➢ General Description

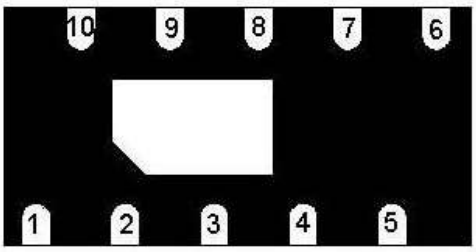
The PAE0566P provides a typical line to line capacitance of 0.4pF and low insertion loss up to 5GHz providing greater signal integrity making it ideally suited for USB 3.0 applications, such as Digital TVs, DVD players, Computer, set-top boxes ,MID and MDDI applications in mobile computing devices.

It has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by ESD(electrostatic discharge), CDE (Cable Discharge Events),and EFT (electrical fast transients).

➢ Feature

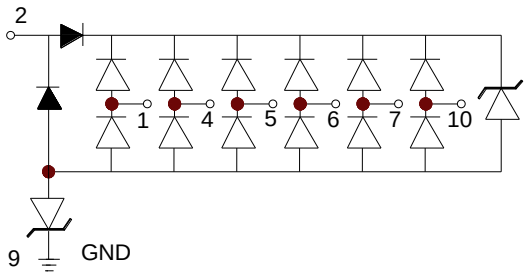
- Protects six I/O lines and one Vcc line
- Low capacitance
- Working voltages : 5V
- Low leakage current
- Low capacitance (<0.8pF) for high-speed interfaces
- No insertion loss to 5.0GHz
- Response Time is < 1 ns
- Meets MSL 1 Requirements
- **Solid-state silicon avalanche technology**
- ROHS compliant

➢ DFN4120-10L



➢ Application

- USB 3.0/3.1
- HDMI1.4
- MDDI
- IEEE 1394 Firewire Ports
- Projection TV Monitors and Flat Panel Displays
- Computers
- Projection TV



➢ Protection solution to meet

- IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 3A (8/20μs)

➢ Maximum Ratings (T_A=25°C Unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P_{PPP}	100	Watts
Peak Pulse Current(tp=8/20μs waveform)	I_{PP}	3	A
ESD Rating per IEC61000-4-2： Contact Air		8 15	KV
Lead Soldering Temperature	T_L	260 (10 sec.)	℃
Operating Temperature Range	T_J	-55 ~ 150	℃
Storage Temperature Range	T_{STG}	-55 ~ 150	℃

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

*Other voltages may be available upon request.

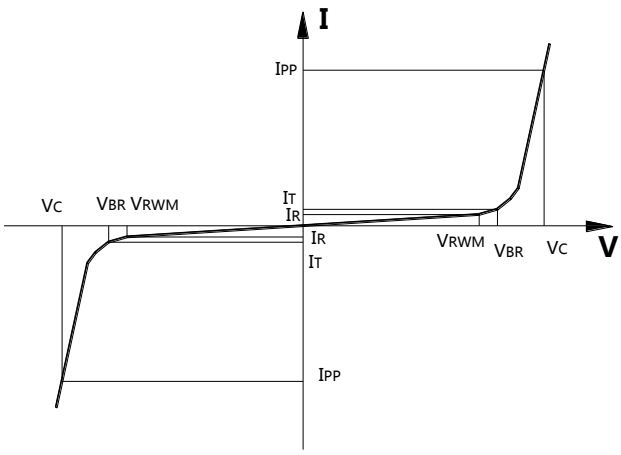
1. Non-repetitive current pulse, per Figure 1.

➢ Electrical Characteristics (T_A=25°C Unless otherwise specified)

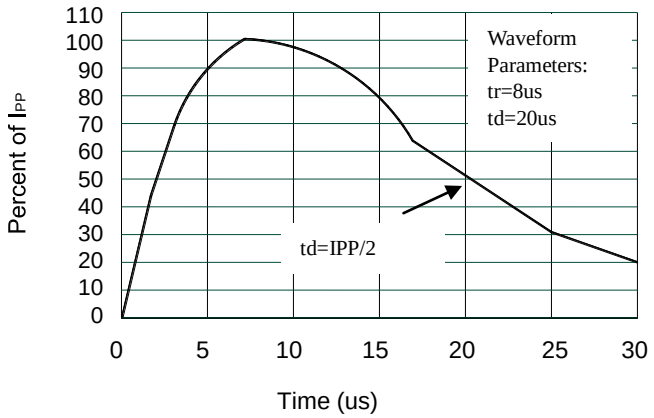
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{RWM}	Reverse Working Voltage	Any I/O to Ground			5.0	V
V_{BR}	Reverse Breakdown Voltage	IT = 1mA, Any I/O to Ground	6.0			V
I_R	Reverse Leakage Current	V_{RWM} = 5V, Any I/O to Ground			1	μA
V_C	Clamping Voltage	I_{PP} = 1A, tp =8/20μs, any I/O pin to Ground			25	V
I_{PP}	Peak Pulse Current	tp =8/20μs			3	A
C_J	Junction Capacitance	V_R = 0V, f = 1MHz, between I/O pins		0.4	0.5	pF
		V_R = 0V, f = 1MHz, any I/O pin to Ground		0.5	0.8	pF

Junction capacitance is measured in VR=0V,F=1MHz

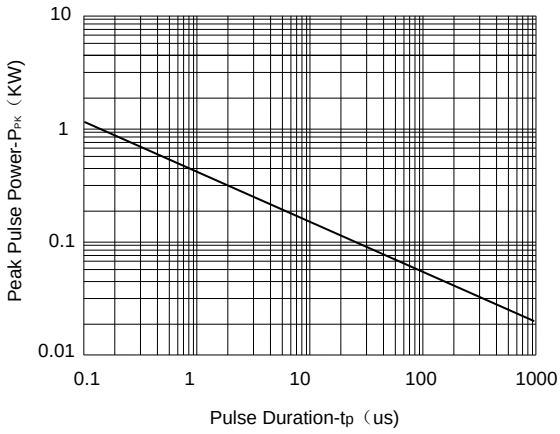
Symbol	Parameter
V_{RWM}	Working Peak Reverse Voltage
V_{BR}	Breakdown Voltage @ I_T
V_C	Clamping Voltage @ I_{PP}
I_T	Test Current
I_{RM}	Leakage current at V_{RWM}
I_{PP}	Peak pulse current
C_O	Off-state Capacitance
C_J	Junction Capacitance



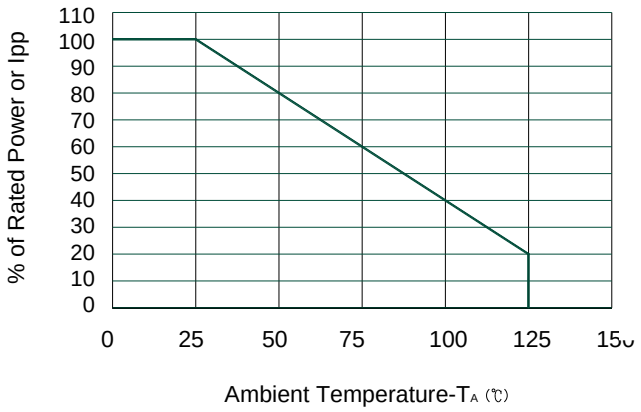
➢ Typical Characteristics



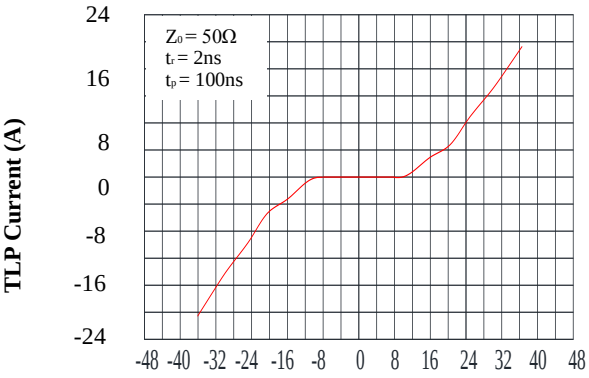
Pulse Waveform



Non-Repetitive Peak Pulse Power vs. Pulse Time



Power Derating Curve



5V Single Channel TVS TLP Clamping Voltage

➢ Ordering Information

Part Number	Description	Quantity
PAE0566P	DFN4120-10L Reel	3000 pcs

➢ Typical applications

USB3.0 (with PAE0566P)

Considerations:

● Each port depending upon what it's connected to can operate:

• Up to 5Gbps over the new super-speed data pairs, SSTX± and SSRX±

• Up to 480Mbps on the legacy data pair, D±

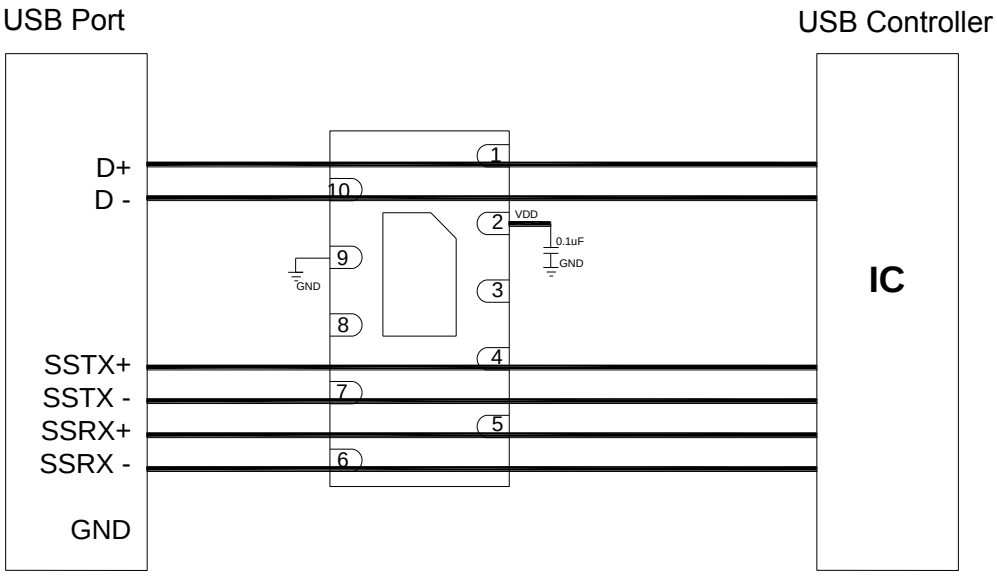
● Requires 4 channels of ultra-low capacitance protection for the super-speed data pair (i.e. SSTX± and SSRX±)

● Requires 2 channels of protection for the legacy D± data pair

VBUS can be protected by connecting it to the VCC pin on the PAE0566PB or by using a separate single channel device

●The PAE0566P shown below integrates all 6 channels of protection into a small form factor DFN4120-10L package.

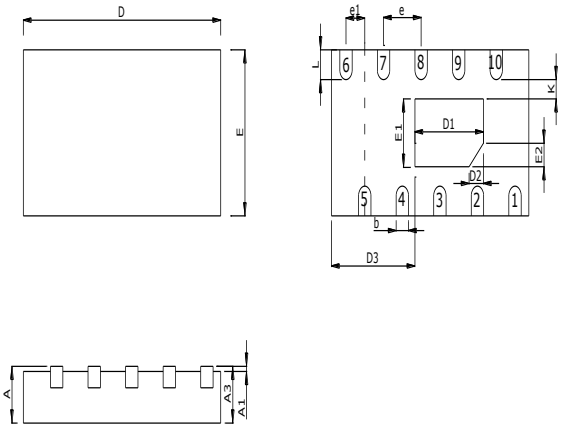
Application Schematic:



USB3.0 protected solution

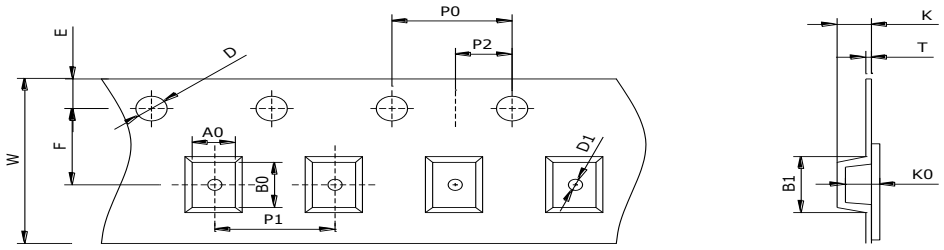
➢ Package Information (DFN4120-10L)

Case Material: Molded Plastic. UL Flammability



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.450	0.550	0.018	0.022
A1	0.000	0.050		0.002
A3	0.152(REF)		0.006(REF)	
D	4.050	4.150	0.159	0.163
E	1.950	2.050	0.077	0.081
D1	1.300	1.500	0.051	0.059
E1	0.700	0.900	0.028	0.035
D3	1.650	1.850	0.065	0.073
D2	0.200(REF)		0.008(REF)	
E2	0.200(REF)		0.008(REF)	
k	0.200(MIN)		0.008(MIN)	
b	0.150	0.250	0.006	0.010
e	0.800(TYP)		0.031(TYP)	
e1	0.350	0.450	0.014	0.018
L	0.250	0.350	0.010	0.014

DFN4120-10L Reel Dim



Package	Chip Size	Pocket Size B0×A0×K0(mm)	Tape Width	Reel Diameter	Quantity Per Reel	P0	P1
DFN4120-10L	4.10×2.00×0.50	4.20×2.10×0.60	8mm	178mm(7")	3000	4mm	4mm
D0	D1	E	F	K	T	W	
1.5mm	0.2mm	1.75mm	3.5mm	0.55mm	0.2mm	8mm	

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