Application Report
SLLA391–April 2018

TUSB212 Schematic Checklist

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ABSTRACT

This application report is for the TUSB212 a USB High-Speed (HS) signal conditioner, designed to compensate for ISI signal loss in a transmission channel. TUSB212 is agnostic to USB Low Speed (LS) and Full Speed (FS) signals while USB High Speed (HS) signals are compensated. This schematic checklist provides a brief explanation of each device pin and the recommended configuration of the device pins for default operation. Use this information to check the connectivity for each TUSB212 on a system schematic.

This document is intended to aid design at the system level for general applications but should not be the only resource used. In addition to this list, customers are advised to use the information in the TUSB212 datasheet, TUSB212 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/SLLA391.

Trademarks

1 TUSB212 Schematic Checklist

Table 1. TUSB212 Schematic Checklist

Pin Name	Pin Number	Pin Description	Recommendation
VCC	12	3.3-V power	Parallel array of 1 µF and 0.1 µF capacitors on VCC to GND
VREG	11	1.8-V LDO output.	Connect a 0.1 µF capacitor between VREG and GND
GND	10	Ground	GND must be connected to GROUND
RSTN	5	Device disable/enable.	Connect a 0.1 µF capacitor between RSTN and GND. A second option is to control this pin externally. The device should not be enabled until the power on ramp has settled to 3 V or higher to ensure a correct power on reset of the digital circuitry.
EQ	6	USB High Speed AC boost select via external pull down resistor. Sampled upon power up, no real time changes.	Pull-down resistor connected to the EQ pin, the value options: 160 Ω (max) = EQ Level 0 1.4 - 2 kΩ = EQ Level 1 3.7 - 3.9 kΩ = EQ Level 2 6 kΩ (min) = EQ Level 3
D1P	2	USB High Speed positive port.	D1P must be shorted to D2P. Make sure the USB2 pin polarity corresponds to the pins DxP/DxM respectively.
D1M	1	USB High Speed negative port.	D1M must be shorted to D2M. Make sure the USB2 pin polarity corresponds to the pins DxP/DxM respectively.
D2P	7	USB High Speed positive port.	D1P must be shorted to D2P. Make sure the USB2 pin polarity corresponds to the pins DxP/DxM respectively.
D2M	8	USB High Speed negative port.	D1M must be shorted to D2M. Make sure the USB2 pin polarity corresponds to the pins DxP/DxM respectively.
SDA	3	I2C Mode: Bidirectional I2C data pin. Non-I2C Mode: No function.	I2C Mode: 4.7 kΩ (5%) pull-up resistor required for I2C Mode. Non-I2C Mode: This pin must be floating or connected to ground.
SCL/CD	4	I2C Mode: I2C clock pin. Non-I2C mode: Flag indicating that a USB device is attached.	I2C mode: I2C clock pin [I2C address = 0x2C], 4.7 kΩ (5%) pull-up resistor required for I2C Mode. Non-I2C mode: CD can be connected to a LED in series with a resistor to GND. If no LED is needed, the pin can be left unconnected.
DC_BOOST/ENA_HS	9	I2C Mode: Pin is reserved for testing. Non-I2C Mode: DC Boost set before reset then becomes flag indicating that channel is in High Speed mode.	Ensure DC_BOOST/ENA_HS upon reset has correct input voltage for desired DC gain. This can be set via resistive divider with pull-down and pull-up (to 3.3 V) resistors between 22 kΩ to 47 kΩ. See Table 3 in TUSB212 datasheet. After reset pin outputs flag indicating High Speed mode.
Notes: ESD protection should be placed closest to the USB connection. EMI protection placed close to the USB connectors. Verify the pinout of the USB connectors. Verify pin-out of TUSB212 matches datasheet. Always refer to the datasheet of this device for complete descriptions of each pin.			

2 References

- TUSB212 USB 2.0 High Speed Signal Conditioner Datasheet
- TUSB212 Evaluation Module
- Strengthening the USB Type-C signal chain through redrivers

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