

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)

- ✓ 61000-4-4 (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**
- ✔ RoHS Compliant in Lead-Free Versions

MECHANICAL CHARACTERISTICS

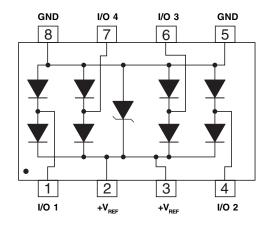
- ✓ Molded JEDEC SO-8 Package
- ✓ Weight 70 milligrams (Approximate)
- ✔ Available in Tin-Lead or Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:

Tin-Lead - Sn/Pb, 85/15: 240-245°C

Pure-Tin - Sn, 100: 260-270°C

- ✓ 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





PSRDA15-4

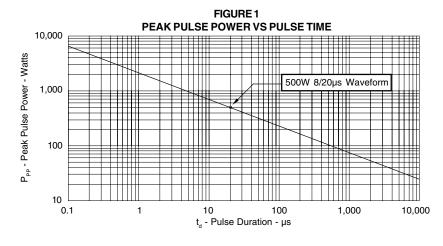
DEVICE CHARACTERISTICS

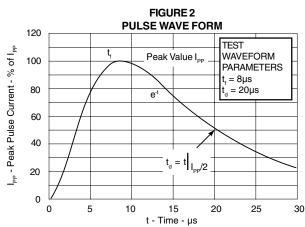
MAXIMUN RATINGS @ 25°C Unless Otherwise Specified							
PARAMETER	SYMBOL	VALUE	UNITS				
Peak Pulse Power ($t_p = 8/20\mu s$) - See Figure 1	P _{PP}	500	Watts				
Operating Temperature	T _J	-55°C to 150°C	∞				
Storage Temperature	T _{STG}	-55°C to 150°C	°C				
Maximum Forward Voltage @ 100mA (See Note 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 _{WM}	MINIMUM BREAKDOWN VOLTAGE @ 1mA V	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) $@I_p = 1A$ V_C	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ 8/20µs	MAXIMUM LEAKAGE CURRENT @V _{WM}	MAXIMUM CAPACITANCE (See Note 1) (See Figure 5) @0V, 1 MHz C
		VOLTS	V _(BR) VOLTS	VOLTS	V _C @ I _{PP}	μA	C _{j(SD)} 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	10.9V @ 43.0A 13.5V @ 42.0A 25.9V @ 21.0A 30.0V @ 17.0A	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.



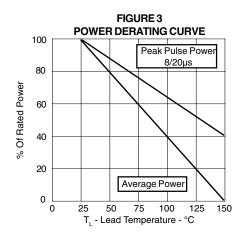


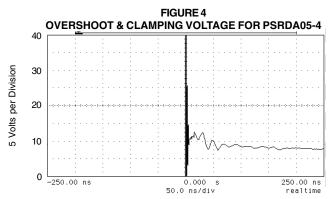
www.protekdevices.com

PSRDA3.3-4

PSRDA15-4

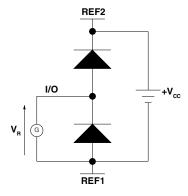
GRAPHS

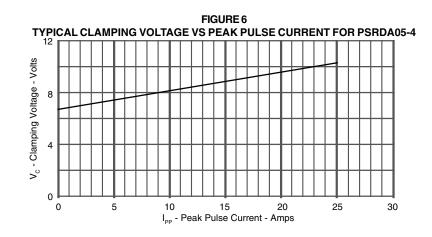


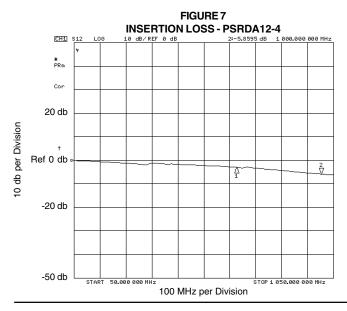


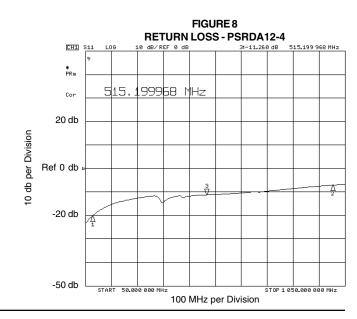
ESD Test Pulse: 8 kilovolt, 1/30ns (waveshape)

FIGURE 5
INPUT CAPACITANCE CIRCUIT









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 μ 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

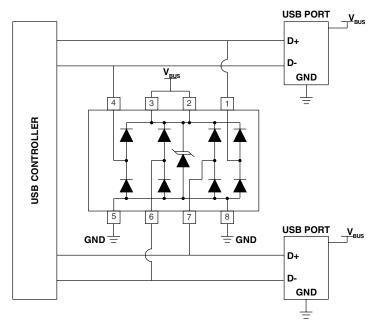
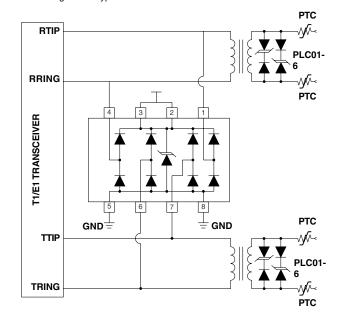


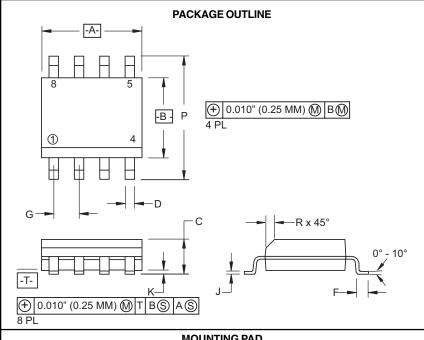
Figure 2. Typical Differential-Mode T1/E1 Protection

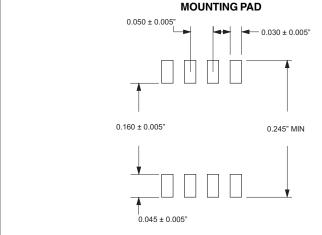


PSRDA3.3-4

PSRDA15-4

PACKAGE OUTLINE & DIMENSIONS





SO-8



PACKAGE DIMENSIONS

	MILLIME	ETERS	INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	4.80	5.00	0.189	0.196	
В	3.80	4.00	0.150	0.157	
С	1.35	1.75	0.054	0.068	
D	0.35	0.49	0.014	0.019	
F	0.40	1.250	0.016	0.049	
G	1.27 BSC	1.27 BSC	0.05 BSC	0.05 BSC	
J	0.18	0.25	0.007	0.009	
K	0.10	0.25	0.004	0.008	
Р	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" (0.380 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-LF = Lead-Free, Pure Tin Plating, i.e., PSRDA05-4-LF-T7.
- 4. Suffix-T13 = 13 Inch Reel 2,500 pieces per 12mm tape, i.e., PSRDA05-4-T13.
- 5. No Suffix = Product Shipped in Tubes of 98 pcs per Tube.

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

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ProTek Devices

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