ASM236x PCB Guideline

ECN

Date	Revision	Item	Description	Explanation
2018/4/19	1.0		release	

PCB Stack-up

Thickness	1.58mm+/-10%		Single end +/-15% Trace Width / impedance		Differential +/-10% Trace Width_spacing / impedance		
Layer	lyr type	Thickness	50ohm	90 ohm	95 ohm	80 ohm
S/M	S/M	0.5				
L1-COMP	0.5oz+plating	1.58	5 / 49.2	5_7 / 90	4_6 / 92.18	6_6 / 78.46
	PP 1080MR	3.5				
L2-GND	1oz	1.3				
	CORE	48.4				
L3-VCC	1oz	1.3				
	PP 1080MR	3.5				
L4-SOLD	0.5oz+plating	1.58	5 / 49.2	5_7 / 90	4_6 / 92.18	6_6 / 78.46
S/M	S/M	0.5	\			
	Thickness(mil)	62.16				
	mm	1.578864				

trace spacing(S)   trace spacing(S)

Single End

spacing=> edge to edge   spacing=> edge to edge

spacing(S1)   Differential(S)   spacing(S1)

Differential   Differential

spacing=> edge to edge

spacing=> edge to edge   spacing=> edge to edge

GND_signal   GND signal
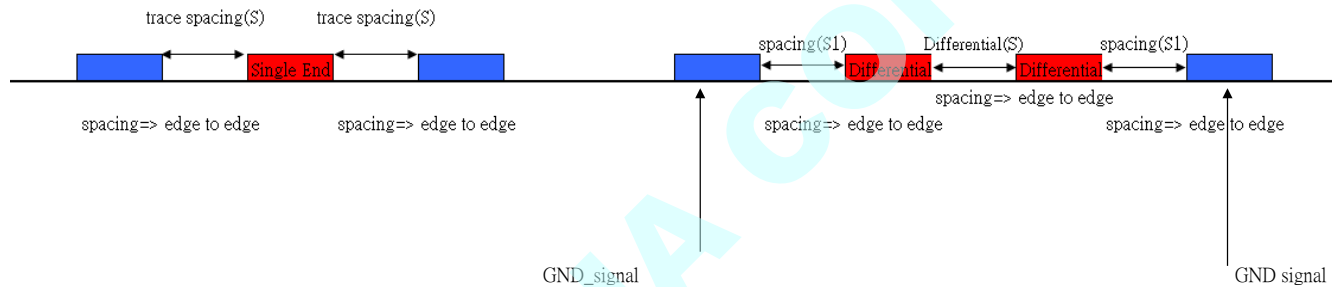
USB3.1 UTXP/N/0/1,URXP/N/0/1   Differential Pair Guidelines

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Characteristic Trace Impedance	**Difference Pair Impedance = 80 ohm +/- 10 ohm**	Shielding is needed for USB 3.1 differential pairs for signal integrity and EMC performance as below. A radial bend is preferred for 10Gbps.
Differential(S1:W:S:W:S1)	25 : 6 : 6 : 6 : 25	Each distance 40mil with ground via hole for guard trace as below.
Serpentine Spacing	25 mil	
Total Length	**< 1.5", ASAP**	maintain loss, crosstalk and fiber weave effect. Shielding is needed for USB 3.1 differential pairs for signal integrity and EMC performance.
Series Capacity	Cs=0.22uF (0402 size / X7R)	The Cap close to Connector for UTXP/N
Differential Pair Length Matching	< 5 mil	

USB2.0 UDP/N   Differential Pair Guidelines

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Characteristic Trace Impedance	Difference Pair Impedance = 90 ohm +/- 15%	
Differential (S1:W:S:W:S1)	15 : 5 : 7 : 5 : 15	
Serpentine Spacing	15 mil	
Total Length	< 4"	
Differential Pair Length Matching	< 20 mil	

Other

Parameter	Guidelines	Guidelines	Guidelines
Signal Name	UREXT	VBUS	VCC33U,VDD12U
Topology	Point to Point	Point to Point	Point to Point
Single End (W:S)	10 : 7	5 : 8	15 : 8
Total Length	ASAP	10"	ASAP

PCIe Gen3 8Gbps

PTXPx/Nx,PRXPx/Nx, Differential Pair Rounting Guidelines

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Layer	Microstrip	
Characteristic Trace Impedance	TX&RX Impedance Difference Pair = 80 ohm +/- 10%	
Differential (S1:W:S:W:S1)	25 : 6 : 6 : 6 : 25	
Serpentine Spacing	25 mil	
Series Capacity	Cs=0.22uF (0402 type / X7R)	The AC-couple capacitor close to connector for PETXP/N
VIA hole Max.	<= 2 for connector ; <= 4 for down device or chip	
Total Length	< 6" for connector (min. length 0.5"), < 9" for on board or down device (min. length 0.5").	
Differential Pair Length Matching	< 5 mil	

XO/XI

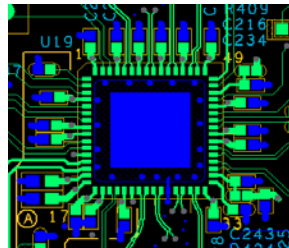| Parameter	Guidelines
Signal Name	XO /XI
Characteristic Trace Impedance	Impedance Difference Pair = 95 ohm +/- 15%
Differential (S1:W:S:W:S1)	30 : 4 : 6 : 4 : 30
Total Length	< 0.5" ,ASAP

Other

Parameter	Guidelines
Signal Name	VDD/VCCLP/VCCLU/VCCH/VCCx
Topology	Point to Point
Single End (W:S)	15 : 8
Total Length	ASAP

PECLK

PE_CLKP/N

Parameter	Guidelines	Notes
Signal Reference	Ground	
Signal Name	PECLKP/N	
Layer	Microstrip	
Characteristic Trace Impedance	Impedance Difference Pair = 95 ohm +/- 15%	Single End Impedance = 50 ohm +/- 15%
Differential (S1:W:S:W:S1)	30 : 4 : 6 : 4 : 30	
Total Length	< 10" for connector ,< 11" for chip pad,ASAP	
Differential Pair Length Matching	< 10 mil	

GND

GND_layer
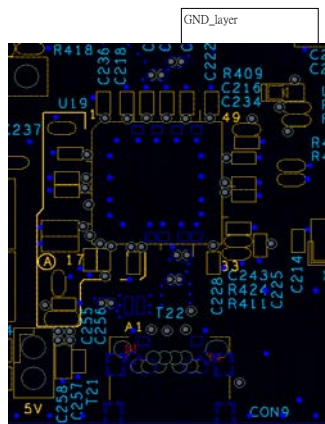
SPIDI/SPICK/SPIDO/SPICS/I2C_DATA/I2C_CLK

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Characteristic Trace Impedance (Single-Ended)	50 ohm +/- 15%	
Trace Width	5 mils	
Trace Spacing	10 mils	
Total Length	< 10"	

CC1/CC2

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Trace Width	8 mils	
Trace Spacing	15 mils	
Total Length	< 10"	

GPIO/Strapping/UART_TX/UART_RX

Parameter	Guidelines	Notes
Topology	Point to Point	
Signal Reference	Ground	
Characteristic Trace Impedance (Single-Ended)	50 ohm +/- 15%	
Trace Width	5 mils	
Trace Spacing	8 mils	
Total Length	< 10"	