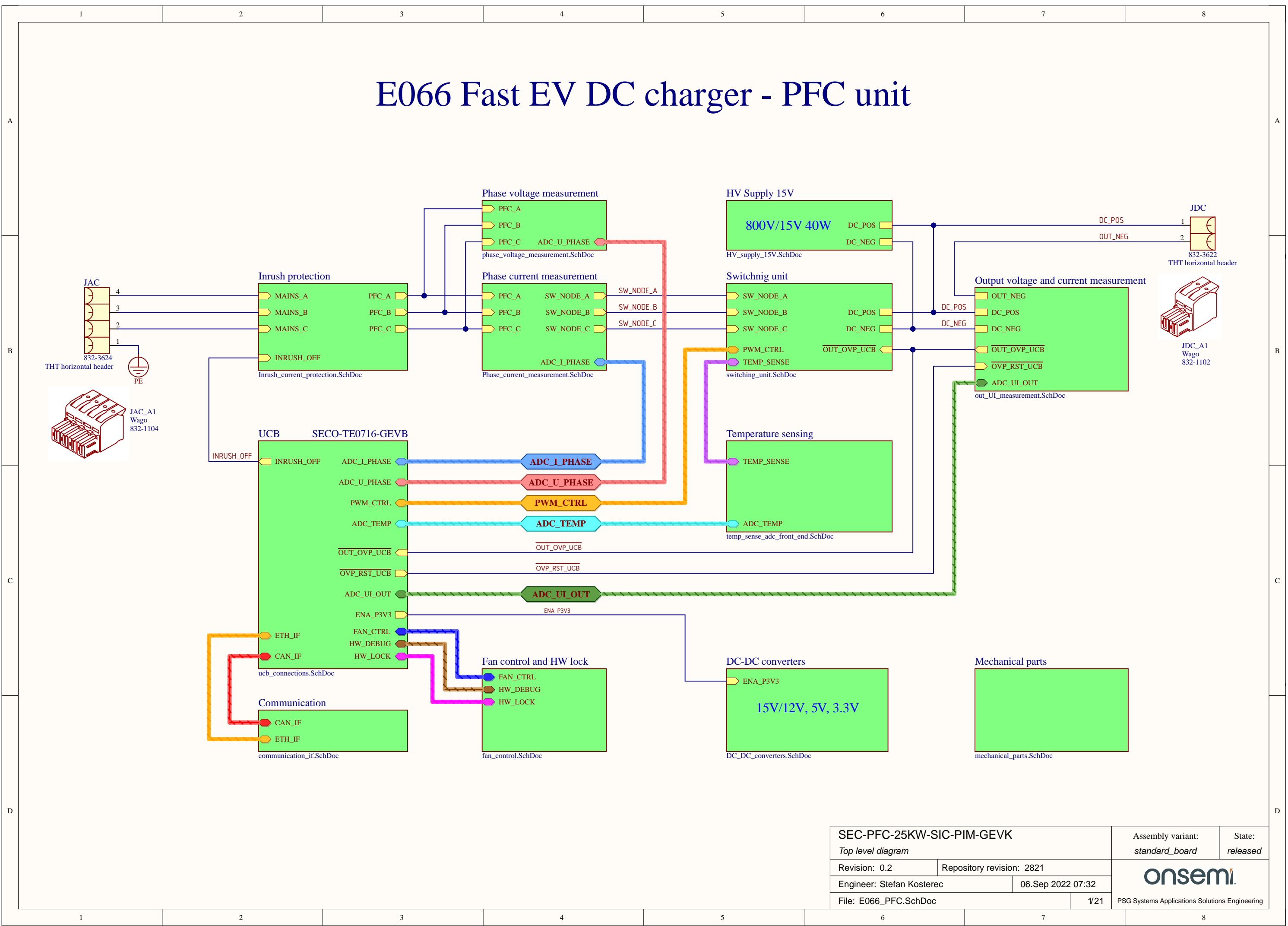


E066 Fast EV DC charger - PFC unit



SEC-PFC-25KW-SIC-PIM-GEVK

Top level diagram

Revision: 0.2

Repository revision: 2821

Engineer: Stefan Kosterec

06.Sep 2022 07:32

File: E066_PFC.SchDoc

1/21

Assembly variant:

standard_board

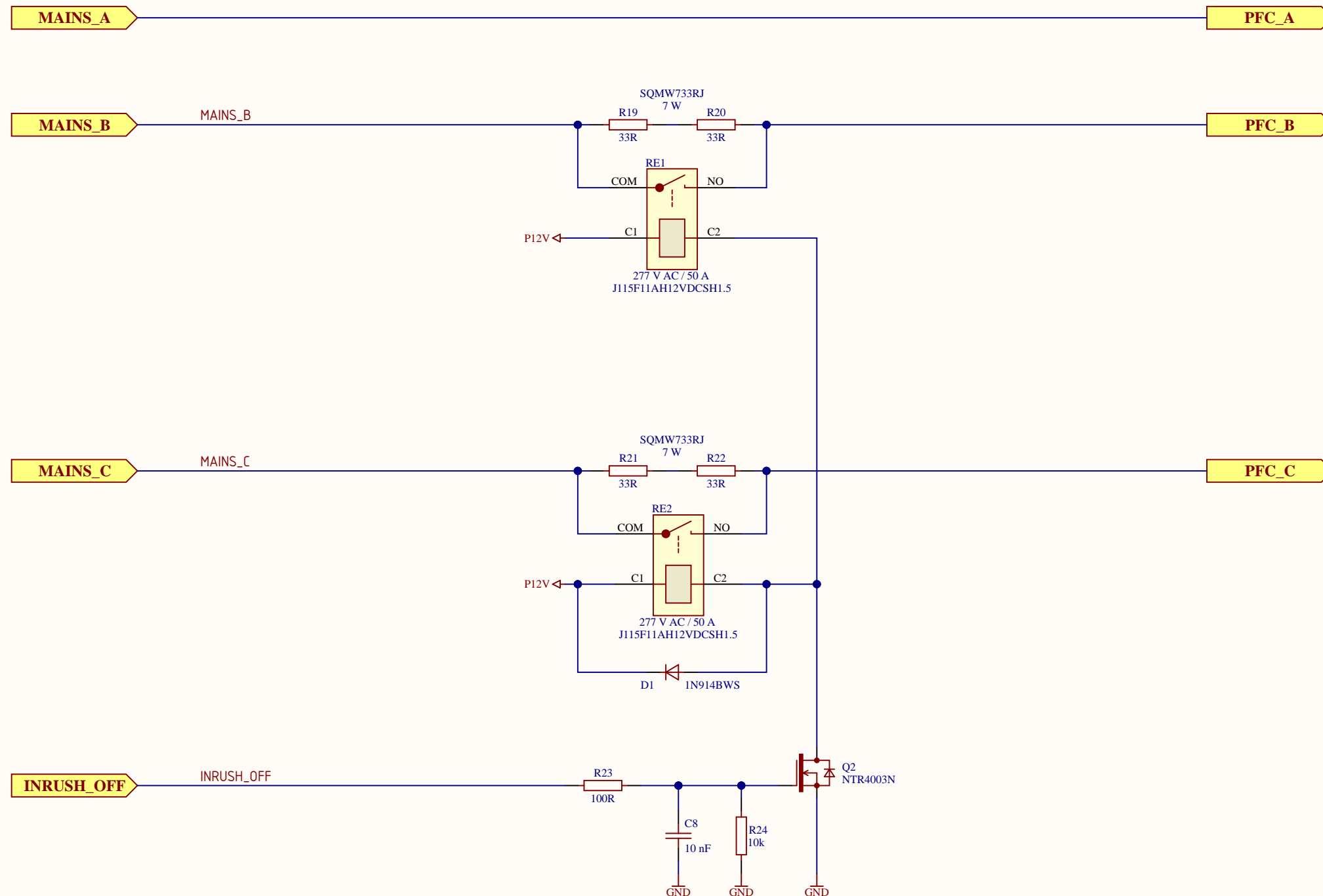
State:

released

onsemi

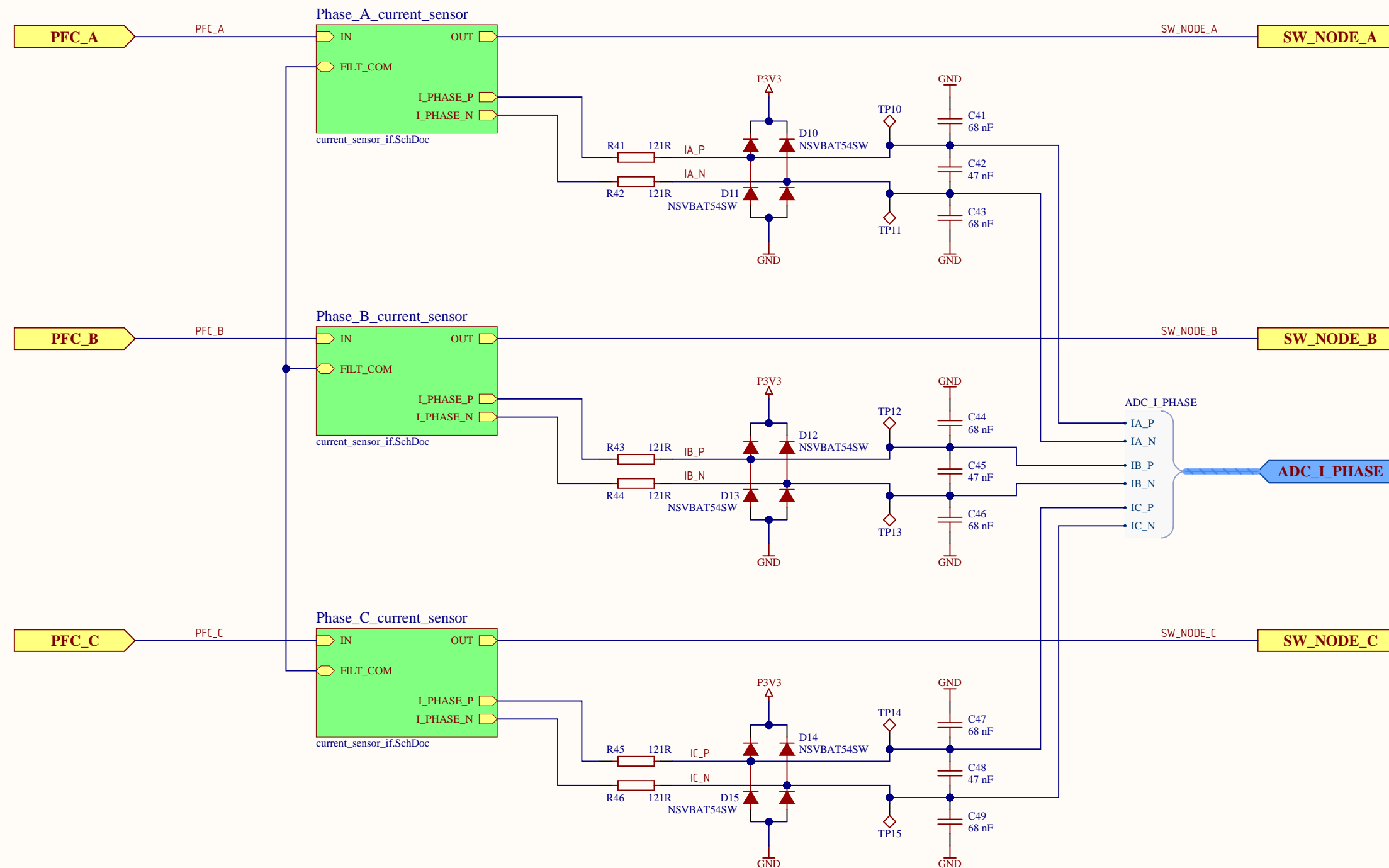
PSG Systems Applications Solutions Engineering

Inrush current protection



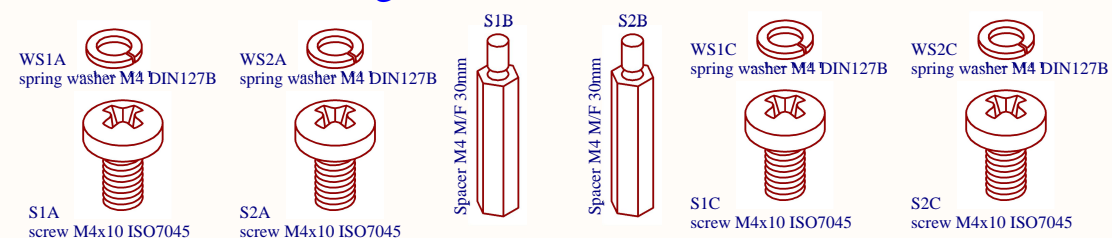
SEC-PFC-25KW-SIC-PIM-GEVK			Assembly variant:	State:
Inrush current protection			standard_board	released
Revision: 0.2	Repository revision: 2821		onsemi	
Engineer: Stefan Kosterec		06.Sep 2022 07:32		
File: Inrush_current_protection.SchDoc		2/21		
			PSG Systems Applications Solutions Engineering	


Phase current measurement



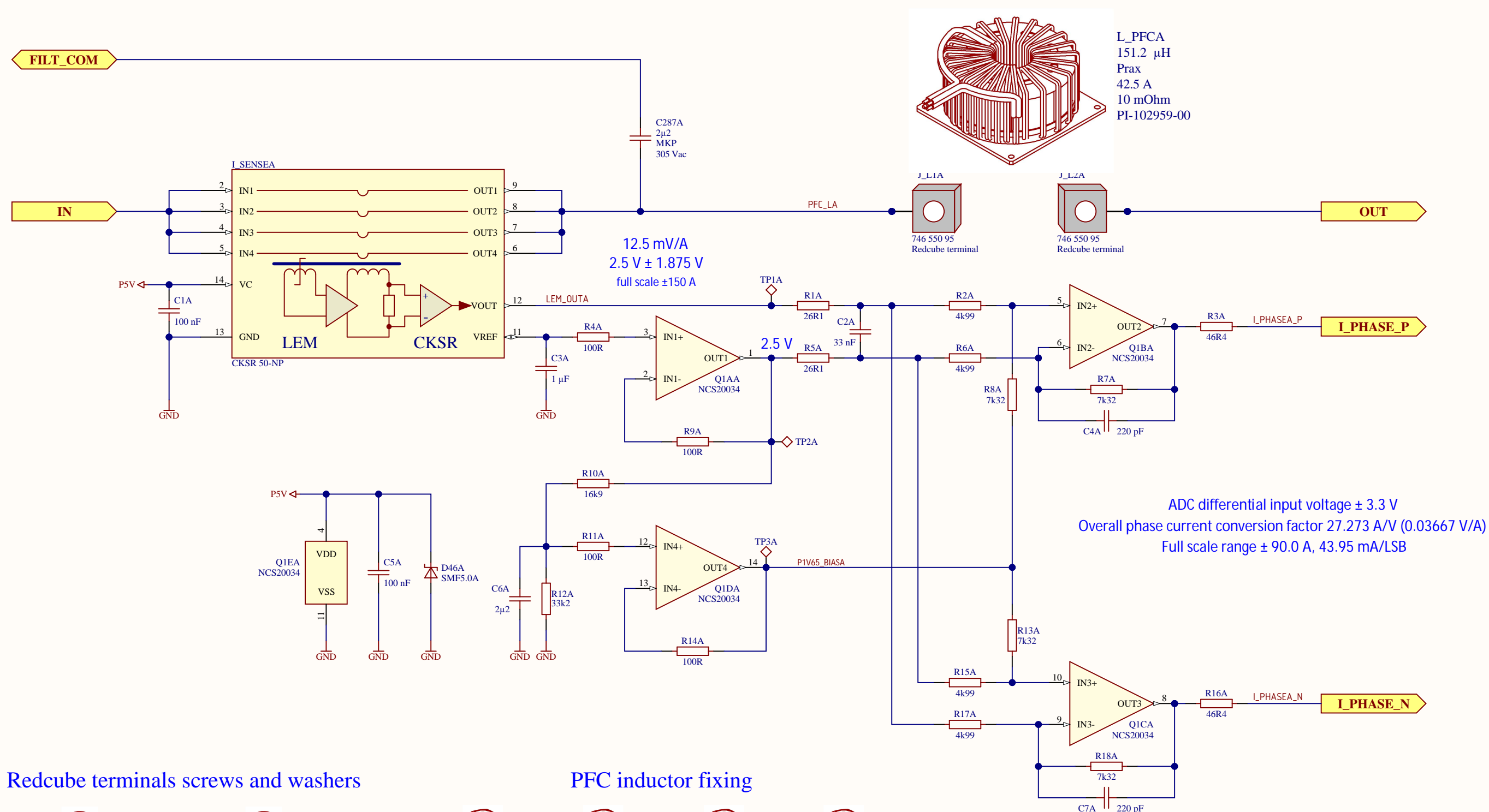
CM: 19.3 kHz, DM: 8.1 kHz

PFC inductors fixing



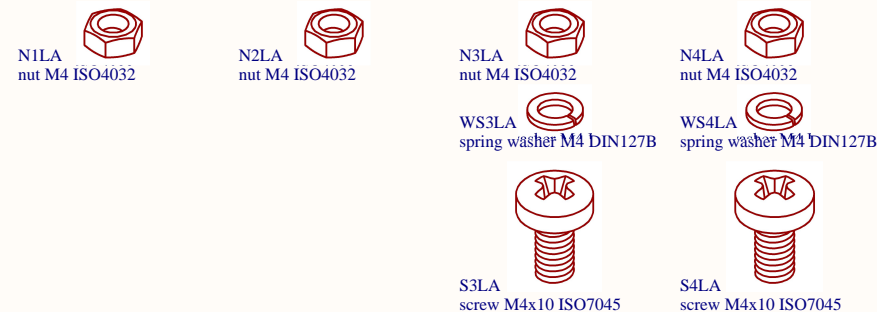
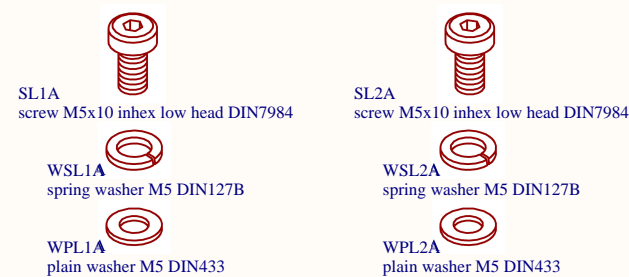
SEC-PFC-25KW-SIC-PIM-GEVK <i>Phase current measurement</i>		Assembly variant: <i>standard_board</i>	State: <i>released</i>
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kostrec	06.Sep 2022 13:01		
File: phase_current_measurement.SchDoc	3/21		


Phase A current sensor



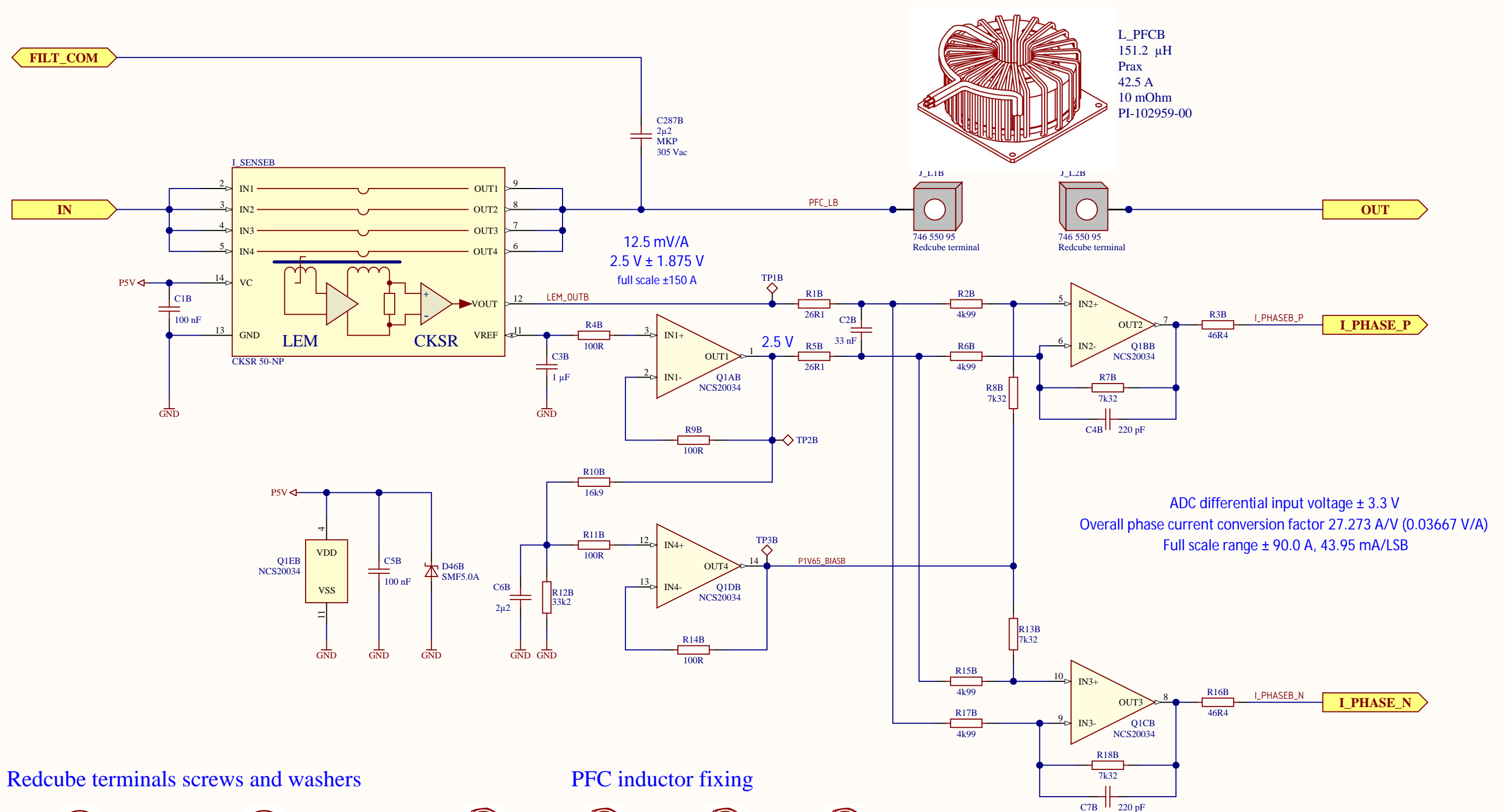
Redcube terminals screws and washers

PFC inductor fixing


$$G = 1.467$$

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


Phase B current sensor



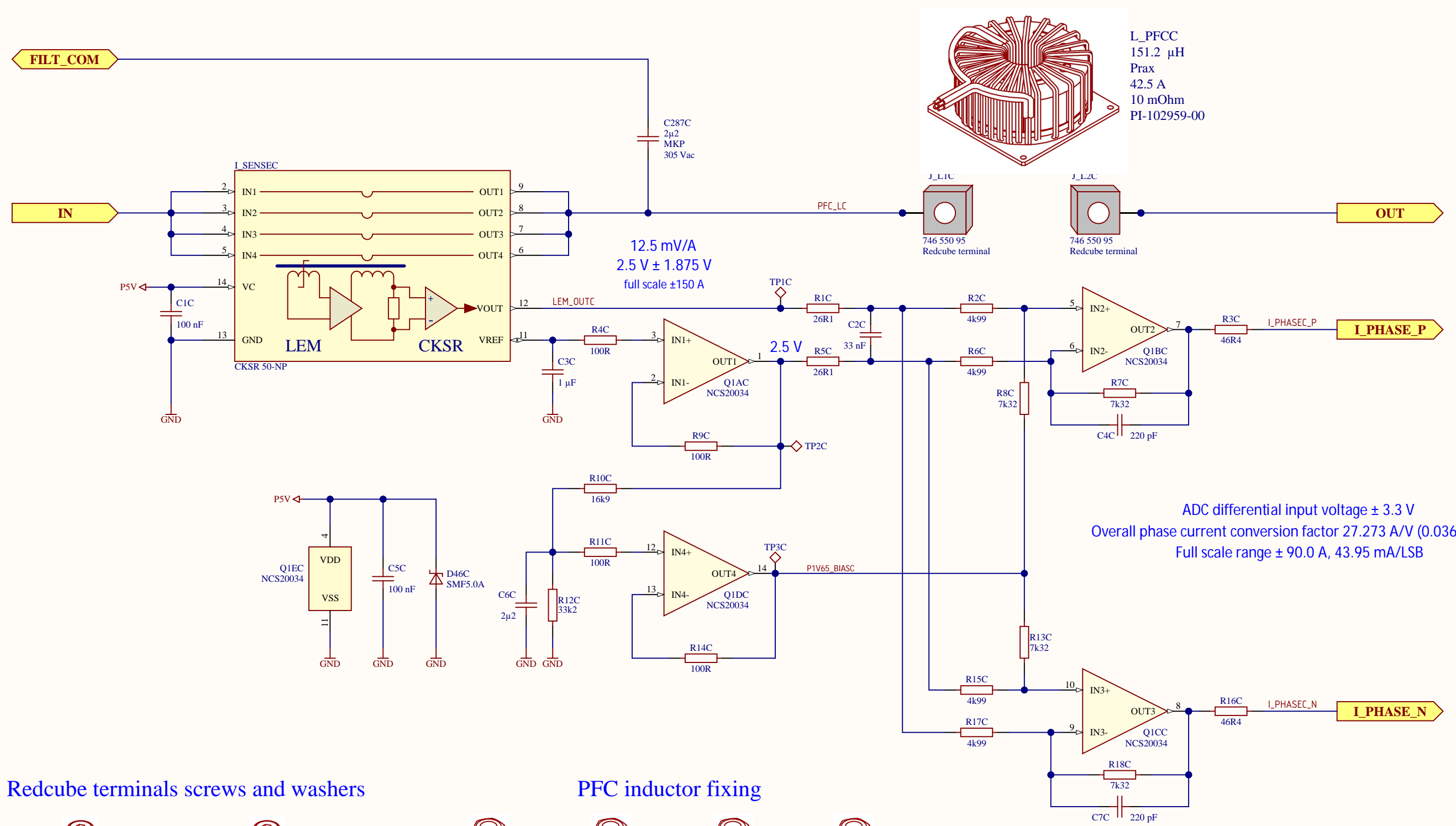
Redcube terminals screws and washers

PFC inductor fixing


$$G = 1.467$$

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

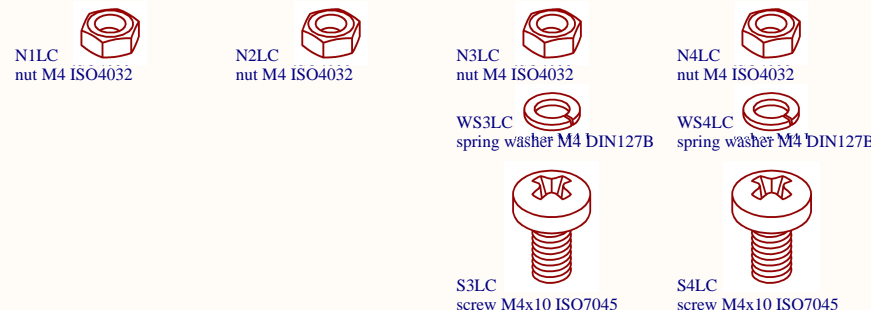
Phase C current sensor



Redcube terminals screws and washers



PFC inductor fixing



SEC-PFC-25KW-SIC-PIM-GEVK

Phase current sensor interface

Revision: 0.2

Repository revision: 2821

Engineer: Stefan Kosterec

07.Sep 2022 18:30

File: current_sensor_if.SchDoc

6/21

Assembly variant:

standard_board

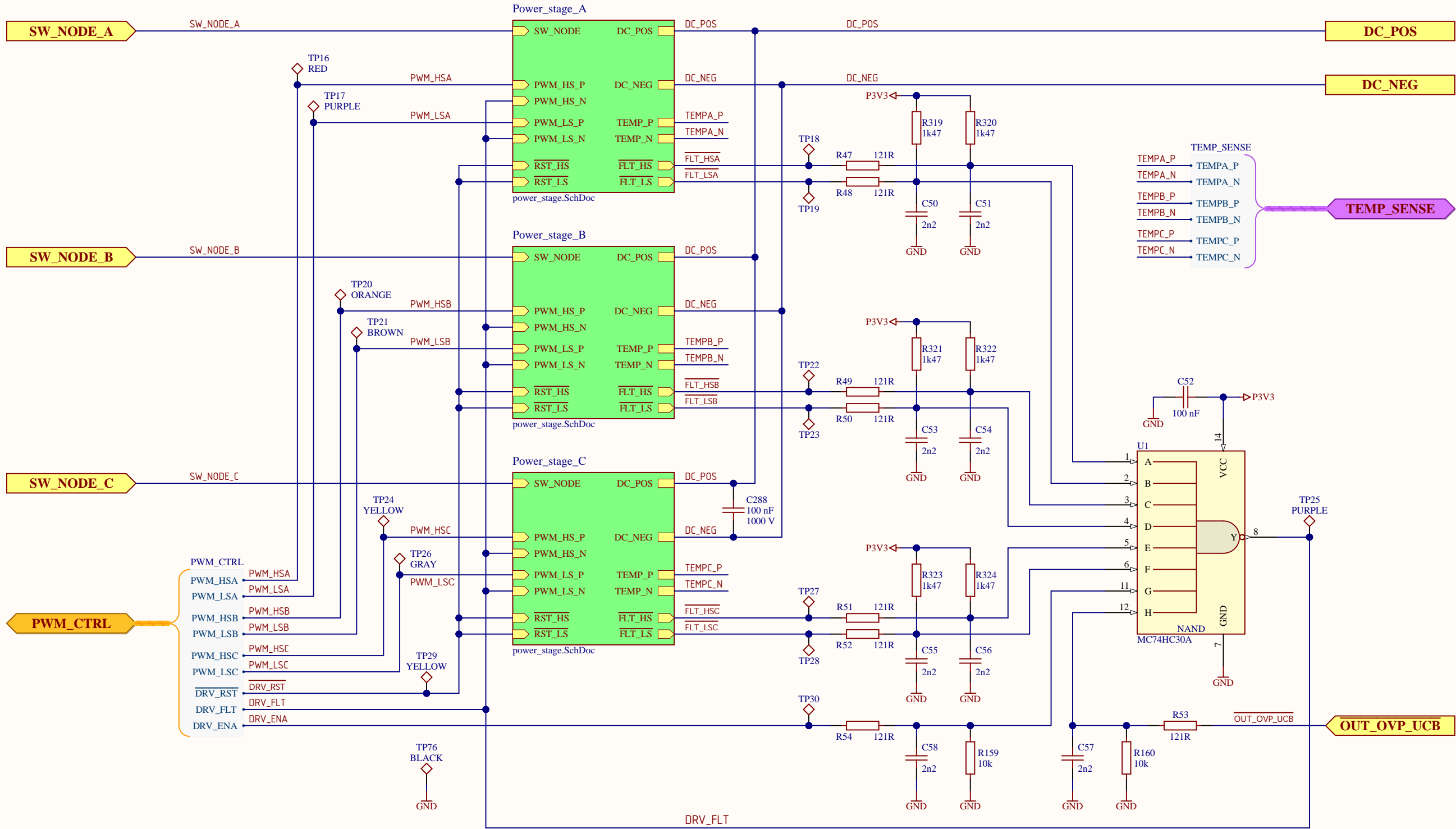
State:

released

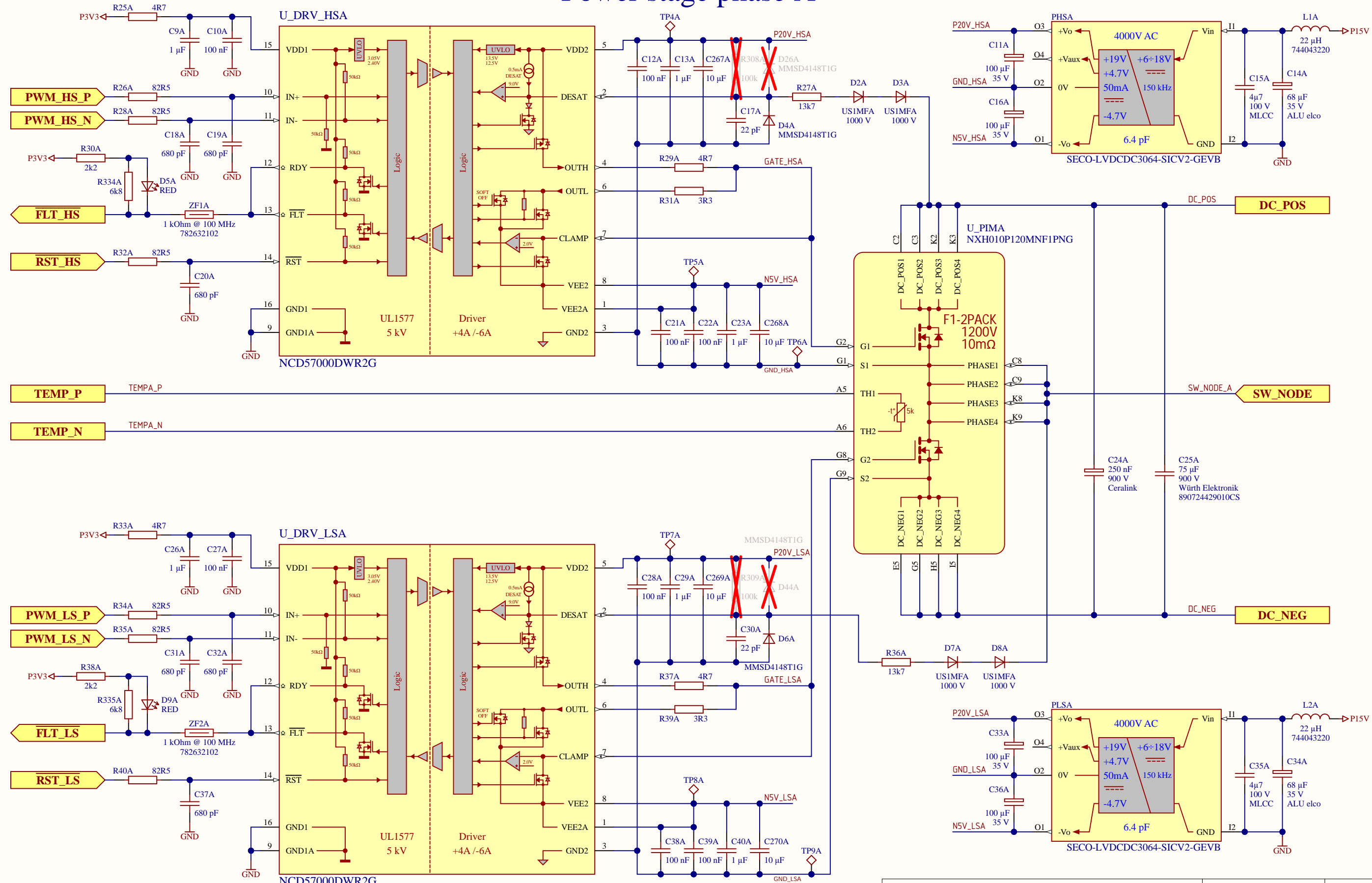
onsemi

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Power switching and fault logic

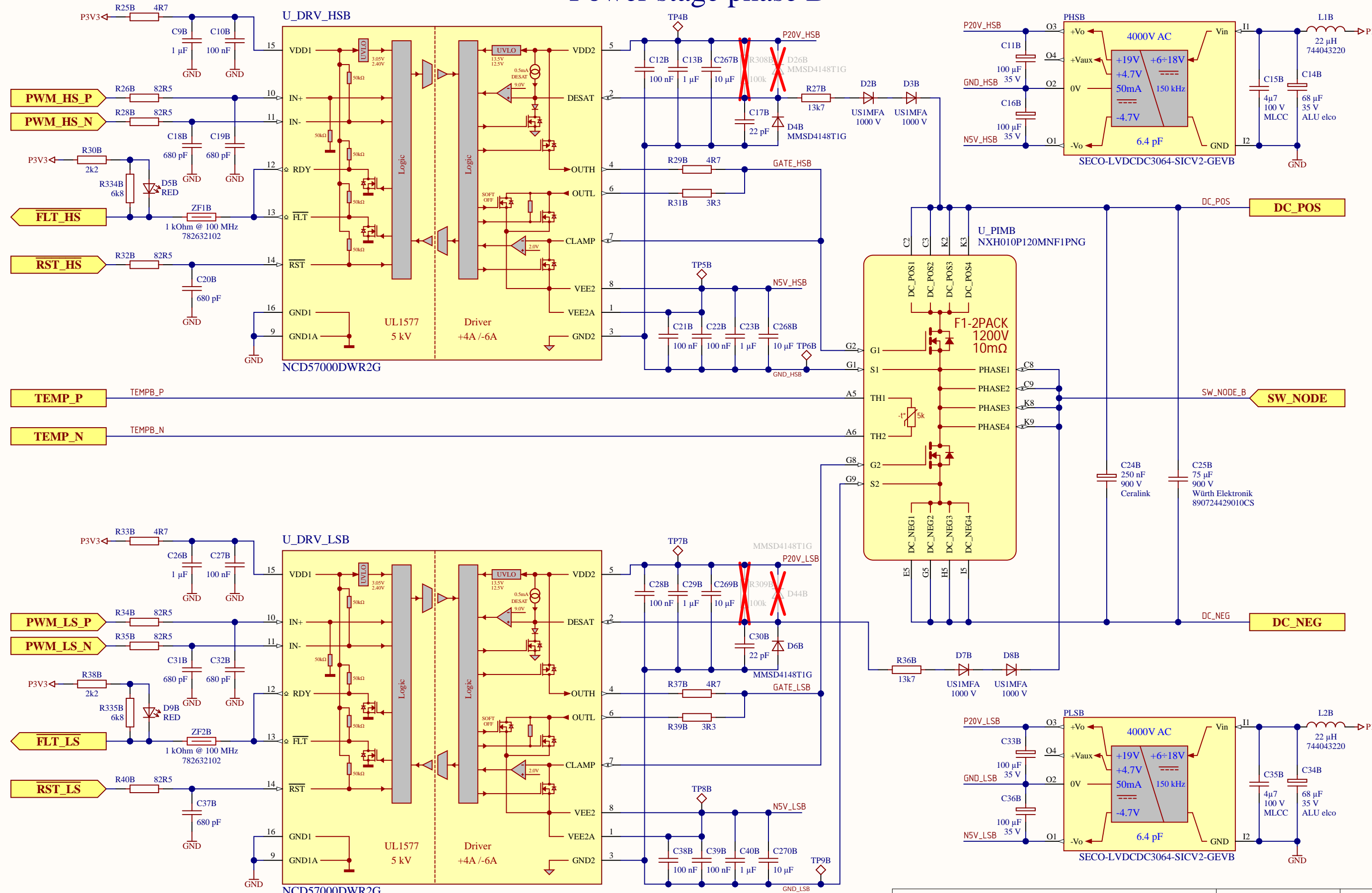



Power stage phase A



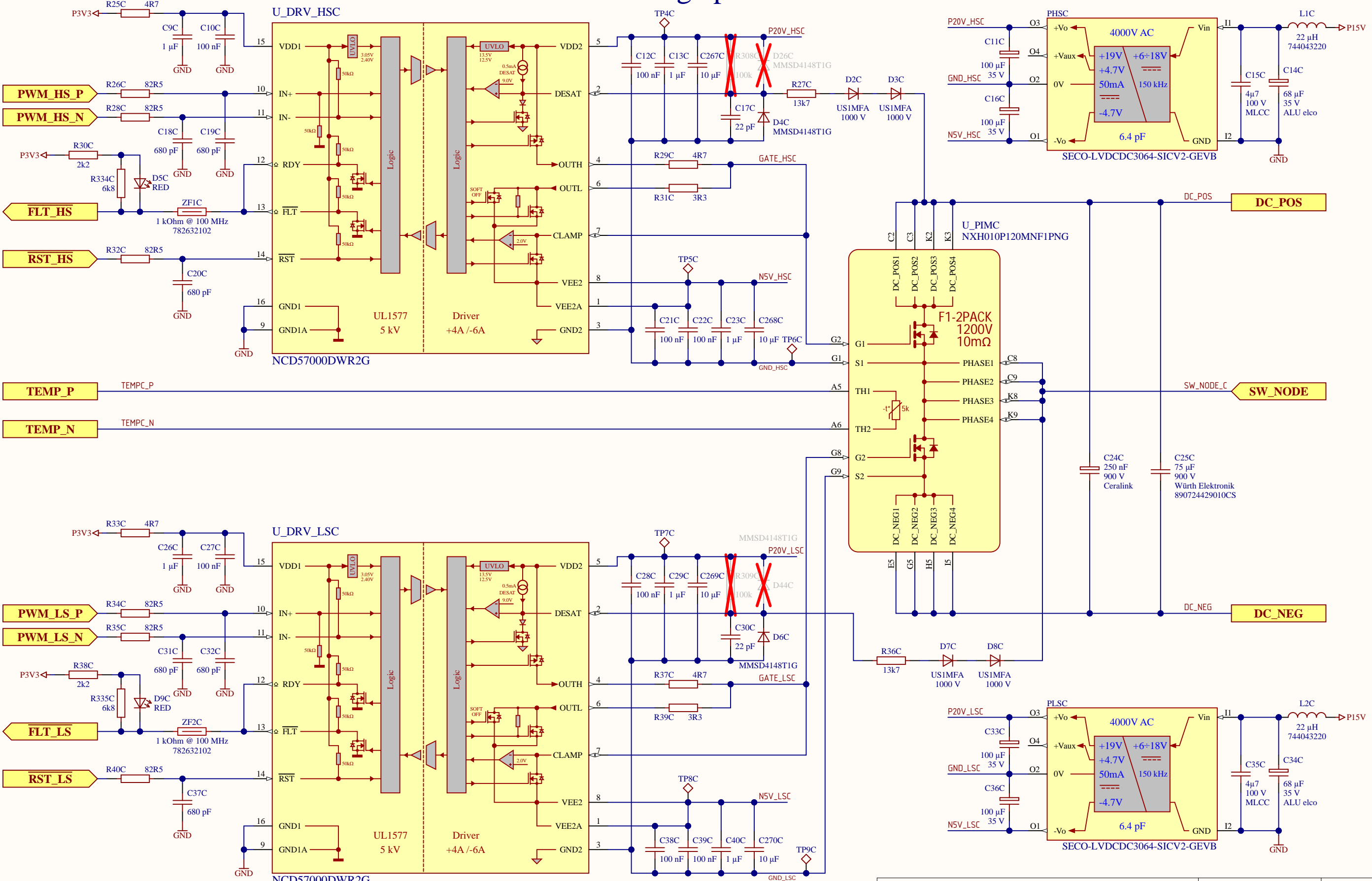
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
SiC module power stage		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec		07.Sep 2022 19:41	
File: power_stage.SchDoc		8/21	PSG Systems Applications Solutions Engineering


Power stage phase B



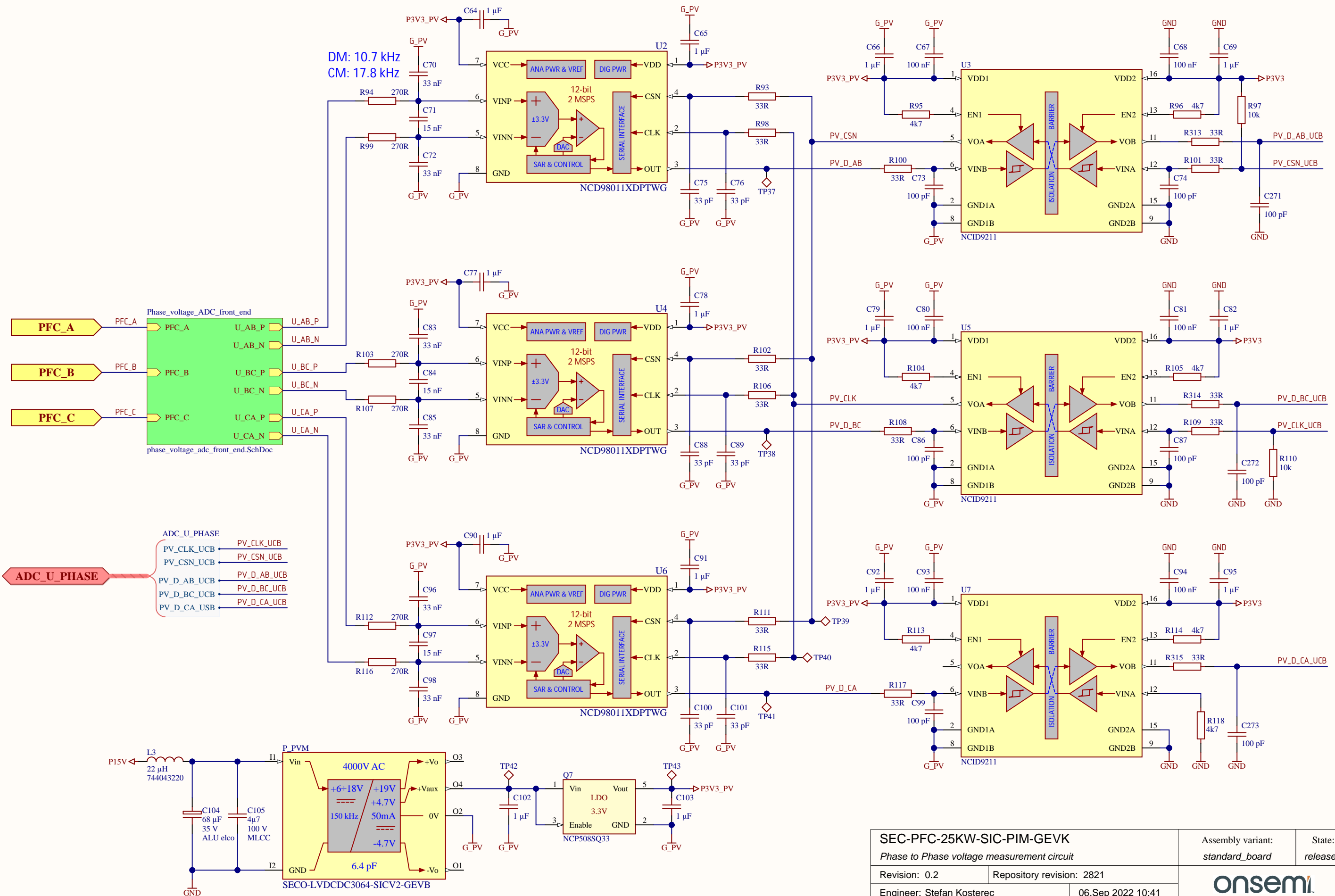
SEC-PFC-25KW-SIC-PIM-GEVK		Assembly variant:	State:
SiC module power stage		standard_board	released
Revision: 0.2	Repository revision: 2821		
Engineer: Stefan Kosterec	07.Sep 2022 19:41		
File: power_stage.SchDoc	9/21		
			
		PSG Systems Applications Solutions Engineering	

Power stage phase C

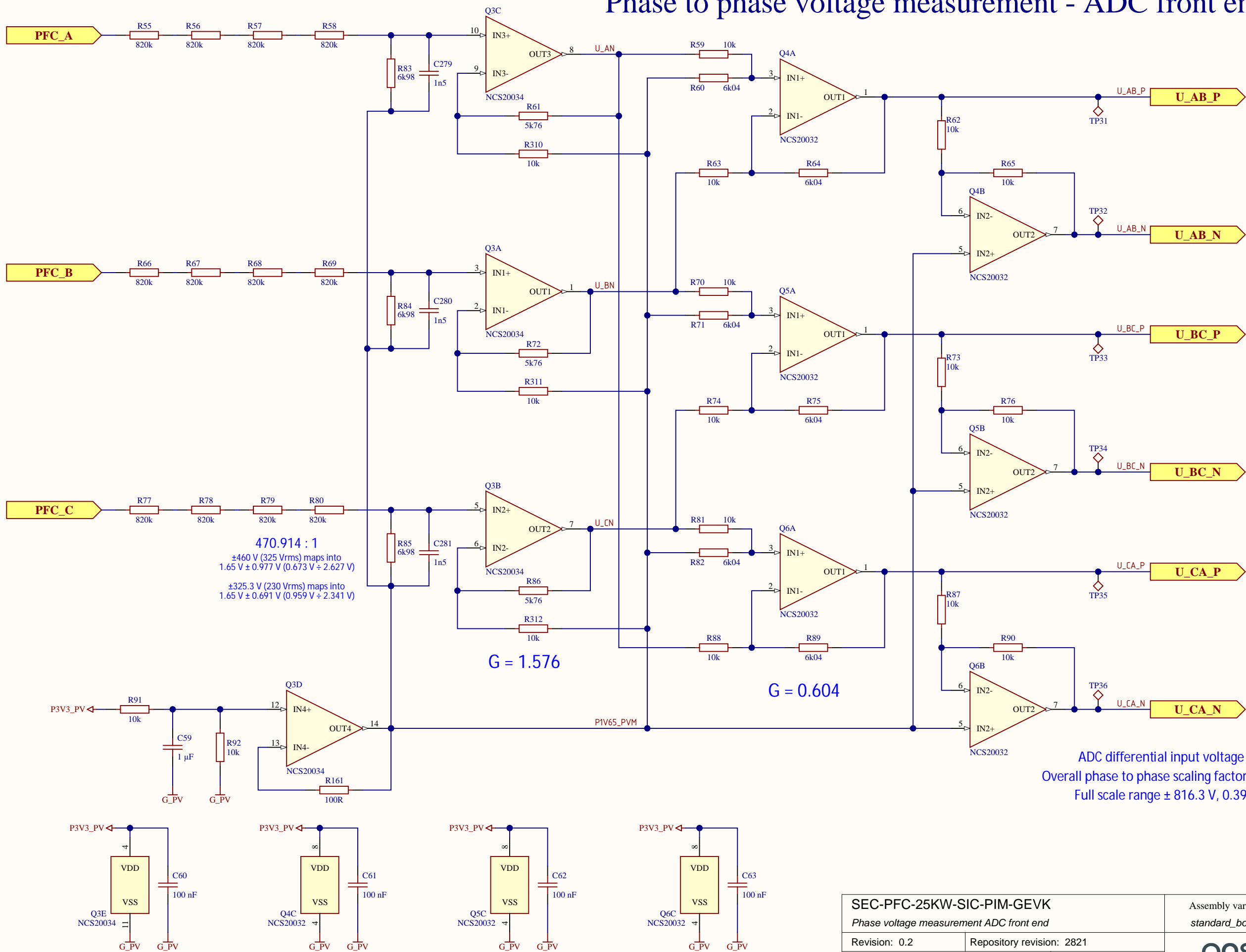


SEC-PFC-25KW-SIC-PIM-GEVK <i>SiC module power stage</i>		Assembly variant: <i>standard_board</i>	State: <i>released</i>
Revision: 0.2	Repository revision: 2821		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec	07.Sep 2022 19:41		
File: power_stage.SchDoc	10/21		

Phase to phase voltage measurement



Phase to phase voltage measurement - ADC front end



SEC-PFC-25KW-SIC-PIM-GEVK

Phase voltage measurement ADC front end

Revision: 0.2 Repository revision: 2821

Engineer: Stefan Kosterec 06.Sep 2022 08:53

File: phase_voltage_adc_front_end.SchDoc 12/21

Assembly variant:

standard_board

State:

released

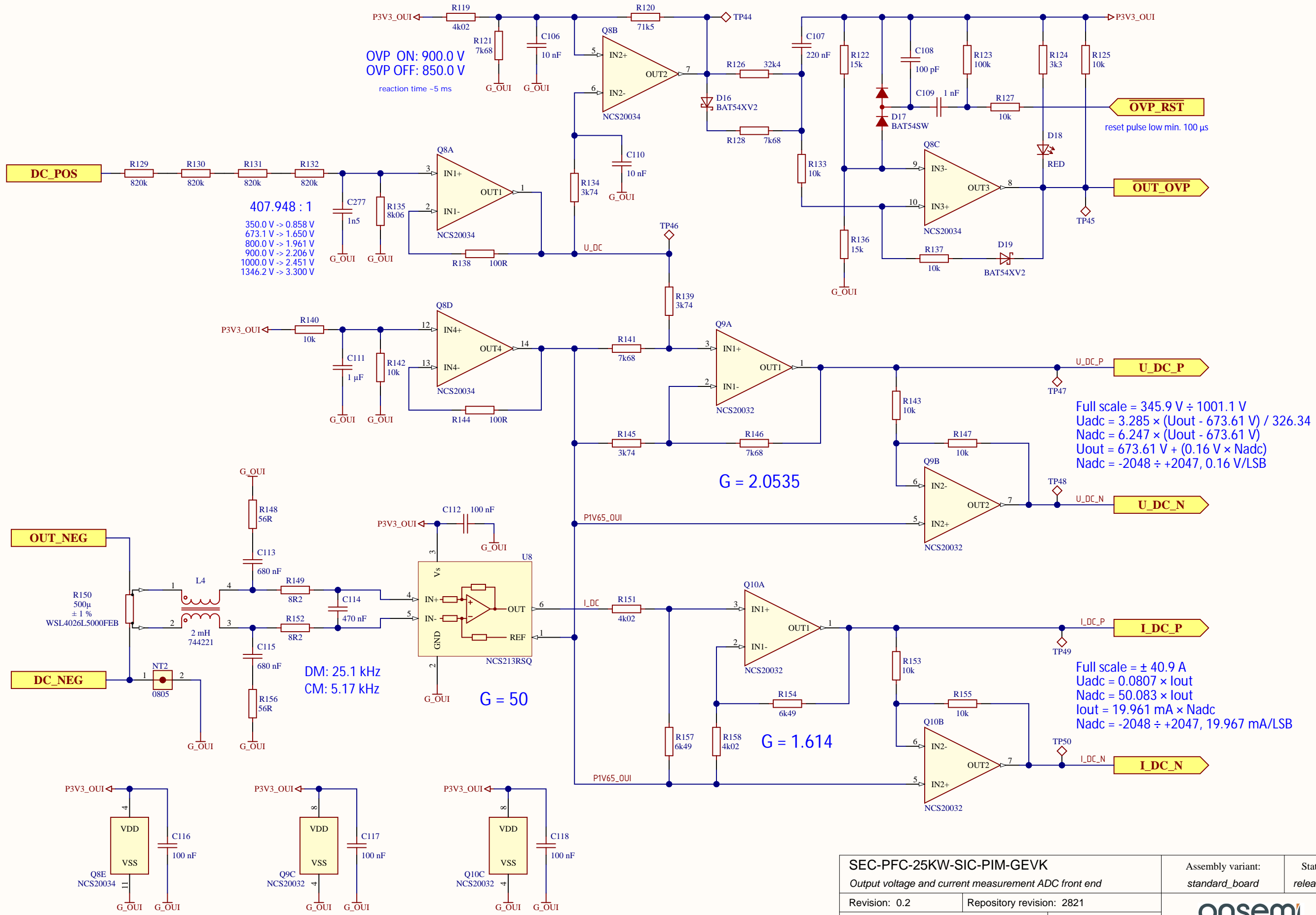
onsemi

PSG Systems Applications Solutions Engineering

A



Output voltage and current measurement ADC front end



Temperature sensing ADC front end

Temperature measurement target range 0 ÷ 170°C

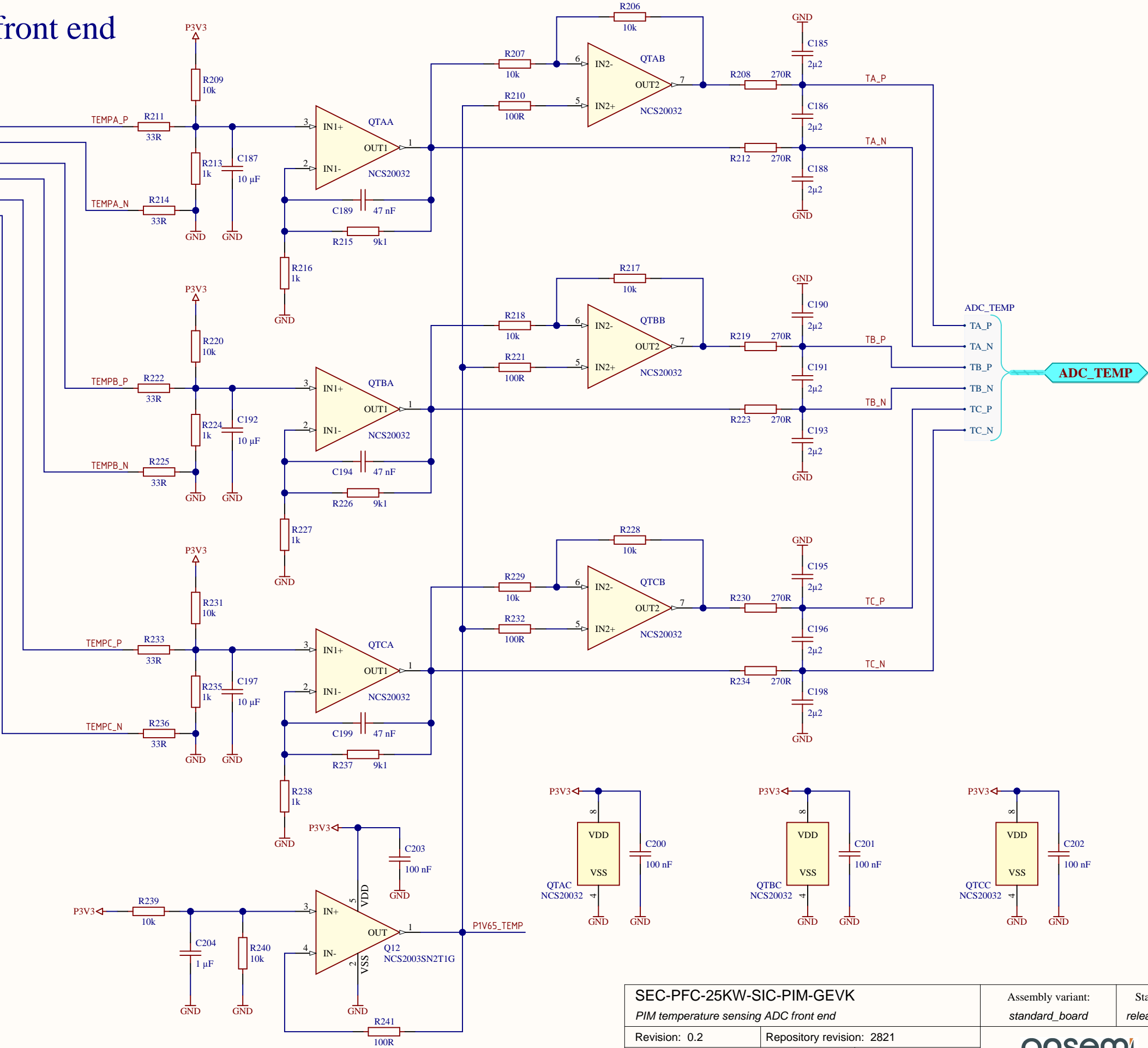
NXH010P120MNF1PNG NTC parameters:
R25 = 5 kΩ
B(25/100) = 3455 K

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

Revision: 0.2

Repository revision: 2821

Engineer: Stefan Kosterec

06.Sep 2022 07:24

File: temp_sense_adc_front_end.SchDoc

16/21

Assembly variant:

standard_board

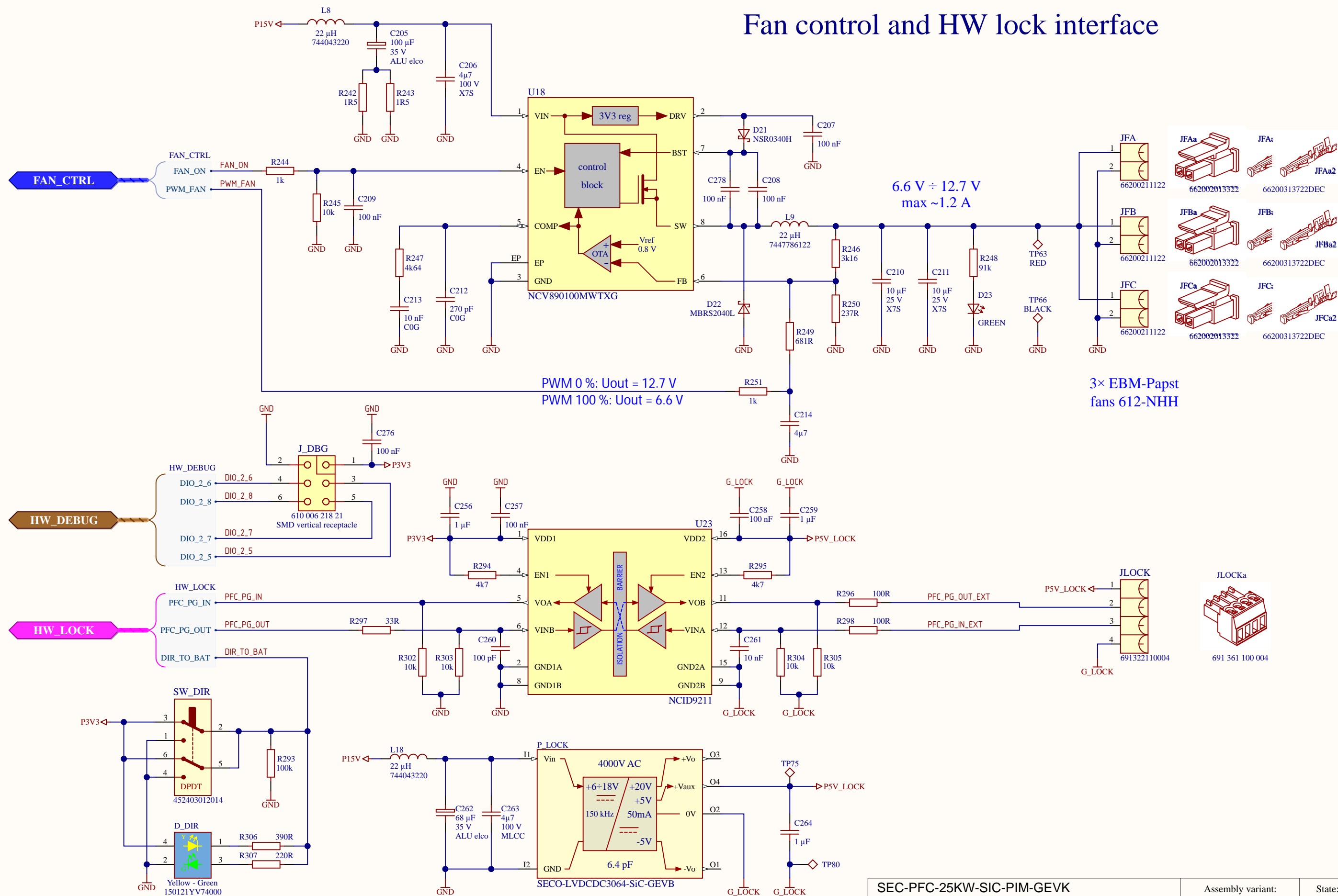
State:

released

onsemi

PSG Systems Applications Solutions Engineering

Fan control and HW lock interface



SEC-PFC-25KW-SIC-PIM-GEVK

Fan control and HW lock interface

Revision: 0.2 Repository revision: 2821

Engineer: Stefan Kosterec 06.Sep 2021 08:35

File: fan_control.SchDoc 17/21

Assembly variant:

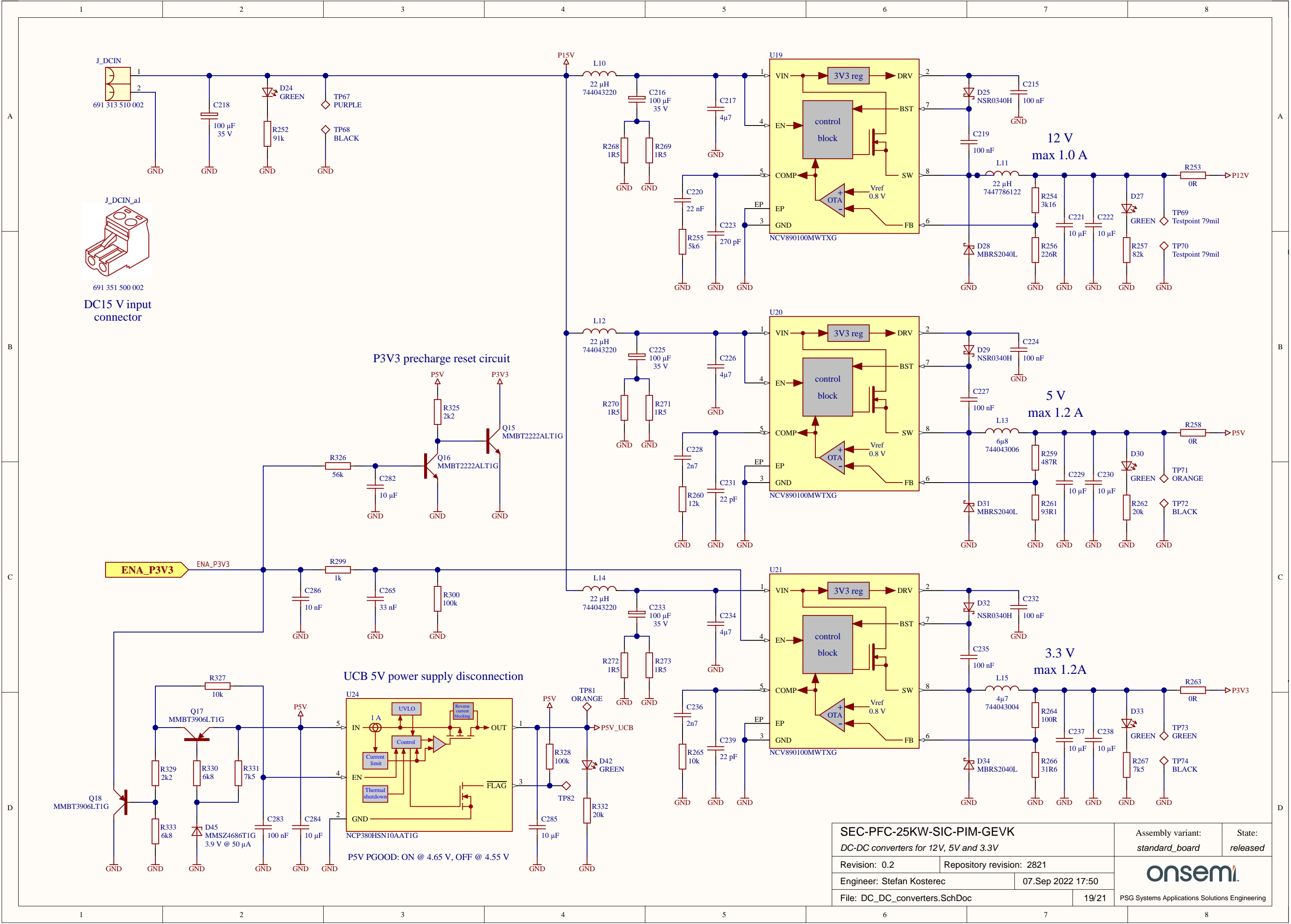
standard_board

State:

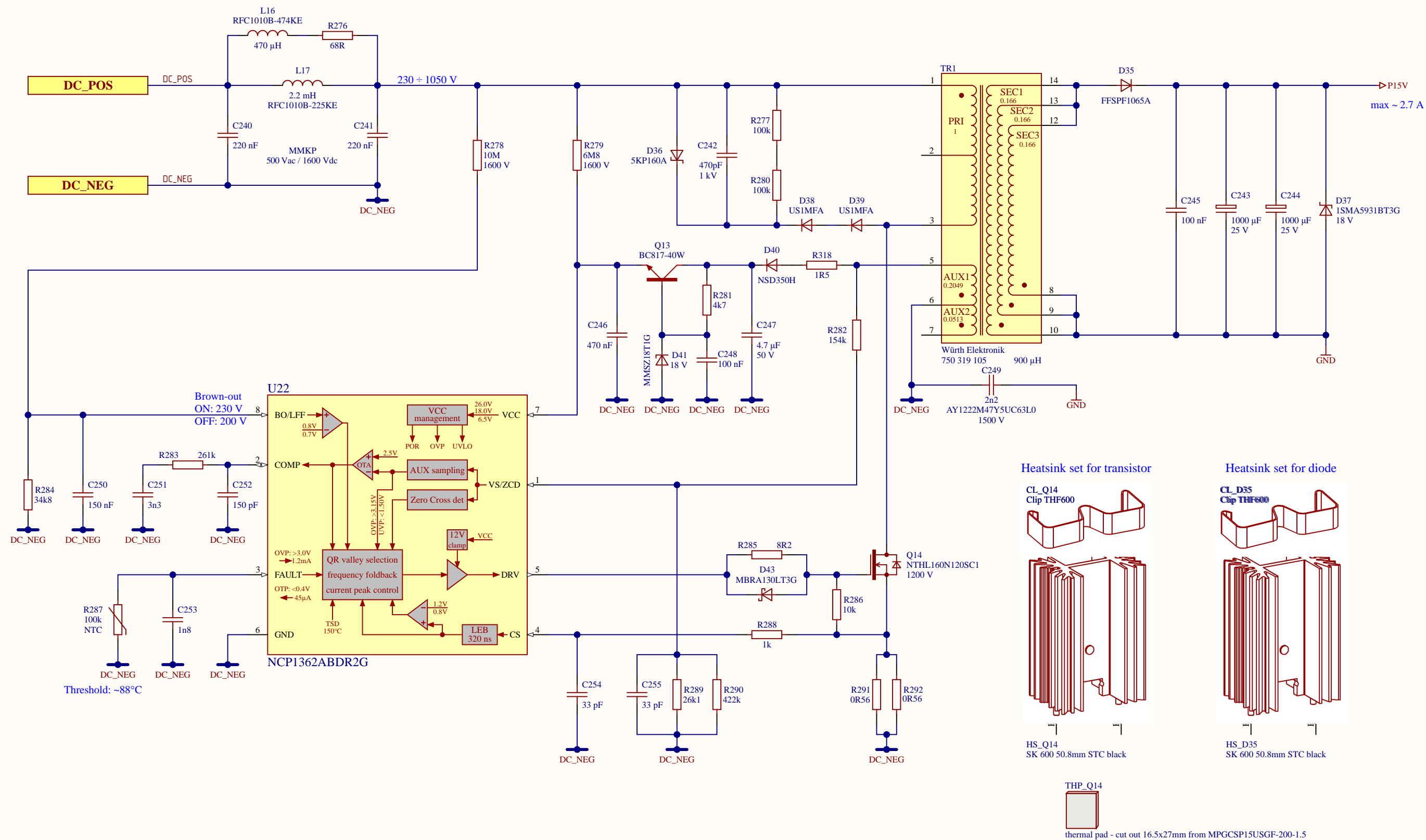
released

onsemi

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High voltage DC-DC converter 800 V to 15 V 40 W



SEC-PFC-25KW-SIC-PIM-GEVK

High voltage DC-DC converter 800 V to 15 V 40 W

Revision: 0.2

Repository revision: 2821

Engineer: Stefan Kosterec

09.Sep 2022 15:16

File: HV_supply_15V.SchDoc

20/21

Assembly variant:

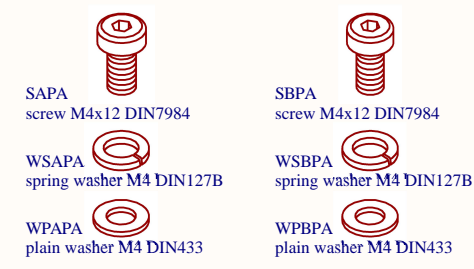
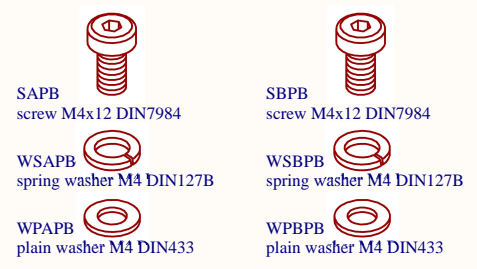
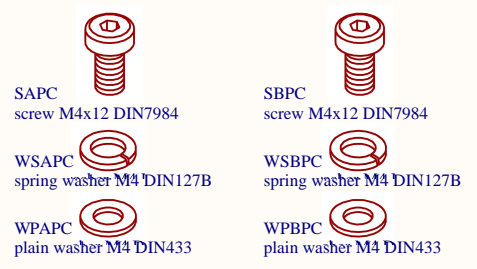
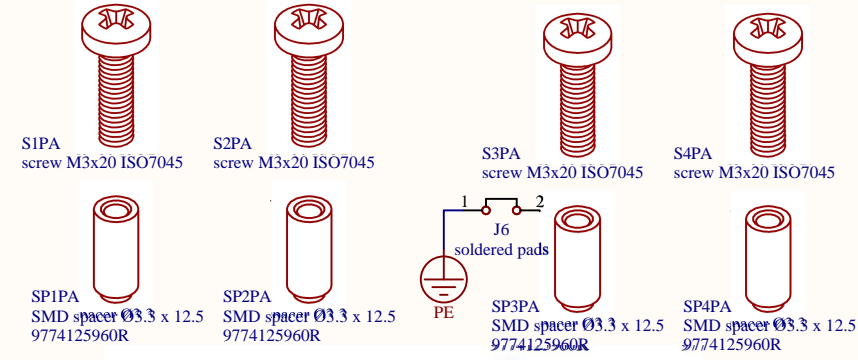
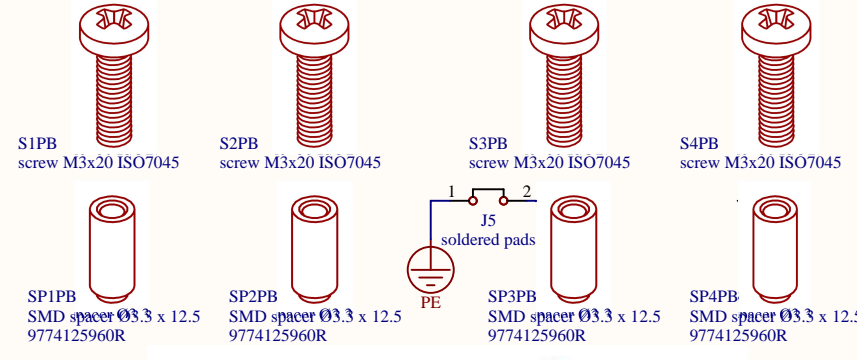
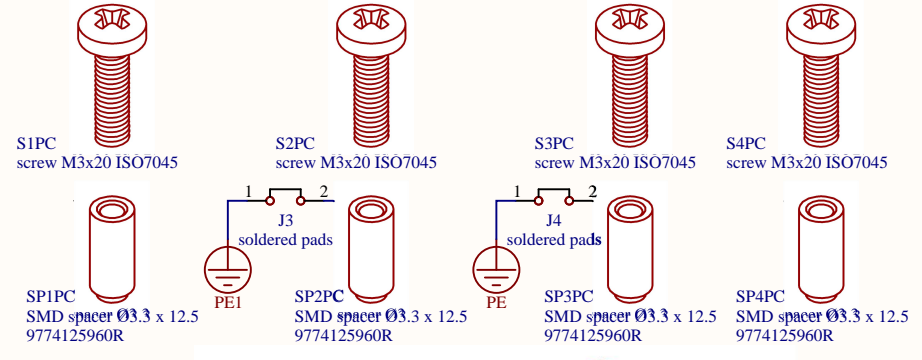
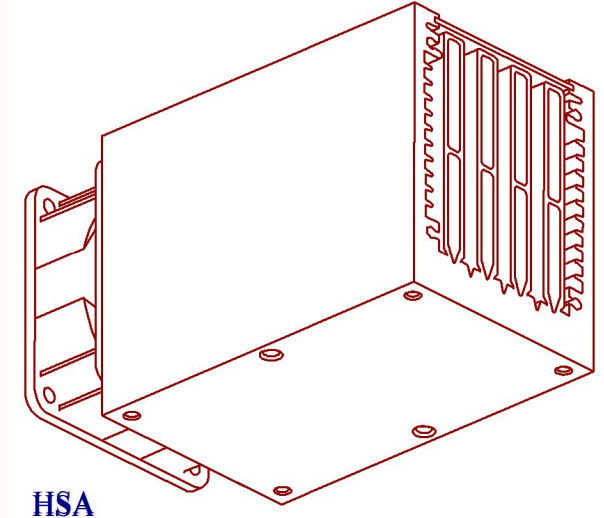
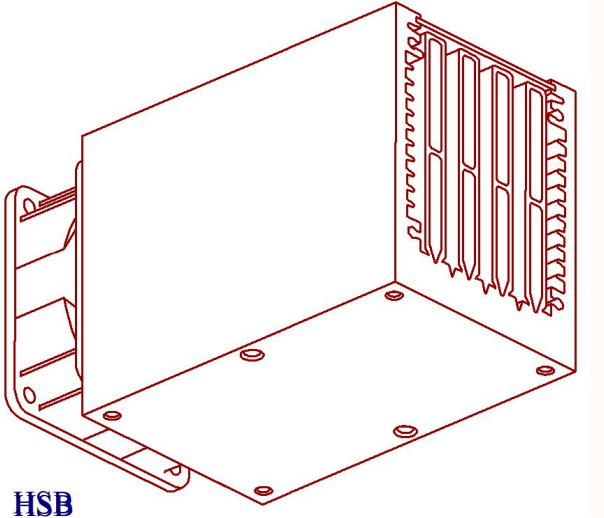
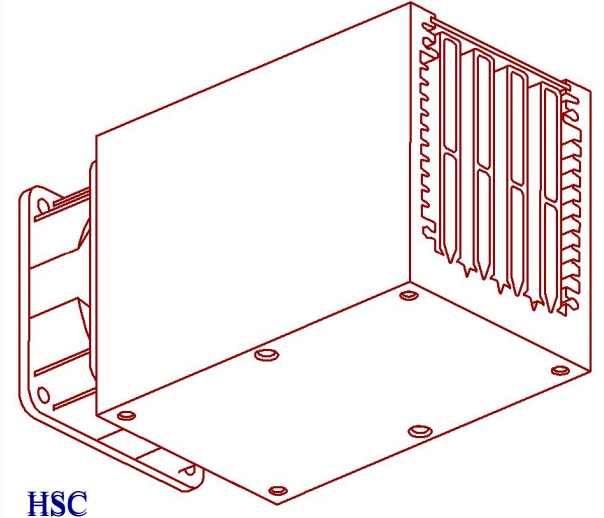
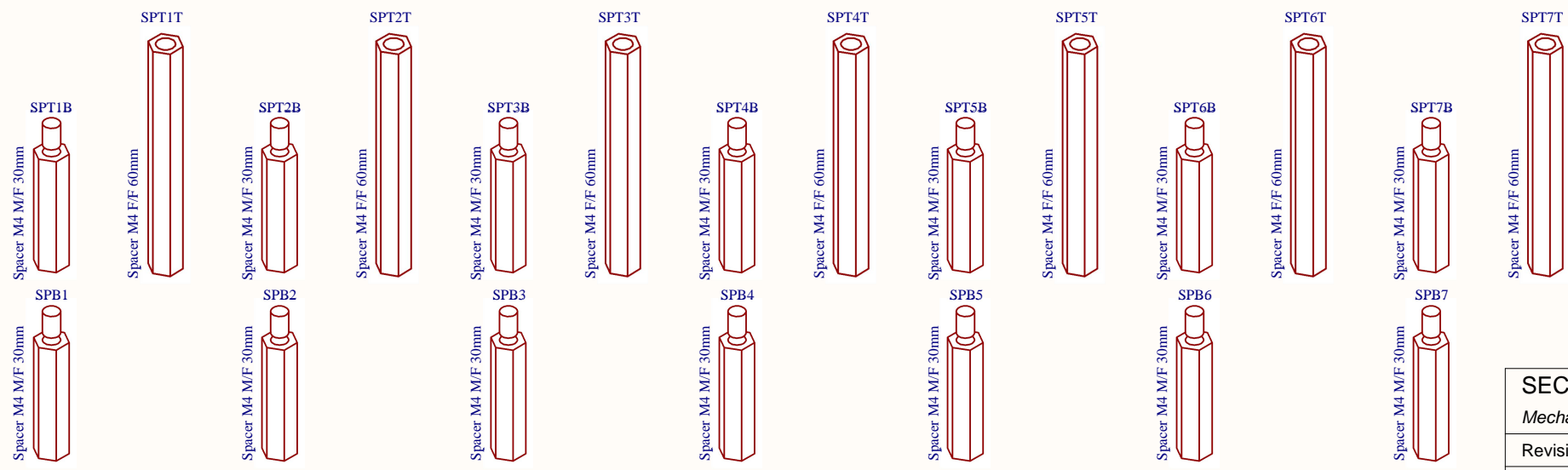
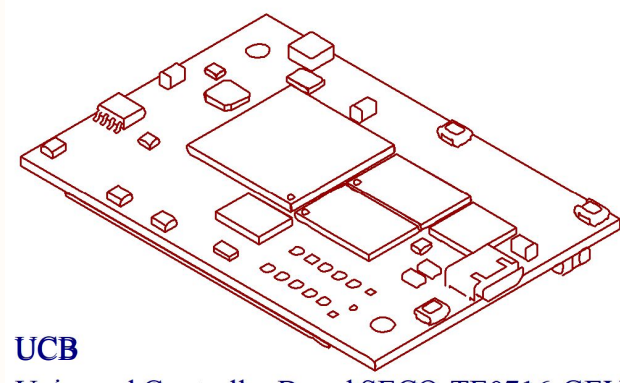



standard_board

State:

released

onsemi

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1	2	3	4	5	6	7	8														
A	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 																
	 <p>HSA LA 6 100 12 - modified for E066 PFC</p>		 <p>HSB LA 6 100 12 - modified for E066 PFC</p>		 <p>HSC LA 6 100 12 - modified for E066 PFC</p>																
C	Spacers for board mechanical support 																				
	 <p>UCB Universal Controller Board SECO-TE0716-GEVB</p>						<table><tr><td colspan="2">SEC-PFC-25KW-SIC-PIM-GEVK <i>Mechanical and enclosed in package parts</i></td><td>Assembly variant: <i>standard_board</i></td><td>State: <i>released</i></td></tr><tr><td>Revision: 0.2</td><td colspan="2">Repository revision: 2821</td><td rowspan="3"> PSG Systems Applications Solutions Engineering</td></tr><tr><td colspan="2">Engineer: Stefan Kosterec</td><td>06.Sep 2021 11:16</td></tr><tr><td colspan="2">File: mechanical_parts.SchDoc</td><td>21/21</td></tr></table>	SEC-PFC-25KW-SIC-PIM-GEVK <i>Mechanical and enclosed in package parts</i>		Assembly variant: <i>standard_board</i>	State: <i>released</i>	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
	SEC-PFC-25KW-SIC-PIM-GEVK <i>Mechanical and enclosed in package parts</i>		Assembly variant: <i>standard_board</i>	State: <i>released</i>																	
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																			
1	2	3	4	5	6	7	8														