

## PSRDA3.3-4 thru PSRDA15-4

### STEERING DIODE / TVS ARRAY COMBO

#### **APPLICATIONS**

- ✓ Ethernet 10/100 Base T
- ✓ Computer I/O Ports SCSI, FireWire & USB
- ✓ Set-Top Box Protection
- ✓ Video Card

#### IEC COMPATIBILITY (EN61000-4)

✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV

√ 61000-4-4 (EFT): 40A - 5/50ns

✓ 61000-4-5 (Surge): 24A, 8/20µs - Level 2(Line-Gnd) & Level 3(Line-Line)

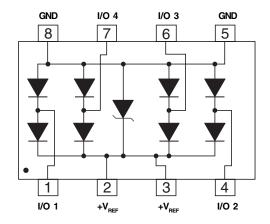
#### **FEATURES**

- ✓ 500 Watts Peak Pulse Power per Line (tp=8/20µs)
- ✓ Unidirectional Configuration
- ✓ Available in 4 Voltage Types: 3.3V to 15V
- ✔ Protects Up to Four (4) I/O Ports
- ✓ ESD Protection > 40 kilovolts
- **✓ LOW CAPACITANCE: 15pF**

#### **MECHANICAL CHARACTERISTICS**

- ✓ Molded JEDEC SO-8 Package
- ✓ Weight 15 milligrams (Approximate)
- ✓ Flammability rating UL 94V-0
- ✓ 12mm Tape and Reel Per EIA Standard 481
- ✓ Marking: Logo, Marking Code, Date Code & Pin One Defined By Dot on Top of Package

#### **PINCONFIGURATION**





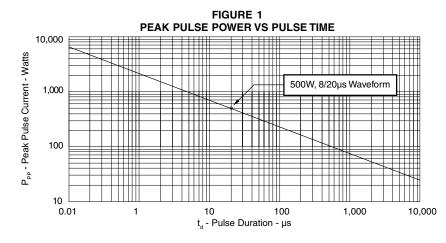
### **DEVICE CHARACTERISTICS**

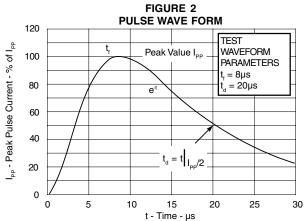
MAXIMUN RATINGS @ 25°C Unless Otherwise Specified						
PARAMETER	SYMBOL	VALUE	UNITS			
Peak Pulse Power (t <sub>p</sub> = 8/20μs) - See Figure 1	P <sub>PP</sub>	500	Watts			
Operating Temperature	T <sub>J</sub>	-55°C to 150°C	°C			
Storage Temperature	T <sub>STG</sub>	-55°C to 150°C	°C			
Maximum Forward Voltage @ 100mA (See Note 1)	$V_{F}$	1.1	Volts			

Note 1: Measured between pins 8 or 5 to 1, 2, 3, 4, 6 and 7.

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified							
PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE V <sub>WM</sub> VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1mA V <sub>(BR)</sub> VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)  @ I <sub>P</sub> = 1A V <sub>C</sub> VOLTE	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM LEAKAGE CURRENT @V <sub>WM</sub> I <sub>D</sub>	MAXIMUM CAPACITANCE (See Note 1) (See Figure 5)  @ 0V, 1 MHz  C (SED) pF
PSRDA3.3-4 PSRDA05-4 PSRDA12-4 PSRDA15-4	PRA PRB PRD PRE	3.3 5.0 12.0 15.0	4.0 6.0 13.3 16.7	6.5 9.8 19.0 24.0	V <sub>C</sub> @ I <sub>PP</sub> 10.9V @ 43.0A 13.5V @ 42.0A 25.9V @ 21.0A 30.0V @ 17.0A	μΑ 125 20 1 1	15 15 15 15

**Note 1:** Capacitance measured at  $V_{\text{WM}} = V_{\text{CC}}$  connected between I/O pins to pin 8 and 5 (Gnd).  $V_{\text{R}} = V_{\text{WM}}$  @ 1MHz. As shown in Figure 5, REF1 is connected to ground, REF2 is connected to + $V_{\text{CC}}$ , and input applies to  $V_{\text{CC}} = 5V$ ,  $V_{\text{sign}} = \text{mV}$ , F = 1 MHz.

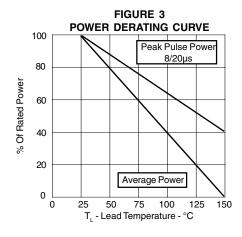


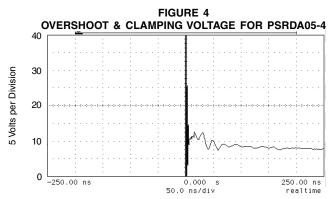


## **PSRDA3.3-4**

## PSRDA15-4

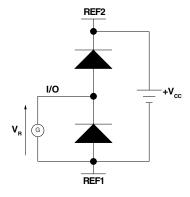
#### **GRAPHS**

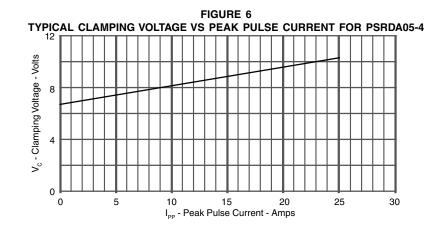




ESD Test Pulse: 8 kilovolt, 1/30ns (waveshape)

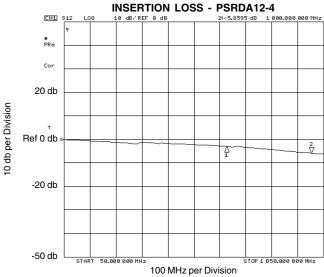
FIGURE 5
INPUT CAPACITANCE CIRCUIT





-50 db

FIGURE 7



EHI S11 L06 10 dB/REF 0 dB 3-11.260 dB 515.199 968 MHz

\* PRm
Cor 515.199958 MHz

20 db

-20 db

FIGURE 8

**RETURN LOSS - PSRDA12-4** 

100 MHz per Division

www.protekdevices.com

## **PSRDA3.3-4**

## PSRDA15-4

#### APPLICATION NOTE

The PSRDAxx-4 Series are low capacitance, unidirectional TVS arrays that are designed to protect I/O or high speed data lines from the damaging effects of ESD or EFT. This product series has a surge capability of 500 Watts  $P_{PP}$  per line for an 8/20 $\mu$ s waveshape and offers ESD protection > 40kV.

#### **DIFFERENTIAL-MODE CONFIGURATION (Figure 1)**

Ideal for use in USB applications, the PSRDAxx-4 Series provides up to four (4) lines of protection in a differential-mode configuration as depicted in Figure 1.

Circuit connectivity is as follows:

- ✔ Pins 1, 4, 6 and 7 are connected to the data lines.
- Pins 5 and 8 are connected to ground.
- ✓ Pins 2 and 3 are connected to the databus.

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

The PSRDAxx-4 Series also provides up to four (4) lines of protection in a differential-mode configuration as depicted in Figure 2 for T1/E1 applications.

Circuit connectivity is as follows:

- ✓ Pins 1, 4, 6 and 7 are connected to the data lines.
- ✔ Pins 5 and 8 are connected to ground.
- ✓ Pins 2 and 3 are connected to the databus.

#### 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. Typical Differential-Mode USB Protection

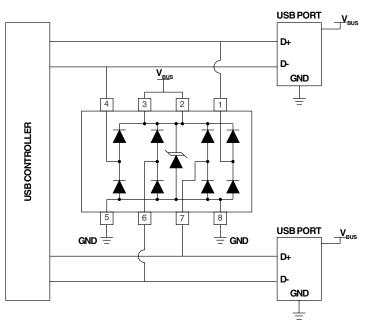
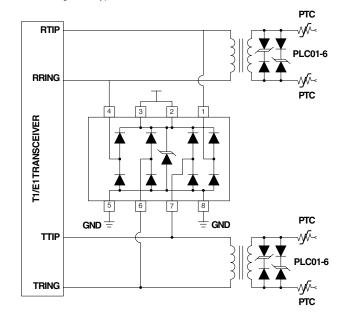


Figure 2. Typical Differential-Mode T1/E1 Protection



## **PSRDA3.3-4**

## PSRDA15-4

#### PACKAGE OUTLINE & DIMENSIONS

# **PACKAGE OUTLINE** 5 (0.25 MM) (M) B (M) -B-① R X 45° .0° - 10° (+) 0.010" (0.25 MM) M T B A S

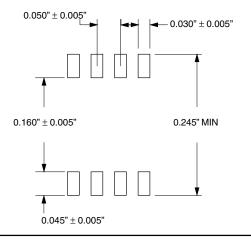
SO-8



#### **PACKAGE DIMENSIONS**

MILLIM	ETERS	INCHES		
MIN	MAX	MIN	MAX	
4.80	5.00	0.189	0.196	
3.80	4.00	0.150	0.157	
1.35	1.75	0.054	0.068	
0.35	0.49	0.014	0.019	
0.40	1.250	0.016	0.049	
1.27 BSC	1.27 BSC	0.05 BSC	0.05 BSC	
0.18	0.25	0.007	0.009	
0.10	0.25	0.004	0.008	
5.80	6.20	0.229	0.244	
0.25	0.50	0.010	0.019	
	MIN  4.80 3.80 1.35 0.35 0.40 1.27 BSC 0.18 0.10 5.80	4.80 5.00 3.80 4.00 1.35 1.75 0.35 0.49 0.40 1.250 1.27 BSC 0.18 0.25 0.10 0.25 5.80 6.20	MIN         MAX         MIN           4.80         5.00         0.189           3.80         4.00         0.150           1.35         1.75         0.054           0.35         0.49         0.014           0.40         1.250         0.016           1.27 BSC         0.05 BSC           0.18         0.25         0.007           0.10         0.25         0.004           5.80         6.20         0.229	

#### MOUNTINGPAD



#### **NOTES**

- T = Seating Plane and Datum Surface.
   Dimensions "A" and "B" are Datum.
- 3. Dimensions "A" and "B" do not include mold protrusion.
- 4. Maximum mold protrusion is 0.015" (0.380 mm) per side. 5. Dimensioning and tolerances per ANSI Y14.5M, 1982.
- 6. 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 1,000 pieces per 12mm tape, i.e., PSRDA05-4-T7.
- 3. Suffix-T13 = 13 Inch Reel 2,500 pieces per 12mm tape, i.e., PSRDA05-4-T13.
- 4. No Suffix = Product Shipped in Tubes of 98 pcs per Tube.

Outline & Dimensions: Rev 1 - 11/01, 06009

#### COPYRIGHT © ProTek Devices 2003

SPECIFICATIONS: ProTek reserves the right to change the electrical and or mechanical characteristics described herein without notice (except JEDEC).

DESIGN CHANGES: ProTek reserves the right to discontinue product lines without notice, and that the final judgement concerning selection and specifications is the buyer's and that in furnishing engineering and technical assistance, ProTek assumes no responsibility with respect to the selection or specifications of such products.

#### 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