

## STANDARD CAPACITANCE TVS ARRAY

### APPLICATIONS

- ✓ Notebook Computers
- ✓ Cellular Phone Base Stations
- ✓ Personal Digital Assistant (PDA)
- ✓ Digital Cameras

### IEC COMPATIBILITY (EN61000-4)

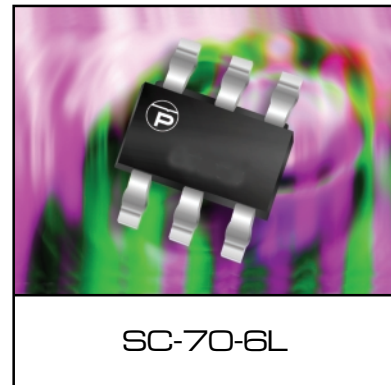
- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns

### FEATURES

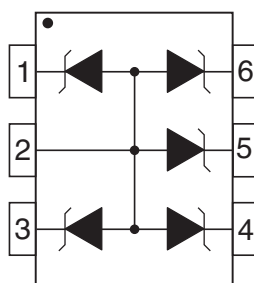
- ✓ 100 Watts Peak Pulse Power per Line ( $t_p=8/20\mu s$ )
- ✓ Monolithic Design
- ✓ Available in Multiple Voltage Types Ranging From 5V to 24V
- ✓ Protect 4 Lines Bidirectional and 5 Lines Unidirectional
- ✓ ESD Protection > 25 kilovolts
- ✓ Low Clamping Voltage

### MECHANICAL CHARACTERISTICS

- ✓ Molded JEDEC SC-70-6L Package
- ✓ Weight 14 milligrams (Approximate)
- ✓ Flammability rating UL 94V-0
- ✓ 8mm Tape and Reel Per EIA Standard 481
- ✓ Marking: Marking Code & Pin One Defined By DOT on Package



### PIN CONFIGURATIONS

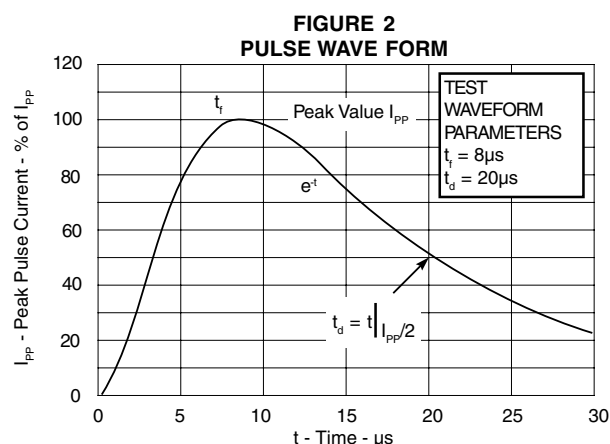
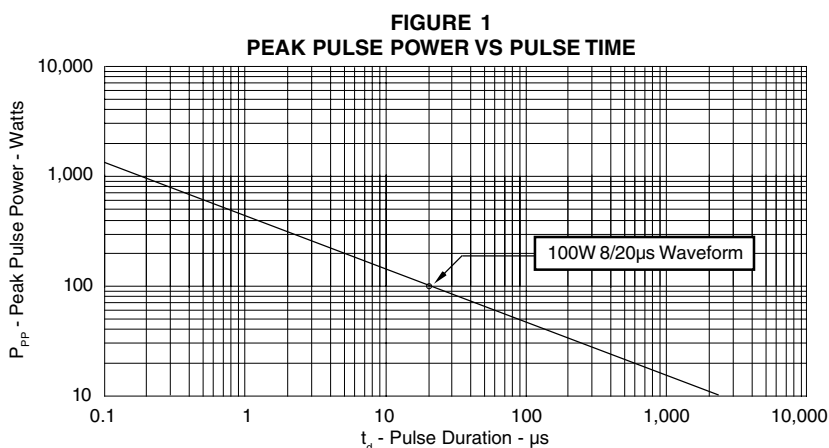


## DEVICE CHARACTERISTICS

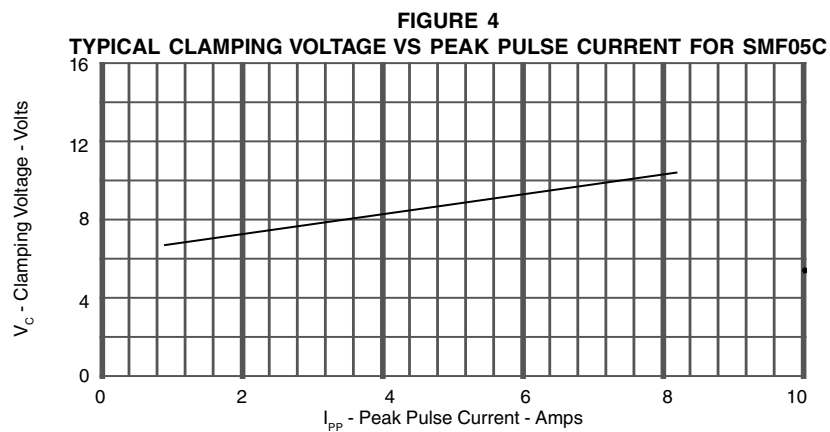
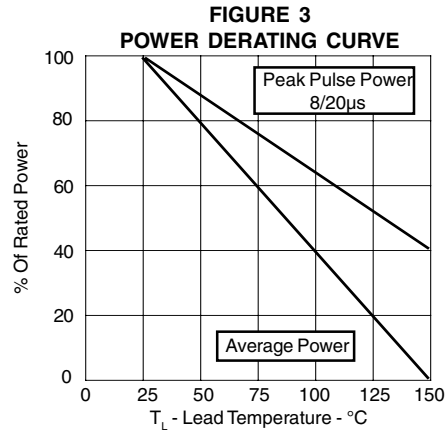
| MAXIMUM RATINGS @ 25°C Unless Otherwise Specified     |           |                |       |
|---|-----------|----------------|-------|
| PARAMETER   | SYMBOL    | VALUE          | UNITS |
| Peak Pulse Power ( $t_p = 8/20\mu s$ ) - See Figure 1 | $P_{PP}$  | 100            | Watts |
| Operating Temperature                                 | $T_J$     | -55°C to 150°C | °C    |
| Storage Temperature                                   | $T_{STG}$ | -55°C to 150°C | °C    |

| ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified |                |                         |                              |                                       |                                       |                                |                                  |
|---|----------------|-------------------------|------------------------------|---------------------------------------|---------------------------------------|--------------------------------|----------------------------------|
| PART NUMBER   | DEVICE MARKING | RATED STAND-OFF VOLTAGE | MINIMUM BREAKDOWN VOLTAGE    | MAXIMUM CLAMPING VOLTAGE (See Fig. 2) | MAXIMUM CLAMPING VOLTAGE (See Fig. 2) | MAXIMUM LEAKAGE CURRENT        | TYPICAL CAPACITANCE (See Note 1) |
|   |                | $V_{WM}$<br>VOLTS       | @ 1mA<br>$V_{(BR)}$<br>VOLTS | @ $I_p = 5A$<br>$V_C$<br>VOLTS        | @ 8/20 $\mu s$<br>$V_C$ @ $I_{PP}$    | @ $V_{WM}$<br>$I_D$<br>$\mu A$ | @ 0V, 1 MHz<br>$C_J$<br>pF       |
| SMF05C  | 05C            | 5.0                     | 6.0                          | 9.8                                   | 10.0V @ 10.0A                         | 5                              | 60                               |
| SMF12C  | 12C            | 12.0                    | 13.3                         | -                                     | 23.8V @ 4.2A                          | 1                              | 30                               |
| SMF15C  | 15C            | 15.0                    | 16.7                         | -                                     | 33.3V @ 3.0A                          | 1                              | 25                               |
| SMF24C  | 24C            | 24.0                    | 26.7                         | -                                     | 55.5V @ 1.8A                          | 1                              | 20                               |

**Note 1:** Pins 1, 3, 4, 5 or 6 to pin 2.



## GRAPHS



## APPLICATION NOTE

The SMFC Series are TVS arrays designed to protect I/O or data lines from the damaging effects of ESD or EFT. This product provides both unidirectional and bidirectional protection, with a surge capability of 100 Watts  $P_{PP}$  per line for an 8/20 $\mu$ s waveshape and ESD protection > 25 kilovolts.

### UNIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 1)

The SMFC Series provides up to four (4) lines of protection in a common-mode configuration as depicted in Figure 1.

Circuit connectivity is as follows:

- ✓ Line 1 is connected to Pin 1.
- ✓ Line 2 is connected to Pin 3.
- ✓ Line 3 is connected to Pin 4.
- ✓ Line 4 is connected to Pin 6.
- ✓ Pin 2 is connected to ground.

### BIDIRECTIONAL DIFFERENTIAL-MODE CONFIGURATION (Figure 2)

The SMFC Series provides up to five (5) lines of protection in a differential-mode configuration as depicted in Figure 2.

Circuit connectivity is as follows:

- ✓ Line 1 is connected to Pin 1.
- ✓ Line 2 is connected to Pin 3.
- ✓ Line 3 is connected to Pin 4.
- ✓ Line 4 is connected to Pin 5.
- ✓ Line 5 is connected to Pin 6.
- ✓ Pin 2 is not connected.

### CIRCUIT BOARD LAYOUT RECOMMENDATIONS

Circuit board layout is critical for Electromagnetic Compatibility (EMC) 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.

Figure 1 - Unidirectional Configuration  
Common-Mode I/O Port Protection

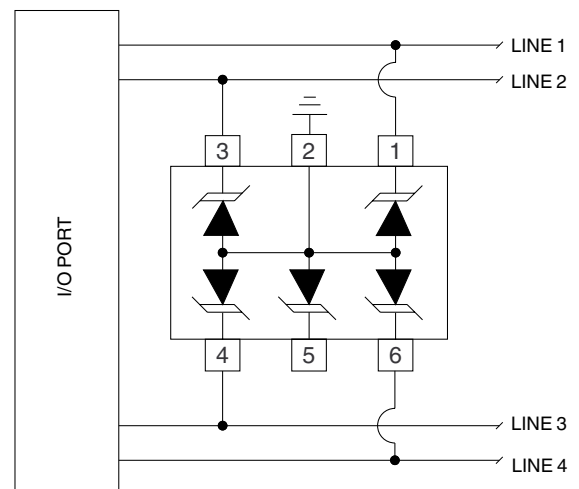
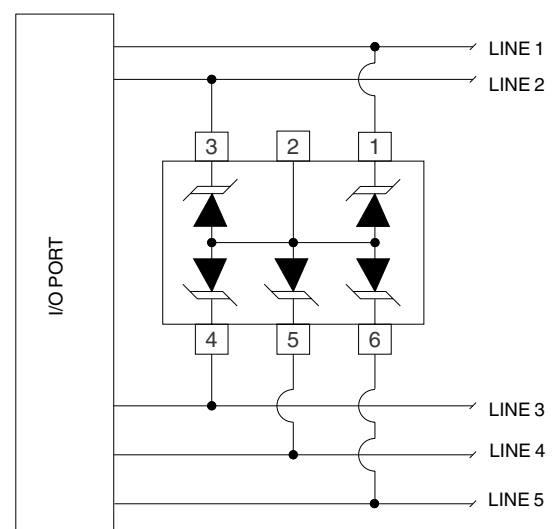
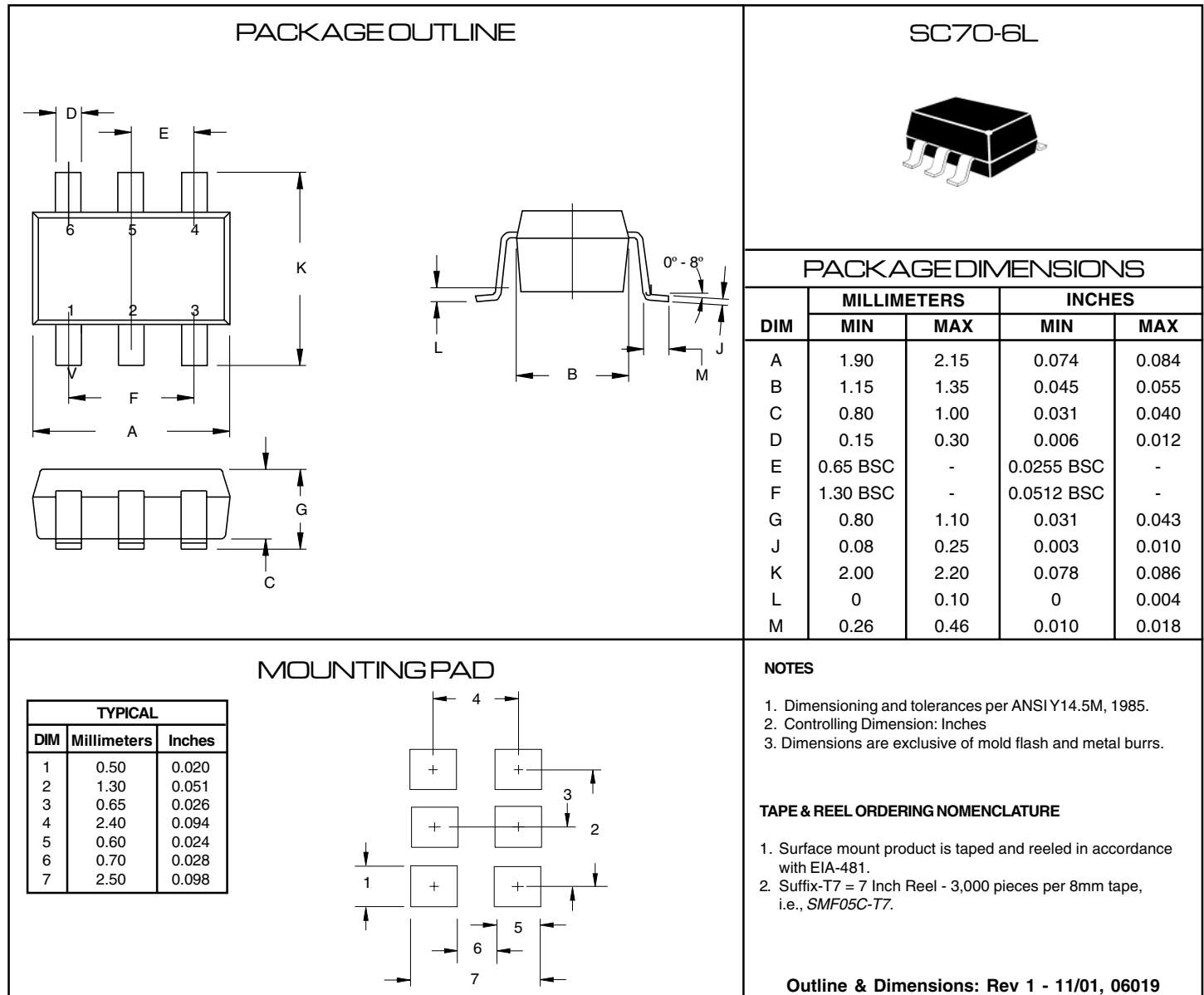


Figure 2 - Bidirectional Configuration  
Differential-Mode I/O Port Protection



## PACKAGE OUTLINE & DIMENSIONS



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### ProTek Devices

2929 South Fair Lane, Tempe, AZ 85282

Tel: 602-431-8101 Fax: 602-431-2288

E-Mail: [sales@protekdevices.com](mailto:sales@protekdevices.com)

Web Site: [www.protekdevices.com](http://www.protekdevices.com)