

APPLICATIONS

- ✓ Ethernet - 10 Base T
- ✓ Cellular Phones
- ✓ Handheld Electronics
- ✓ FireWire & USB Interfaces

IEC COMPATIBILITY (EN61000-4)

- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns
- ✓ 61000-4-5 (Surge): 12A, 8/20 μ s - Level 1(Line-Gnd) & Level 2(Line-Line)

FEATURES

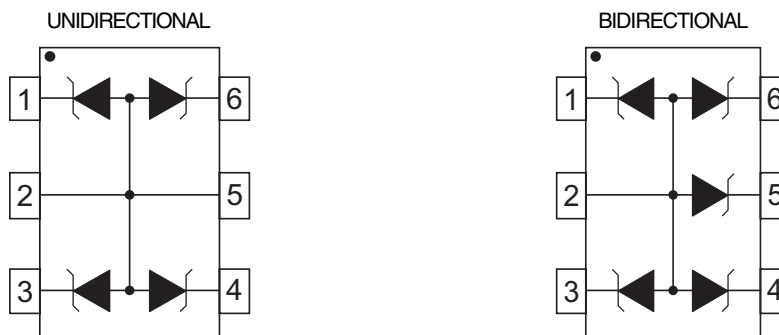
- ✓ 350 Watts Peak Pulse Power per Line ($t_p=8/20\mu$ s)
- ✓ Monolithic Design
- ✓ Available in Multiple Voltage Types Ranging From 5V to 24V
- ✓ Protects 4 Lines
- ✓ ESD Protection > 25 kilovolts
- ✓ Low Clamping Voltage
- ✓ Unidirectional & Bidirectional Configurations
- ✓ Low Leakage Current
- ✓ RoHS Compliant

MECHANICAL CHARACTERISTICS

- ✓ Molded JEDEC SOT-23-6 Package
- ✓ Weight 16 milligrams (Approximate)
- ✓ Available in Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- ✓ Consult Factory for Leaded Device Availability
- ✓ 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



PSMS05 thru PSMS24C

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} | 350 | 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 (See Notes 1-3) | DEVICE MARKING | RATED STAND-OFF VOLTAGE V_{WM} VOLTS | MINIMUM BREAKDOWN VOLTAGE @ 1mA $V_{(BR)}$ VOLTS | MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ $I_p = 1A$ V_C VOLTS | MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ 8/20 μs V_C @ I_{PP} | MAXIMUM LEAKAGE CURRENT @ V_{WM} I_b μA | TYPICAL CAPACITANCE (See Note 4) 0V @ 1 MHz C_j pF |
|--------------------------------|----------------|--|---|--|--|---|--|
| PSMS05 | PRH | 5.0 | 6.0 | 9.8 | 21.0V @ 17.0A | 20 | 150 |
| PSMS05C | PRL | 5.0 | 6.0 | 9.8 | 21.0V @ 17.0A | 20 | 150 |
| PSMS12 | PRI | 12.0 | 13.3 | 19 | 29.2V @ 12.0A | 1 | 80 |
| PSMS12C | PRM | 12.0 | 13.3 | 19 | 29.2V @ 12.0A | 1 | 80 |
| PSMS15 | PRJ | 15.0 | 16.7 | 24 | 34.6V @ 10.0A | 1 | 50 |
| PSMS15C | PRN | 15.0 | 16.7 | 24 | 34.6V @ 10.0A | 1 | 50 |
| PSMS24 | PRK | 24.0 | 26.7 | 43 | 58.3V @ 6.0A | 1 | 40 |
| PSMS24C | PRO | 24.0 | 26.7 | 43 | 58.3V @ 6.0A | 1 | 40 |

Note 1: Part numbers with an additional "C" suffix are bidirectional devices, i.e., PSMS05C.

Note 2: *Unidirectional Only:* Test between pin 1 to 2 or 5, 4 to 2 or 5, 6 to 2 or 5, 3 to 2 or 5.

Note 3: *Bidirectional Only:* Test between pin 5 to 1 or 3 or 4 or 6. Electrical characteristics apply in both directions.

Note 4: *Unidirectional Only:* Capacitance measured between pins 1, 3, 4, 6, to 2.

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

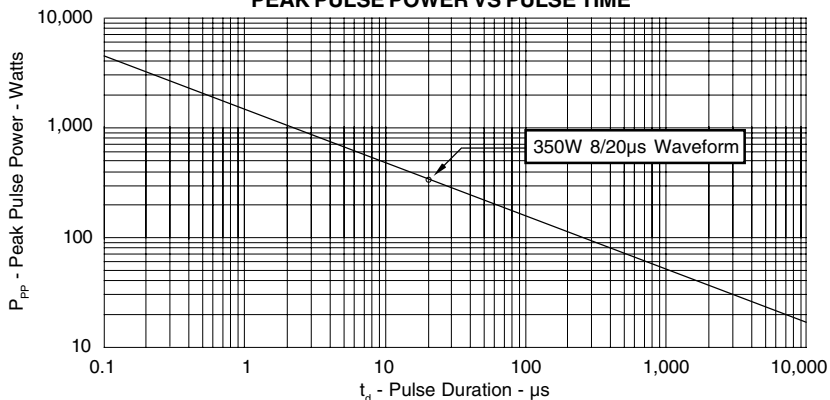
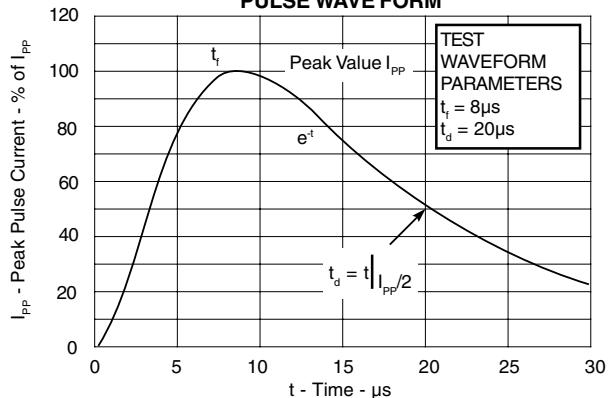
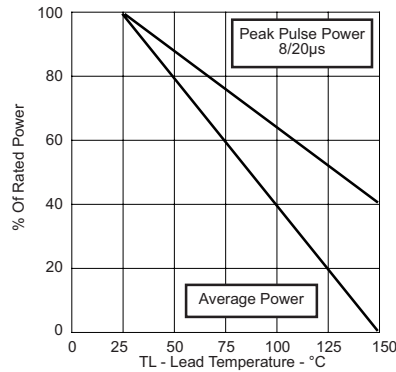


FIGURE 2
PULSE WAVE FORM

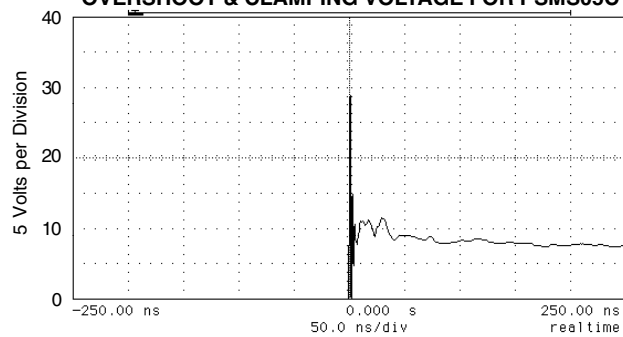


GRAPHS

**FIGURE 3
POWER DERATING CURVE**

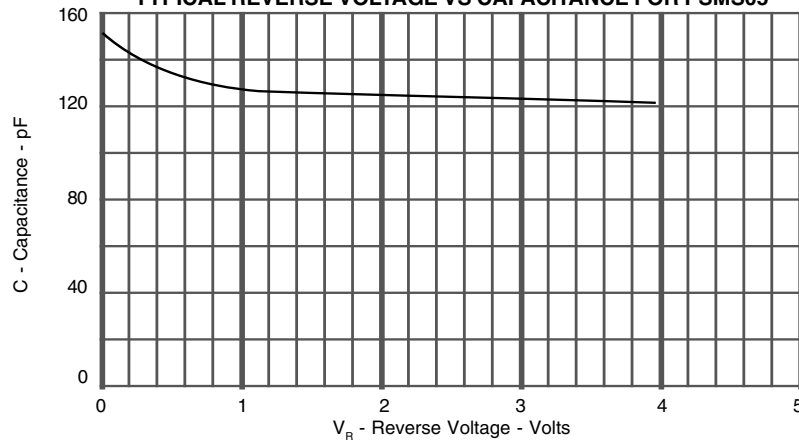


**FIGURE 4
OVERSHOOT & CLAMPING VOLTAGE FOR PSMS05C**



ESD Test Pulse: 25 kilovolt, 1/30ns (waveform)

**FIGURE 5
TYPICAL REVERSE VOLTAGE VS CAPACITANCE FOR PSMS05**



APPLICATION NOTE

The PSMS Series are TVS arrays designed to protect I/O or data lines from the damaging effects of ESD or EFT. This product series provides both unidirectional and bidirectional protection, with a surge capability of 350 Watts P_{PP} per line for an 8/20 μ s waveform and ESD protection > 25 kilovolts.

UNIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 1)

The PSMS 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 5 is connected to ground.
- ✓ Pin 2 is not connected.

BIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 2)

The PSMSxxC Series provides up to four (4) lines of protection in a common-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.
- ✓ Pin 6 is connected to ground.
- ✓ 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

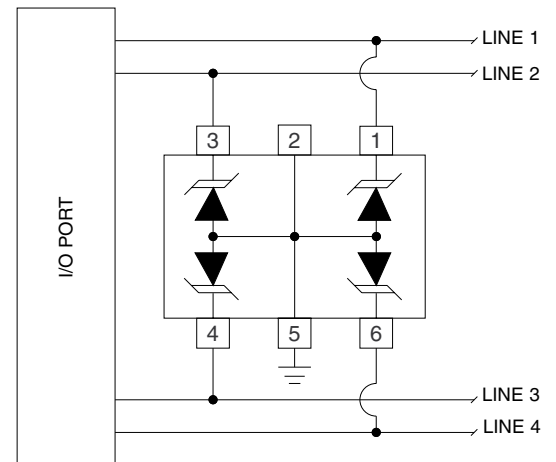
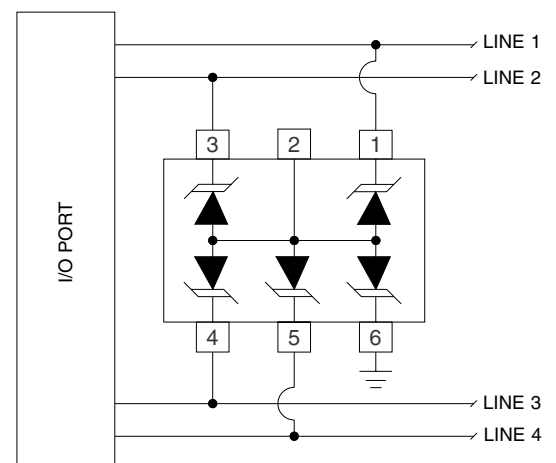


Figure 2 - Bidirectional Configuration
Common-Mode I/O Port Protection



PSMS05 thru PSMS24C

SOT-23-6 PACKAGE OUTLINE & DIMENSIONS

| PACKAGE OUTLINE | | SOT-23-6 | | | |
|--------------------|-------------|----------|-----------|-----------|--|
| | | | | | |
| PACKAGE DIMENSIONS | | | | | |
| DIM | MILLIMETERS | | INCHES | | |
| | MIN | MAX | MIN | MAX | |
| A | 2.80 | 3.05 | 0.110 | 0.120 | |
| B | 1.50 | 1.75 | 0.059 | 0.070 | |
| C | 0.90 | 1.30 | 0.036 | 0.051 | |
| D | 0.35 | 0.50 | 0.014 | 0.020 | |
| E | 0.85 | 1.05 | 0.033 | 0.040 | |
| F | 1.70 | 2.10 | 0.067 | 0.083 | |
| G | 0.90 | 1.45 | 0.036 | 0.057 | |
| J | 0.09 | 0.20 | 0.003 | 0.008 | |
| K | 2.60 | 3.00 | 0.102 | 0.118 | |
| L | 0.20 TYP | 0.20 TYP | 0.007 TYP | 0.007 TYP | |
| M | 0.35 | 0.55 | 0.014 | 0.022 | |

| TYPICAL | | |
|---------|-------------|--------|
| DIM | Millimeters | Inches |
| 1 | 0.70 | 0.028 |
| 2 | 1.90 | 0.074 |
| 3 | 0.95 | 0.037 |
| 4 | 2.40 | 0.094 |
| 5 | 1.00 | 0.039 |

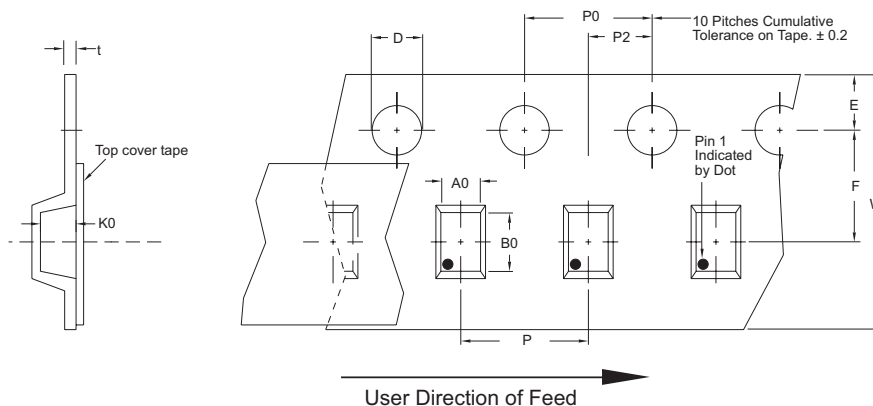
| MOUNTING PAD | | | | |
|--------------|--|--|--|--|
| | | | | |

| NOTES | |
|---|--|
| 1. Dimensioning and tolerances per ANSI Y14.5M, 1985. | |
| 2. Controlling Dimension: Inches | |
| 3. Dimensions are exclusive of mold flash and metal burrs. | |
| TAPE & REEL/BULK ORDERING NOMENCLATURE | |
| 1. Surface mount product is taped and reeled in accordance with EIA-481. | |
| 2. Suffix -T7 = 7 Inch Reel - 3,000 pieces per 8mm tape, i.e., <i>PSMS-T7</i> | |
| 3. Suffix -LF = Lead-Free, Pure-Tin Plating, i.e., <i>PSMS-LF-T7</i> . | |

Outline & Dimensions: Rev 2 - 10/05, 06013

Tape & Reel Specifications (Dimensions in millimeters)

| Reel Dia. | Tape Width | A0 | B0 | K0 | D | E | F | W | P0 | P2 | P | tmax |
|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|
| 178mm (7") | 8mm | 3.20 ± 0.10 | 3.20 ± 0.10 | 1.65 ± 0.10 | 1.50 ± 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 | 0.25 |



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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
 Web Site: www.protekdevices.com