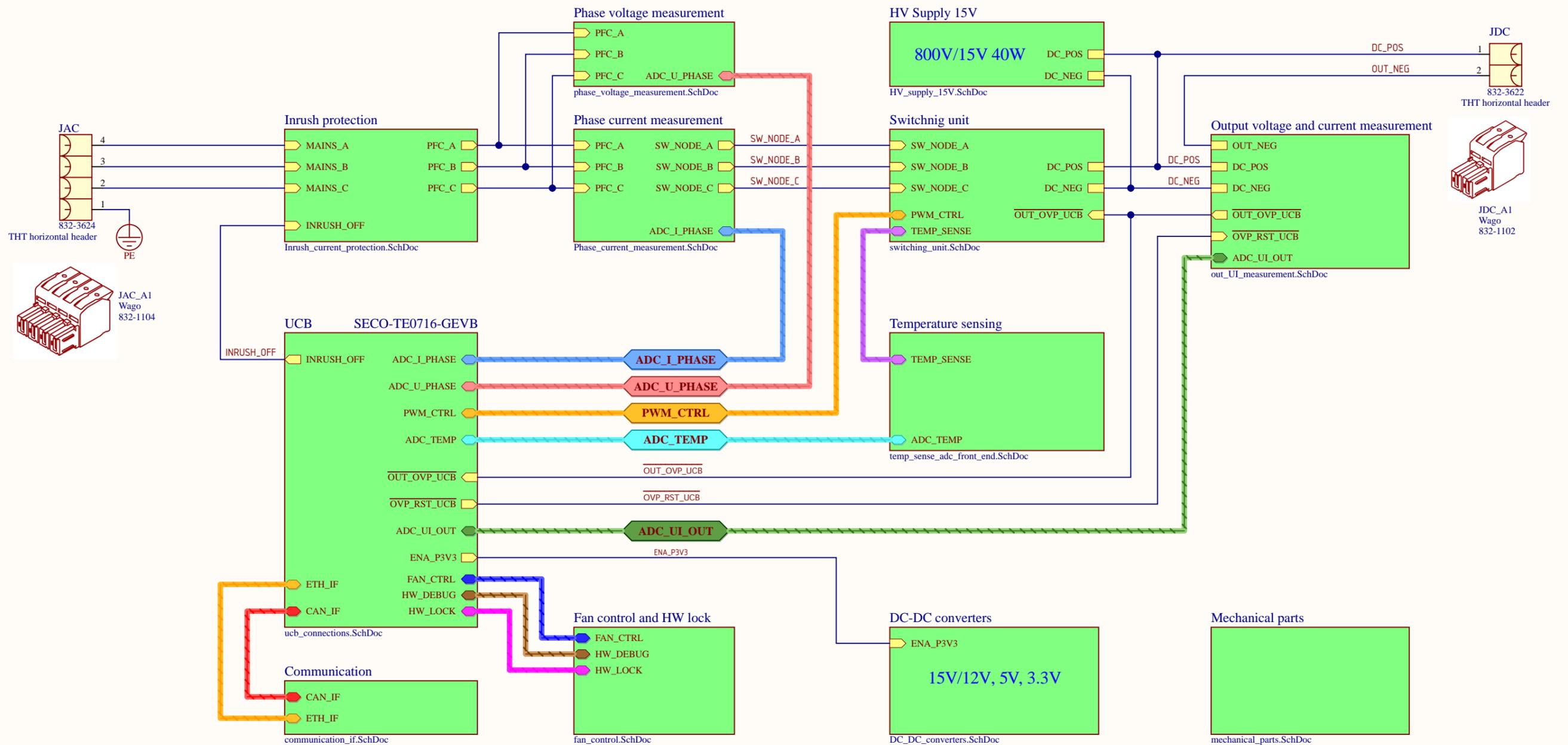
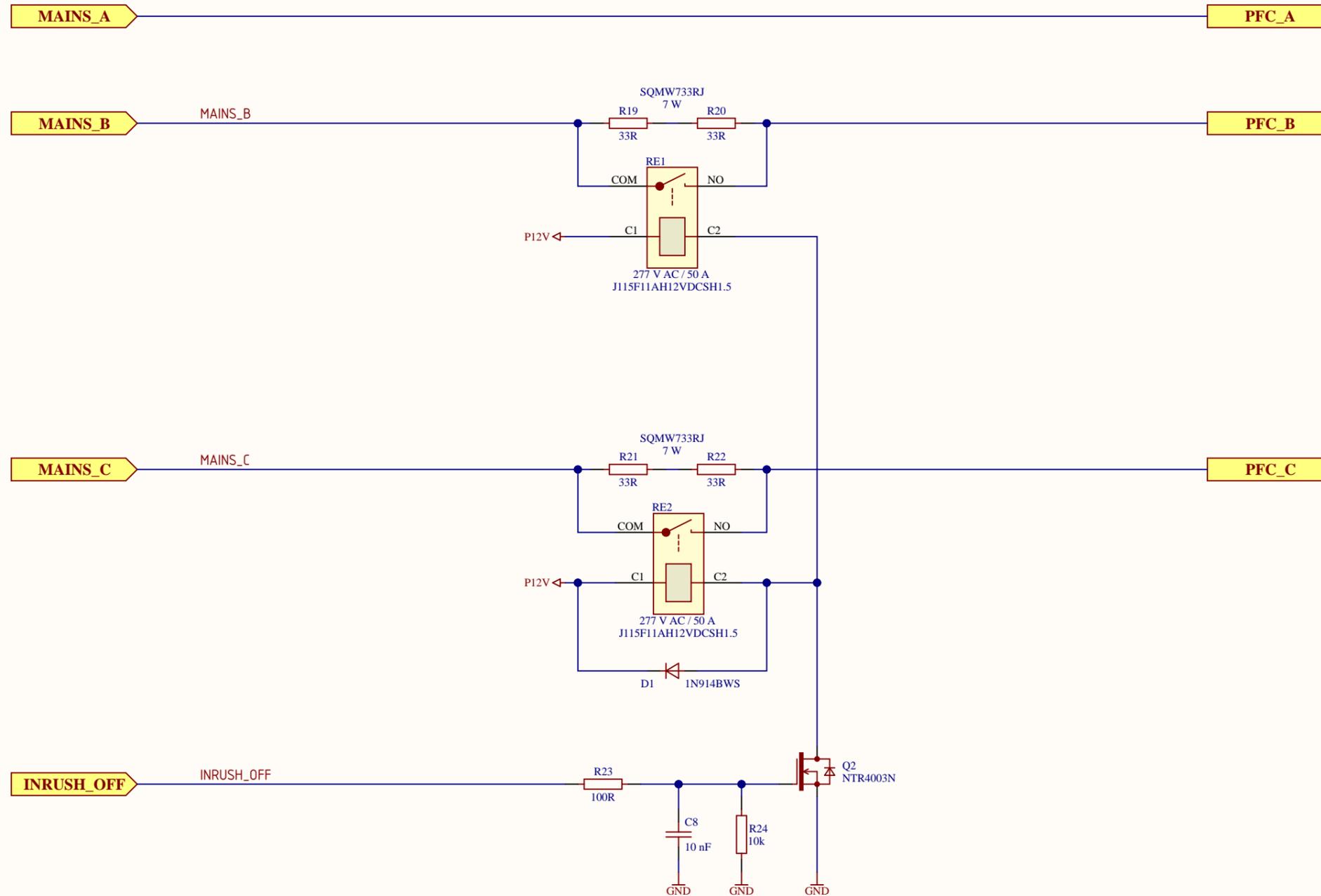


E066 Fast EV DC charger - PFC unit



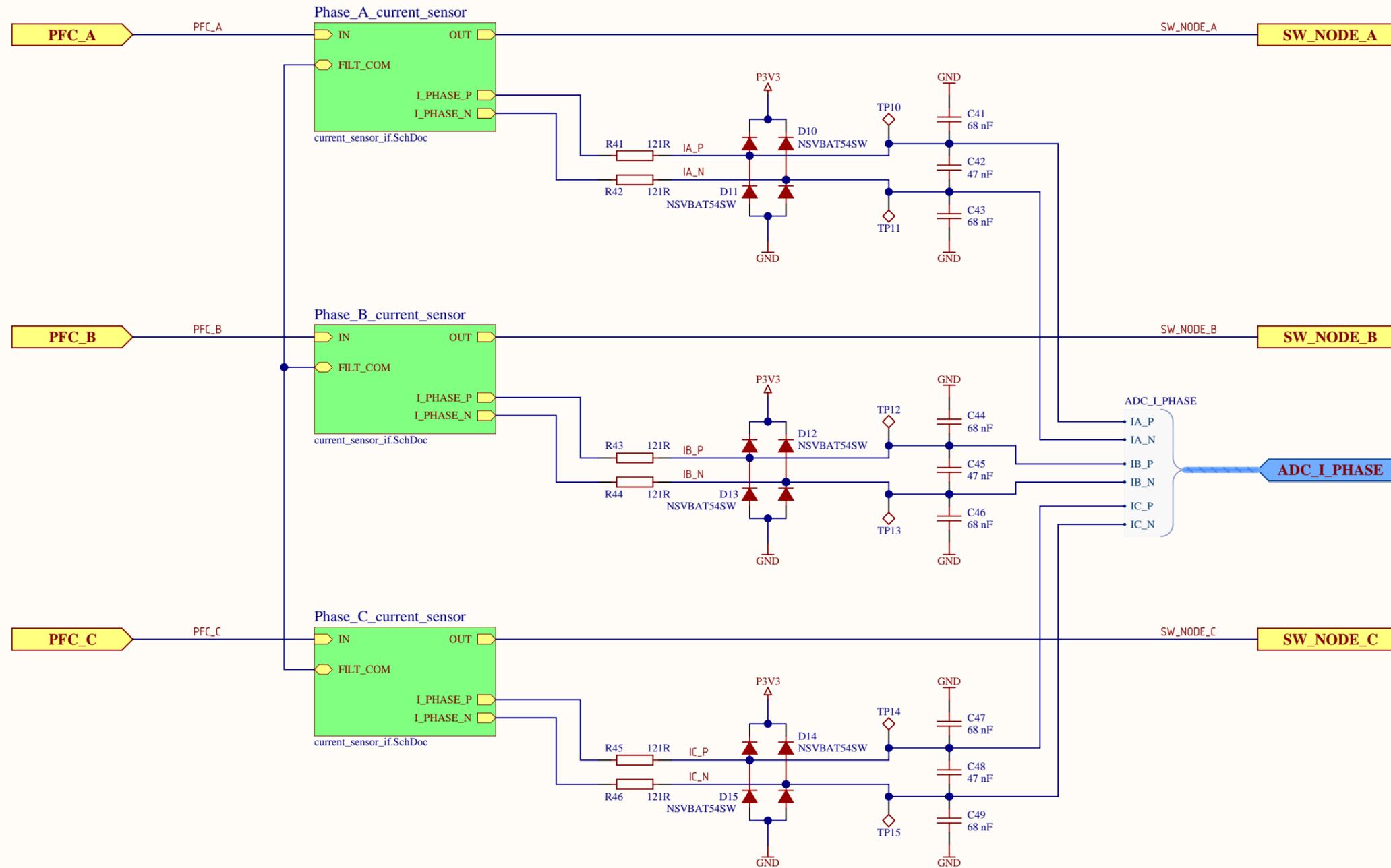
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Top level diagram		standard_board	released
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec	06.Sep 2022 07:32		
File: E066_PFC.SchDoc	1/21		

Inrush current protection



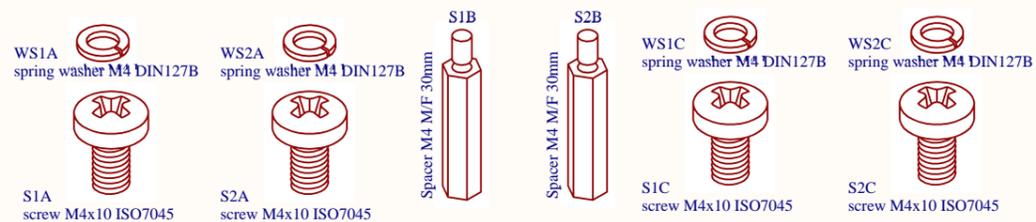
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Inrush current protection		standard_board	released
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec		06.Sep 2022 07:32	
File: Inrush_current_protection.SchDoc		2/21	

Phase current measurement



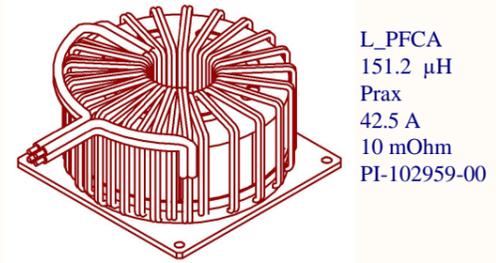
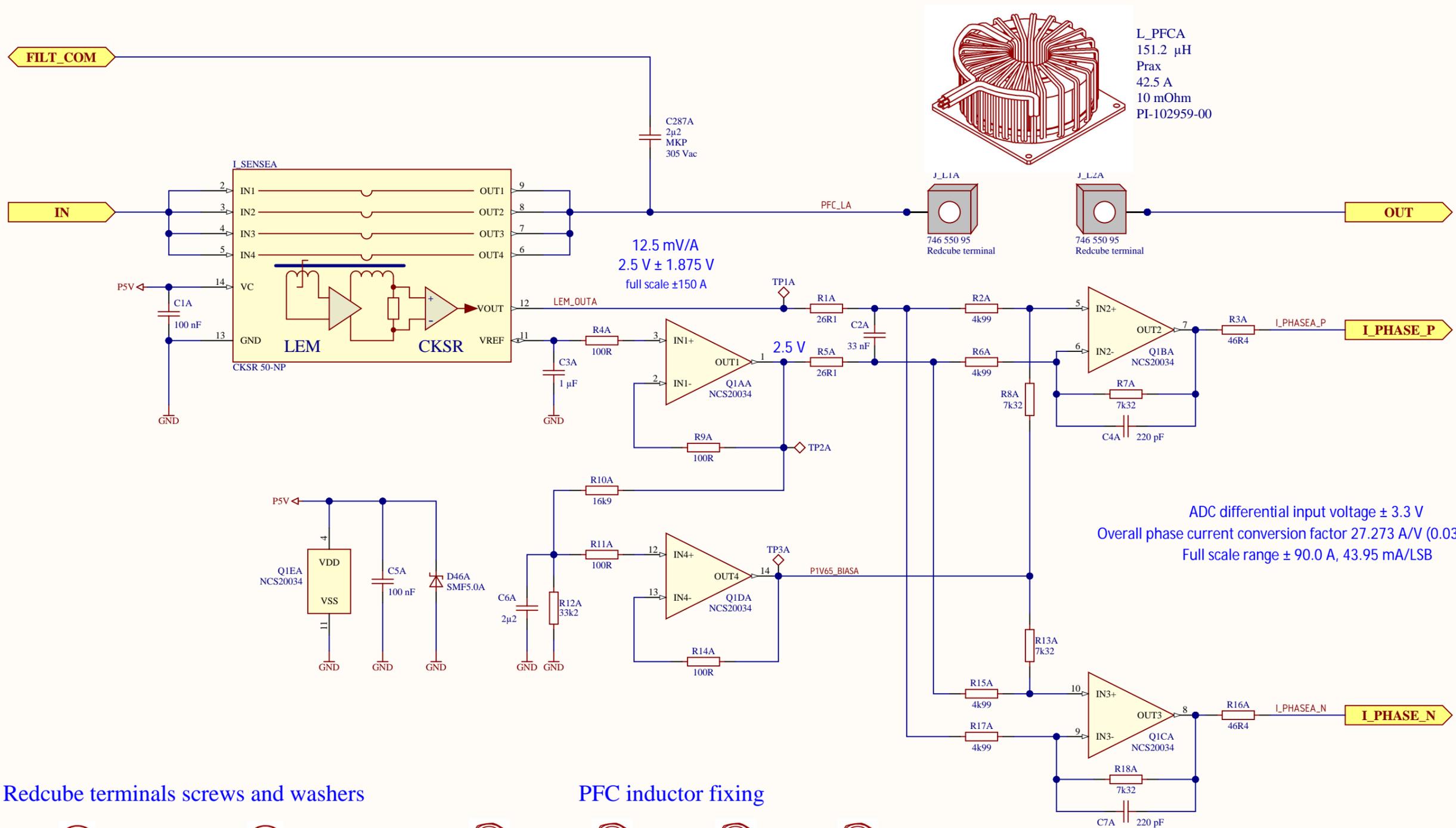
CM: 19.3 kHz, DM: 8.1 kHz

PFC inductors fixing

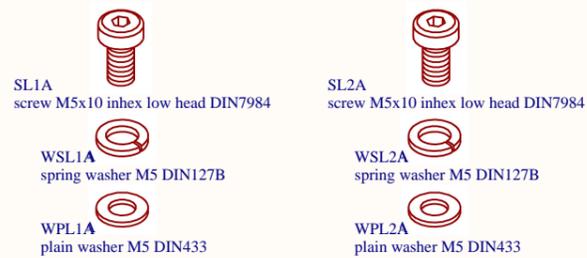


SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase current measurement		standard_board	released
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec	06.Sep 2022 13:01		
File: phase_current_measurement.SchDoc	3/21		

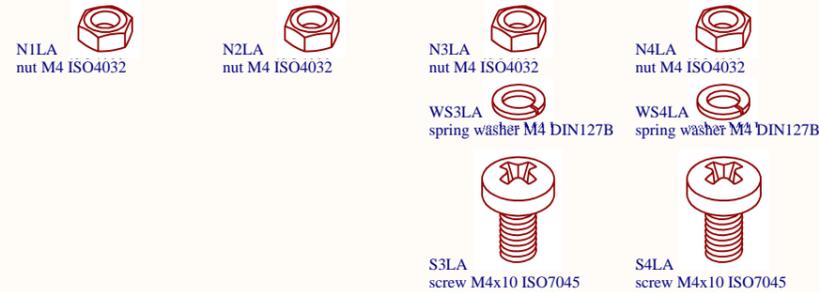
Phase A current sensor



Redcube terminals screws and washers

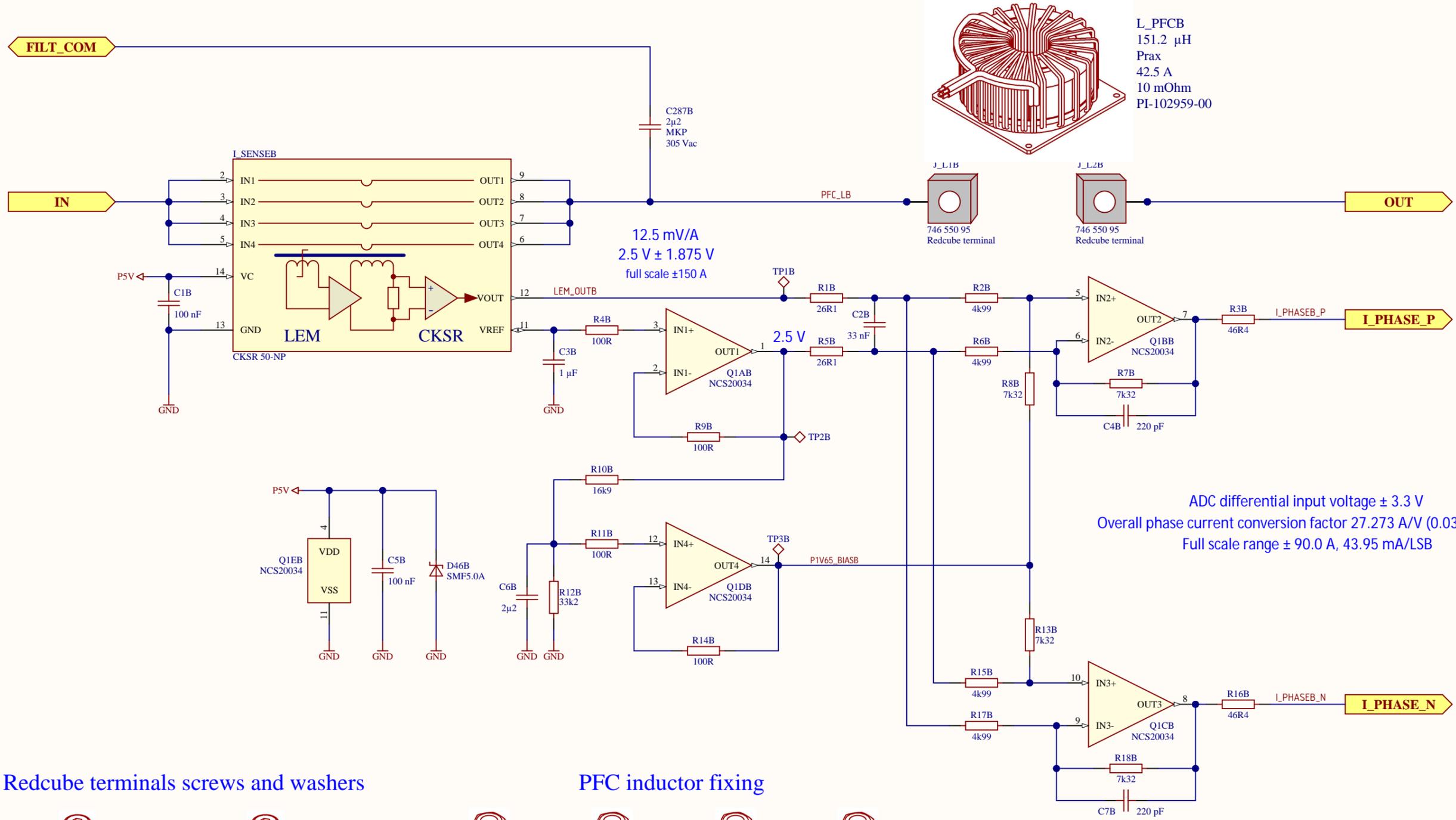


PFC inductor fixing



SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase current sensor interface		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 18:30		
File: current_sensor_if.SchDoc	4/21		
		PSG Systems Applications Solutions Engineering	

Phase B current sensor



Redcube terminals screws and washers

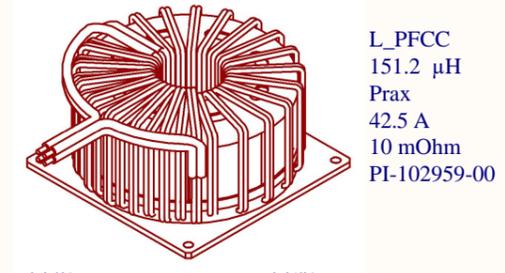
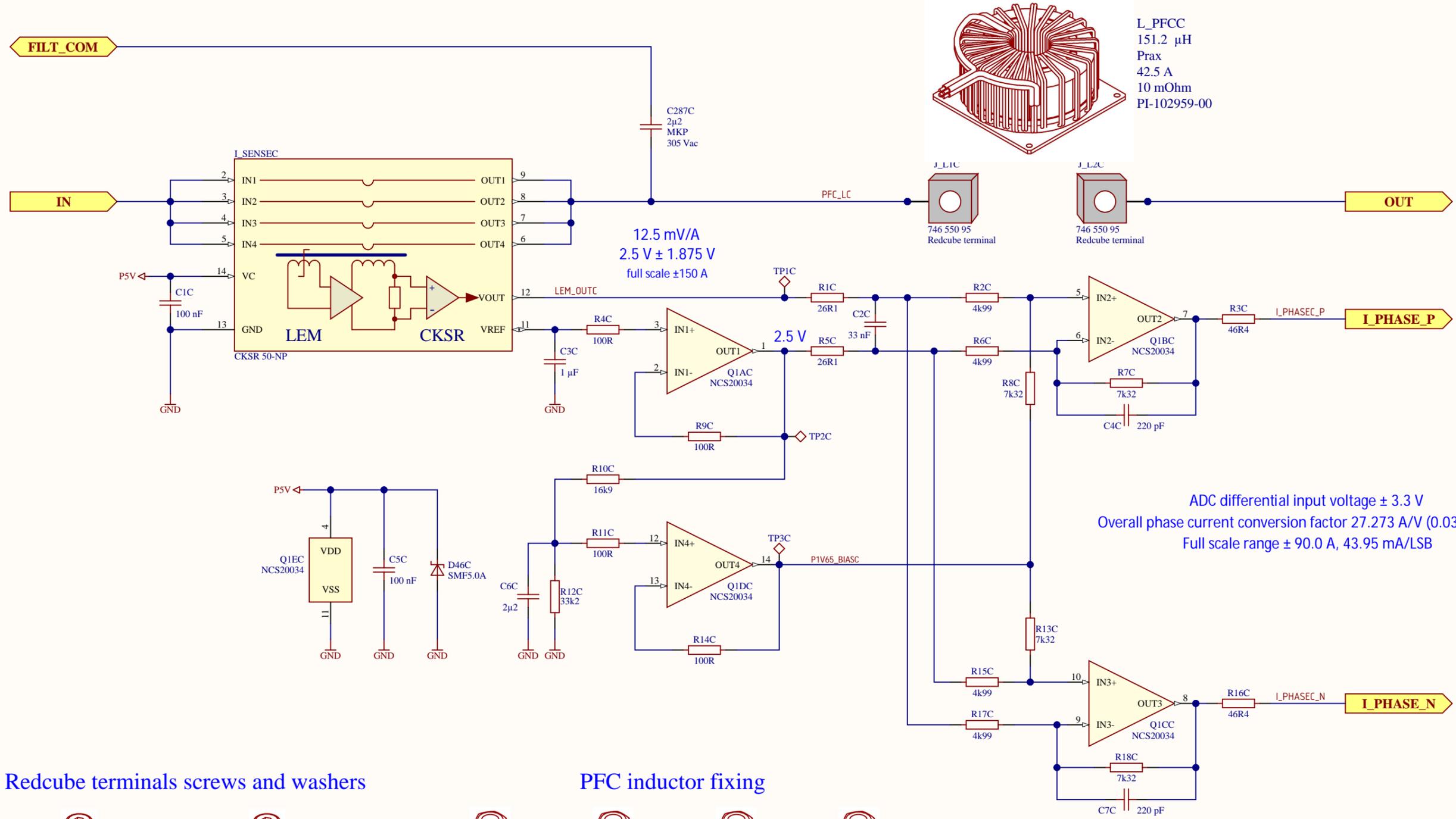
- SL1B screw M5x10 inhex low head DIN7984
- SL2B screw M5x10 inhex low head DIN7984
- WSL1B spring washer M5 DIN127B
- WSL2B spring washer M5 DIN127B
- WPL1B plain washer M5 DIN433
- WPL2B plain washer M5 DIN433

PFC inductor fixing

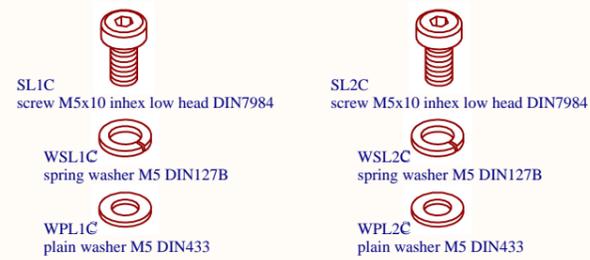
- N1LB nut M4 ISO4032
- N2LB nut M4 ISO4032
- N3LB nut M4 ISO4032
- N4LB nut M4 ISO4032
- WS3LB spring washer M4 DIN127B
- WS4LB spring washer M4 DIN127B
- S3LB screw M4x10 ISO7045
- S4LB screw M4x10 ISO7045

SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase current sensor interface		standard_board	released
Revision: 0.2	Repository revision: 2821	onsemi PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	07.Sep 2022 18:30		
File: current_sensor_if.SchDoc	5/21		

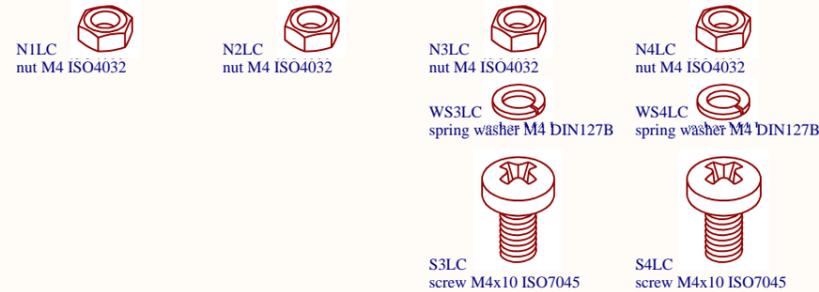
Phase C current sensor



Redcube terminals screws and washers

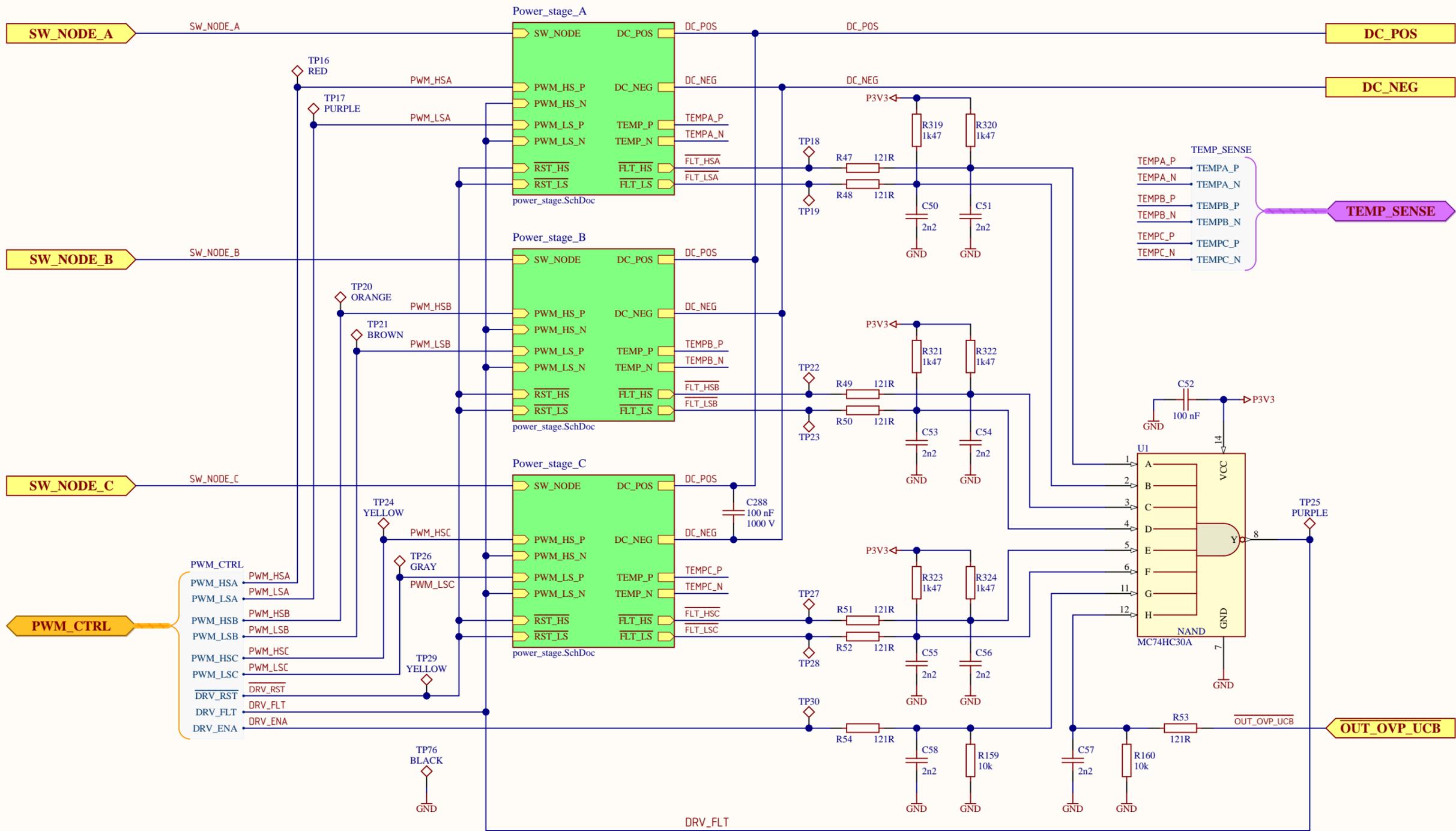


PFC inductor fixing



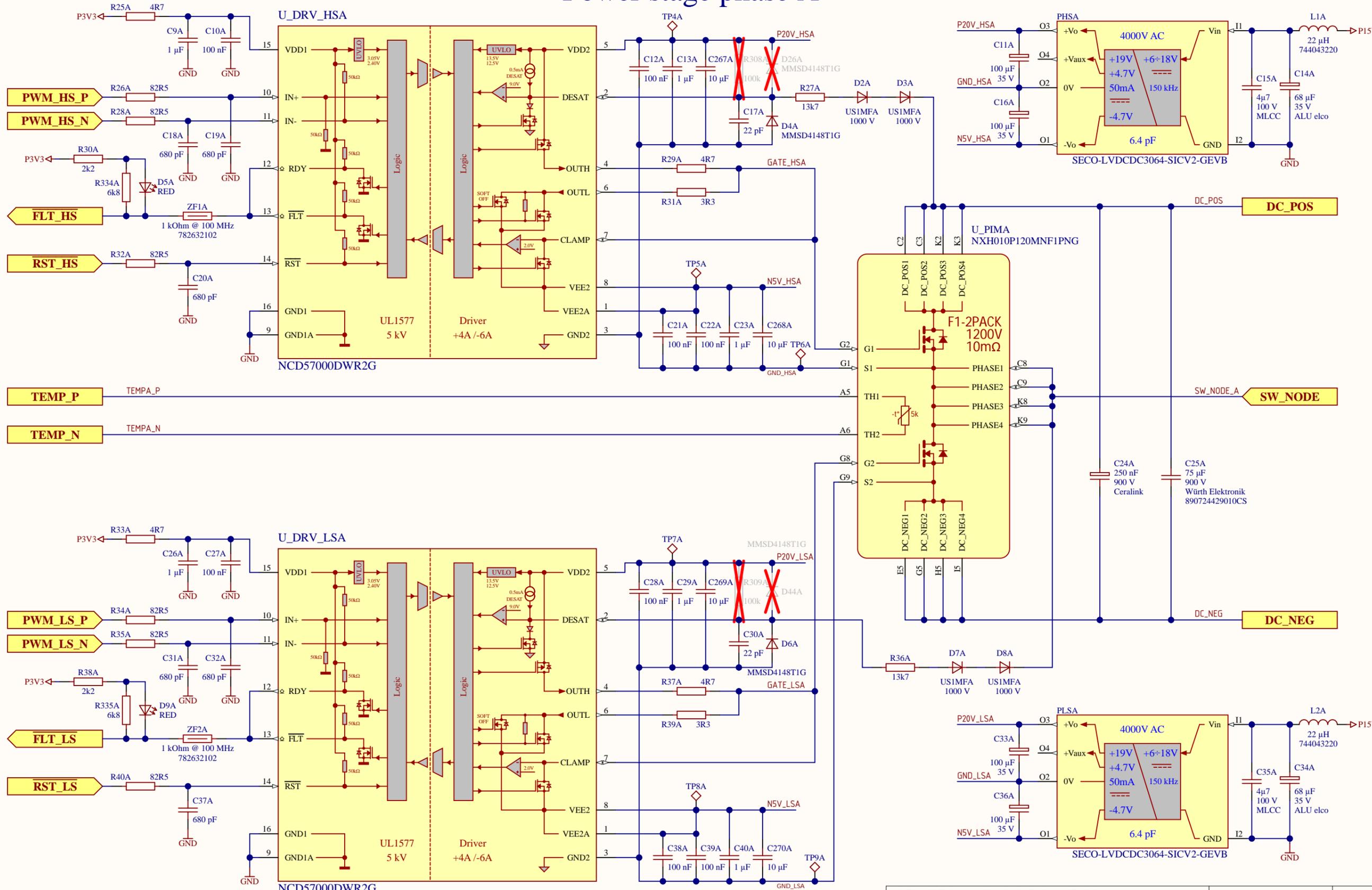
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase current sensor interface		standard_board	released
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec	07.Sep 2022 18:30		
File: current_sensor_if.SchDoc	6/21		

Power switching and fault logic



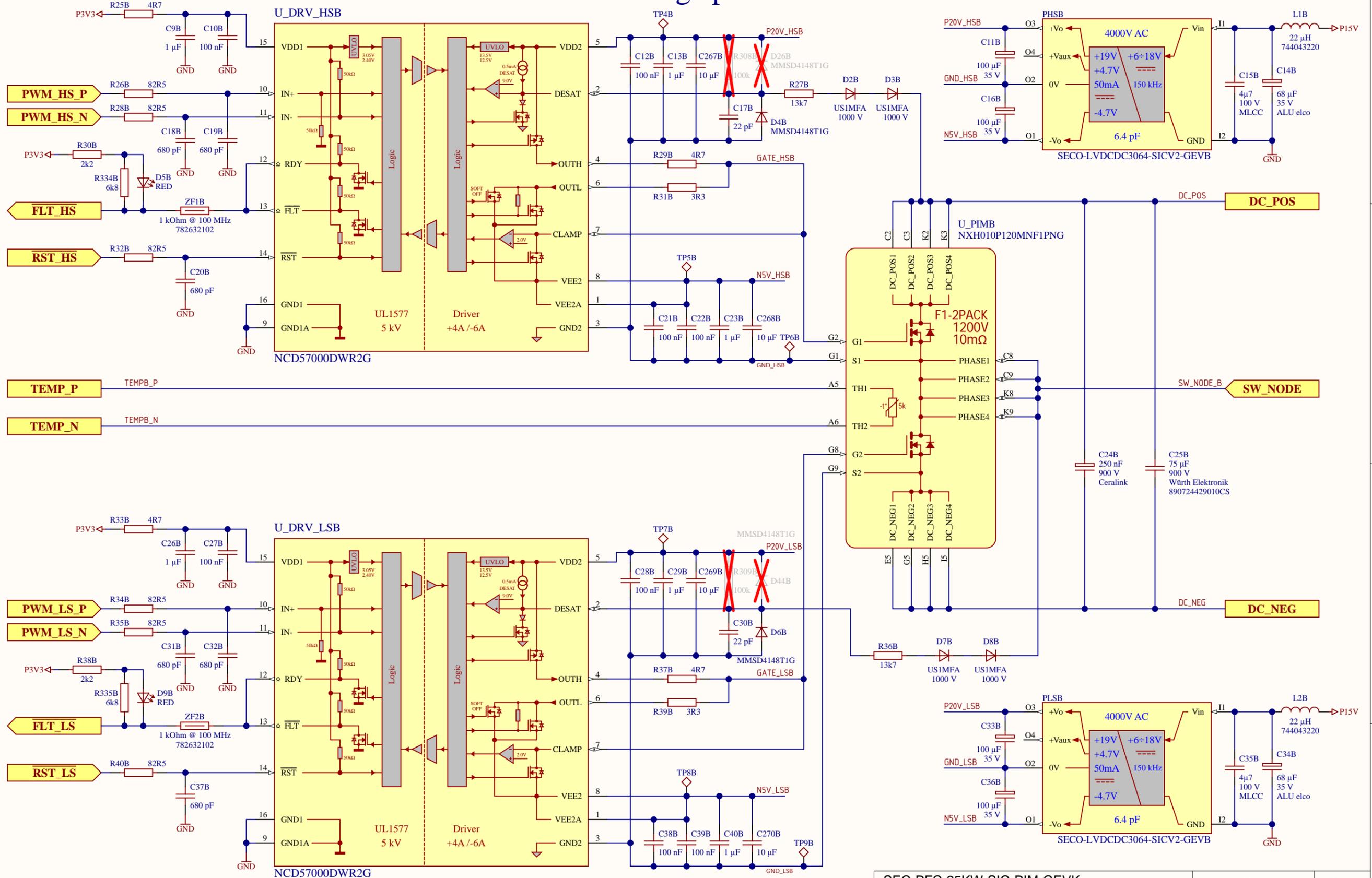
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Power switching unit and fault logic		standard_board	released
Revision: 0.2	Repository revision: 2821	 PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	07.Sep 2022 20:39		
File: switching_unit.SchDoc	7/21		

Power stage phase A



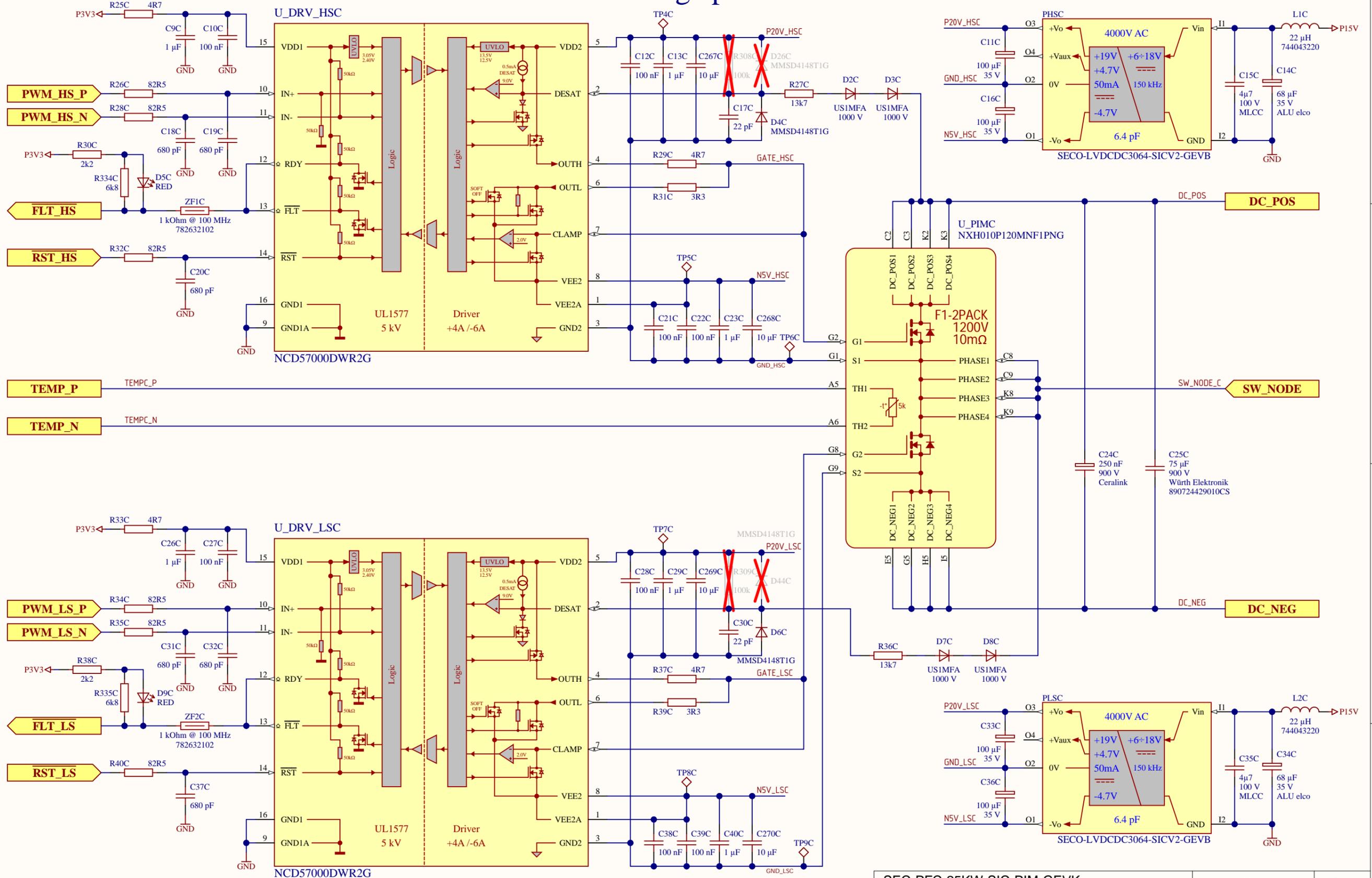
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
SiC module power stage		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 19:41		
File: power_stage.SchDoc	8/21		
		PSG Systems Applications Solutions Engineering	

Power stage phase B



SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
SiC module power stage		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 19:41		
File: power_stage.SchDoc	9/21		
		PSG Systems Applications Solutions Engineering	

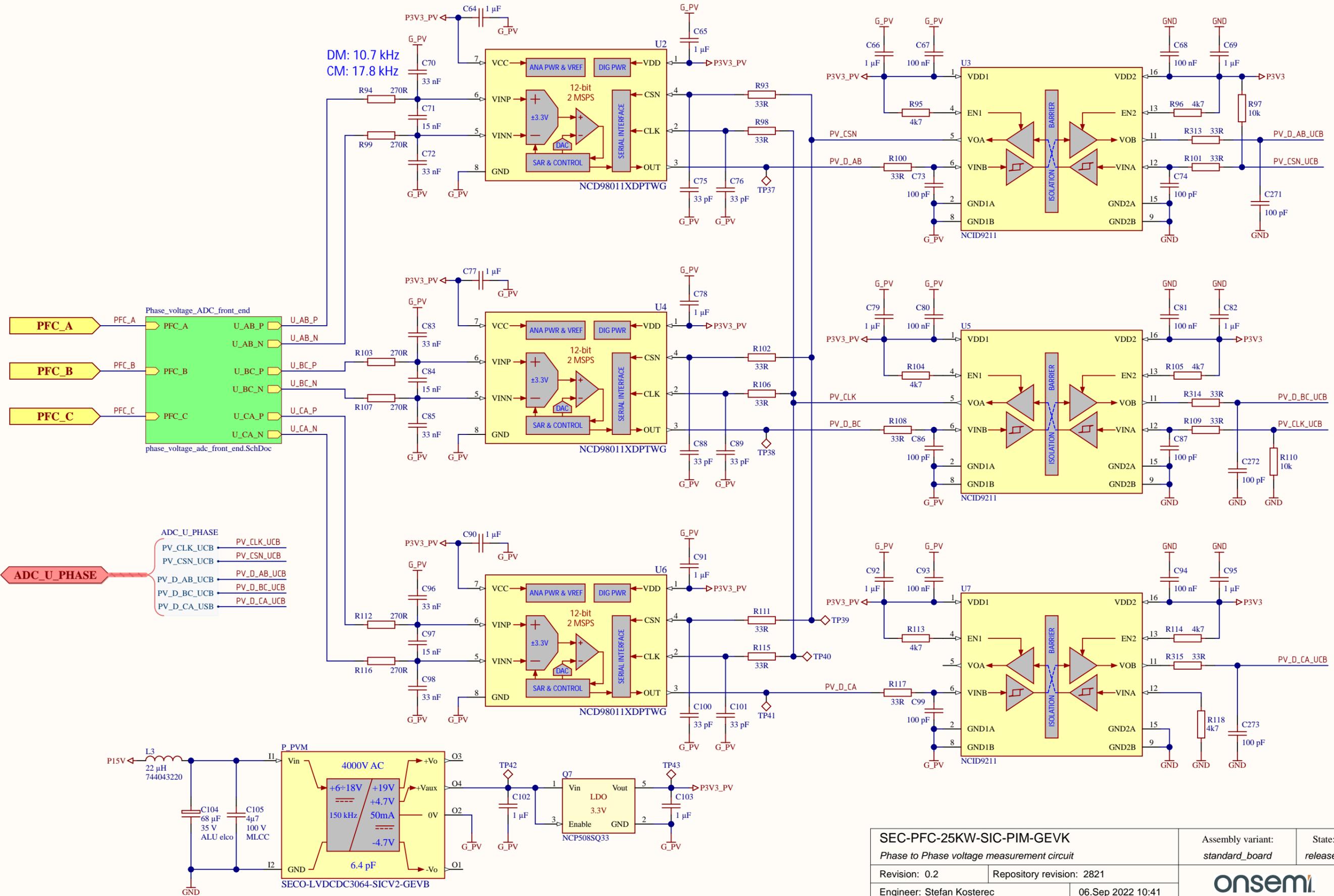
Power stage phase C



SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
SiC module power stage		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 19:41		
File: power_stage.SchDoc	10/21		
		PSG Systems Applications Solutions Engineering	

Phase to phase voltage measurement

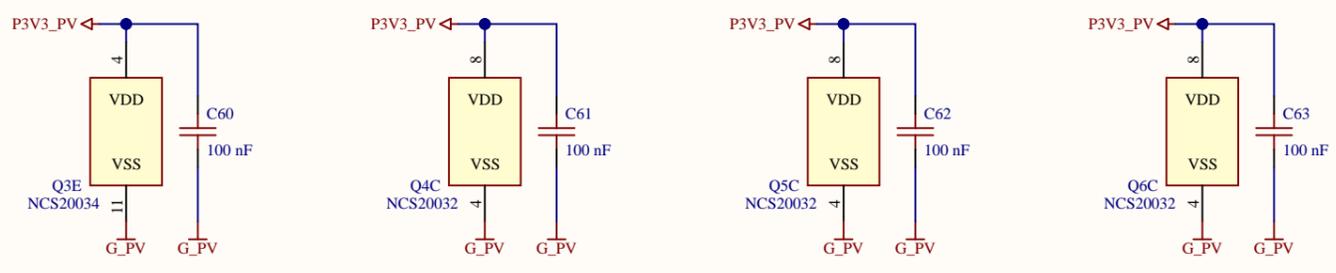
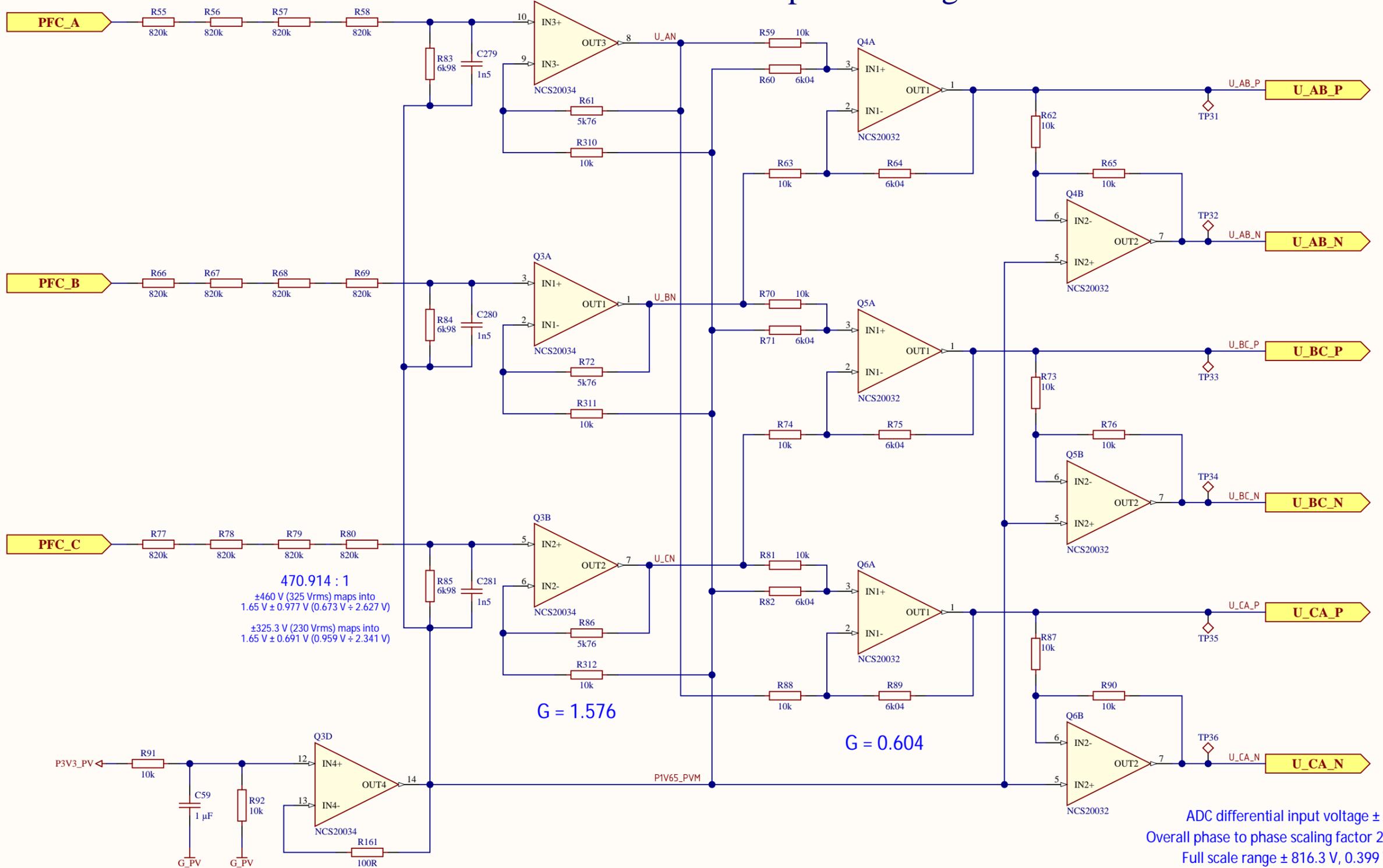
DM: 10.7 kHz
CM: 17.8 kHz



- ADC_U_PHASE
- PV_CLK_UCB
 - PV_CSN_UCB
 - PV_D_AB_UCB
 - PV_D_BC_UCB
 - PV_D_CA_UCB

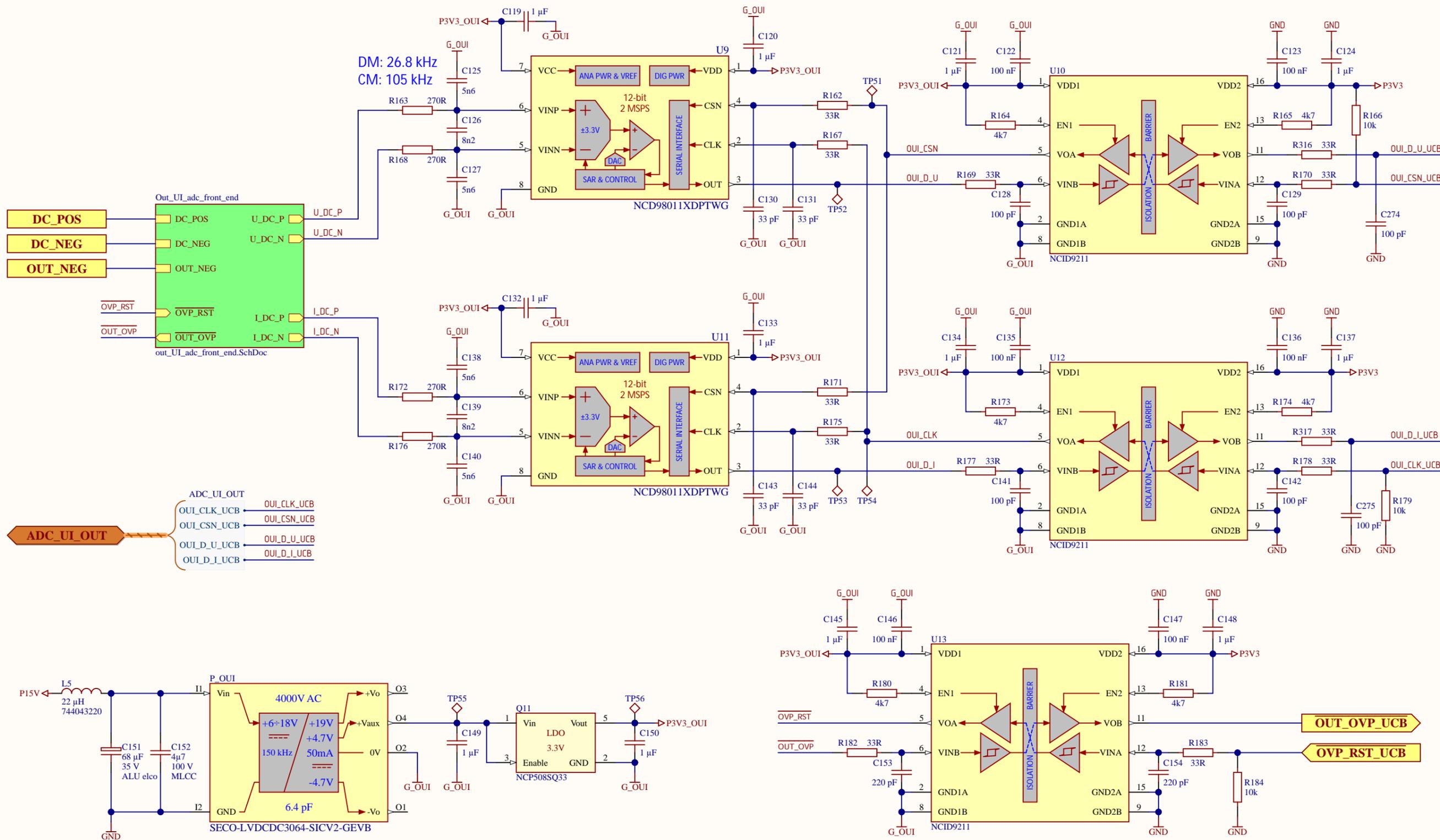
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase to Phase voltage measurement circuit		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	06.Sep 2022 10:41		
File: phase_voltage_measurement.SchDoc	11/21		
		PSG Systems Applications Solutions Engineering	

Phase to phase voltage measurement - ADC front end



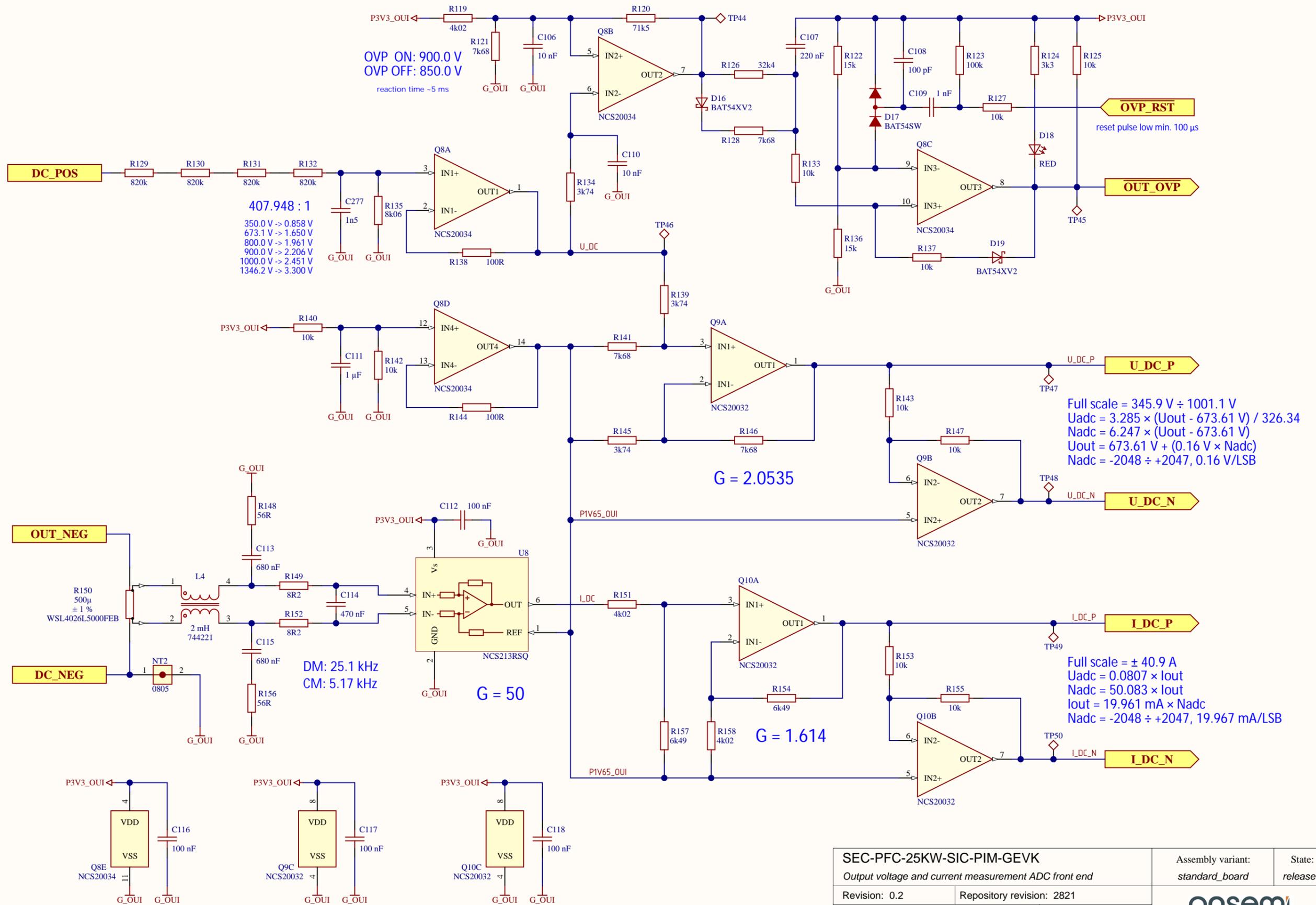
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Phase voltage measurement ADC front end		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	06.Sep 2022 08:53		
File: phase_voltage_adc_front_end.SchDoc	12/21		
		PSG Systems Applications Solutions Engineering	

Output voltage and current measurement



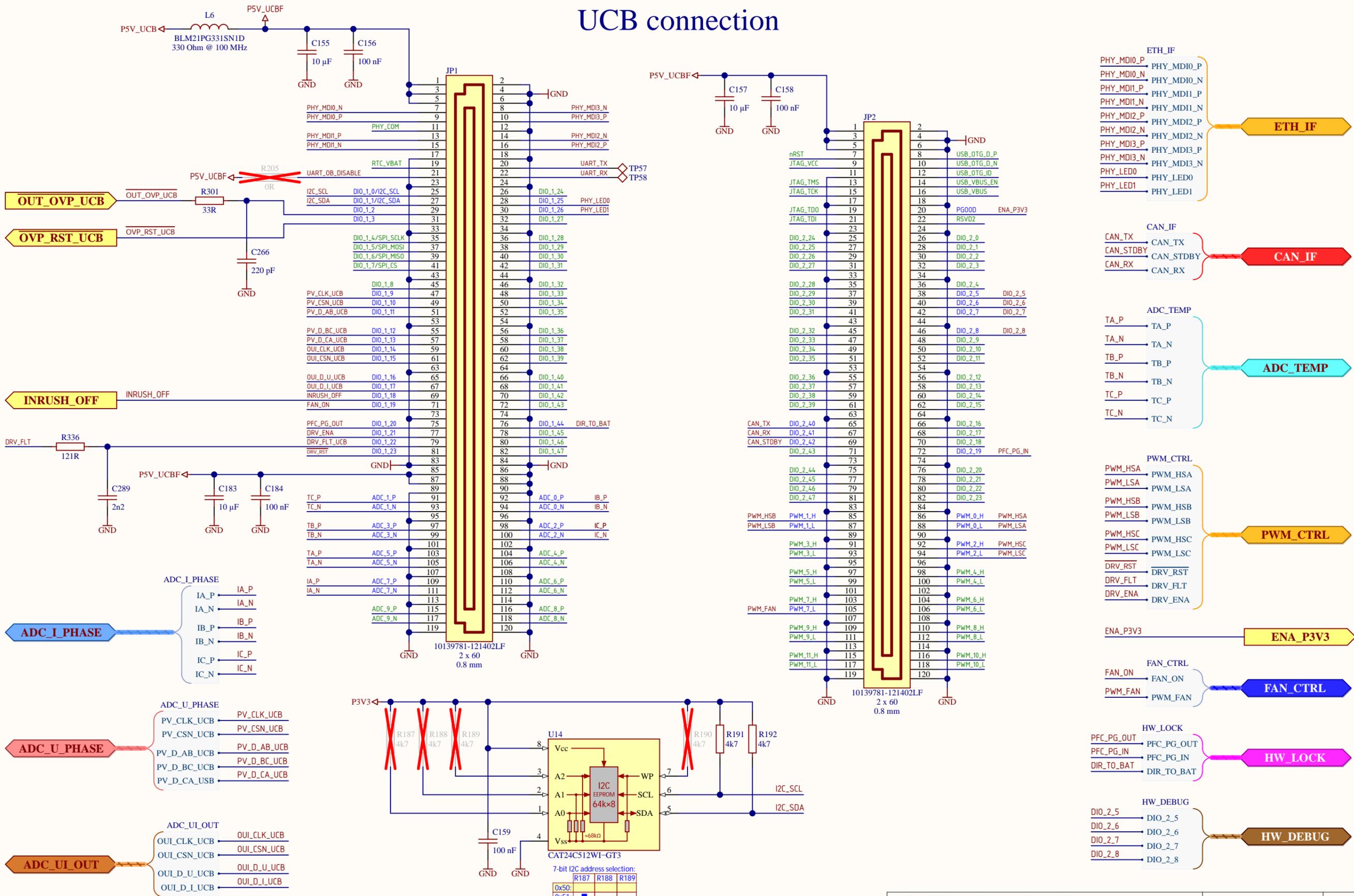
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Output voltage and current measurement circuit		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	06.Sep 2022 10:43		
File: out_UI_measurement.SchDoc	13/21	PSG Systems Applications Solutions Engineering	

Output voltage and current measurement ADC front end



SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Output voltage and current measurement ADC front end		standard_board	released
Revision: 0.2	Repository revision: 2821	 PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	06.Sep 2022 08:21		
File: out_UI_adc_front_end.SchDoc	14/21		

UCB connection



Note: GREEN signals are not used and not connected in this application
 BLUE labels show standard UCB signal name

SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Universal Controller Board connections		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	09.Sep 2022 15:15		
File: ucb_connections.SchDoc	15/21	PSG Systems Applications Solutions Engineering	

7-bit I2C address selection:

R187	R188	R189
0x50:		
0x51:	■	
0x52:	■	
0x53:	■	■
0x54:	■	■
0x55:	■	■
0x56:	■	■
0x57:	■	■

Temperature sensing ADC front end

TEMP_SENSE

- TEMP_SENSE
- TEMPA_P
- TEMPA_N
- TEMPB_P
- TEMPB_N
- TEMPC_P
- TEMPC_N

Temperature measurement target range 0 ÷ 170°C

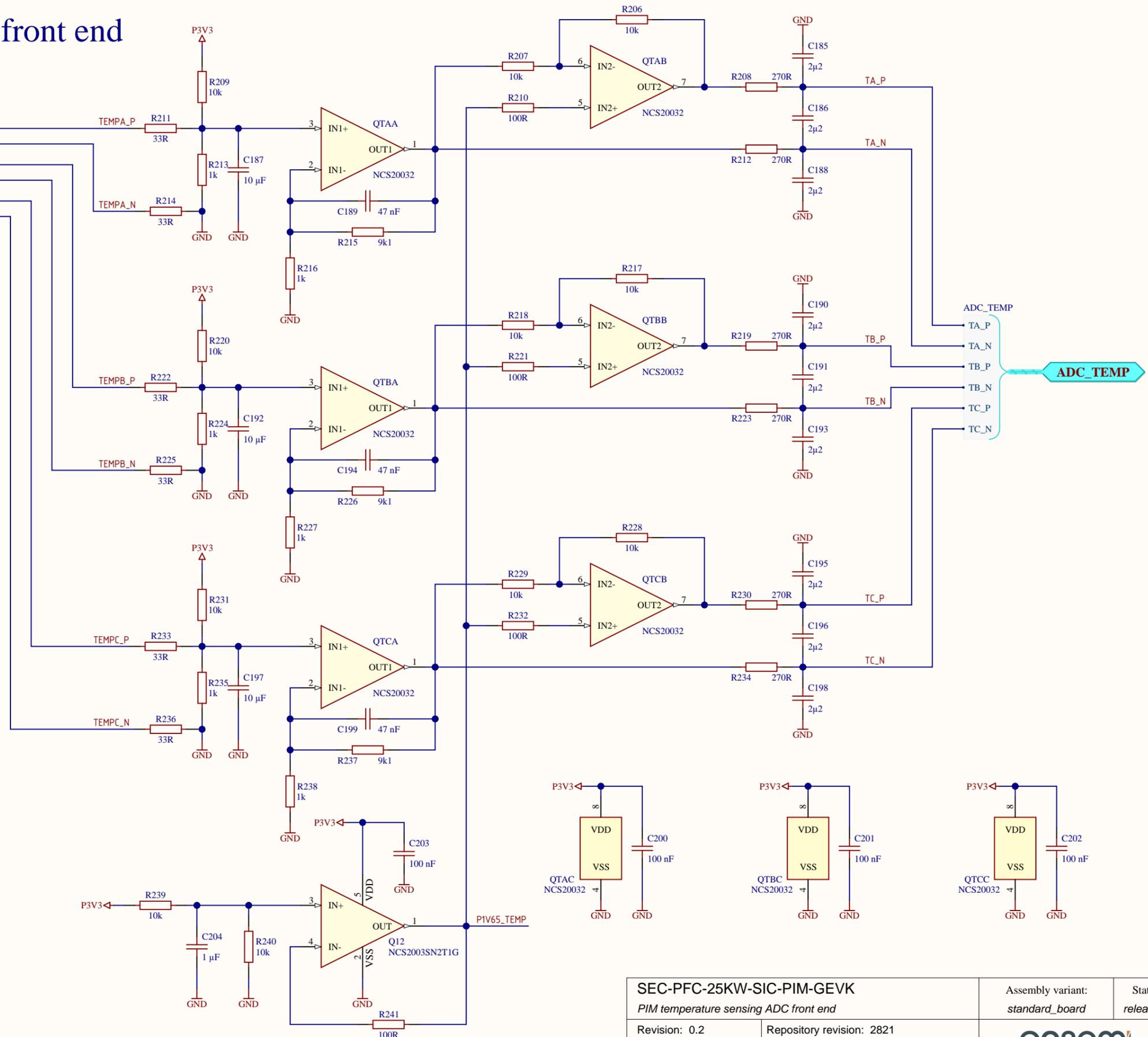
NXH010P120MNF1PNG NTC parameters:
 R25 = 5 kΩ
 B(25/100) = 3455 K

NTC resistance formula:
 $R_T = R_{25} \times e^{B \times (1/T - 1/T_{25})}$ [Ω; Ω, K, K, K]
 $R_T = 5k\Omega \times e^{3455K \times (1/T - 1/298.15K)}$

Conversion table

t [°C]	Rt [Ω]	ADC in [V]	ADC value [-]
- 40	126 481.7	-2.719	-1 688
- 30	68 761.7	-2.686	-1 667
- 20	39 226.2	-2.630	-1 632
- 10	23 352.5	-2.542	-1 578
0	14 440.5	-2.412	-1 497
+ 10	9 238.0	-2.228	-1 383
+ 20	6 092.7	-1.983	-1 231
+ 30	4 130.1	-1.675	-1 039
+ 40	2 870.1	-1.309	- 812
+ 50	2 040.0	-0.899	- 558
+ 60	1 480.0	-0.466	- 289
+ 70	1 093.9	-0.033	- 20
+ 80	822.6	+0.381	+ 236
+ 90	628.3	+0.759	+ 471
+100	486.9	+1.095	+ 680
+110	382.4	+1.385	+ 860
+120	304.0	+1.631	+ 1 012
+130	244.5	+1.837	+ 1 140
+140	198.7	+2.008	+ 1 246
+150	163.0	+2.149	+ 1 333
+160	135.0	+2.265	+ 1 405
+170	112.8	+2.361	+ 1 465
+180	95.0	+2.440	+ 1 514

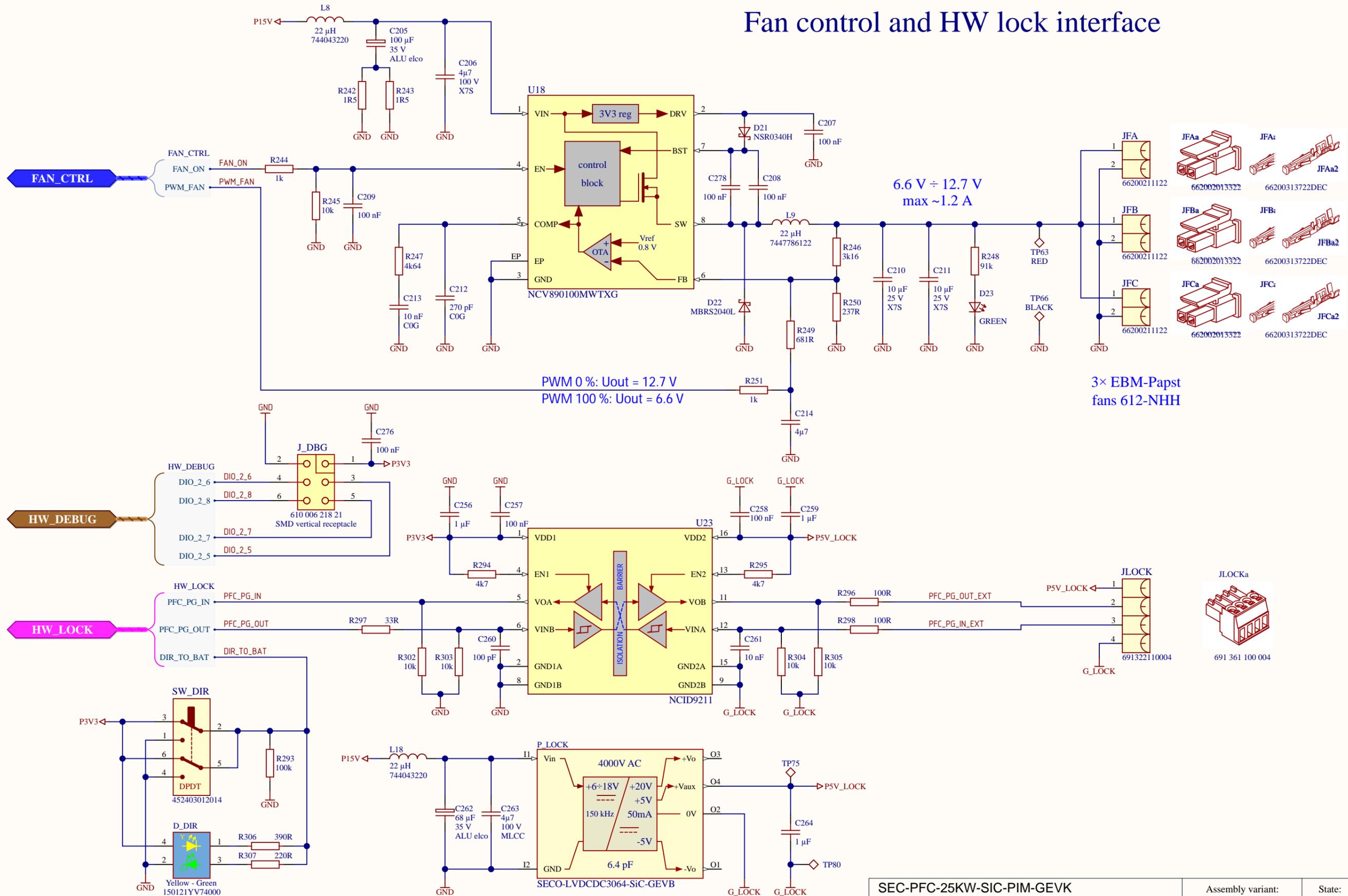
Average resolution (+20 ÷ 130°C):
 0.0464 °C/LSB



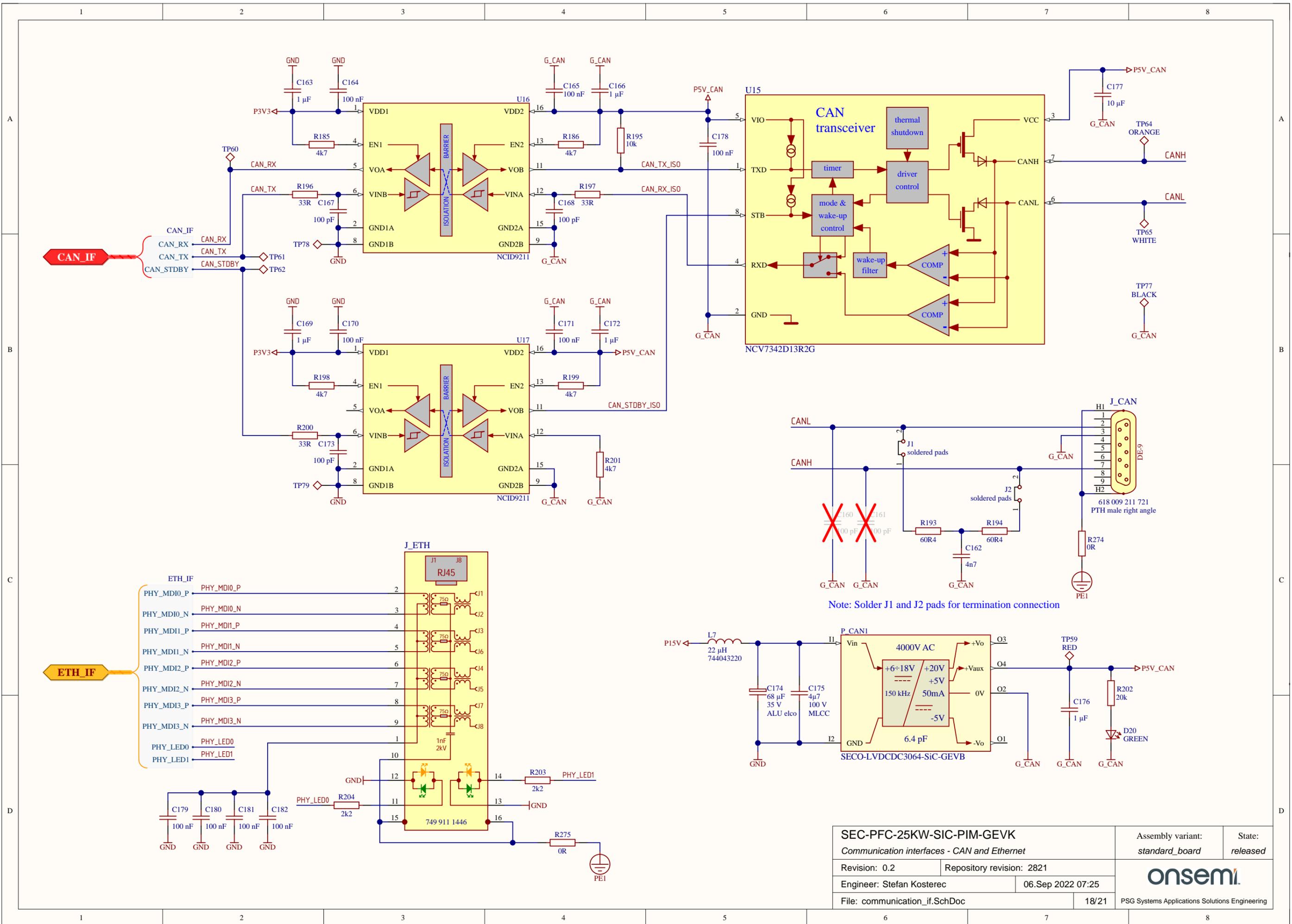
SEC-PFC-25KW-SIC-PIM-GEVK PIM temperature sensing ADC front end		Assembly variant: standard_board	State: released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	06.Sep 2022 07:24		
File: temp_sense_adc_front_end.SchDoc	16/21		

PSG Systems Applications Solutions Engineering

Fan control and HW lock interface



SEC-PFC-25KW-SiC-PIM-GEVK		Assembly variant:	State:
Fan control and HW lock interface		standard_board	released
Revision: 0.2	Repository revision: 2821	 PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	06.Sep 2021 08:35		
File: fan_control.SchDoc	17/21		



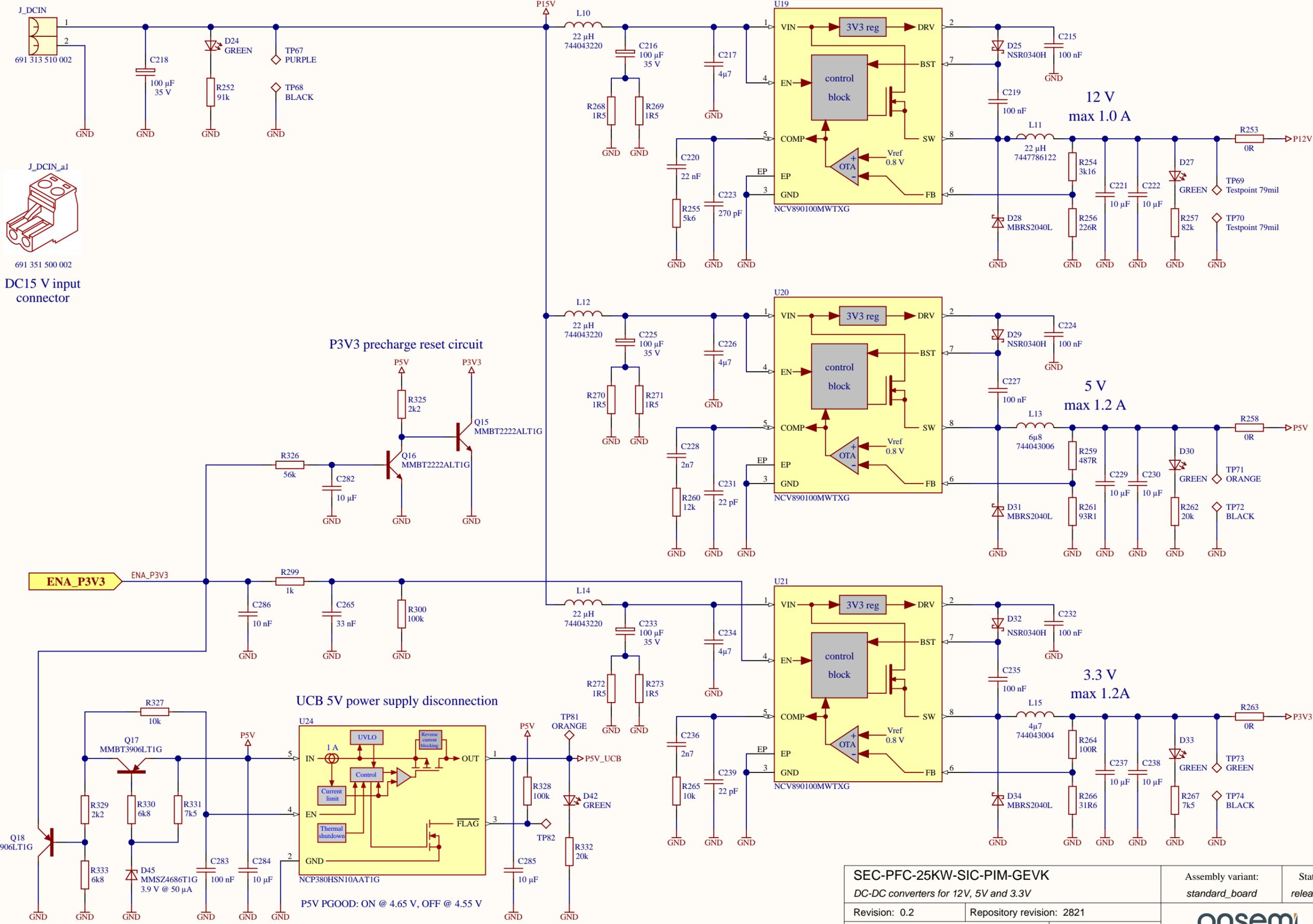
CAN_IF

ETH_IF

Note: Solder J1 and J2 pads for termination connection

SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Communication interfaces - CAN and Ethernet		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	06.Sep 2022 07:25		
File: communication_if.SchDoc	18/21		

PSG Systems Applications Solutions Engineering



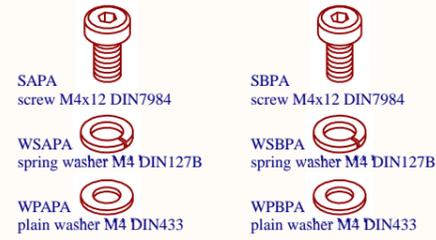
P3V3 precharge reset circuit

UCB 5V power supply disconnection

SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
DC-DC converters for 12V, 5V and 3.3V		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 17:50		
File: DC_DC_converters.SchDoc	19/21		

P5V PGOOD: ON @ 4.65 V, OFF @ 4.55 V

PIM A to heatsink fixing



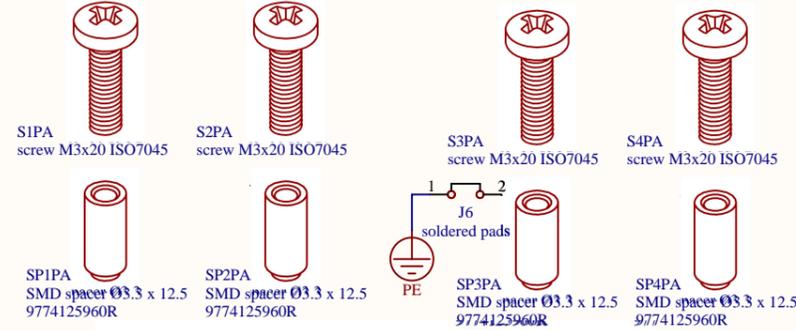
PIM B to heatsink fixing



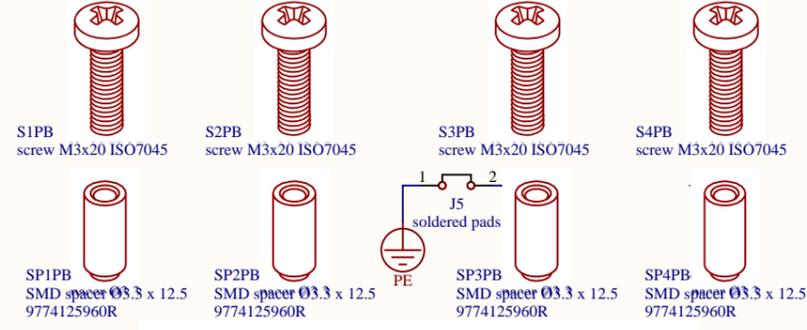
PIM C to heatsink fixing



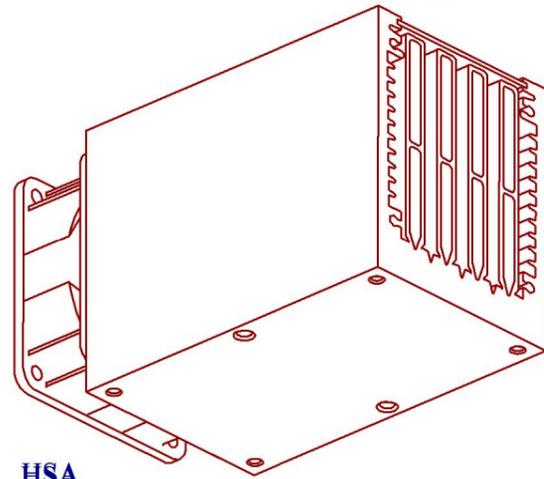
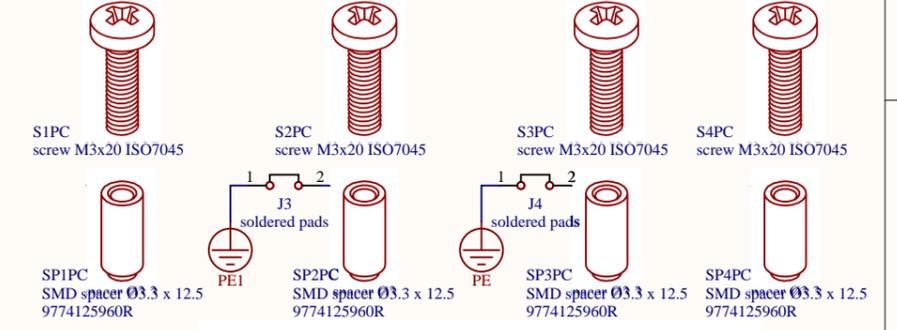
PIM A heatsink to PCB fixing



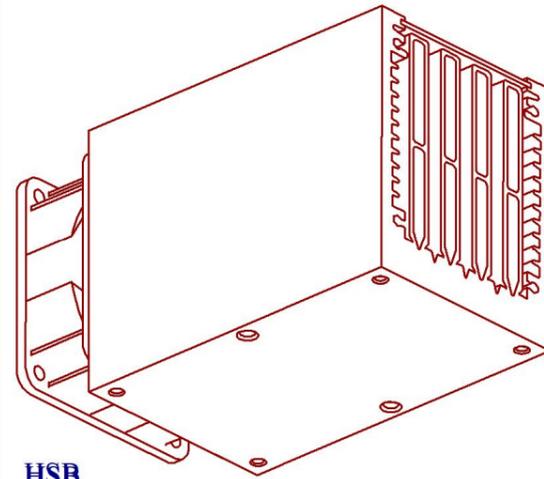
PIM B heatsink to PCB fixing



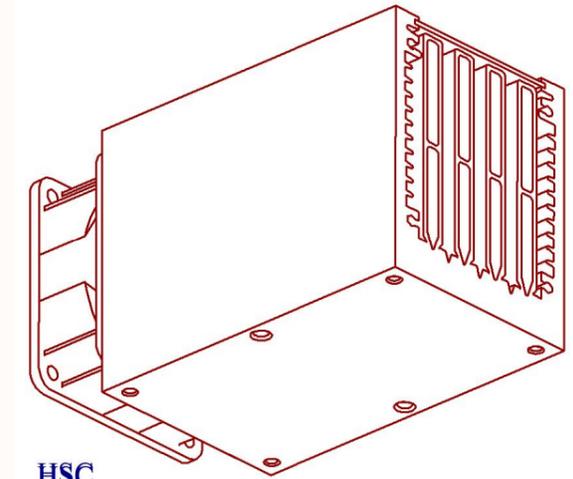
PIM C heatsink to PCB fixing



HSA
LA 6 100 12 - modified for E066 PFC

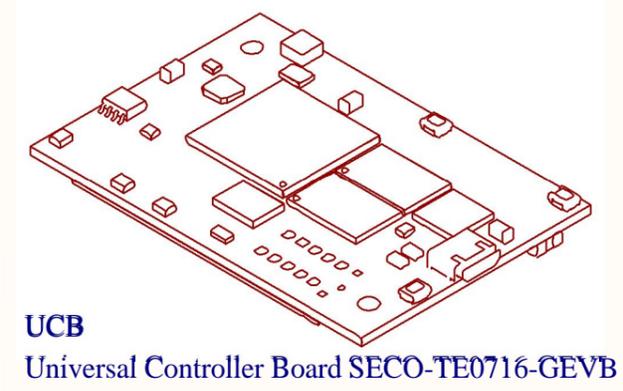
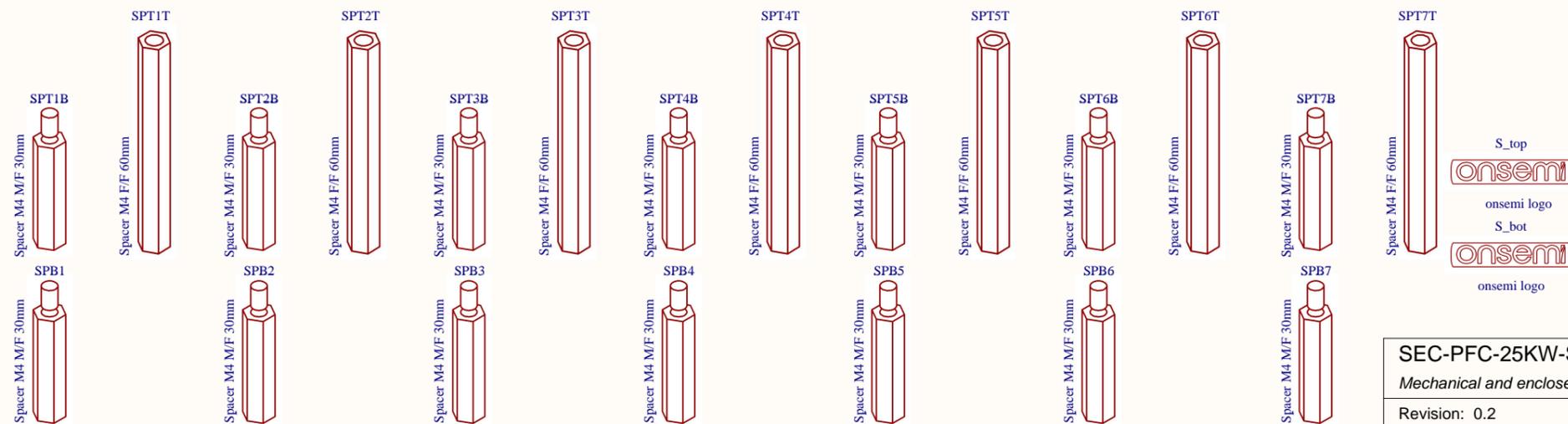


HSB
LA 6 100 12 - modified for E066 PFC



HSC
LA 6 100 12 - modified for E066 PFC

Spacers for board mechanical support



UCB
Universal Controller Board SECO-TE0716-GEVB

SEC-PFC-25KW-SIC-PIM-GEVK <i>Mechanical and enclosed in package parts</i>		Assembly variant: standard_board	State: released
Revision: 0.2	Repository revision: 2821	 PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	06.Sep 2021 11:16		
File: mechanical_parts.SchDoc	21/21		