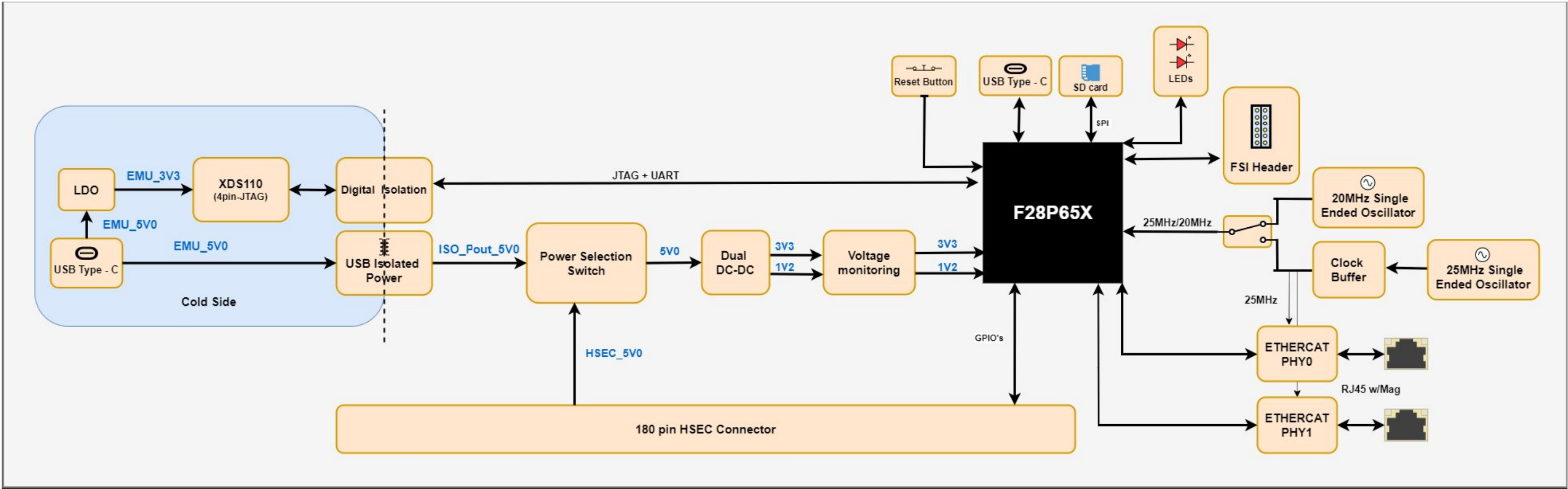


- 1) USB Differential Pairs - 90 Ohm  
(A) XDS\_D\_P and XDS\_D\_N  
(B) USB\_D\_P (GPIO42) and USB\_D\_N (GPIO43)
- 2) ADC Differential pair Impedance Matching - 50 Ohm  
(A) HSEC\_ADC even pins should match with HSEC\_ADC + 1 pin(ie ADC-C2 should match with ADC-C3)  
(B) MCU\_ADC even pins should match with MCU\_ADC + 1 pin(ie MCU\_ADC-A0 should match with MCU\_ADC-A1)
- 3) ETHERCAT Differential pairs - 100 Ohm  
(A) TD\_P and TD\_N  
(B) RD\_P and RD\_N
- 4) CLK Paths - 50 Ohm  
(A) F28P65x\_25MHz\_CLK  
(B) PHY0\_25MHz\_CLK and PHY1\_25MHz\_CLK

Revision History

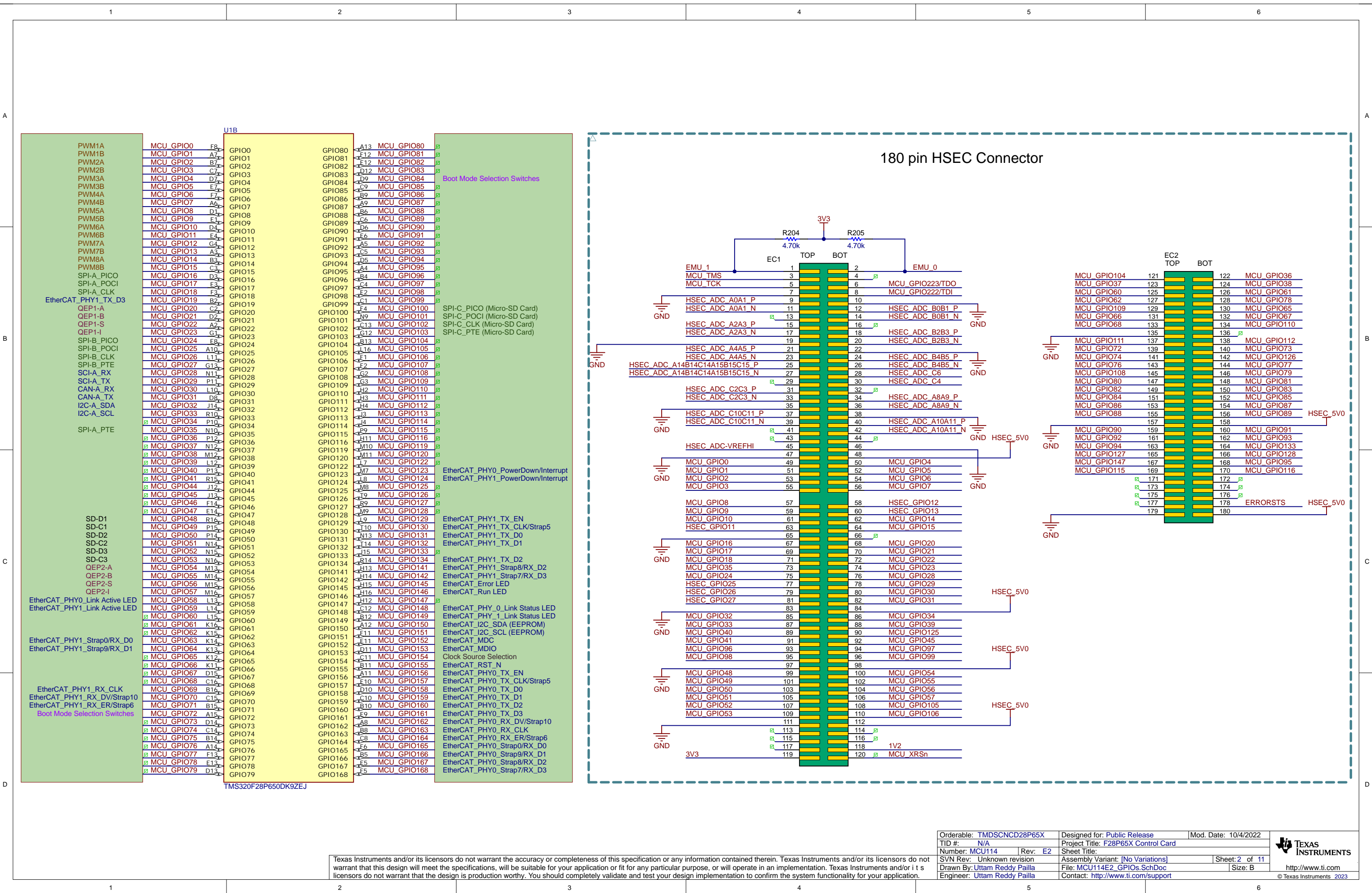
Rev	ECN #	Approved Date	Approved by	Notes
E1	N/A	9/12/2022	UR	Original engineering release
E2	N/A	04/08/2023	UR	1. Cosmetic changes to PCB silk screen 2. GPIO42 and GPIO43 traces for USB data peripheral (J4) were swapped near U1C

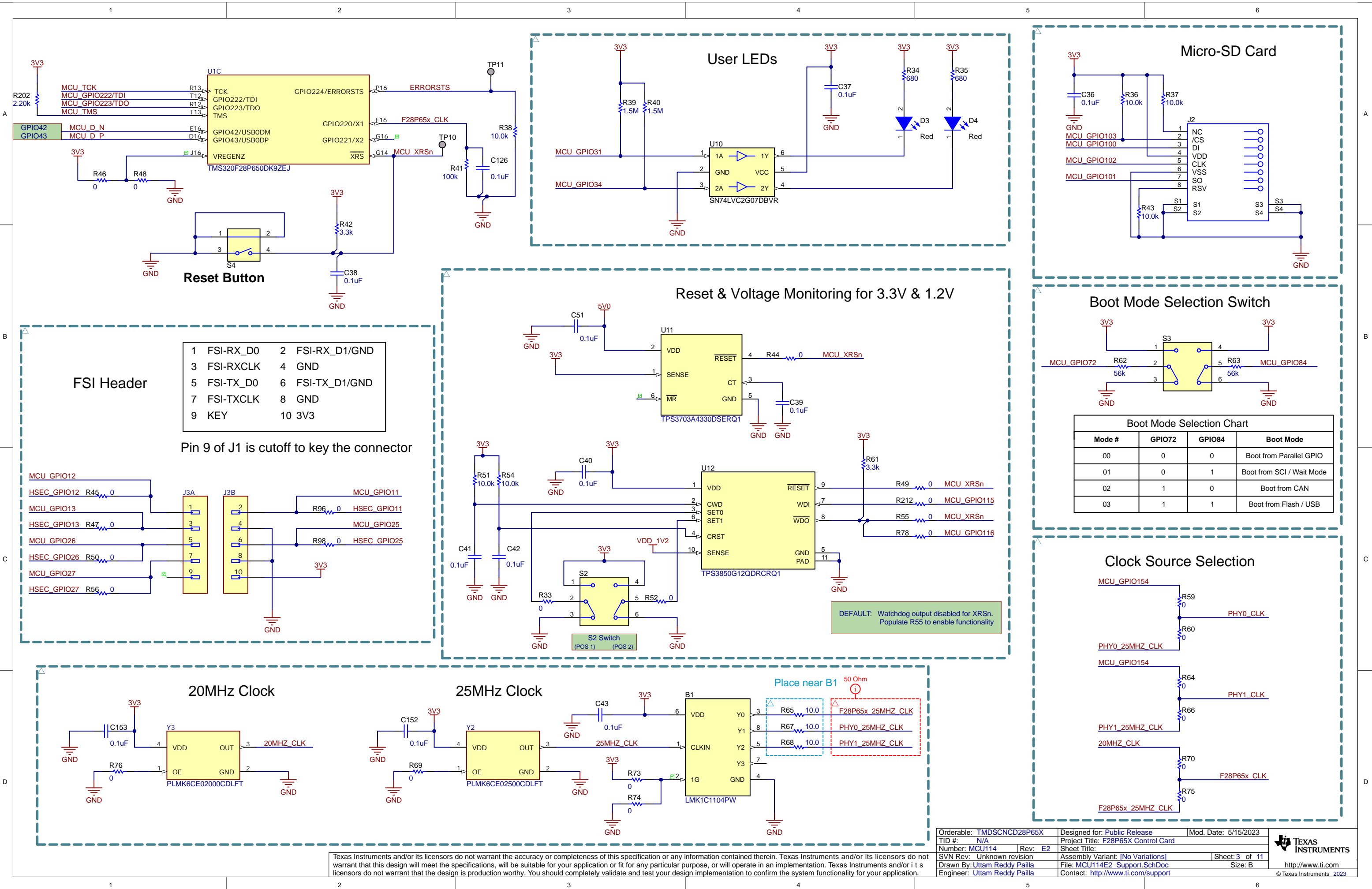


Power to the MCU is either supported by the USB-C on the left or the HSEC 180 pin.

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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 6/7/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: [No Variations]	Sheet: 1 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_CoverSheet.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

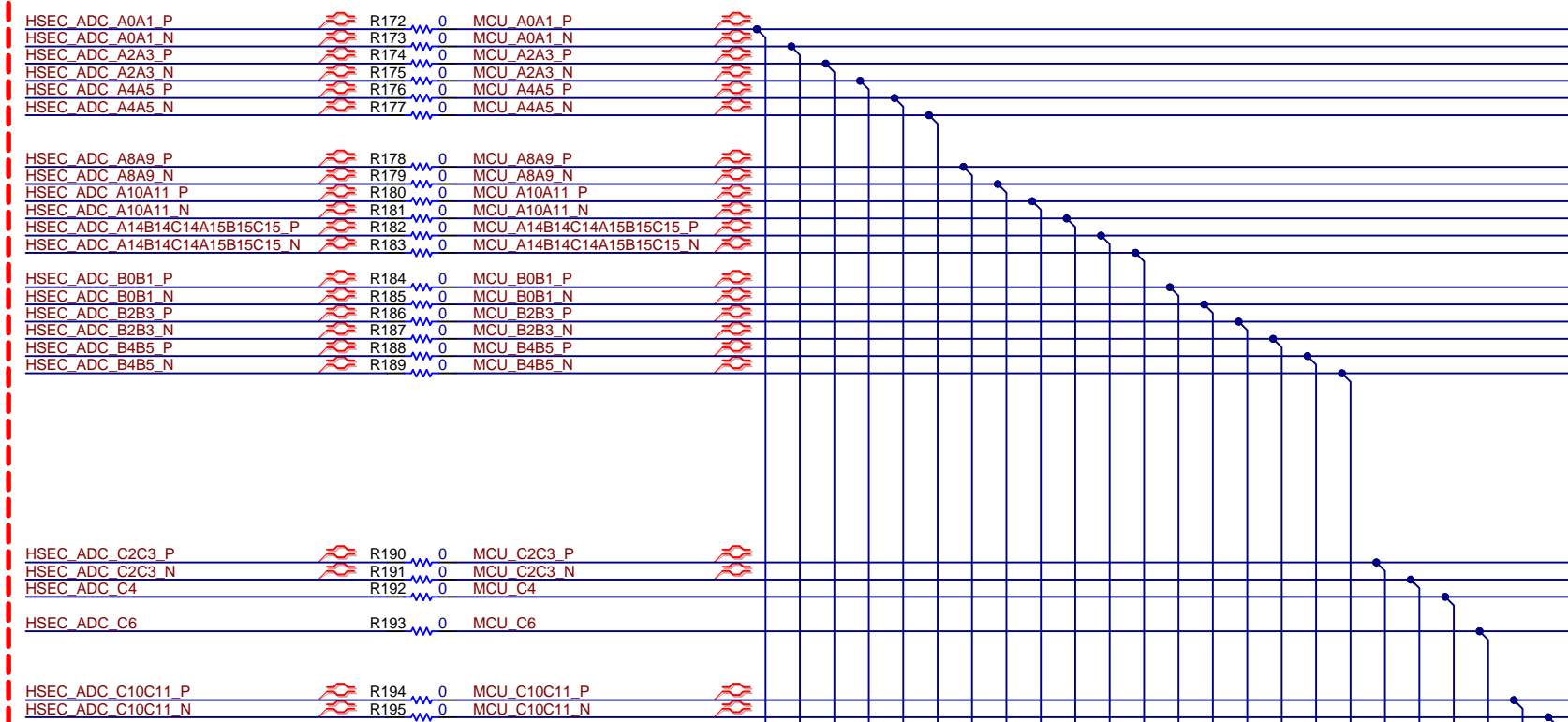
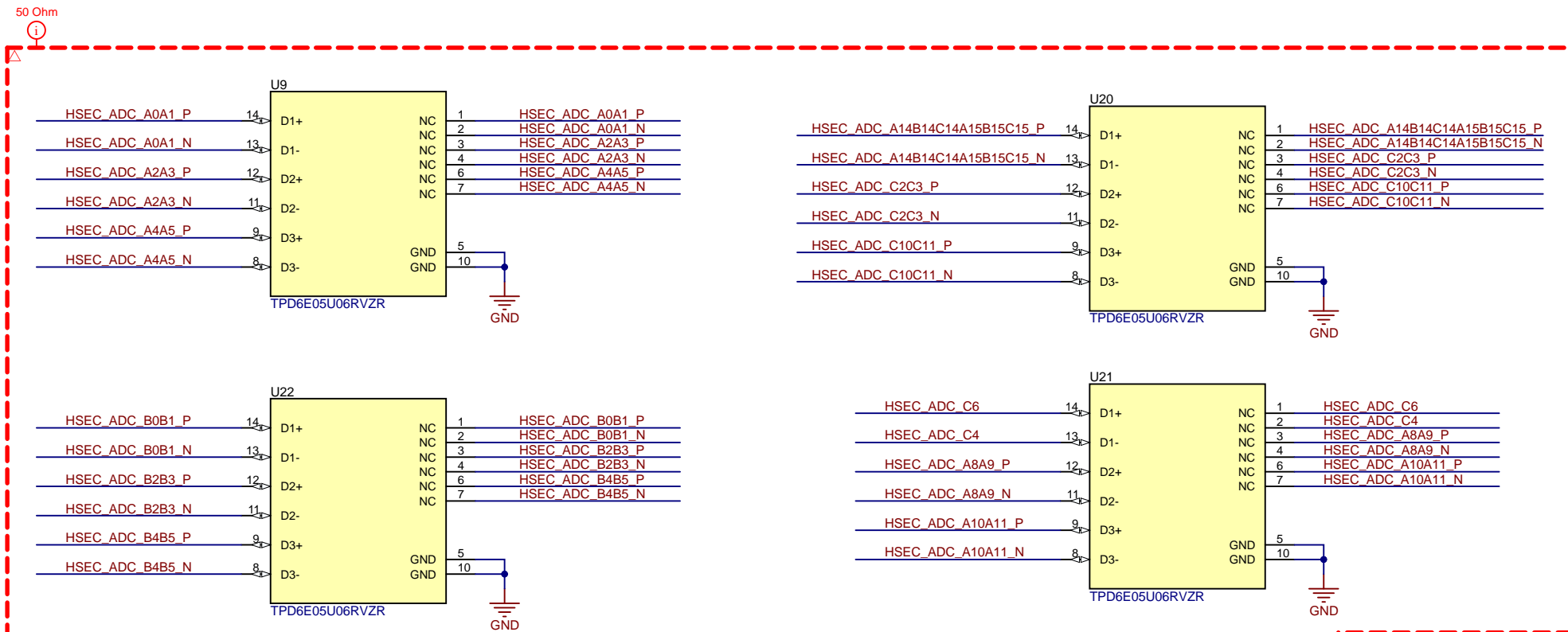




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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/15/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	
SVN Rev: Unknown revision	Assembly Variant: [No Variations]	Sheet: 3 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_Support.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	



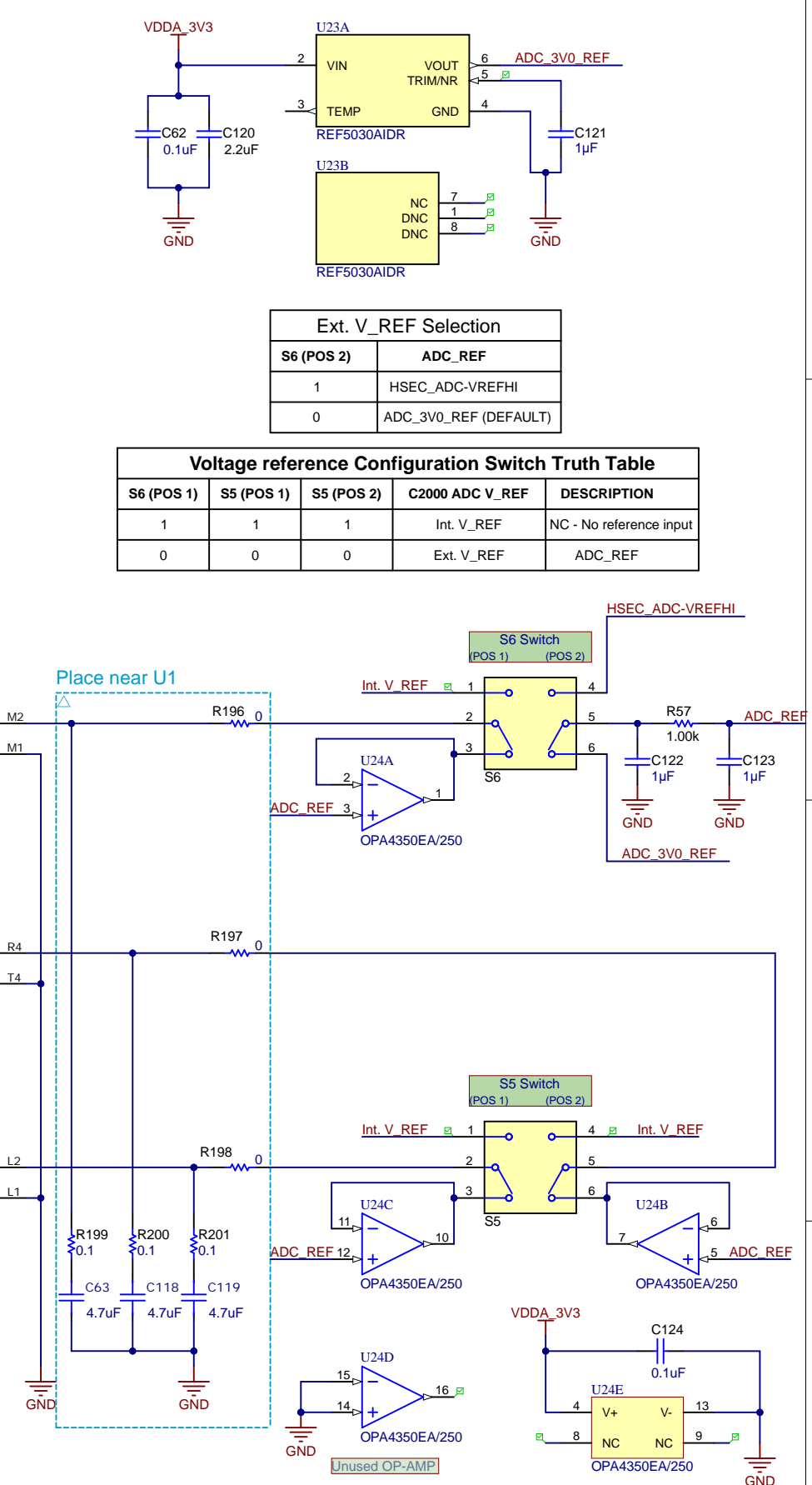


ADC\_A0A1\_P and ADC\_A0A1\_N make a differential pair using channels A0 and A1 respectively.

If you wish to use A0 or A1 independently the "\_P" refers to the first ADC channel (For example A0 in "ADC\_A0A1"). Additionally the "\_N" refers to the second channel, (A1 in "ADC\_A0A1").

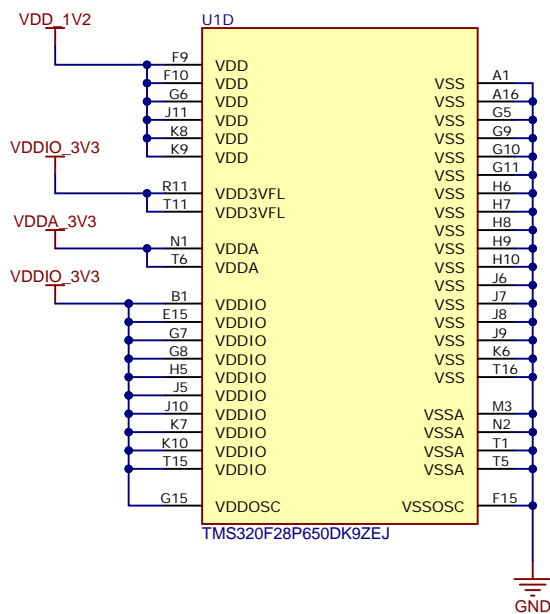
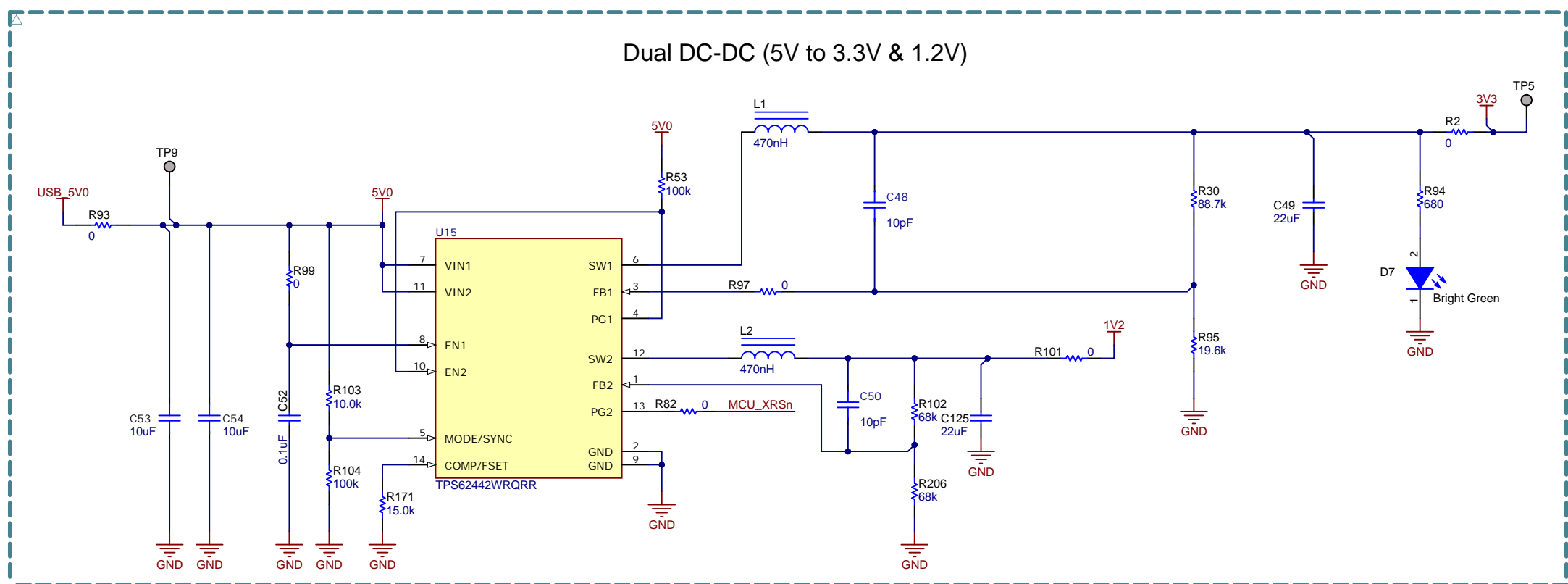
NOTE: C6 and C4 are not differential pairs

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Ext. V_REF Selection	
S6 (POS 2)	ADC_REF
1	HSEC_ADC-VREFHI
0	ADC_3V0_REF (DEFAULT)

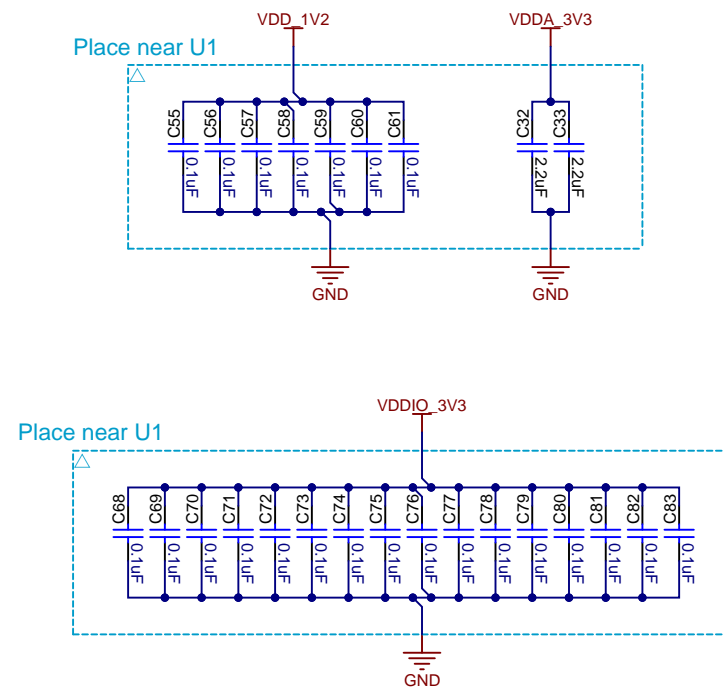
Voltage reference Configuration Switch Truth Table				
S6 (POS 1)	S5 (POS 1)	S5 (POS 2)	C2000 ADC V_REF	DESCRIPTION
1	1	1	Int. V_REF	NC - No reference input
0	0	0	Ext. V_REF	ADC_REF



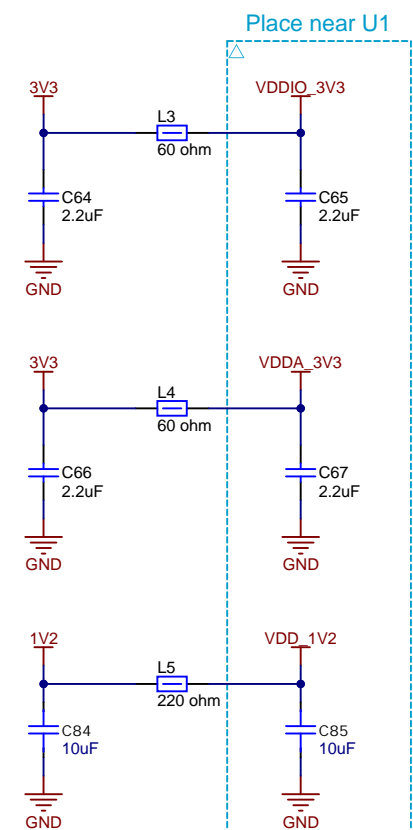
#### NOTES:

- 1) TPS62442 Dual DC-DC provides an output current of 2A/2A or 3A/1A, this amount of current capacity should not be necessary for certain applications using F28P65x. This is just necessary for the control card design
- 2) Alternative part: TPS62441 Dual DC-DC provides an output current of 1A/1A
- 3) DC-DC can be used without supervisory circuit in specific applications by considering the slew rates of MCU and DC-DC for proper reset.

#### Decoupling Capacitors



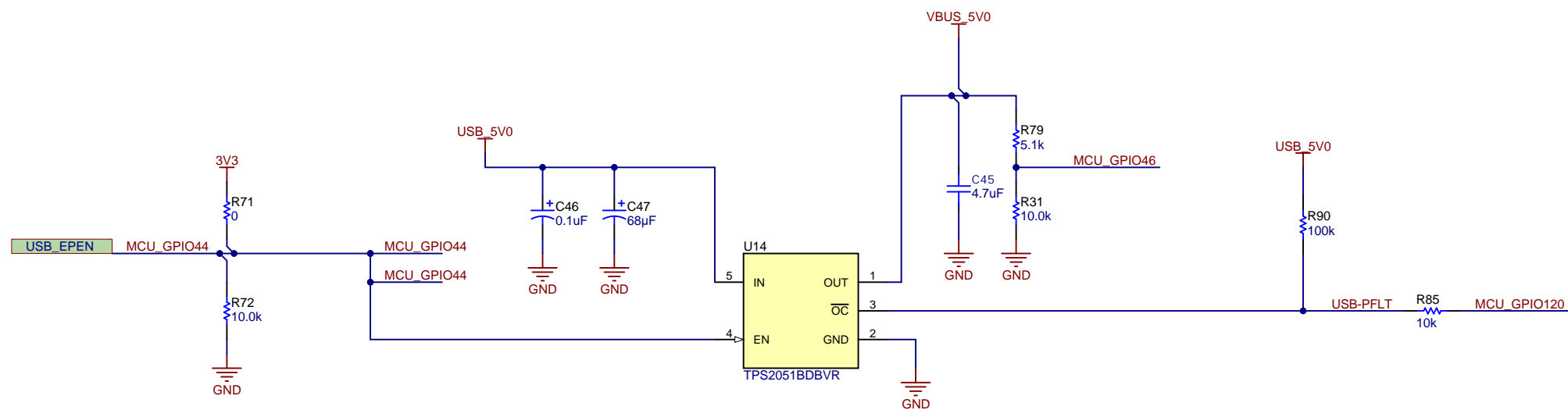
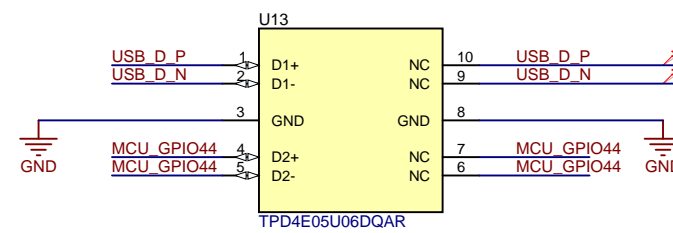
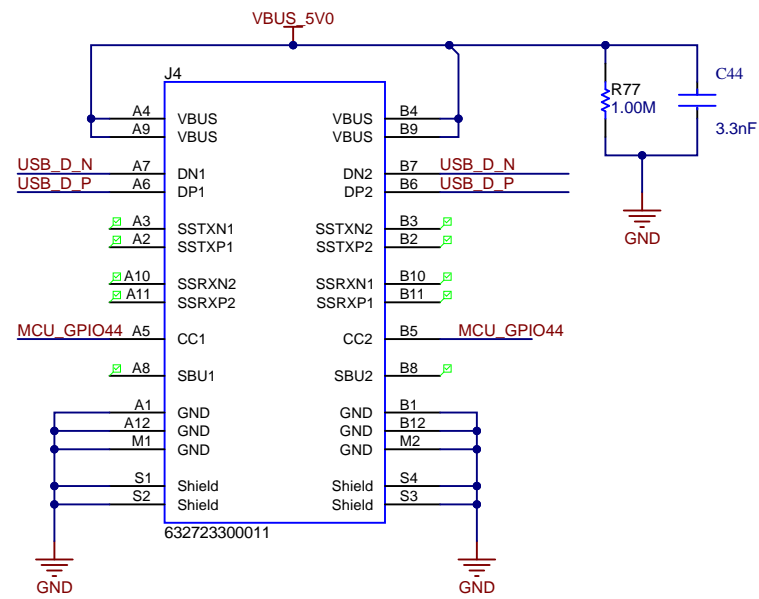
#### Ferrite Beads



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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 4/14/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: [No Variations]	Sheet 5 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_Power.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: <a href="http://www.ti.com/support">http://www.ti.com/support</a>	



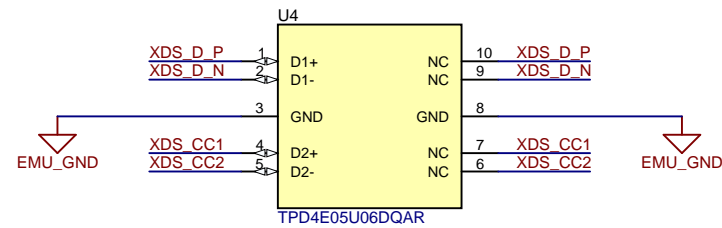
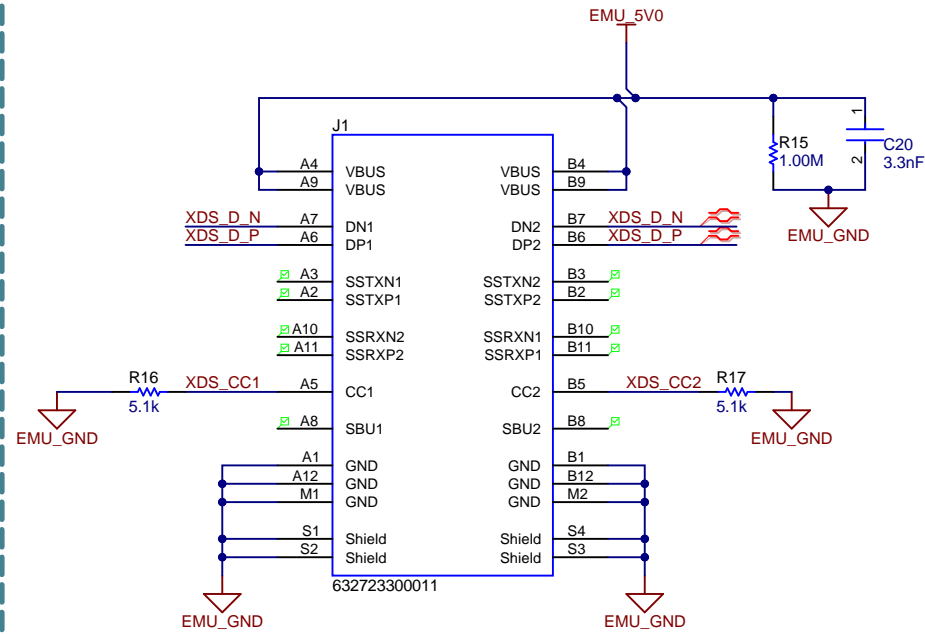


Switch Truth Table		
MCU_GPIO44 STATUS	DESCRIPTION	USB_MODE
1 (HIGH)	UB_CC1 & USB_CC2 are pulled up	Host mode
0 (LOW)	UB_CC1 & USB_CC2 are strongly pulled down	Device mode (DEFAULT)

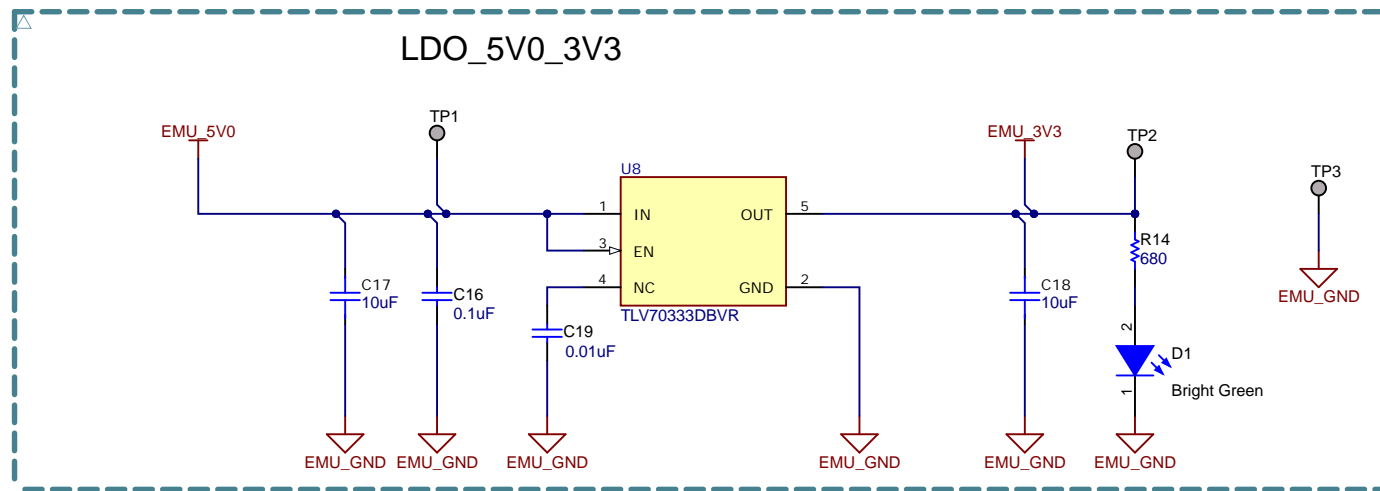
NOTE: USB VBUS\_5V0, PFLT & EPEN do not have a specific mux position in this device.

In this controlCARD, a standard GPIO is used to detect changes to these signals.

## USB- Type C Connector - XDS110

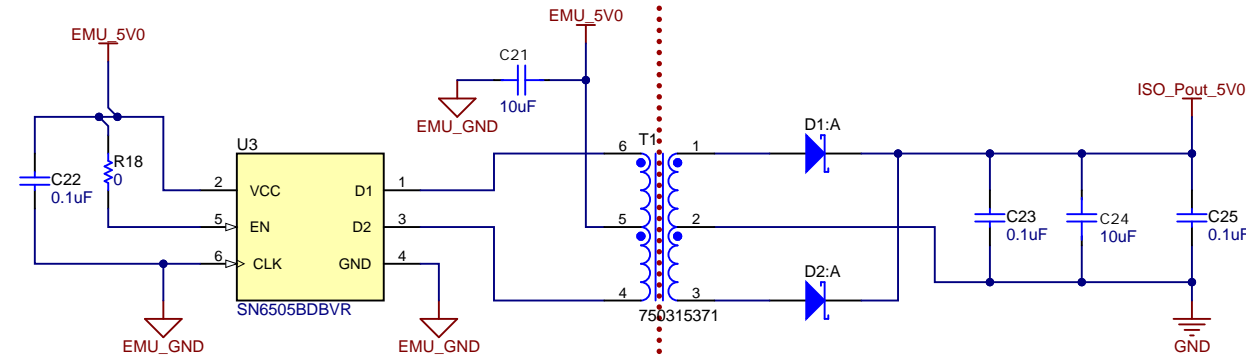


## LDO\_5V0\_3V3



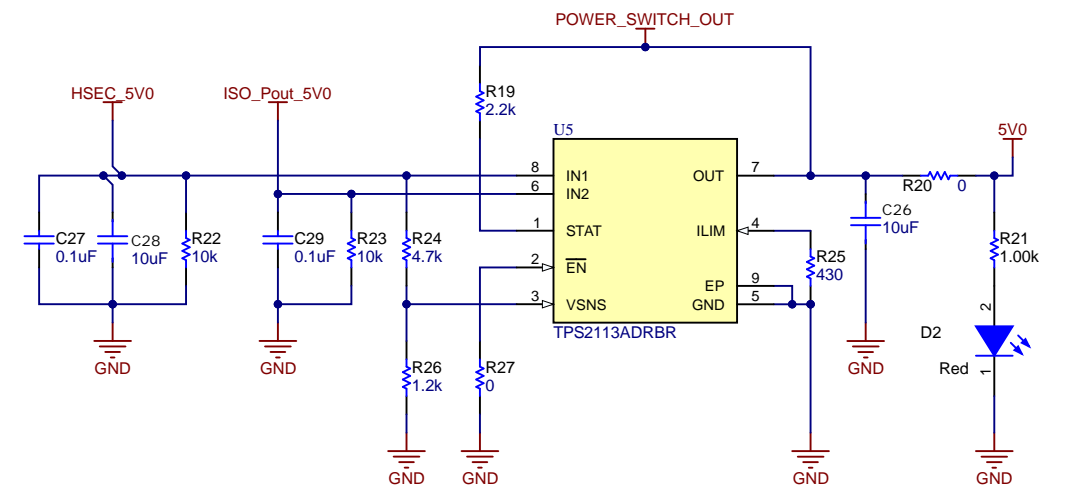
(Cold Side)

## USB Isolated Power



(Hot Side)

## Power Selection Switch



### Switch Truth Table

HSEC_5V0 > 4V	ISO_Pout_5V0 > HSEC_5V0	POWER_SWITCH_OUT
Yes	X	HSEC_5V0
No	No	HSEC_5V0
No	Yes	ISO_Pout_5V0

NOTE: for TYPE C, the USB2.0 OTG device is referred as a Dual Role Port (DRP)

DRP can function either as a USB host or USB peripheral, the selection choice depends on the channel configuration (CC1/CC2).

1. USB host (DFP) - Use pull-up resistors on CC1/CC2 ; Provides Vbus to the attached peripheral
2. USB peripheral (UFP) -Use pull-down resistors on CC1/CC2 ; monitors Vbus to establish a data connection and/or power on board circuits



A

B

C

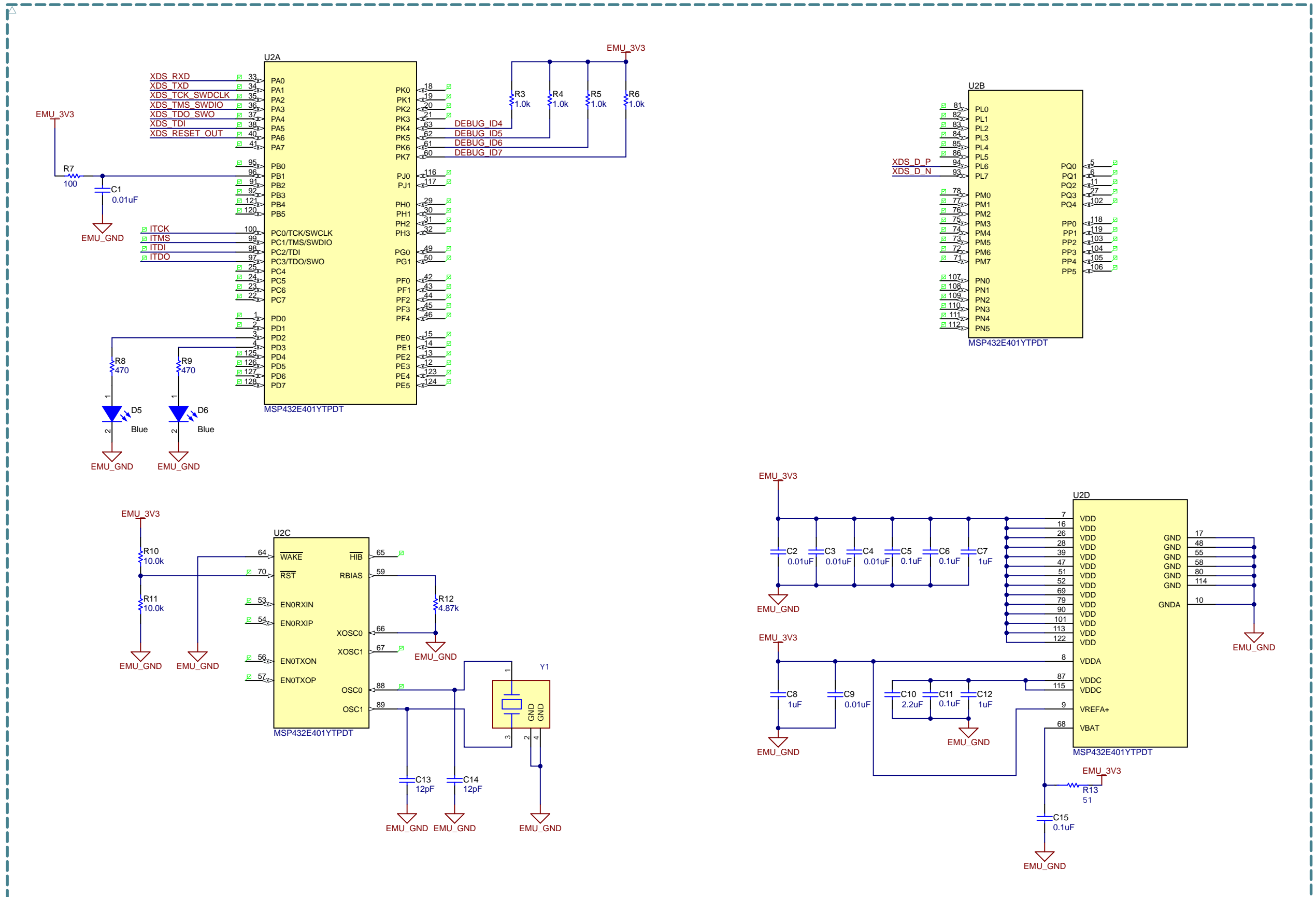
D

A

B

C

D



Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 3/28/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: [No Variations]	Sheet: 9 of 11
Drawn By: Uttam Reddy Pailla	File: MCU114E2_XDS110_MCU.SchDoc	Size: B
Engineer: Uttam Reddy Pailla	Contact: http://www.ti.com/support	

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