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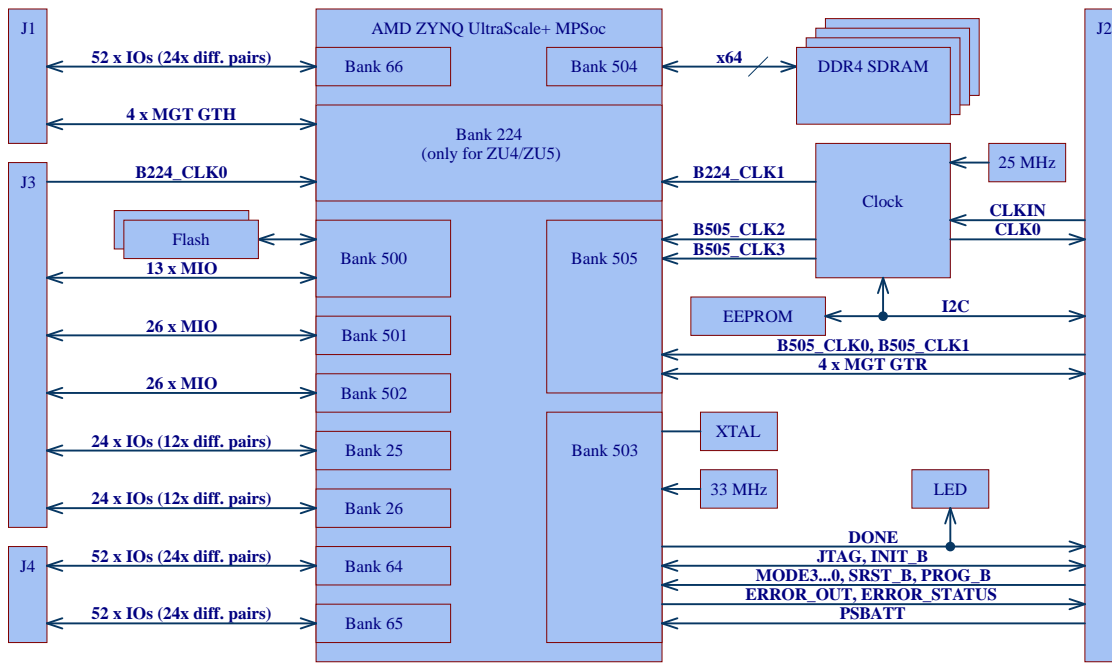
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Schematics and other handouts serve for informational purposes only!

Drawn by	ED
Checked by	MR
Assembly variant	5DI81-A
Created by	ED
Modified by	ED
Modified at	2023-05-17



Title: TE0813 - Legal Notices		
A4	Number: TE0813 5DI81-A	Rev. 02
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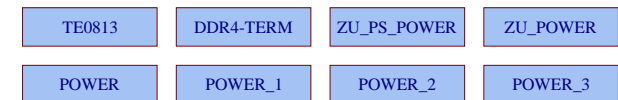


Supported Voltage Ranges:

Power Rail	Direction	Range	Tolerance	Description	Note
3.3VIN	IN	3.3V	+/- 5 %	Micromodule Power	Management voltage rail, supplied by power rail
PL_DCIN	IN	3.3V	+/- 5 %	Micromodule Power	Programmable Logic, supplied by power rail
LP_DCDC	IN	3.3V	+/- 3 %	Micromodule Power	Low-Power Domain, supplied by power rail
GT_DCDC	IN	3.3V	+/- 3 %	Micromodule Power	GTH Transceiver, supplied by power rail
DCDCIN	IN	3.3V	+/- 5 %	Micromodule Power	Full-Power Domain and GTR, supplied by power rail
VCCO_64	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 64	Supplied by external power rail via B2B connector
VCCO_65	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 65	Supplied by external power rail via B2B connector
VCCO_66	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 66	Supplied by external power rail via B2B connector
VCCO_25	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 25	Supplied by external power rail via B2B connector
VCCO_26	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 26	Supplied by external power rail via B2B connector
PSBATT	IN	1.2 V - 1.5 V	-	RTC / BBRAM	Supplied by external power rail via B2B connector
PL_1V8	OUT	1.8 V	+/- 3 %	Power for Carrier	Micromodule: Programmable Logic
PS_1V8	OUT	1.8 V	+/- 3 %	Power for Carrier	Micromodule: Processing System
DDR_1V2	OUT	1.2 V	+/- 3 %	Power for Carrier	Micromodule: PS DDR I/O Supply


I2C Address:

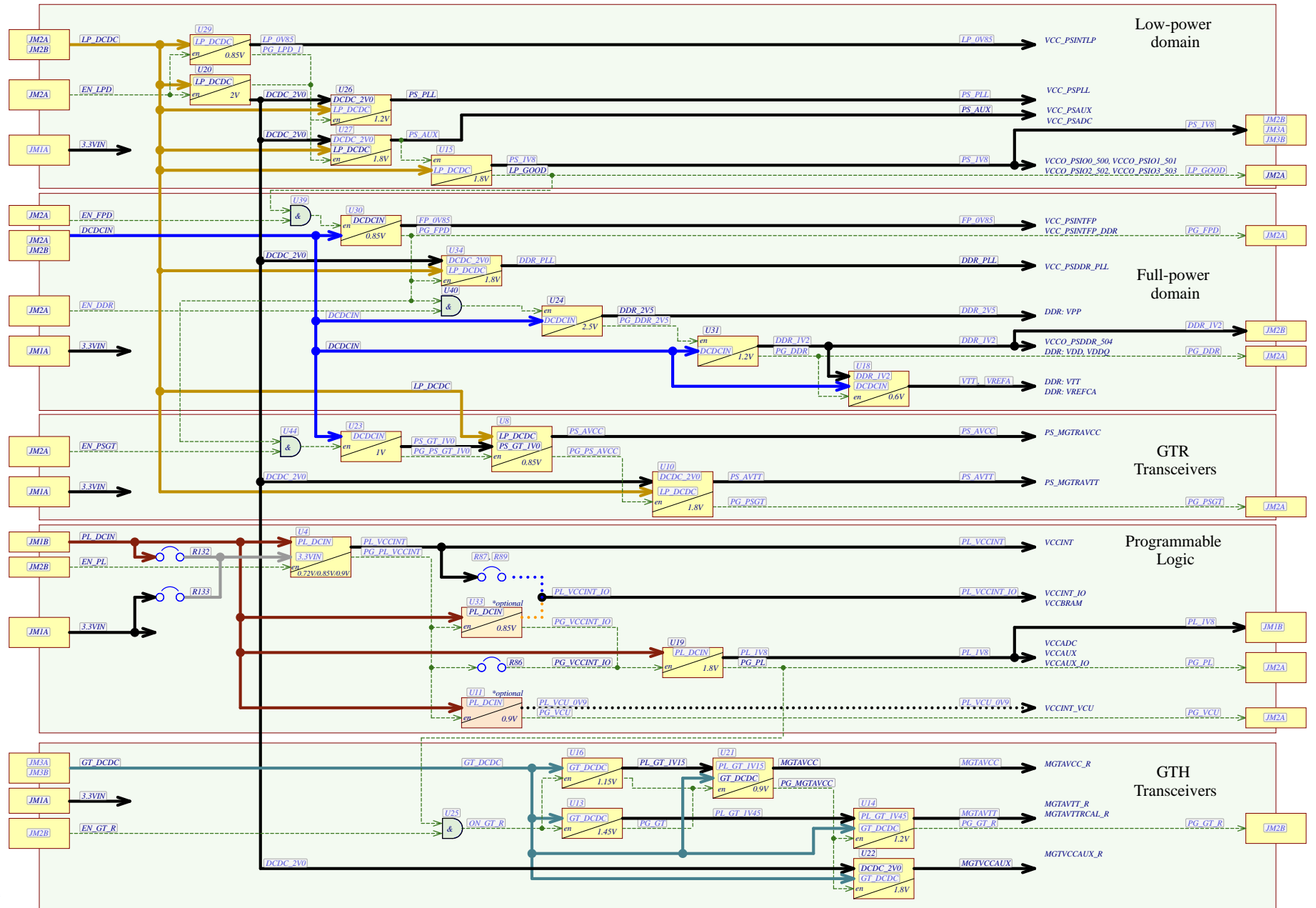
Device	I2C ADDR	Note
PLL U5	0x70	-
EEPROM U28	0x50	-



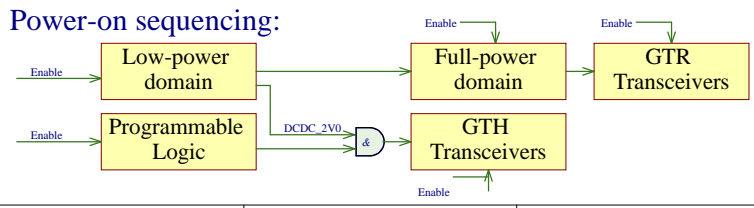
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REV	DATE	Description	
-01	2021-05	Initial revision	VT
	2022-03	Added Table with Supported Voltage Ranges	
	2022-05	Changed DCDC U4 TPS548A28 to MPQ8633BGLE-Z Changed C92 100nF to 1nF	
	2022-11	Added additional Info about Voltage Range	
-02	2023-07	<p>1. Change DCDC U11 from EN6347QI to MPM3860GQW-Z and adapted according circuits.</p> <p>2. Connected DDR4-TEN signals together for U2, U3, U9, and U12 and pulled them low via 499 Ohm resistor R131. Added a testpoint TP3 for DDR4-TEN.</p> <p>3. Changed voltage rail from 1.35 V to 1.45 V via adapting voltage divider resistors R33 and R38 and changed according voltage rail name PL_GT_1V35 to PL_GT_1V45.</p> <p>4. Changed voltage rail from 1.05 V to 1.15 V via adaption voltage divider resistors R44 and R46 and changed according rail name PL_GT_1V05 to PL_GT_1V15.</p> <p>5. Added diode D2 between U41 pin 3 net MR and voltage rail 3.3VIN.</p> <p>6. Connected enable signal for U11 and U33 from "3.3VIN" to "PG_PL_VCCINT".</p> <p>7. Added capacitors C137, C147, and C148 for VTT voltage rail.</p> <p>8. Added resistors R132 (default: not fitted) and R133 to supply U4 VCC either from "PL_DCCIN" or from "3.3VIN".</p> <p>9. Change resistor R92 from 4.22 kOhm to 9.09 kOhm to set current limit to nearly 14.5 A for U4.</p> <p>10. Added remote sense option:</p> <p>10.1 R134 for U30</p> <p>10.2 R135 for U29</p> <p>10.3 R136 for U31</p> <p>11. Added decoupling capacitors:</p> <p>11.1 C210 and C211 for U5.</p> <p>11.2 C190 for U7.</p> <p>11.3 C198, C199, and C213 for U8.</p> <p>11.4 C153, C170...172 for U9</p> <p>11.5 C196 C197, and C212 for U10.</p> <p>11.6 C156 and C157 for U12</p> <p>11.7 C207 and C208 for U14.</p> <p>11.8 C189 for U17.</p> <p>11.9 C149...152, C205, and C206 for U18</p> <p>11.10 C209 and C217 for U21.</p> <p>11.11 C214...216 for U22.</p> <p>11.12 C154 and C155 for U24</p> <p>11.13 C188 and C191 for U26.</p> <p>11.14 C187 and C195 for U27.</p> <p>11.15 C203 and C204 for U34.</p> <p>11.16 C201 for U39.</p> <p>11.17 C202 for U40.</p> <p>11.18 C178 for U41.</p> <p>11.19 C200 for U44.</p> <p>12. Added testpoints TP4, TP19, TP26.</p> <p>13. Added UKCA logo.</p> <p>14. Change 100 nF capacitors C135 and C136 from 6.3 V to 25 V for BOM optimization.</p>	ED

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- EN_GT_R Net name
- Power bus
- Control signal
- Power bus in FPGA speedgrade -1/-2/-3 assembly variants
- Power bus in FPGA speedgrade -1L/-2L assembly variants (low power)
- PL_DCIN
0.9V Optional power converter
- & Logic AND gate



Title: TE0813 - Power Diagram		
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Special notes:

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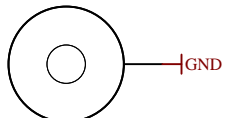
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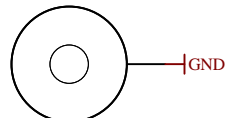
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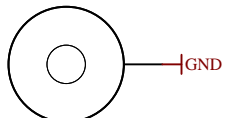
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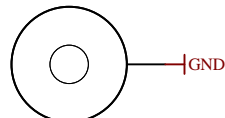
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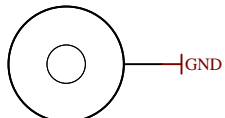
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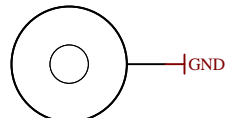
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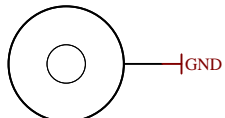
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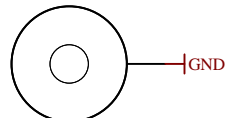
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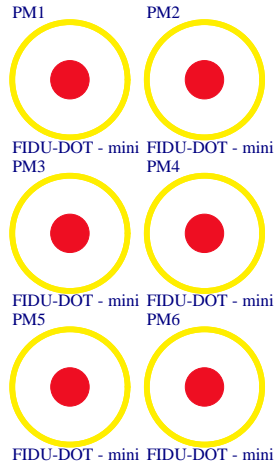
Mount.Hole 3.2mm für Unterlegscheibe



Mount.Hole 3.2mm für Unterlegscheibe



Mount.Hole 3.2mm für Unterlegscheibe



UKCA1

UKCA Logo on Top Overlay

UKCA-TOPOVERLAY

CE1

CE Logo on Top Overlay

CE-TOPOVERLAY

MECH1

TE Address Overlay

LOGO ADDRESS

LOGO1

TE Logo PRINT Layer

LOGO PRINT

Serial
Serial
Serialnumber 6,3 x 6.3mm



Title: TE0813

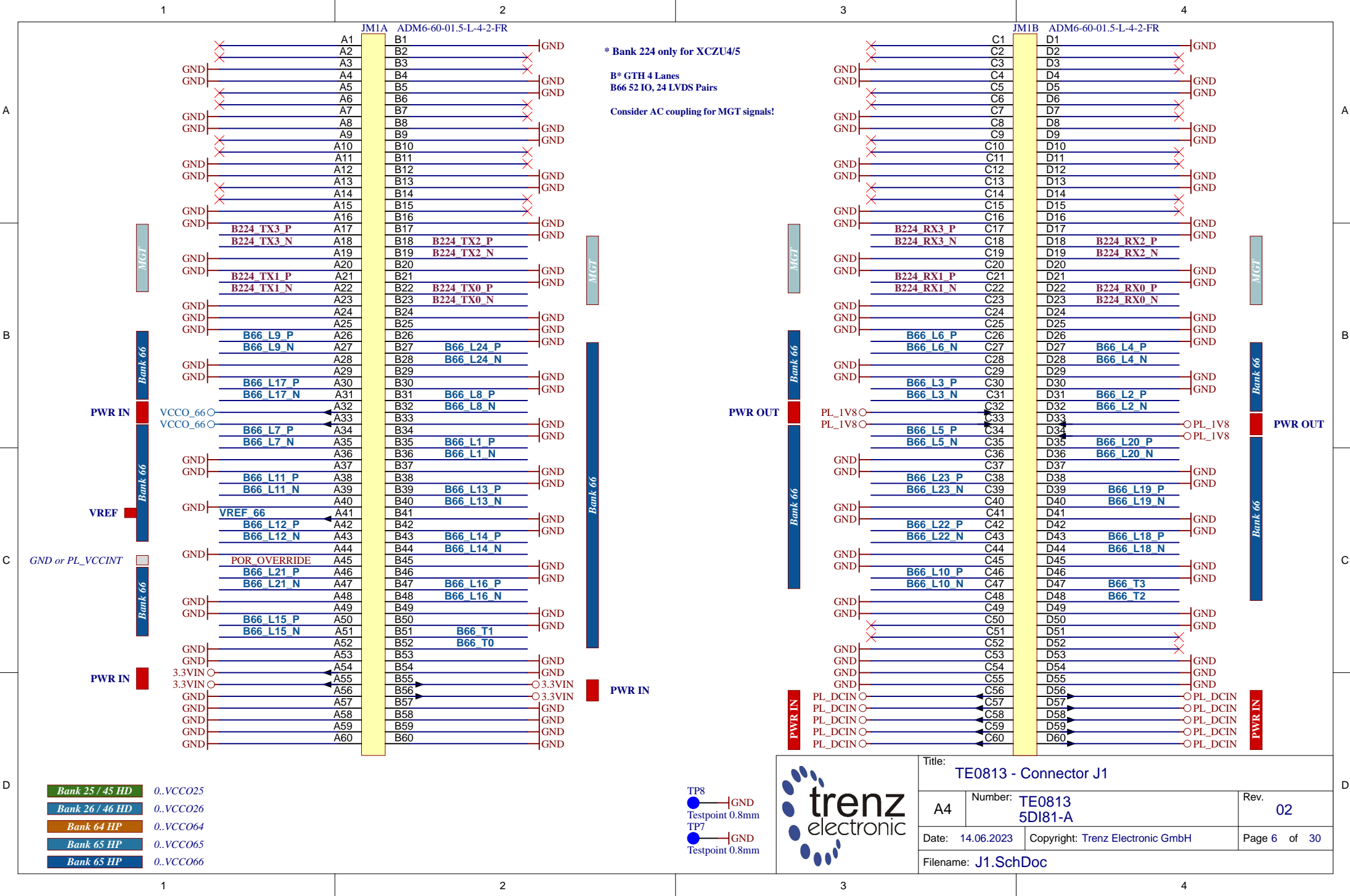
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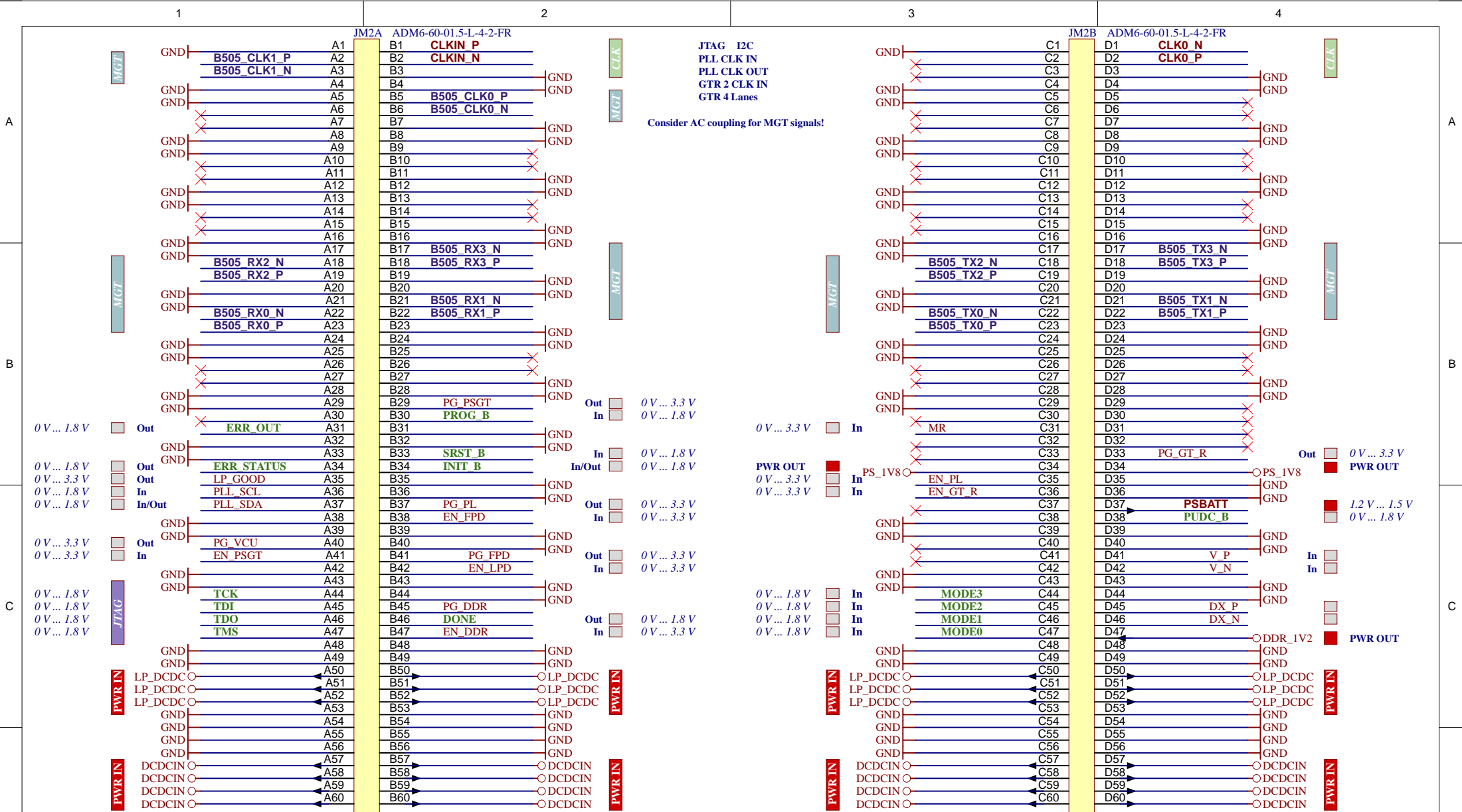


* Bank 224 only for XCZU4/5
 B* GTH 4 Lanes
 B66 52 IO, 24 LVDS Pairs
 Consider AC coupling for MGT signals!

TP8 — GND
 Testpoint 0.8mm
 TP7 — GND
 Testpoint 0.8mm



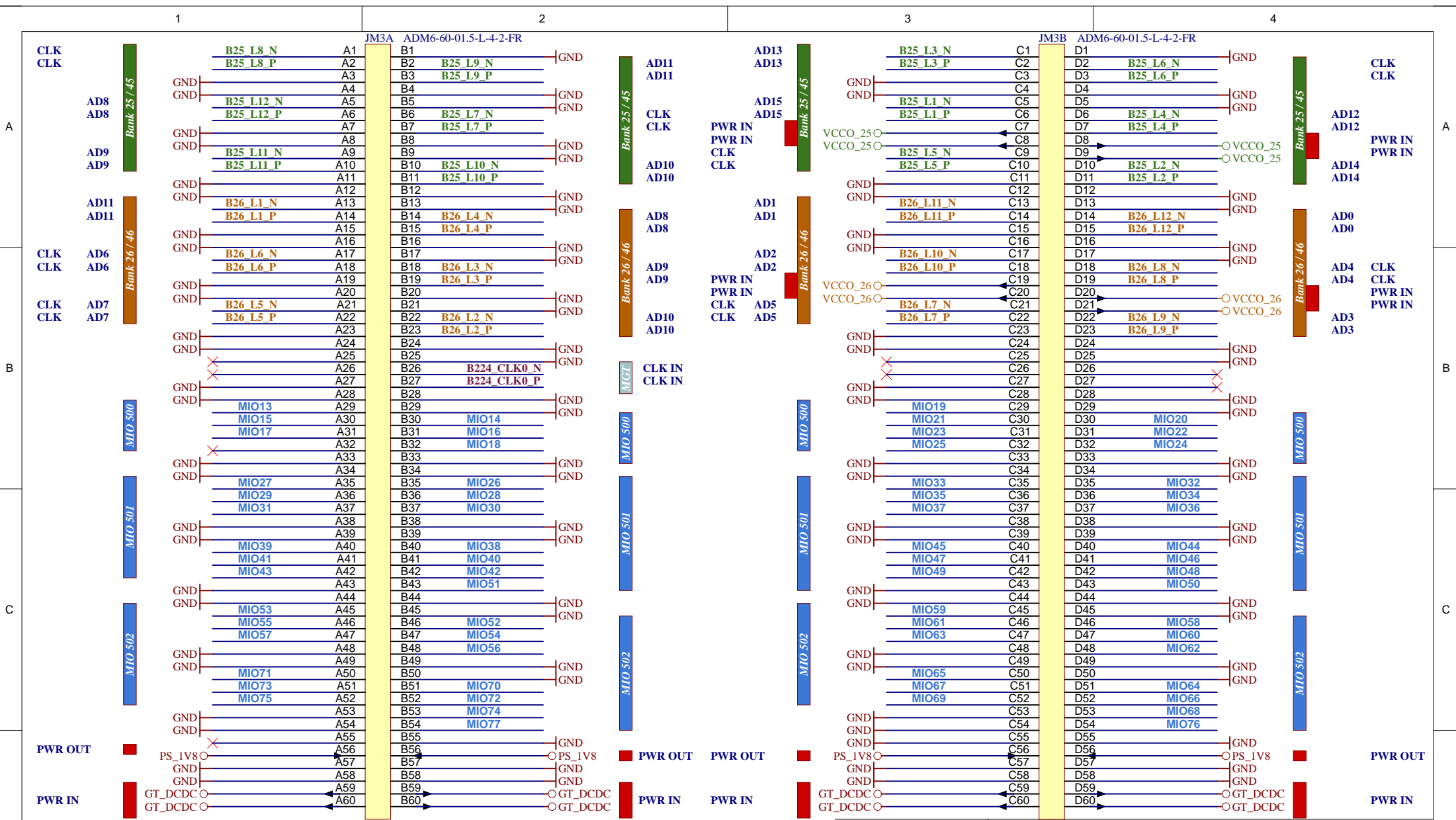
Title: TE0813 - Connector J1		
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- Bank 25 / 45 HD 0..VCC025
- Bank 26 / 46 HD 0..VCC026
- Bank 64 HP 0..VCC064
- Bank 65 HP 0..VCC065
- Bank 65 HP 0..VCC066



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- Bank 25 / 45 HD ..VCC025
- Bank 26 / 46 HD ..VCC026
- Bank 64 HP ..VCC064
- Bank 65 HP ..VCC065
- Bank 65 HP ..VCC066
- * Bank 25 for XCZU2/3
- * Bank 45 for XCZU4/5
- ** Bank 26 for XCZU2/3
- ** Bank 46 for XCZU4/5
- *** Bank 224 only for XCZU4/5
- B* 24 IO, 12 LVDS Pairs
- B** 24 IO, 12 LVDS Pairs
- B*** GTH 1 CLK IN
- 65 MIO



Title: TE0813 - Connector J3		
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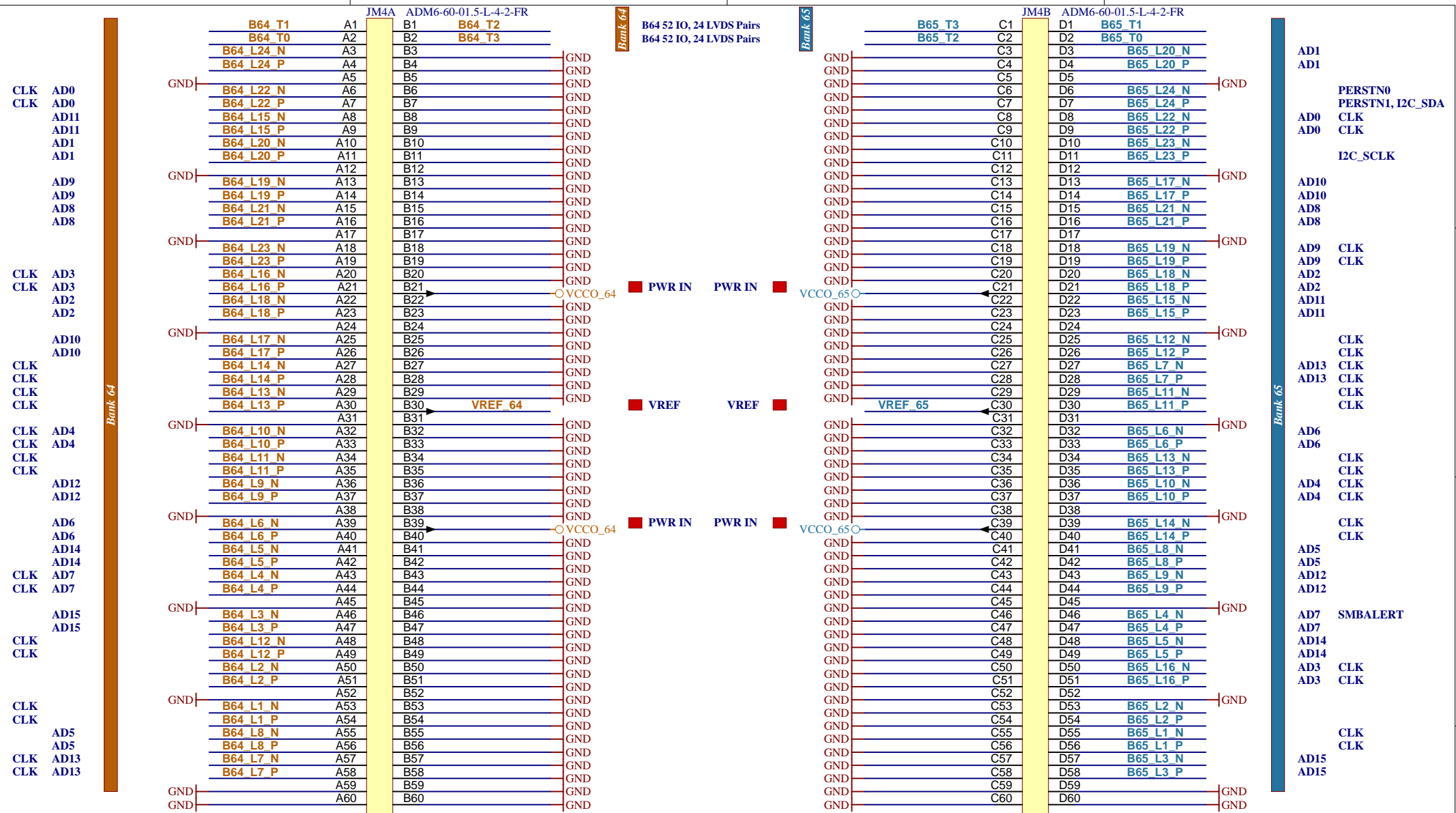
D

A

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- Bank 25 / 45 HD ..VCCO25
- Bank 26 / 46 HD ..VCCO26
- Bank 64 HP ..VCCO64
- Bank 65 HP ..VCCO65
- Bank 65 HP ..VCCO66



Title: TE0813 - Connector J4		
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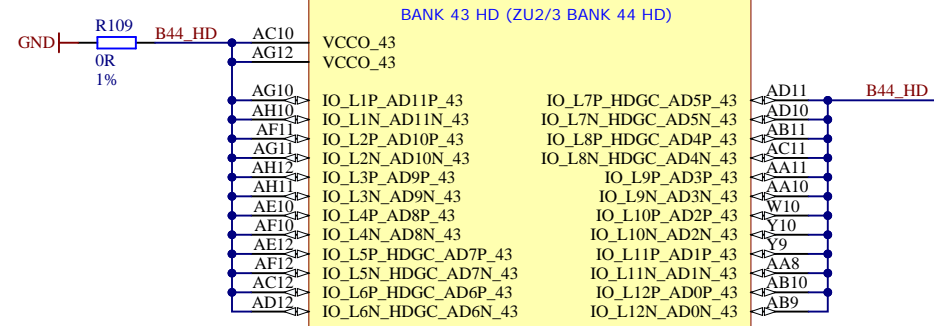
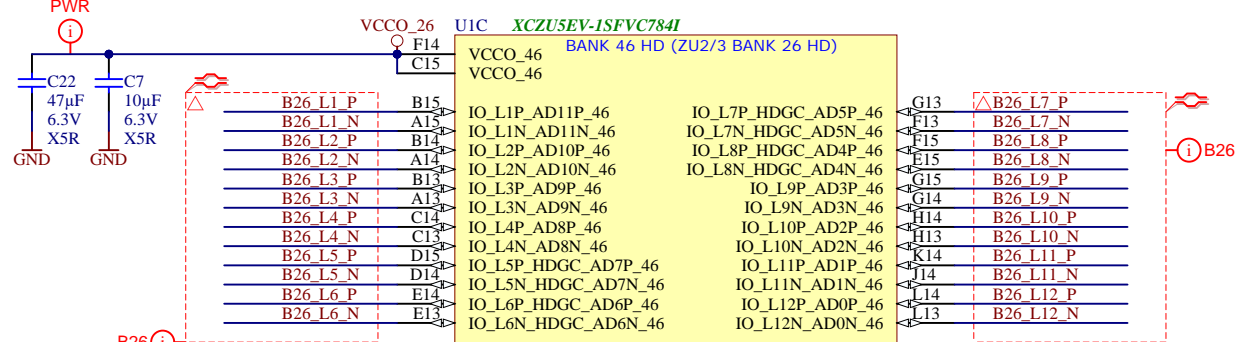
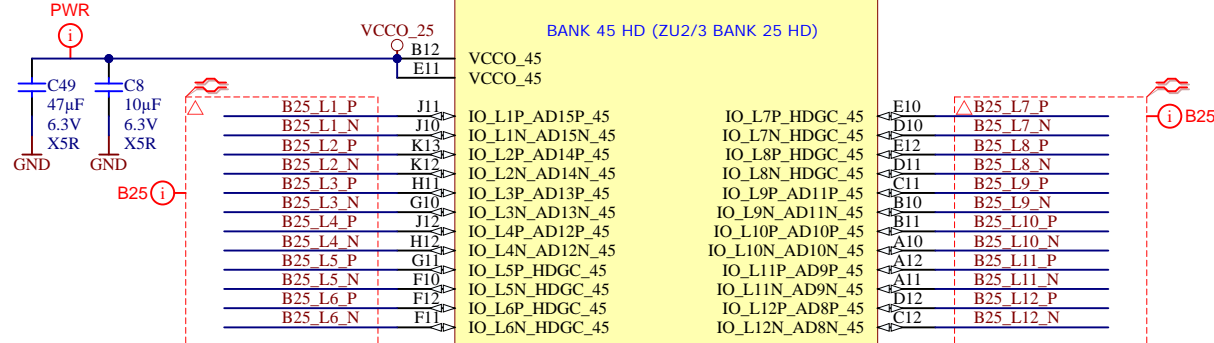
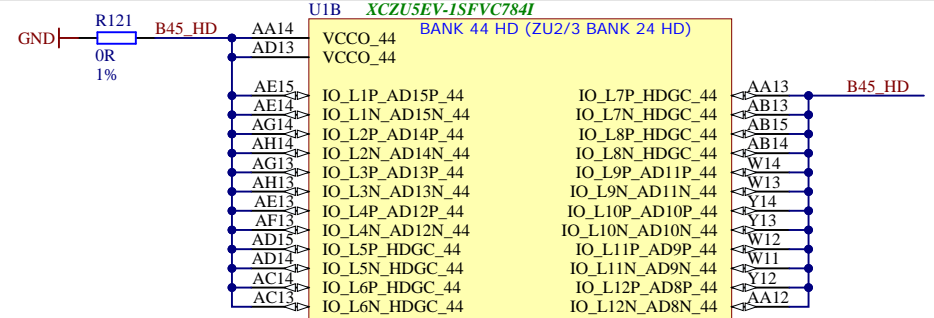
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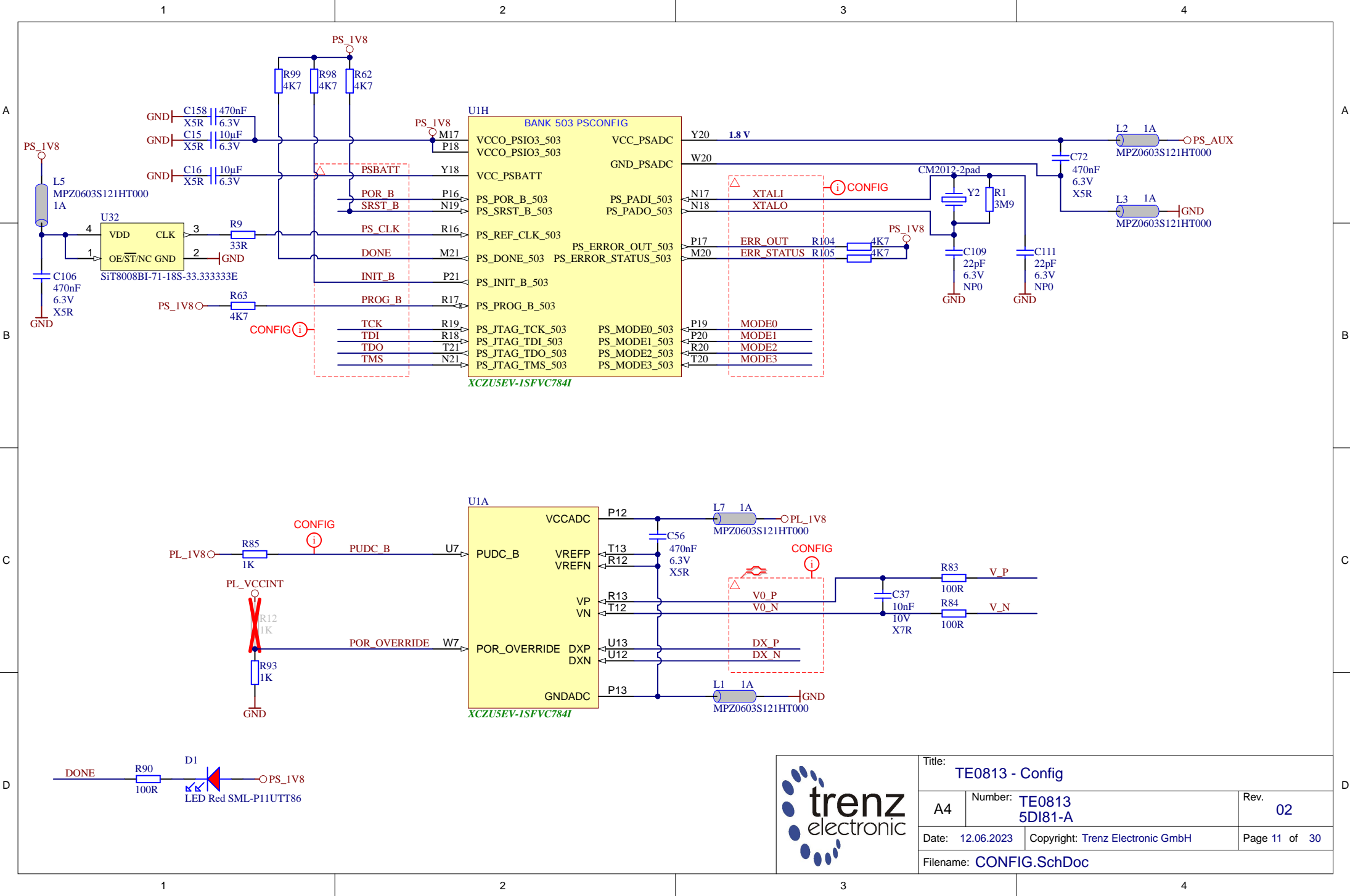
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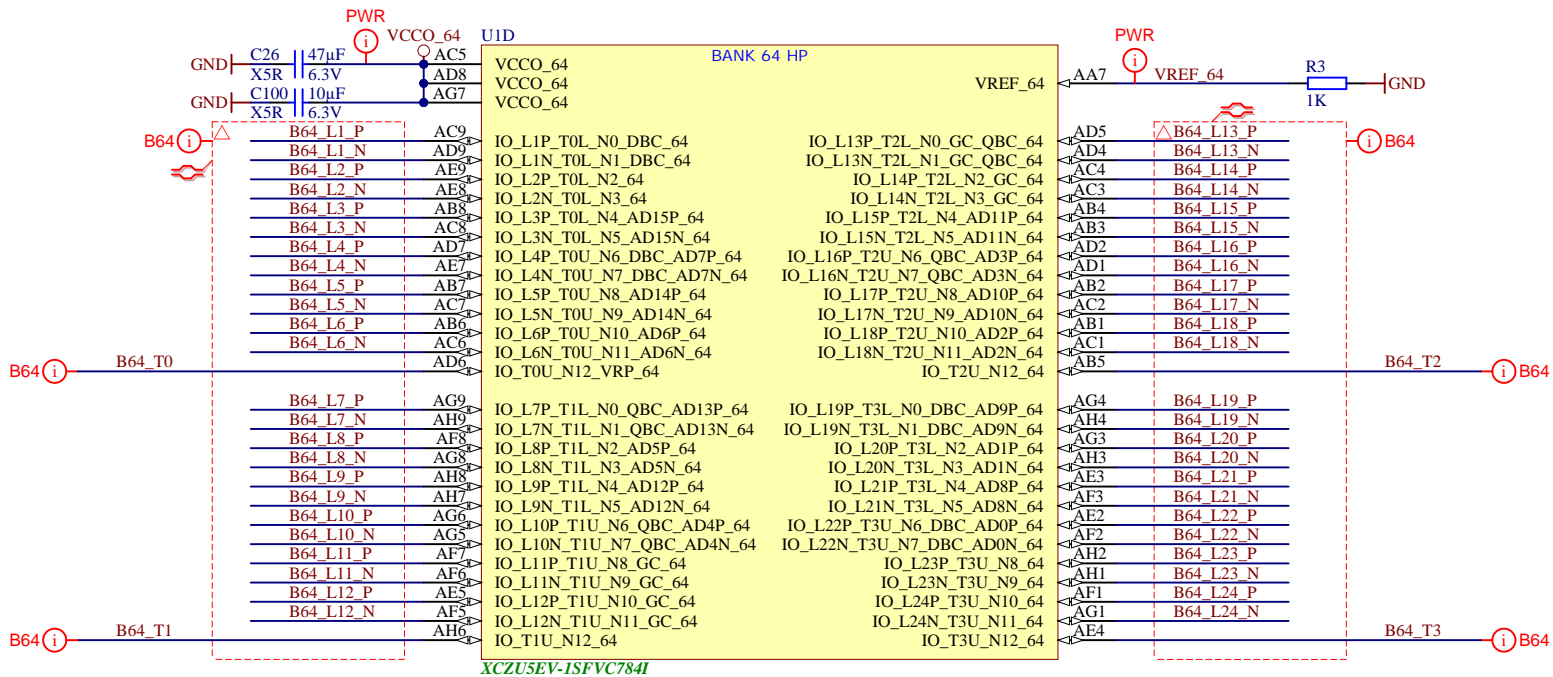
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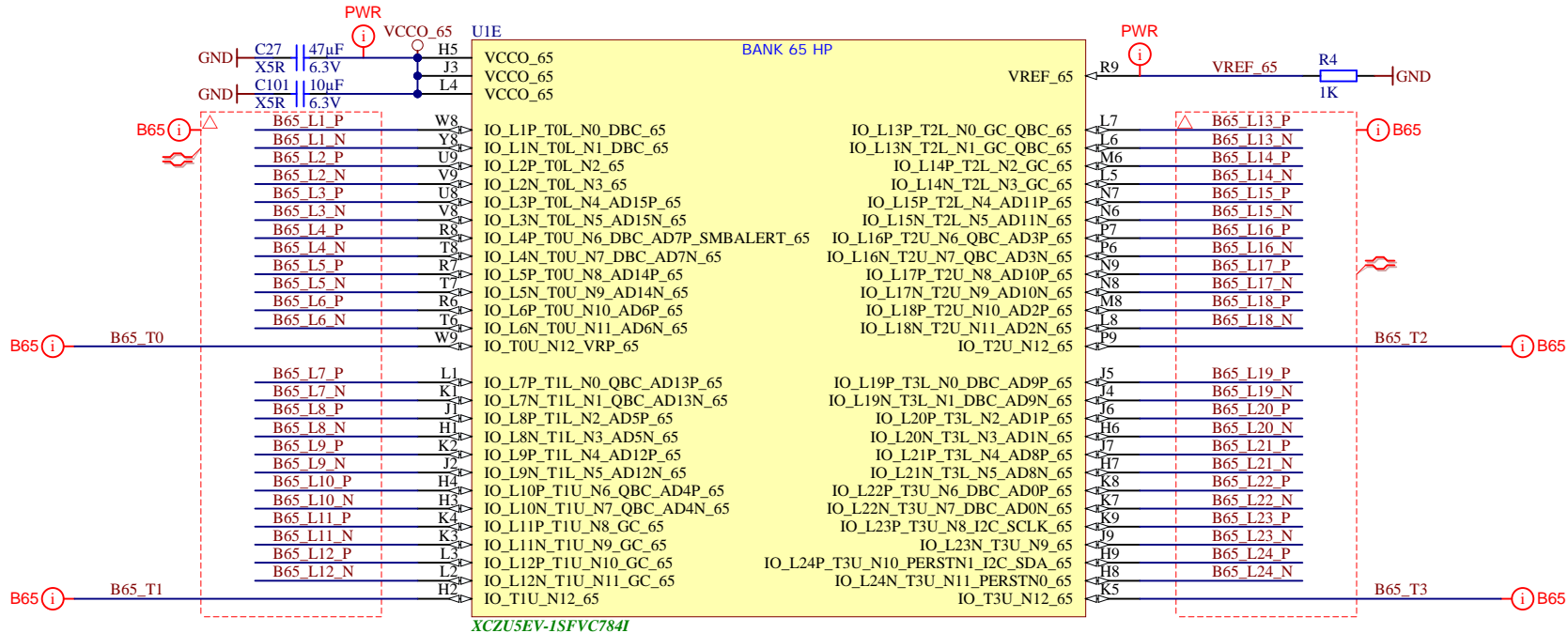
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Filename: B_HD.SchDoc		Page 10 of 30



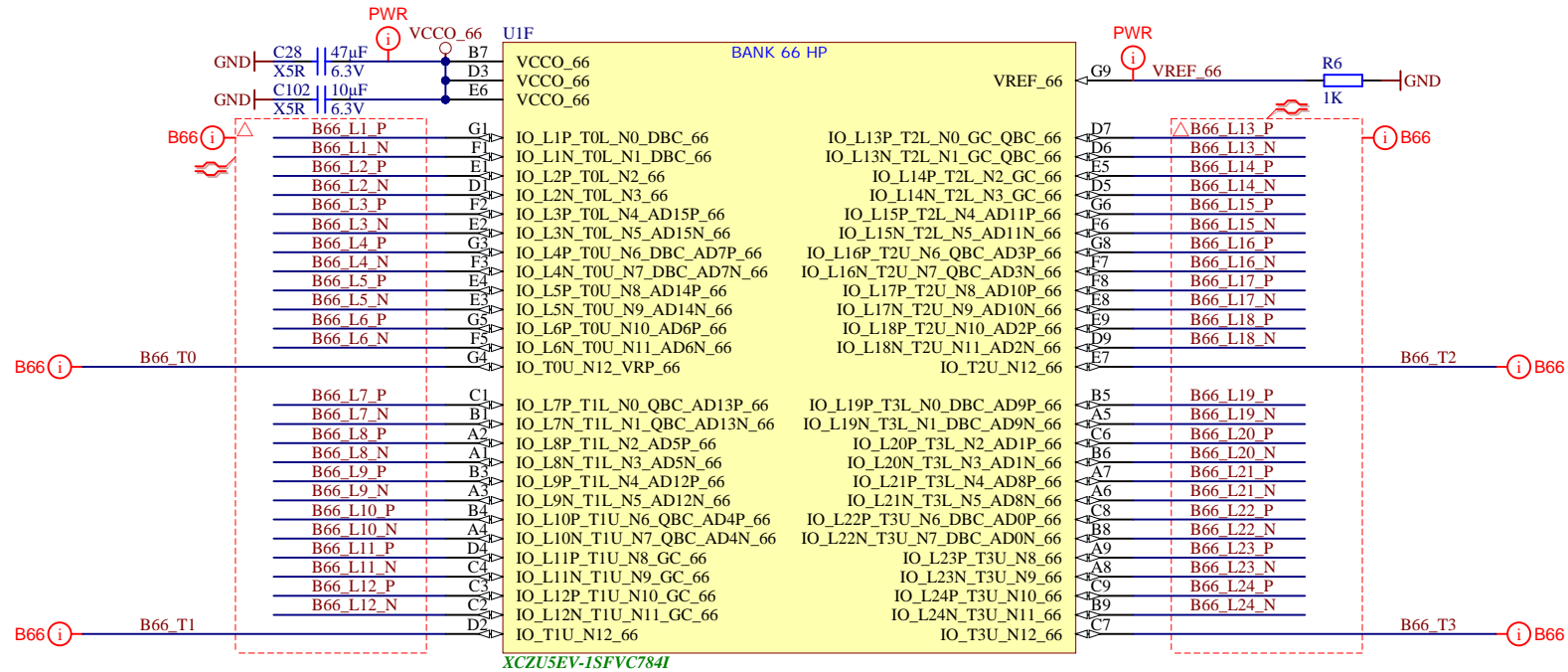

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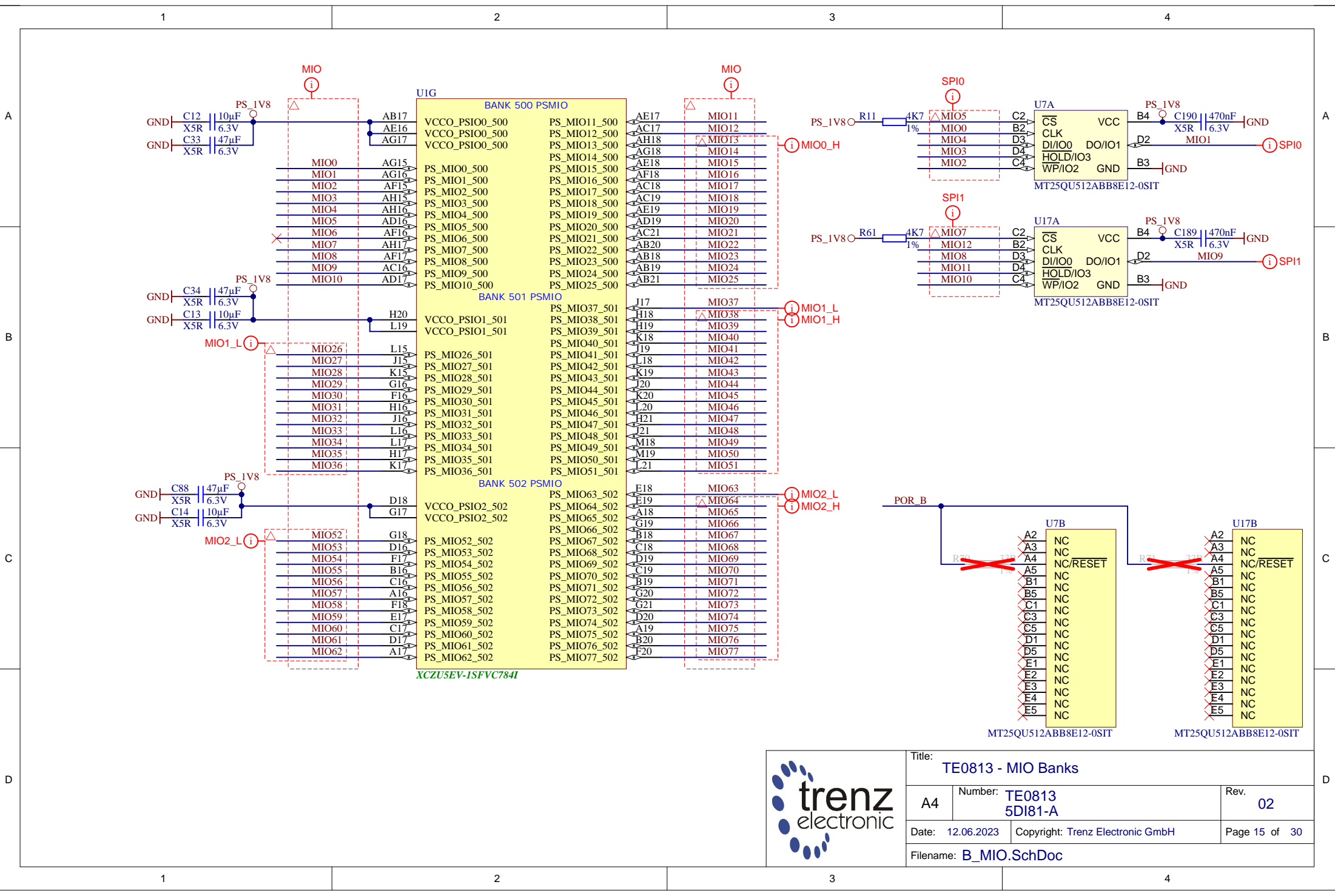
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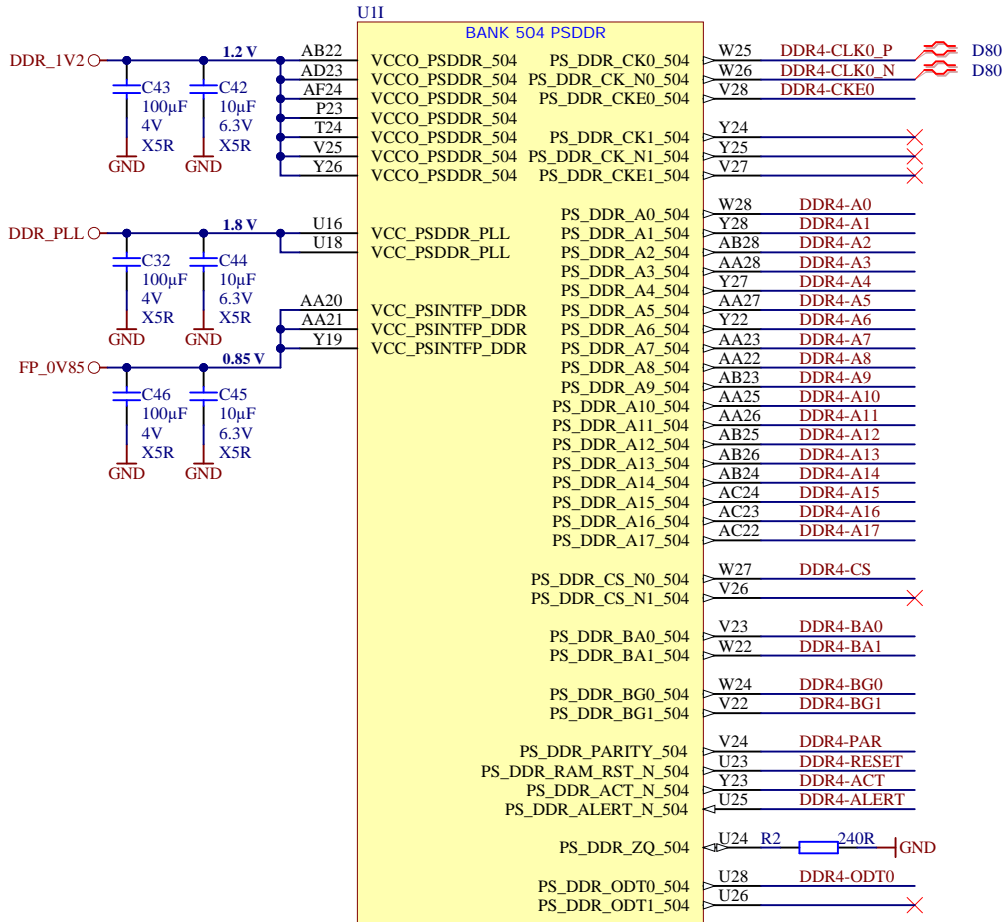



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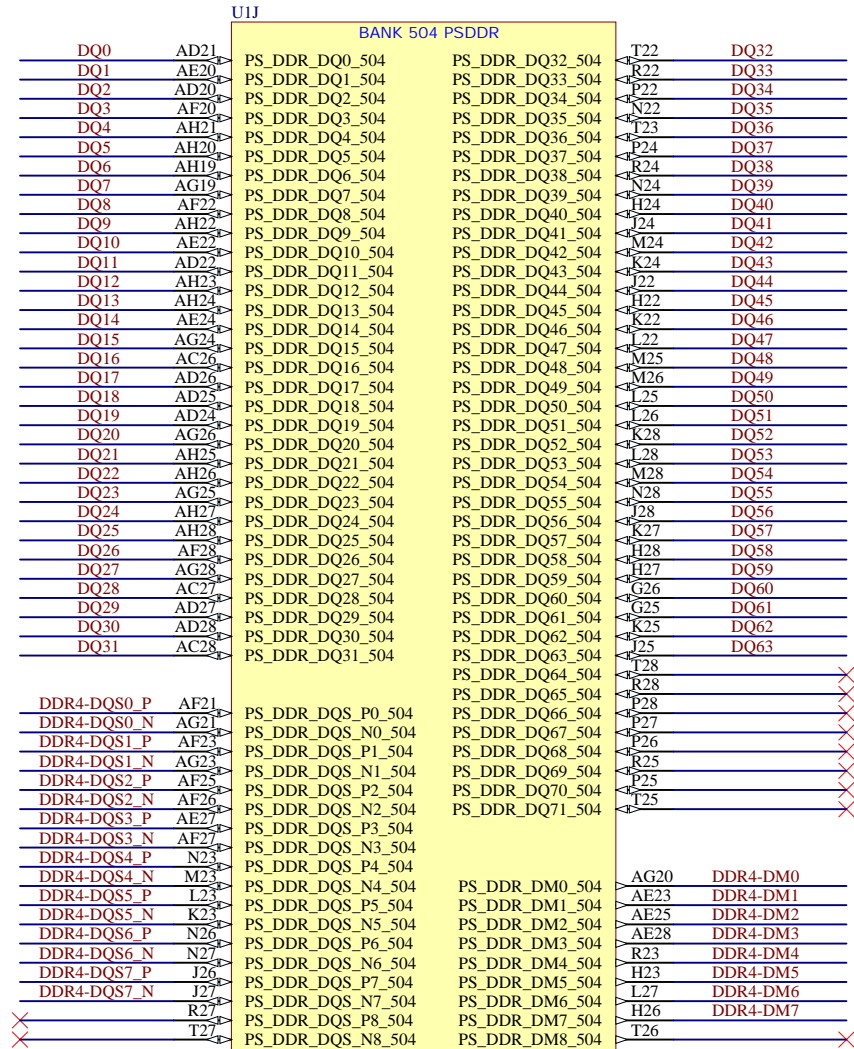


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Title: TE0813 - MIO Banks		
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XCZU5EV-1SFVC784I



XCZU5EV-1SFVC784I



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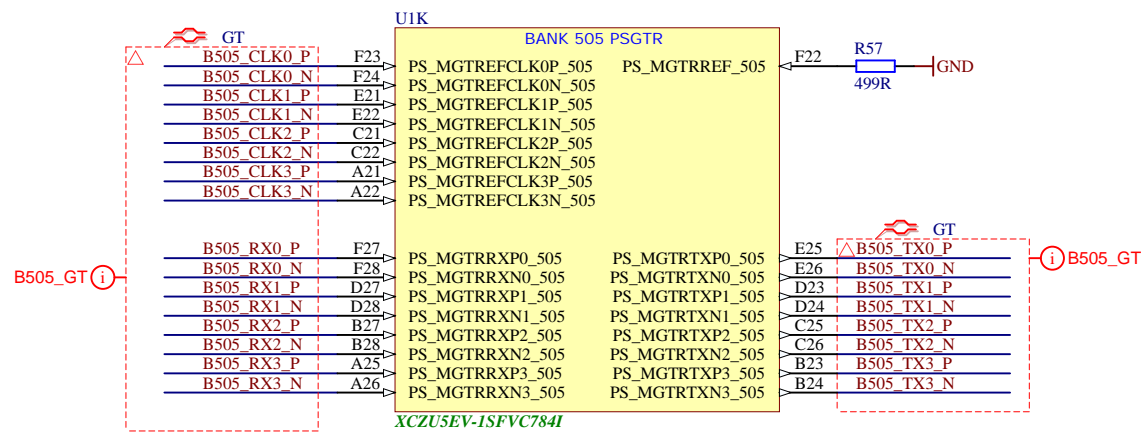
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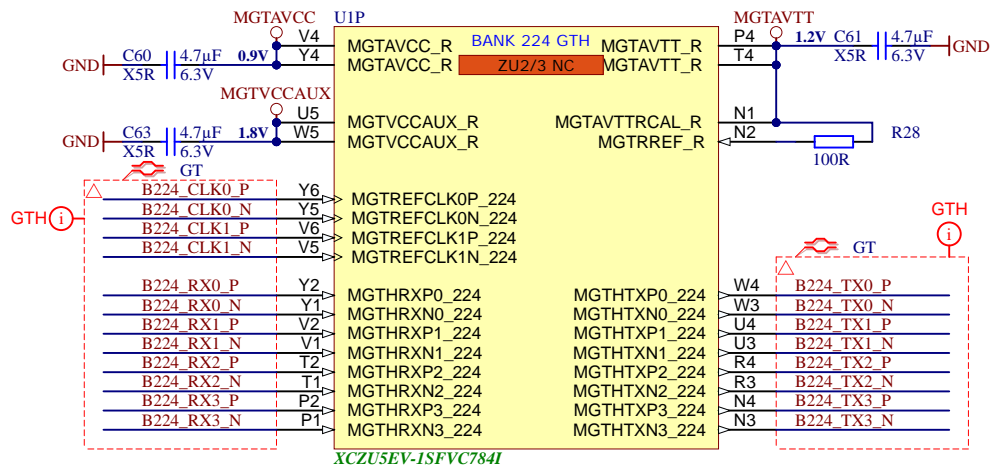
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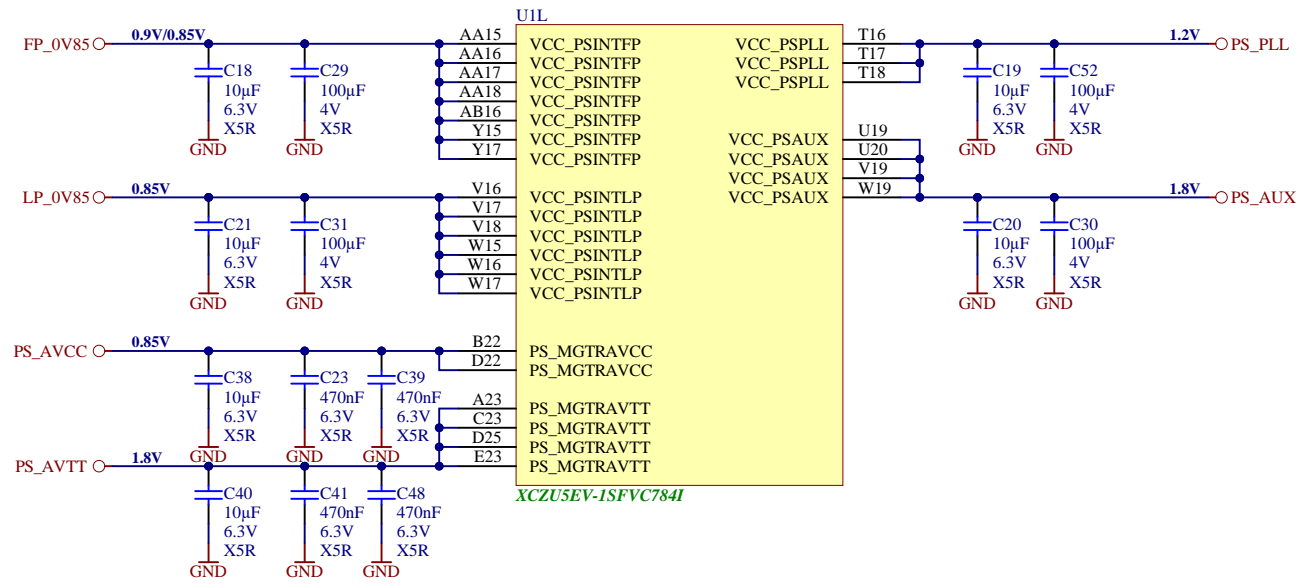
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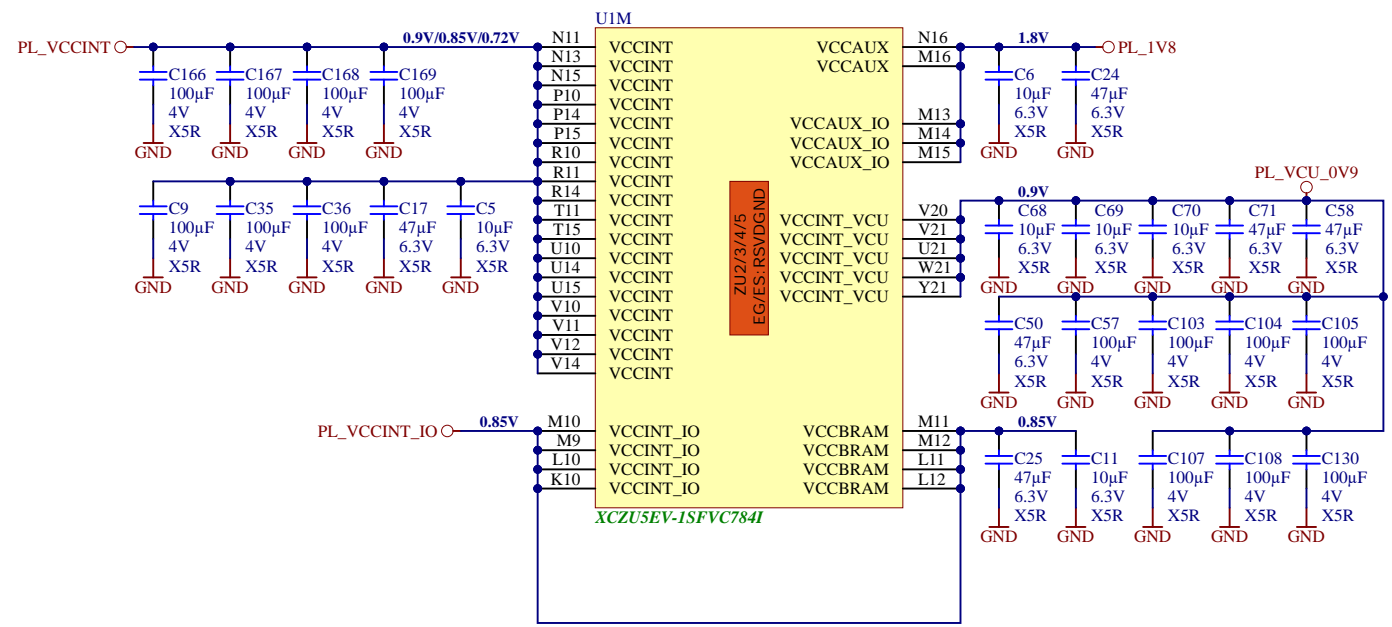
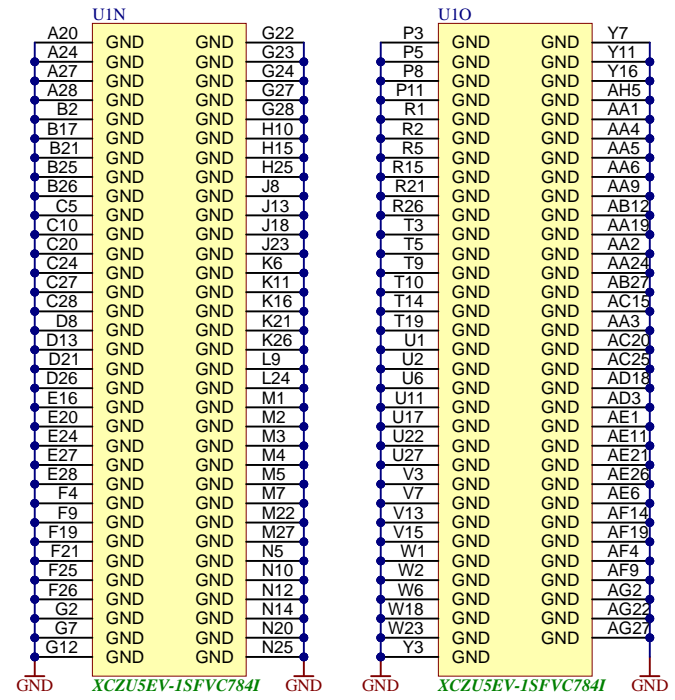



U1L

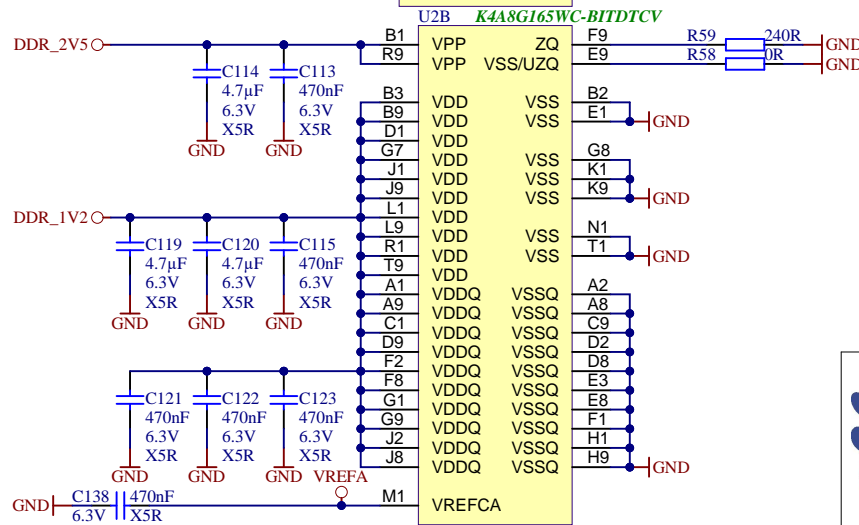
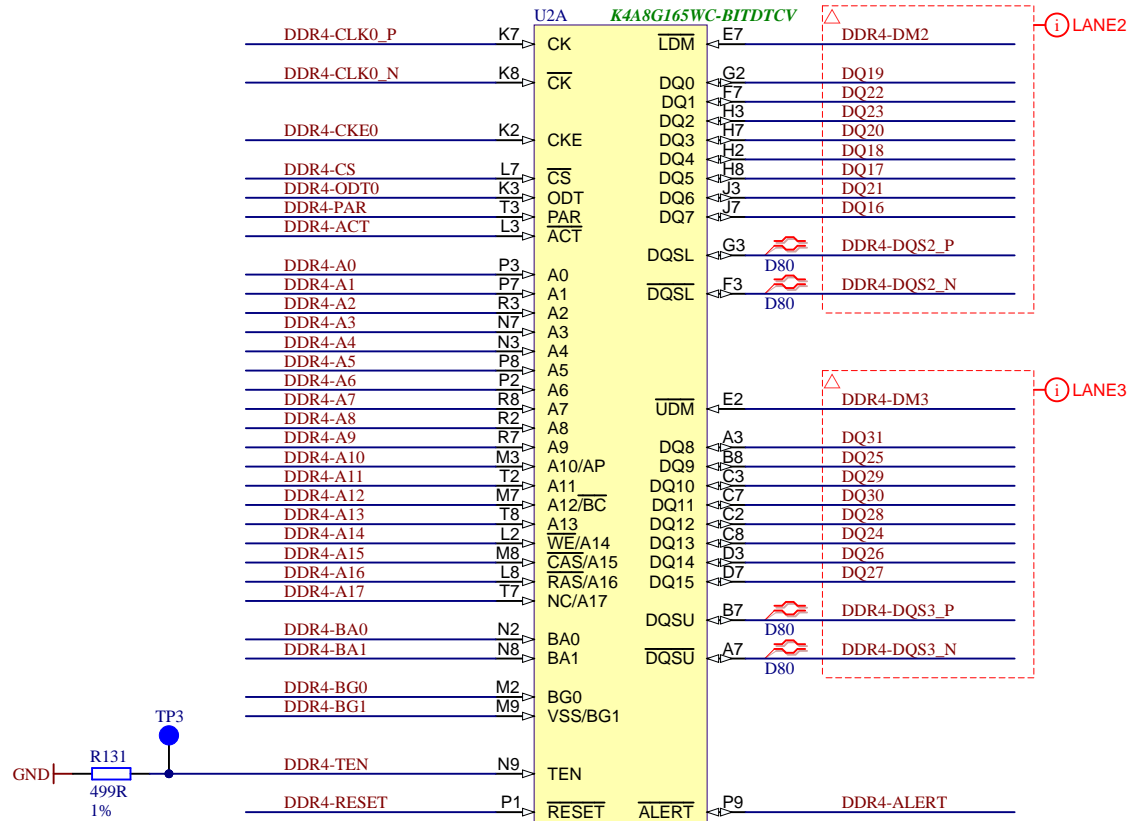
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VCC_PSINTFP	VCC_PSPLL
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VCC_PSINTFP	VCC_PSAUX
VCC_PSINTLP	VCC_PSINTLP
VCC_PSINTLP	VCC_PSINTLP
VCC_PSINTLP	VCC_PSINTLP
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VCC_PSINTLP	VCC_PSINTLP
VCC_PSINTLP	VCC_PSINTLP
PS_MGTRAVCC	PS_MGTRAVCC
PS_MGTRAVTT	PS_MGTRAVTT
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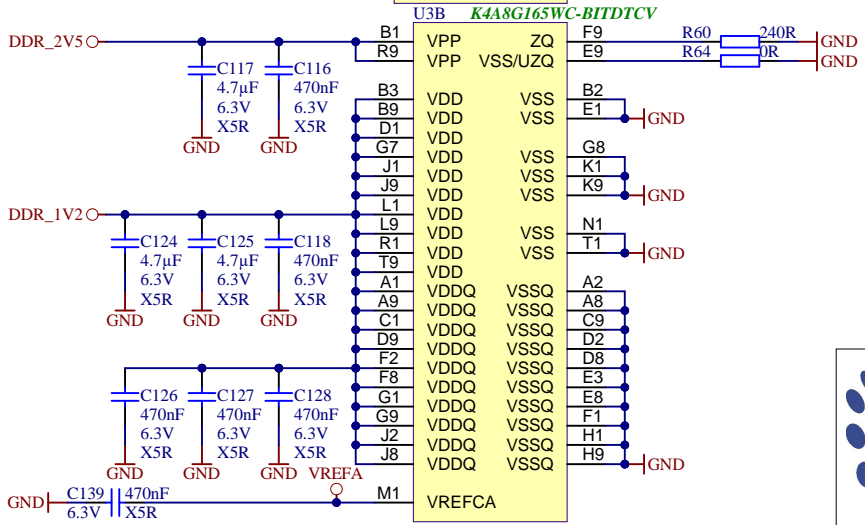
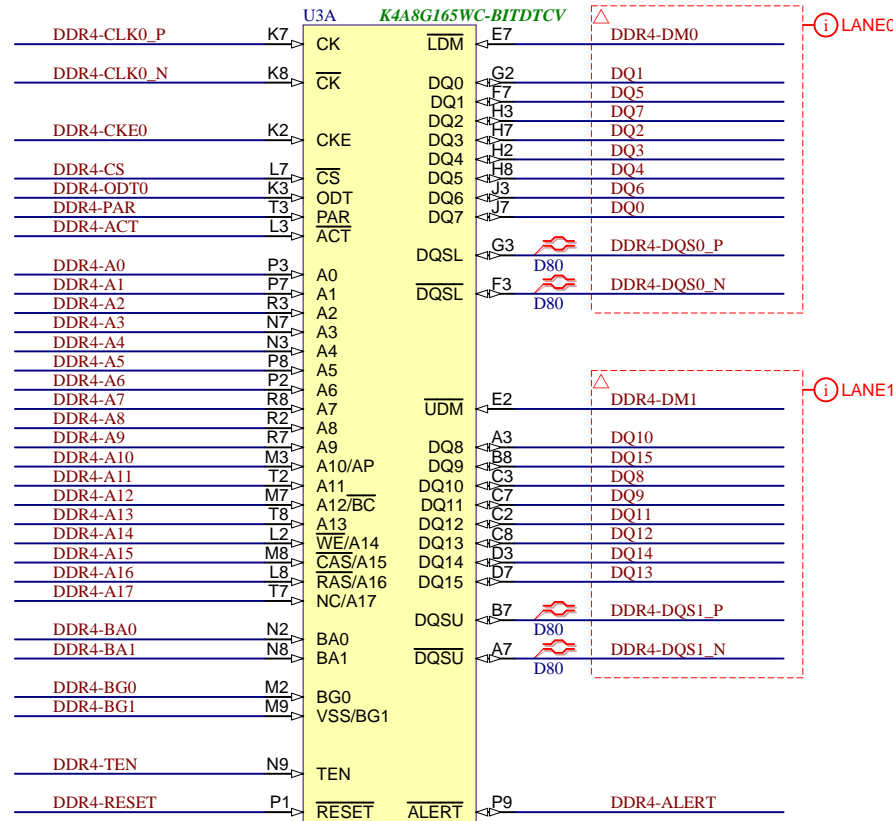
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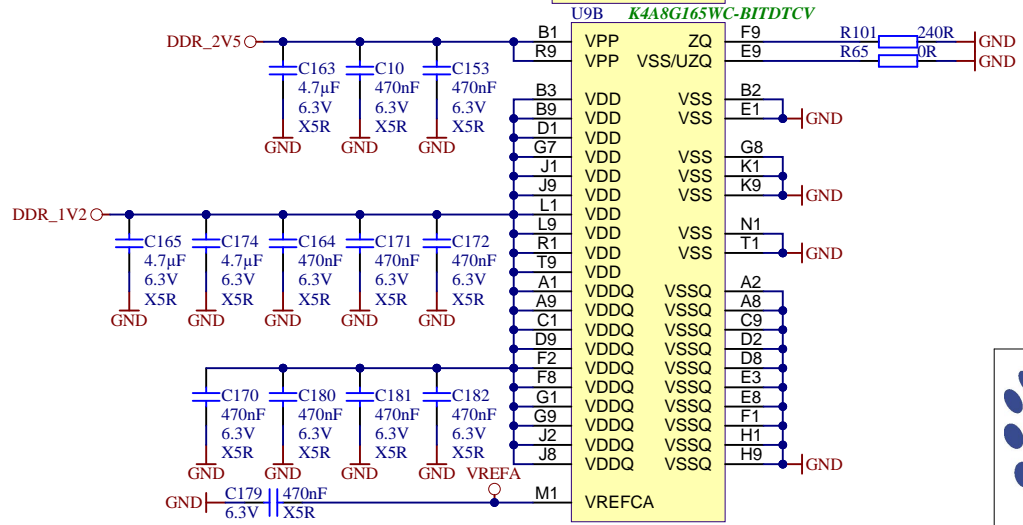
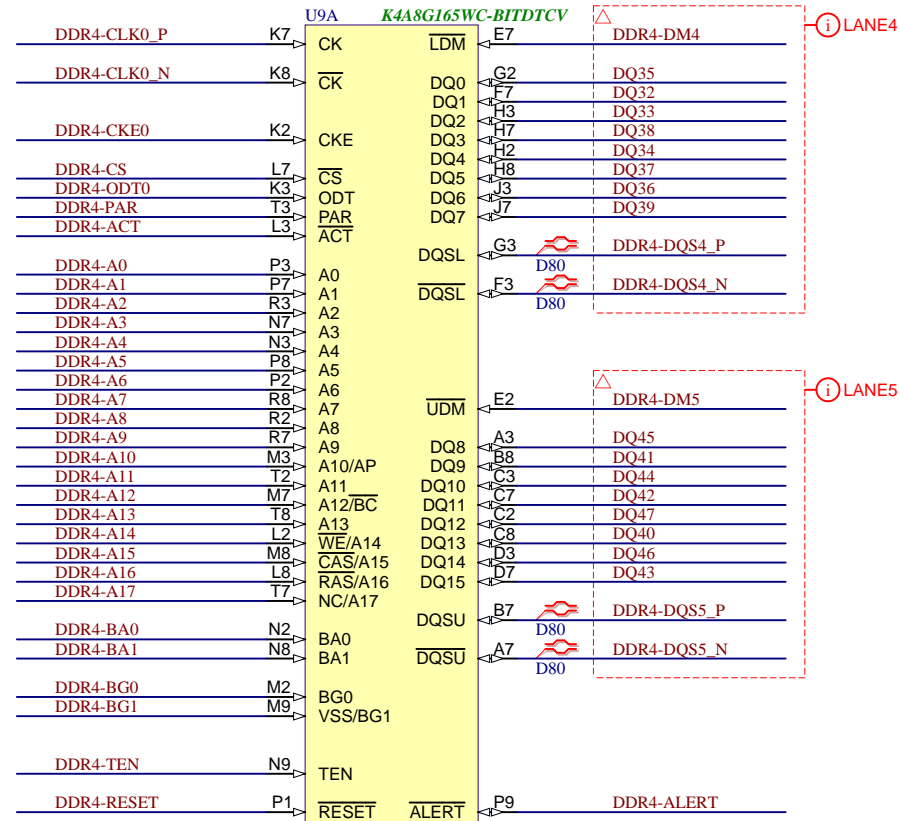
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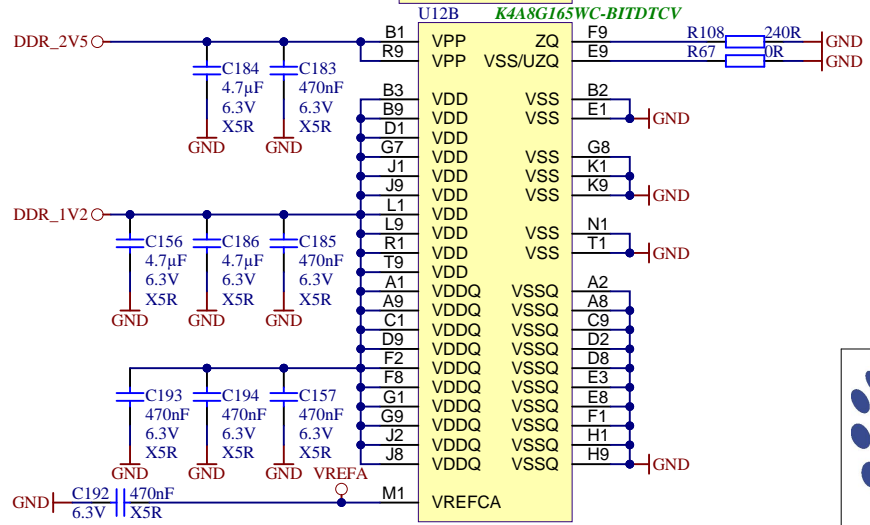
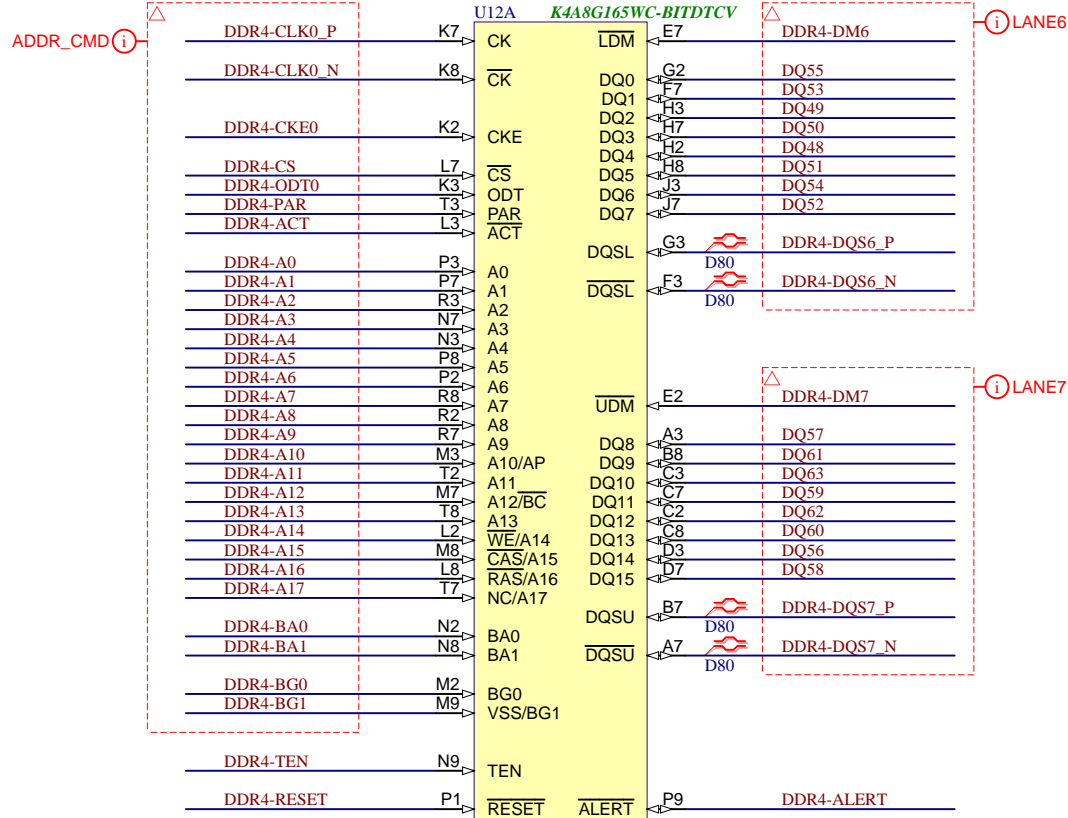
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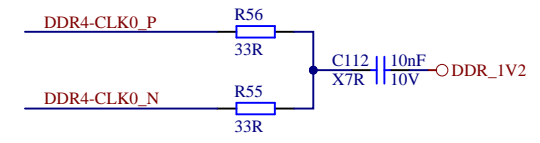
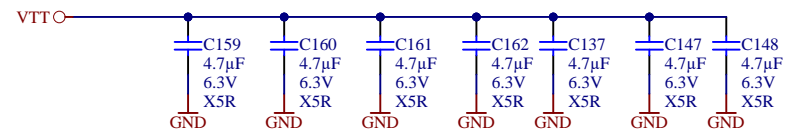
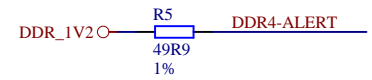
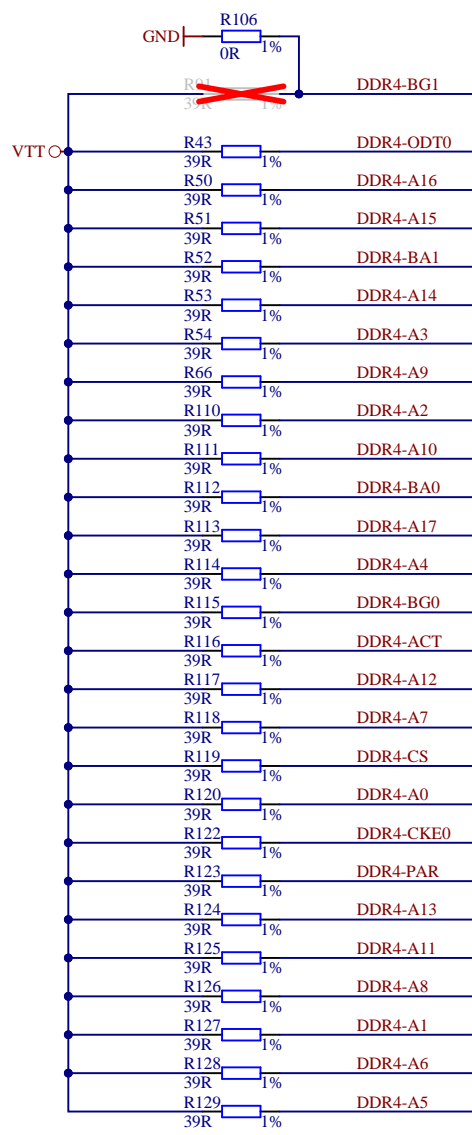
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Filename: DDR4-RAM_2.SchDoc		



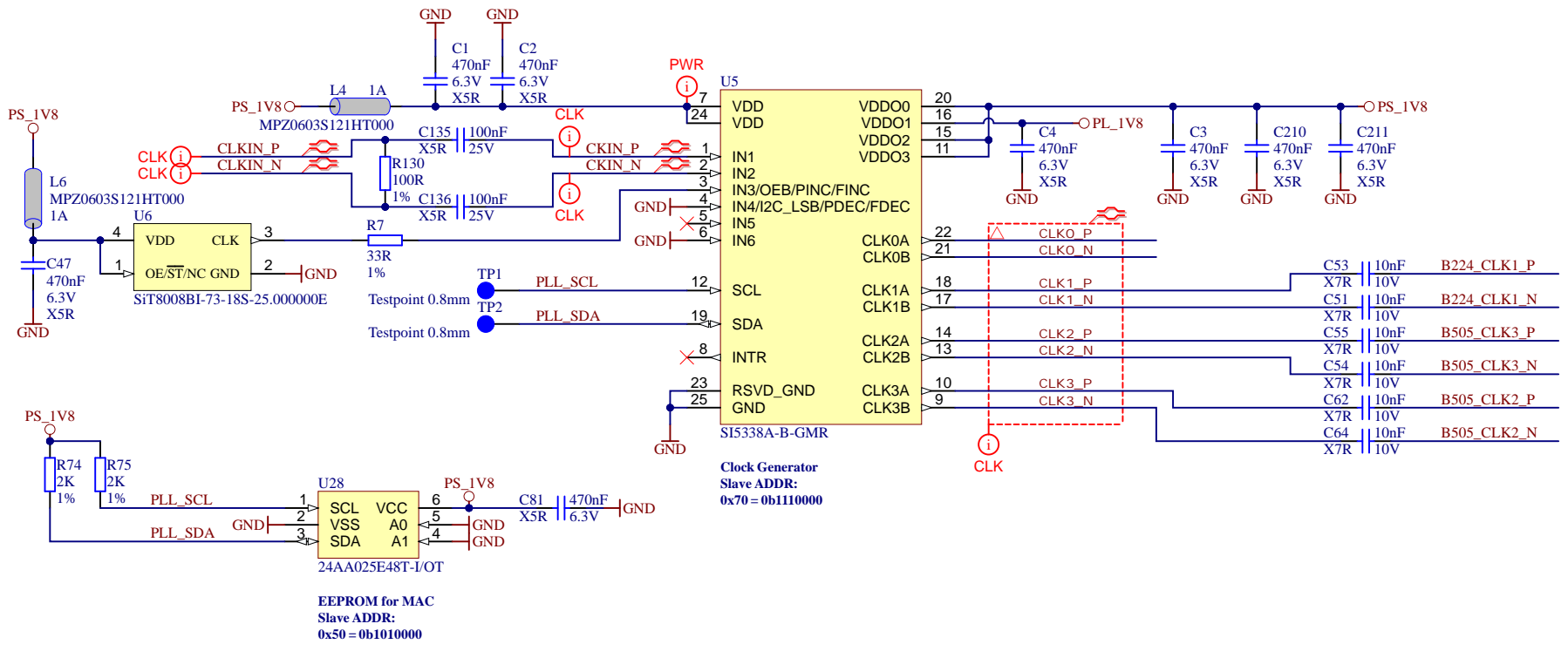
Title: TE0813 - DDR4_3_RAM		
A4	Number: TE0813 5DI81-A	Rev. 02
Date: 12.06.2023	Copyright: Trenz Electronic GmbH	Page 23 of 30
Filename: DDR4-RAM_3.SchDoc		




Title: TE0813 - DDR4_4_RAM		
A4	Number: TE0813 5DI81-A	Rev. 02
Date: 12.06.2023	Copyright: Trenz Electronic GmbH	Page 24 of 30
Filename: DDR4-RAM_4.SchDoc		



	Title: TE0813 - DDR4_TERM		
	A4	Number: TE0813 5DI81-A	Rev. 02
	Date: 12.06.2023	Copyright: Trenz Electronic GmbH	Page 25 of 30
	Filename: DDR4-TERM.SchDoc		

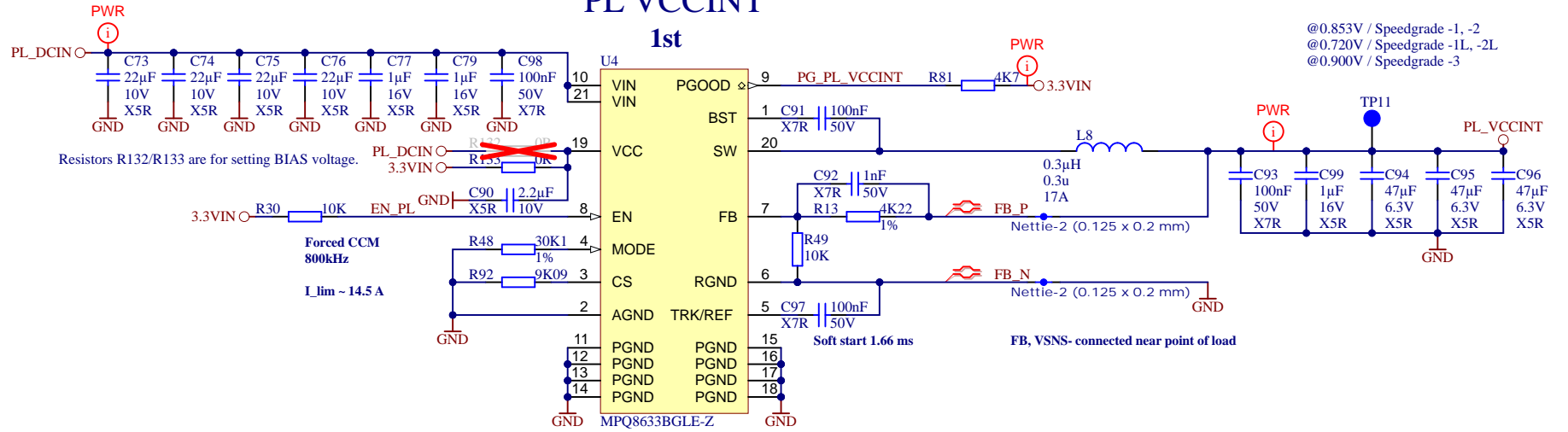


		Title: TE0813 - CLOCK	
		A4	Number: TE0813 5DI81-A
Date: 12.06.2023		Copyright: Trenz Electronic GmbH	
Filename: Clock.SchDoc		Page 26 of 30	

U4 can be TPS548A28RWWR or MPQ8633BGLE-Z which is up to Trenz Electronic GmbH.

PL VCCINT

1st

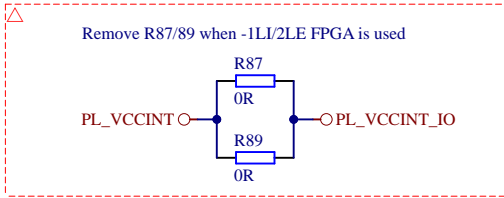


FPGA Speedgrade	R13	R49	PL_VCCINT
-1LI	2 kOhm	10 kOhm	0.720 V
-2LE	2 kOhm	10 kOhm	0.720 V
-1	4.22 kOhm	10 kOhm	0.853 V
-2	4.22 kOhm	10 kOhm	0.853 V
-3E	10 kOhm	20 kOhm	0.900 V

U4 pin compatible with
 -- TPS548B28 (20A)
 -- TPS548A28 (15A)
 -- TPS54JA20 (12A)

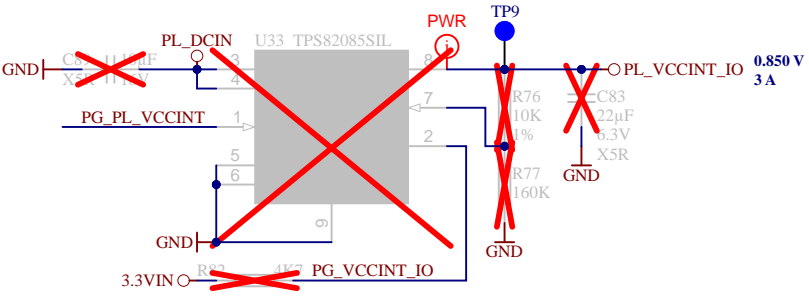


Title: TE0813 - POWER_1		
A4	Number: TE0813 5DI81-A	Rev. 02
Date: 14.06.2023	Copyright: Trenz Electronic GmbH	Page 27 of 30
Filename: POWER.SchDoc		

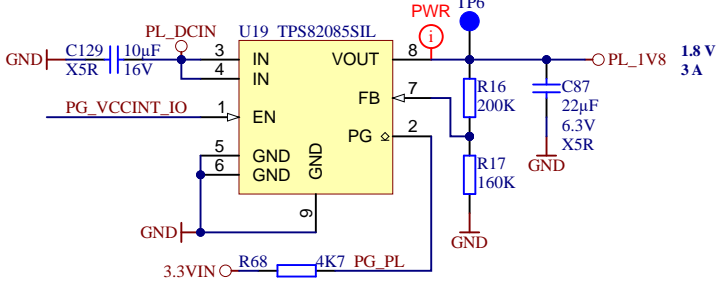


VCCINT_IO & VCCBRAM

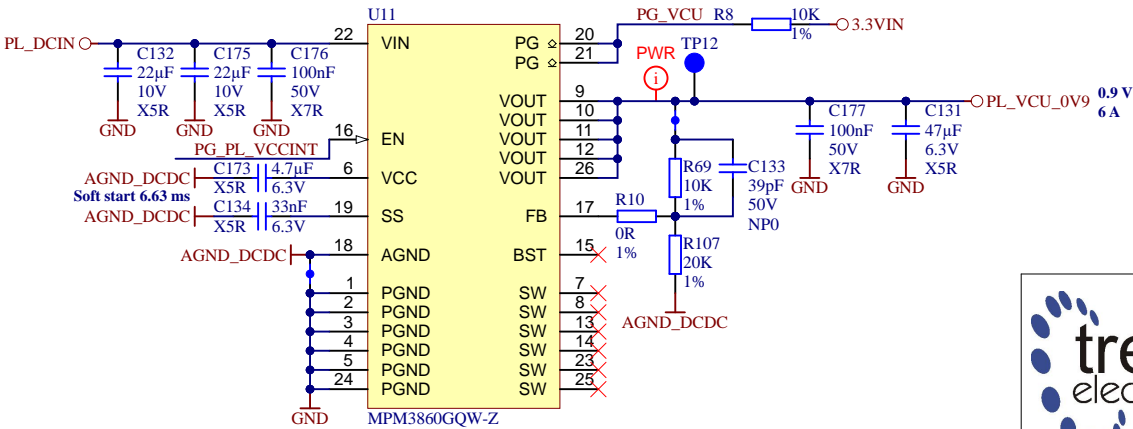
Add U33 when -1L1/2LE FPGA is used



PL VCCIO

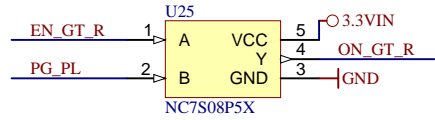
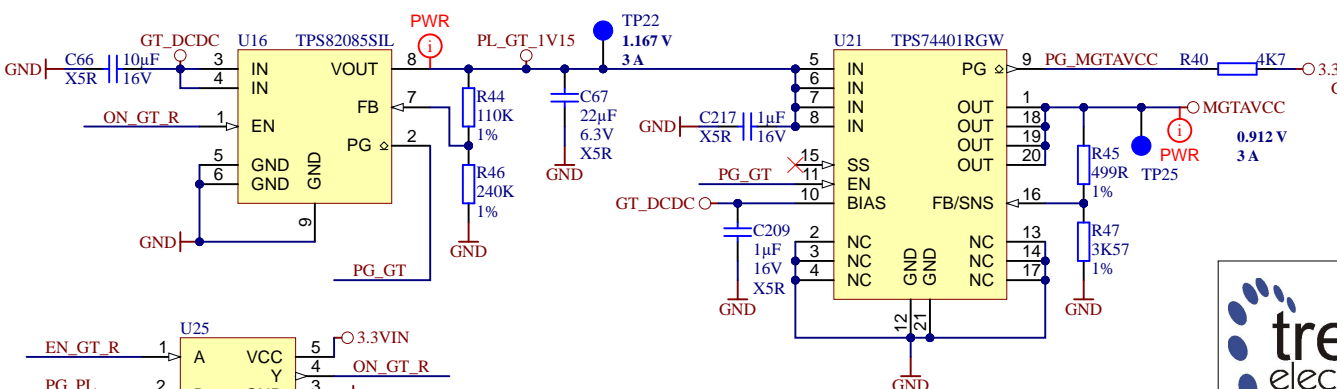
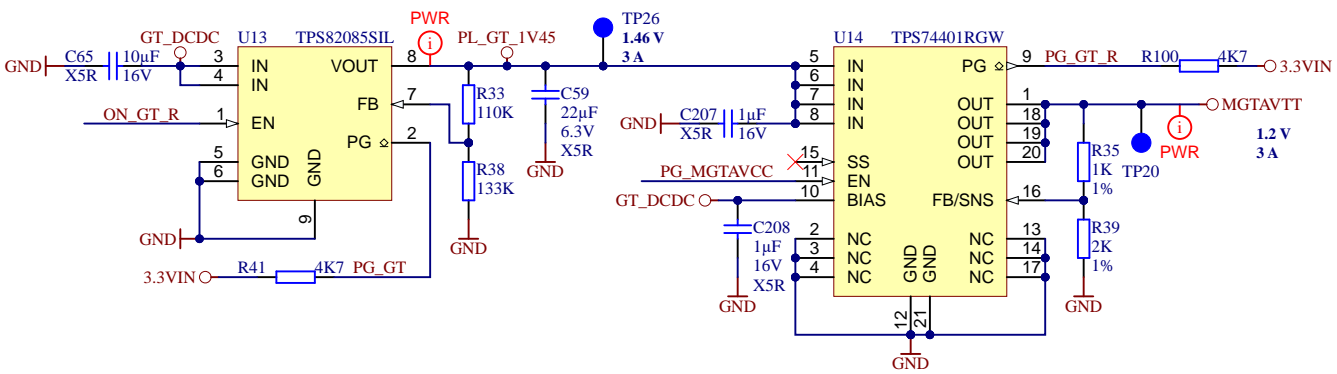
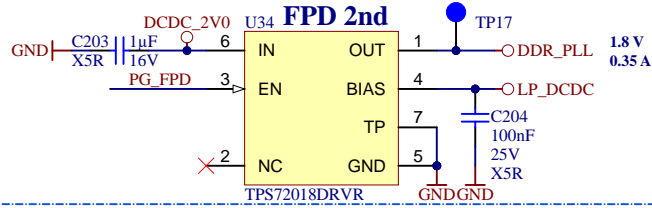
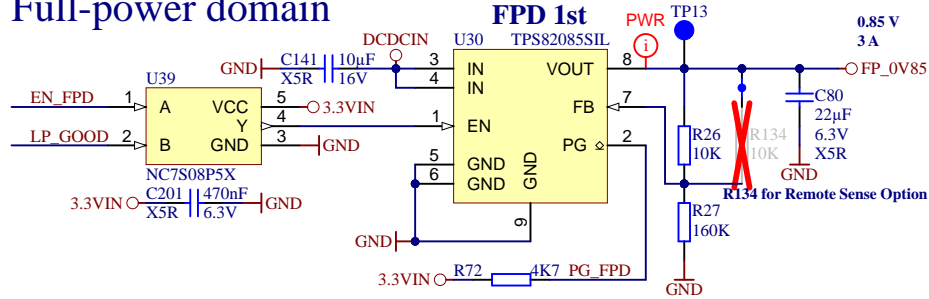


VCU

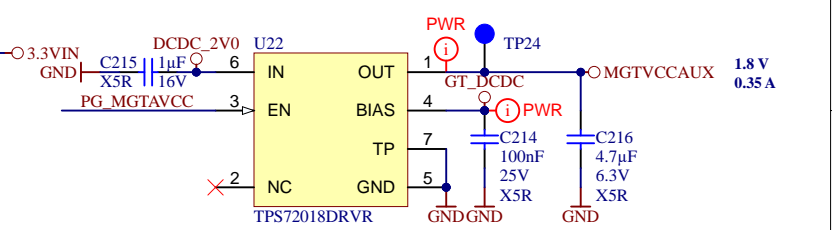
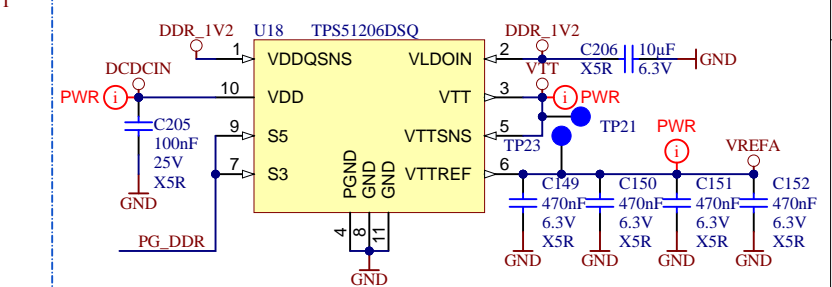
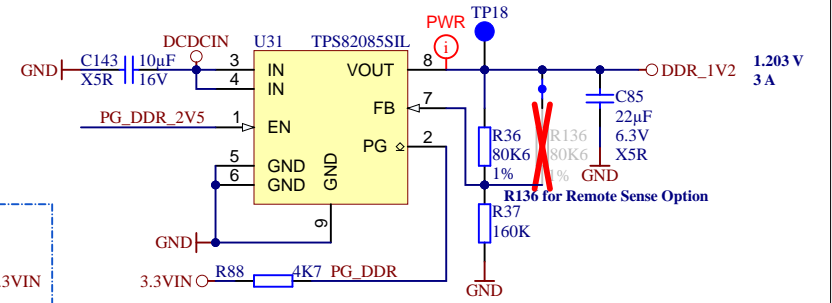
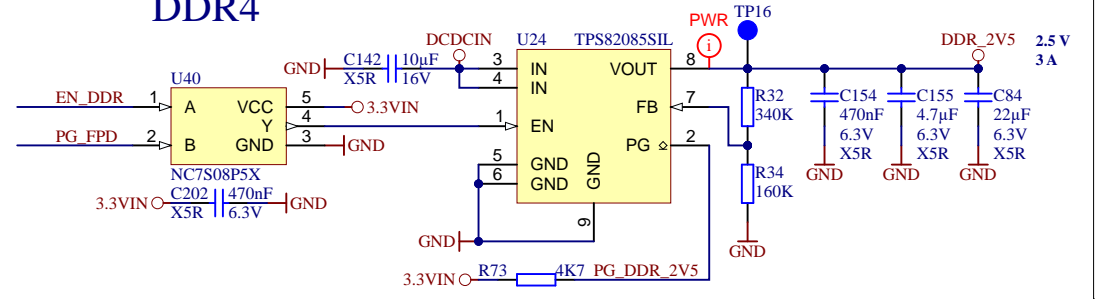


Title: TE0813 - POWER_2		
A4	Number: TE0813 5DI81-A	Rev. 02
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Filename: POWER_1.SchDoc		

Full-power domain



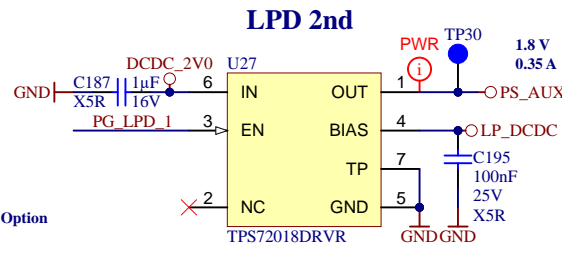
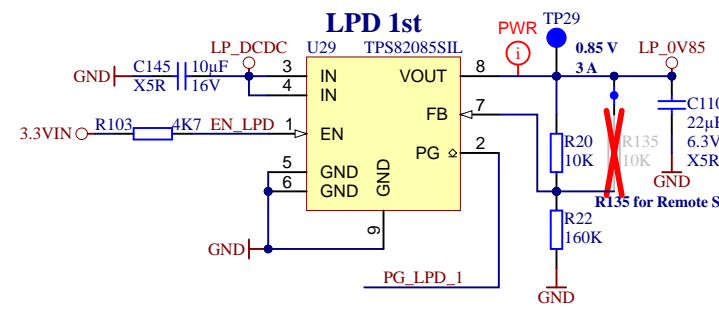
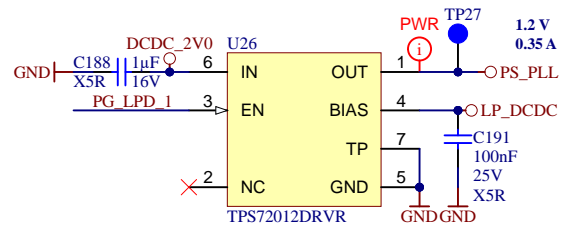
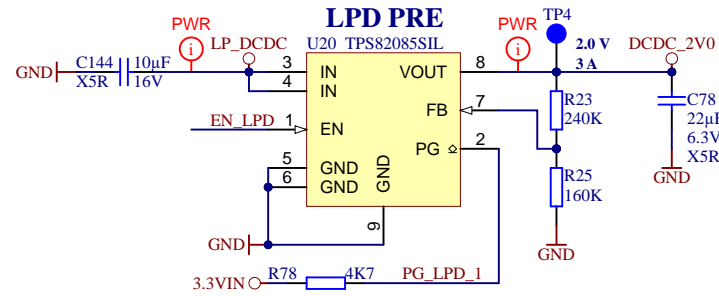
DDR4



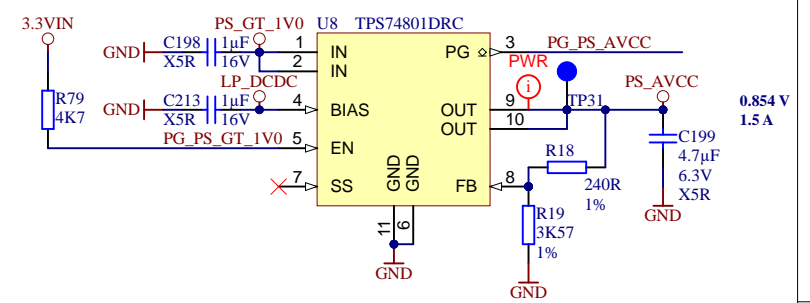
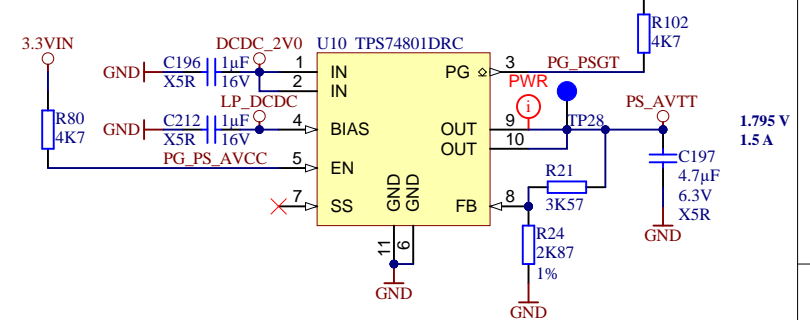
PL MGT

Title: TE0813 - POWER_3		
A4	Number: TE0813 5DI81-A	Rev. 02
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Filename: POWER_2.SchDoc		

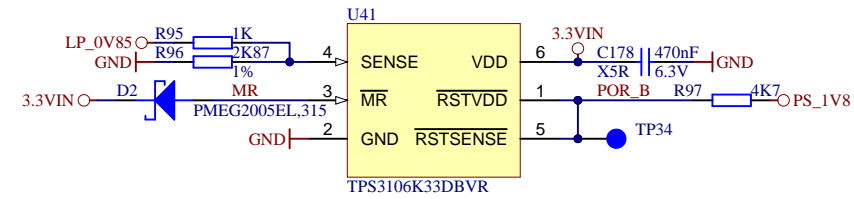
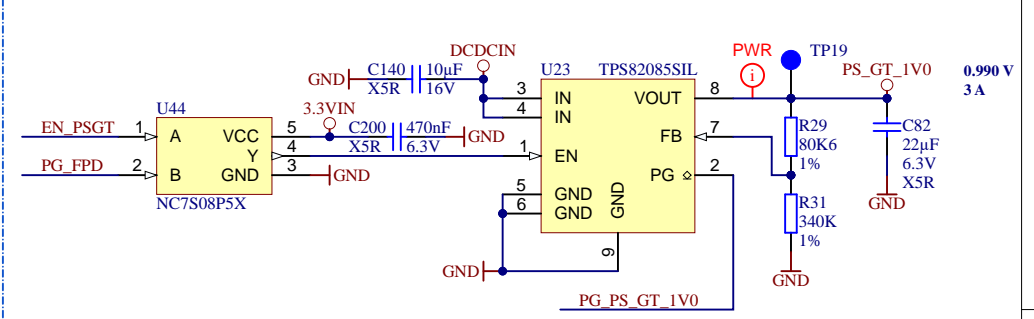
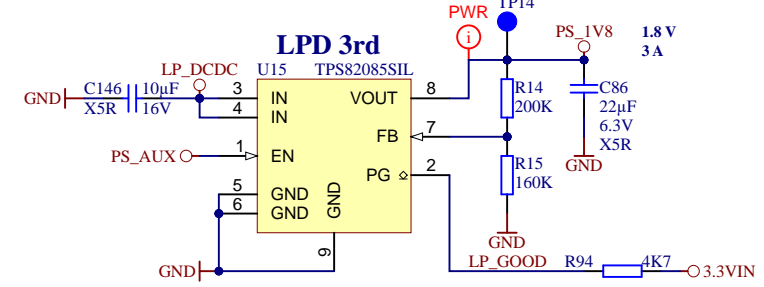
Low-power domain



PS MGT



PS MIO VCCIO



Net Name	Voltage Rail	Low Detect
LP_OV85	0.85 V	0.743 V
3.3VIN	3.3 V	2.941 V



Title: TE0813 - POWER_4		
A4	Number: TE0813 5DI81-A	Rev. 02
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Filename: POWER_3.SchDoc		