

## 500 WATT TVS ARRAY



### DESCRIPTION

The PSOT series are 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 interfaces.

The PSOT series has a peak pulse power of 500 Watts for an 8/20 $\mu$ s waveshape and is available in either a bidirectional or unidirectional 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): 24A, 8/20 $\mu$ s - Level 2 (Line-Ground) & Level 3 (Line-Line)
- 500 Watts Peak Pulse Power per Line (tp = 8/20 $\mu$ s)
- Low Clamping Voltage
- Bidirectional and Unidirectional Configurations
- Available in Multiple Voltages Ranging from 3V to 36V
- RoHS Compliant
- REACH Compliant

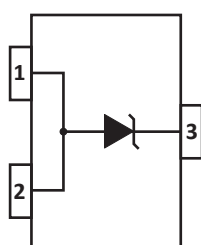
### APPLICATIONS

- RS-232, RS-422 & RS-423
- Cellular Phones
- Controlling & Monitoring Systems
- Handheld Devices
- Wireless Bus Protection

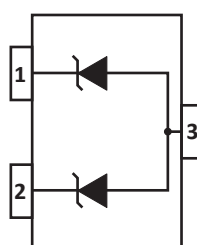
### MECHANICAL CHARACTERISTICS

- 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 CONFIGURATIONS



UNIDIRECTIONAL



BIDIRECTIONAL

## TYPICAL DEVICE CHARACTERISTICS

## MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER                                                | SYMBOL           | VALUE      | UNITS |
|----------------------------------------------------------|------------------|------------|-------|
| Peak Pulse Power (tp = 8/20μs) - See Figure 1            | P <sub>PP</sub>  | 500        | Watts |
| Operating Temperature                                    | T <sub>L</sub>   | -55 to 150 | °C    |
| Storage Temperature                                      | T <sub>STG</sub> | -55 to 150 | °C    |
| Forward Voltage @ 100mA, 300μs, Square Wave - See Note 1 | V <sub>F</sub>   | 1.5        | Volts |

## NOTES

1. Applies to unidirectional pins only.

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

| PART NUMBER<br>(Note 1) | DEVICE MARKING | RATED STAND-OFF VOLTAGE<br><br>V <sub>WM</sub><br>VOLTS | MINIMUM BREAKDOWN VOLTAGE<br><br>@ 1mA<br>V <sub>(BR)</sub><br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2)<br>@ I <sub>p</sub> = 1A<br>V <sub>C</sub><br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2)<br>@ 8/20μs<br>V <sub>C</sub> @ I <sub>PP</sub> | MAXIMUM LEAKAGE CURRENT<br><br>@V <sub>WM</sub><br>I <sub>D</sub><br>μA | TYPICAL CAPACITANCE<br><br>@0V, 1MHz<br>C<br>pF |
|-------------------------|----------------|---------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------|
| PSOT03                  | 03             | 3.3                                                     | 4.0                                                                  | 6.5                                                                                   | 10.9V @ 43.0A                                                                     | 125                                                                     | 500                                             |
| PSOT03C                 | 03C            | 3.3                                                     | 4.0                                                                  | 7.0                                                                                   | 10.9V @ 43.0A                                                                     | 125                                                                     | 300                                             |
| PSOT05                  | 05             | 5.0                                                     | 6.0                                                                  | 9.8                                                                                   | 13.5V @ 42.0A                                                                     | 20                                                                      | 350                                             |
| PSOT05C                 | 05C            | 5.0                                                     | 6.0                                                                  | 9.8                                                                                   | 13.5V @ 42.0A                                                                     | 20                                                                      | 210                                             |
| PSOT08                  | 08             | 8.0                                                     | 8.5                                                                  | 13.4                                                                                  | 16.9V @ 34.0A                                                                     | 10                                                                      | 250                                             |
| PSOT08C                 | 08C            | 8.0                                                     | 8.5                                                                  | 13.4                                                                                  | 16.9V @ 34.0A                                                                     | 10                                                                      | 150                                             |
| PSOT12                  | 12             | 12.0                                                    | 13.3                                                                 | 19.0                                                                                  | 25.9V @ 21.0A                                                                     | 2                                                                       | 150                                             |
| PSOT12C                 | 12C            | 12.0                                                    | 13.3                                                                 | 19.0                                                                                  | 25.9V @ 21.0A                                                                     | 2                                                                       | 90                                              |
| PSOT15                  | 15             | 15.0                                                    | 16.7                                                                 | 24.0                                                                                  | 30.0V @ 17.0A                                                                     | 1                                                                       | 100                                             |
| PSOT15C                 | 15C            | 15.0                                                    | 16.7                                                                 | 24.0                                                                                  | 30.0V @ 17.0A                                                                     | 1                                                                       | 60                                              |
| PSOT24                  | 24             | 24.0                                                    | 26.7                                                                 | 43.0                                                                                  | 49.0V @ 12.0A                                                                     | 1                                                                       | 88                                              |
| PSOT24C                 | 24C            | 24.0                                                    | 26.7                                                                 | 43.0                                                                                  | 49.0V @ 12.0A                                                                     | 1                                                                       | 63                                              |
| PSOT36                  | 36             | 36.0                                                    | 40.0                                                                 | 51.0                                                                                  | 76.8V @ 9.0A                                                                      | 1                                                                       | 80                                              |
| PSOT36C                 | 36C            | 36.0                                                    | 40.0                                                                 | 51.0                                                                                  | 76.8V @ 9.0A                                                                      | 1                                                                       | 60                                              |

## NOTES

1. Part Numbers with an additional "C" suffix are bidirectional devices, i.e., PSOT05C.

## TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
PEAK PULSE POWER VS PULSE TIME

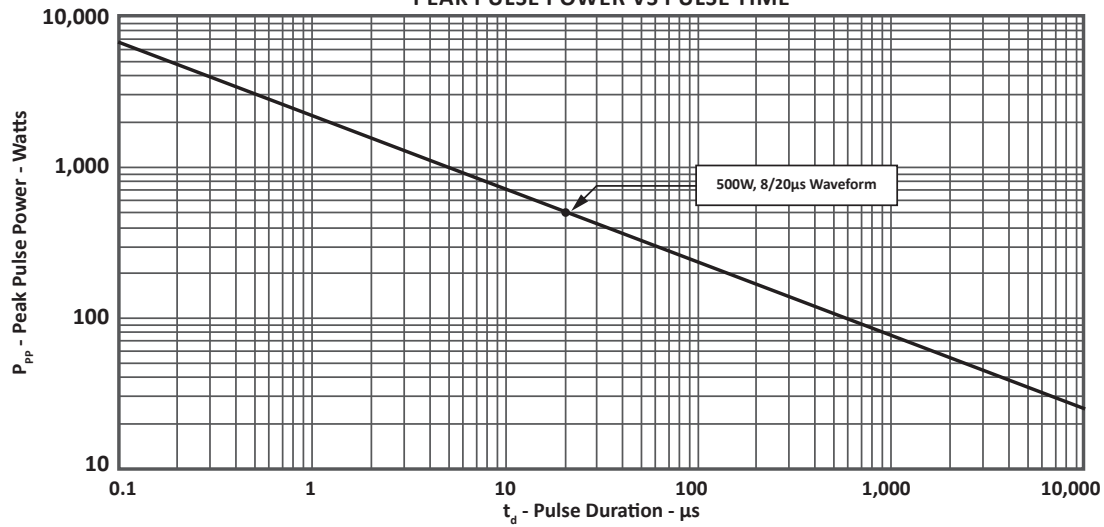


FIGURE 2  
PULSE WAVE FORM

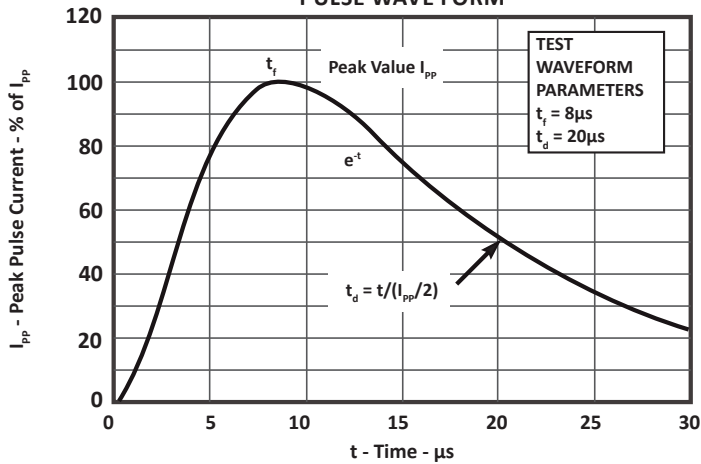
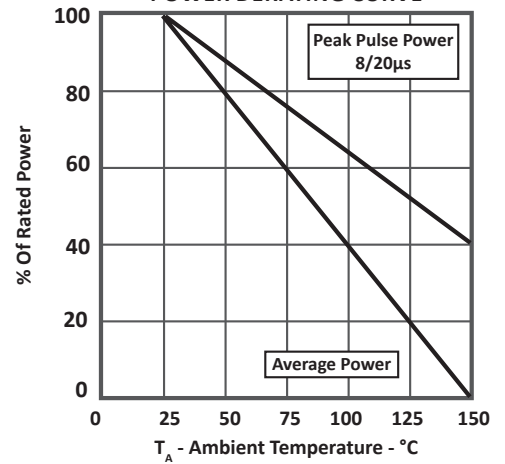
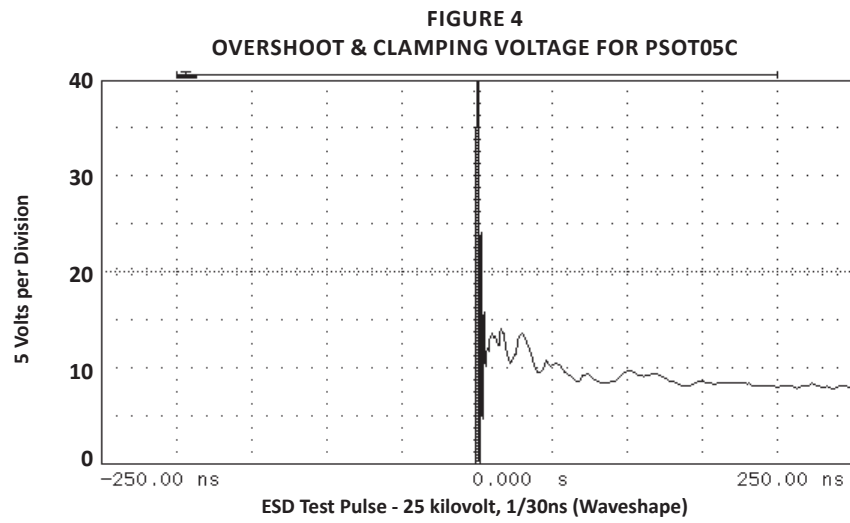
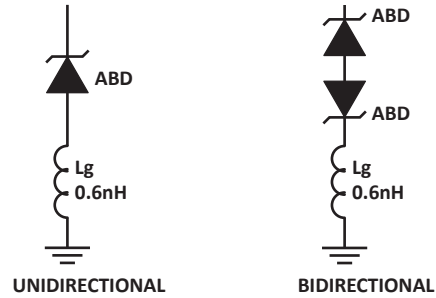


FIGURE 3  
POWER DERATING CURVE



**TYPICAL DEVICE CHARACTERISTICS**

## SPICE MODEL

**FIGURE 1**  
**SPICE MODEL FOR**


ABD - Avalanche Breakdown Diode (TVS)  
 Lg - Lead Inductance

**TABLE 1 - SPICE PARAMETERS**

| PARAMETER       | UNIT | ABD(TVS)    |
|-----------------|------|-------------|
| BV              | V    | See Table 2 |
| IBV             | μA   | 1           |
| C <sub>jo</sub> | pF   | See Table 2 |
| I <sub>s</sub>  | A    | See Table 2 |
| V <sub>j</sub>  | V    | 0.6         |
| M               | -    | 0.33        |
| N               | -    | 1           |
| R <sub>s</sub>  | Ohms | See Table 2 |
| TT              | s    | 1E-8        |
| EG              | eV   | 1.11        |

**TABLE 2 - ABD SPECIFIC SPICE PARAMETERS**

| PART NUMBER | B <sub>v</sub> (VOLTS) | C <sub>jo</sub> (pF) | I <sub>s</sub> (AMPS) | Rs(OHMS) |
|-------------|------------------------|----------------------|-----------------------|----------|
| PSOT03      | 4.5                    | 438                  | 1E-13                 | 0.21     |
| PSOT05      | 6.0                    | 284                  | 1E-13                 | 0.21     |
| PSOT08      | 8.5                    | 146                  | 1E-13                 | 0.21     |
| PSOT12      | 13.3                   | 123                  | 1E-13                 | 0.21     |
| PSOT15      | 16.7                   | 102                  | 1E-13                 | 0.21     |
| PSOT24      | 26.7                   | 61                   | 1E-13                 | 0.21     |
| PSOT36      | 40.0                   | 40                   | 1E-13                 | 0.21     |
| PSOT03C     | 4.5                    | 219                  | 1E-13                 | 0.28     |
| PSOT05C     | 6.0                    | 142                  | 1E-13                 | 0.28     |
| PSOT08C     | 8.5                    | 73                   | 1E-13                 | 0.28     |
| PSOT12C     | 13.3                   | 62                   | 1E-13                 | 0.28     |
| PSOT15C     | 16.7                   | 51                   | 1E-13                 | 0.28     |
| PSOT24C     | 26.7                   | 30                   | 1E-13                 | 0.28     |
| PSOT36C     | 40.0                   | 20                   | 1E-13                 | 0.28     |

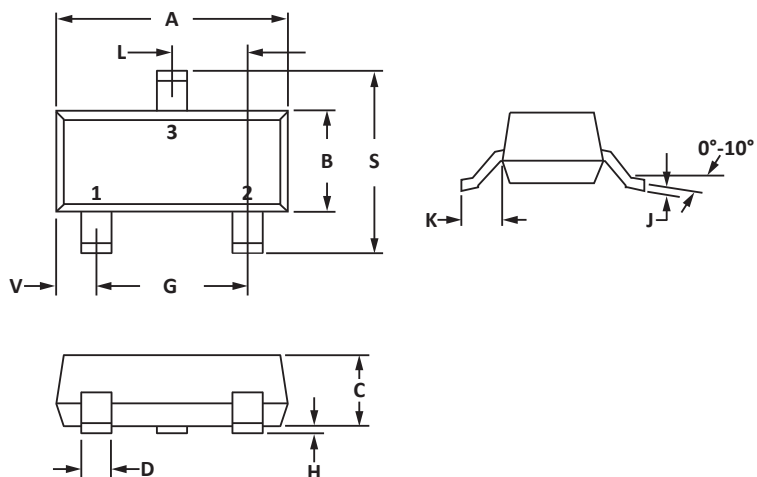
## SOT-23 PACKAGE INFORMATION

## 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.

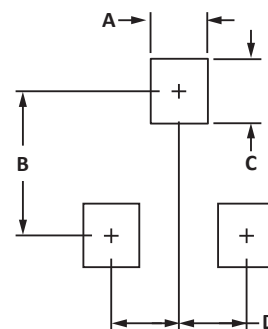


## PAD LAYOUT DIMENSIONS

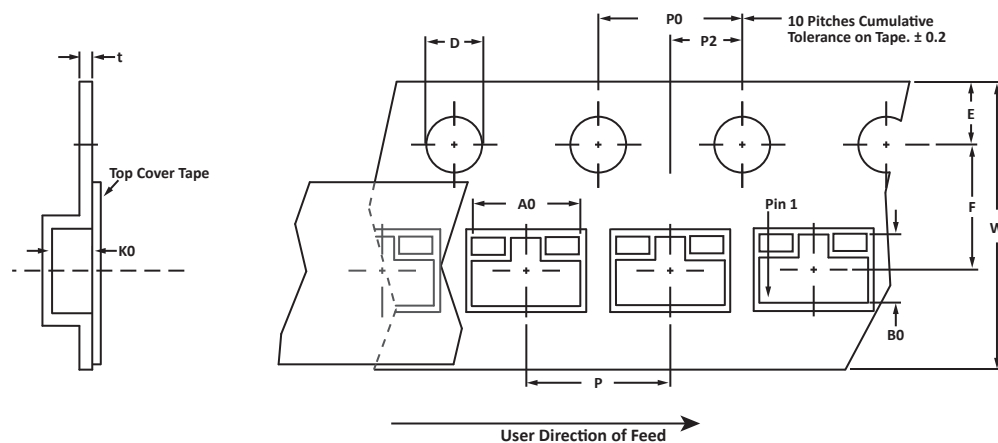
| DIM | MILLIMETERS |      | INCHES |       |
|-----|-------------|------|--------|-------|
|     | MIN         | MAX  | MIN    | MAX   |
| A   | 0.71        | 0.97 | 0.028  | 0.038 |
| B   | 1.88        | 2.13 | 0.074  | 0.084 |
| C   | 0.71        | 0.97 | 0.028  | 0.038 |
| D   | 0.81        | 1.07 | 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<br>(xx = Voltage) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| PSOTxx/PSOTxxC                     | -LF             | -T7         | 3000     | 7"        | n/a      |
| PSOTxx/PSOTxxC                     | -LF             | -T13        | 10,000   | 13"       | n/a      |

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 high performance interface and linear products. They include analog switches; multiplexers; LED drivers; LED wafer die for ESD protection; audio control ICs; RF and related high frequency products.

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