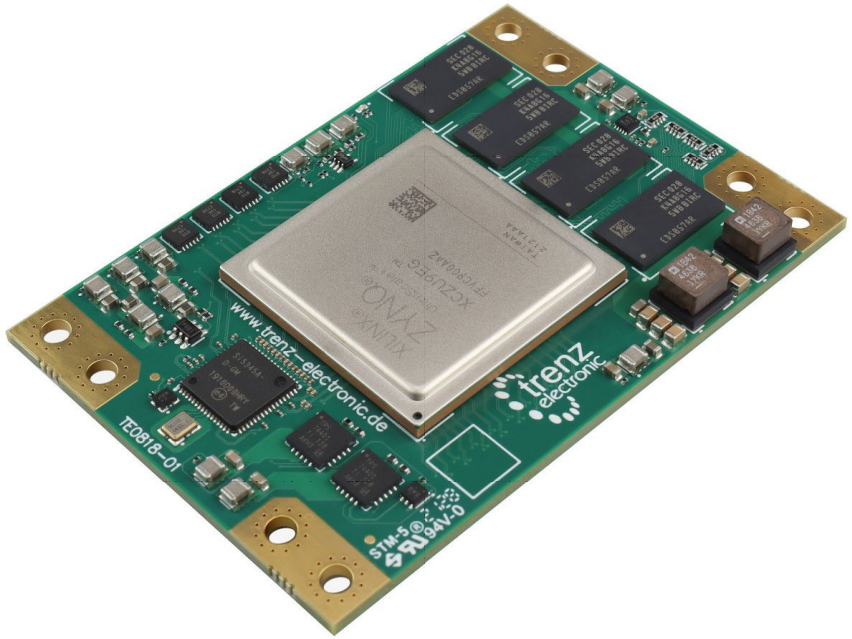

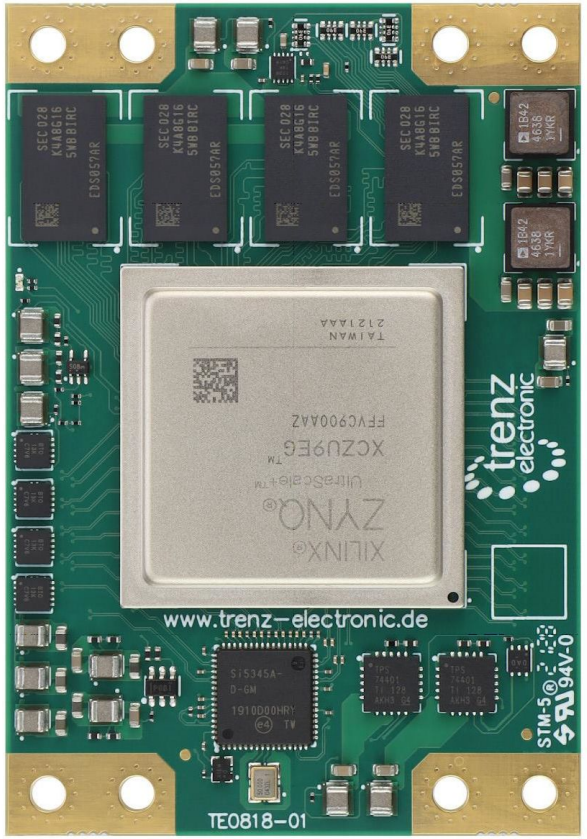

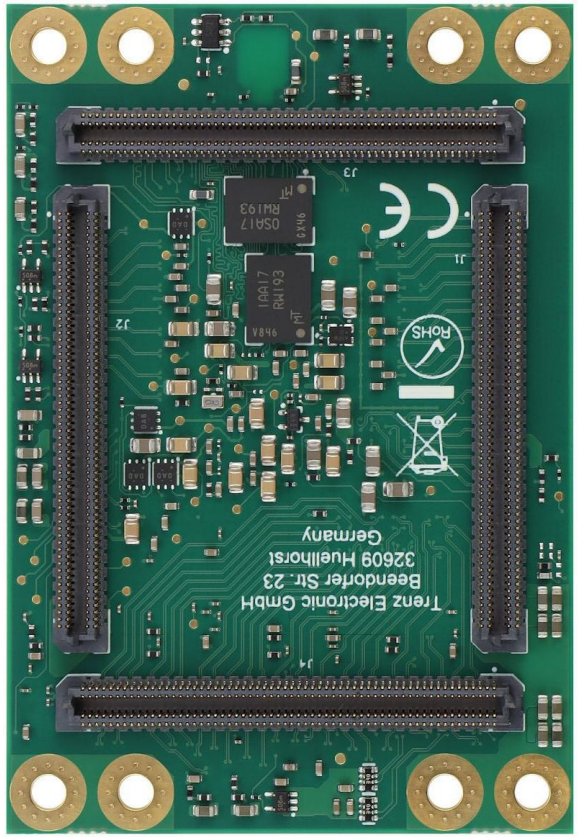

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Project is protected under copyright and we strongly and strictly prohibit the reverse engineering or recreation, even if the design is just adapted or modified.

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 BGI81-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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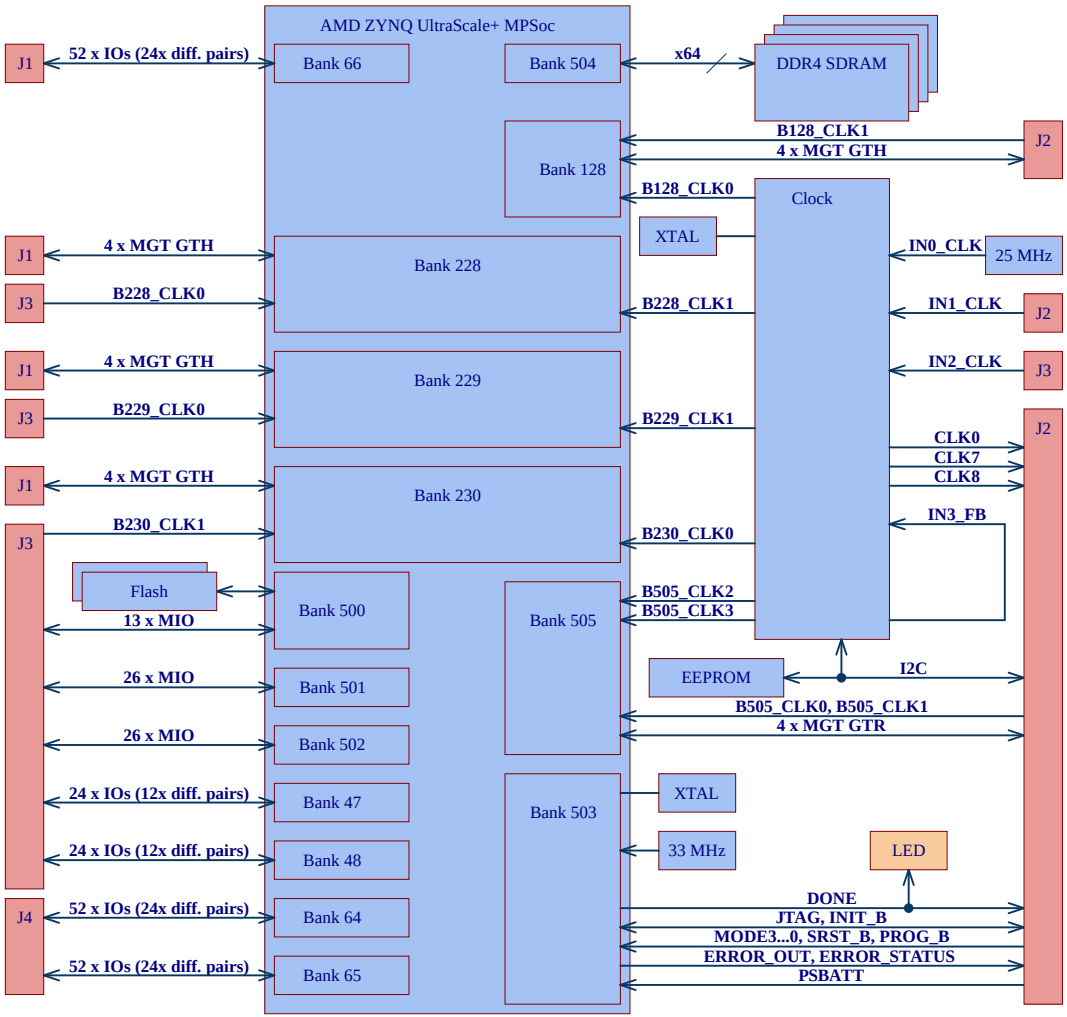
Title: TE0818 - Revision History

A4 | Number: TE0818 BGI81-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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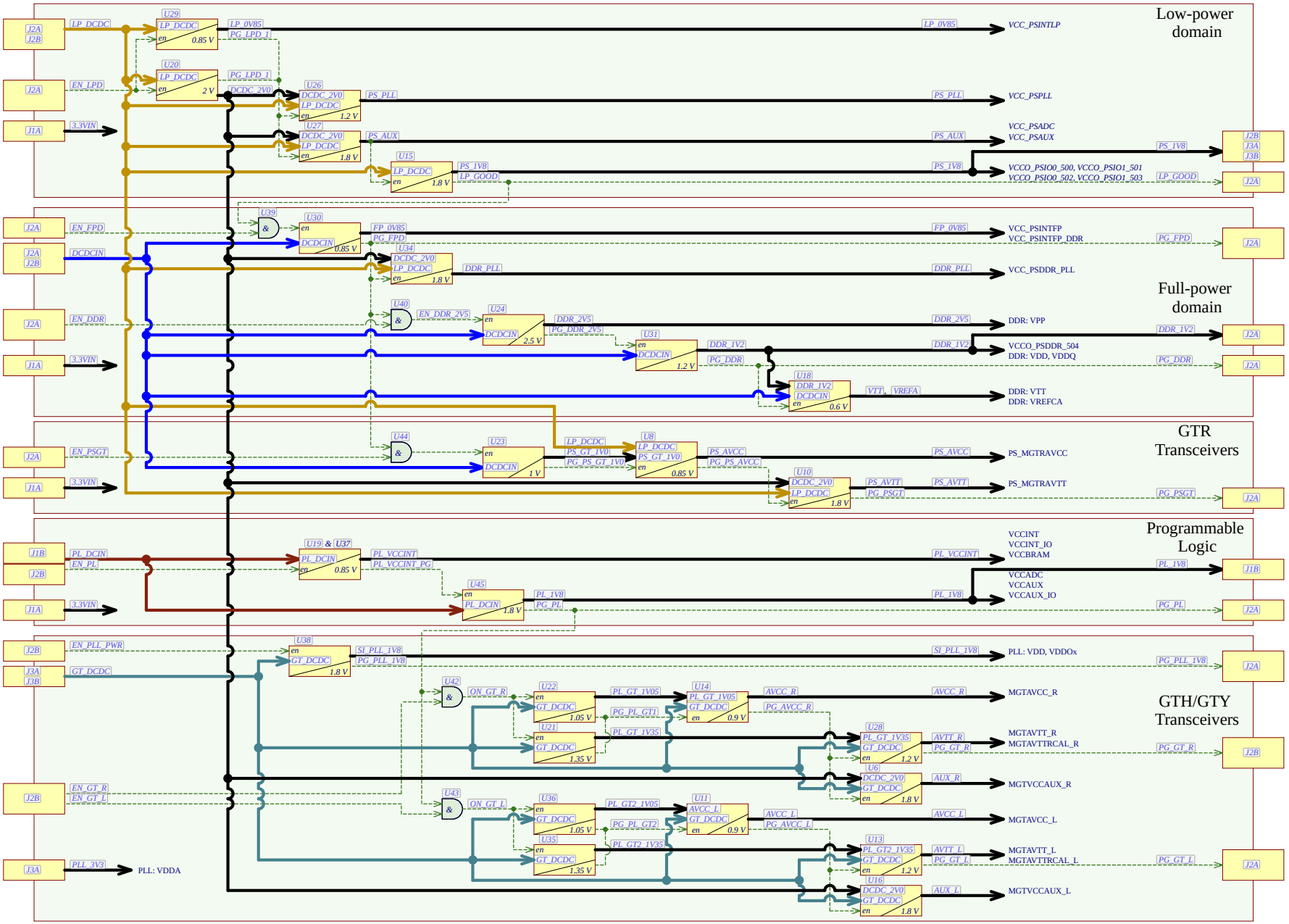
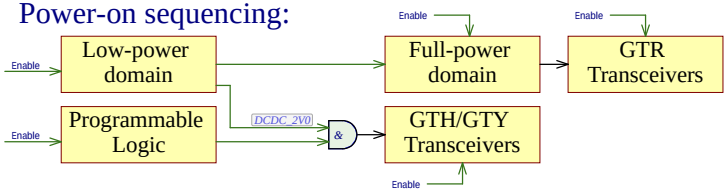
Title: TE0818 - System Overview

A4	Number: TE0818 BGI81-A	Rev. 02
Date: 18.09.2023	Copyright: Trenz Electronic GmbH	Page 3 of 31
Filename: TE0818-Overview.SchDoc		



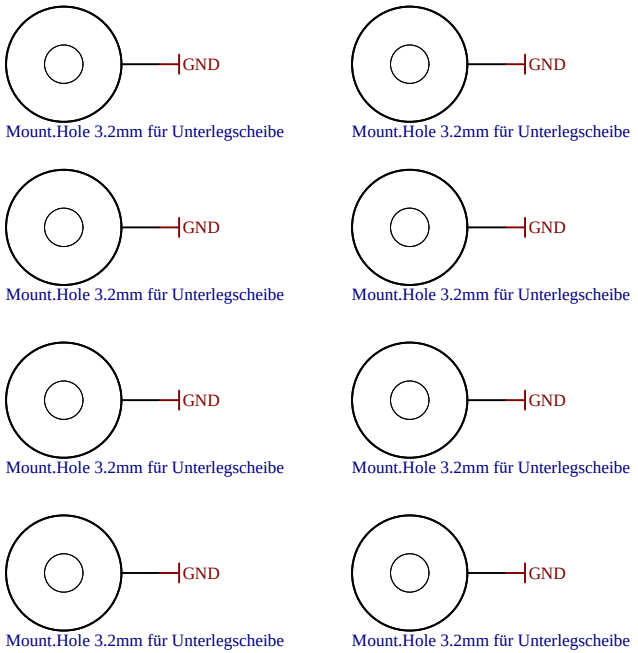
Power-on sequencing:



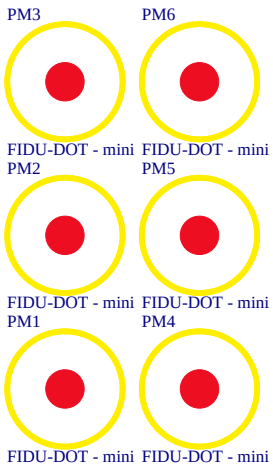
EN_GT_R — Net name
Power bus
Control signal
PL_DCIN 0.9V — Power converter
& — Logic AND gate

Title: TE0818 - Power Diagram			
A3	Nummer: TE0818 BGI81-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:	BGI81-A
Created by:	ED
Modified by:	ED
Modified at:	2023-09-20

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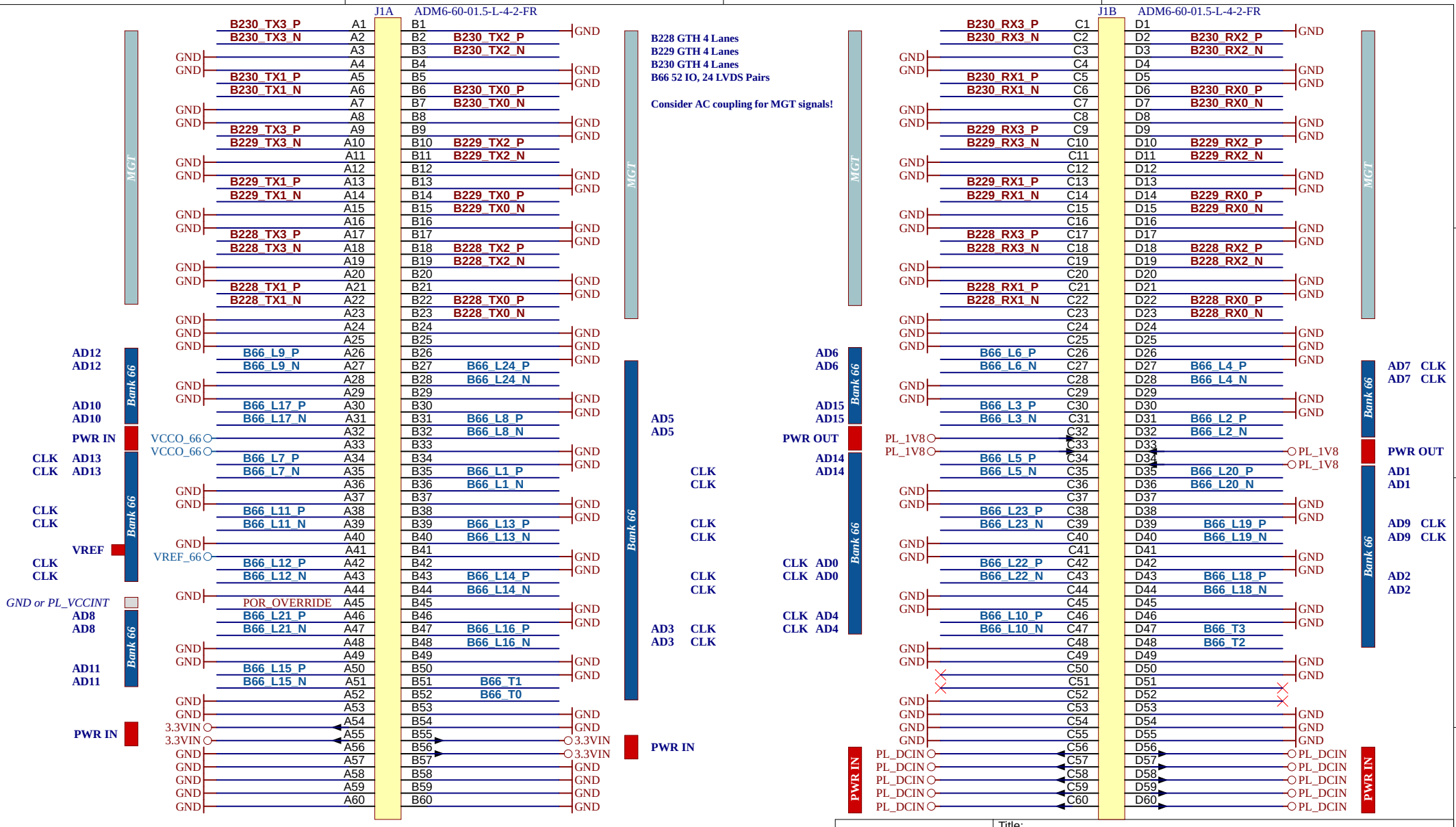
Title: TE0818		
A4	Number: TE0818 BGI81-A	Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 5 of 31
Filename: TE0818.SchDoc		



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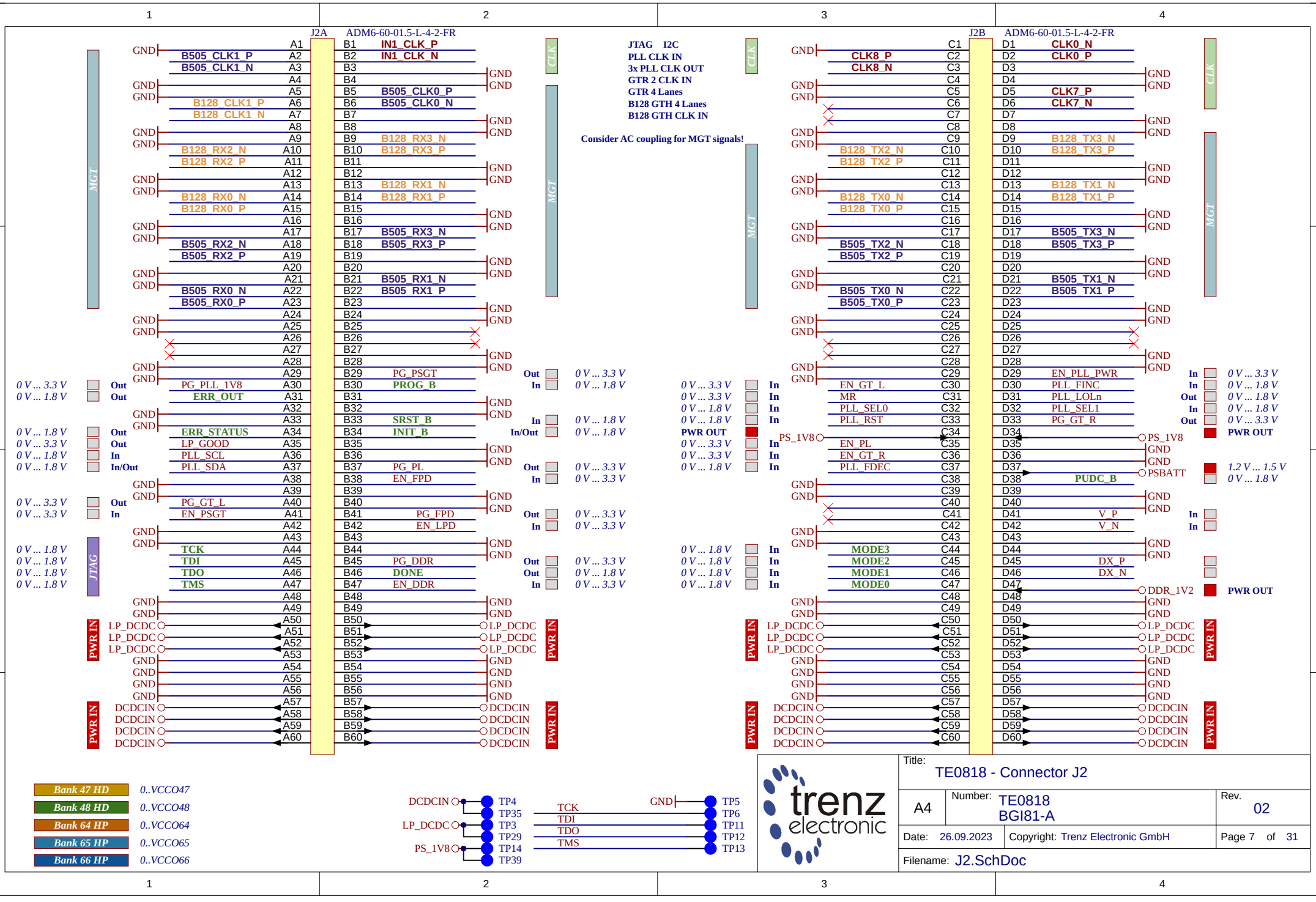
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 6 of 31
Filename: J1.SchDoc			


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 BGI81-A
Rev. 02
Date: 26.09.2023
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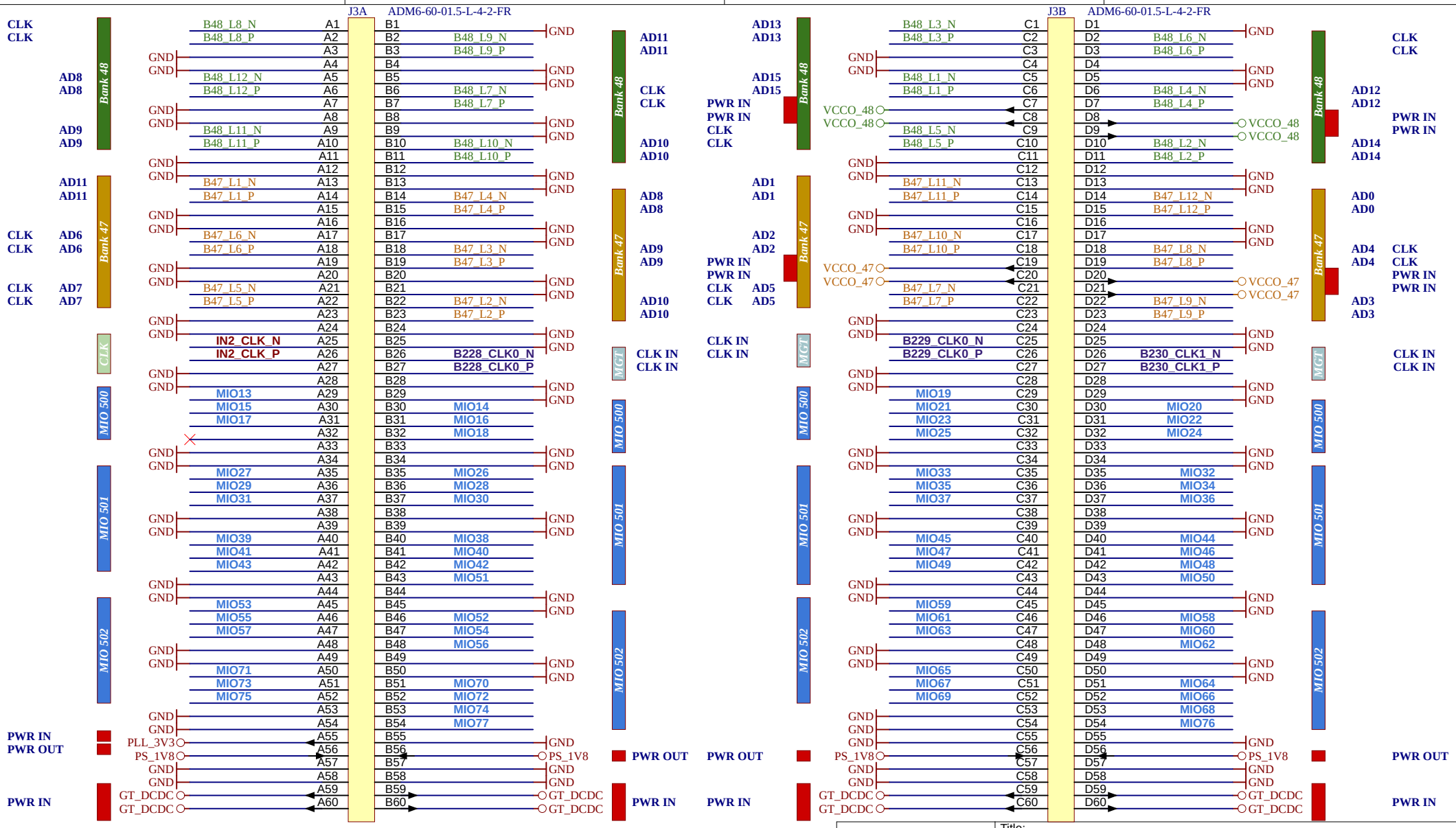
Filename: J2.SchDoc


J3A ADM6-60-01.5-L-4-2-FR
J3B ADM6-60-01.5-L-4-2-FR
Bank 48
Bank 47
CLK
MIO 500
MIO 501
MIO 502
MGT
B48_L8_N B48_L8_P B48_L12_N B48_L12_P B48_L11_N B48_L11_P B47_L1_N B47_L1_P B47_L6_N B47_L6_P B47_L5_N B47_L5_P
B48_L9_N B48_L9_P B48_L7_N B48_L7_P B48_L10_N B48_L10_P B47_L4_N B47_L4_P B47_L3_N B47_L3_P B47_L2_N B47_L2_P
B48_L3_N B48_L3_P B48_L1_N B48_L1_P B48_L5_N B48_L5_P B47_L11_N B47_L11_P B47_L10_N B47_L10_P B47_L7_N B47_L7_P
B48_L6_N B48_L6_P B48_L4_N B48_L4_P B48_L2_N B48_L2_P B47_L12_N B47_L12_P B47_L8_N B47_L8_P B47_L9_N B47_L9_P
IN2_CLK_N IN2_CLK_P B228_CLK0_N B228_CLK0_P B229_CLK0_N B229_CLK0_P B230_CLK1_N B230_CLK1_P
MIO13 MIO15 MIO17 MIO27 MIO29 MIO31 MIO39 MIO41 MIO43 MIO53 MIO55 MIO57 MIO71 MIO73 MIO75
MIO14 MIO16 MIO18 MIO26 MIO28 MIO30 MIO38 MIO40 MIO42 MIO51 MIO52 MIO54 MIO56 MIO70 MIO72 MIO74 MIO77
MIO19 MIO21 MIO23 MIO25 MIO33 MIO35 MIO37 MIO45 MIO47 MIO49 MIO59 MIO61 MIO63 MIO65 MIO67 MIO69
MIO20 MIO22 MIO24 MIO32 MIO34 MIO36 MIO44 MIO46 MIO48 MIO50 MIO58 MIO60 MIO62 MIO64 MIO66 MIO68 MIO76
PLL_3V3 PS_1V8 GT_DCDC VCCO_48 VCCO_47 GND
PWR IN PWR OUT CLK IN
AD0 AD1 AD2 AD3 AD4 AD5 AD7 AD8 AD9 AD10 AD11 AD12 AD14 AD15
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
B47 24 IO, 12 LVDS Pairs
B48 24 IO, 12 LVDS Pairs
B228 GTH CLK IN
B229 GTH CLK IN
B230 GTH CLK IN
65 MIO
PLL CLK IN
GND TP10 GT_DCDC TP38 TP9
trenz electronic
Title: TE0818 - Connector J3
A4
Number: TE0818 BGI81-A
Rev. 02
Date: 26.09.2023
Copyright: Trenz Electronic GmbH
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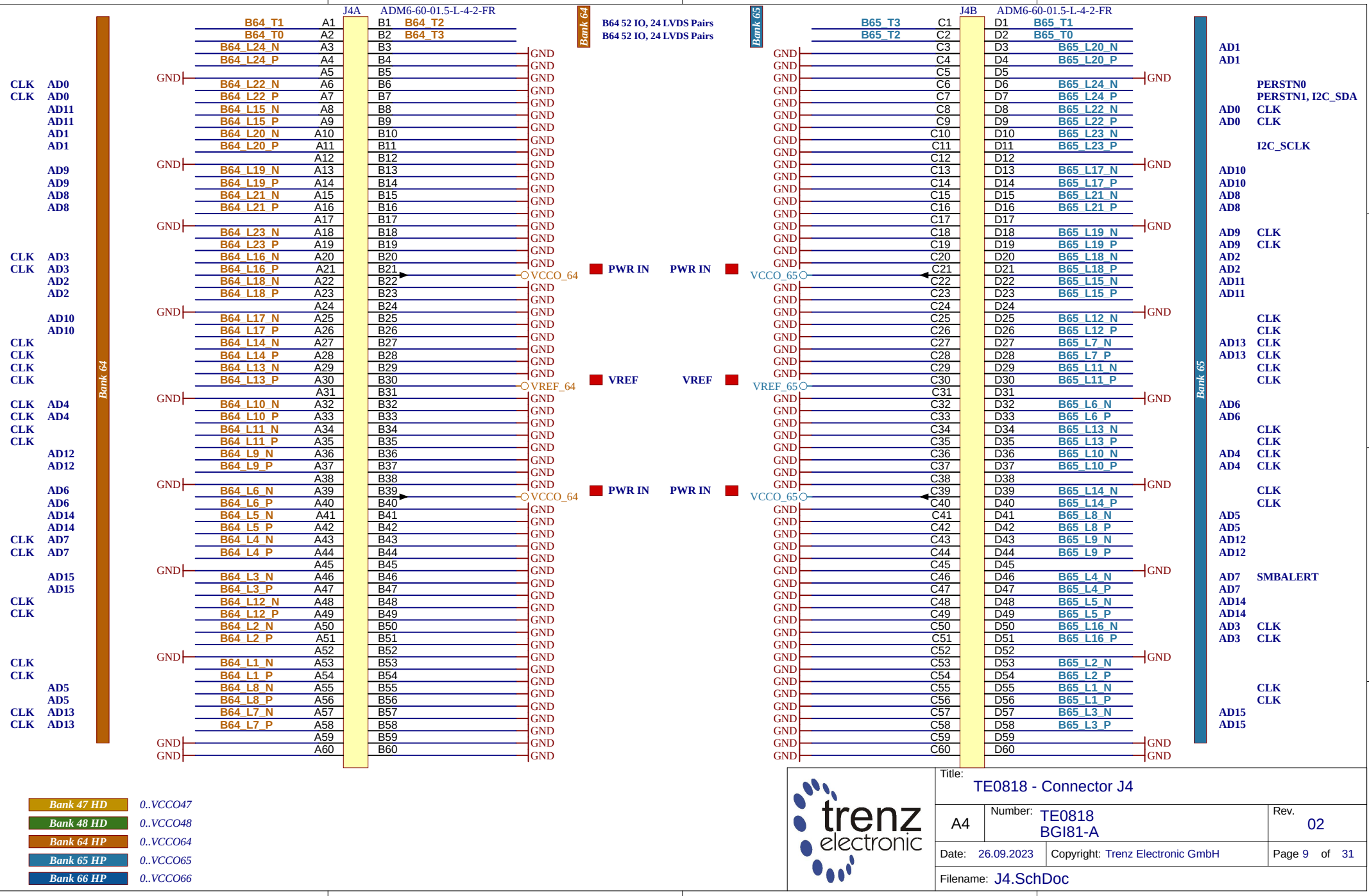
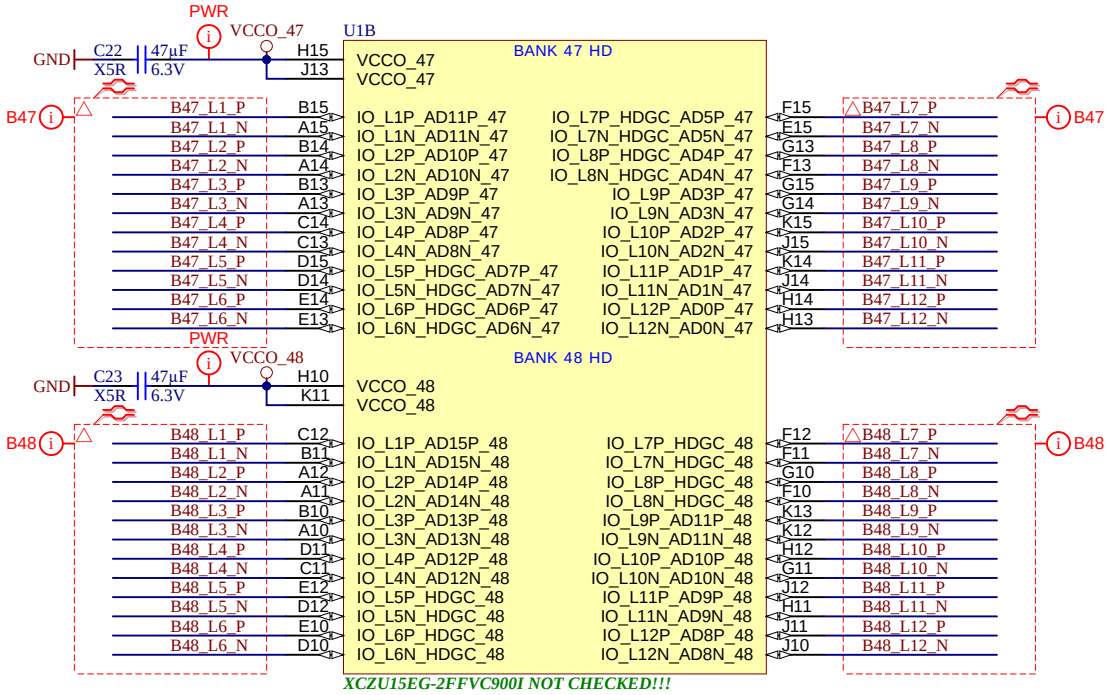
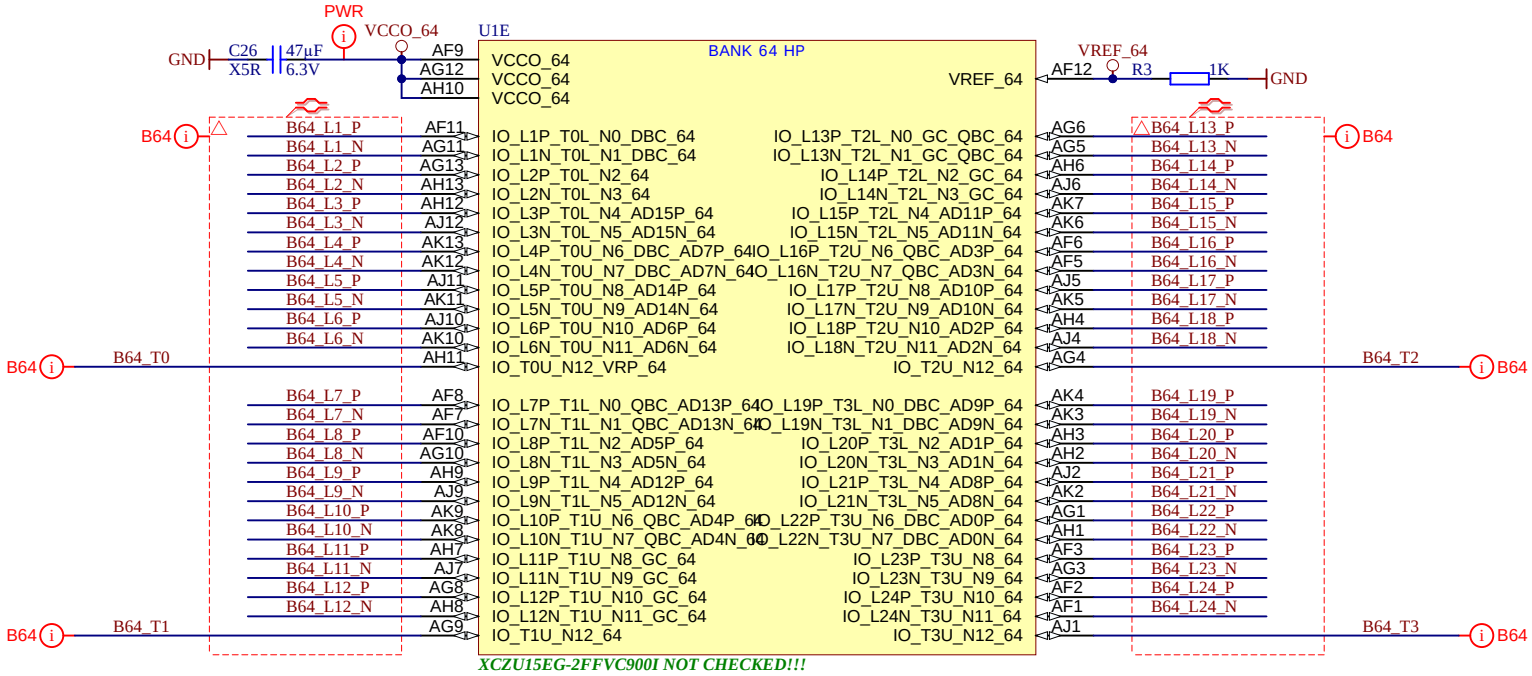
Filename: J3.SchDoc

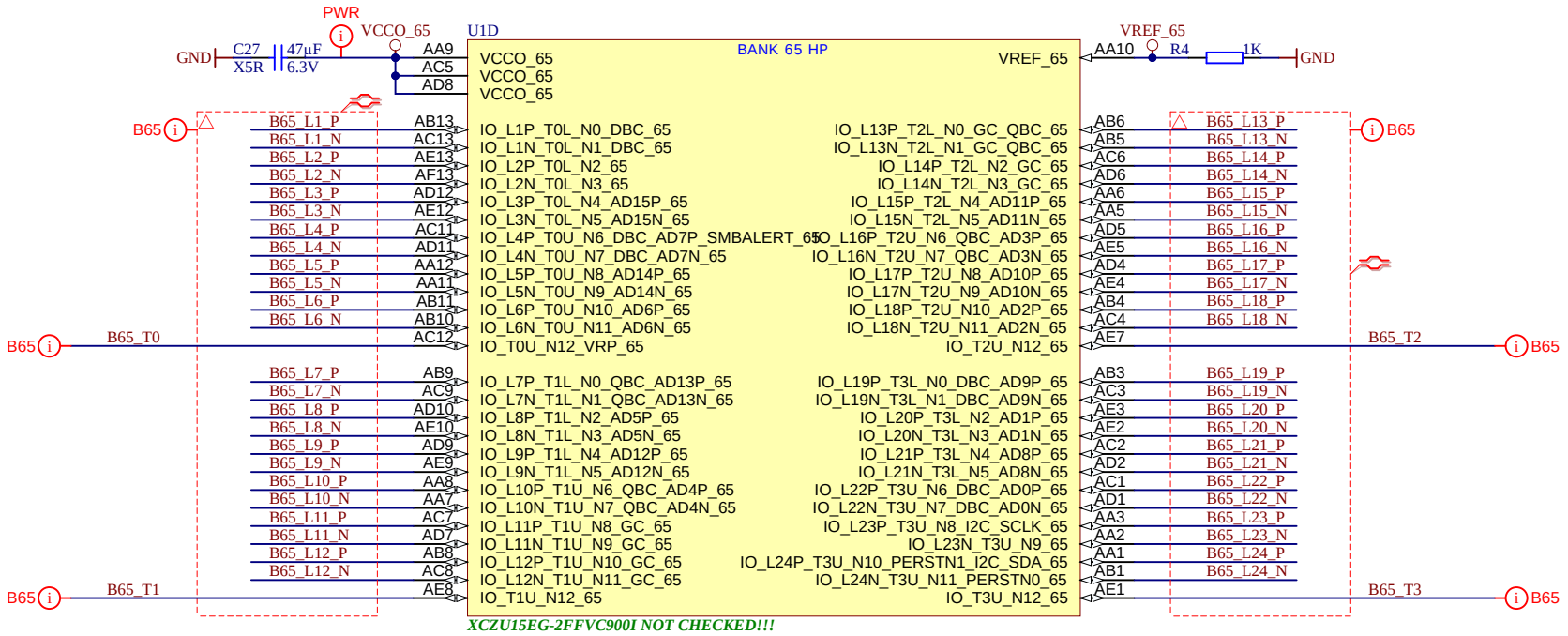

J4A
ADM6-60-01.5-L-4-2-FR
Bank 64
B64 52 IO, 24 LVDS Pairs
B64 52 IO, 24 LVDS Pairs
Bank 65
J4B
ADM6-60-01.5-L-4-2-FR
PWR IN
PWR IN
VREF
VREF
VCCO_64
VCCO_65
VREF_64
VREF_65
Bank 47 HD 0..VCCO47
Bank 48 HD 0..VCCO48
Bank 64 HP 0..VCCO64
Bank 65 HP 0..VCCO65
Bank 66 HP 0..VCCO66
trenz electronic
Title: TE0818 - Connector J4
A4
Number: TE0818 BGI81-A
Rev. 02
Date: 26.09.2023
Copyright: Trenz Electronic GmbH
Page 9 of 31
Filename: J4.SchDoc



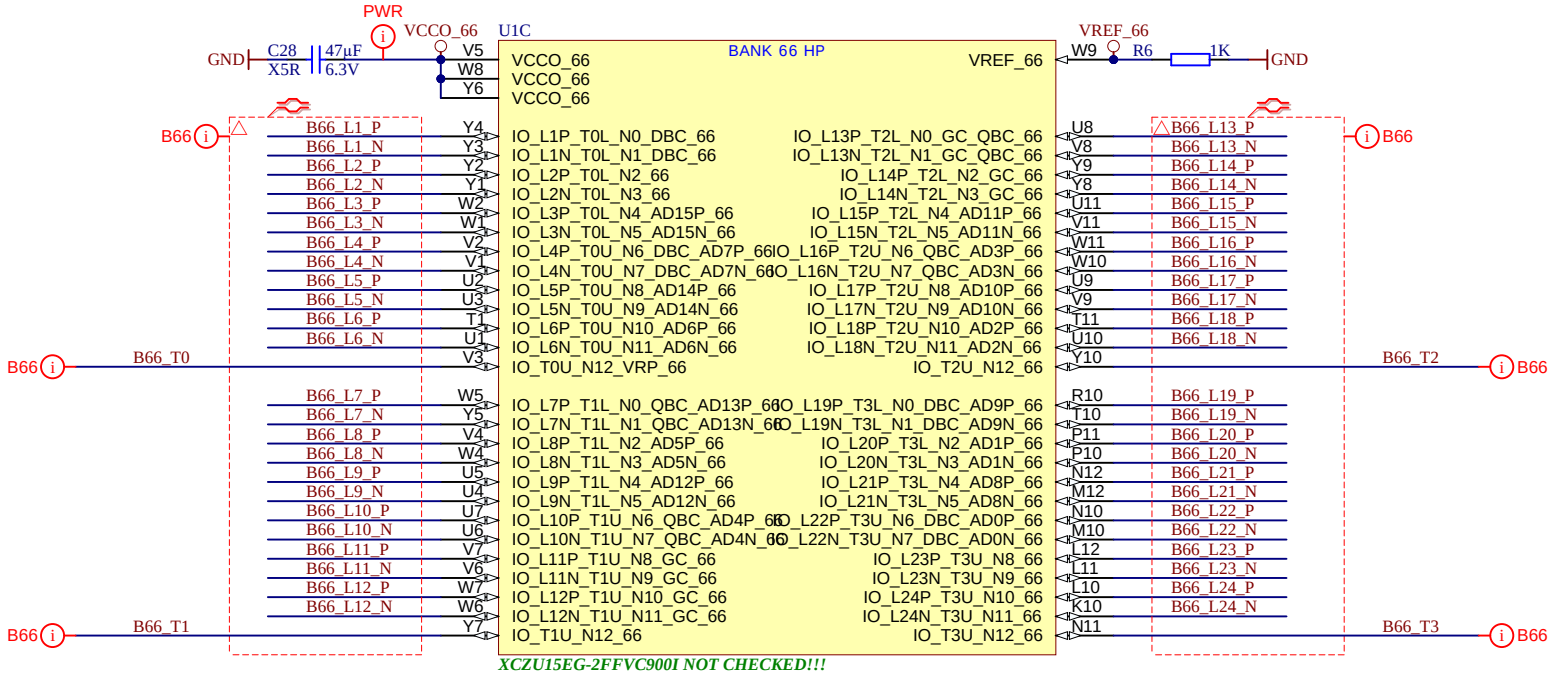
trenz electronic	Title: TE0818 - HD Bank		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 10 of 31
Filename: B_HD.SchDoc			



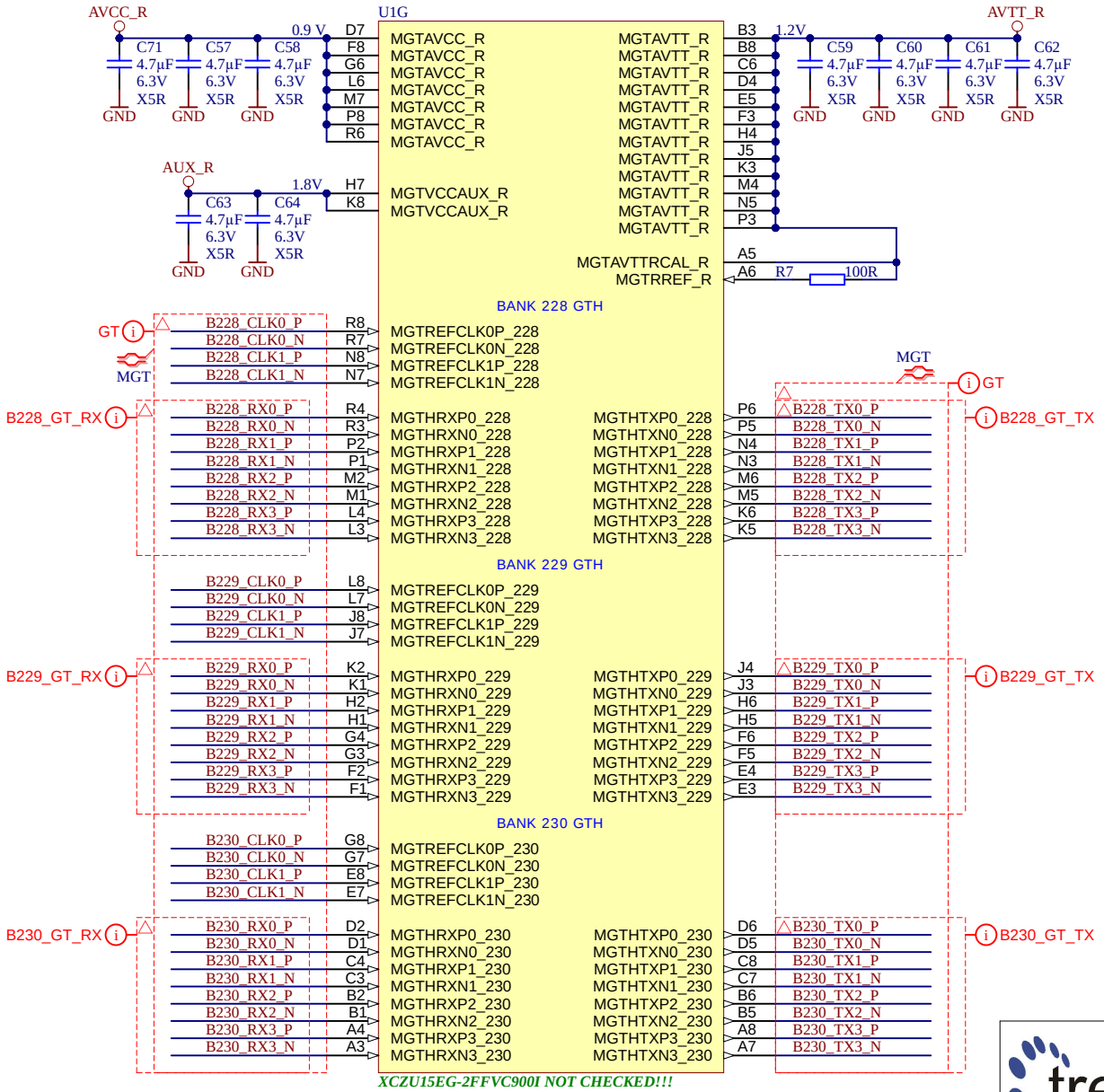
trenz electronic	Title: TE0818 - HP Bank 1		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 11 of 31
Filename: B64.SchDoc			



trenz electronic	Title: TE0818 - HP Bank 2		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 12 of 31
Filename: B65.SchDoc			



trenz electronic	Title: TE0818 - HP Bank 3		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 13 of 31
Filename: B66.SchDoc			



Title: TE0818 - GTH Bank 1			
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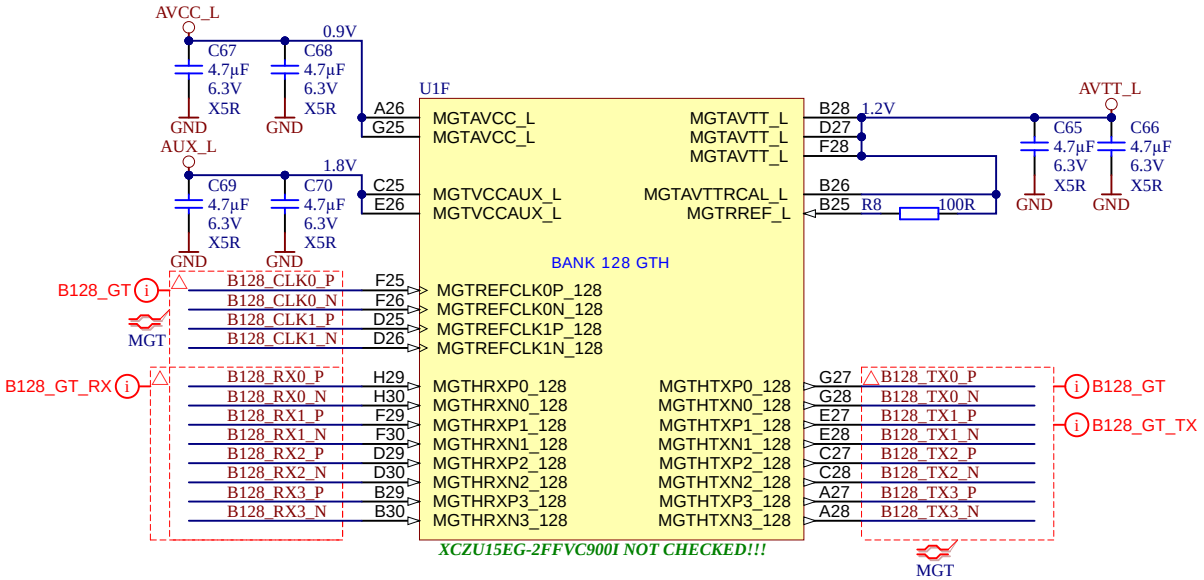
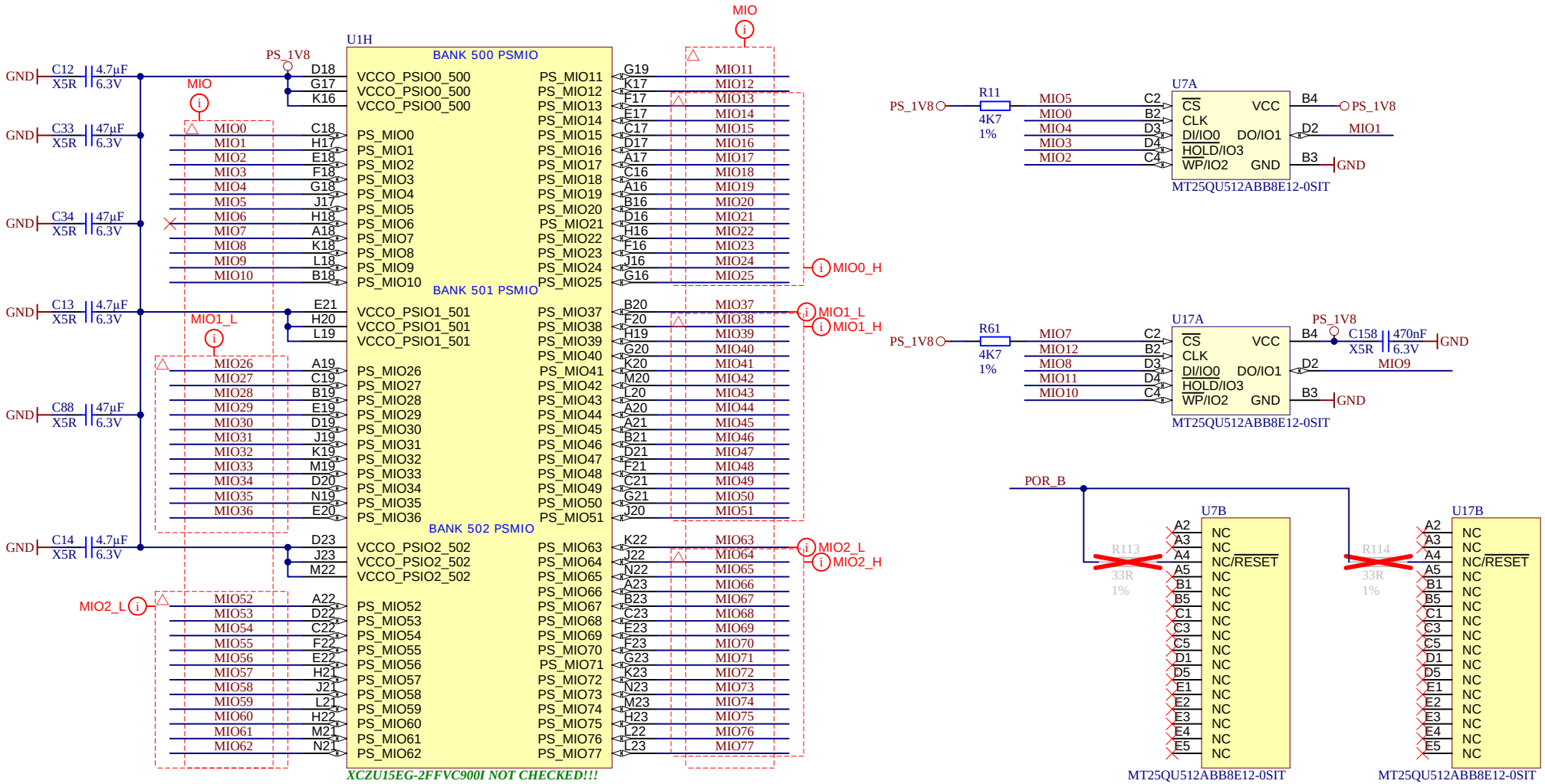
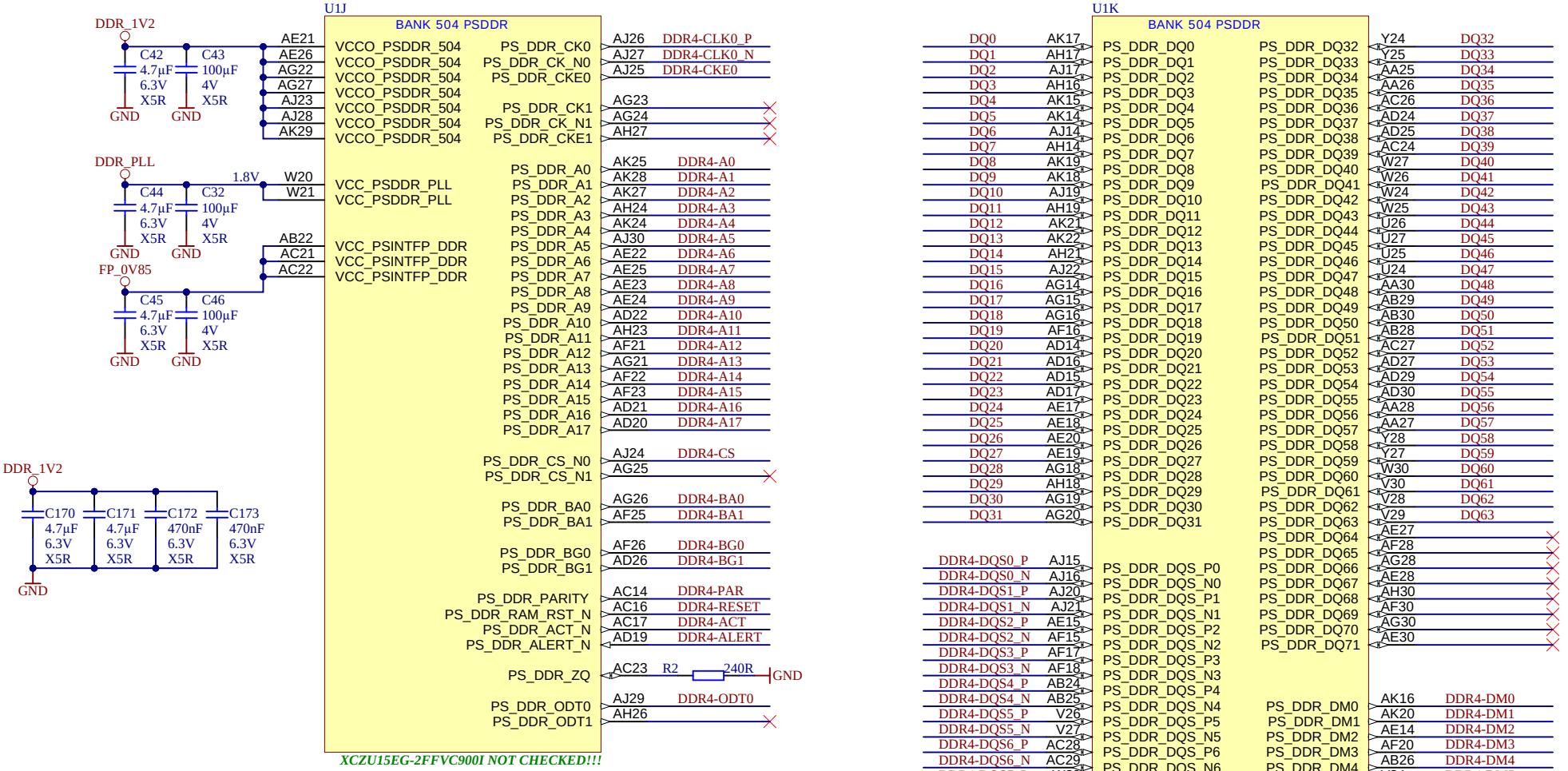
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 14 of 31
Filename: B_GT.SchDoc			



trenz electronic	Title: TE0818 - GTH Bank 2		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 15 of 31
Filename: B_GT_2.SchDoc			



Title: TE0818 - MIO Banks			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 16 of 31
Filename: B_MIO.SchDoc			



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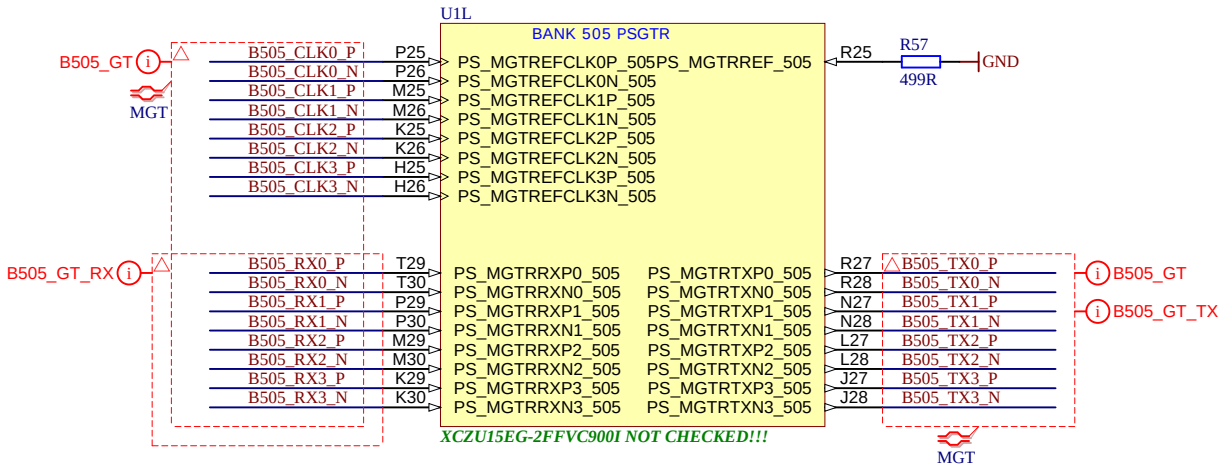
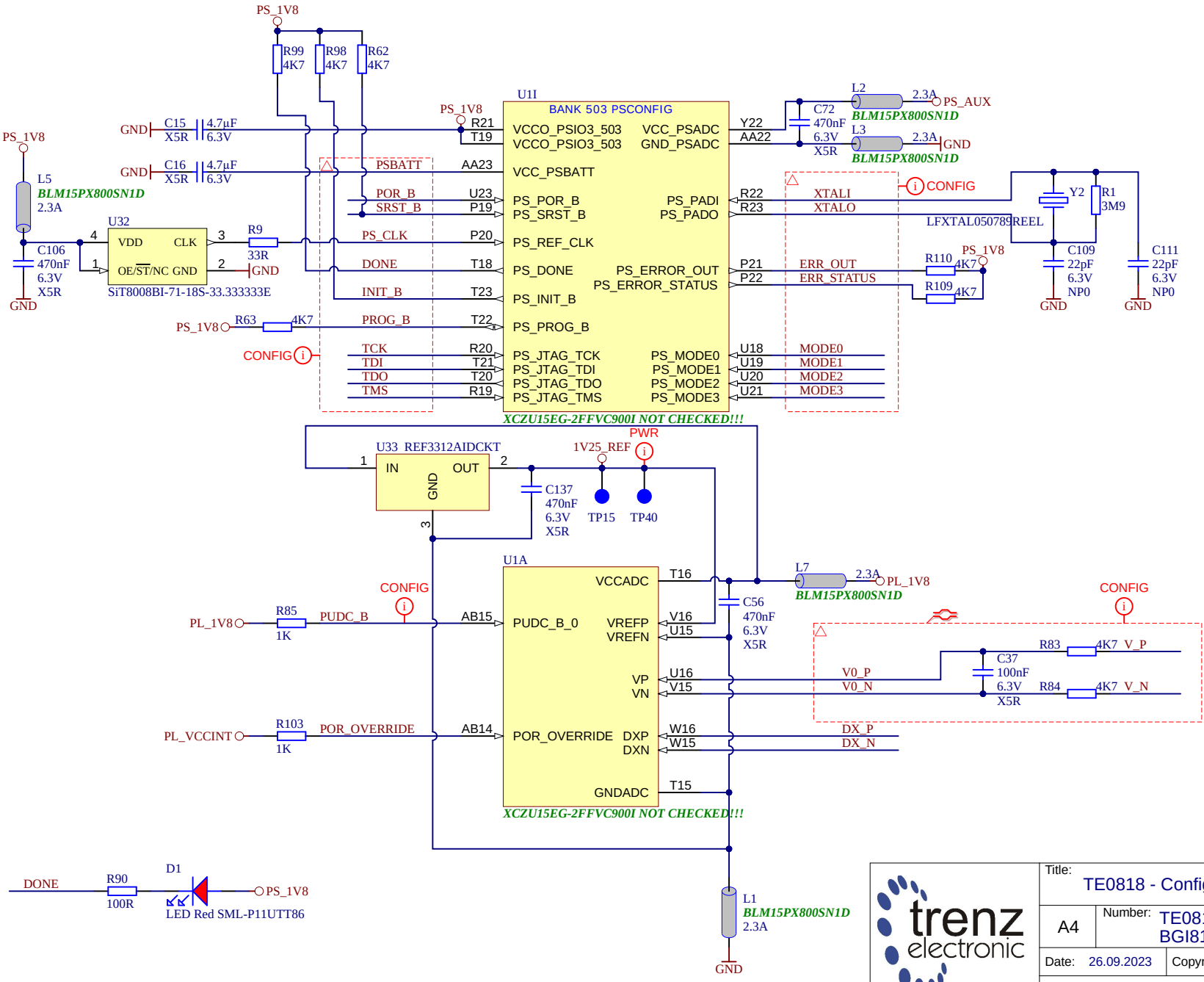
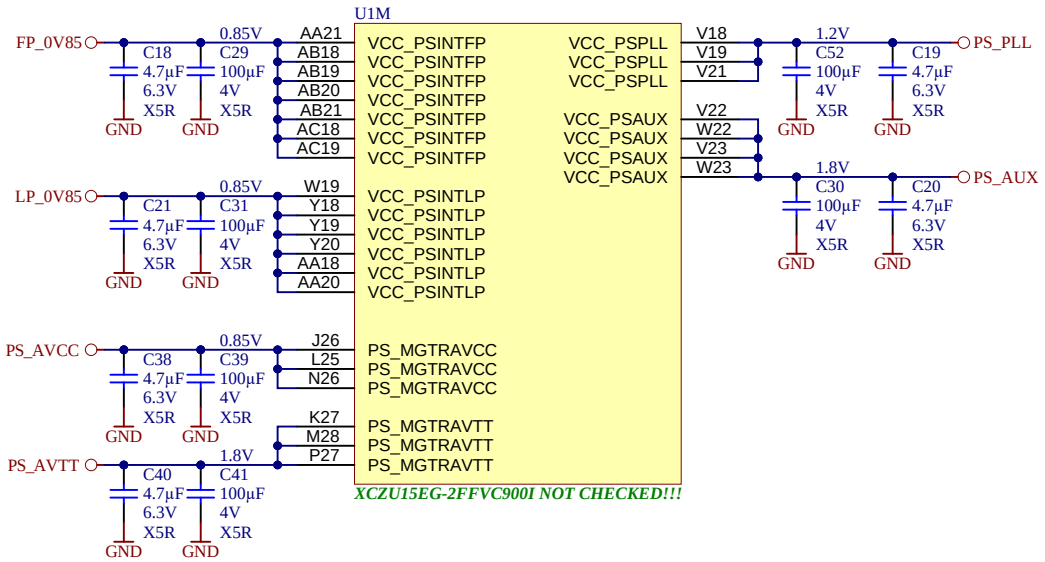
Title: TE0818 - PS DDR			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 17 of 31
Filename: PS_DDR.SchDoc			

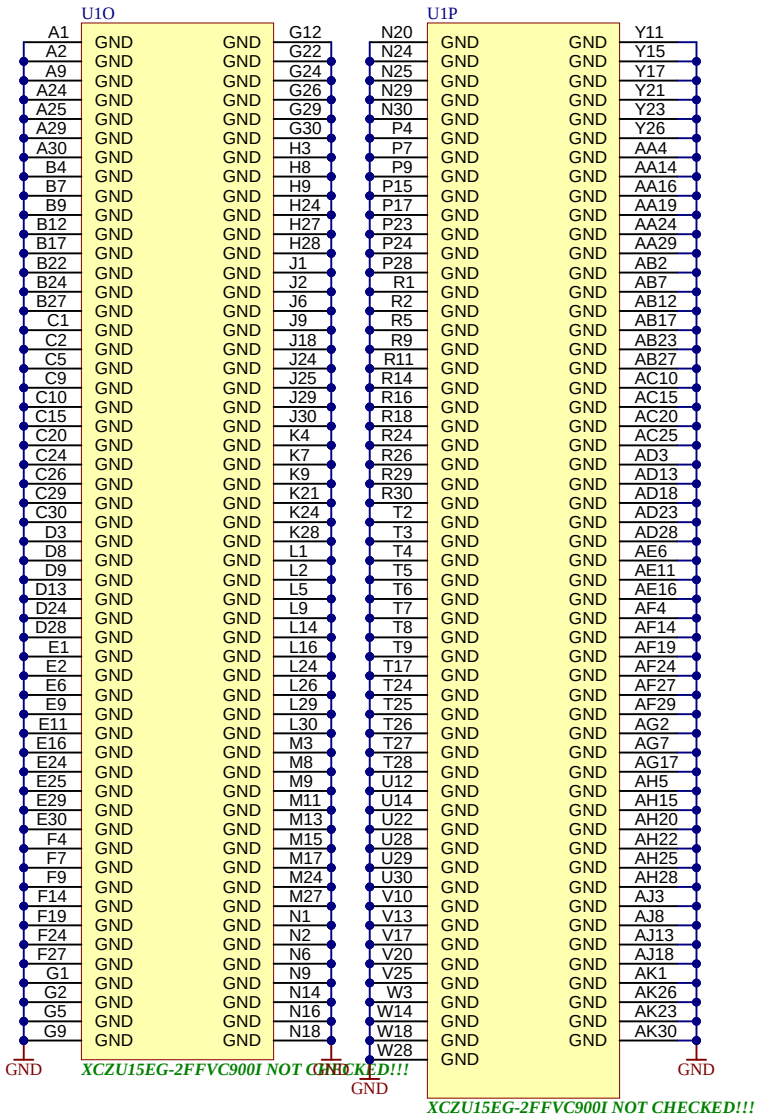


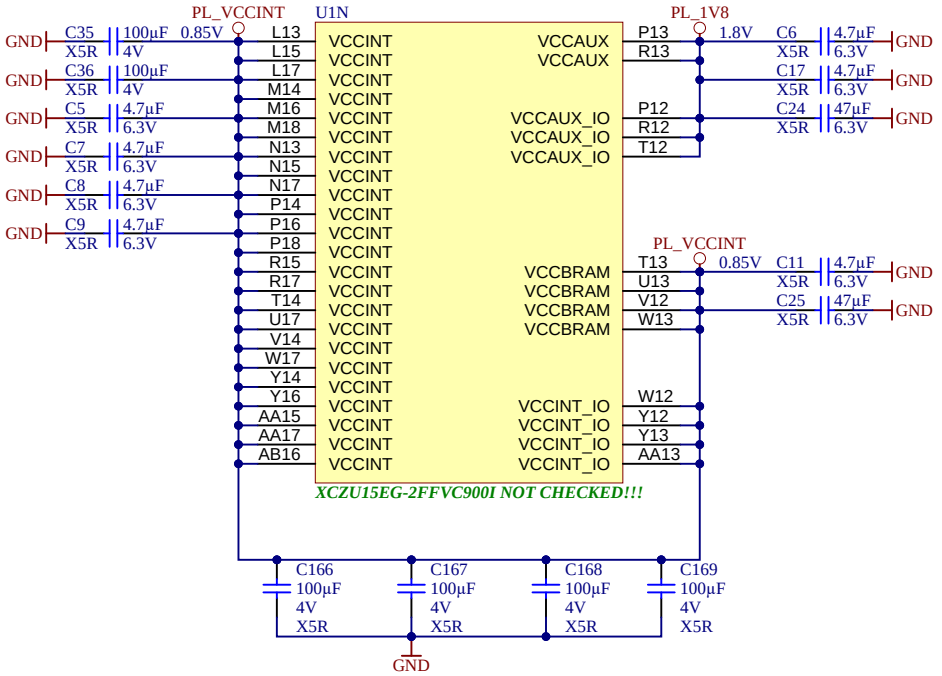
Title: TE0818 - PS GT			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 18 of 31
Filename: B_PS_GT.SchDoc			


PS_1V8
R99 4K7
R98 4K7
R62 4K7
U1I
BANK 503 PSCONFIG
VCCO_PSIO3_503
VCCO_PSIO3_503
VCC_PSADC
GND_PSADC
VCC_PSBATT
PS_POR_B
PS_SRST_B
PS_PADI
PS_PADO
PS_REF_CLK
PS_DONE
PS_ERROR_OUT
PS_ERROR_STATUS
PS_INIT_B
PS_PROG_B
PS_JTAG_TCK
PS_JTAG_TDI
PS_JTAG_TDO
PS_JTAG_TMS
PS_MODE0
PS_MODE1
PS_MODE2
PS_MODE3
XCZU15EG-2FFVC900I NOT CHECKED!!!
C15 4.7µF X5R 6.3V
C16 4.7µF X5R 6.3V
L5 BLM15PX800SN1D 2.3A
C106 470nF 6.3V X5R
U32
SiT8008BI-71-18S-33.333333E
R9 33R
PSBATT
POR_B
SRST_B
PS_CLK
DONE
INIT_B
PROG_B
R63 4K7
CONFIG
TCK
TDI
TDO
TMS
L2 2.3A PS_AUX BLM15PX800SN1D
L3 2.3A GND BLM15PX800SN1D
C72 470nF 6.3V X5R
XTALI
XTALO
LFXTAL050789REEL
Y2
R1 3M9
C109 22pF 6.3V NP0
C111 22pF 6.3V NP0
R110 4K7
R109 4K7
ERR_OUT
ERR_STATUS
MODE0
MODE1
MODE2
MODE3
U33_REF3312AIDCKT
IN
OUT
GND
PWR
1V25_REF
C137 470nF 6.3V X5R
TP15
TP40
U1A
VCCADC
PUDC_B_0
VREFP
VREFN
VP
VN
POR_OVERRIDE
DXP
DXN
GNDADC
XCZU15EG-2FFVC900I NOT CHECKED!!!
L7 2.3A PL_1V8 BLM15PX800SN1D
C56 470nF 6.3V X5R
R85 1K
PUDC_B
R103 1K
POR_OVERRIDE
PL_VCCINT
V0_P
V0_N
C37 100nF 6.3V X5R
R83 4K7 V_P
R84 4K7 V_N
DX_P
DX_N
D1
R90 100R
LED Red SML-P11UTT86
L1 BLM15PX800SN1D 2.3A
trenz electronic
Title: TE0818 - Config
A4
Number: TE0818 BGI81-A
Rev. 02
Date: 26.09.2023
Copyright: Trenz Electronic GmbH
Page 19 of 31
Filename: CONFIG.SchDoc

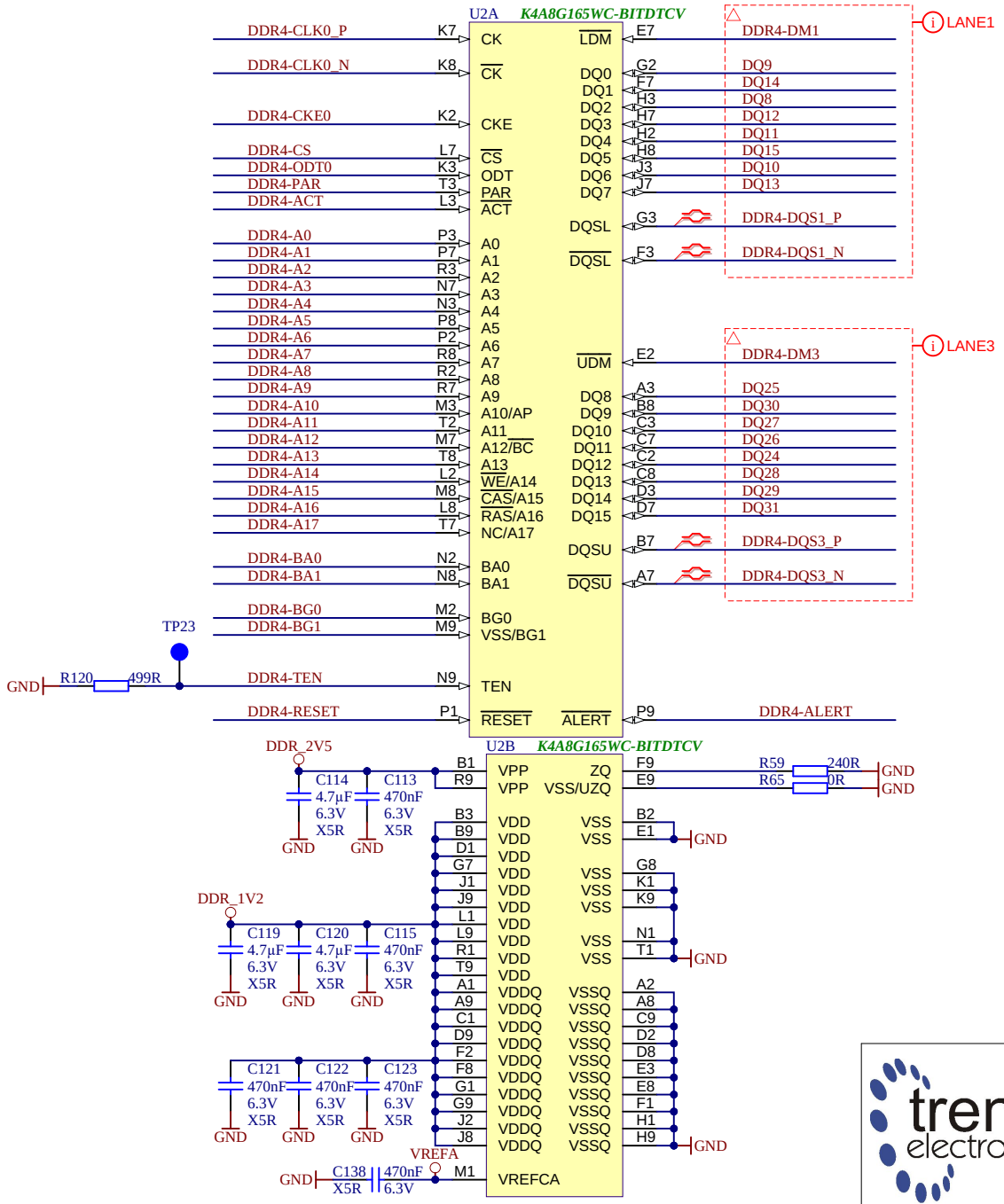


trenz electronic	Title: TE0818 - PS Power		
	A4	Number: TE0818 BGI81-A	Rev. 02
	Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 20 of 31
	Filename: ZU_PS_POWER.SchDoc		





trenz electronic	Title: TE0818 - PL Power		
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 21 of 31
Filename: ZU_POWER.SchDoc			



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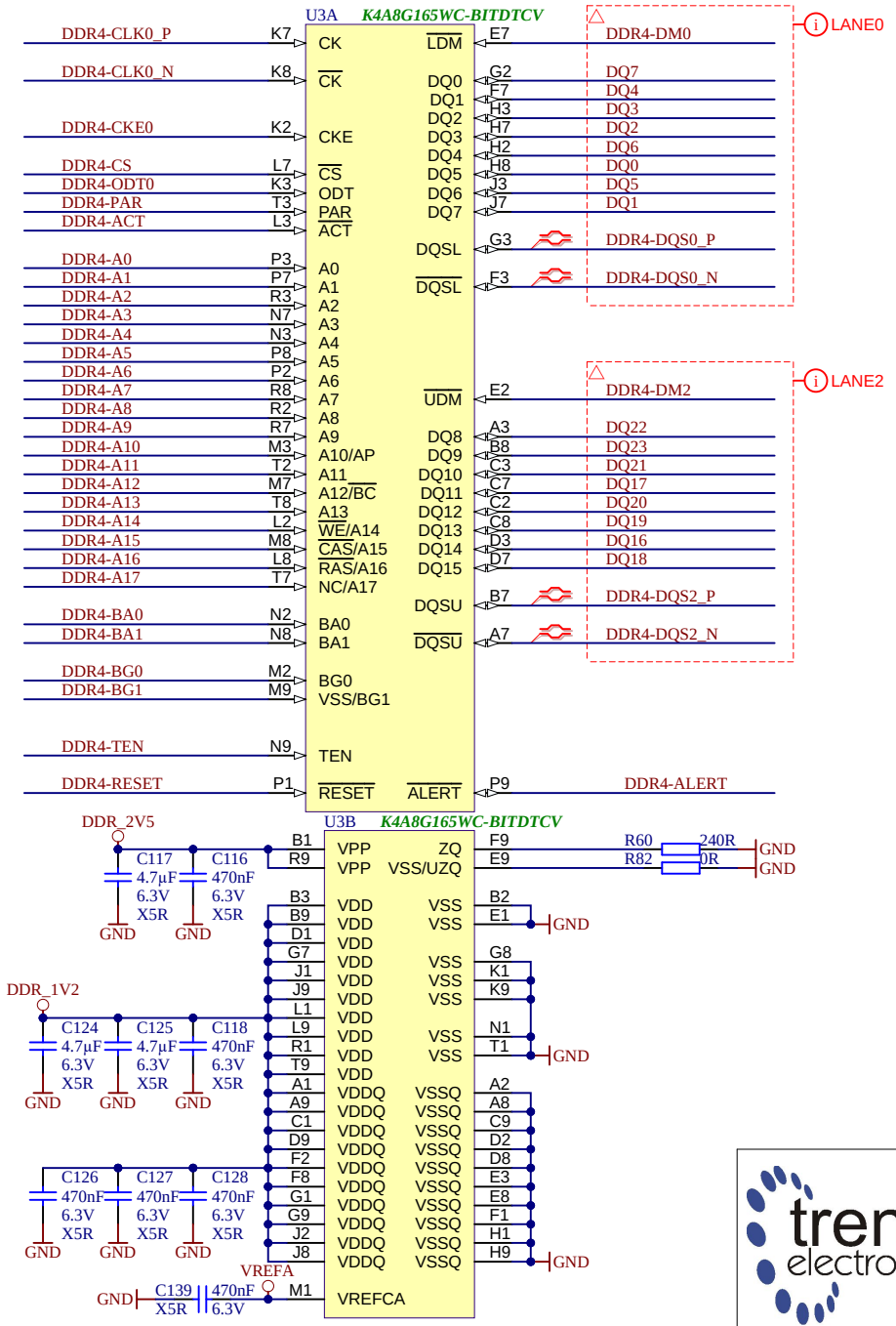
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 22 of 31
Filename: DDR4-RAM.SchDoc			



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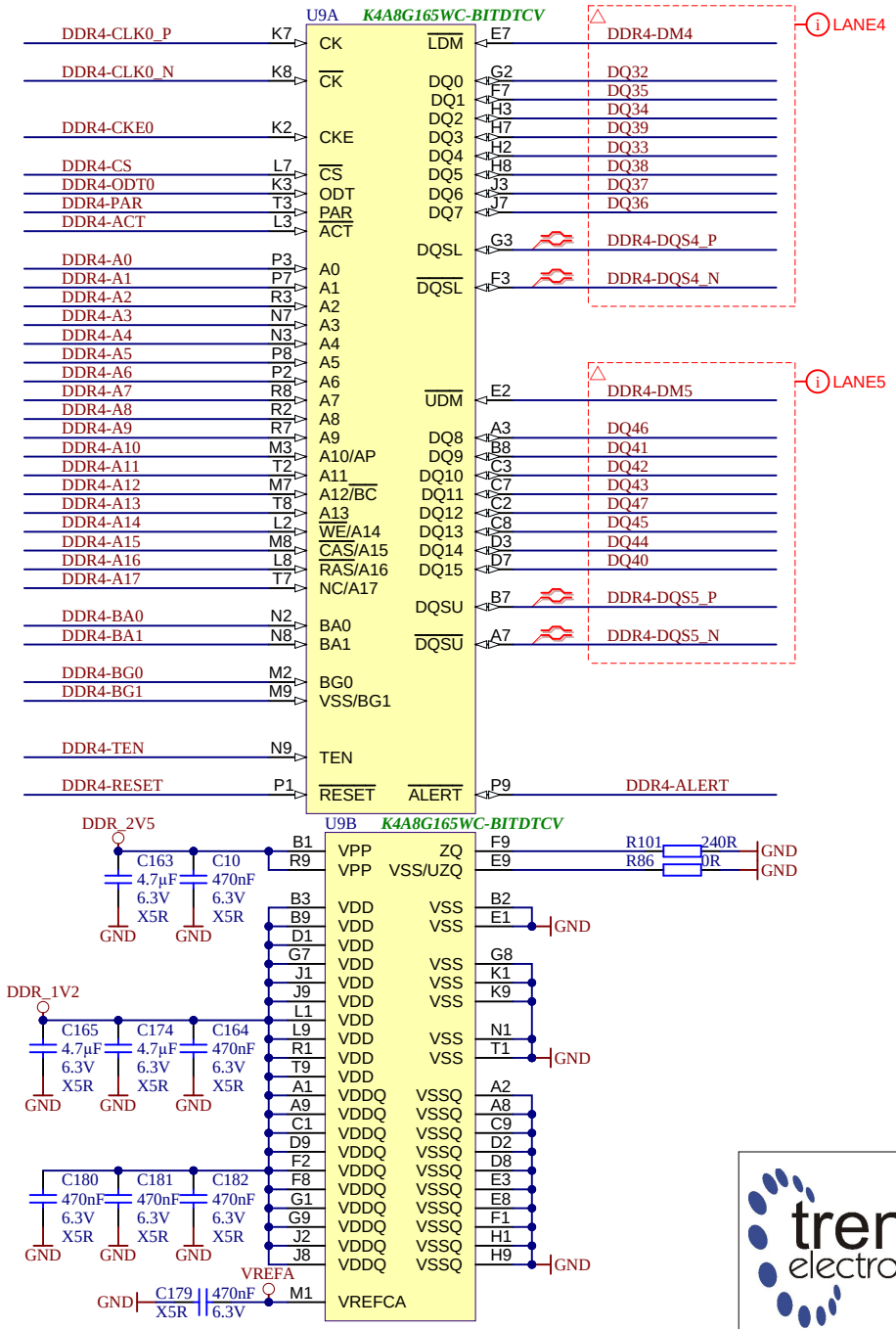
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 23 of 31
Filename: DDR4-RAM_2.SchDoc			



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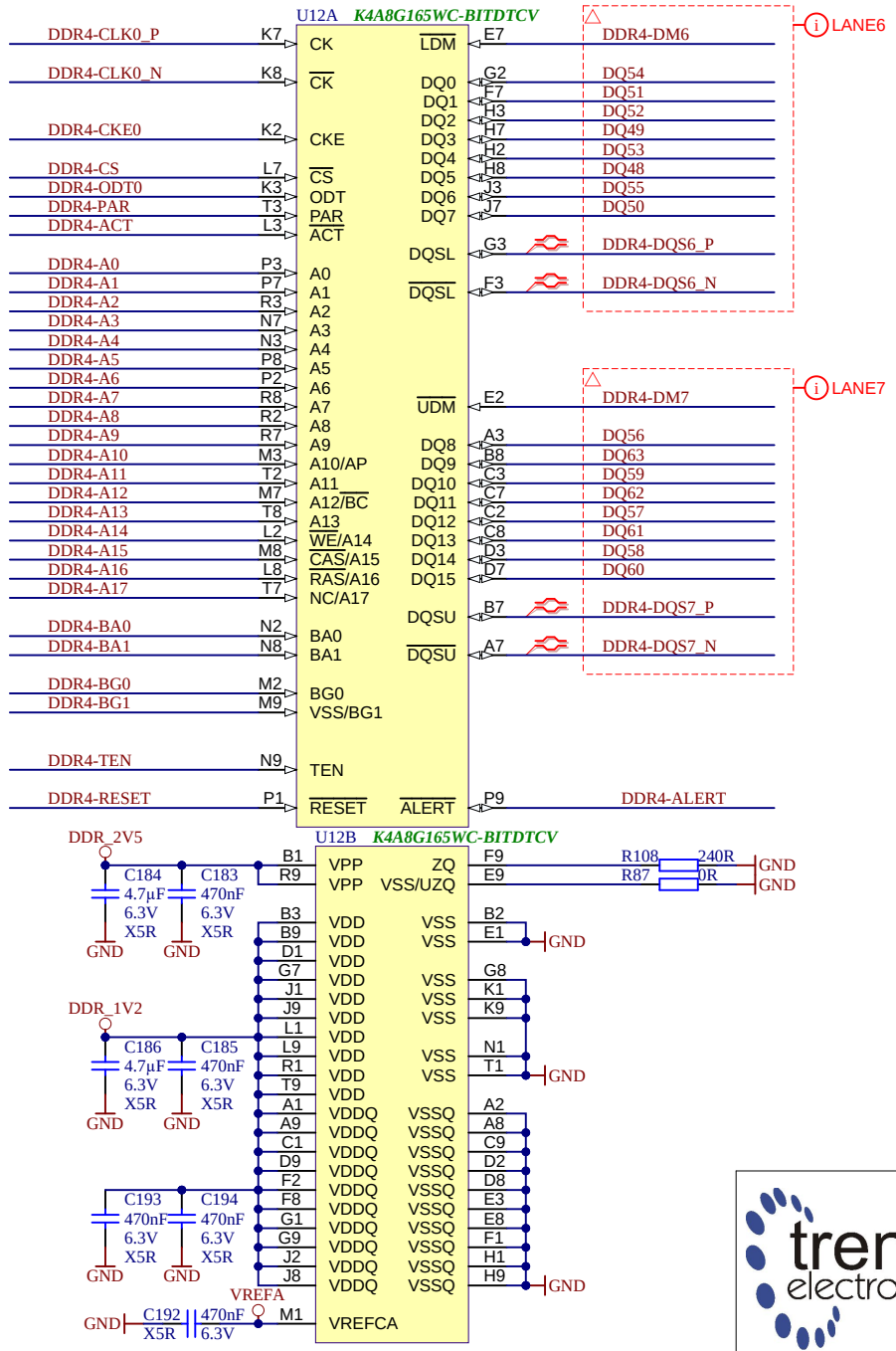
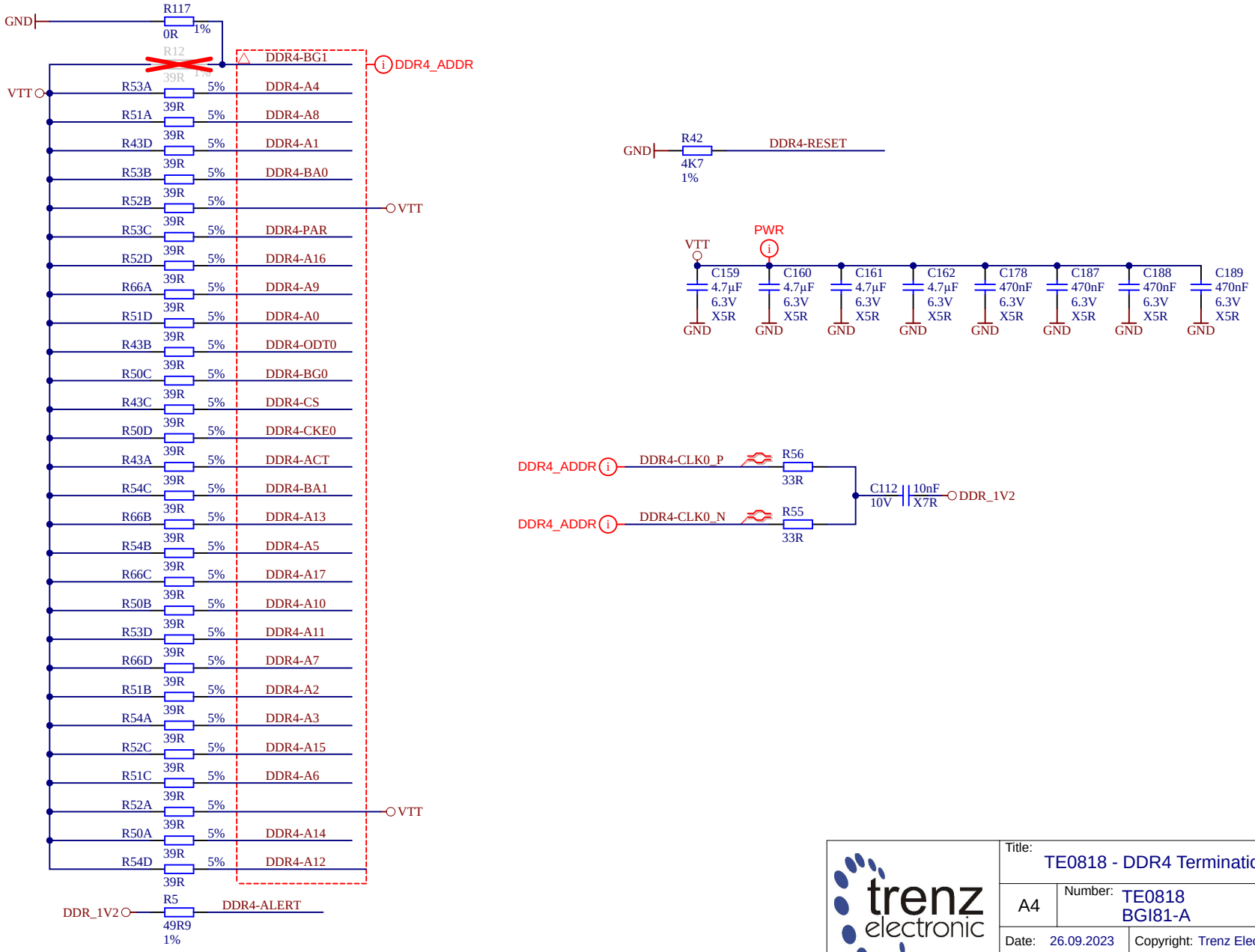
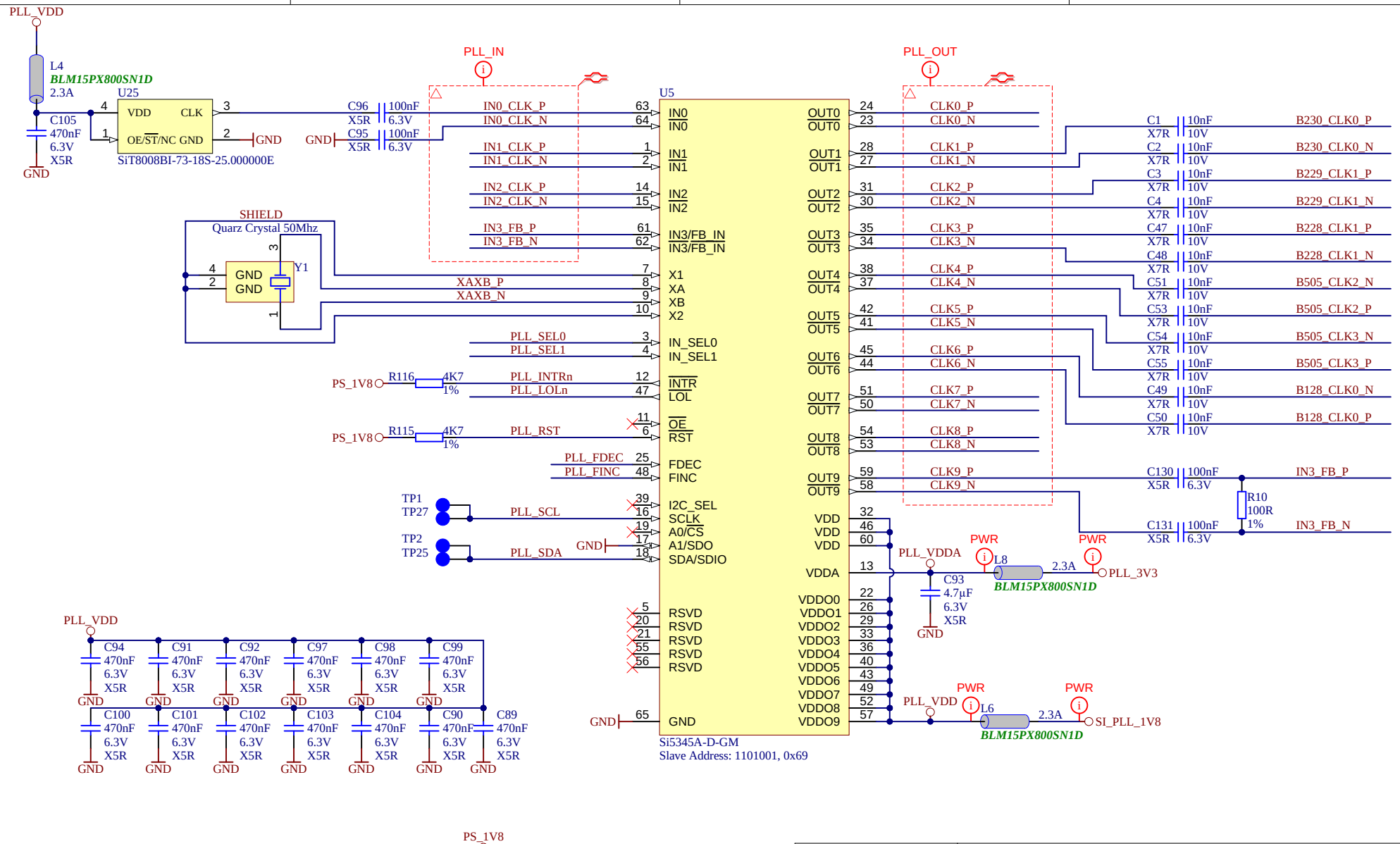
Title: TE0818 - DDR4 RAM 3			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 24 of 31
Filename: DDR4-RAM_3.SchDoc			



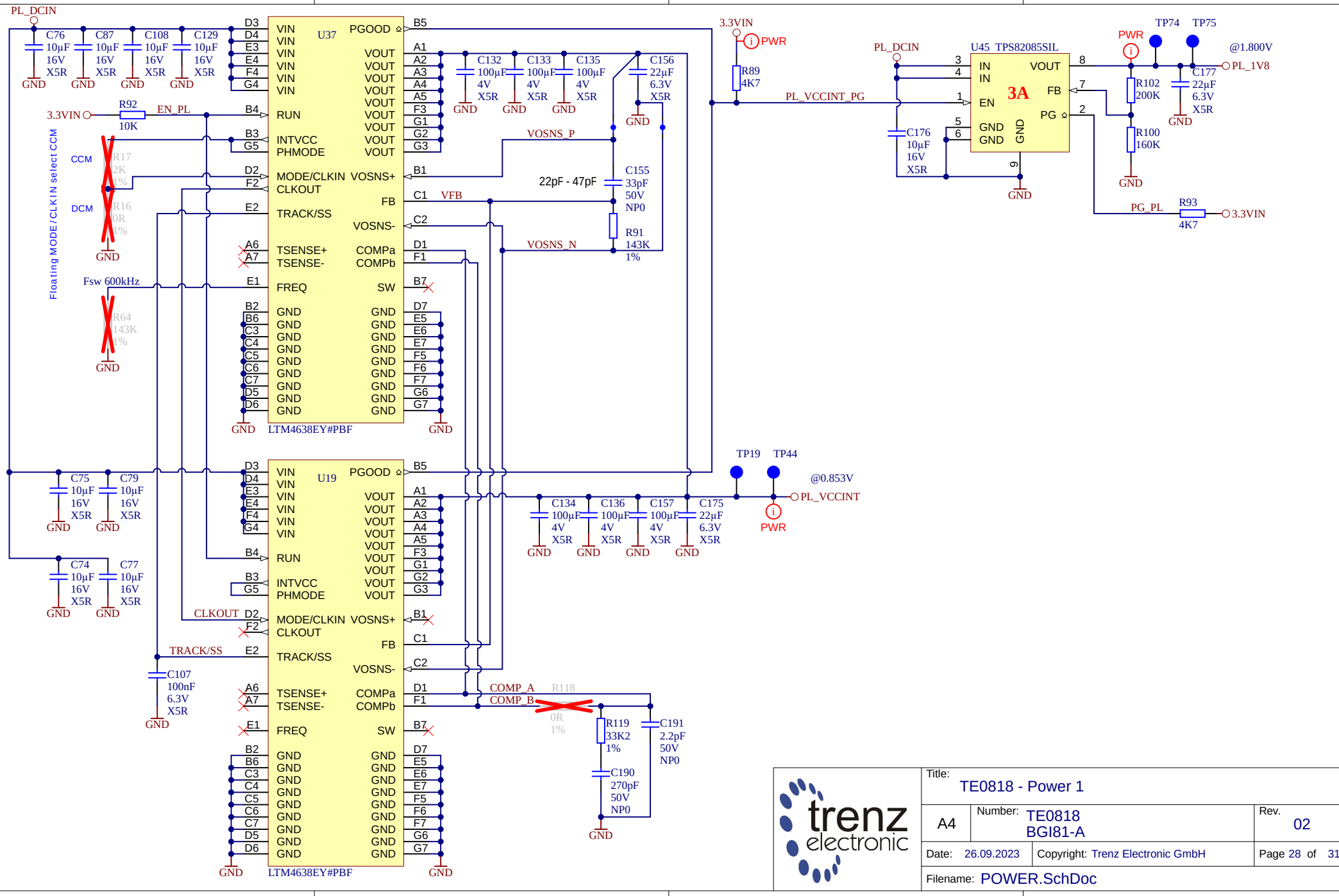
Title: TE0818 - DDR4 RAM 4			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 25 of 31
Filename: DDR4-RAM_4.SchDoc			



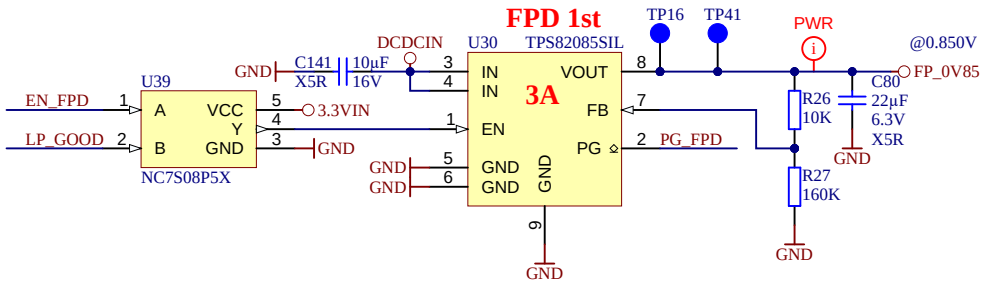
Title: TE0818 - DDR4 Termination			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 26 of 31
Filename: DDR4-TERM.SchDoc			

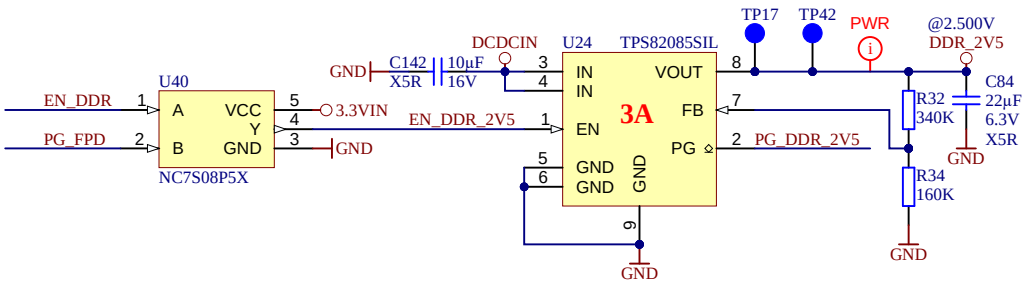


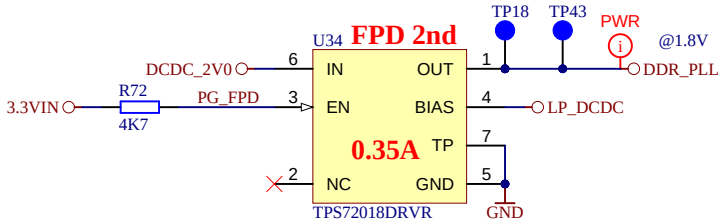
trenz electronic	Title: TE0818 - Clock		
	A4	Number: TE0818 BGI81-A	Rev. 02
	Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 27 of 31
	Filename: Clock.SchDoc		

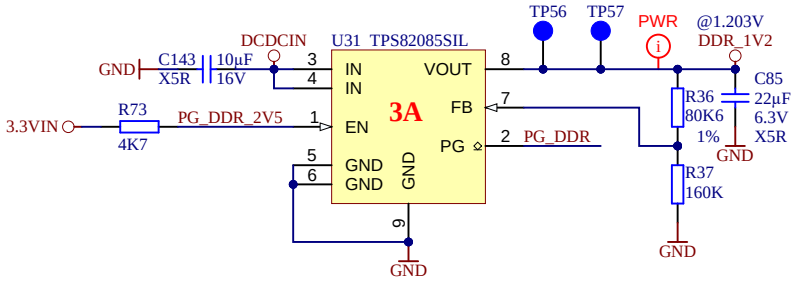


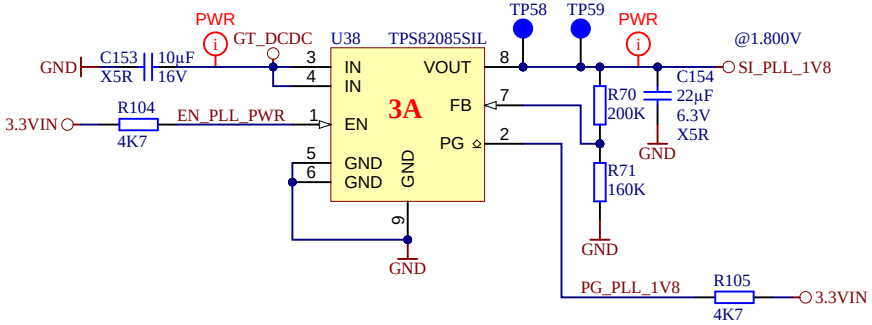
Title: TE0818 - Power 1			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 28 of 31
Filename: POWER.SchDoc			

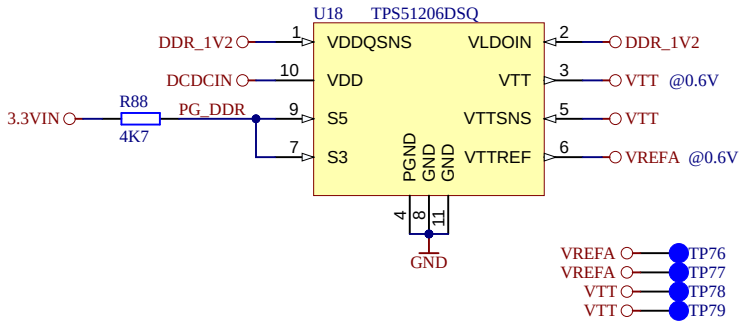












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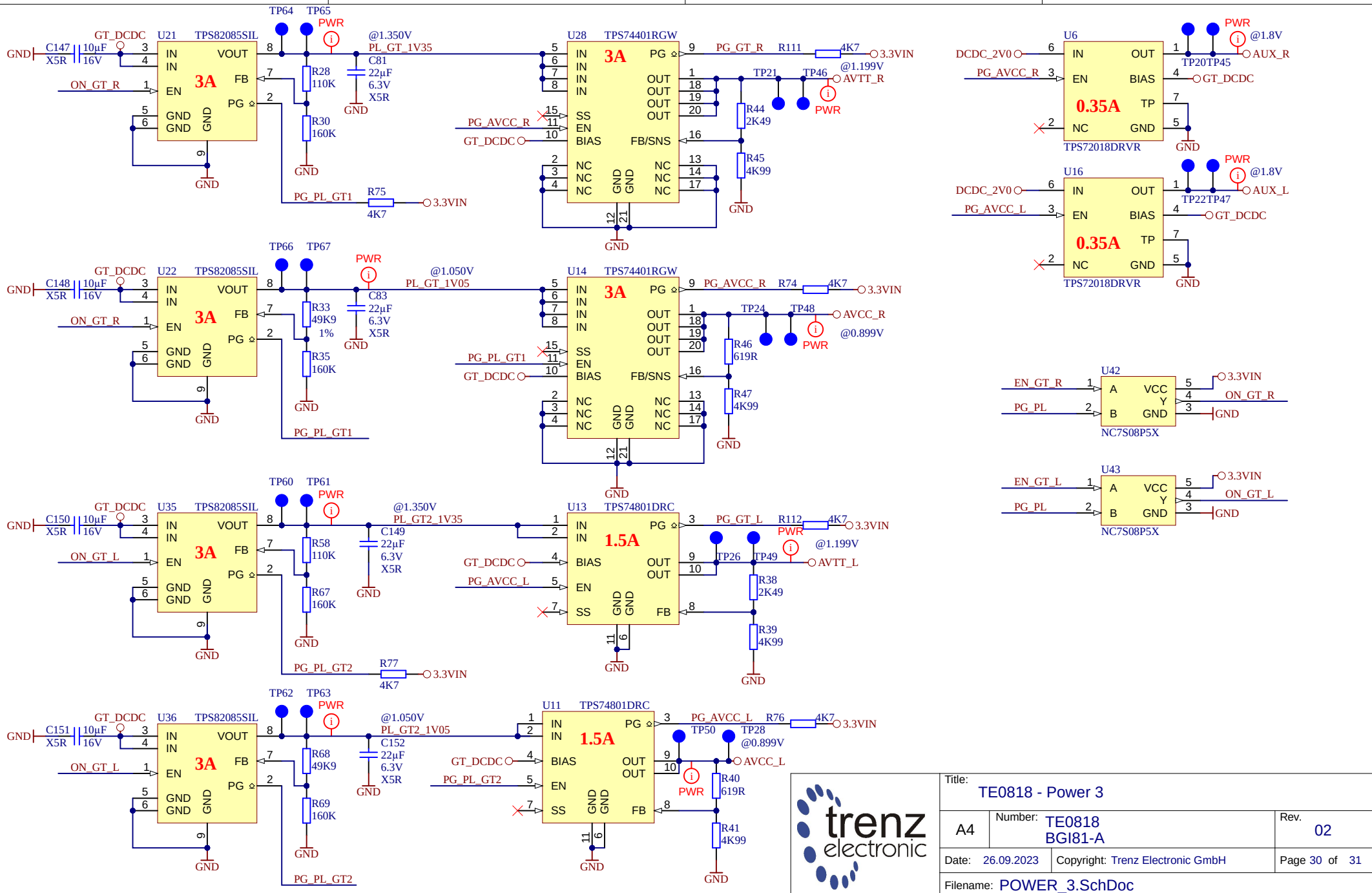
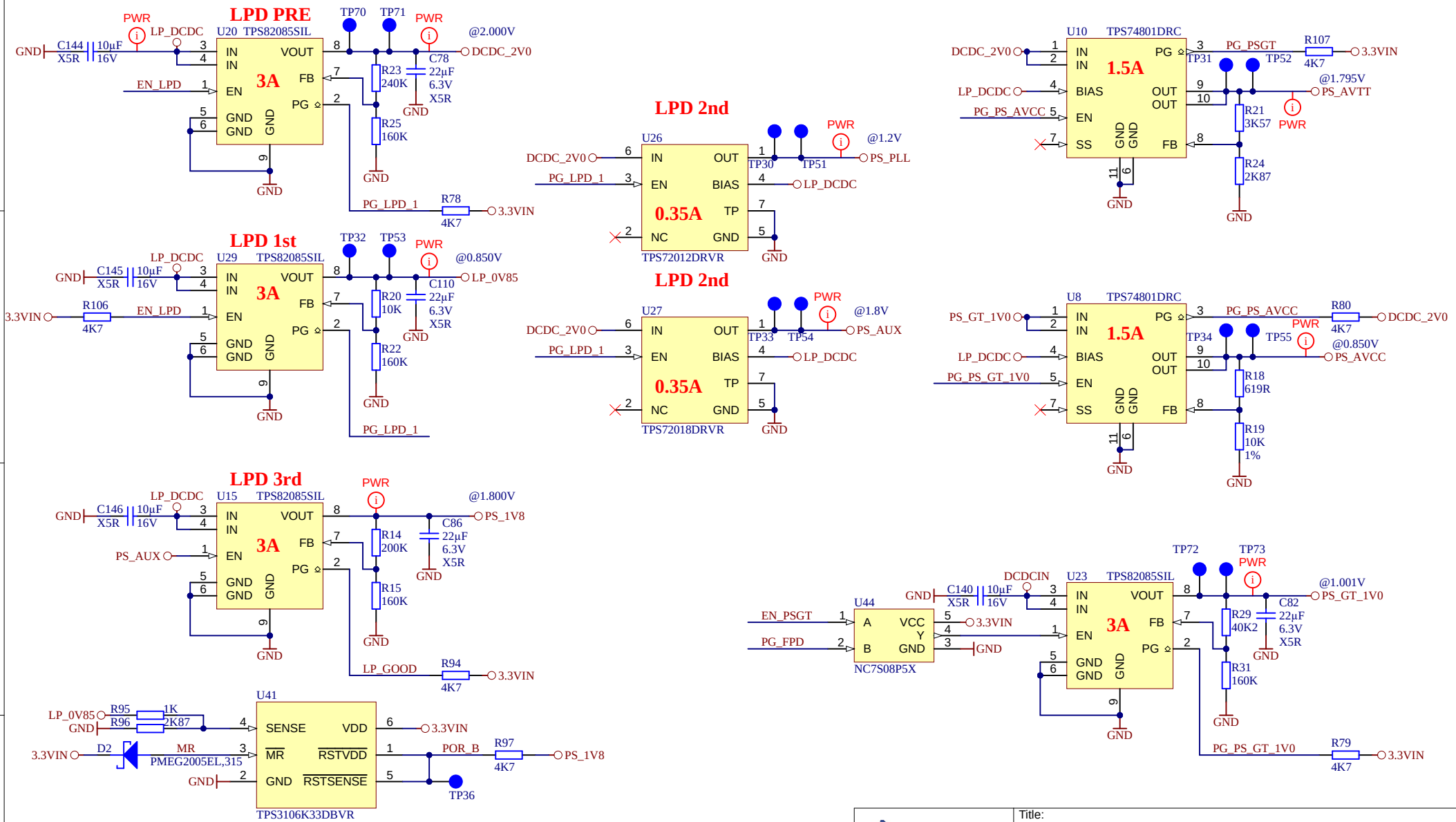
Title: TE0818 - Power 2			
A4	Number: TE0818 BGI81-A		Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH		Page 29 of 31
Filename: POWER_2.SchDoc			



Title: TE0818 - Power 3			
A4	Number: TE0818 BGI81-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

Title: TE0818 - Power 4		
A4	Number: TE0818 BGI81-A	Rev. 02
Date: 26.09.2023	Copyright: Trenz Electronic GmbH	Page 31 of 31
Filename: POWER_4.SchDoc		