Application Report
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TUSB522P Schematic Checklist

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ABSTRACT

This application report for TUSB522P, a single-lane USB 3.1 GEN1 redriver and signal conditioner supporting 5 Gbps. The device allows the dual-channel capability to enable a system to maintain signal integrity on both transmit and receive data paths. This schematic checklist provides a brief explanation of each device pin and the recommended configuration of the device pin for default operation. Use this information to check the connectivity for each TUSB522P on a system schematic.

This document aids the design at the system level for general applications. This document should not be the only resource used. In addition to this list, customers are advised to use the information in the TUSB522P datasheet, TUSB522P EVM User's Guide and associated documents to gain a full understanding of device functionality. Project collateral discussed in this application report can be downloaded from the following URL: www.ti.com/lit/zip/SLLA399.

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1 TUSB522P Schematic Checklist

Table 1. Schematic Checklist

Pin Name	Pin Number(s)	Pin Description	Recommendation
Power Pins			
VCC	1,13	3.3 V Positive Power Supply	Parallel array of one 1µF and two 0.1µF capacitors to GND.
GND	10, 21, PAD	Ground	Connected to Ground.
Configuration Pins			
EQ1	2	Tri-level configuration input pins for CH 1 Equalization.	Use 47kΩ pull-down resistor for 3 dB of gain on CH 1. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
EQ2	17	Tri-level configuration input pins for CH 2 Equalization.	Use 47kΩ pull-down resistor for 3 dB of gain on CH 2. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
DE1	16	Tri-level configuration input pins for CH 1 De-emphasis.	Use 47kΩ pull-down resistor for 0 dB of de-emphasis on CH 1 output. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
DE2	3	Tri-level configuration input pins for CH 2 De-emphasis.	Use 47kΩ pull-down resistor for 0 dB of de-emphasis on CH 2 output. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
OS1	15	Tri-level configuration input pins for CH 1 Output Swing.	Use 47kΩ pull-down resistor for 0.9 x Vpp on CH 1 output. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
OS2	4	Tri-level configuration input pins for CH 2 Output Swing.	Use 47kΩ pull-down resistor for 0.9 x Vpp on CH 1 output. Refer to Table 1 in the datasheet for additional configurations. To avoid over equalizing data start at the lowest settings and increase until desrided eye is achieved.
EN_RXD	5	Active hgih device enable, has an internal 660-kΩ pull-down resistor.	Add a 4.7KΩ Pull up to VCC for normal operation. Resets state machine when toggled.

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Table 1. Schematic Checklist (continued)

Pin Name	Pin Number(s)	Pin Description	Recommendation
USB Data Lines			
TX1P	22	Differential output for 5 Gbps positive signal on CHl 1	Connect to the USB3.1 RXP/N terminals from an USB3 HOST, HUB or DEVICE using 0.1uF AC coupling capacitors or connect to the TXP/N terminals from an USB3 connector using 0.1uF AC coupling capacitors. These pins allow polarity swapping.
TX1N	23		
TX2P	12	Differential output for 5 Gbps positive signal on CH 2	
TX2N	11		
RX1P	9	Differential output for 5 Gbps positive signal on CHl 1	Connect to the USB3.1 TXP/N terminals from an USB3 HOST, HUB or DEVICE using 0.1uF AC coupling capacitors or connect to the RXP/N terminals from an USB3 connector. NO AC coupling capacitors. These pins allow polarity swapping.
RX1N	8		
RX2P	19	Differential output for 5 Gbps positive signal on CH 2	
RX2N	20		
Misc. Pins			
RSV	14	Reserved	Leave no-connected.
NC	6,7,18,24	No Connection	Leave no-connected.

2 References

- TUSB522P 3.3 V Dual-Channel USB 3.1 GEN 1 Redriver, Equalizer Datasheet
- TUSB522PEVM Users Guide
- Strengthening the USB Type-C signal chain through redrivers

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