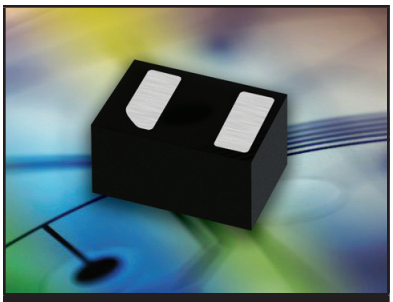
ULTRA LOW CAPACITANCE - SUPER SPEED BUS PROTECTION - TVS ARRAY



DFN-2 PACKAGE

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

APPLICATIONS

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

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

TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20µs) - See Figure 1	P_{PP}	20	Watts
Operating Temperature	T_A	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified						
PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE V_{WM} VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2) @I_P = 1A V_C VOLTS	MAXIMUM LEAKAGE CURRENT @V_{WM} I_D µA	TYPICAL CAPACITANCE @0V, 1MHz C_J pF
PSSB05P	S	5.0	6.0	20	1	0.3

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

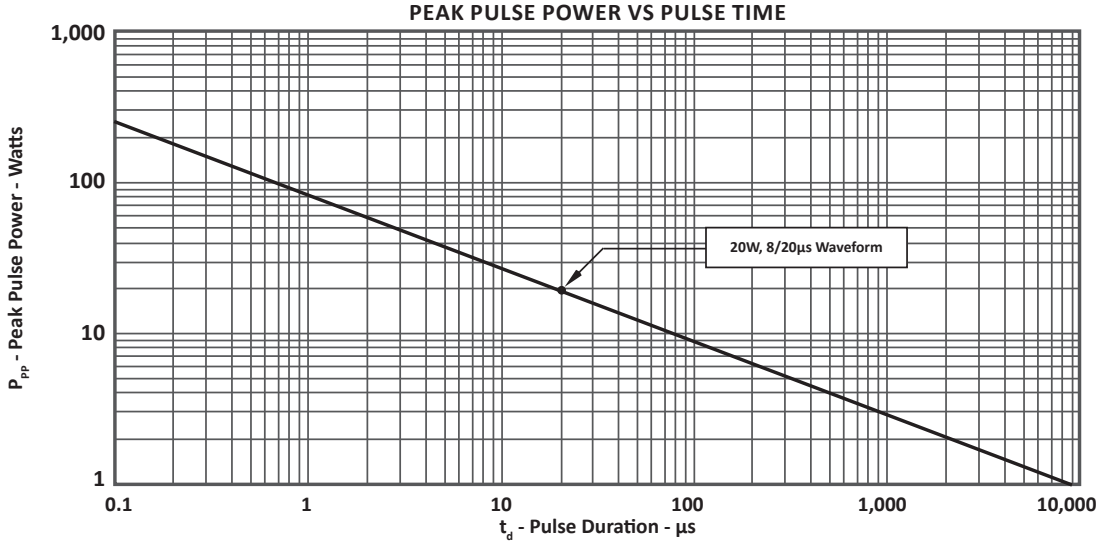
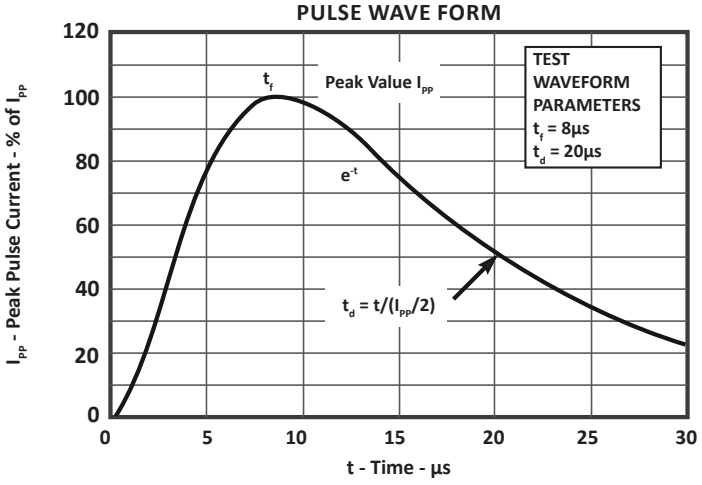
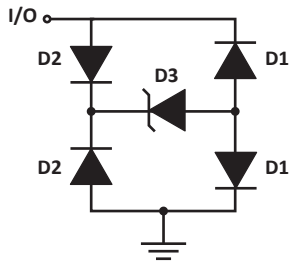


FIGURE 2
PULSE WAVE FORM



SPICE MODEL

FIGURE 1
SPICE MODEL



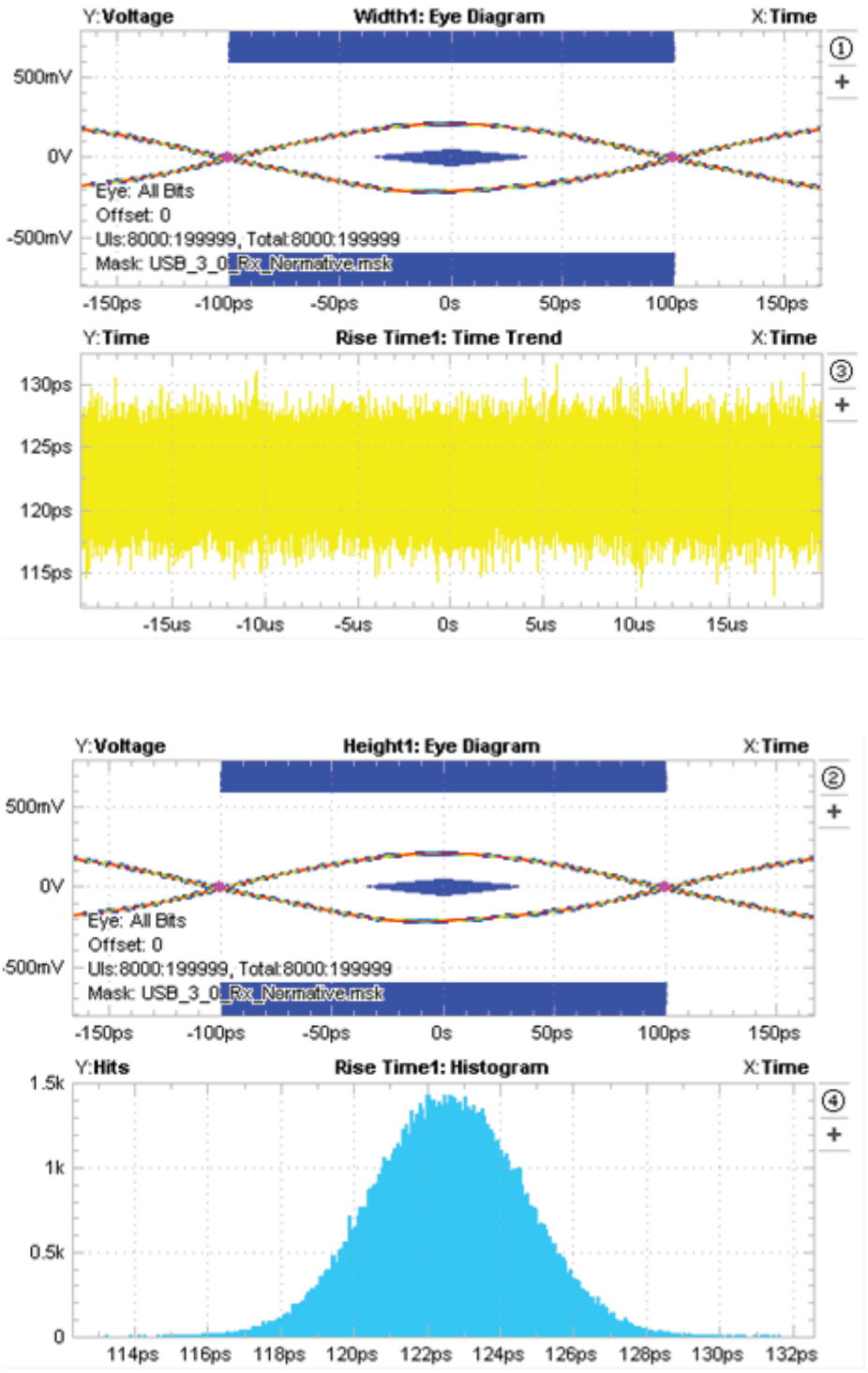
ABD (D3) - Avalanche Breakdown Diode (TVS)
LCRD (D1/D2): Low Capacitance Rectifier Diode

TABLE 1 - SPICE PARAMETERS

PARAMETER	UNIT	ABD/TVS(D3)	LCRD (D1)	LCRD (D2)
BV	V	11.50	100	100
IBV	mA	1	1	1
C_{jo}	pF	60	0.3	0.3
I_S	A	1E-11	1E-11	1E-11
Vj	V	0.6	0.6	0.6
M	-	0.4	0.01	0.01
N	-	1.1	1.1	1.1
R_S	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

FIGURE 3
EYE DIAGRAM - USB 3.0



APPLICATION INFORMATION

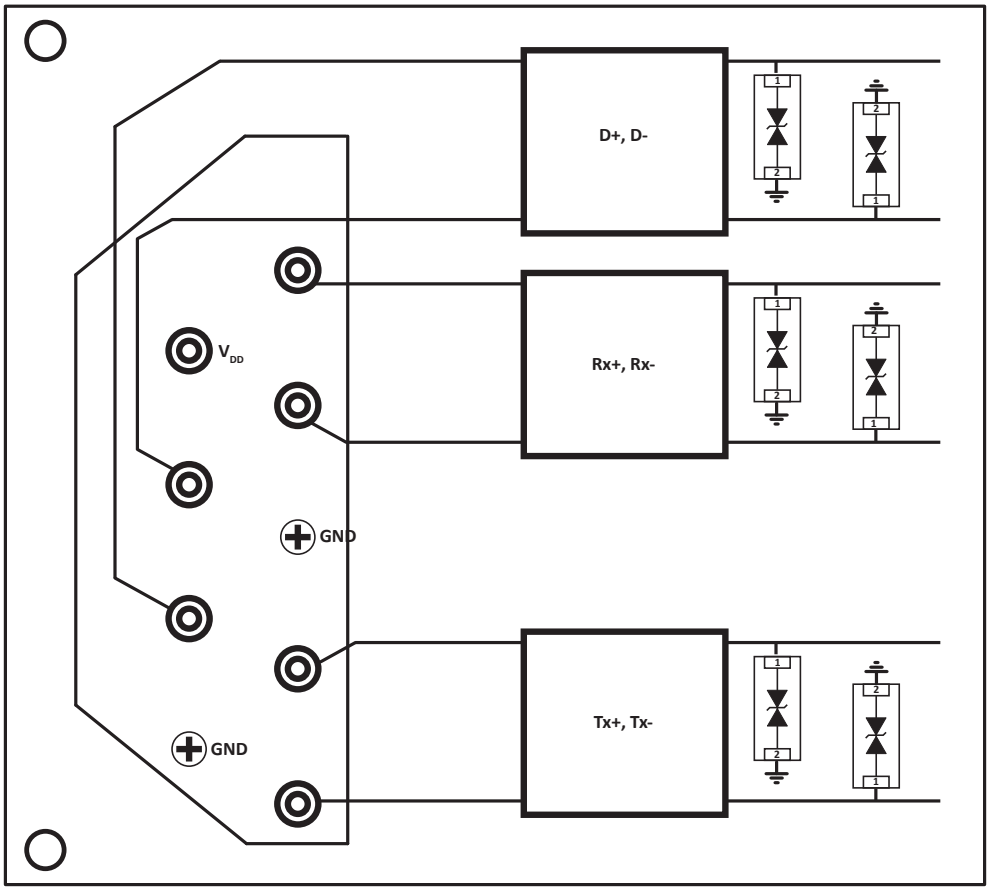


FIGURE 1 - USB 3.0 PROTECTION

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

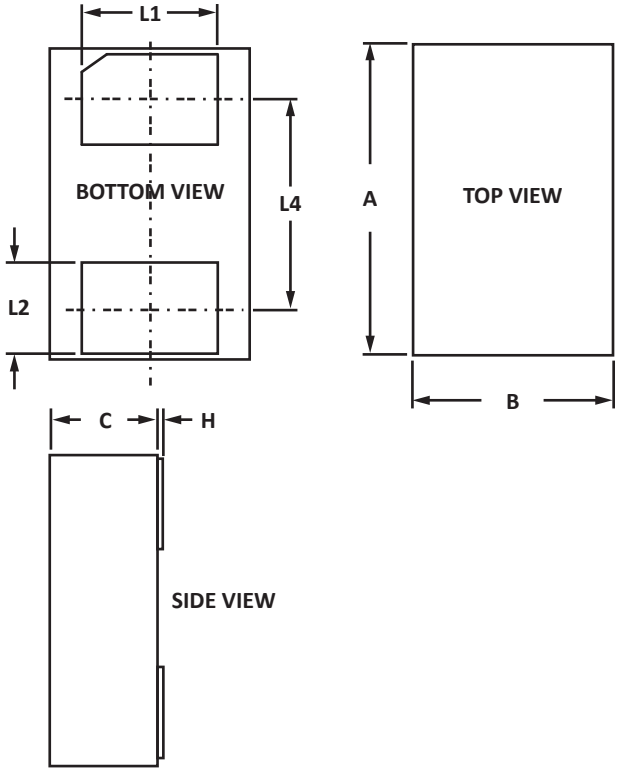
Circuit board layout is critical for electromagnetic compatibility protection. The following guidelines are recommended:

- 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

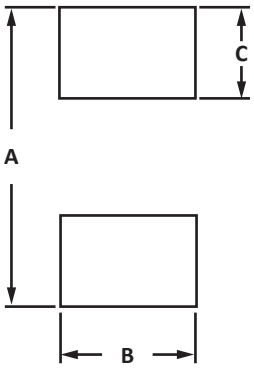
OUTLINE DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.05	0.035	0.041
B	0.51	0.65	0.02	0.024
C	0.51	0.60	0.02	0.024
H	0~0.10	0~0.10	0~0.004	0~0.004
L1	0.45	0.55	0.018	0.022
L2	0.18	0.30	0.007	0.012
L4	0.65 BSC		0.026 BSC	

NOTES
1. Dimensioning and tolerances per ANSI Y14.M, 1985.
2. Controlling dimension: inches.
3. Dimensions are exclusive of mold flash and metal burrs.

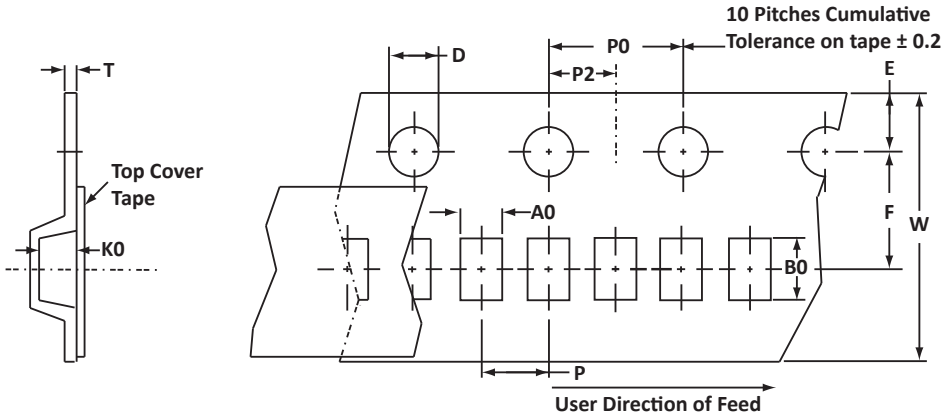


PAD LAYOUT DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.30	1.50	0.051	0.059
B	0.60	0.70	0.024	0.028
C	0.40	0.55	0.016	0.022

NOTES
1. Controlling dimension: inches.



TAPE AND REEL



SPECIFICATIONS												
REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	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

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

COMPANY INFORMATION

COMPANY PROFILE

ProTek Devices, based in Tempe, Arizona USA, is a manufacturer of Transient Voltage Suppression (TVS) products designed specifically for the protection of electronic systems from the effects of lightning, Electrostatic Discharge (ESD), Nuclear Electromagnetic Pulse (NEMP), inductive switching and EMI/RFI. With over 25 years of engineering and manufacturing experience, ProTek designs TVS devices that provide application specific protection solutions for all electronic equipment/systems.

ProTek Devices Analog Products Division, also manufactures analog interface, control, RF and power management products.

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