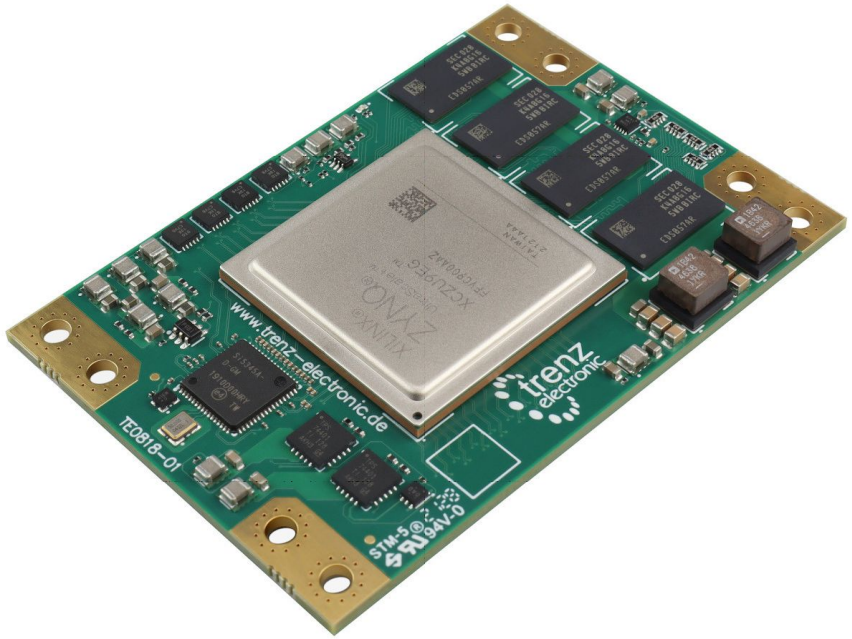

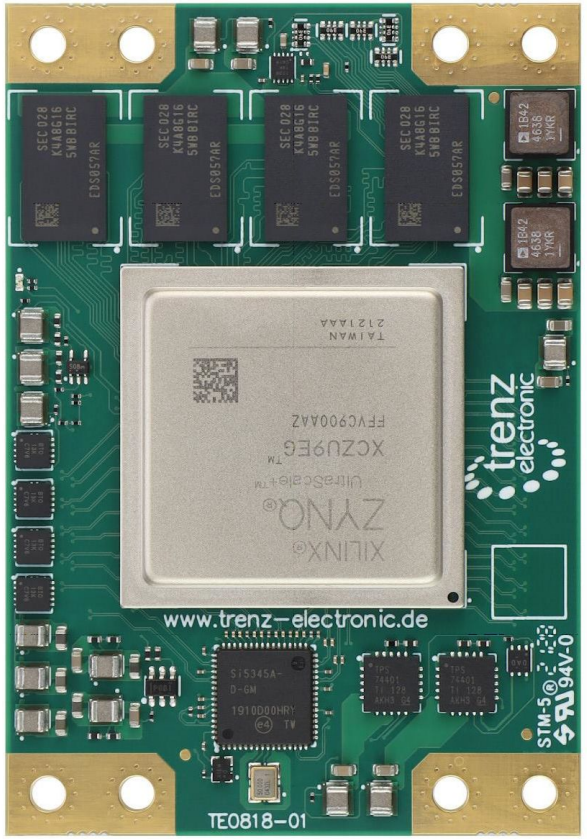

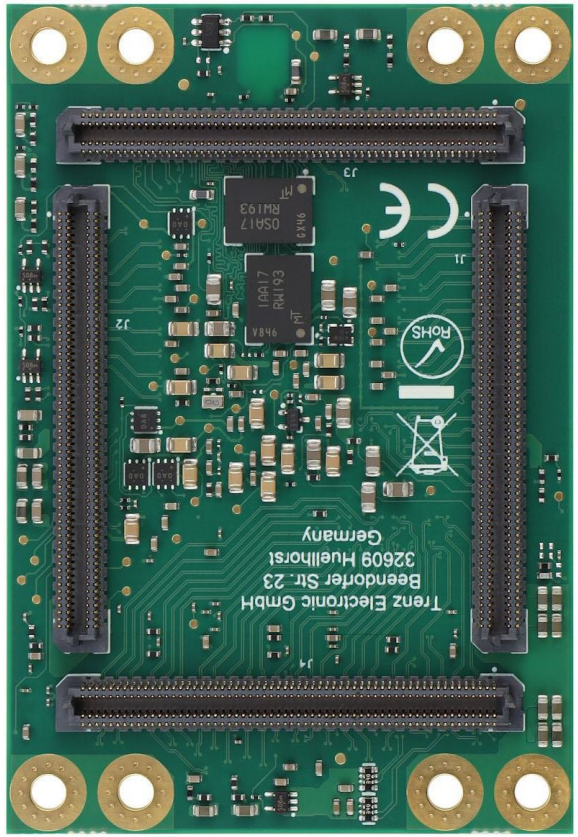

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Project is protected under copyright and we strongly and strictly prohibit the reverse engineering or recreation, even if the design is just adapted or modified.

TE0818 is protected under such right and in case of plagiarism we will have to do anything necessary in order to protect our assets.

Schematics and other handouts serve for informational purposes only!

trenz electronic	Title: TE0818 - Legal Notices		
	A4	Number: TE0818 9BE81-A	Rev. 02
	Date: 19.09.2023	Copyright: Trenz Electronic GmbH	Page 1 of 31
	Filename: Legal Notices Modules.SchDoc		

REV	DATE	Description	
-01	2021-05	Initial revision	VT
-02	2023-10	1. Added capacitors C178, C187, C188, C189 (470nF) to VTT net. 2. Added U18/ U37 compensation network: R119, C190, C191. R118 is optional jumper and is installed when using the internal compensation network. External compensation network is used by default. 3. Connected all DDR4 TEN pins together and pulled them down with resistor R120 and added testpoint TP23. 4. Added testpoints TP25, TP27, TP29, TP35, TP37... TP79. 5. Changed capacitor C112 size from 0402 to 0201 and voltage rating from 16 V to 10 V. 6. Changed ferrid beads from MPZ0603S121HT000 to BLM15PX800SZ1D for L1, L2, L3, L4, L5, and L7. 7. Changed ferrid beads from MPZ1608S221A to BLM15PX800SZ1D for L6 and L8. 8. Added diode D2 between U41 pin 3 net MR and voltage rail 3.3VIN. 9. Modified trace length. 10. Updated documentation overviews.	VY/ED
-02a	2023-10-12	1. Changed inductors L1... L8 from BLM15PX800SZ1D to BLM15PX800SN1D.	ED

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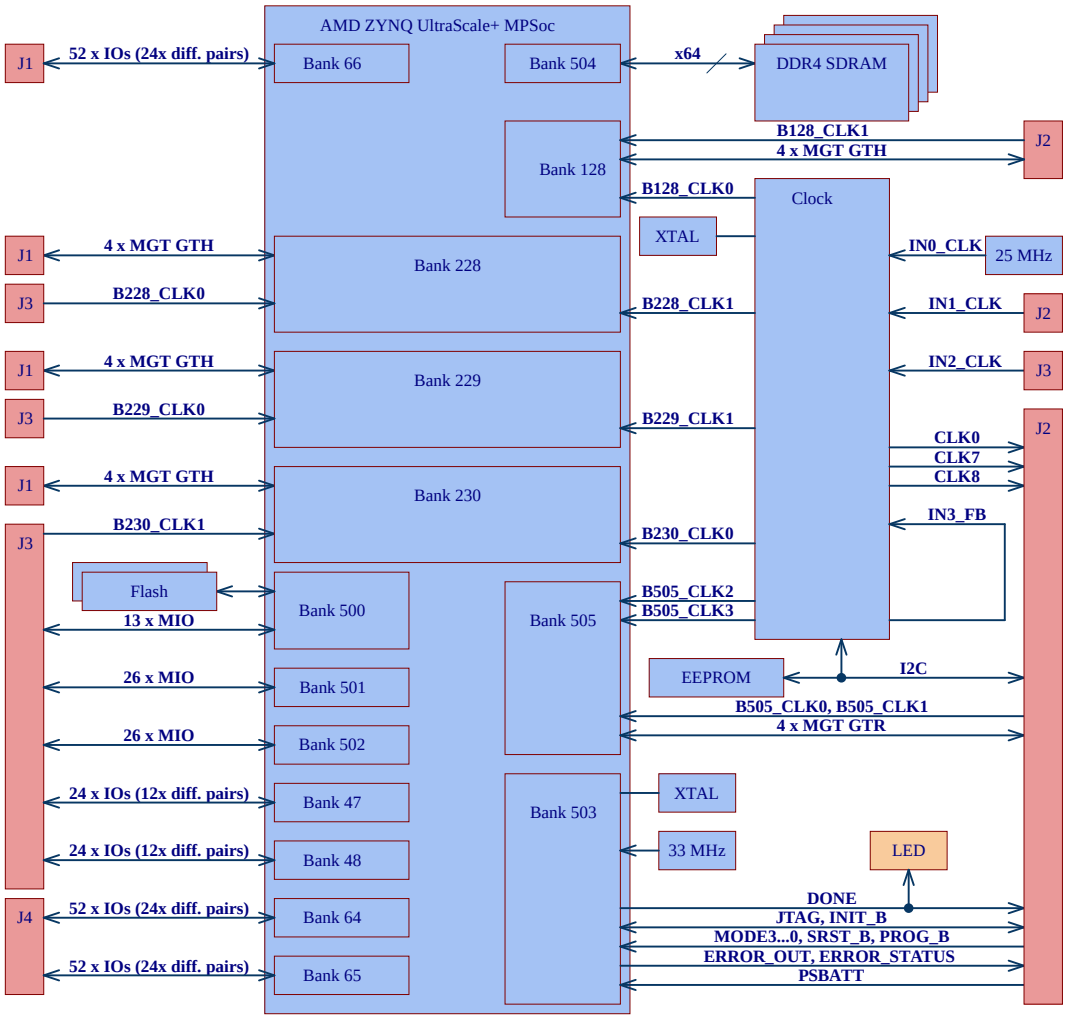
Title: TE0818 - Revision History

A4 | Number: TE0818 9BE81-A | Rev. 02

Date: 12.10.2023 | Copyright: Trenz Electronic GmbH | Page 2 of 31

Filename: Revision_Changes.SchDoc



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_47	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 47	Supplied by external power rail via B2B connector
VCCO_48	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 48	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
PLL_3V3	IN	3.3 V	+/- 3 %	Power for PLL	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	0x69	-
EEPROM U4	0x50	-

Legend:

- B2B Connector
- LED Interface
- On-board Components

TE0818	ZU_POWER	POWER	POWER_3
DDR4-TERM	ZU_PS_POWER	POWER_2	POWER_4

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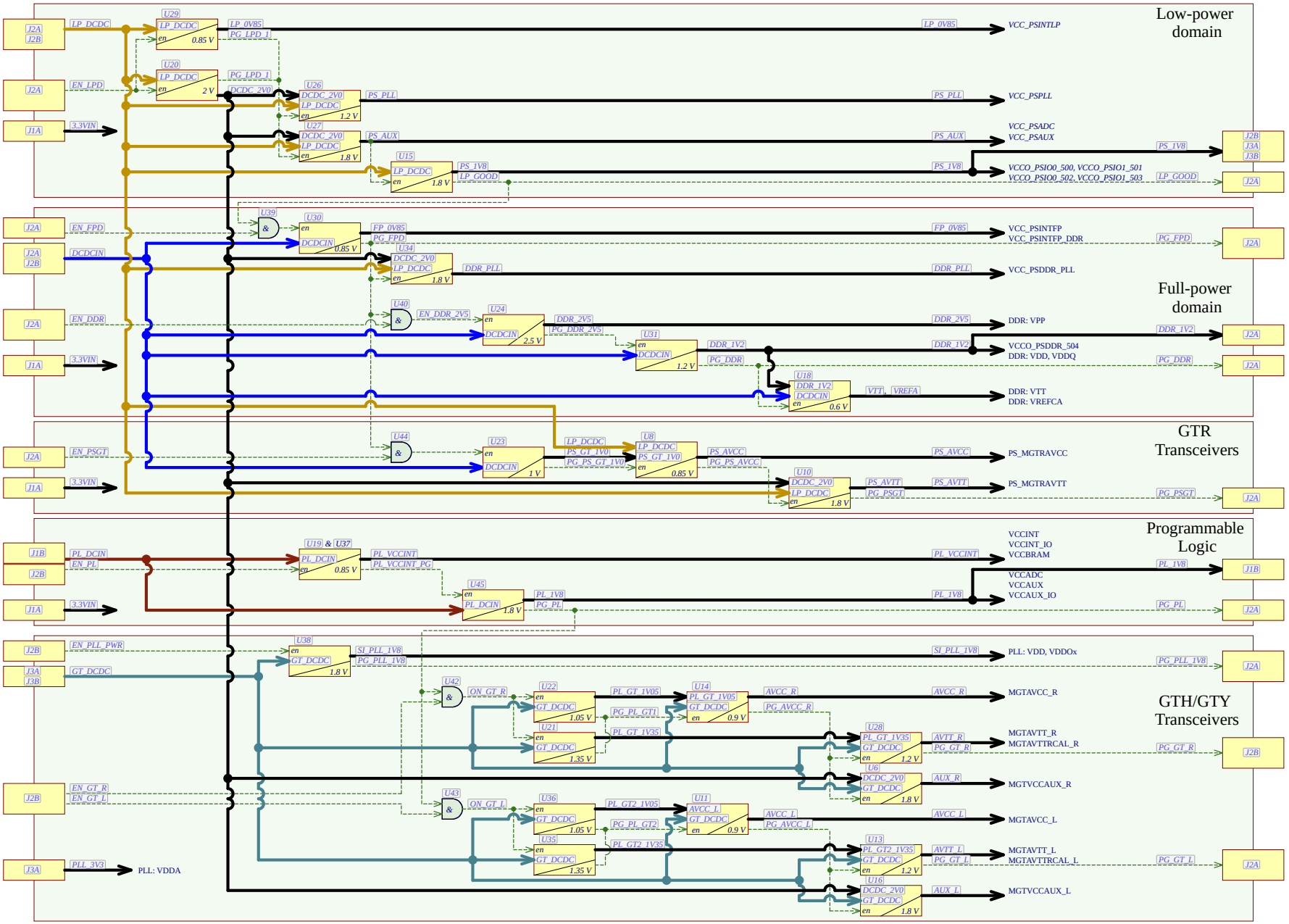
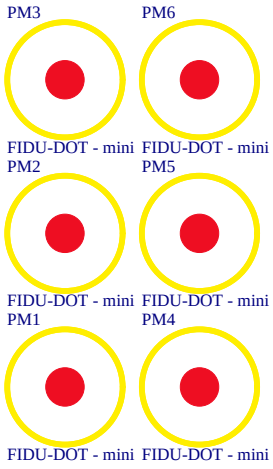
Title: TE0818 - System Overview		
A4	Number: TE0818 9BE81-A	Rev. 02
Date: 18.09.2023	Copyright: Trenz Electronic GmbH	Page 3 of 31
Filename: TE0818-Overview.SchDoc		

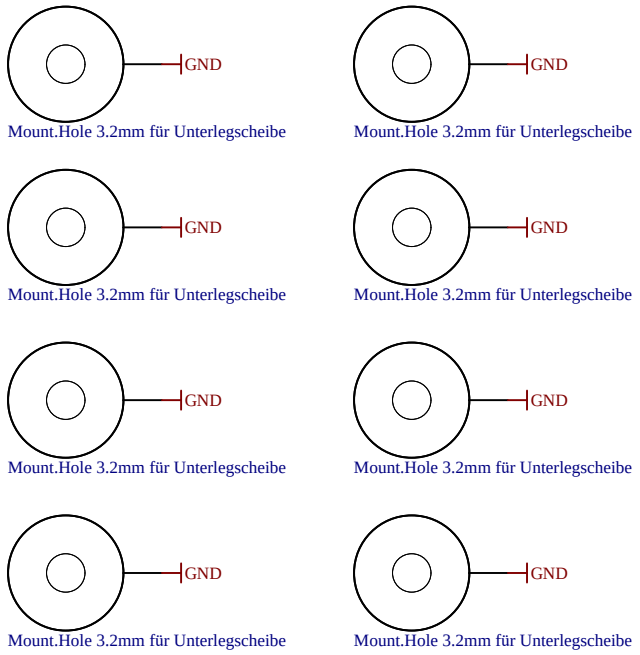


Title: TE0818 - Power Diagram			
A3	Nummer: TE0818 9BE81-A		Rev. 02
Datum: 19.09.2023	Copyright:Trenz Electronic GmbH		Page 4 of 31
Filename: Power_Diagram.SchDoc			

Special notes:

Serial
Serial
Serialnumber 6,3 x 6.3mm
LOGO1
TE Logo PRINT Layer
LOGO PRINT
MECH1
TE Address Overlay
LOGO ADDRESS
CE
CE Logo on Top Overlay
CE-TOPOVERLAY
RoHS
RoHS Logo on Top Overlay
RoHS-TOPOVERLAY
WEEE
WEEE Logo on Top Overlay
WEEE-TOPOVERLAY





Design drawn by:	ED
Checked by:	VY
Assembly variant:	9BE81-A
Created by:	ED
Modified by:	ED
Modified at:	2023-09-20

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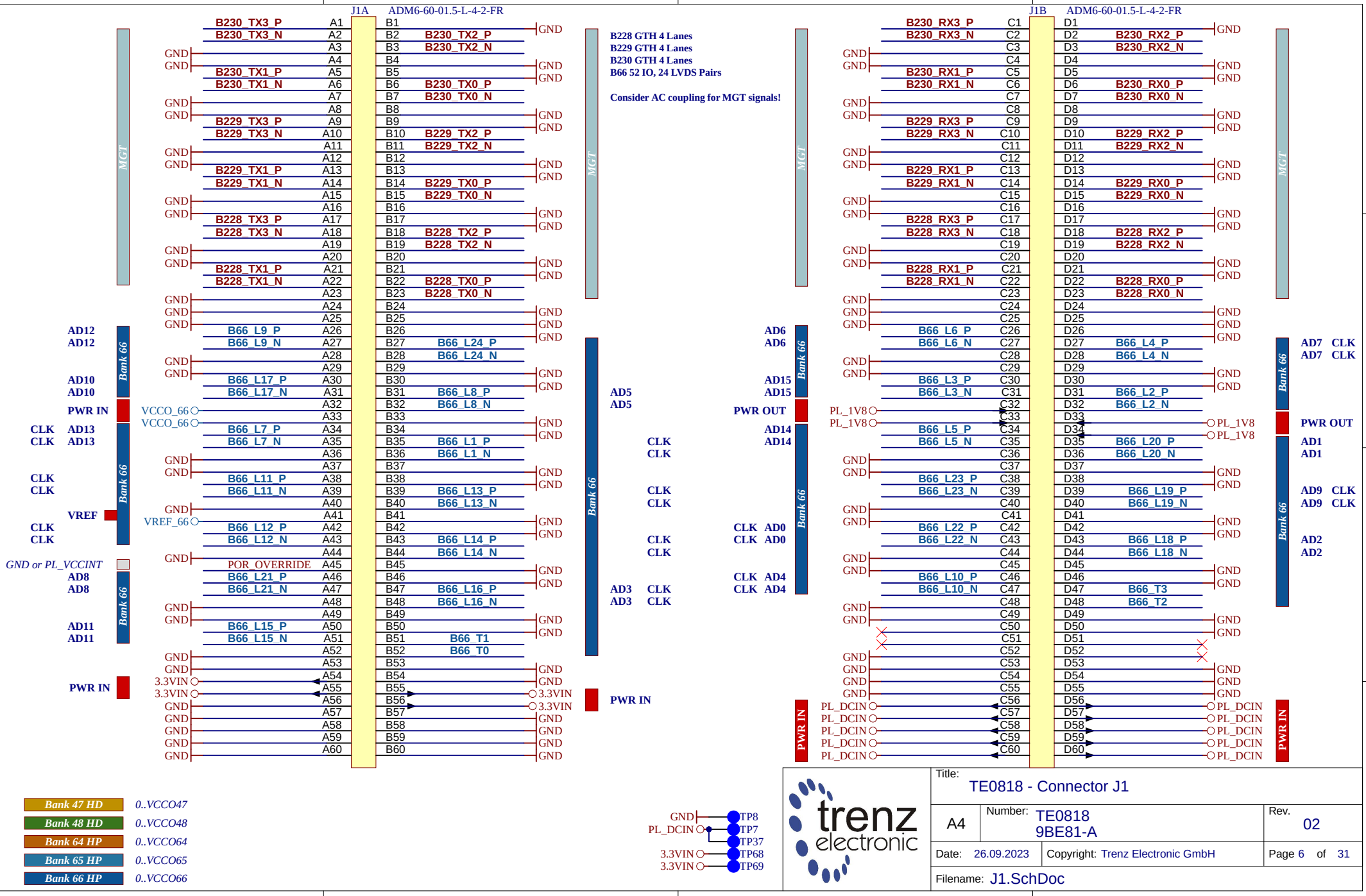
Title: TE0818		
A4	Number: TE0818 9BE81-A	Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 5 of 31
Filename: TE0818.SchDoc		



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Title: TE0818 - Connector J1			
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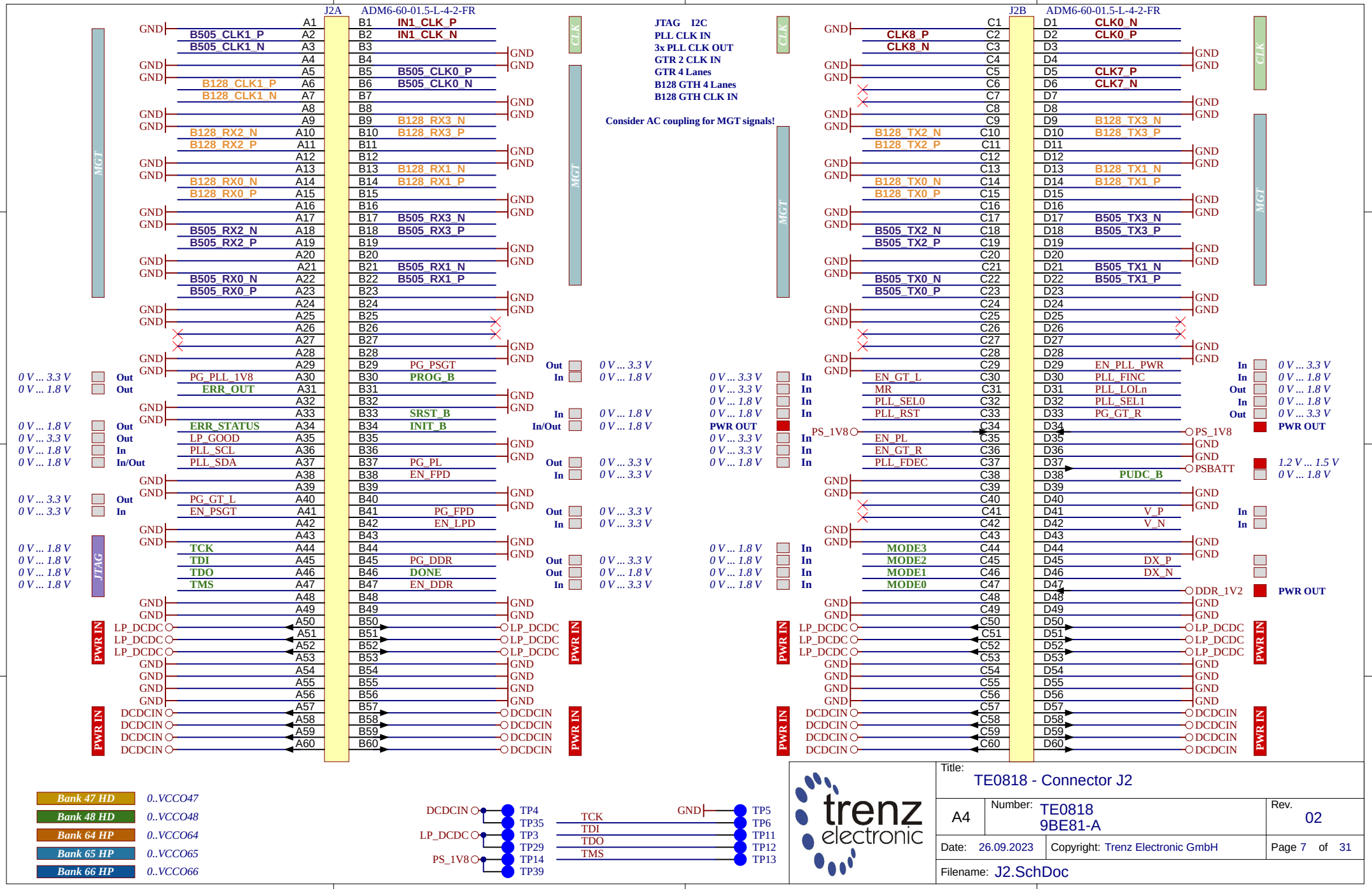
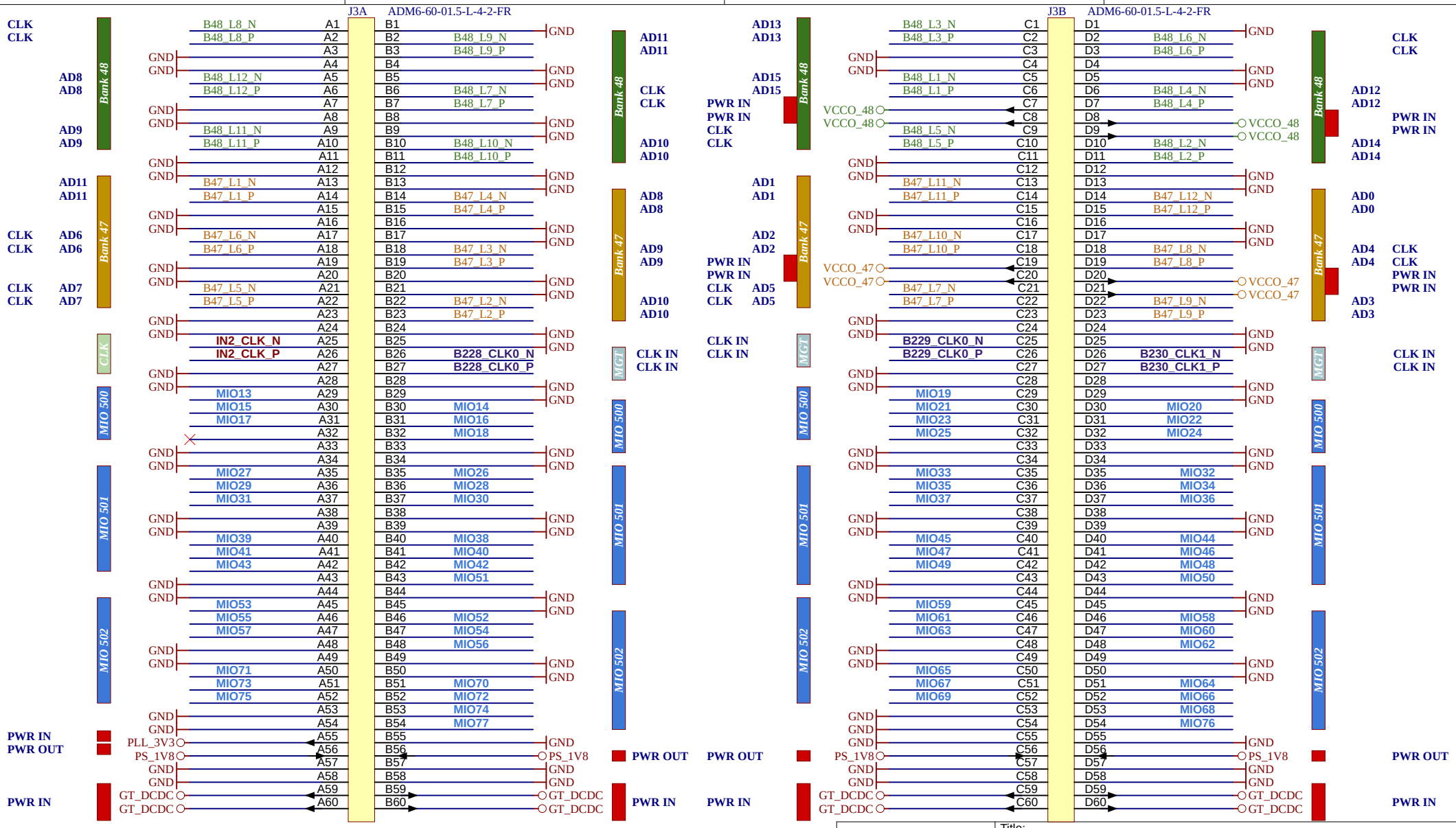
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 6 of 31
Filename: J1.SchDoc			


J2A
ADM6-60-01.5-L-4-2-FR
J2B
ADM6-60-01.5-L-4-2-FR
JTAG I2C
PLL CLK IN
3x PLL CLK OUT
GTR 2 CLK IN
GTR 4 Lanes
B128 GTH 4 Lanes
B128 GTH CLK IN
Consider AC coupling for MGT signals!
Bank 47 HD 0..VCCO47
Bank 48 HD 0..VCCO48
Bank 64 HP 0..VCCO64
Bank 65 HP 0..VCCO65
Bank 66 HP 0..VCCO66
Title: TE0818 - Connector J2
A4
Number: TE0818 9BE81-A
Rev. 02
Date: 26.09.2023
Copyright: Trenz Electronic GmbH
Page 7 of 31
Filename: J2.SchDoc



Title: TE0818 - Connector J3			
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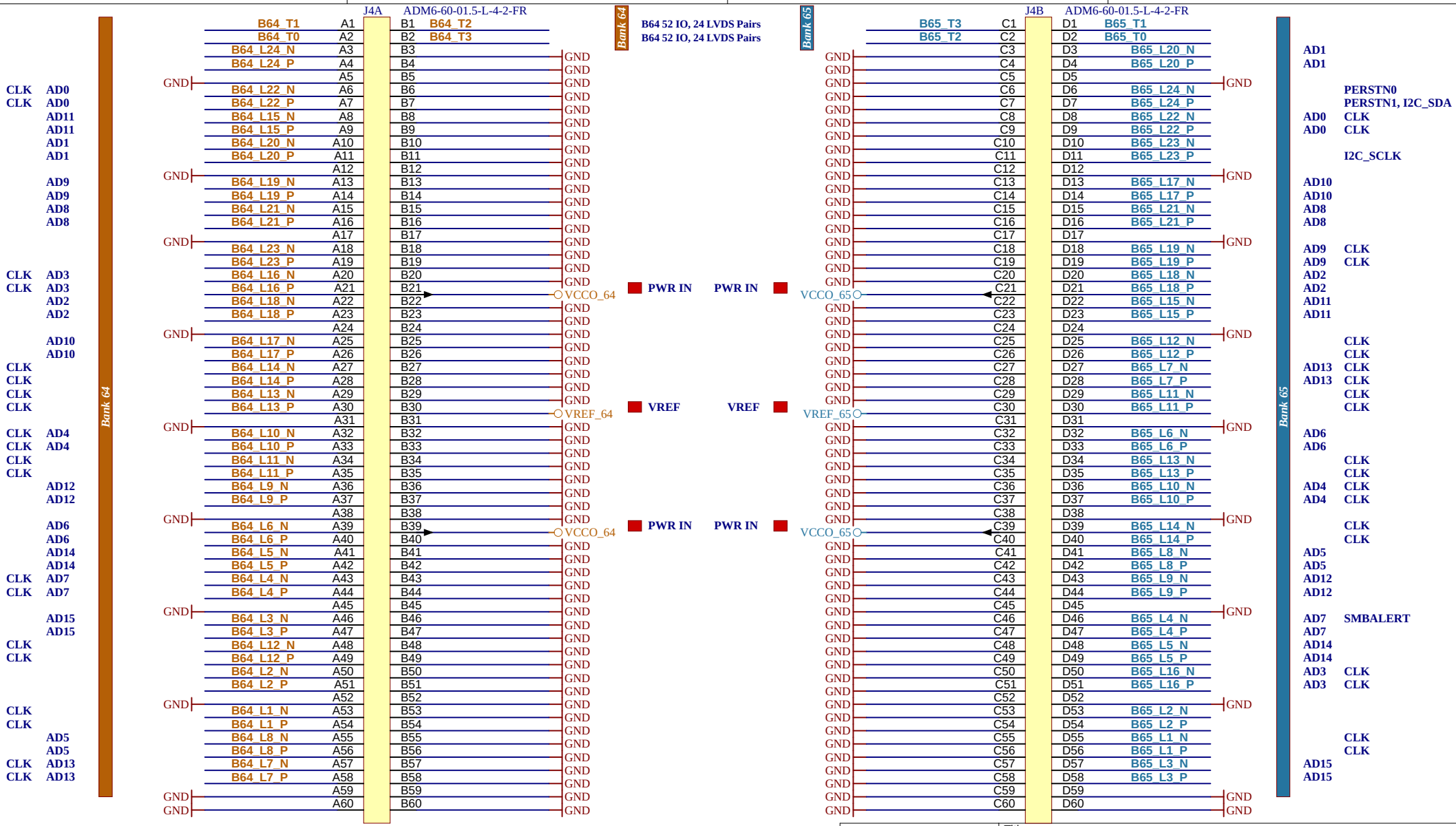
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 8 of 31
Filename: J3.SchDoc			



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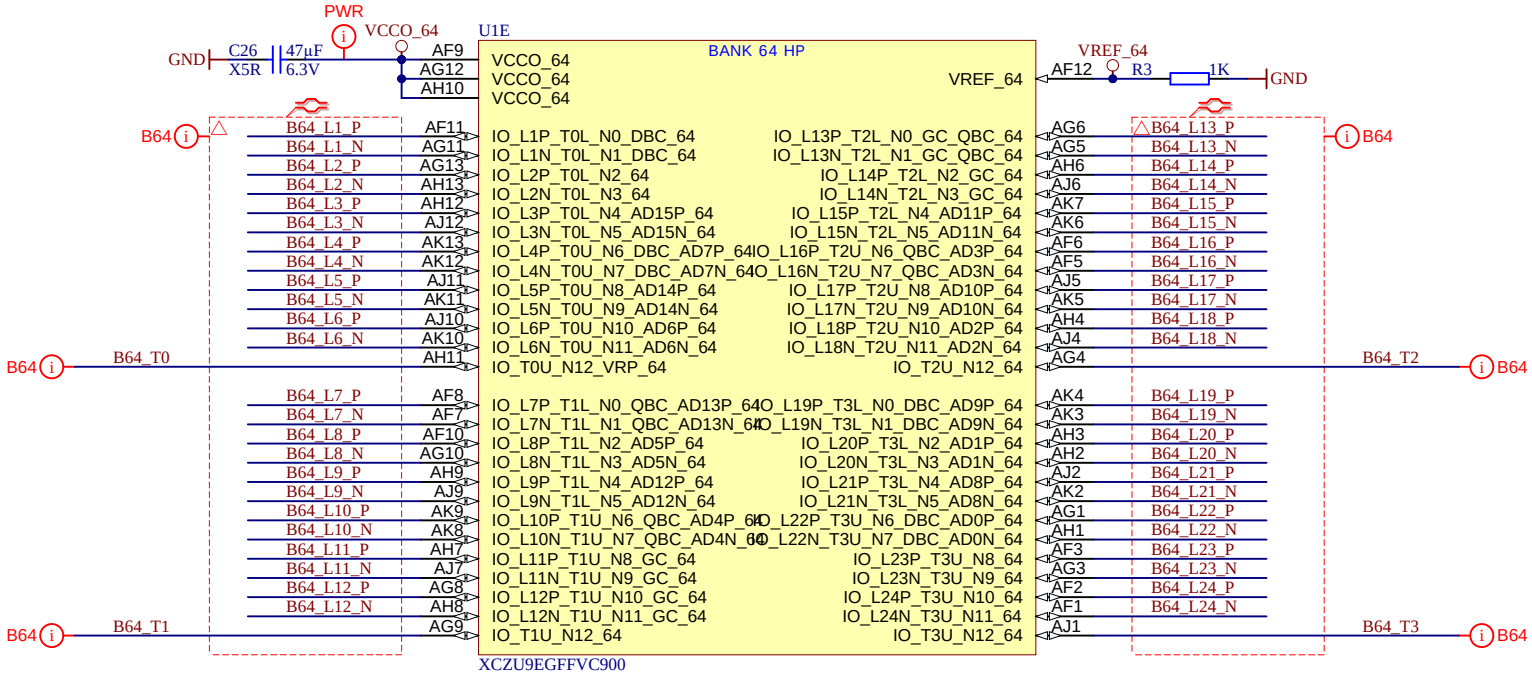
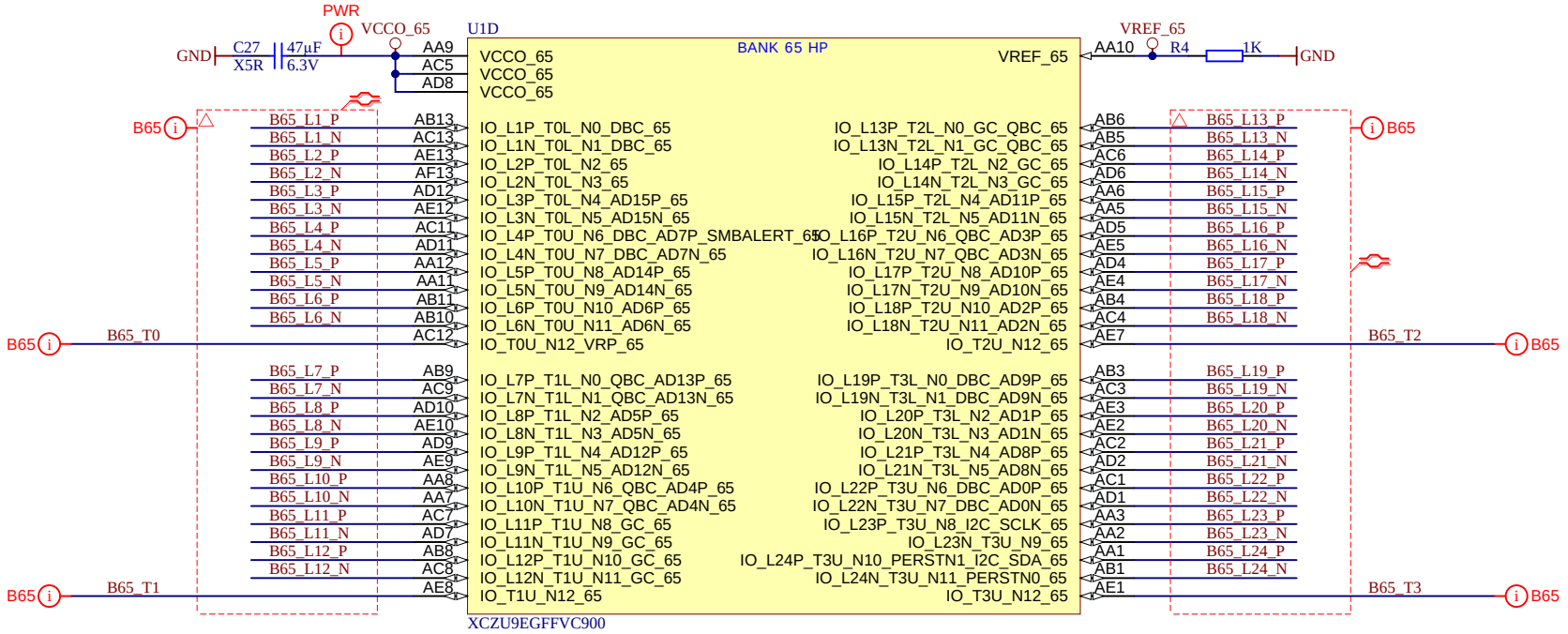
A4	Number: TE0818 9BE81-A	Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 9 of 31
Filename: J4.SchDoc		

trenz electronic	Title: TE0818 - HD Bank		
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 10 of 31
Filename: B_HD.SchDoc			



trenz electronic	Title: TE0818 - HP Bank 1		
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 11 of 31
Filename: B64.SchDoc			



B65_L1_P	AB13	IO_L1P_T0L_N0_DBC_65	IO_L13P_T2L_N0_GC_QBC_65	AB6	B65_L13_P
B65_L1_N	AC13	IO_L1N_T0L_N1_DBC_65	IO_L13N_T2L_N1_GC_QBC_65	AB5	B65_L13_N
B65_L2_P	AE13	IO_L2P_T0L_N2_65	IO_L14P_T2L_N2_GC_65	AC6	B65_L14_P
B65_L2_N	AF13	IO_L2N_T0L_N3_65	IO_L14N_T2L_N3_GC_65	AD6	B65_L14_N
B65_L3_P	AD12	IO_L3P_T0L_N4_AD15P_65	IO_L15P_T2L_N4_AD11P_65	AA6	B65_L15_P
B65_L3_N	AE12	IO_L3N_T0L_N5_AD15N_65	IO_L15N_T2L_N5_AD11N_65	AA5	B65_L15_N
B65_L4_P	AC11	IO_L4P_T0U_N6_DBC_AD7P_SMBALERT_65	IO_L16P_T2U_N6_QBC_AD3P_65	AD5	B65_L16_P
B65_L4_N	AD11	IO_L4N_T0U_N7_DBC_AD7N_65	IO_L16N_T2U_N7_QBC_AD3N_65	AE5	B65_L16_N
B65_L5_P	AA12	IO_L5P_T0U_N8_AD14P_65	IO_L17P_T2U_N8_AD10P_65	AD4	B65_L17_P
B65_L5_N	AA11	IO_L5N_T0U_N9_AD14N_65	IO_L17N_T2U_N9_AD10N_65	AE4	B65_L17_N
B65_L6_P	AB11	IO_L6P_T0U_N10_AD6P_65	IO_L18P_T2U_N10_AD2P_65	AB4	B65_L18_P
B65_L6_N	AB10	IO_L6N_T0U_N11_AD6N_65	IO_L18N_T2U_N11_AD2N_65	AC4	B65_L18_N
	AC12	IO_T0U_N12_VRP_65	IO_T2U_N12_65	AE7	
B65_L7_P	AB9	IO_L7P_T1L_N0_QBC_AD13P_65	IO_L19P_T3L_N0_DBC_AD9P_65	AB3	B65_L19_P
B65_L7_N	AC9	IO_L7N_T1L_N1_QBC_AD13N_65	IO_L19N_T3L_N1_DBC_AD9N_65	AC3	B65_L19_N
B65_L8_P	AD10	IO_L8P_T1L_N2_AD5P_65	IO_L20P_T3L_N2_AD1P_65	AE3	B65_L20_P
B65_L8_N	AE10	IO_L8N_T1L_N3_AD5N_65	IO_L20N_T3L_N3_AD1N_65	AE2	B65_L20_N
B65_L9_P	AD9	IO_L9P_T1L_N4_AD12P_65	IO_L21P_T3L_N4_AD8P_65	AC2	B65_L21_P
B65_L9_N	AE9	IO_L9N_T1L_N5_AD12N_65	IO_L21N_T3L_N5_AD8N_65	AD2	B65_L21_N
B65_L10_P	AA8	IO_L10P_T1U_N6_QBC_AD4P_65	IO_L22P_T3U_N6_DBC_AD0P_65	AC1	B65_L22_P
B65_L10_N	AA7	IO_L10N_T1U_N7_QBC_AD4N_65	IO_L22N_T3U_N7_DBC_AD0N_65	AD1	B65_L22_N
B65_L11_P	AC7	IO_L11P_T1U_N8_GC_65	IO_L23P_T3U_N8_I2C_SCLK_65	AA3	B65_L23_P
B65_L11_N	AD7	IO_L11N_T1U_N9_GC_65	IO_L23N_T3U_N9_65	AA2	B65_L23_N
B65_L12_P	AB8	IO_L12P_T1U_N10_GC_65	IO_L24P_T3U_N10_PERSTN1_I2C_SDA_65	AA1	B65_L24_P
B65_L12_N	AC8	IO_L12N_T1U_N11_GC_65	IO_L24N_T3U_N11_PERSTN0_65	AB1	B65_L24_N
	AE8	IO_T1U_N12_65	IO_T3U_N12_65	AE1	

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Title: TE0818 - HP Bank 2

A4 | Number: TE0818 9BE81-A | Rev. 02

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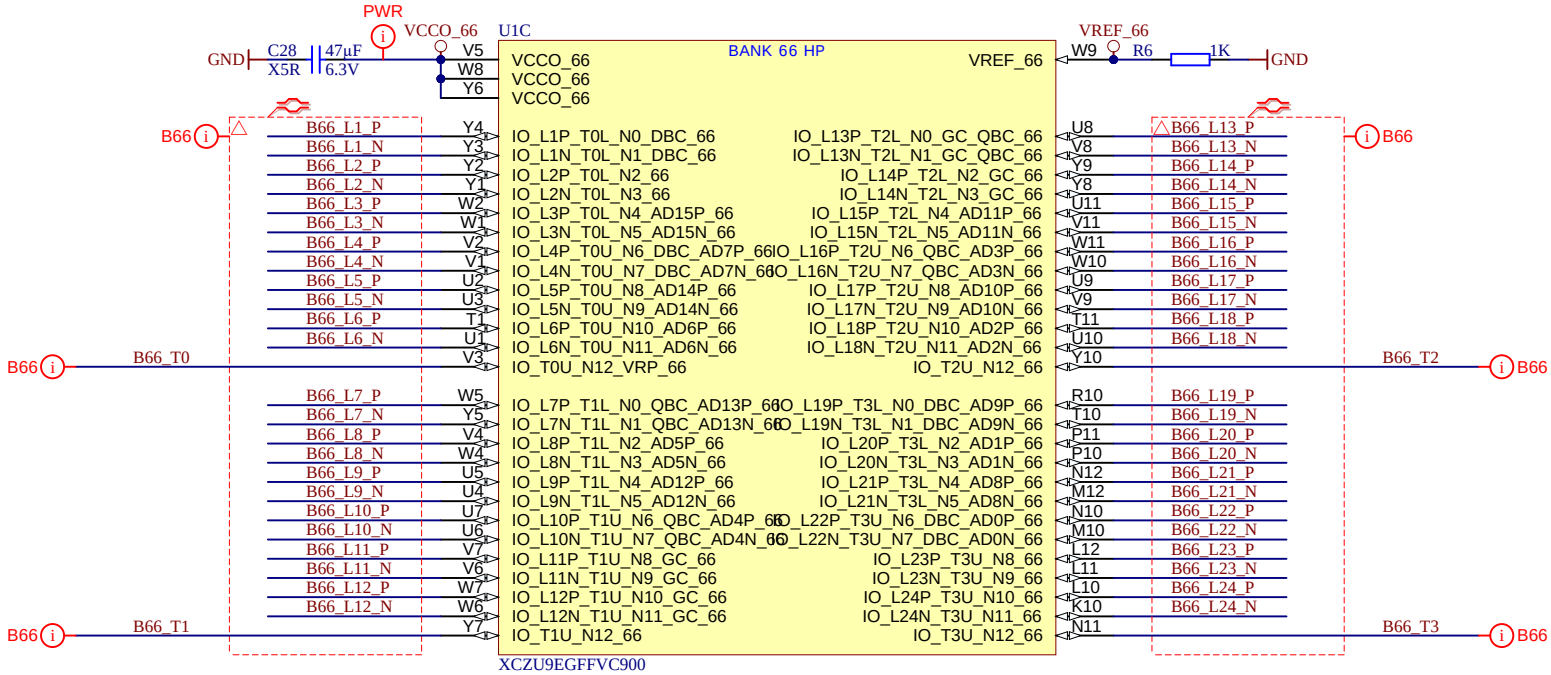
Filename: B65.SchDoc



trenz electronic	Title: TE0818 - HP Bank 3		
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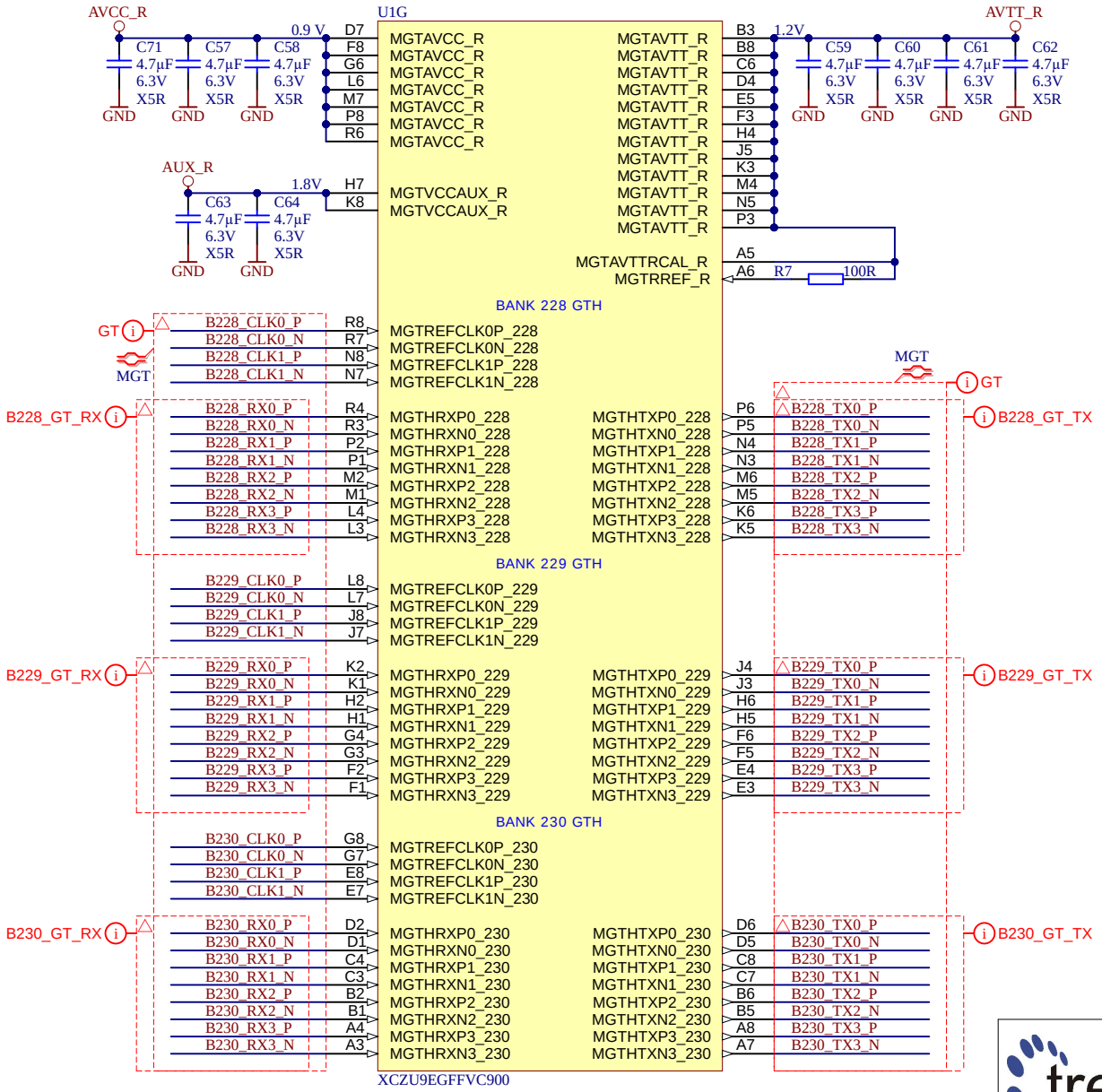
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 13 of 31
Filename: B66.SchDoc			



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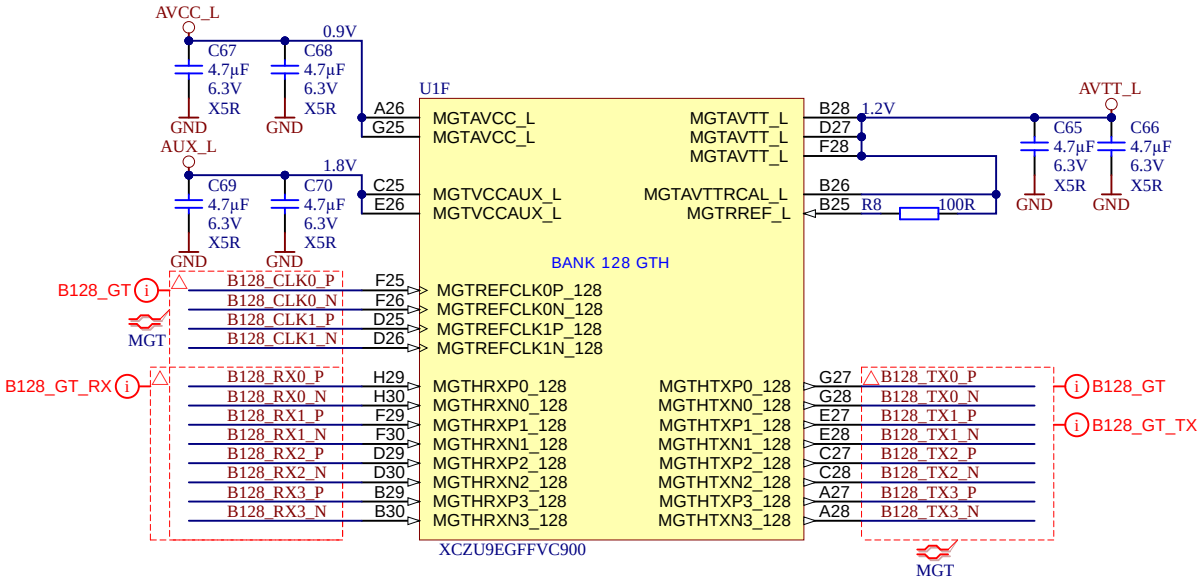
Title: TE0818 - GTH Bank 1			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 14 of 31
Filename: B_GT.SchDoc			



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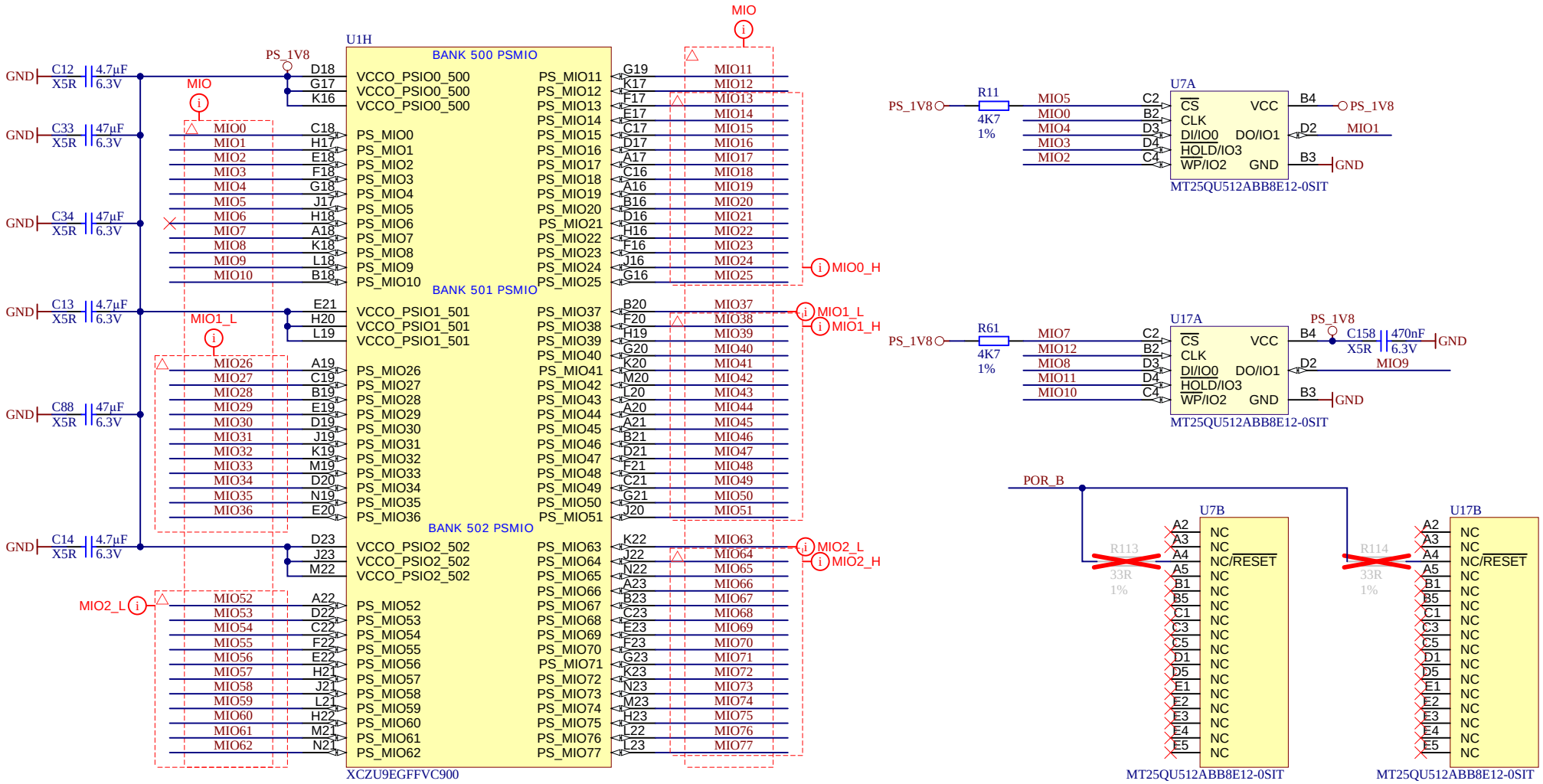
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 15 of 31
Filename: B_GT_2.SchDoc			



Title: TE0818 - MIO Banks			
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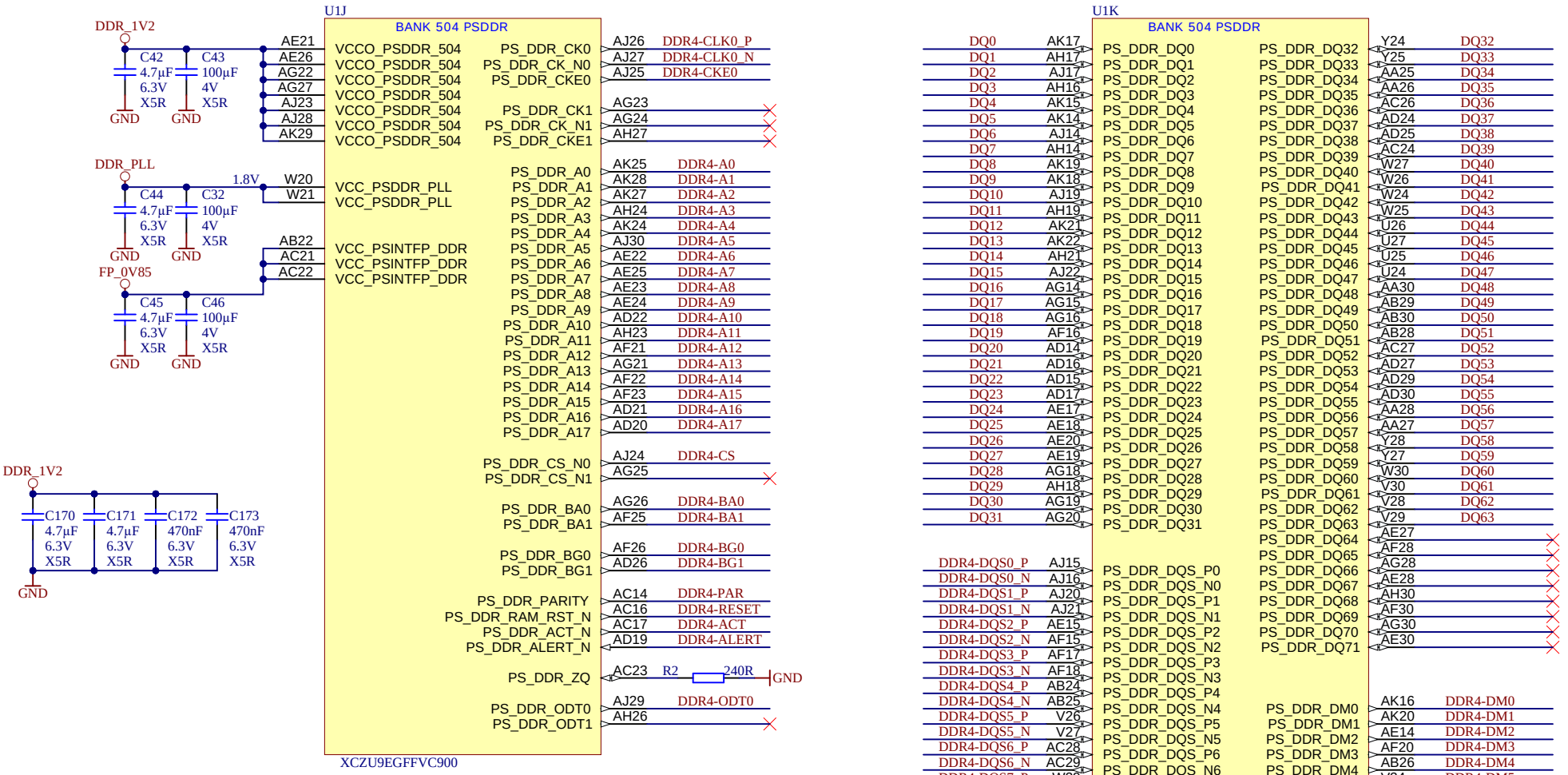
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 16 of 31
Filename: B_MIO.SchDoc			



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Title: TE0818 - PS DDR		
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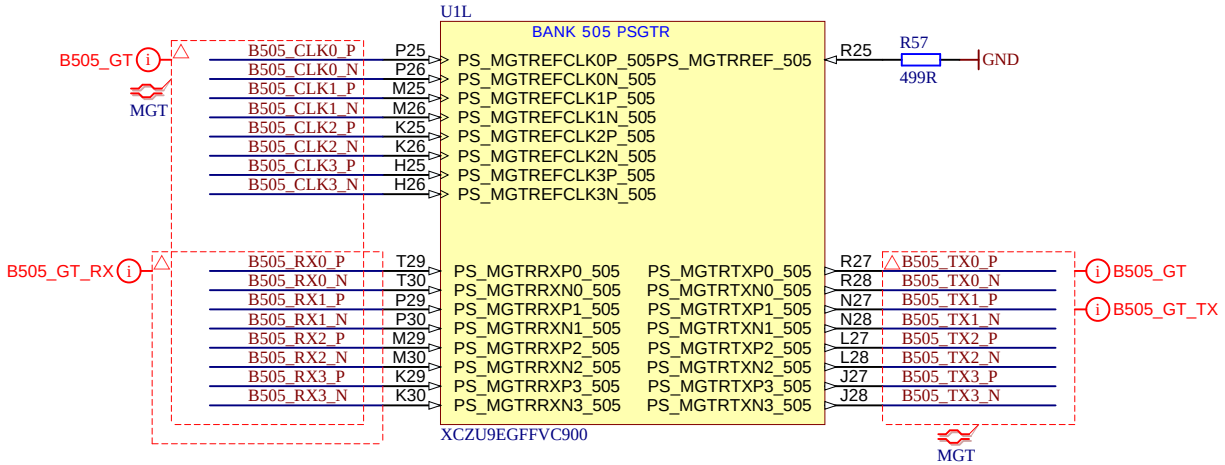
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 17 of 31
Filename: PS_DDR.SchDoc		



trenz electronic	Title: TE0818 - PS GT		
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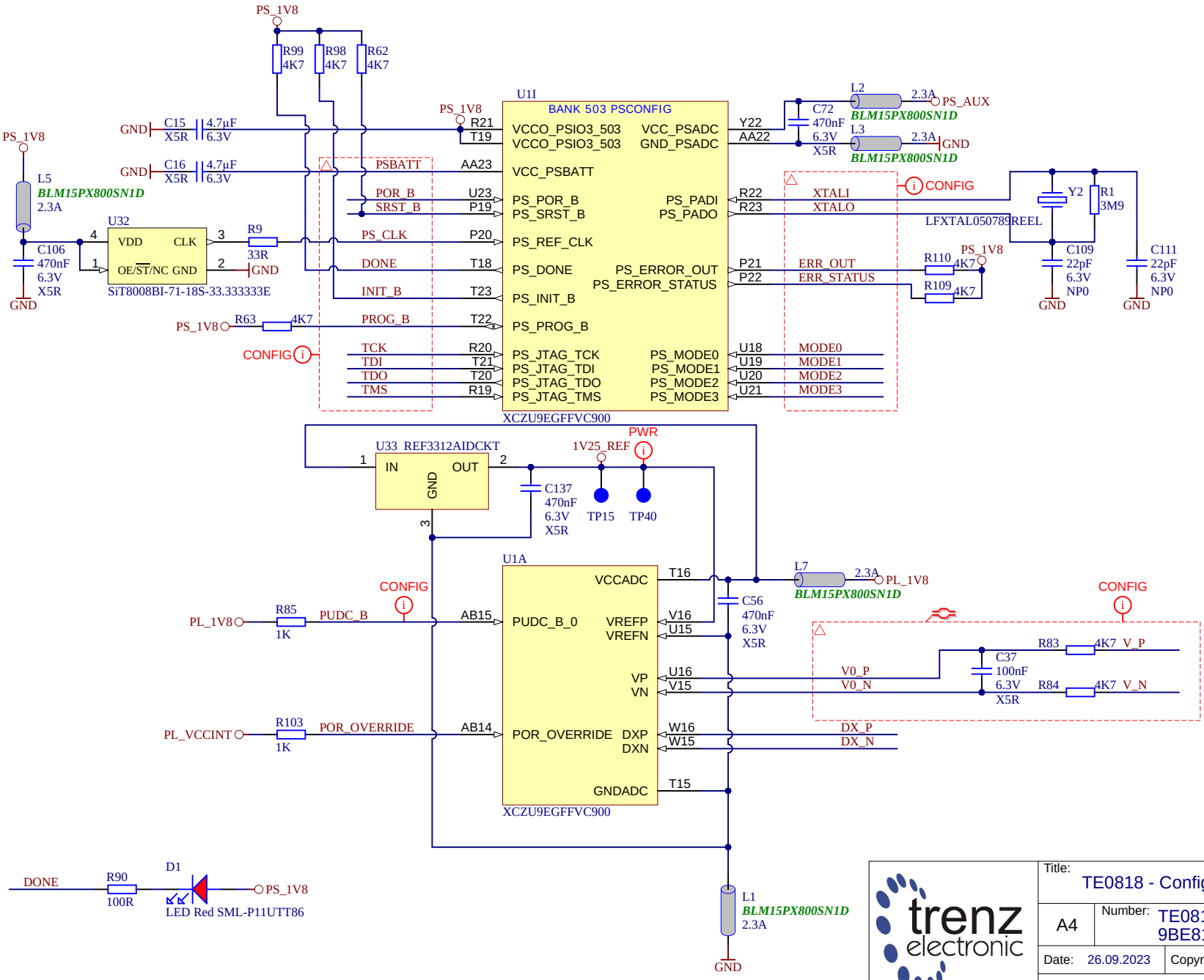
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 18 of 31
Filename: B_PS_GT.SchDoc			



Title: TE0818 - Config			
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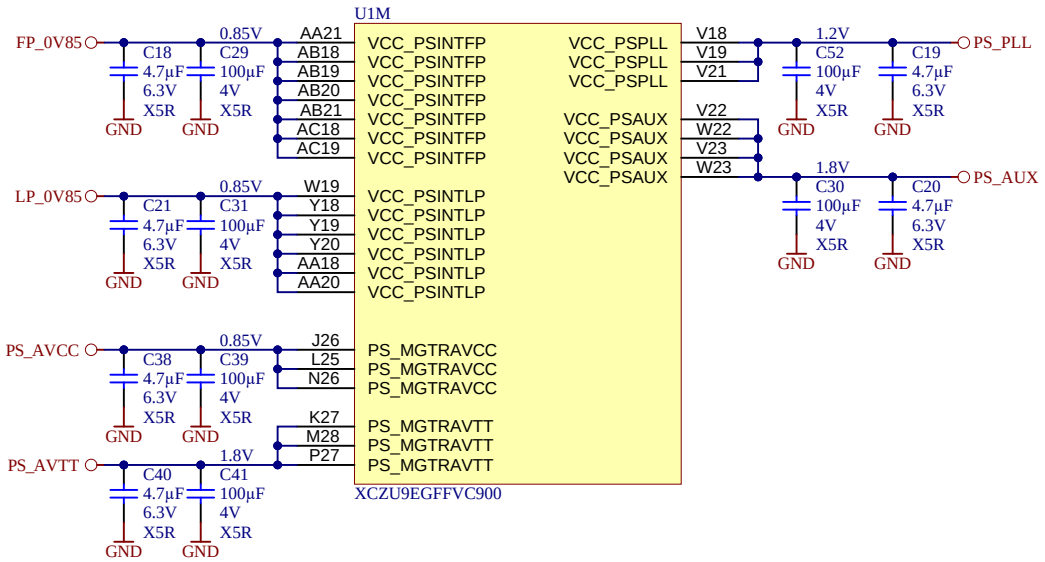
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 19 of 31
Filename: CONFIG.SchDoc			



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Title: TE0818 - PS Power		
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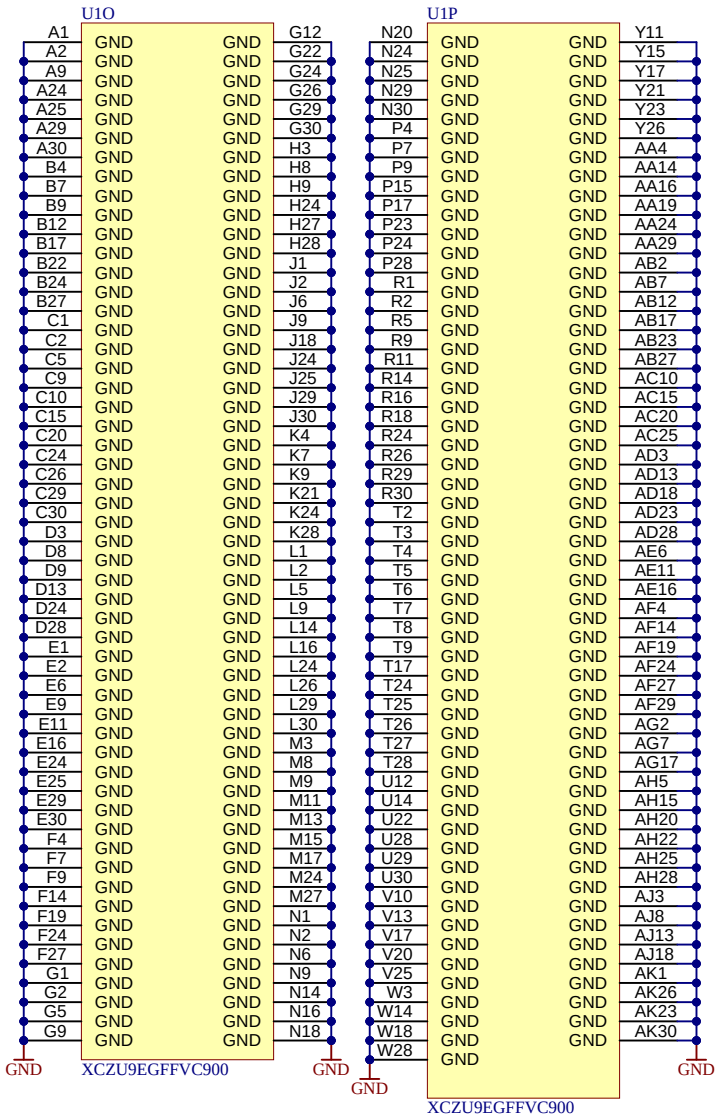
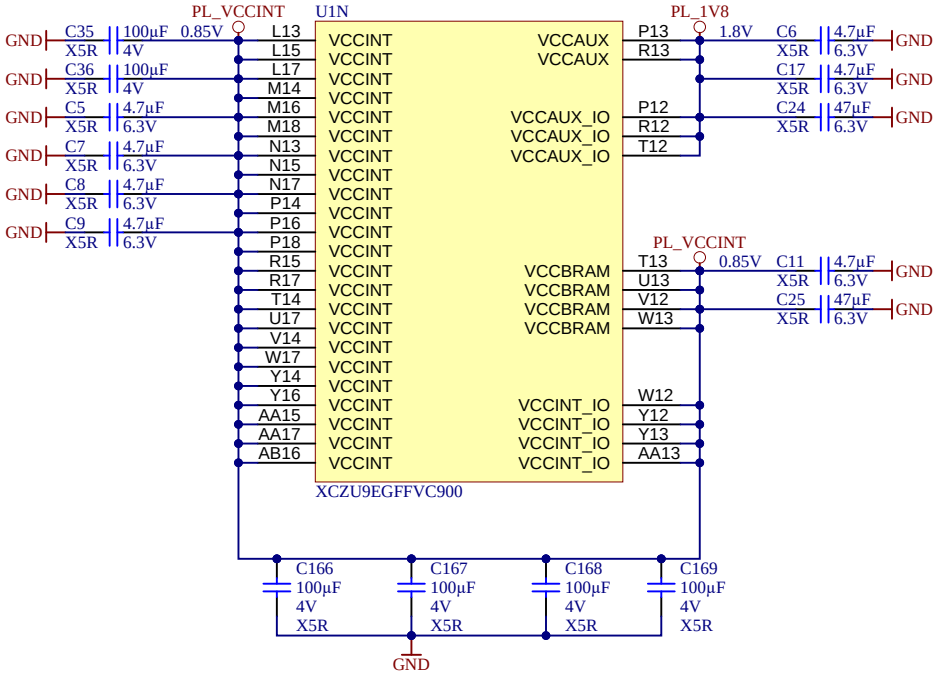
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 20 of 31
Filename: ZU_PS_POWER.SchDoc		





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Title: TE0818 - PL Power		
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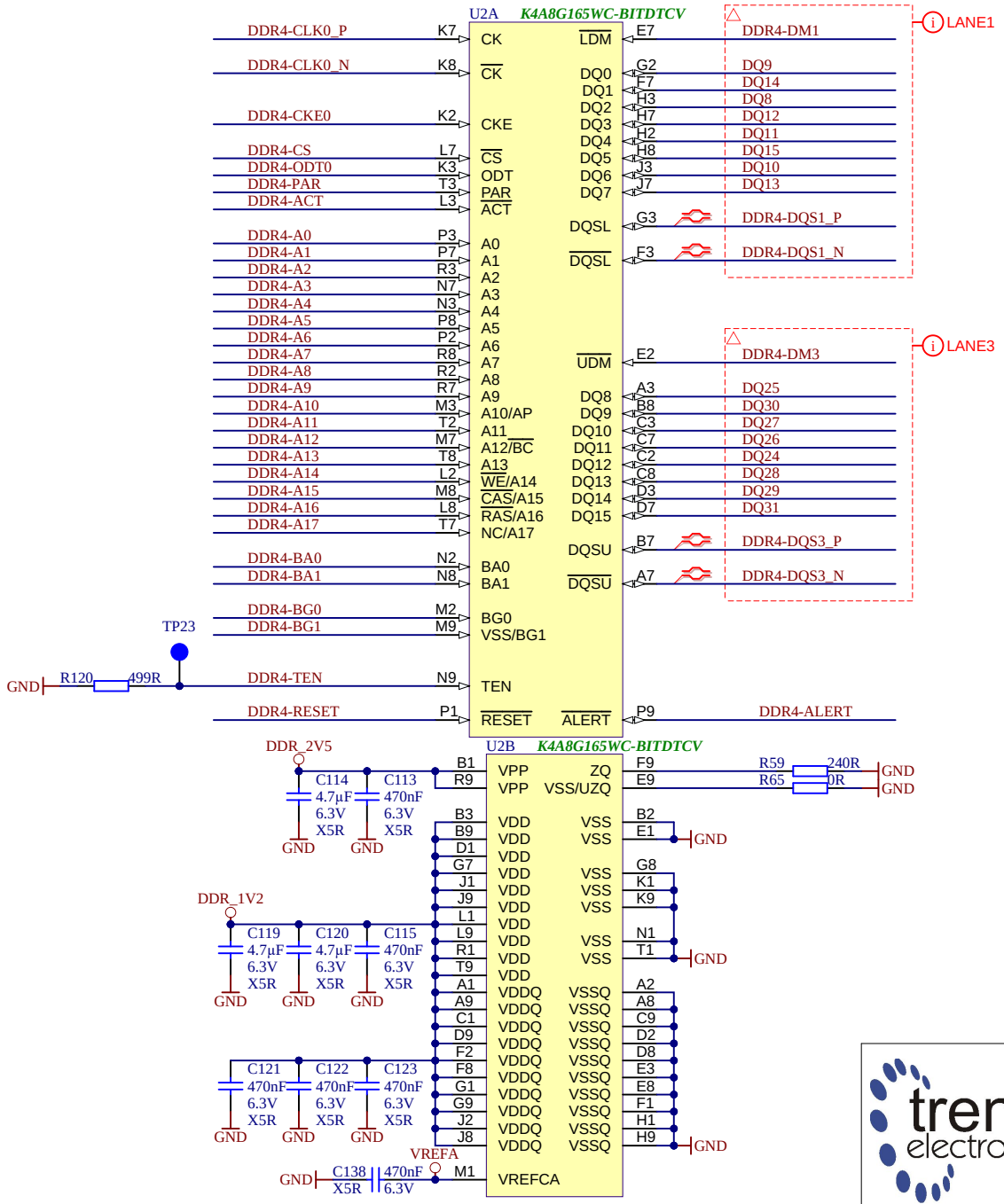
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 21 of 31
Filename: ZU_POWER.SchDoc		



Title: TE0818 - DDR4 RAM 1			
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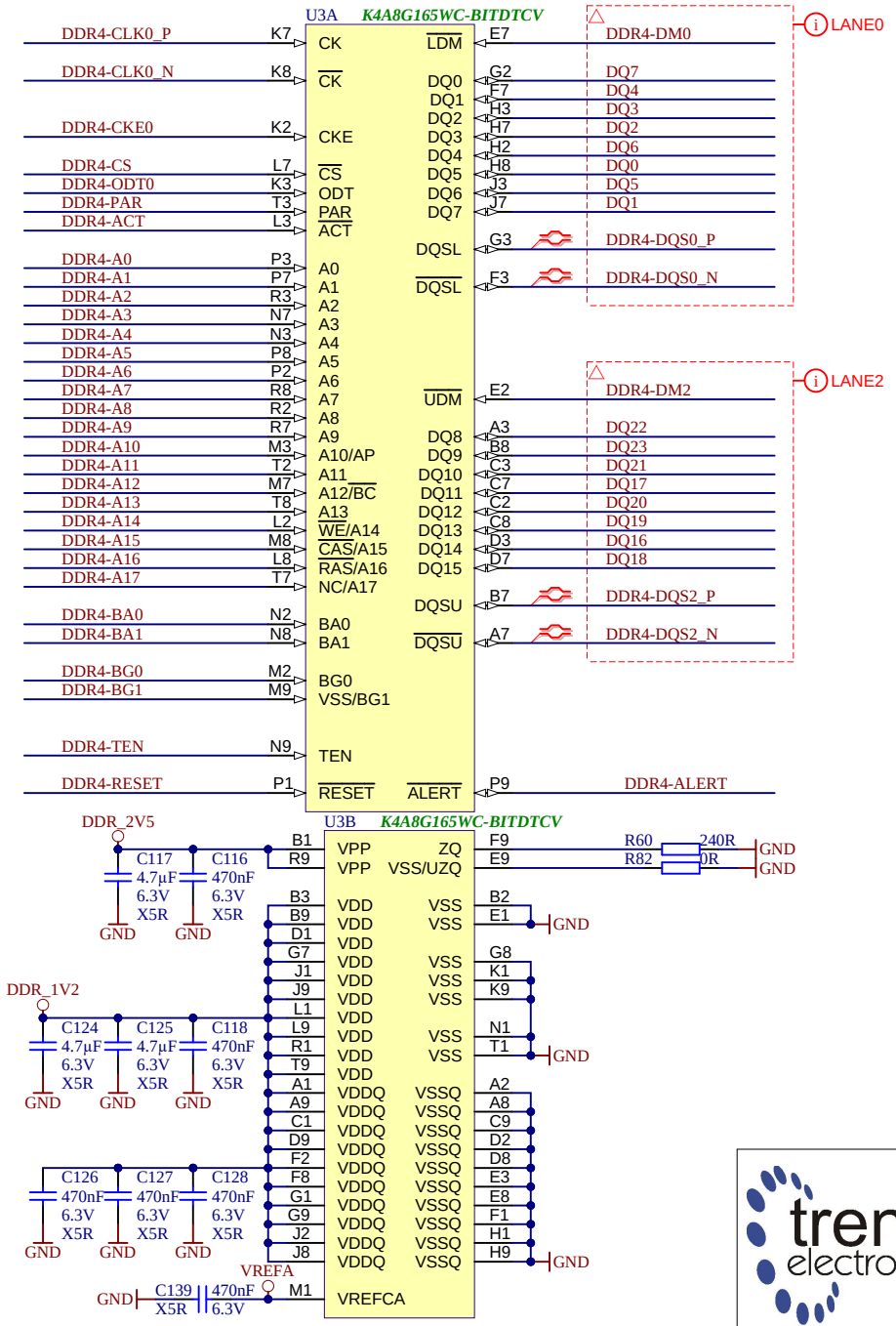
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 22 of 31
Filename: DDR4-RAM.SchDoc			



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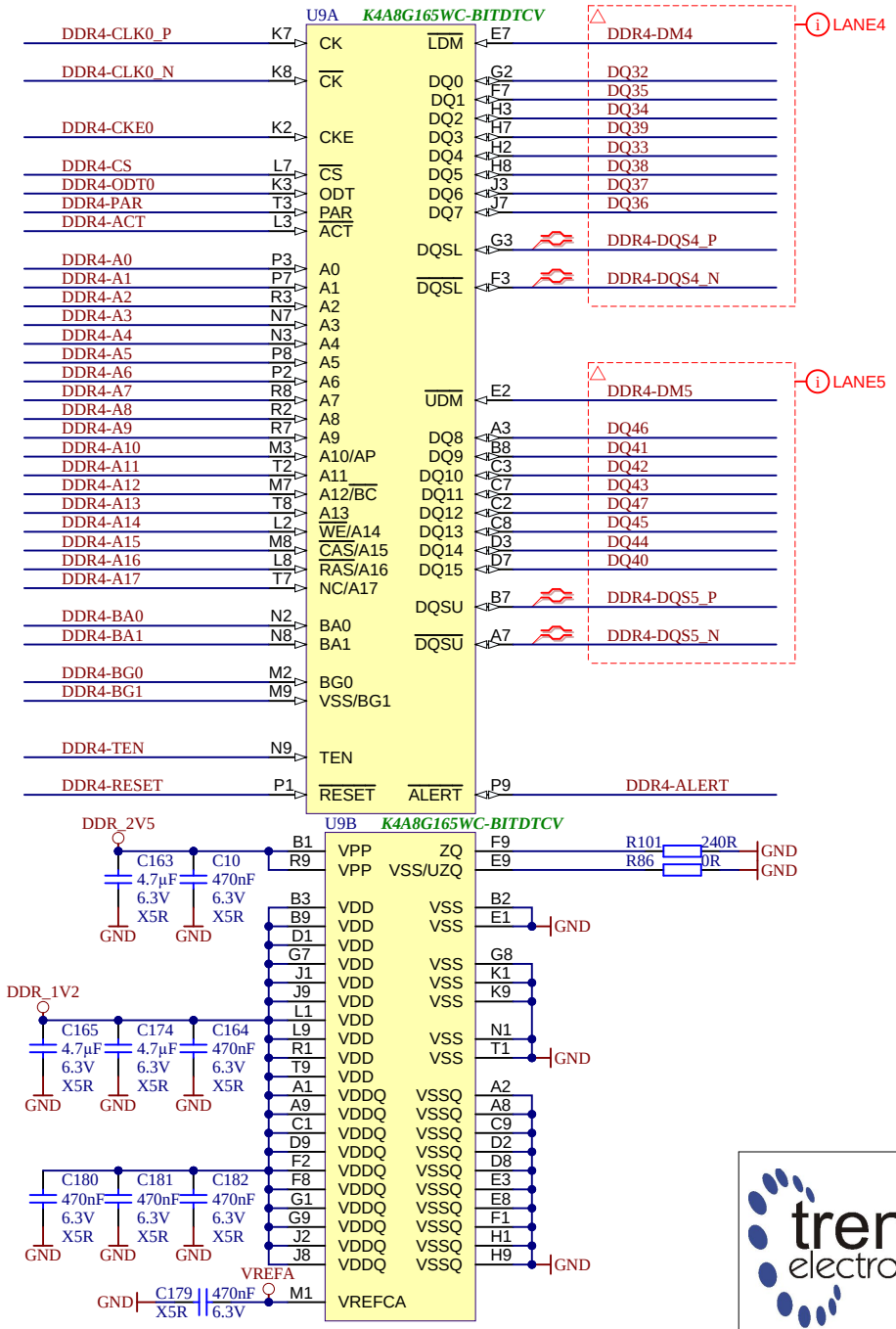
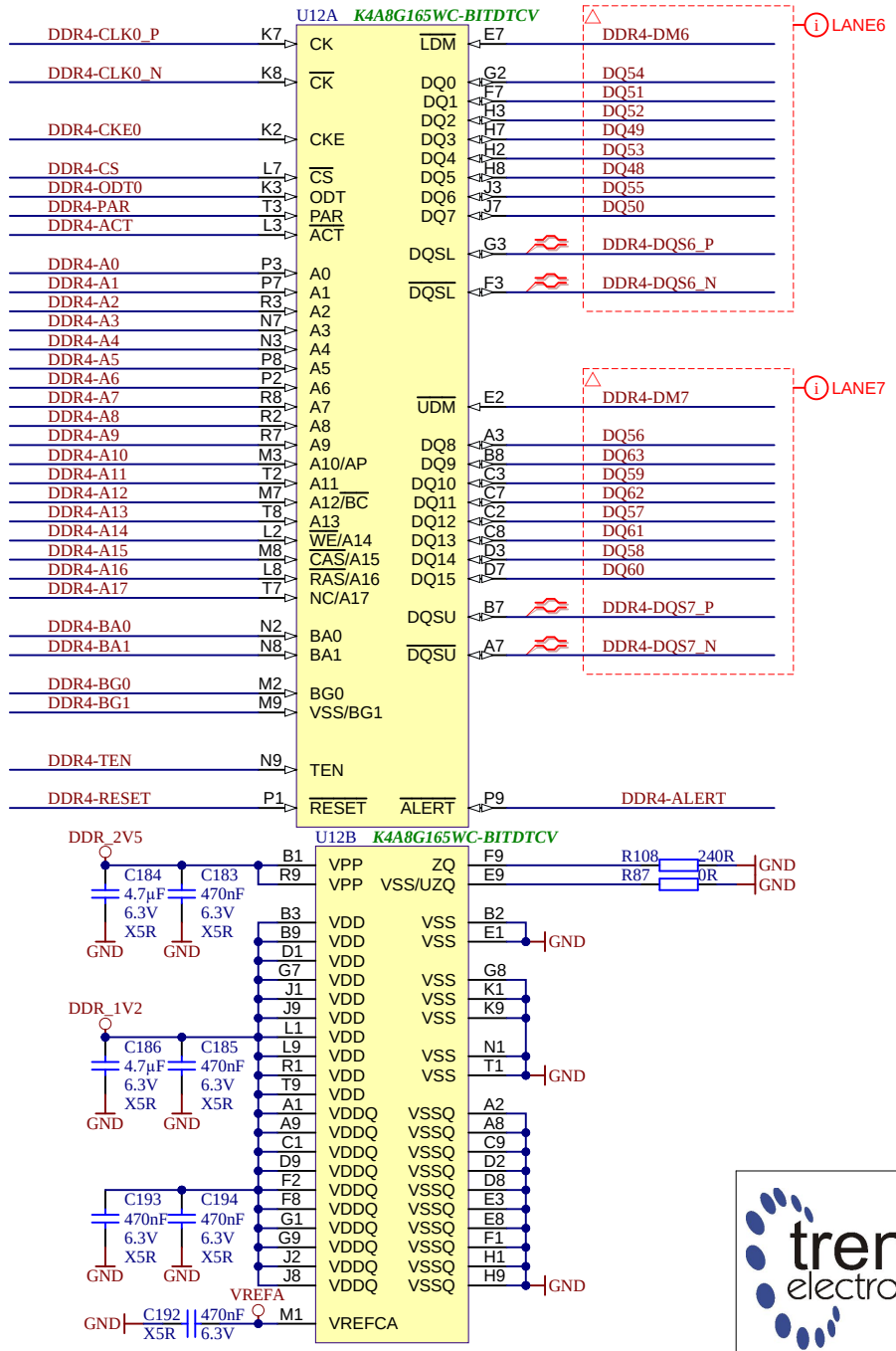
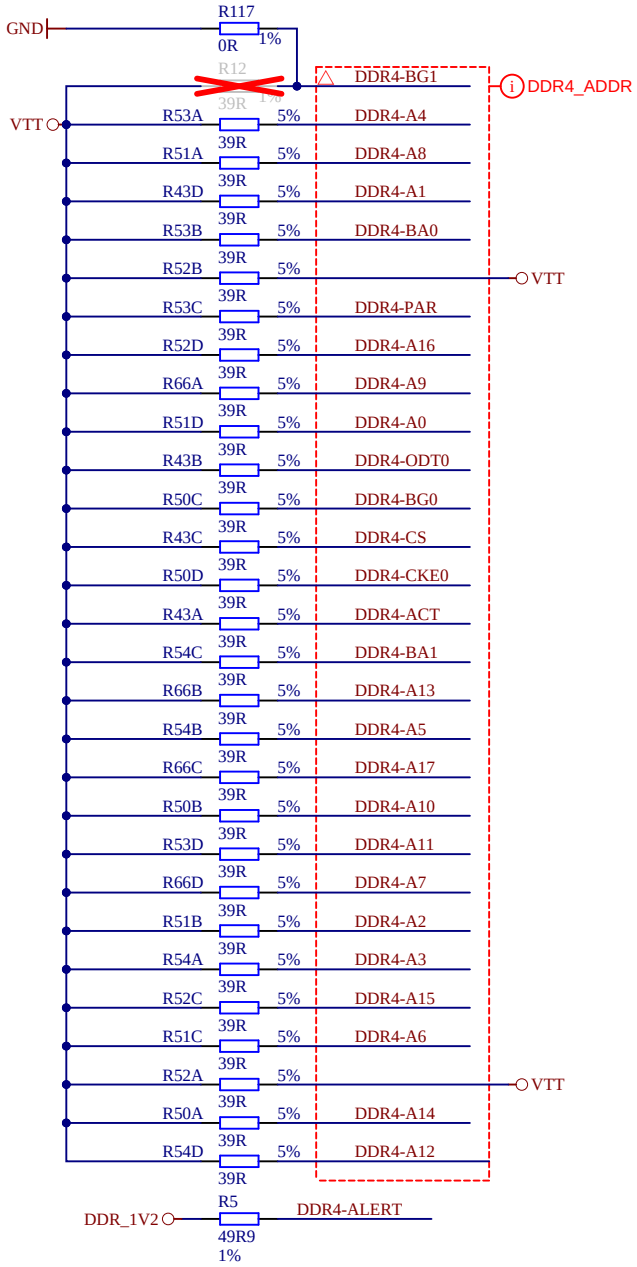
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 23 of 31
Filename: DDR4-RAM_2.SchDoc			

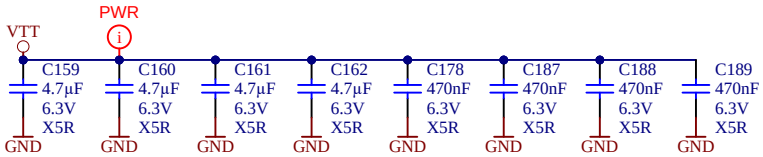


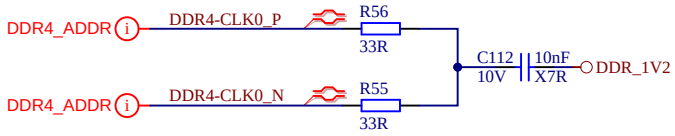
trenz electronic	Title: TE0818 - DDR4 RAM 3		
	A4	Number: TE0818 9BE81-A	Rev. 02
	Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 24 of 31
	Filename: DDR4-RAM_3.SchDoc		



Title: TE0818 - DDR4 RAM 4			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 25 of 31
Filename: DDR4-RAM_4.SchDoc			







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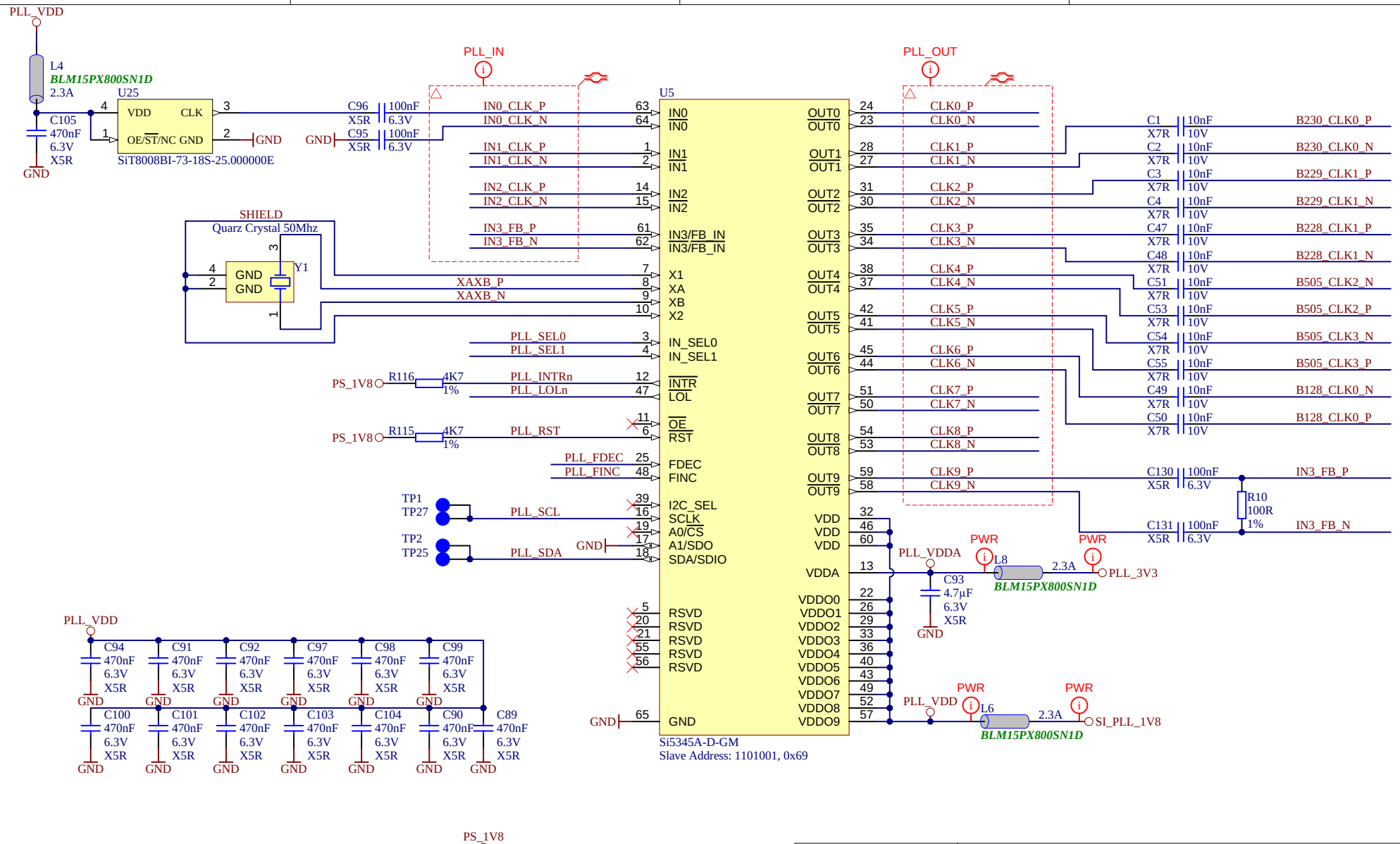
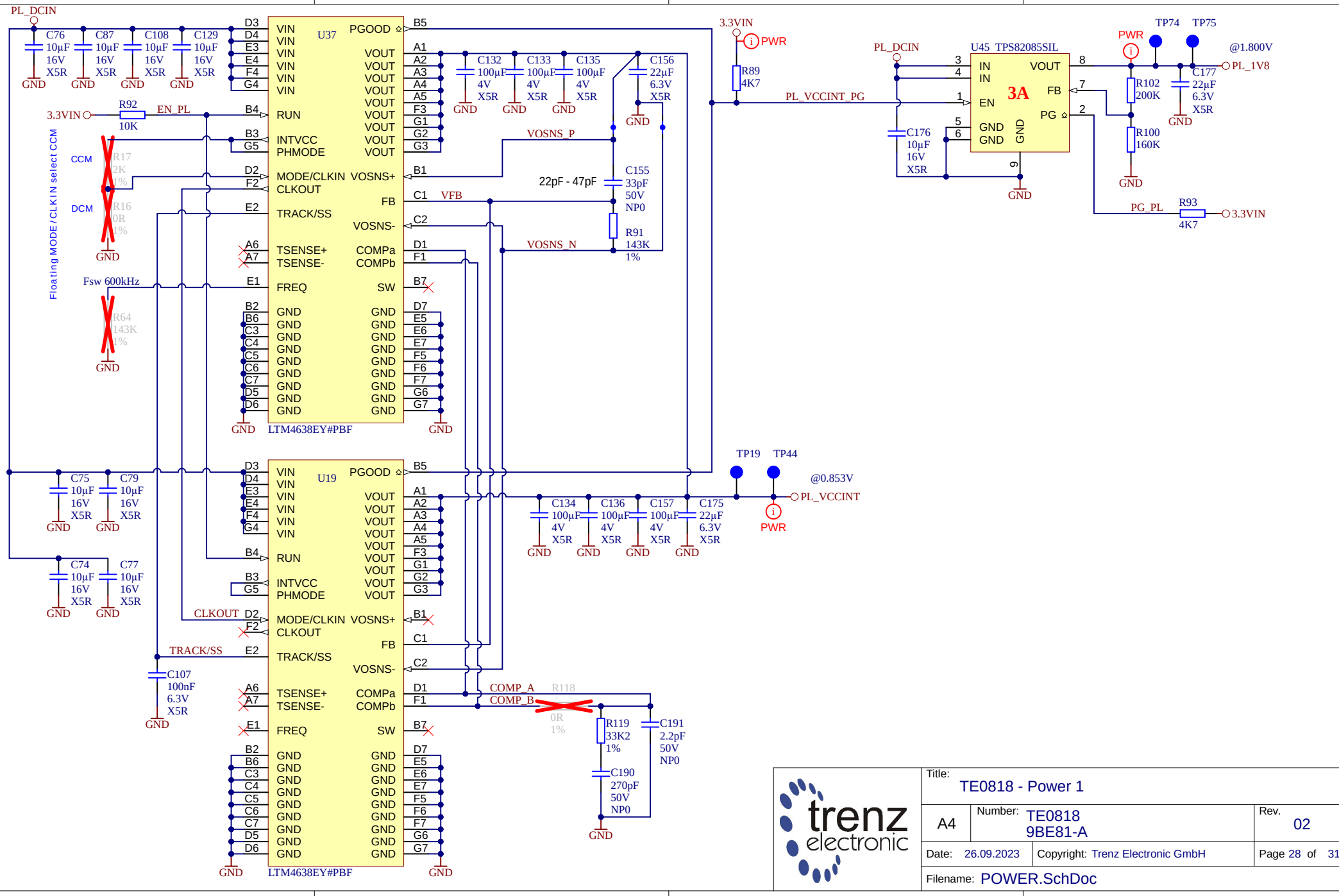
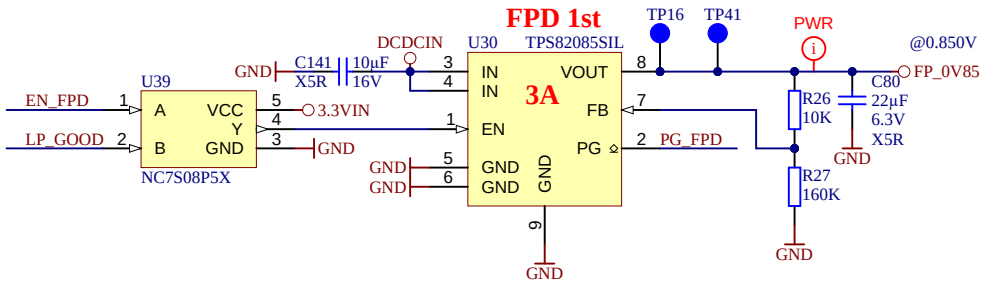
Title: TE0818 - DDR4 Termination			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 26 of 31
Filename: DDR4-TERM.SchDoc			

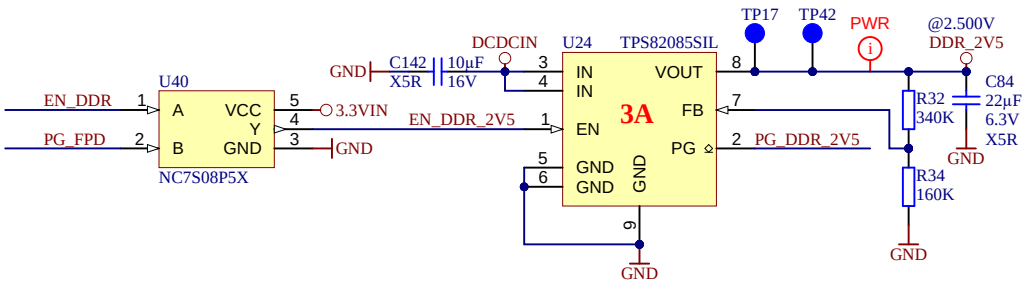


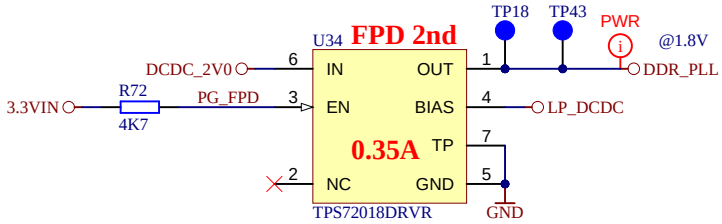
trenz electronic	Title: TE0818 - Clock		
	A4	Number: TE0818 9BE81-A	Rev. 02
	Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 27 of 31
	Filename: Clock.SchDoc		

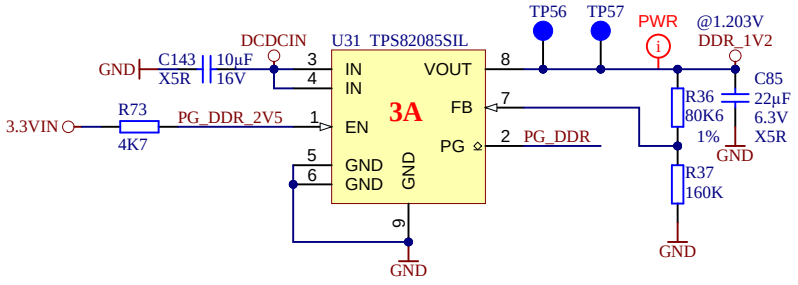


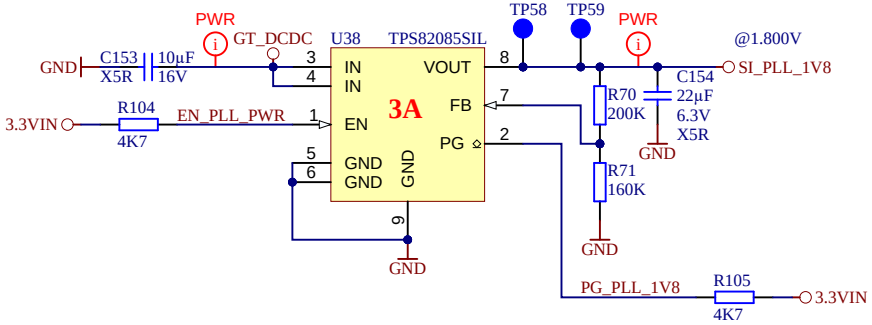
Title: TE0818 - Power 1			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 28 of 31
Filename: POWER.SchDoc			

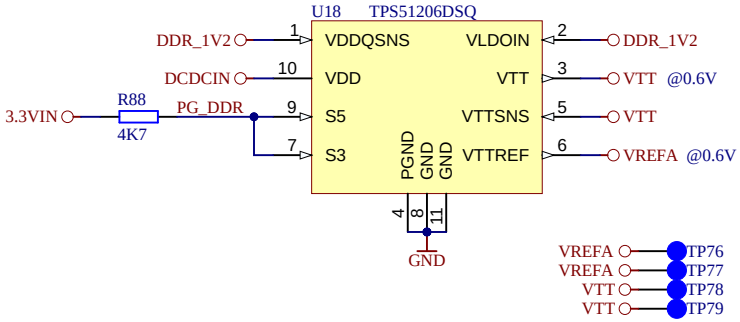












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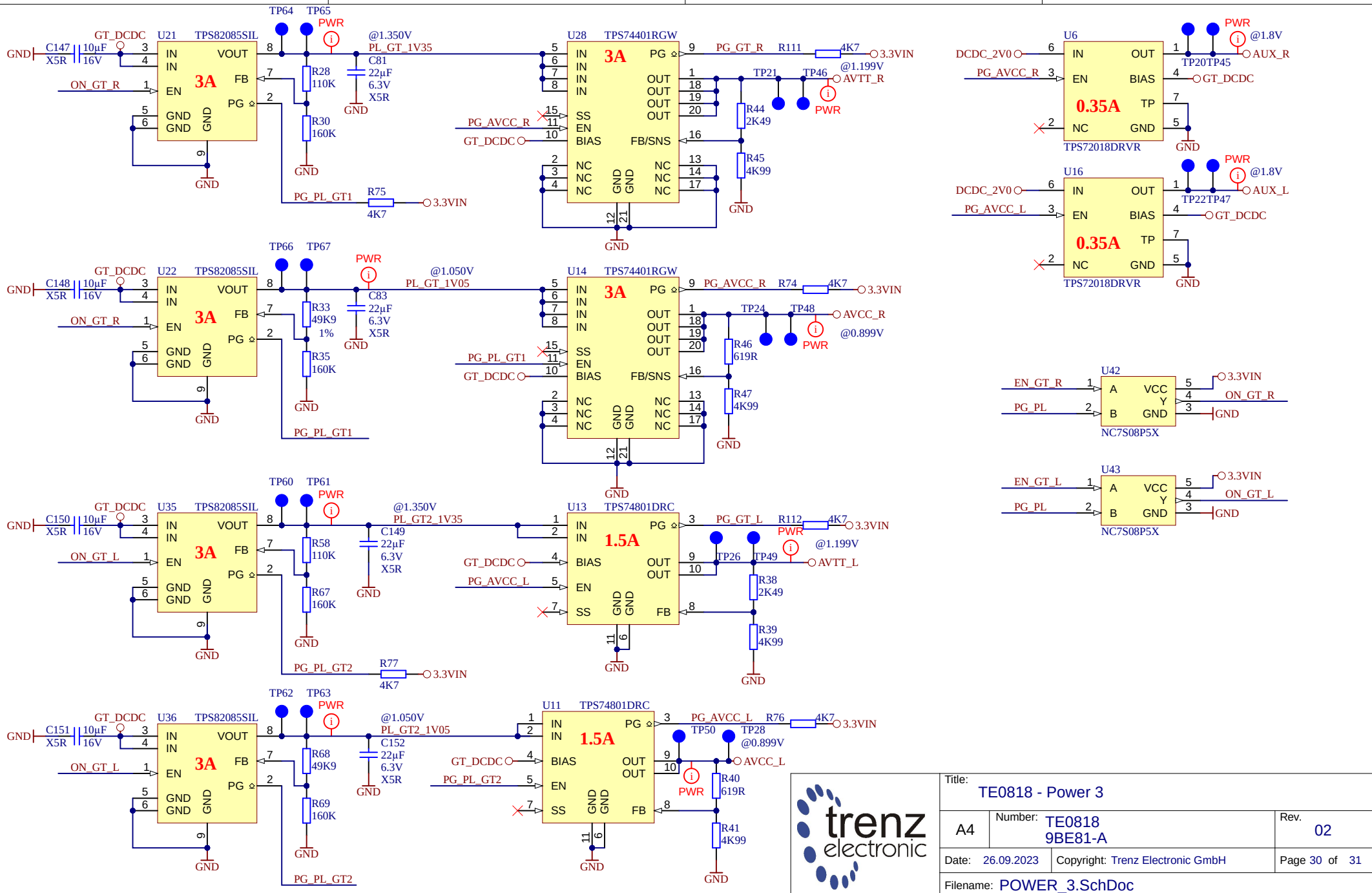
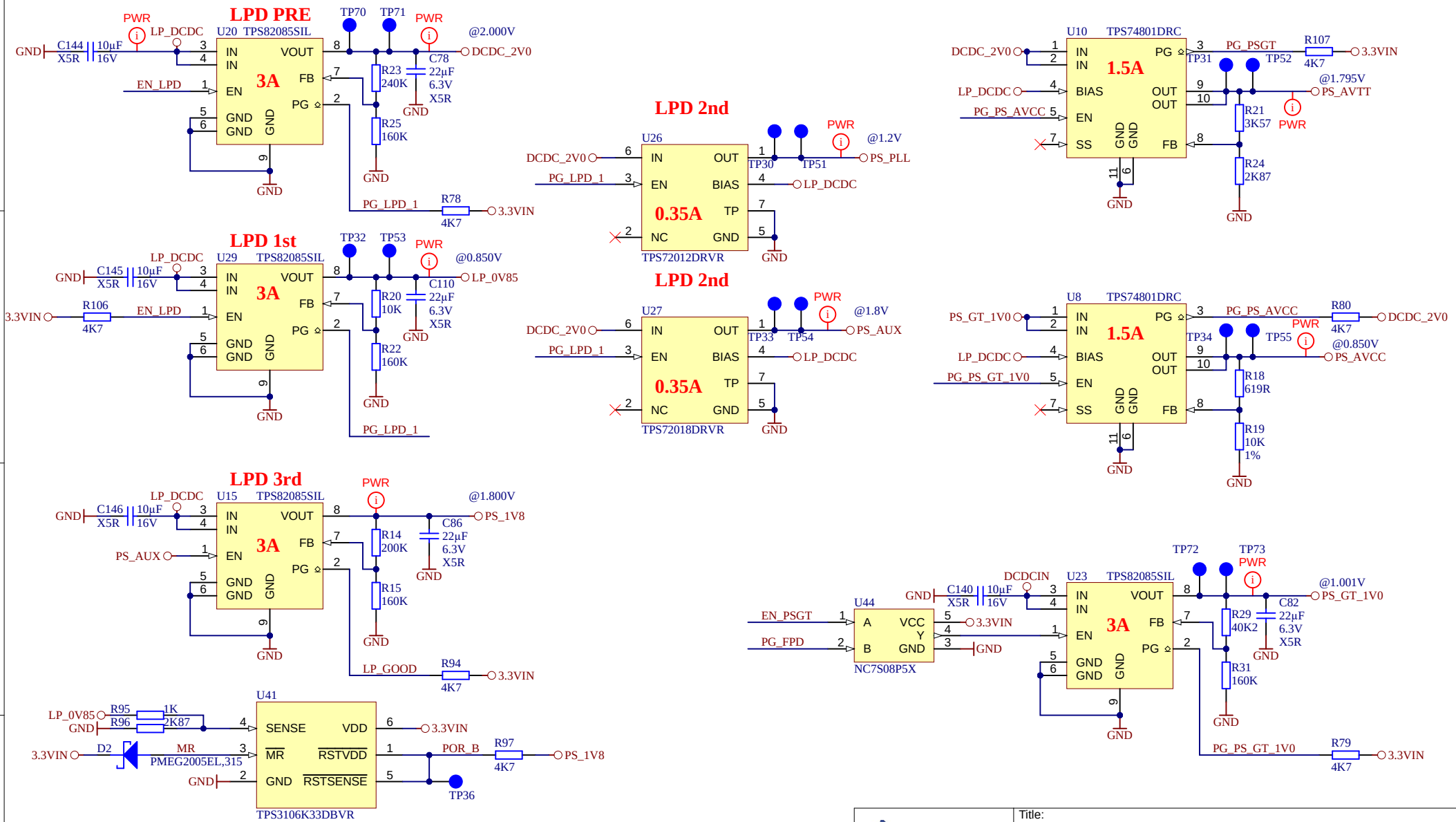
Title: TE0818 - Power 2			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 29 of 31
Filename: POWER_2.SchDoc			



Title: TE0818 - Power 3			
A4	Number: TE0818 9BE81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 30 of 31
Filename: POWER_3.SchDoc			



Net Name	Voltage Rail	Low Detect
LP_0V85	0.85 V	0.743 V
3.3VIN	3.3 V	2.941 V

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Title: TE0818 - Power 4		
A4	Number: TE0818 9BE81-A	Rev. 02
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