

## SUBMINATURE MONOLITHIC TVS ARRAYS

### 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

### FEATURES

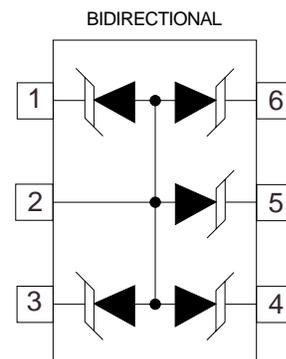
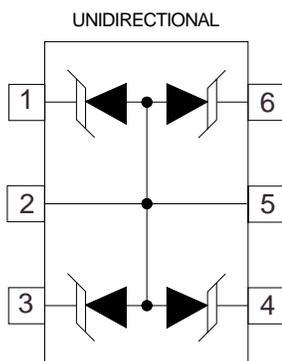
- ✓ ESD Protection > 25 kilovolts
- ✓ 350 Watts Peak Pulse Power per Line (8/20µs)
- ✓ Low Clamping Voltage
- ✓ Available in Multiple Voltage Types Ranging from 3V to 24V
- ✓ Unidirectional & Bidirectional Configurations
- ✓ Low Standby Current

### MECHANICAL CHARACTERISTICS

- ✓ Molded JEDEC SOT-23-6
- ✓ Weight 0.6 grams (Approximate)
- ✓ Flammability Rating UL 94V-0
- ✓ 8mm Tape and Reel Per EIA Standard 481-1-A
- ✓ Device Marking: Marking Code & Logo
- ✓ Pin One Defined By DOT on Top of Package



### CIRCUIT DIAGRAMS



## 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	$T_J$	-55°C to 150°C	°C
Storage Temperature	$T_{STG}$	-55°C to 150°C	°C

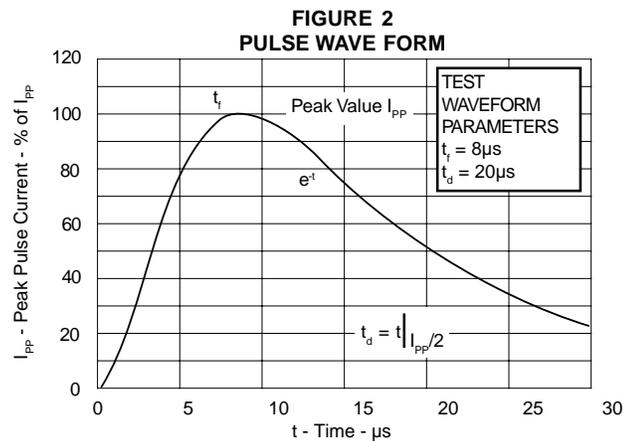
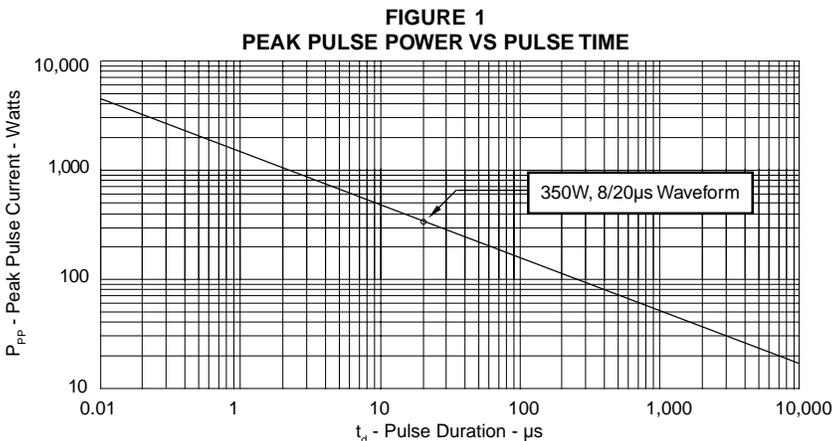
ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified							
PART NUMBER (See Notes 1, 2 & 3)	DEVICE MARKING	RATED STAND-OFF VOLTAGE	MINIMUM BREAKDOWN VOLTAGE	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM LEAKAGE CURRENT	TYPICAL CAPACITANCE (See Note 4)
		$V_{WM}$ VOLTS	@ 1mA $V_{(BR)}$ VOLTS	@ $I_p = 1A$ $V_C$ VOLTS	@ 8/20 $\mu s$ $V_C @ I_{PP}$	@ $V_{WM}$ $I_D$ $\mu A$	0V @ 1 MHz C pF
PSMS03	PRG	3.3	4.0	6.5	17.5V @ 20A	75	300
PSMS03C	PRP	3.3	4.0	6.5	17.5V @ 20A	75	150
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	75
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	40
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	25
PSMS24	PRK	24.0	26.7	40	58.3V @ 6.0A	1	40
PSMS24C	PRO	24.0	26.7	40	58.3V @ 6.0A	1	20

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

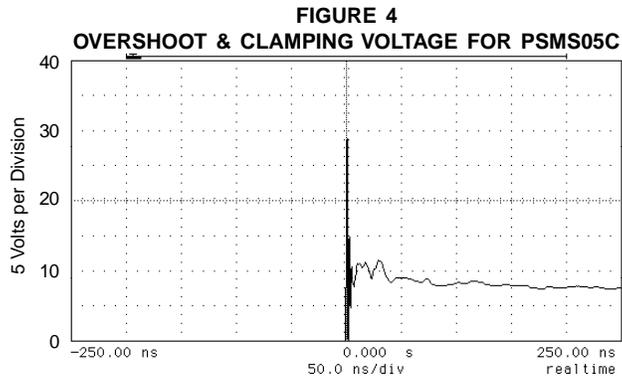
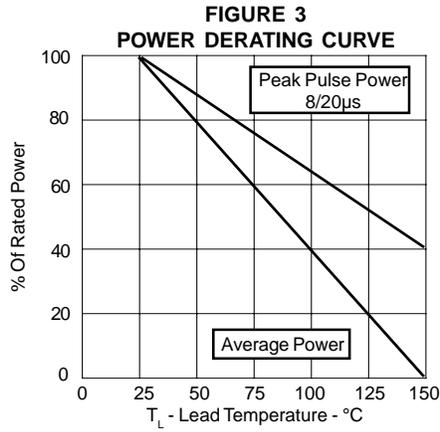
**Note 2:** *Unidirectional Only:* Test between pin 1 to 2 or 5, 4 to 2 or 5, 6 to 2 or 5, 3 to 2 or 5.

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

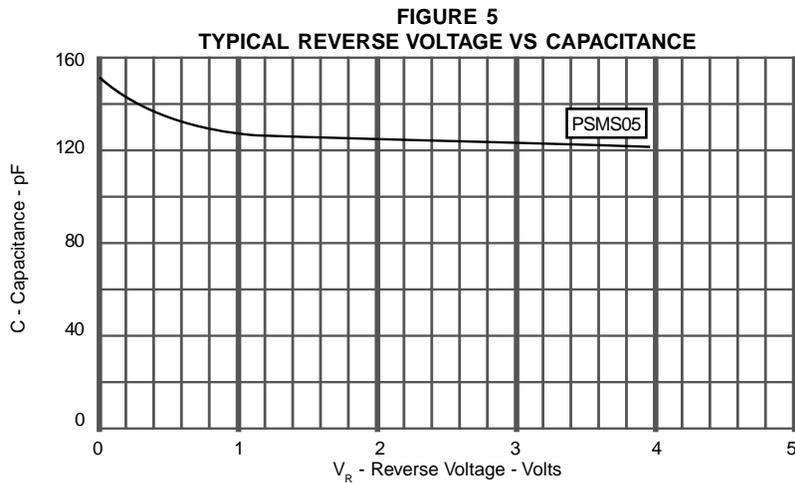
**Note 4:** *Unidirectional Only:* Capacitance measured between pins 1, 3, 4, 6, to 2. *Bidirectional Only:* Capacitance measured between pins 1, 3, 4, 6 to 5.



GRAPHS



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



## APPLICATION NOTES

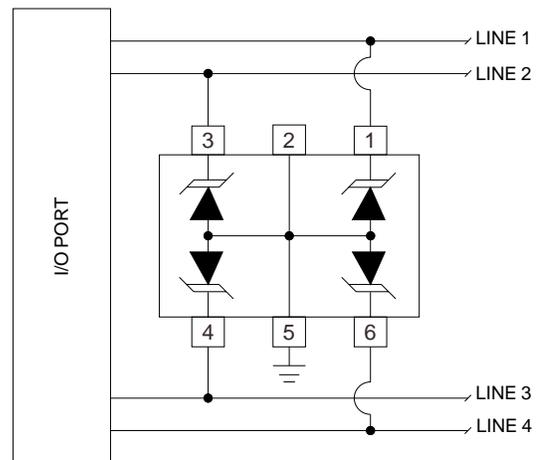
The PSMS Series are TVS arrays designed to protect I/O or data lines from the damaging effects of ESD (> 25kV) or EFT. This product series provides both unidirectional and bidirectional protection, with a surge capability of 350 Watts  $P_{pp}$  per line for an 8/20 $\mu$ s waveform.

### 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.



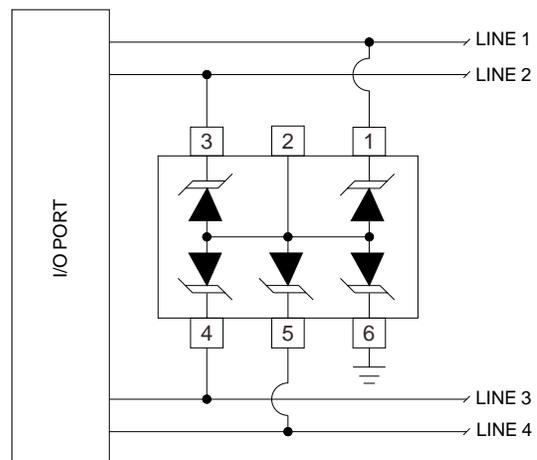
**Figure 1 - Unidirectional Configuration  
Common-Mode I/O Port Protection**

### BIDIRECTIONAL COMMON MODE CONFIGURATION (Figure 1)

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.



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

### 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.

# PSMS03 thru PSMS24C

## PACKAGE OUTLINE & DIMENSIONS

### PACKAGE OUTLINE

### SOT-23-6

PACKAGEDIMENSIONS				
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	0.090	0.20	0.0035	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

### 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.

**06013 Rev 1 - 11/01**

### TAPE & REEL PACKAGING:

Surface mount product is taped and reeled in accordance with EIA-481, reel quantities and sizes are as follows:  
 7 Inch Reel - 3,000 pieces per reel; 13 Inch Reel - 10,000 pieces per reel

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