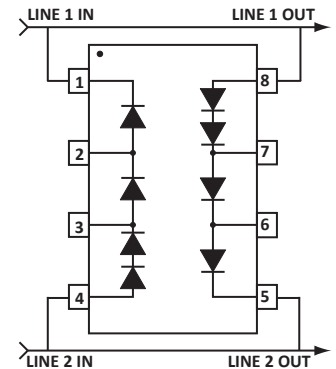
PARAMETER	UNIT	LCRD
BV	V	200
IBV	$\mu$ A	0.01
$C_{jo}$	pF	5
$I_s$	A	1E-13
Vj	V	0.6
M	-	0.33
N	-	1
$R_s$	Ohms	0.31
TT	s	1E-9
EG	eV	1.11

## APPLICATION INFORMATION

### FIGURE 1 - DIFFERENTIAL MODE I/O PORT PROTECTION

Circuit connectivity is as follows:

- Pins 1, 4, 5 and 8 are connected to the data lines.
- Pins 2, 3, 6 and 7 are not connected.



### FIGURE 2 - COMMON MODE SENSOR PROTECTION

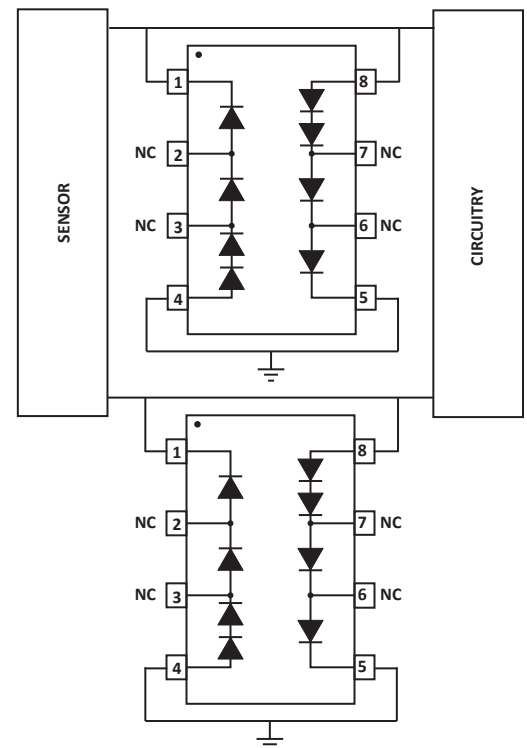
Circuit connectivity is as follows:

- Pins 1 and 8 connected to the dataline.
- Pins 4 and 5 connected to ground.
- Pins 2, 3, 6 and 7 are not connected.

### CIRCUIT BOARD RECOMMENDATIONS

Circuit board layout is critical for electromagnetic compatibility protection. The following guidelines are recommended:

- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including power and ground loops should be minimized.
- The transient current return path to ground should be kept as short as possible to reduce parasitic inductance.
- Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.



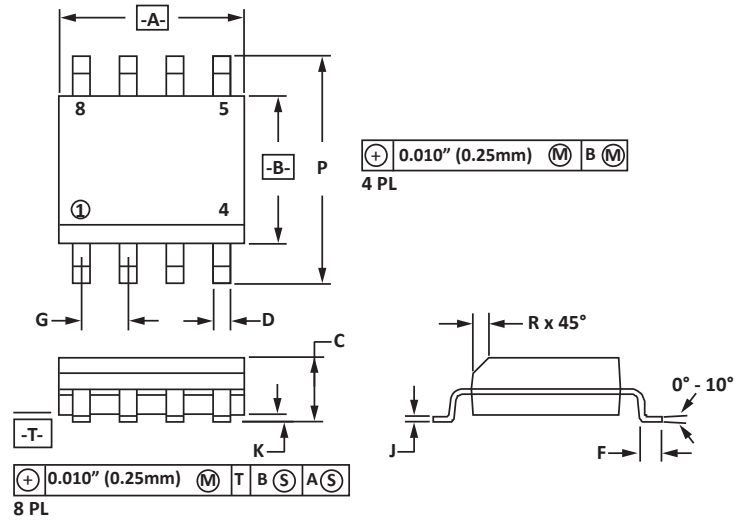
## SO-8 PACKAGE INFORMATION

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.05 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.008
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

## NOTES

- T = Seating plane and datum surface.
- Dimensions "A" and "B" are datum.
- Dimensions "A" and "B" do not include mold protrusion.
- Maximum mold protrusion is 0.015" (0.380mm) per side.
- Dimensioning and tolerances per ANSI Y14.5M, 1982.
- Dimensions are exclusive of mold flash and metal burrs.

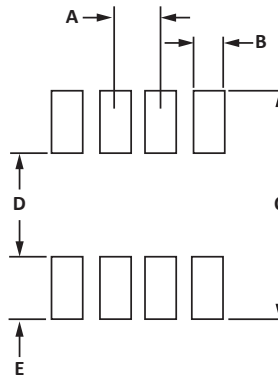


## PAD LAYOUT DIMENSIONS

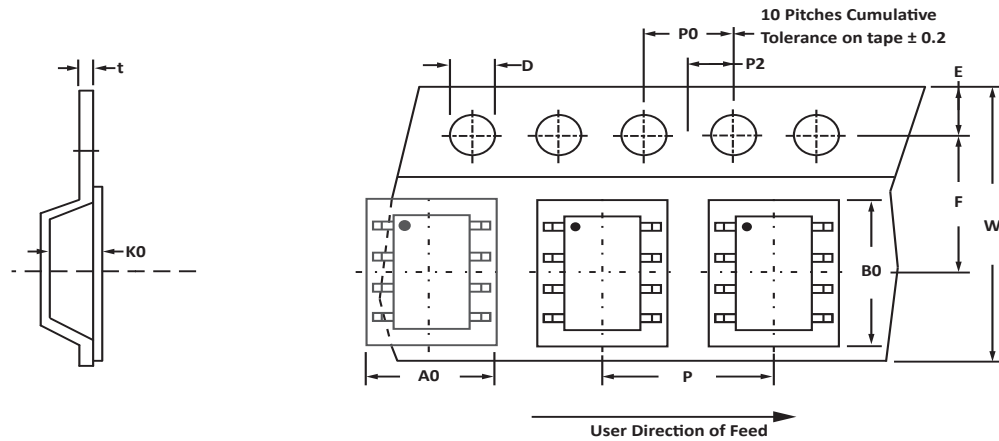
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.14	1.40	0.045	0.055
B	0.64	0.89	0.025	0.035
C	6.22	-	0.245	-
D	3.94	4.17	0.155	0.165
E	1.02	1.27	0.040	0.050

## NOTES

- Controlling dimension: inches.



## TAPE AND REEL



## SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	12mm	6.50 ± 0.10	5.40 ± 0.10	2.00 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.05	12.00 ± 0.30	4.00 ± 0.12	2.00 ± 0.10	8.00 ± 0.10	0.25

## NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T7 = 7" Reel - 1,000 pieces per 12mm tape.
- Suffix - T13 = 13" Reel - 2,500 pieces per 12mm tape.
- Bulk product shipped in tubes of 98 pieces per tube.
- Marking on Part - marking code (see page 2), date code, logo and pin one defined by dot on top of package.

## ORDERING INFORMATION

BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
PLC496	-LF	-T7	1,000	7"	98
PLC496	-LF	-T13	2,500	13"	98

This device is only available in a Lead-Free configuration.



## COMPANY INFORMATION

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### COMPANY PROFILE

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products.

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