

500 WATT ULTRA LOW CAPACITANCE TVS ARRAY



SOT-23 PACKAGE

DESCRIPTION

The PSOTxxLC series are ultra low capacitance transient voltage suppressor (TVS) arrays, designed for power or data line applications that provide protection against ESD, tertiary lightning and switching transients. This series offers low clamping voltage for the protection of sensitive components.

The PSOTxxLC series has a peak pulse power of 500 Watts for an 8/20 μ s waveshape and is available in a SOT-23 package configuration. This series meets the IEC 61000-4-2, 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): 12A, 8/20 μ s - Level 1(Line-Ground) & Level 2(Line-Line)
- 500 Watts Peak Pulse Power per Line(tp = 8/20 μ s)
- Low Clamping Voltage
- Ultra Low Capacitance
- Available in Multiple Voltages Ranging from 3V to 36V
- RoHS Compliant
- REACH Compliant

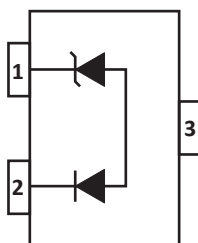
APPLICATIONS

- Ethernet 10/100 Base T
- Cellular Phones
- FireWire
- Audio/Video Inputs
- Portable Electronics

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} | 500 | Watts |
| 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 (Note 1) | DEVICE MARKING | RATED STAND-OFF VOLTAGE V_{WM} VOLTS | MINIMUM BREAKDOWN VOLTAGE (Note 2) @ 1mA $V_{(BR)}$ VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ $I_p = 1A$ V_C VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ $I_p = 5A$ V_C VOLTS | MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA | TYPICAL CAPACITANCE @ 0V, 1MHz C pF |
|-------------------------|----------------|--------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------|
| PSOT03LC | 03L | 3.3 | 4.0 | 7.0 | 9.0 | 125 | 5 |
| PSOT05LC | 05L | 5.0 | 6.0 | 9.8 | 11.0 | 20 | 5 |
| PSOT08LC | 08L | 8.0 | 8.5 | 13.4 | 15.0 | 10 | 5 |
| PSOT12LC | 12L | 12.0 | 13.3 | 19.0 | 23.0 | 1 | 5 |
| PSOT15LC | 15L | 15.0 | 16.7 | 24.0 | 28.0 | 1 | 5 |
| PSOT24LC | 24L | 24.0 | 26.7 | 43.0 | 46.0 | 1 | 5 |
| PSOT36LC | 36L | 36.0 | 40.0 | 51.0 | 68.0 | 1 | 5 |

NOTES

1. Positive potential is applied from pin 1 to 2; pin 2 is ground.
2. Do not test or surge from pin 2 to 1. PIV typically greater than 100V for rectifier diode.

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

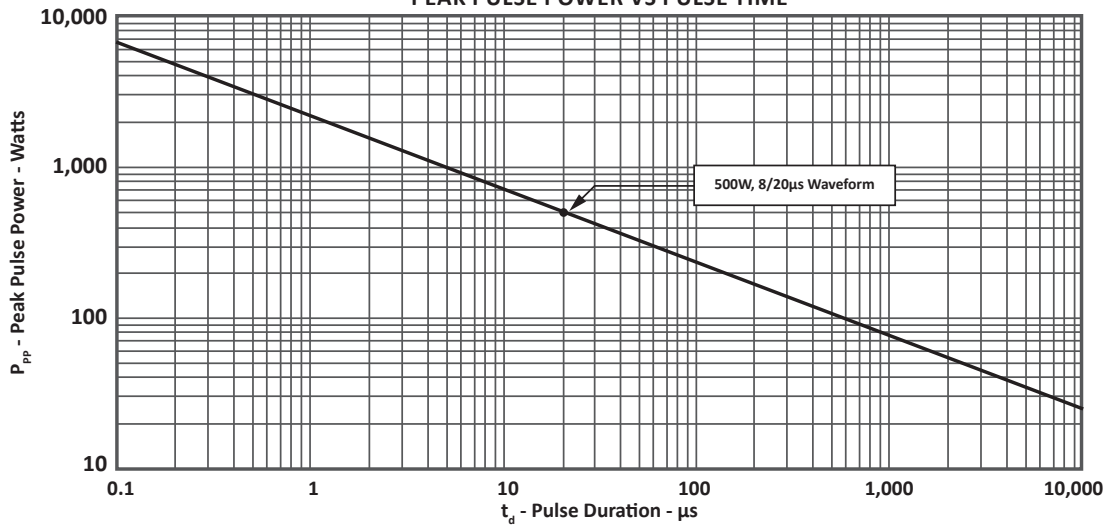
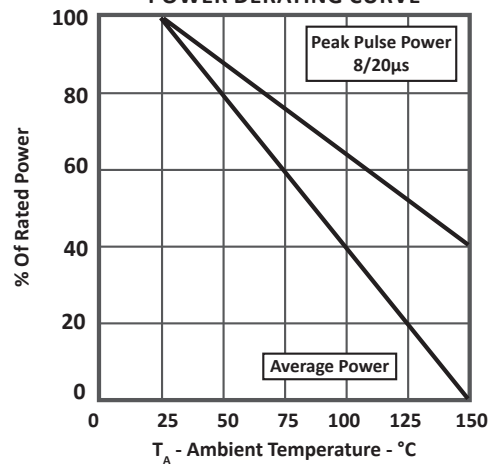


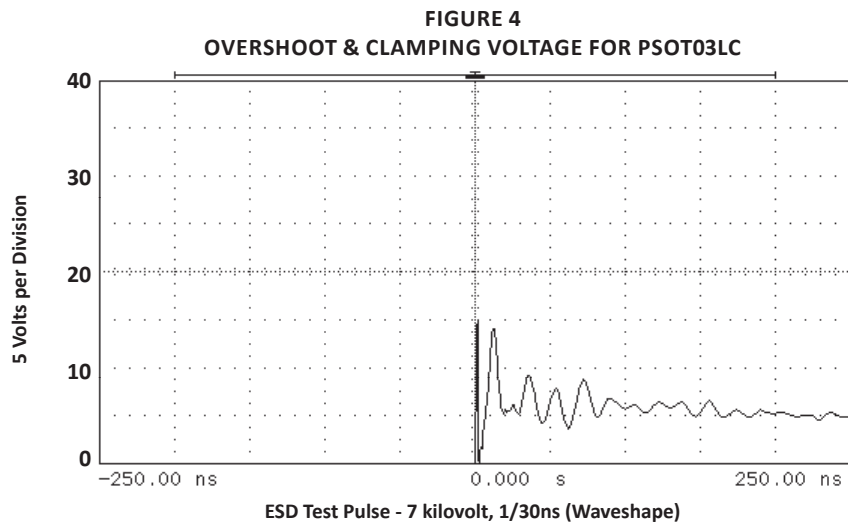
FIGURE 2
PULSE WAVE FORM



FIGURE 3
POWER DERATING CURVE



TYPICAL DEVICE CHARACTERISTICS



SPICE MODEL

FIGURE 1
SPICE MODEL FOR



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

TABLE 1 - SPICE PARAMETERS

| PARAMETER | UNIT | ABD(TVS) | LCRD |
|-----------|---------------|-------------|-------|
| BV | V | See Table 2 | 200 |
| IBV | μA | 1 | 0.01 |
| C_{jo} | pF | See Table 2 | 5 |
| I_s | A | See Table 2 | 1E-14 |
| Vj | V | 0.6 | 0.6 |
| M | - | 0.33 | 0.33 |
| N | - | 1 | 1 |
| R_s | Ohms | See Table 2 | 0.31 |
| TT | s | 1E-8 | 1E-9 |
| EG | eV | 1.11 | 1.11 |

TABLE 2 - ABD SPECIFIC SPICE PARAMETERS

| PART NUMBER | B_v (VOLTS) | C_{jo} (pF) | I_s (AMPS) | R_s (OHMS) |
|-------------|---------------|---------------|--------------|--------------|
| PSOT03LC | 4.5 | 438 | 1E-11 | 0.21 |
| PSOT05LC | 6.0 | 284 | 1E-11 | 0.14 |
| PSOT08LC | 8.5 | 146 | 1E-11 | 0.28 |
| PSOT12LC | 13.3 | 123 | 1E-13 | 0.40 |
| PSOT15LC | 16.7 | 102 | 1E-13 | 0.52 |
| PSOT12LC | 26.7 | 61 | 1E-13 | 1.54 |

APPLICATION INFORMATION

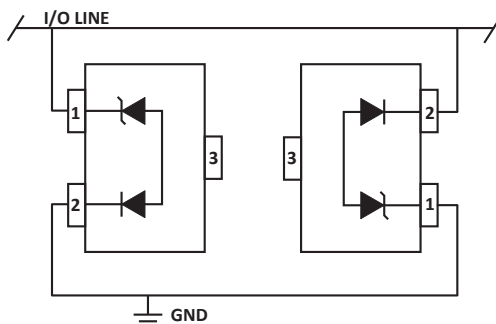


FIGURE 1 - COMMON MODE I/O PORT PROTECTION

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

- I/O Line connected to Device 1, Pin 1.
- I/O Line connected to Device 2, Pin 2.
- Device 1, Pin 2 connected to ground.
- Device 2, Pin 1 connected to ground.
- Device 1 and 2, Pin 3 not connected.

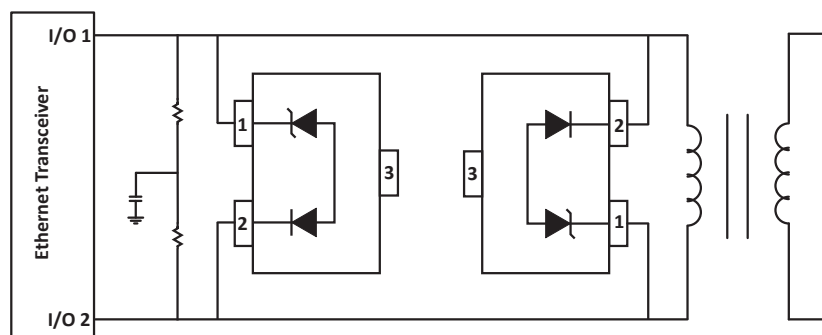


FIGURE 1 - DIFFERENTIAL MODE ETHERNET PROTECTION

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

- I/O Line 1 connected to Device 1, Pin 1.
- I/O Line 1 connected to Device 2, Pin 2.
- I/O Line 2 connected to Device 1, Pin 2.
- I/O Line 2 connected to Device 2, Pin 1.
- Device 1 and 2, 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 dedicated ground planes

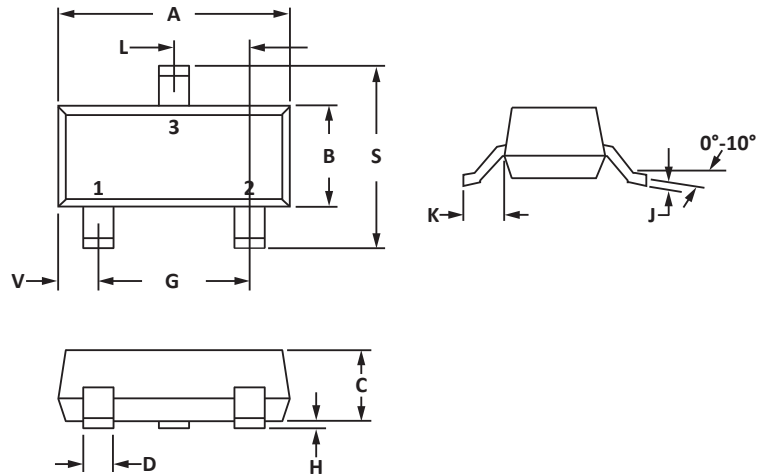
SOT-23 PACKAGE INFORMATION

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.

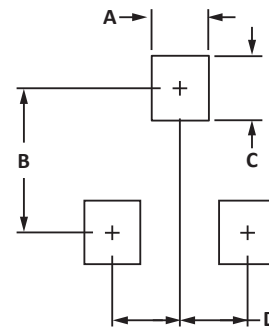


PAD LAYOUT DIMENSIONS

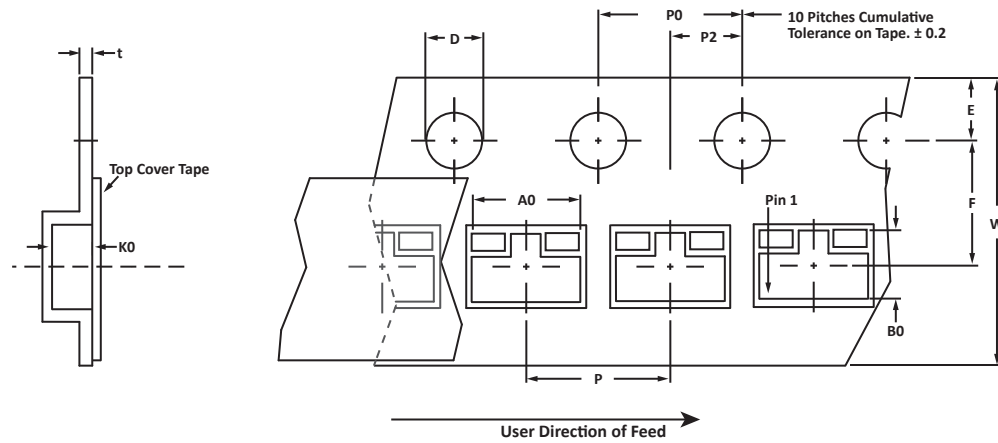
| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.71 | 0.97 | 0.028 | 0.038 |
| B | 1.88 | 2.13 | 0.074 | 0.084 |
| C | 0.71 | 0.97 | 0.028 | 0.038 |
| D | 0.81 | 1.07 | 0.032 | 0.042 |

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

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T7 = 7" Reel - 3,000 pieces per 8mm tape.
- Suffix - T13 = 13" Reel - 10,000 pieces per 8mm tape.
- 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 (xx = Voltage) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| PSOTxxLC | -LF | -T7 | 3,000 | 7" | n/a |
| PSOTxxLC | -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 25 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. ProTek Devices is ISO 9001:2015 certified.

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