

ULTRA LOW CAPACITANCE STEERING DIODE/TVS ARRAY



SOT-23 PACKAGE

DESCRIPTION

The PLC497 is an ultra low capacitance steering diode/TVS array. Designed for protection against Electrostatic Discharge (ESD), Electrical Fast Transients (EFT) and secondary lightning threats, this device is ideal for use in high-speed signal interface applications.

The PLC497 is available in the small SOT-23 package, which reduces internal lead inductance for low overshoot voltage during fast front time transient events like ESD. This device meets the IEC 61000-4-2 and IEC 61000-4-4 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): 20A, 8/20 μ s - Level 2(Line-Ground) & Level 3(Line-Line)
- ESD Protection > 25 kilovolts
- 200 Watts Peak Pulse Power per Line(tp = 8/20 μ s)
- Low Clamping Voltage < 5 Volts
- Ultra Low Capacitance: 2.5pF
- RoHS Compliant
- REACH Compliant

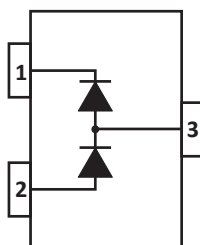
APPLICATIONS

- Low Voltage Wireless Equipment
- Sensor & Control Circuits
- Ethernet 10/100/1000 Base T
- FireWire Interfaces/Connections

MECHANICAL CHARACTERISTICS

- Molded JEDEC SOT-23 Package
- Approximate Weight: 8 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- Flammability Rating UL 94V-0
- 8mm Tape and Reel per EIA Standard 481

PIN CONFIGURATION



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

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20μs) - See Figure 1	P_{PP}	200	Watts
Peak Pulse Current - I_{PP} Max (tp = 8/20μs)	I_{PP}	20	Amps
Operating Temperature	T_L	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C

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}	MAXIMUM WORKING INVERSE BLOCKING VOLTAGE (Note 2) V_{WIB} VOLTS	INVERSE BLOCKING LEAKAGE CURRENT (Note 2) @ V_{WIB} I_R μA	MAXIMUM CAPACITANCE (Note 3) @ 0V, 1MHz C pF
PLC497	LC	1.0	1.3	20	5.0V @ 5.0A	75	1.0	2.5

NOTES

1. Apply positive voltage from pin 2 to pin 1.
2. Apply positive voltage from pin 1 to pin 2.
3. Capacitance from pin 1 to pin 2 < 2.5pF.

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

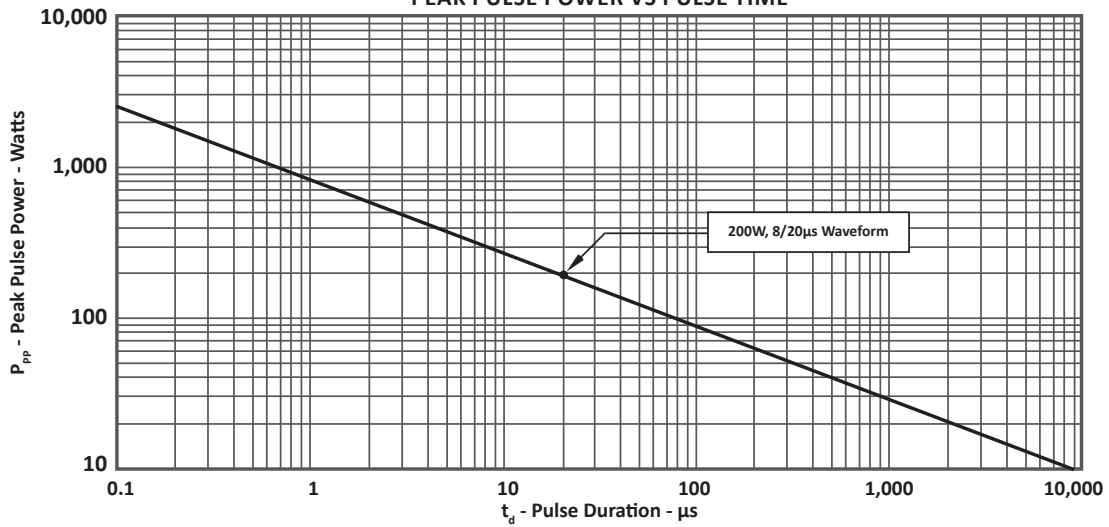


FIGURE 2
PULSE WAVE FORM

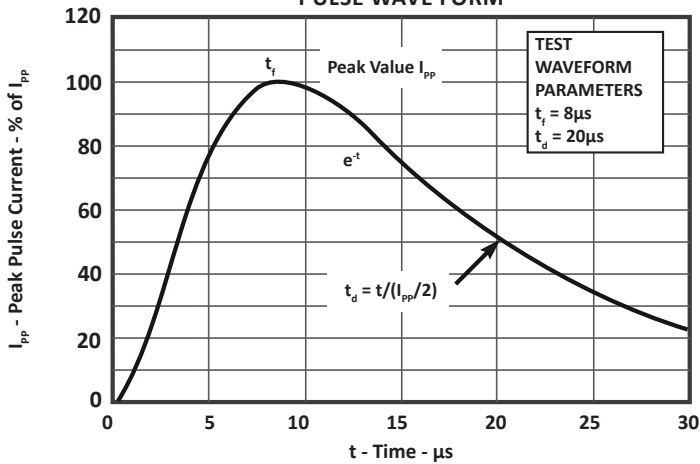
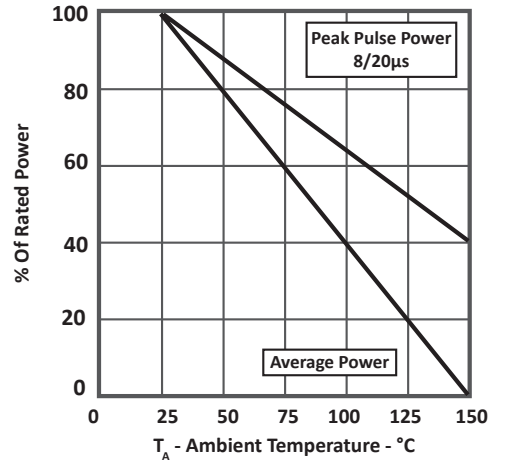


FIGURE 3
POWER DERATING CURVE



TYPICAL DEVICE CHARACTERISTICS

FIGURE 4
OVERSHOOT & CLAMPING VOLTAGE

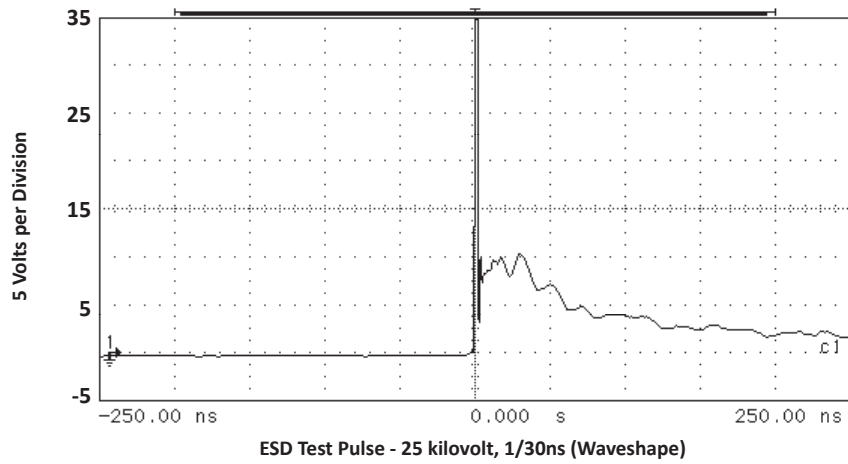
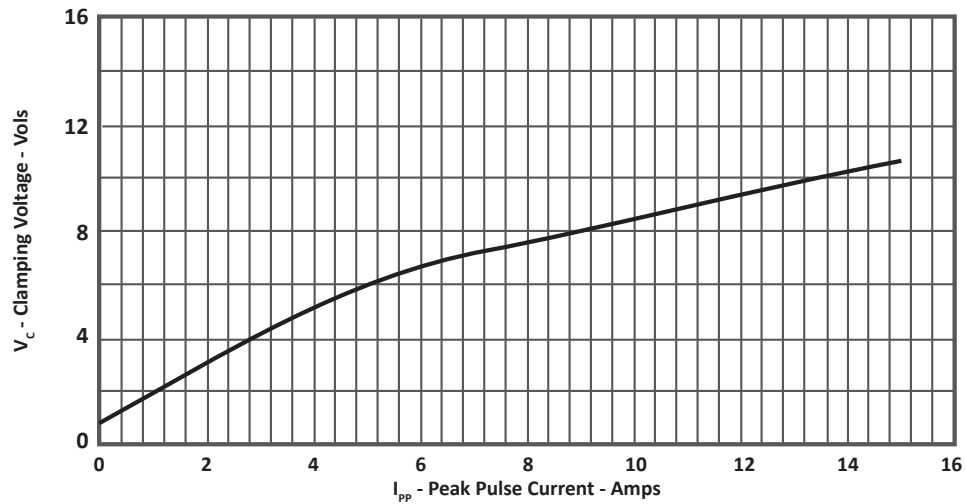


FIGURE 5
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT



SPICE MODEL

FIGURE 1
SPICE MODEL



ABD - Avalanche Breakdown Diode (TVS)
 LCRD - Low Capacitance Rectifier Diode
 Lg - Lead Inductance

TABLE 1 - SPICE PARAMETERS		
PARAMETER	UNIT	LCRD
BV	V	200
IBV	μA	0.01
C_{jo}	pF	5
I_s	A	1E-14
Vj	V	0.6
M	-	0.33
N	-	1
R_s	Ohms	0.31
TT	s	1E-9
EG	eV	1.11

APPLICATION INFORMATION

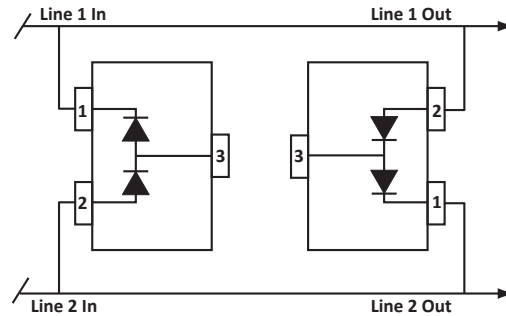


FIGURE 1 - DIFFERENTIAL MODE I/O PORT PROTECTION

Two PLC497 devices used in parallel. Circuit connectivity is as follows:

- Pins 1 and 2 of each device connected to data lines.
- Pin 3 not connected.

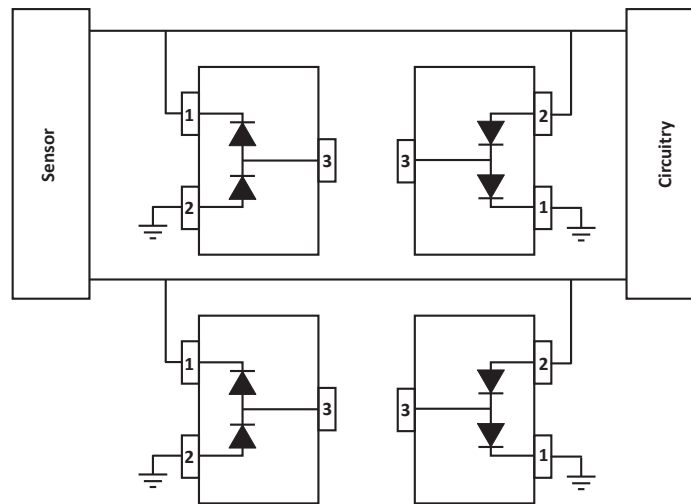


FIGURE 2 - COMMON MODE SENSOR CIRCUIT PROTECTION

Two PLC497 devices used in parallel. Circuit connectivity is as follows:

- Pin 1 on each device connected to data lines.
- Pin 2 on each device connected to ground.
- Pin 3 not connected.

CIRCUIT BOARD RECOMMENDATIONS

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

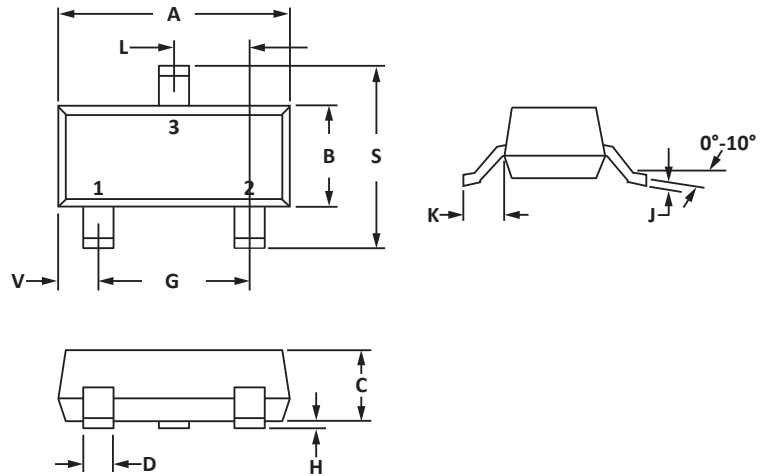
- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including 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.

SOT-23 PACKAGE INFORMATION
OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.04	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.89	1.11	0.035	0.044
D	0.37	0.50	0.015	0.020
G	1.78	2.04	0.070	0.081
H	0.013	0.100	0.001	0.004
J	0.085	0.177	0.003	0.007
K	0.45	0.60	0.018	0.024
L	0.89	1.02	0.035	0.040
S	2.10	2.50	0.083	0.098
V	0.45	0.60	0.018	0.024

NOTES

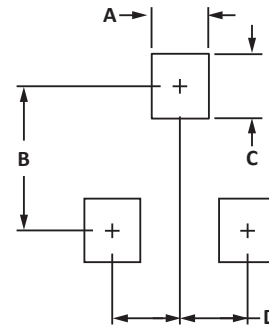
1. Controlling dimension: inches.
2. Dimensioning and tolerances per ANSI Y14.5M, 1985.
3. Pin 3 is the cathode (Unidirectional Only)
4. Dimensions are exclusive of mold flash and metal burrs.

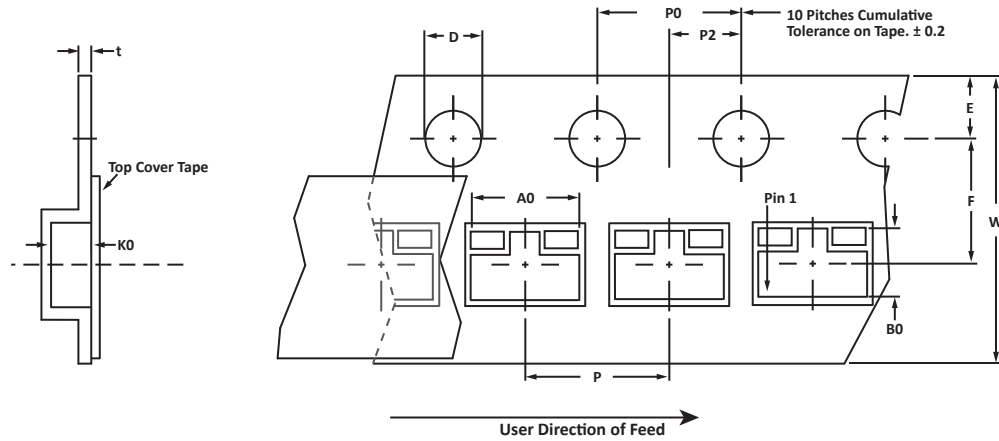

PAD LAYOUT DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

NOTES

1. Controlling dimension: inches.



TAPE AND REEL

SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	8mm	3.15 ± 0.10	2.77 ± 0.10	1.30 ± 0.10	1.55 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	8.00 ± 0.30	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	0.228

NOTES

1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Suffix - T7 = 7" Reel - 3,000 pieces per 8mm tape.
4. Suffix - T13 = 13" Reel - 10,000 pieces per 8mm tape.
5. Marking on Part - marking code (see page 2) and date code.

Package outline, pad layout and tape specifications per document number 06012.R2 8/10.

ORDERING INFORMATION

BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
PLC497	-LF	-T7	3000	7"	n/a
PLC497	-LF	-T13	10,000	13"	n/a

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

COMPANY INFORMATION

COMPANY PROFILE

In business more than 20 years, ProTek Devices™ is a privately-held company located in Tempe, Arizona, that offers a product line of transient voltage suppressors (TVS); avalanche breakdown diodes; steering diode TVS arrays and other surge suppressor component products. These TVS devices protect electronic systems from the effects of lightning, electrostatic discharge (ESD), nuclear electromagnetic pulses (NEMP), inductive switching and EMI / RFI. ProTek Devices also offers high performance interface and linear products that include analog switches; multiplexers; LED drivers; audio control ICs; RF and related high frequency products. The analog devices work in a host of consumer; industrial; automotive and other applications.

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