

## 500 WATT MULTI-LINE TVS ARRAY



### DESCRIPTION

The SMDAxxCM Series are monolithic transient voltage suppressor arrays that provides board level protection for standard TTL and MOS bus line applications against the damaging effects of ESD, tertiary lightning and switching transients.

The SMDAxxCM Series has a peak pulse power rating of 500 Watts for an 8/20 $\mu$ s waveshape. This device series 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): 12A, 8/20 $\mu$ s - Level 1(Line-Gnd) & Level 2(Line-Line)
- 500 Watts Peak Pulse Power per Line (tp = 8/20 $\mu$ s)
- Bidirectional Configuration
- Available in Multiple Voltages Ranging from 5V to 24V
- Protects 4-7 Lines
- Monolithic Design
- RoHS Compliant
- REACH Compliant

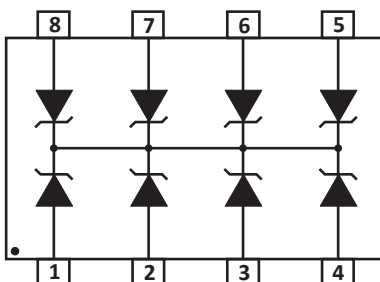
### APPLICATIONS

- RS-232, RS-422 & RS-423 Data Lines
- Microprocessor Based Equipment
- Control & Monitoring Systems
- Portable Electronics
- Sensor Electronics
- Medical Electronics

### 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 ( $t_p = 8/20\mu s$ ) - See Figure 1 | $P_{PP}$  | 500        | Watts |

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

| PART NUMBER | DEVICE MARKING | RATED STAND-OFF VOLTAGE<br><br>$V_{WM}$<br>VOLTS | MINIMUM BREAKDOWN VOLTAGE<br><br>@1mA<br>$V_{(BR)}$<br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2)<br><br>@ $I_p = 1A$<br>$V_c$<br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2)<br><br>@ 8/20 $\mu s$<br>$V_c @ I_{PP}$ | MAXIMUM LEAKAGE CURRENT<br><br>@ $V_{WM}$<br>$I_D$<br>$\mu A$ | MAXIMUM CAPACITANCE<br><br>@0V, 1MHz<br>C<br>pF |
|-------------|----------------|--|--|---|---|---|---|
| SMDA05CM    | REB            | 5.0  | 6.0  | 9.8   | 19.0V @ 30.0A   | 100   | 350   |
| SMDA08CM    | REC            | 8.0  | 8.5  | 13.4  | 23.7V @ 24.0A   | 10  | 300   |
| SMDA12CM    | RED            | 12.0   | 13.4   | 19.0  | 29.2V @ 20.0A   | 1   | 150   |
| SMDA15CM    | REF            | 15.0   | 16.7   | 24.0  | 31.1V @ 18.0A   | 1   | 100   |
| SMDA24CM    | REH            | 24.0   | 26.7   | 43.0  | 45.0V @ 13.0A   | 1   | 63  |

## TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
PEAK PULSE POWER VS PULSE TIME

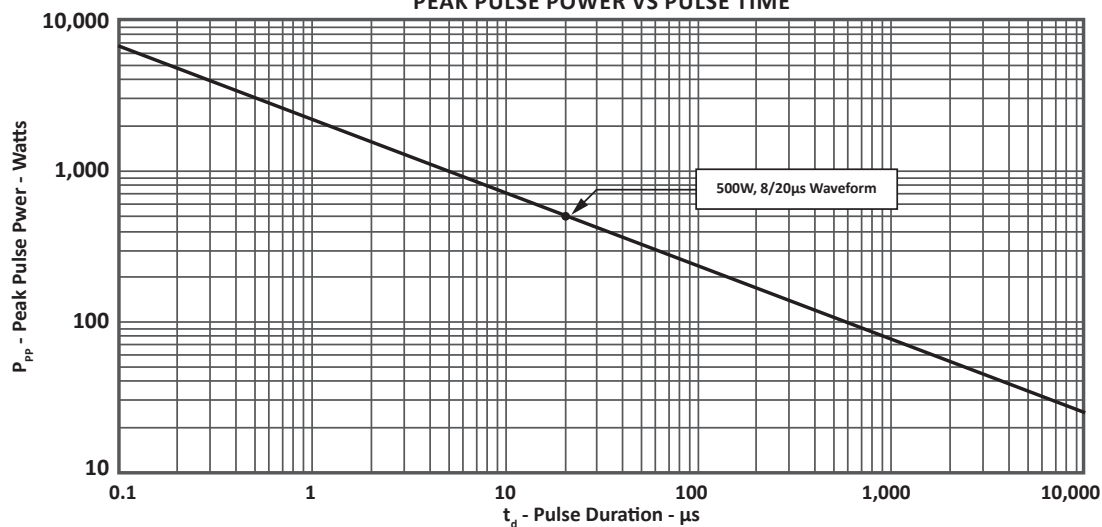


FIGURE 2  
PULSE WAVE FORM

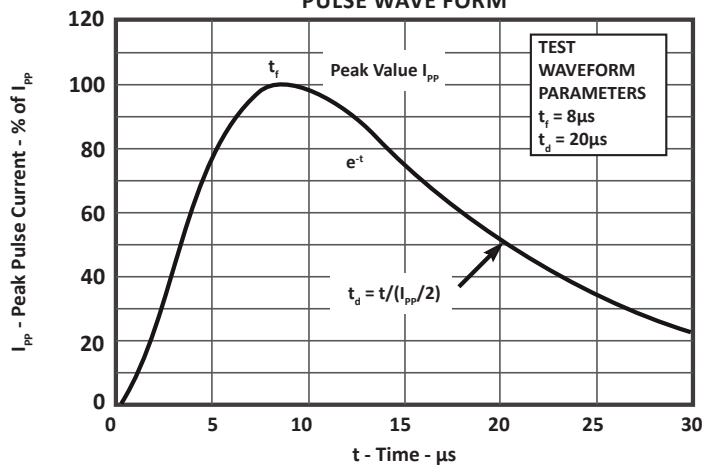
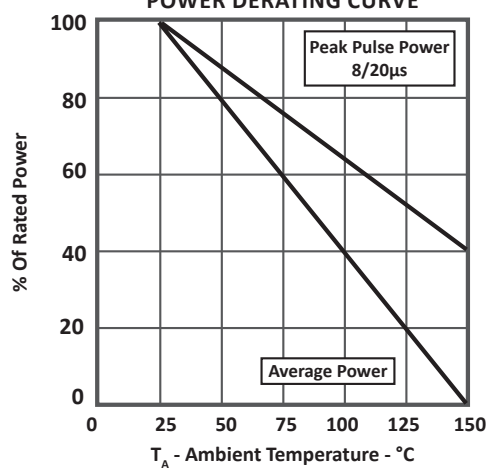
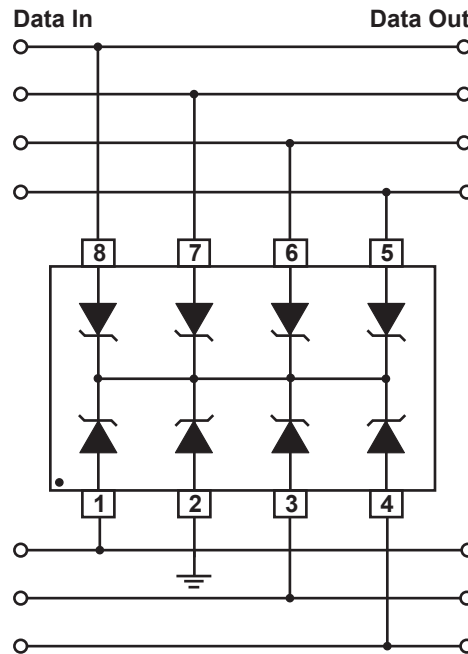


FIGURE 3  
POWER DERATING CURVE



## APPLICATION INFORMATION



**FIGURE 1 - UNIDIRECTIONAL COMMON-MODE PROTECTION**

A SMDAxxCM can protect up to 7 I/O lines. Each, a bidirectional device, can be used on the data lines with signals that are ac in nature. i.e. their amplitude being positive and negative with respect to ground.

The standoff voltage ( $V_{WM}$ ) and breakdown voltage ( $B_{VR}$ ) specifications apply to the Differential voltage applied across any two pins. Taking the SMDA24CM as an example for further discussion, it being a 24V rated device it can handle  $\pm 12V$  between any two lines. The SMDA24CM is connected as follows:

- Pins 1,3,4,5,6,7,8 are connected to the lines that need protection.
- Pin 2 is connected to ground. (Any one pin from Pins 2,3,6 and 7 can be chosen to be the ground pin. They provide shorter path to the current within the chip.) During PCB design ensure that the Ground connection made to Pin 2 is directly to the ground plane to avoid needless parasitic inductance that can be introduced by longer PCB traces.

## CIRCUIT BOARD RECOMMENDATIONS

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

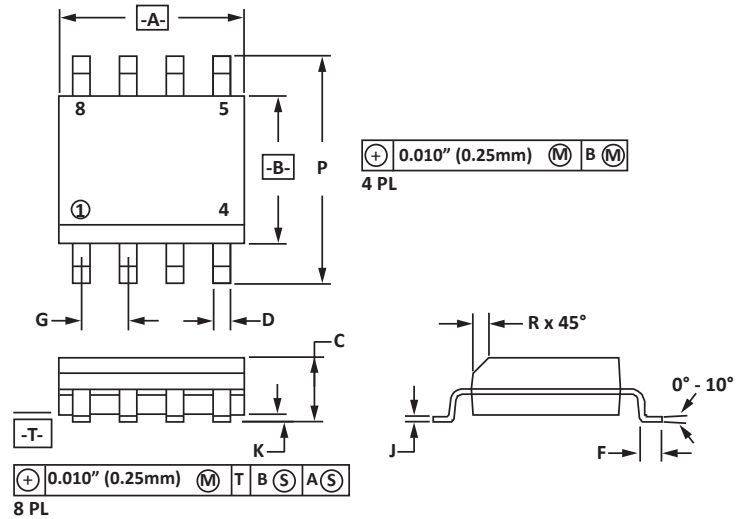
- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including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

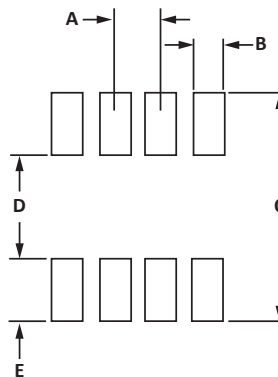
1. -T- = Seating plane and datum surface.
2. Dimensions "A" and "B" are datum.
3. Dimensions "A" and "B" do not include mold protrusion.
4. Maximum mold protrusion is 0.015" (0.380mm) per side.
5. Dimensioning and tolerances per ANSI Y14.5M, 1982.
6. Dimensions are exclusive of mold flash and metal burrs.



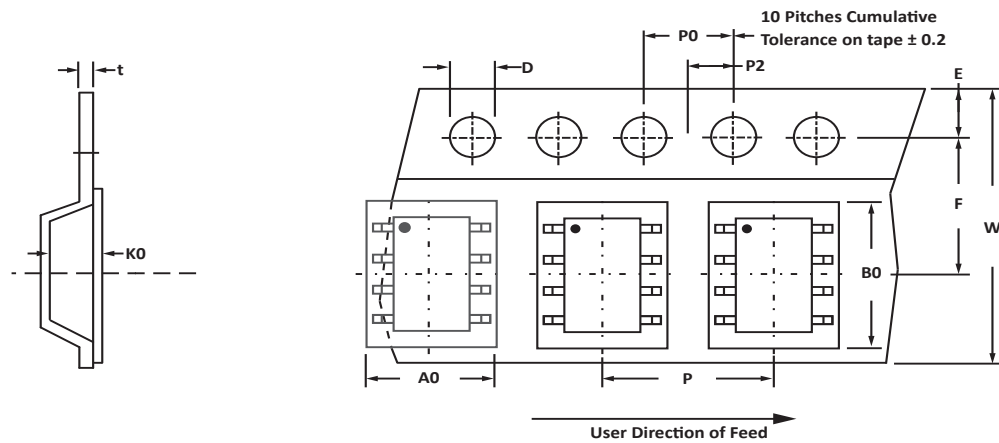
| PAD LAYOUT DIMENSIONS |             |      |        |       |
|-----------------------|-------------|------|--------|-------|
| DIM                   | MILLIMETERS |      | INCHES |       |
|                       | MIN         | MAX  | MIN    | MAX   |
| A                     | 1.14        | 1.40 | 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

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") | 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 | 4.00 ± 0.10 | 0.25 |

## NOTES

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

Package outline, pad layout and tape specifications per document number 06009.R3 9/10.

## ORDERING INFORMATION

| BASE PART NUMBER<br>(xx = Voltage) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| SMDAxxCM                           | -LF             | -T7         | 1,000    | 7"        | 98       |
| SMDAxxCM                           | -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 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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