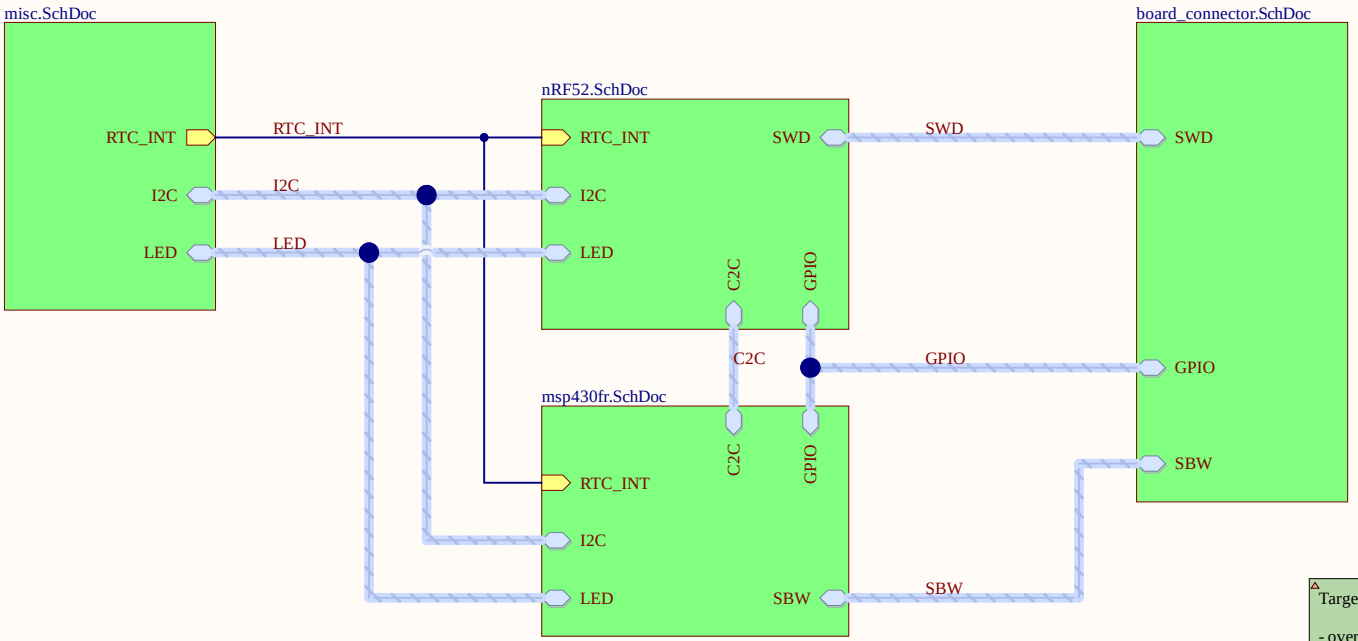


GPIO Current Protection

nRF52
High Drive (>= 2.7 V) -> 6-15 mA sink & drive
Std Drive (>=1.7 V) -> 1-4 mA sink & drive

MSP430FR59x
diode current @ pin max +- 2mA
I_OHmax = -6 mA @ 3V
I_OLmax = 6 mA @ 3V
"8.12.5.3 Typical Characteristics, Digital Outputs" show 0.5 V drop / increase @ 10 mA

74LVC2T45GT
has +- 24 mA drive & sink current

consequence #NAME? limit to 8-10 mA @ 4V with 470 R or 220 R

Target-Features

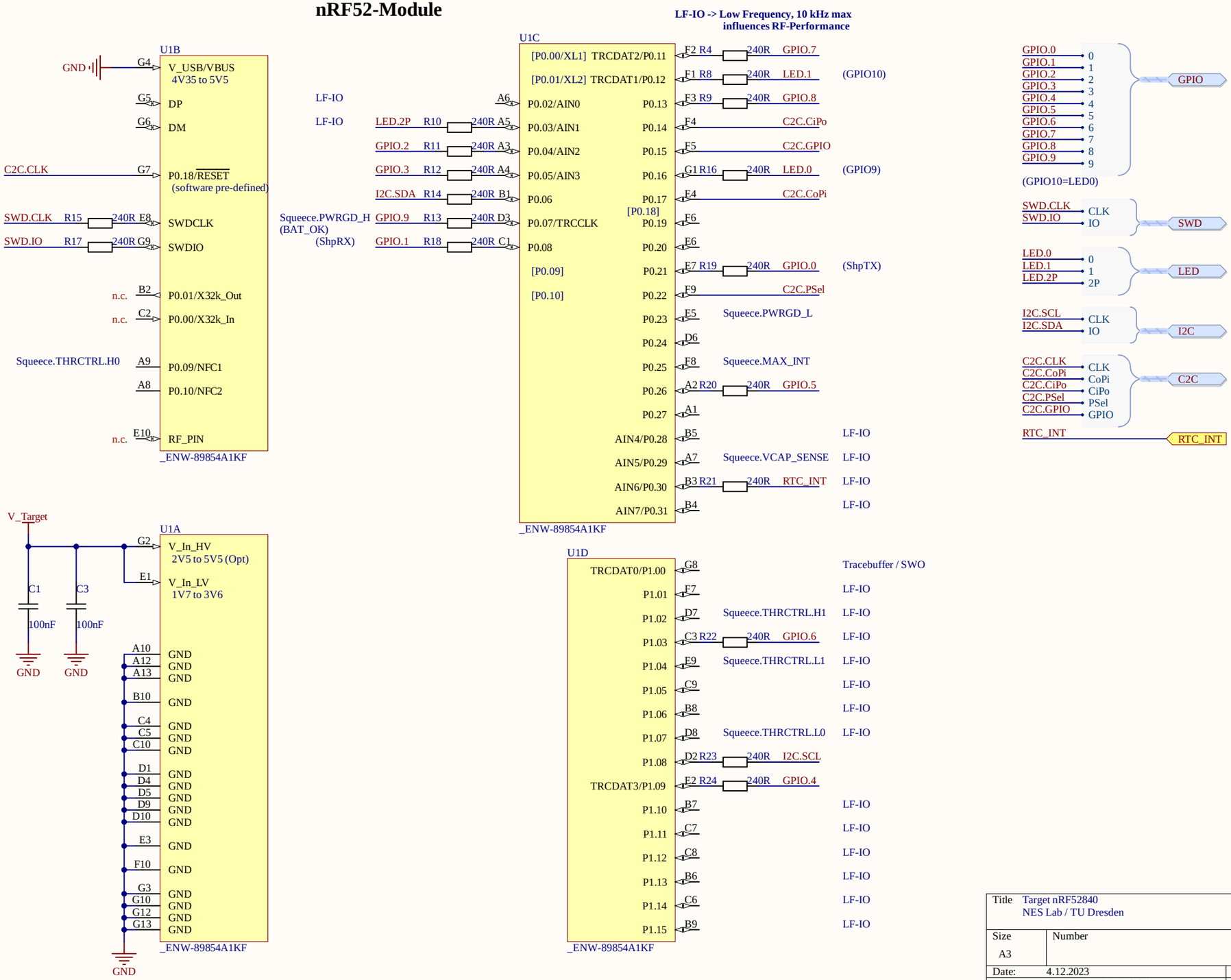
- over-voltage protection for V_LV (max 3.9V)
- two debug LEDs with separate supply
- one self-powered LED to "burn" energy
- io pins not interferring with RF (nRF PS v1.6 page 578)
- LEDs / UART similar to Riotee
- LEDs have minimal impact on pwr-budget

- nRF uses low voltage mode (PSv1.1 page 61)
- 3rd possible way for reset (external), beside jtag and pwr-cycle

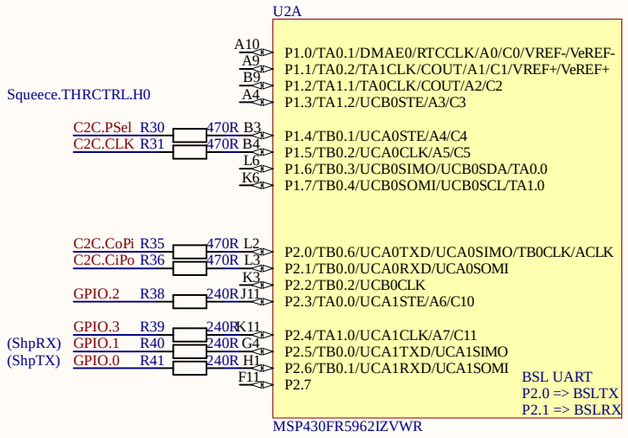
Host-PinHeader-Variants
SSQ-109-02-G-D-RA -> right angled socket (default)
SSQ-109-02-G-D -> straight socket
2x9-header allows to use ribbon-cable to connect to shepherd-cape

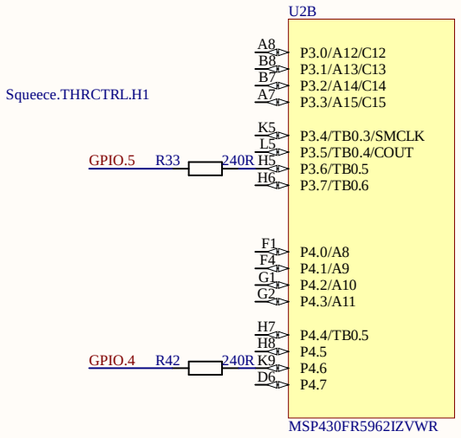
Title	Target-Board Overview NES Lab / TU Dresden		
Size A4	Number		Revision
Date:	4.12.2023	Sheet of	nRF_FRAM_Target.PrjPcb
File:	C:\Users\..\overview.SchDoc	Drawn By:	Ingmar

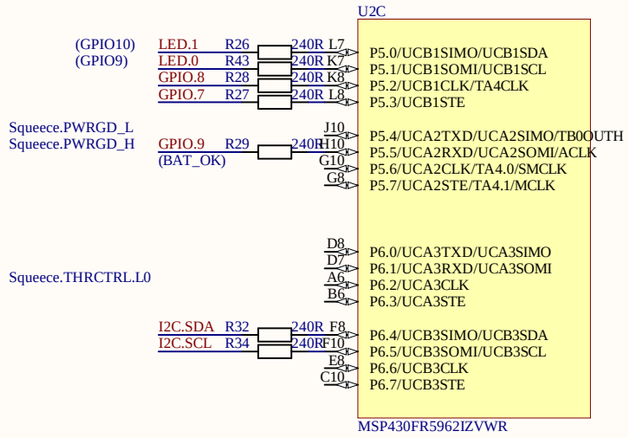
nRF52-Module

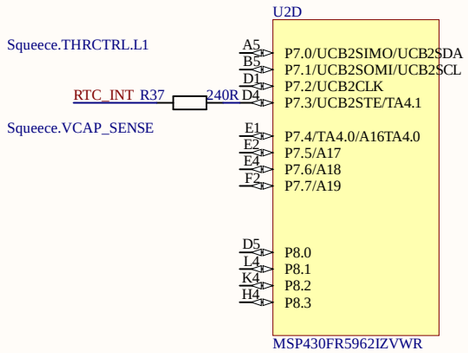


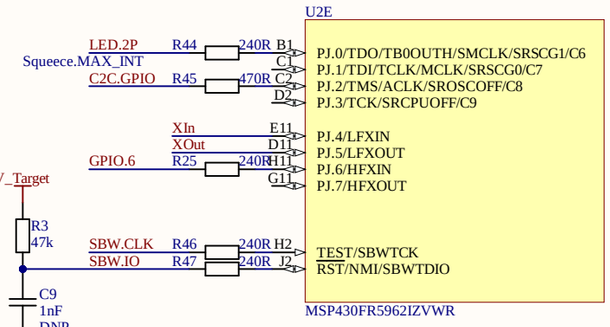
Title	Target nRF52840 NES Lab / TU Dresden	
Size A3	Number	Revision
Date: 4.12.2023		Sheet of nRF_FRAM_Target.PrjPcb
File: C:\Users\..\nRF52.SchDoc		Drawn By: Ingmar

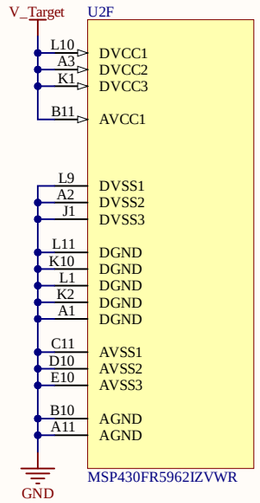


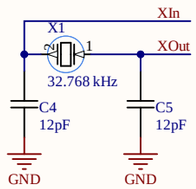


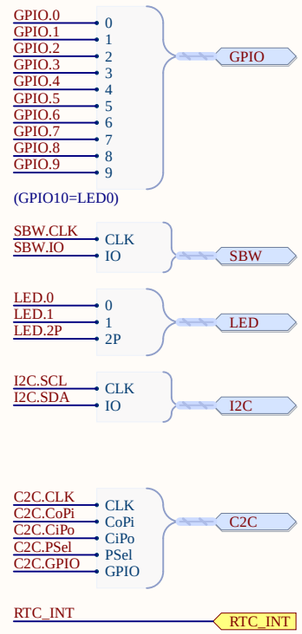






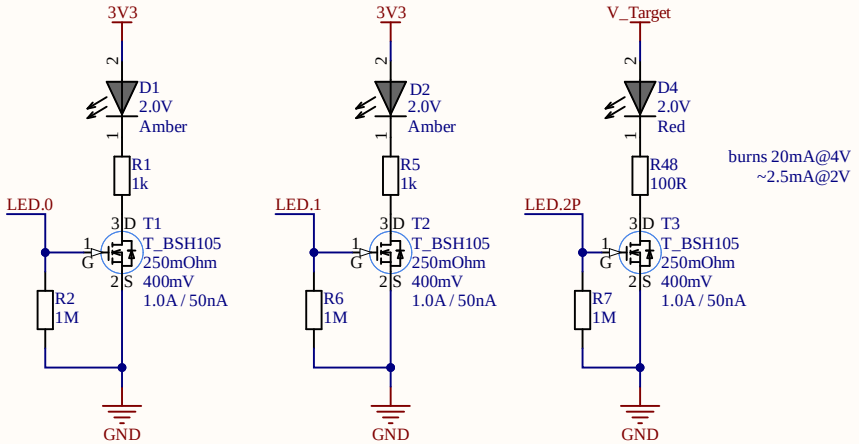


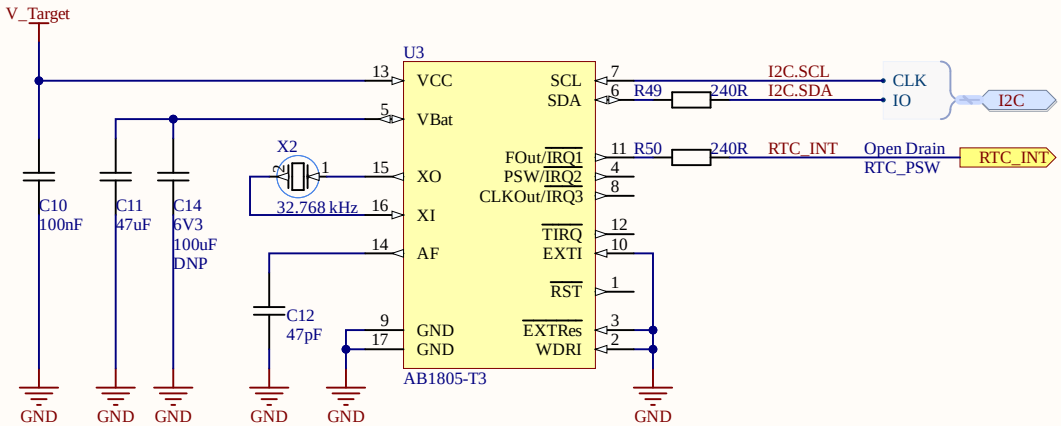




Title	Target MSP430FR NES Lab / TU Dresden	
Size: A3	Number	Revision
Date: 4.12.2023	Sheet of	nRF_FRAM_Target.PrjPcb
File: C:\Users\..\msp430fr.SchDoc	Drawn By:	Ingmar

Debug-LEDs



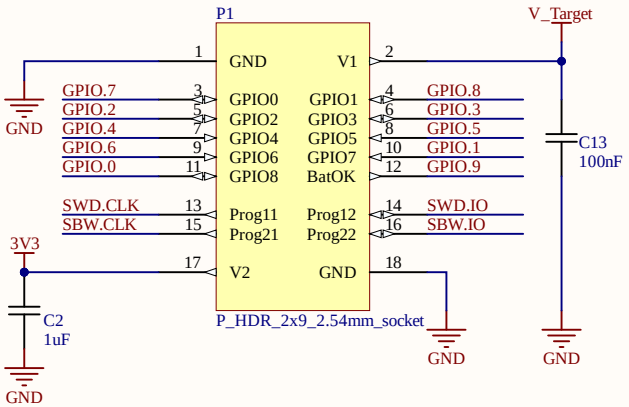


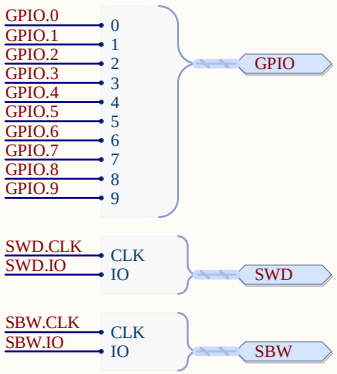
Title	RTC & LEDs NES Lab / TU Dresden		
Size A4	Number	Revision	
Date:	4.12.2023	Sheet of	nRF_FRAM_Target.PrjPcb
File:	C:\Users\..\misc.SchDoc	Drawn By:	Ingmar

Cape-Port

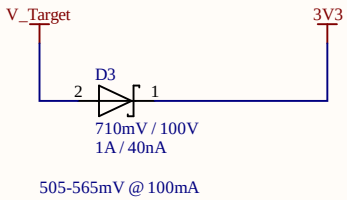
signal-direction is from Host point of view (Target is Guest)

Switchable Directions:
Group A = GPIO 0:3
Group B = GPIO 8

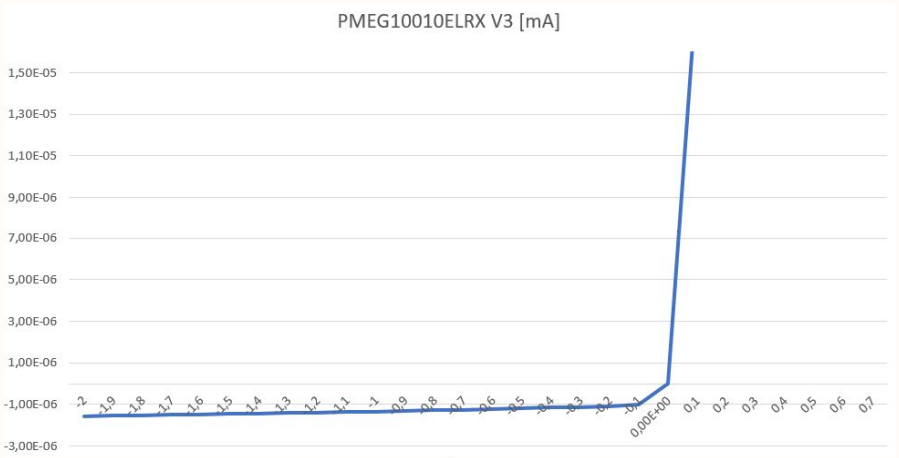




OVP



505-565mV @ 100mA

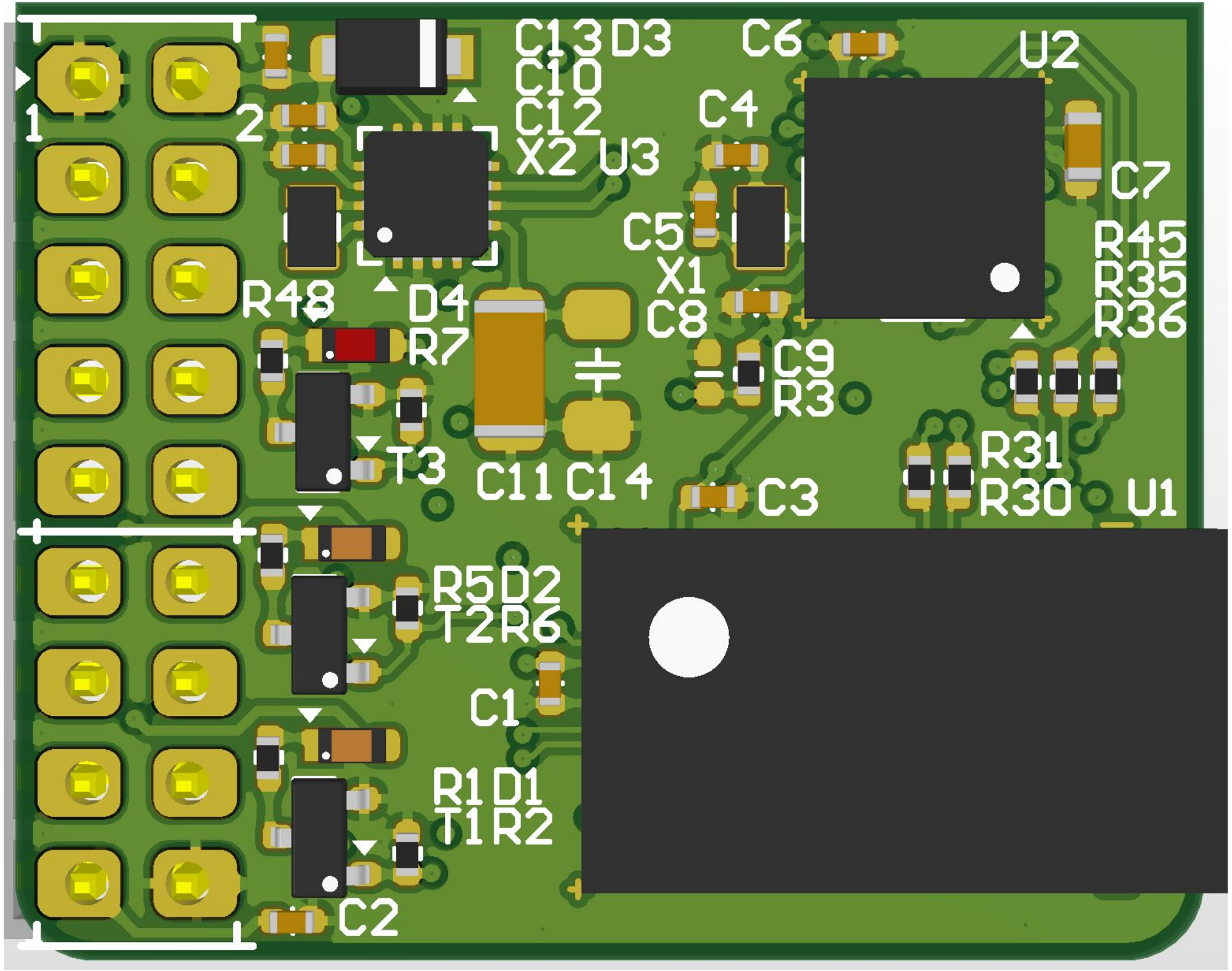


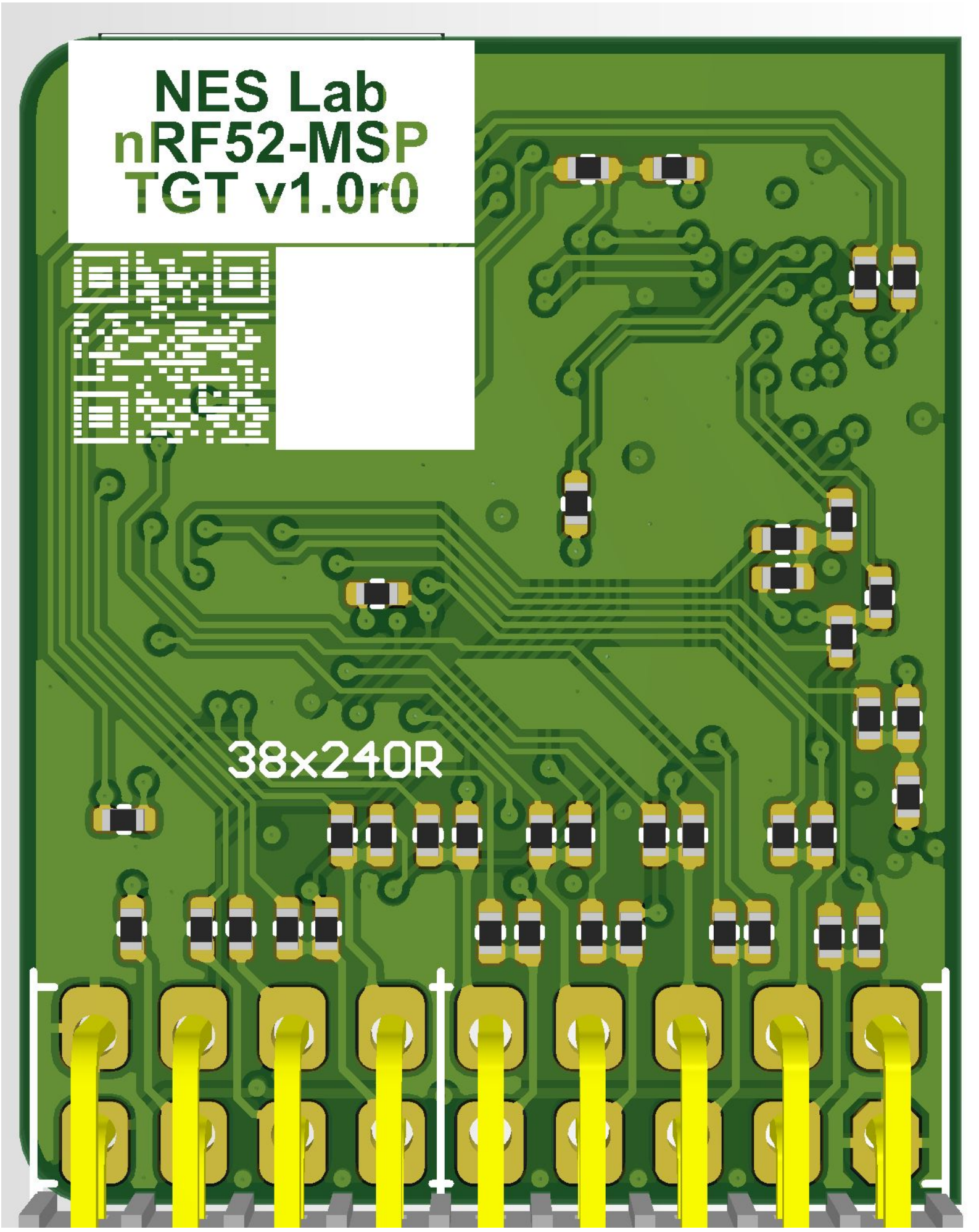
Abs Max Ratings:

nRF52	3.9 V
RTC	3.8 V
MSP430	4.1 V

One Diode:
+ 0.0 V -> 6 pA (noise)
+ 0.1 V -> 47 nA
+ 0.2 V -> 2.3 uA
+ 0.3 V -> 120 uA
+ 0.4 V -> 4.83 mA

Title	Board-Connector NES Lab / TU Dresden	
Size A4	Number	Revision
Date: 4.12.2023		Sheet of nRF_FRAM_Target.PrjPcb
File: C:\Users\..\board_connector.SchDoc		Drawn By: Ingmar


1
2
C13
D3
C10
C12
X2
U3
C6
U2
C4
C7
C5
X1
C8
R45
R35
R36
R48
D4
R7
C9
R3
T3
C11
C14
C3
R31
R30
U1
R5
D2
T2
R6
C1
R1
D1
T1
R2
C2


NES Lab
nRF52-MSP
TGT v1.0r0
38x240R