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## **ULTRA LOW CAPACITANCE - SUPER SPEED BUS PROTECTION - TVS ARRAY**



## DESCRIPTION

The PSSB05P is an ultra low capacitance transient voltage suppressor array, designed to protect super speed bus applications such as USB 3.0, HDMI1.4 and eSATA from the damaging effects of Electrostatic Discharge and Electrical Fast Transients.

The PSSB05P meets IEC 61000-4-2 (ESD) and IEC 61000-4-4 (EFT) requirements. At higher operating frequencies or faster edge rates, insertion loss and signal integrity are a major concern. This device offers an ultra low capacitance and low leakage current in a miniature DFN-2-0402 package.

#### FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air(Level 2) 6kV, Contact(Level 3) 6kV
- Compatible with IEC 61000-4-4 (EFT)
- Compatible with IEC 61000-4-5 (Surge)
- 20 Watts Peak Pulse Power per Line (tp = 8/20µs)
- ESD Protection
- Low Clamping Voltage
- Protects One Bidirectional Line
- Ultra Low Capacitance: 0.3 pF Typical
- RoHS Compliant
- REACH Compliant

## **MECHANICAL CHARACTERISTICS**

- Molded JEDEC DFN-2-0402 Package
- Approximate Weight: 2 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
- Pure-Tin Sn, 100: 260-270°C
- 8mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

# PIN CONFIGURATION



#### **APPLICATIONS**

- USB 3.0 Interface
- HDMI 1.4
- Gigabit Ethernet
- eSATA

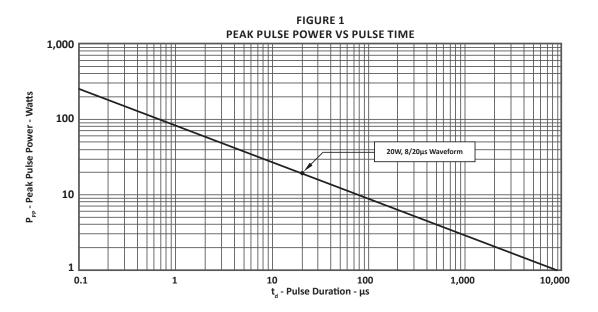
## TYPICAL DEVICE CHARACTERISTICS

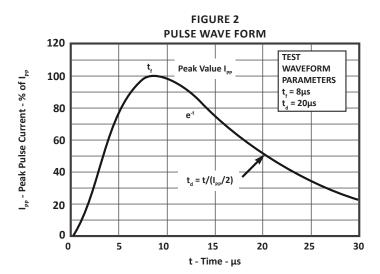
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MAXIMUM RATINGS @ 25°C Unless Otherwise Specified							
PARAMETER SYMBOL VALUE U							
Peak Pulse Power (tp = 8/20µs) - See Figure 1	P <sub>pp</sub>	20	Watts				
Operating Temperature	T <sub>A</sub>	-55 to 150	°C				
Storage Temperature	T <sub>stg</sub>	-55 to 150	°C				

	ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified									
PART NUMBER	R DEVICE RATED MINIMUM MAXIMUM MARKING STAND-OFF BREAKDOWN CLAMPING VOLTAGE VOLTAGE (Fig. 2)					TYPICAL CAPACITANCE				
		V <sub>WM</sub> VOLTS	@ 1mA V <sub>(BR)</sub> VOLTS	@I <sub>p</sub> = 1A V <sub>c</sub> VOLTS	@V <sub>wm</sub> Ι <sub>D</sub> μΑ	00V, 1MHz C <sub>ی</sub> pF				
PSSB05P	S	5.0	6.0	20	1	0.3				

## **TYPICAL DEVICE CHARACTERISTICS**

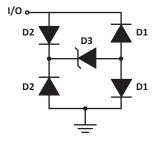




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### SPICE MODEL





ABD (D3) - Avalanche Breakdown Diode (TVS) LCRD (D1/D2): Low Capacitance Rectifier Diode

TABLE 1 - SPICE PARAMETERS									
PARAMETER	ARAMETER UNIT ABD/TVS(D3) LCRD (D1) LCRD (								
BV	V	11.50	100	100					
IBV	mA	1	1	1					
C <sub>jo</sub>	pF	60	0.3	0.3					
۱ <sub>s</sub>	А	1E-11	1E-11	1E-11					
Vj	V	0.6	0.6	0.6					
М	-	0.4	0.01	0.01					
N	-	1.1	1.1	1.1					
R <sub>s</sub>	Ohms	2.9	1.7	1.7					
TT	S	1E-9	1E-9	1E-9					
EG	eV	1.11	1.11	1.11					

## TYPICAL DEVICE CHARACTERISTICS

P PROJEK DEVICES

Only One Name Means ProTek'Tion™

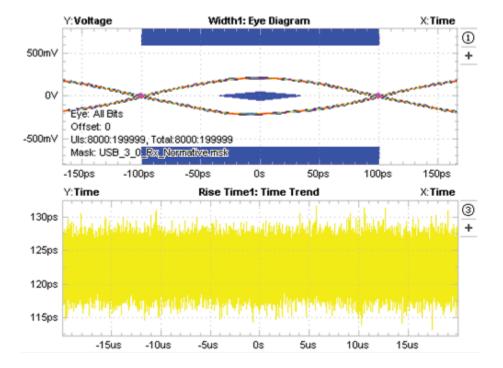
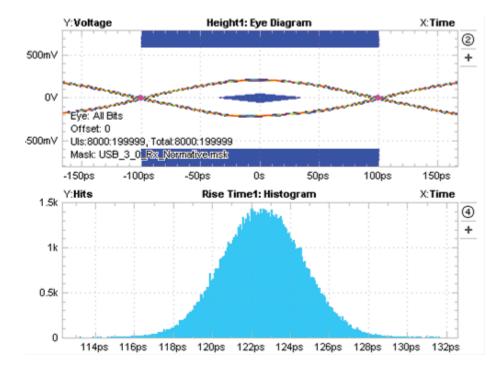
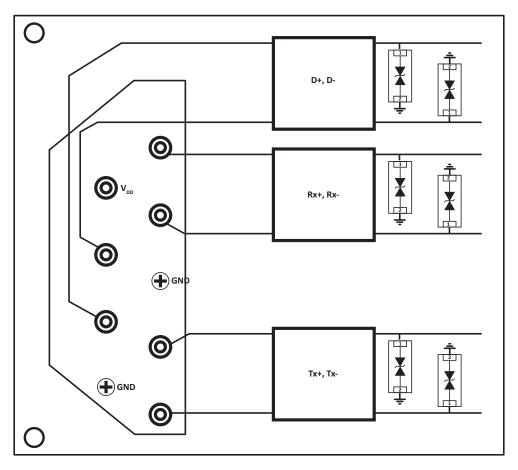


FIGURE 3 EYE DIAGRAM - USB 3.0



#### APPLICATION INFORMATION



### **FIGURE 1 - USB 3.0 PROTECTION**

Six PSSB05P devices placed right at the entry point of the connector or at the individual transmission traces. The PSSB05P provides dedicated ESD protection for each super high speed line for the USB interface. PCB traces are not constrained by the protection devices and can be routed in a manner that best suits the design. These devices can also provide protection for USB 2.0 applications.

## **CIRCUIT BOARD RECOMMENDATIONS**

Circuit board layout is critical for electromagnetic compatibility 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.

## **DFN-2-0402 PACKAGE INFORMATION**

OUTLINE DIMENSIONS							
DIM	MILLIN	IETERS	INC	HES			
DIN	MIN	MAX	MIN	MAX			
А	0.90	1.05	0.035	0.041			
В	0.51	0.65	0.02	0.024			
С	0.51	0.60	0.02	0.024			
н	0~0.10	0~0.10	0~0.004	0~0.004			
L1	0.45	0.55	0.018	0.022			
L2	0.18	0.30	0.007	0.012			
L4	L4 0.65 BSC 0.026 BSC						

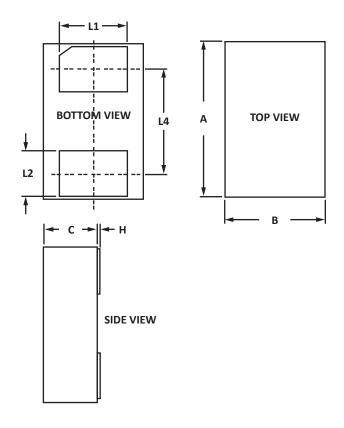
NOTES

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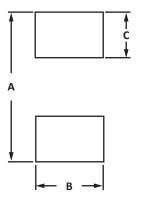
1. Dimensioning and tolerances per ANSI Y14.M, 1985.

2. Controlling dimension: inches.

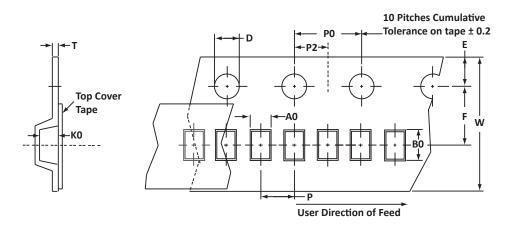
3. Dimensions are exclusive of mold flash and metal burrs.



PAD LAYOUT DIMENSIONS								
DIM	MILLIN	IETERS	INC	HES				
DIM	MIN	MAX	MIN	MAX				
А	1.30	1.50	0.051	0.059				
В	0.60	0.70	0.024	0.028				
С	0.40	0.55	0.016	0.022				
NOTES 1. Controlling dimension: inches.								



#### TAPE AND REEL



SPECIFICATIONS												
REEL DIA.	TAPE WIDTH	A0	BO	ко	D	E	F	w	PO	P2	Р	tmax
178mm (7")	8mm	0.70 ± 0.05	1.15 ± 0.10	0.56 ± 0.05	1.55 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	8.00 ± 0.30	4.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	0.25
178mm (7")       8mm       0.70 ± 0.05       1.15 ± 0.10       0.56 ± 0.05       1.75 ± 0.10       3.50 ± 0.05       8.00 ± 0.30       4.00 ± 0.10       2.00 ± 0.05       2.00 ± 0.05       0.25         NOTES         1. Dimensions are in millimeters.         2. Surface mount product is taped and reeled in accordance with EIA-481.         3. Suffix - T710 = 7" Reel - 10,000 pieces per 8mm tape.         4. Marking on Part - marking code (see page 2).         Package outline, pad layout and tape specifications per document number 06094.R1 3/11 - Option 2.												

ORDERING INFORMATION							
BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY		
PSSB05P	n/a	-T710	10,000	7"	n/a		
This device is only available in a Lead-Free configuration.							

#### COMPANY INFORMATION

#### **COMPANY PROFILE**

In business more than 20 years, ProTek Devices<sup>™</sup> is a privately-held company located in Tempe, Arizona, that offers a product line of transient voltage suppressors (TVS); avalanche breakdown diodes; steering diode TVS arrays and other surge suppressor component products. These TVS devices protect electronic systems from the effects of lightning, electrostatic discharge (ESD), nuclear electromagnetic pulses (NEMP), inductive switching and EMI / RFI. ProTek Devices also offers high performance interface and linear products that include analog switches; multiplexers; LED drivers; audio control ICs; RF and related high frequency products. The analog devices work in a host of consumer; industrial; automotive and other applications.

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