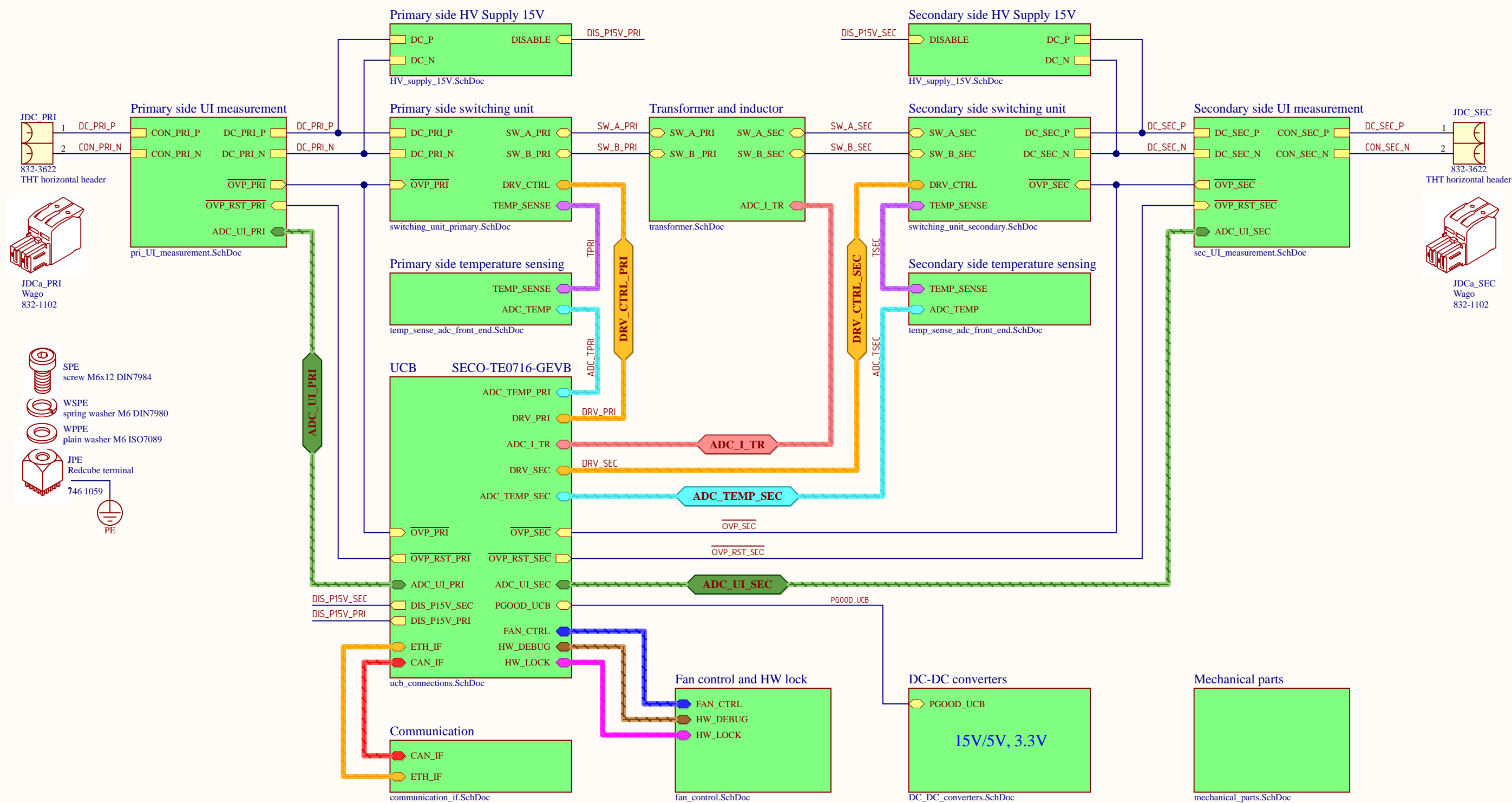


Fast EV DC charger - 25 kW Dual Active Bridge converter



SEC-DAB-25KW-SIC-PIM-GEVK

Top level diagram

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:34

File: E066_DAB.SchDoc

1/23

Assembly variant:

standard_board

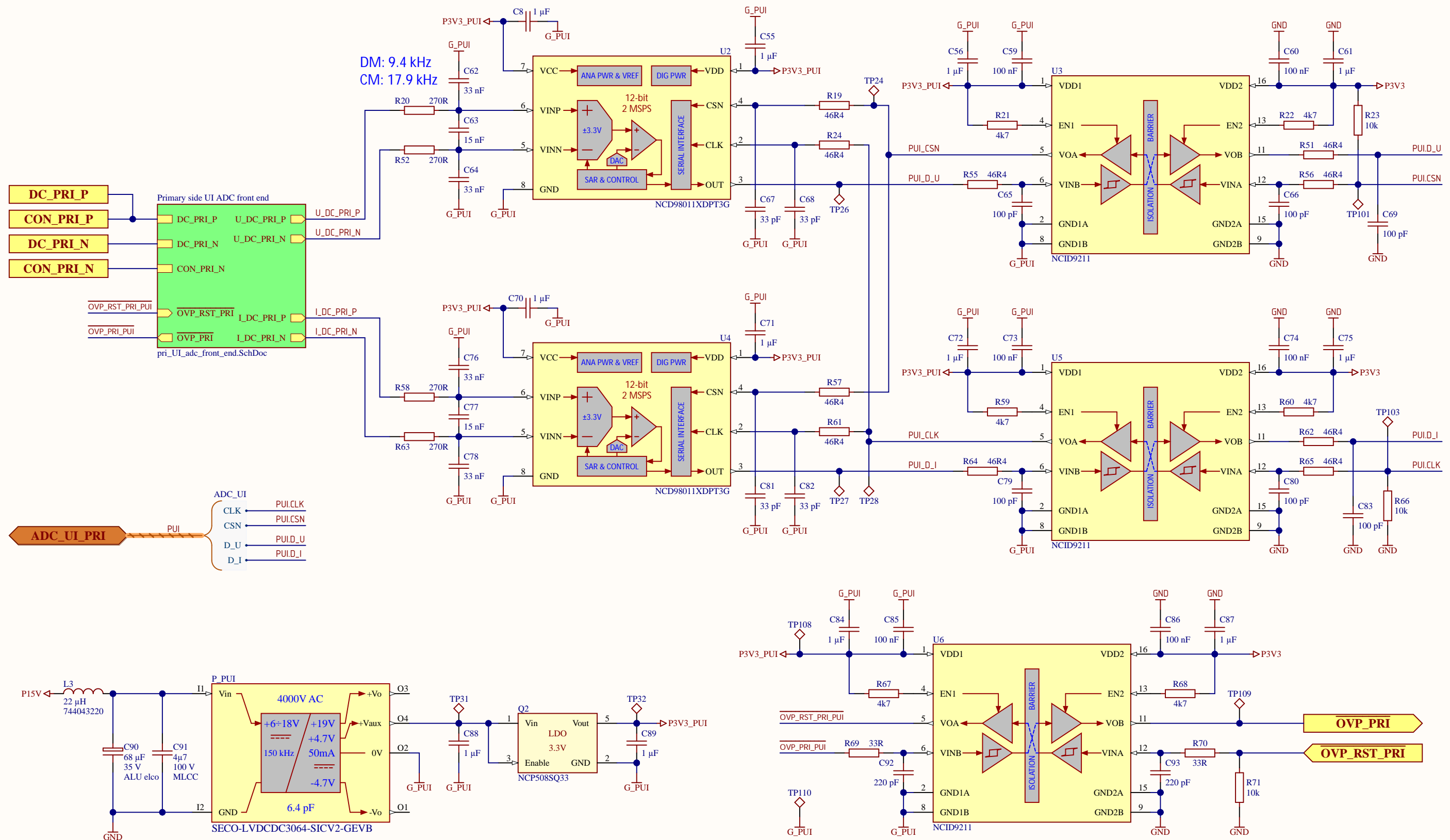
State:


released

onsemi

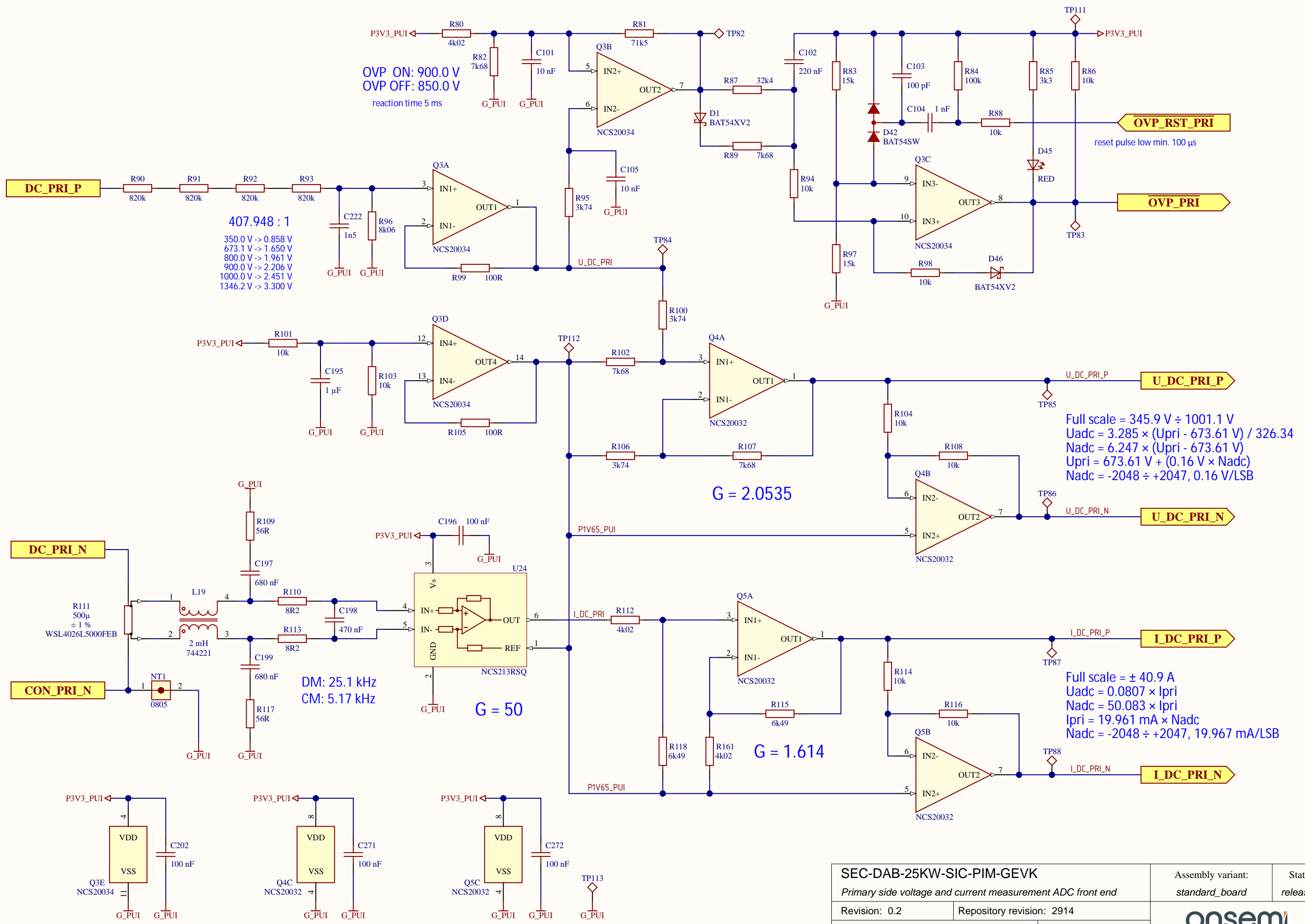
PSG Systems Applications Solutions Engineering

Primary side voltage and current measurement

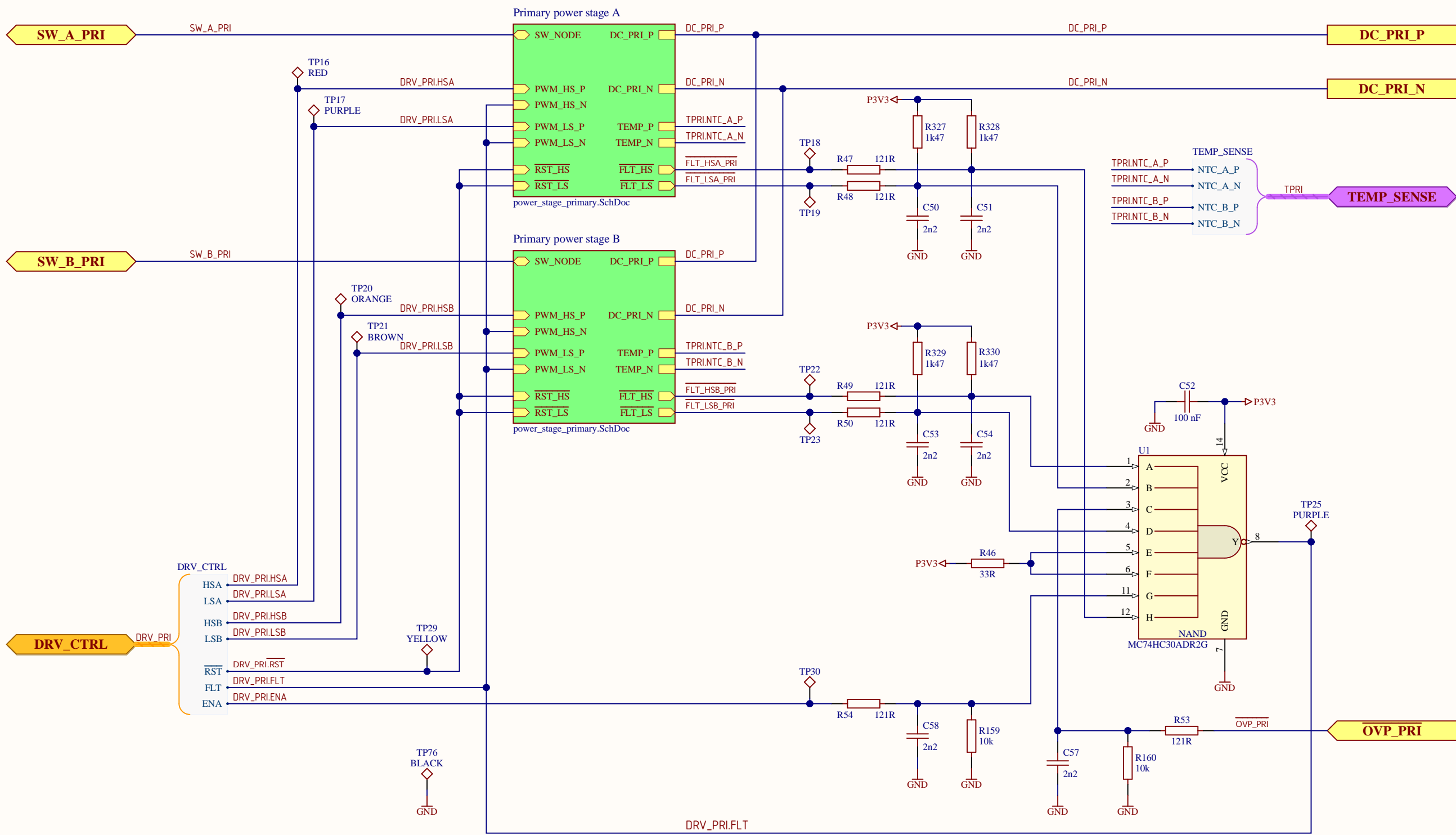


SEC-DAB-25KW-SIC-PIM-GEVK <i>Primary side voltage and current measurment circuit</i>		Assembly variant: <i>standard_board</i>	State: <i>released</i>
Revision: 0.2	Repository revision: 2914		 PSG Systems Applications Solutions Engineering
Engineer: Stefan Kosterec	19.Sep 2022 18:34		
File: pri_UI_measurement.SchDoc		2/23	

Primary side voltage and current measurement ADC front end



Primary side switching and fault logic



SEC-DAB-25KW-SIC-PIM-GEVK

Primary switching unit and fault logic

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:36

File: switching_unit_primary.SchDoc

4/23

Assembly variant:

standard_board

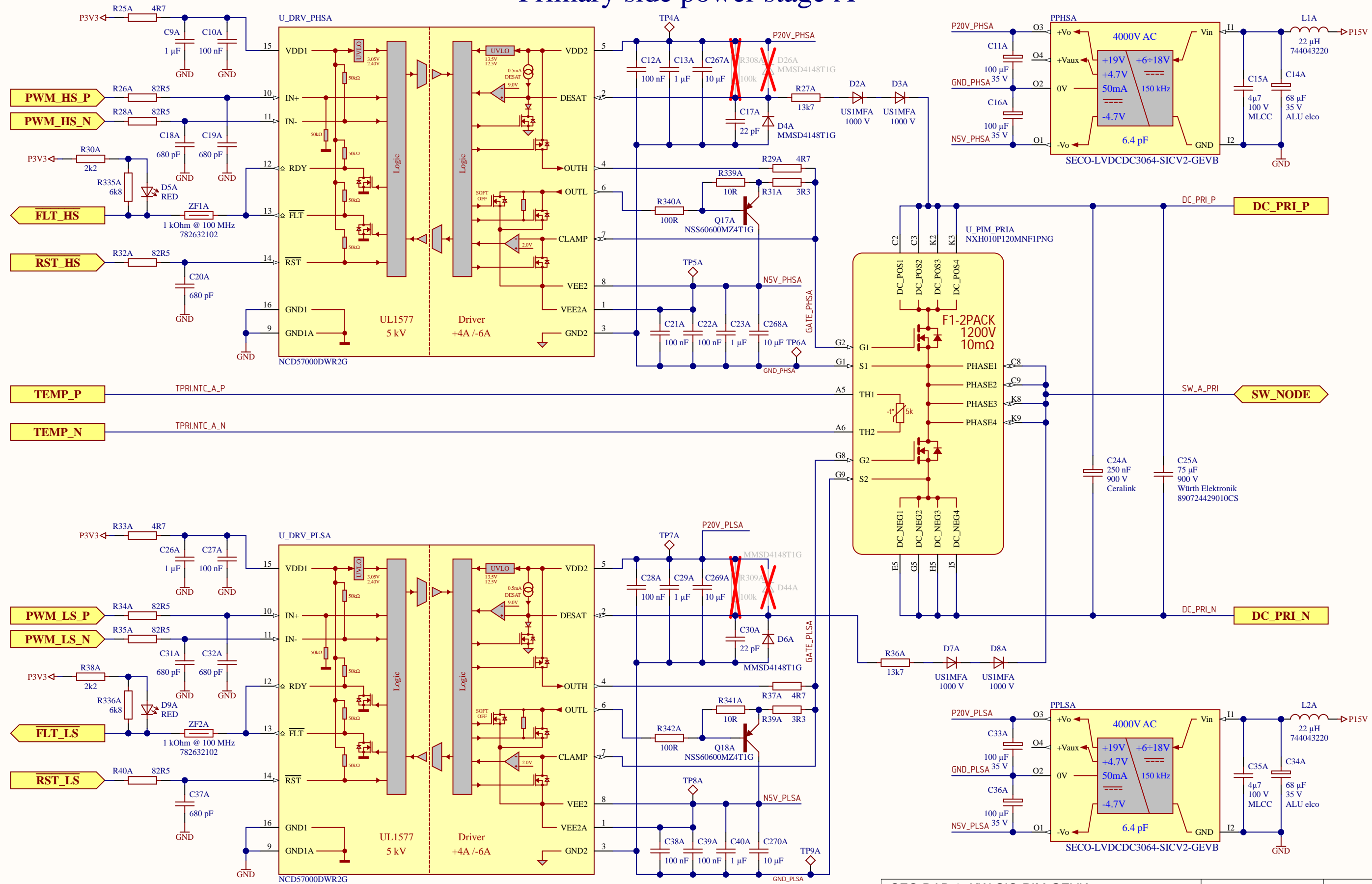
State:

released

onsemi

PSG Systems Applications Solutions Engineering

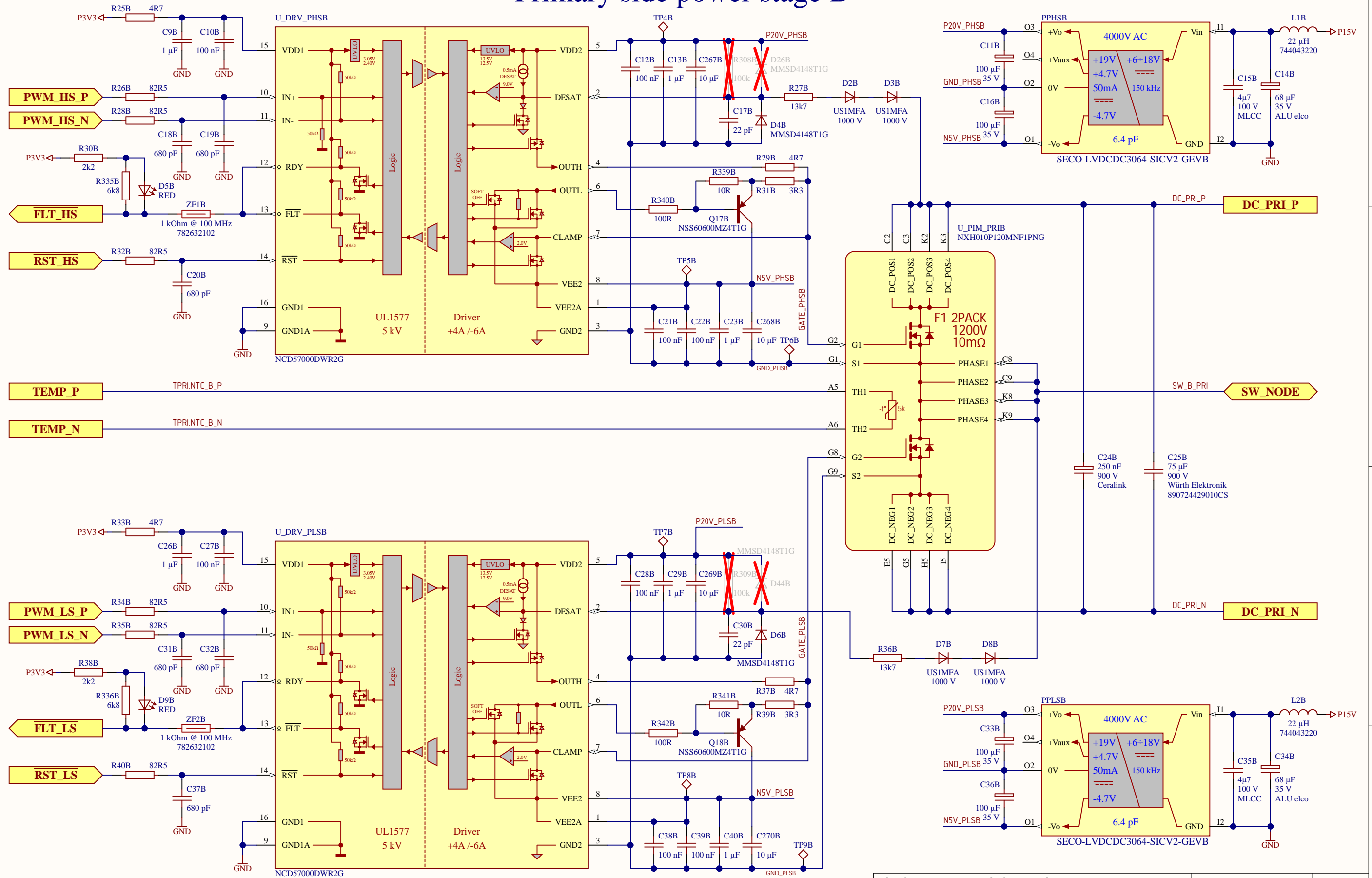
Primary side power stage A




SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Primary side power stage		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec		19.Sep 2022 18:37	
File: power_stage_primary.SchDoc		5/23	PSG Systems Applications Solutions Engineering

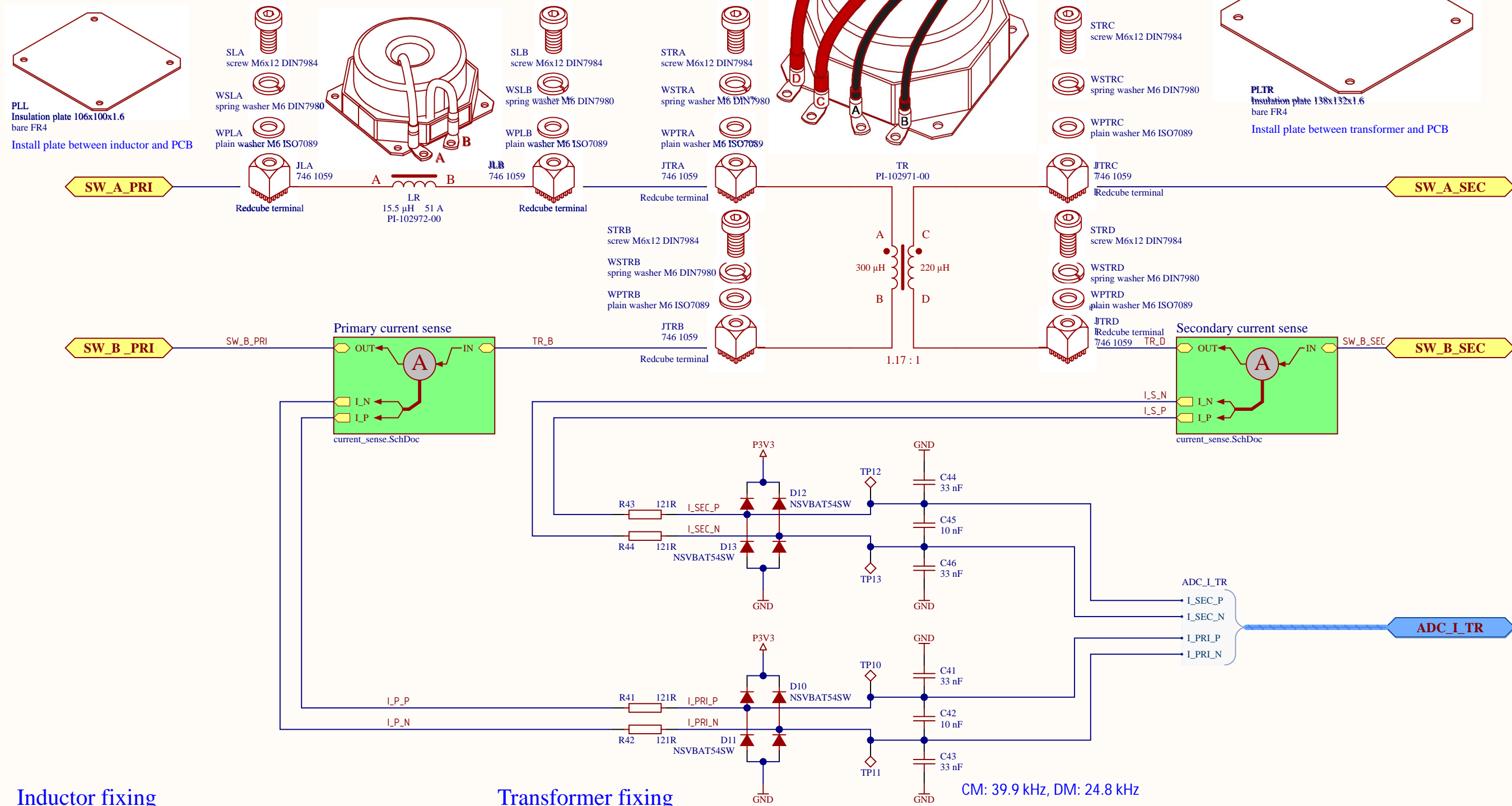
onsemi

Primary side power stage B

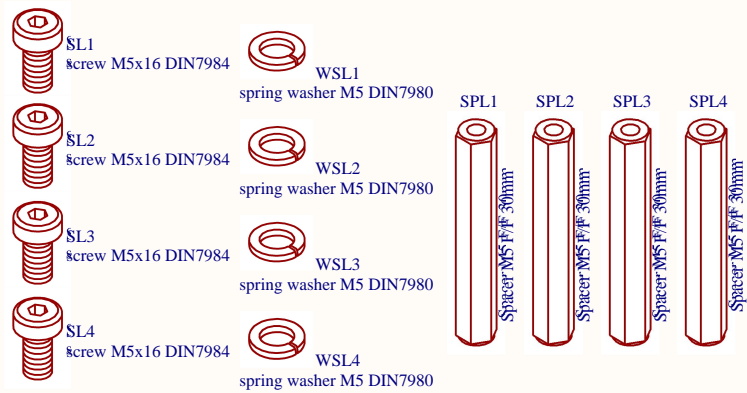


SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Primary side power stage		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec	19.Sep 2022 18:37		
File: power_stage_primary.SchDoc	6/23		

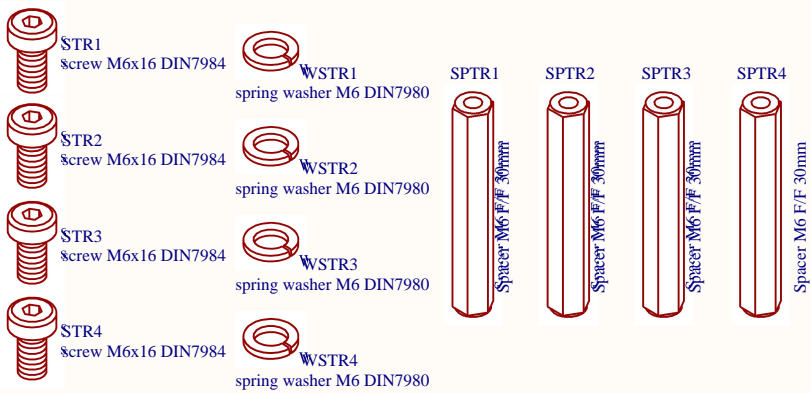
Power transformer and inductor



Inductor fixing

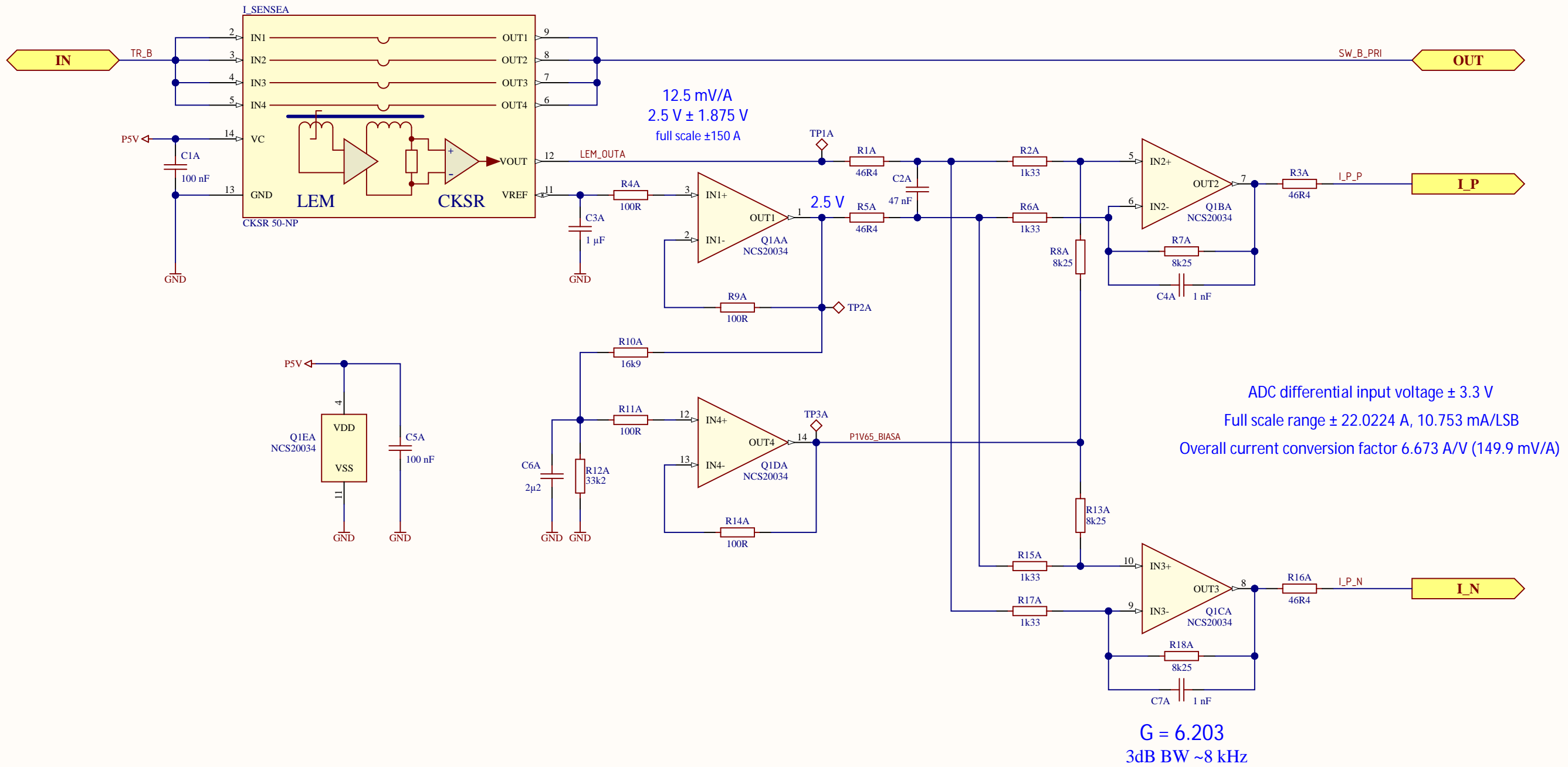


Transformer fixing



SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Power transformer and inductor		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec		19.Sep 2022 18:35	
File: transformer.SchDoc		7/23	PSG Systems Applications Solutions Engineering

Transformer primary side current sense



SEC-DAB-25KW-SIC-PIM-GEVK

Transformer current sensing

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:36

File: current_sense.SchDoc

8/23

Assembly variant:

standard_board

State:

released

onsemi

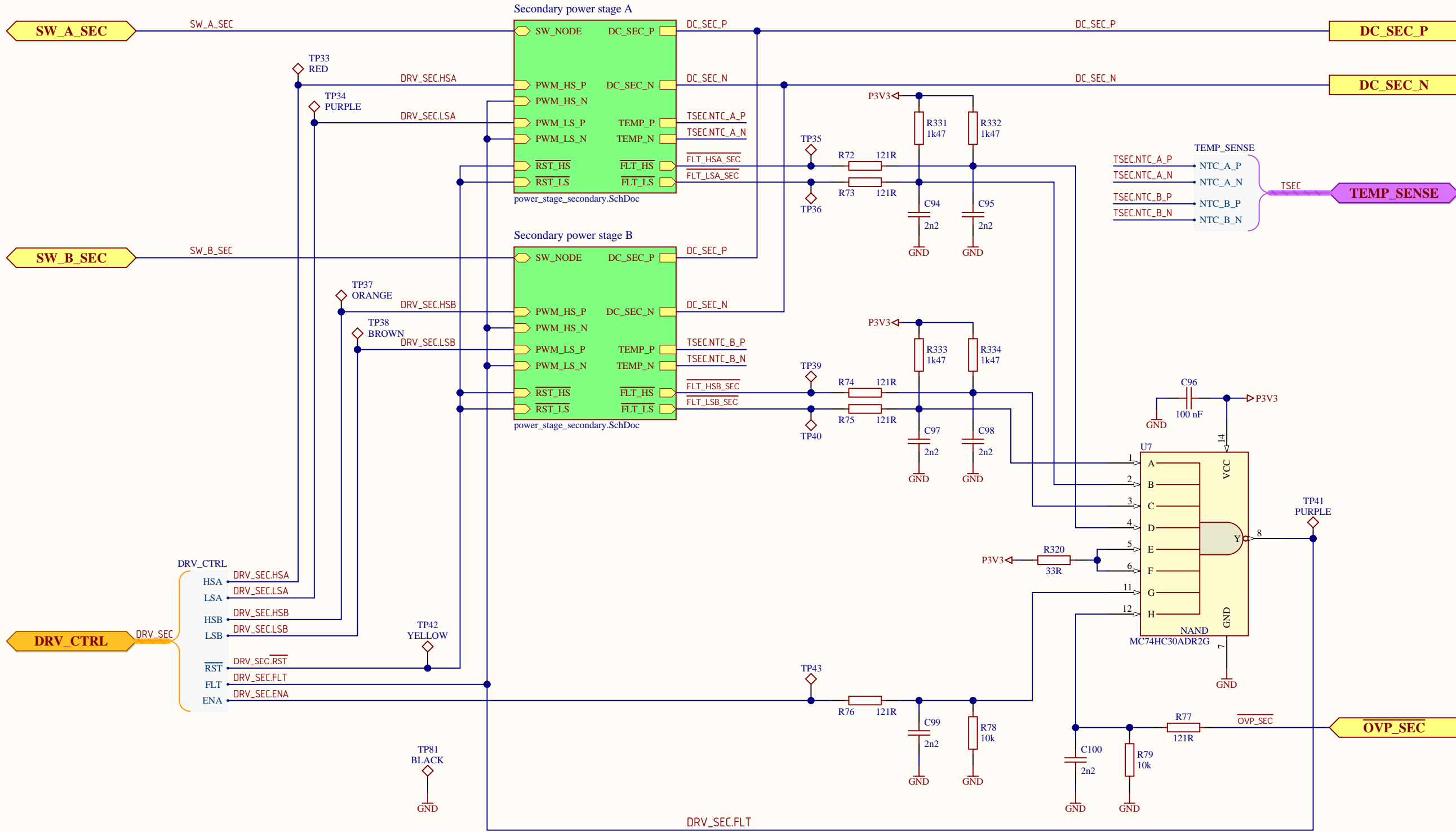
PSG Systems Applications Solutions Engineering

5



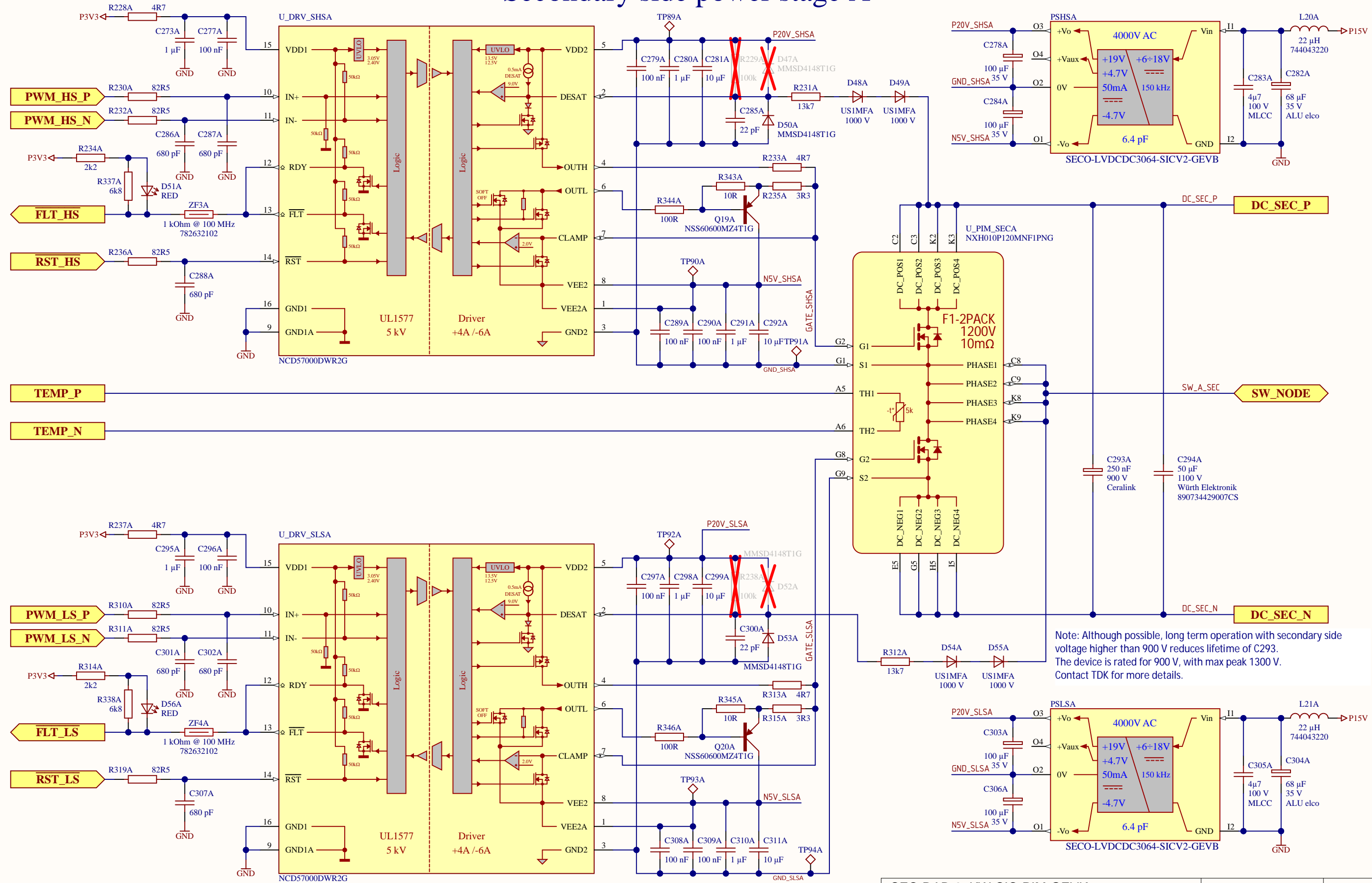
5

Secondary side switching and fault logic



SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Secondary switching unit and fault logic		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec		19.Sep 2022 18:37	
File: switching_unit_secondary.SchDoc		10/23	PSG Systems Applications Solutions Engineering

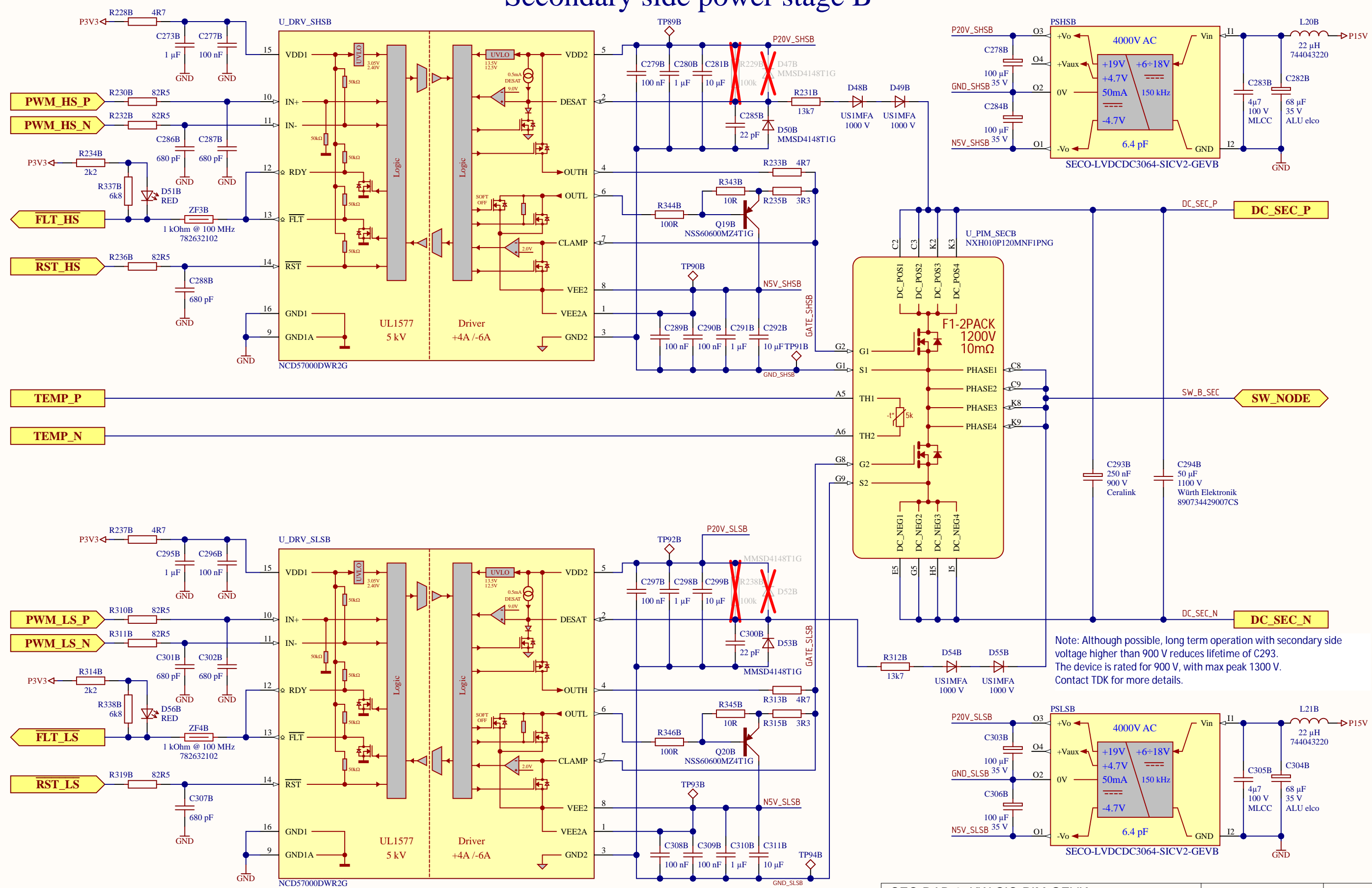
Secondary side power stage A



Note: Although possible, long term operation with secondary side voltage higher than 900 V reduces lifetime of C293. The device is rated for 900 V, with max peak 1300 V. Contact TDK for more details.

SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Secondary side power stage		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec	19.Sep 2022 18:38		
File: power_stage_secondary.SchDoc	11/23		

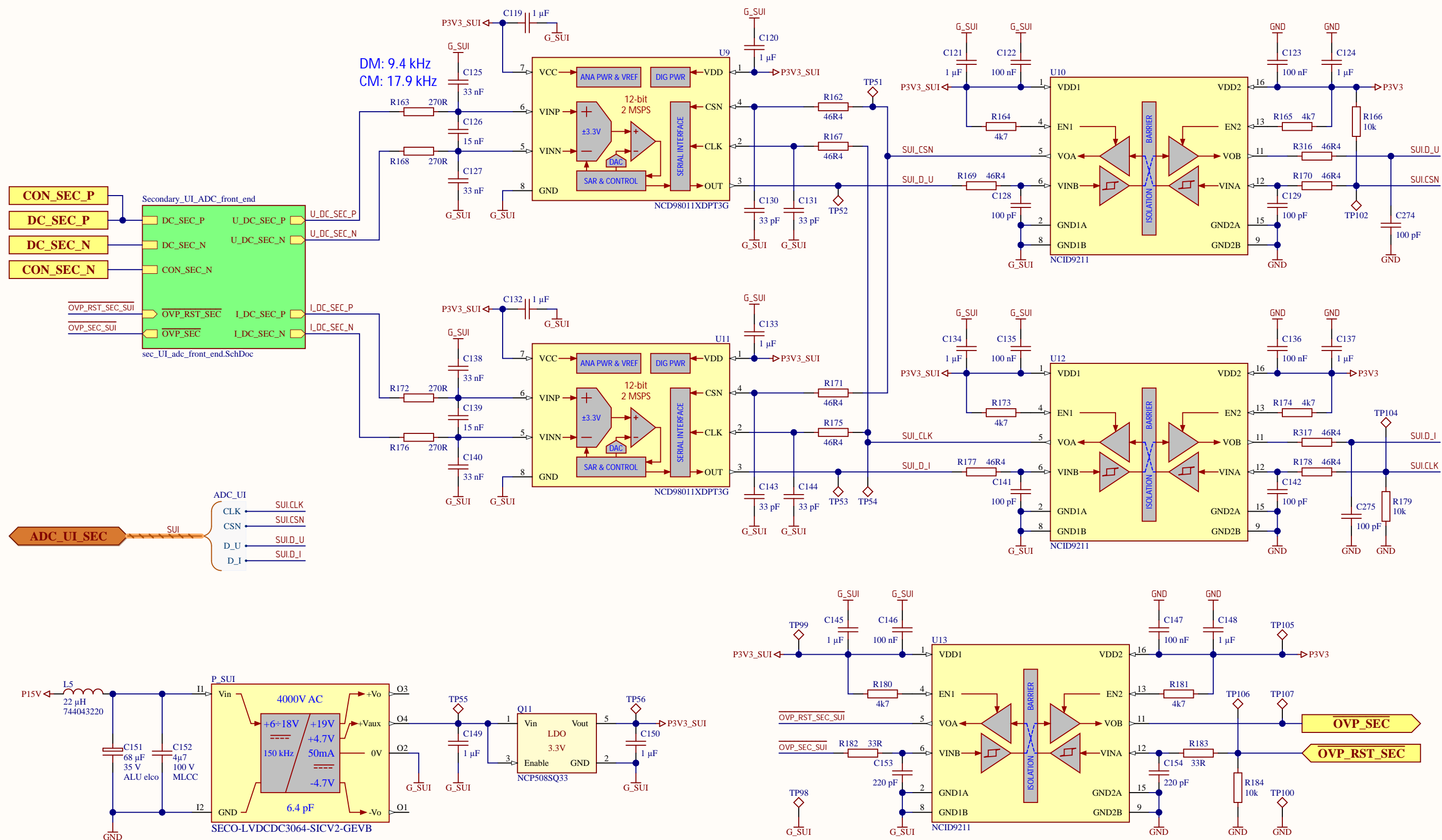
Secondary side power stage B



Note: Although possible, long term operation with secondary side voltage higher than 900 V reduces lifetime of C293. The device is rated for 900 V, with max peak 1300 V. Contact TDK for more details.

SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Secondary side power stage		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec	19.Sep 2022 18:38		
File: power_stage_secondary.SchDoc	12/23		

Secondary side voltage and current measurement



SEC-DAB-25KW-SIC-PIM-GEVK

Secondary side voltage and current measurement circuit

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:38

File: sec_UI_measurement.SchDoc

13/23

Assembly variant:

standard_board

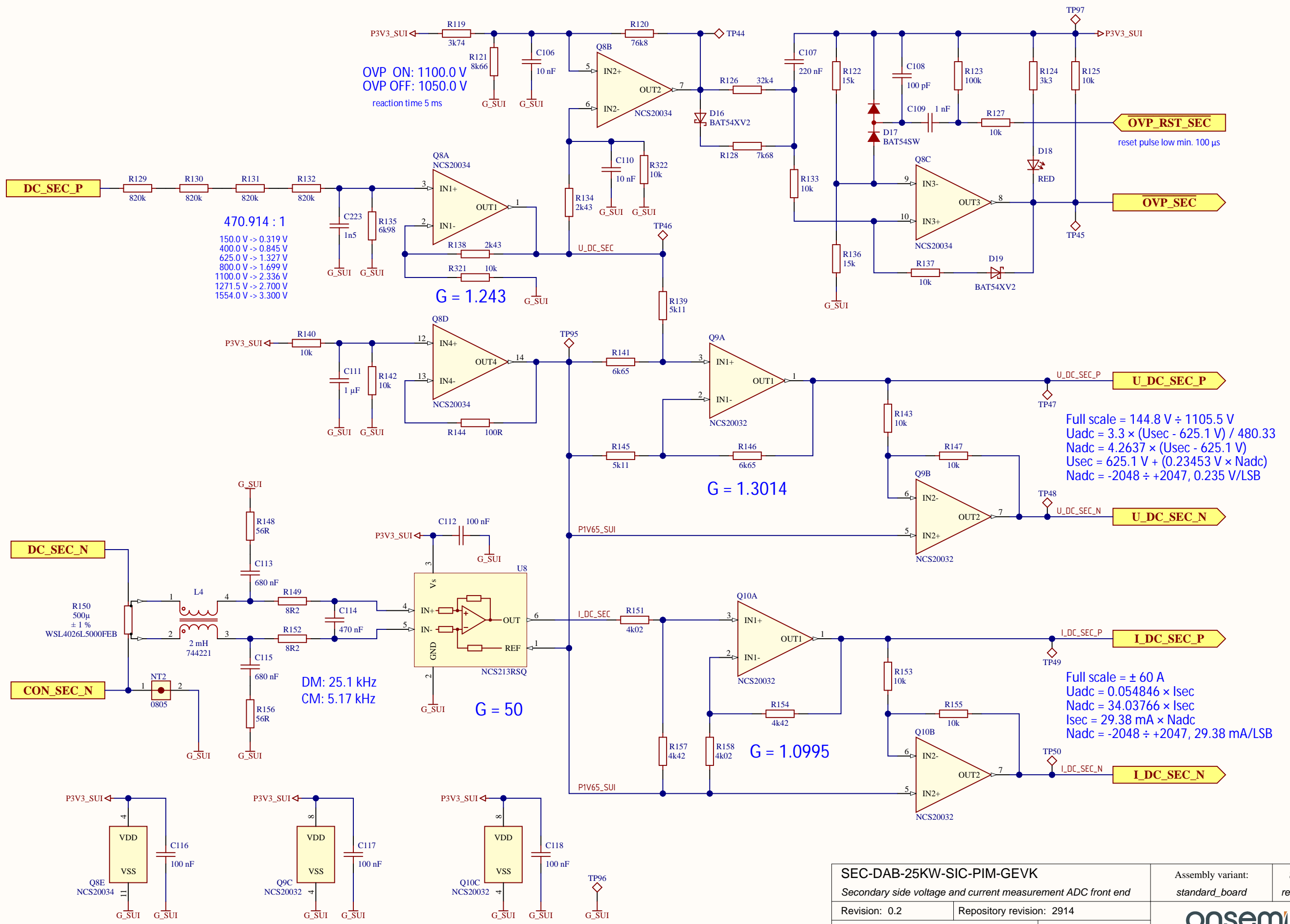
State:

released

onsemi

PSG Systems Applications Solutions Engineering

Secondary side voltage and current measurement ADC front end



Primary side temperature sensing

Temperature measurement target range 0 ÷ 170°C

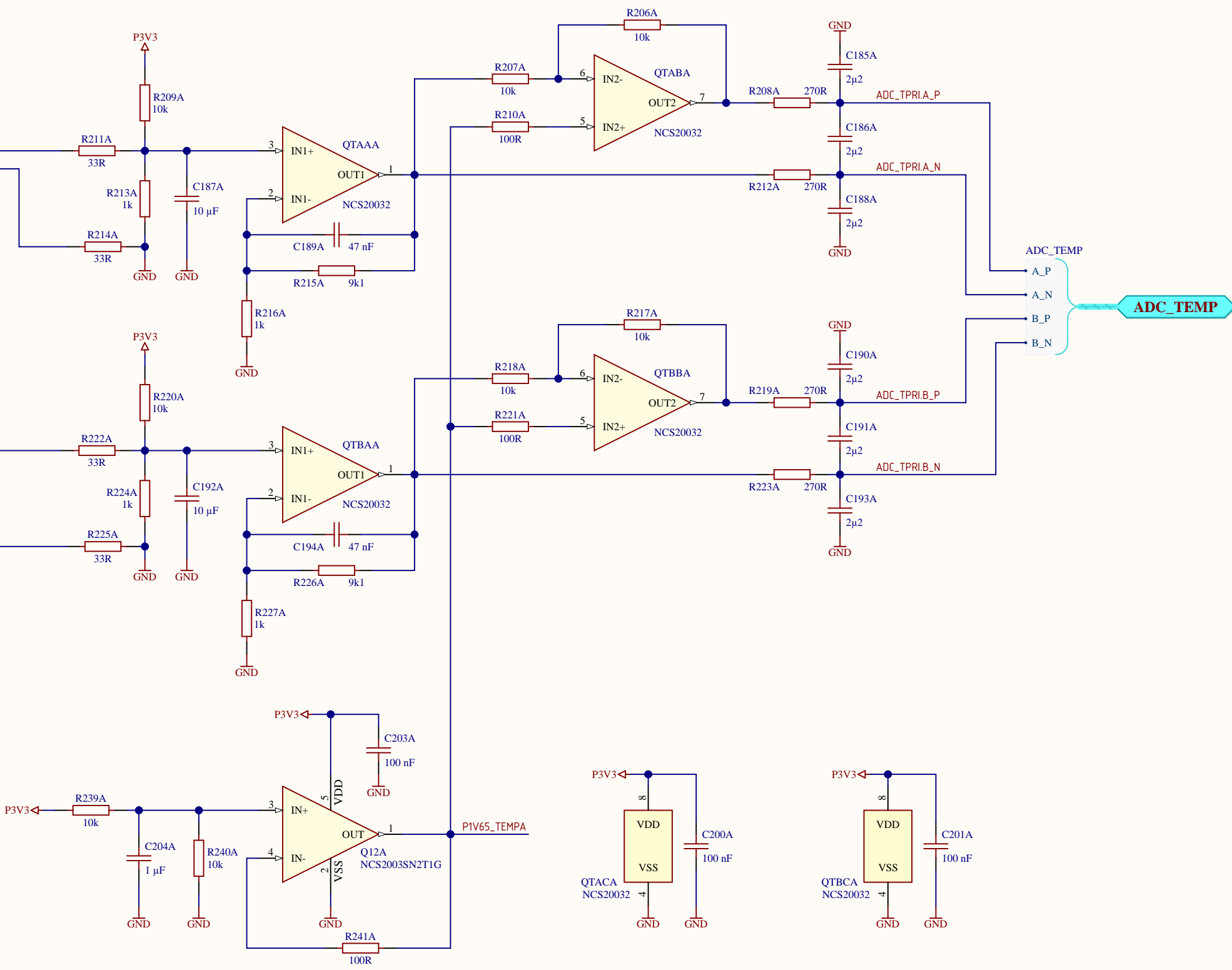
NXH010P120MNF1PNG NTC parameters:
R25 = 5 kΩ
B(25/100) = 3455 K

NTC resistance formula:
 $RT = R25 \times e^{B \times (1/T - 1/T25)}$ [Ω; Ω, K, K, K]
 $RT = 5k\Omega \times e^{3455K \times (1/T - 1/298.15K)}$

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-DAB-25KW-SIC-PIM-GEVK

PIM temperature sensing ADC front end

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:40

File: temp_sense_adc_front_end.SchDoc

16/23

Assembly variant:

standard_board

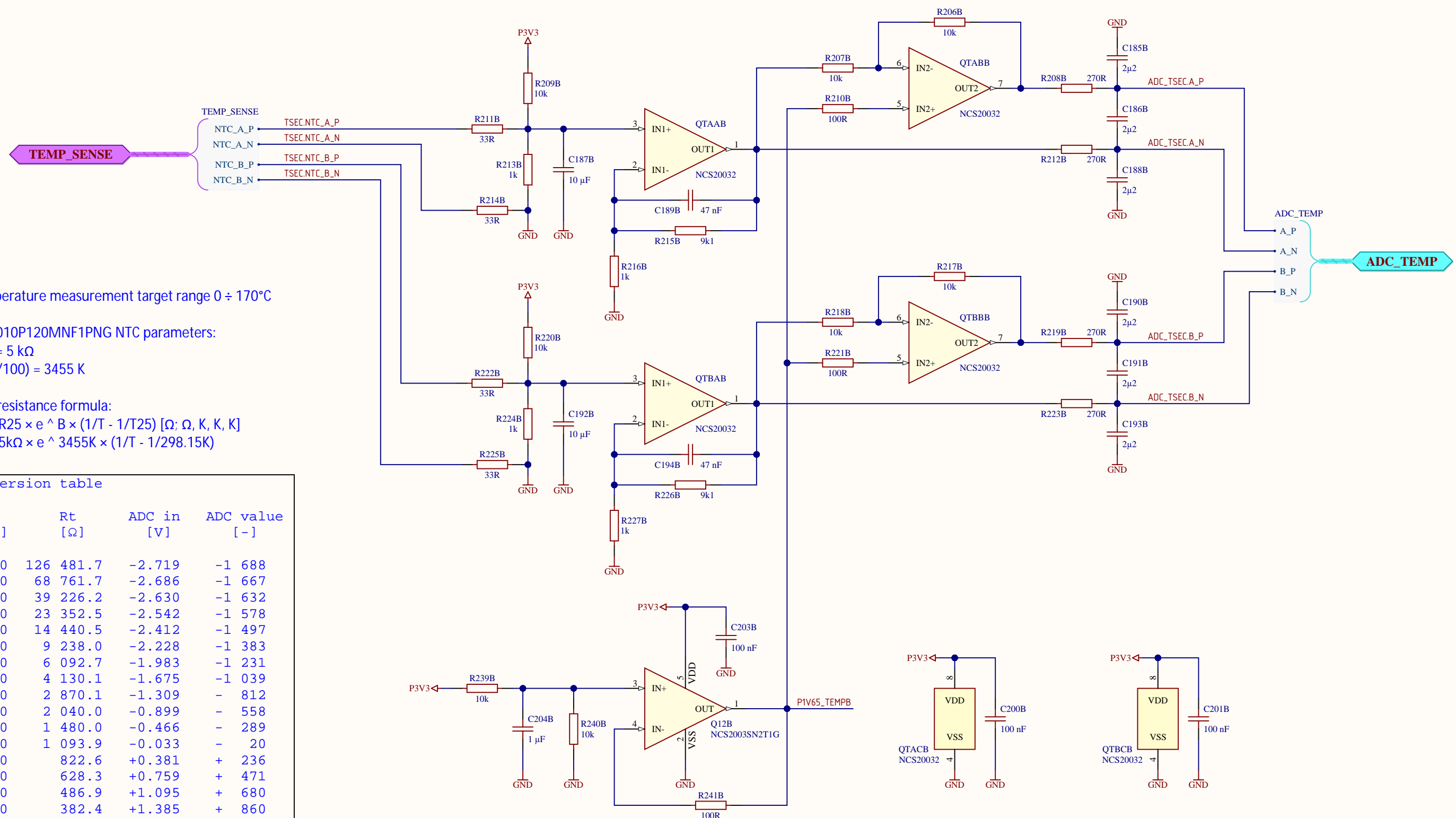
State:

released

onsemi

PSG Systems Applications Solutions Engineering

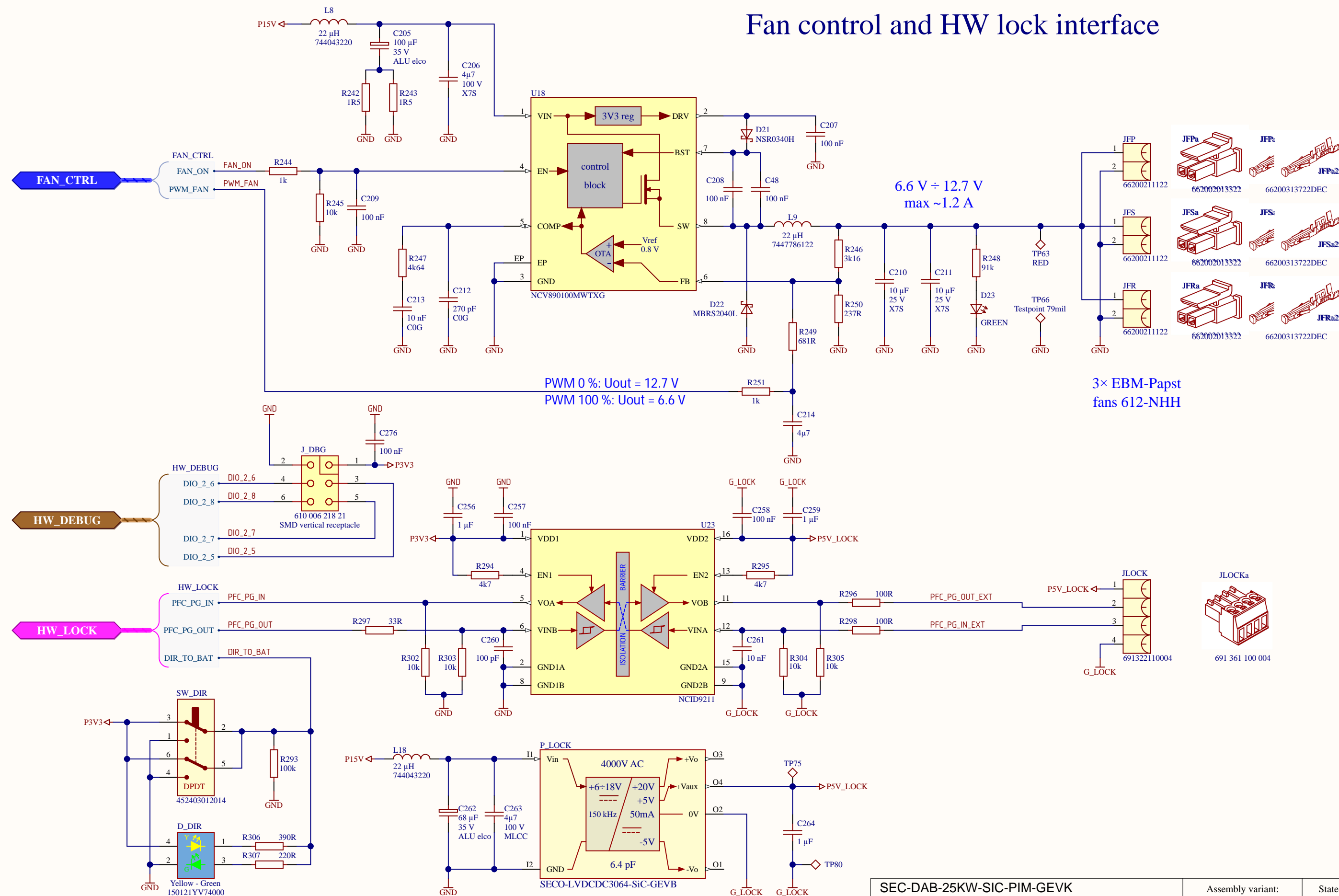
Secondary side temperature sensing



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

Fan control and HW lock interface



Energy transfer direction selector depicted in "From Mains to Battery" position

SEC-DAB-25KW-SIC-PIM-GEVK

Fan control and HW lock interface

Revision: 0.2

Repository revision: 2914

Engineer: Stefan Kosterec

19.Sep 2022 18:40

File: fan_control.SchDoc

18/23

Assembly variant:

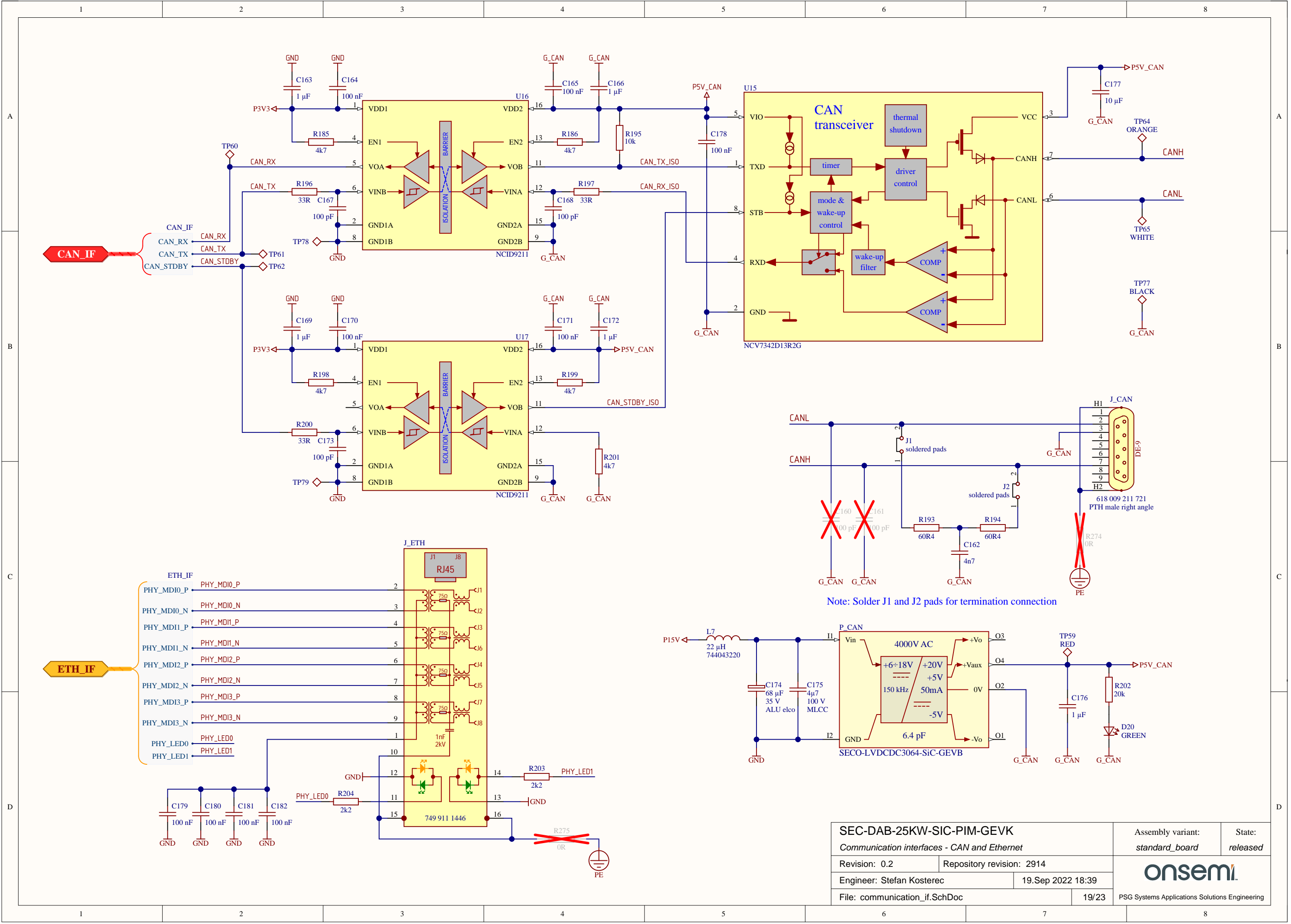
standard_board

State:

released

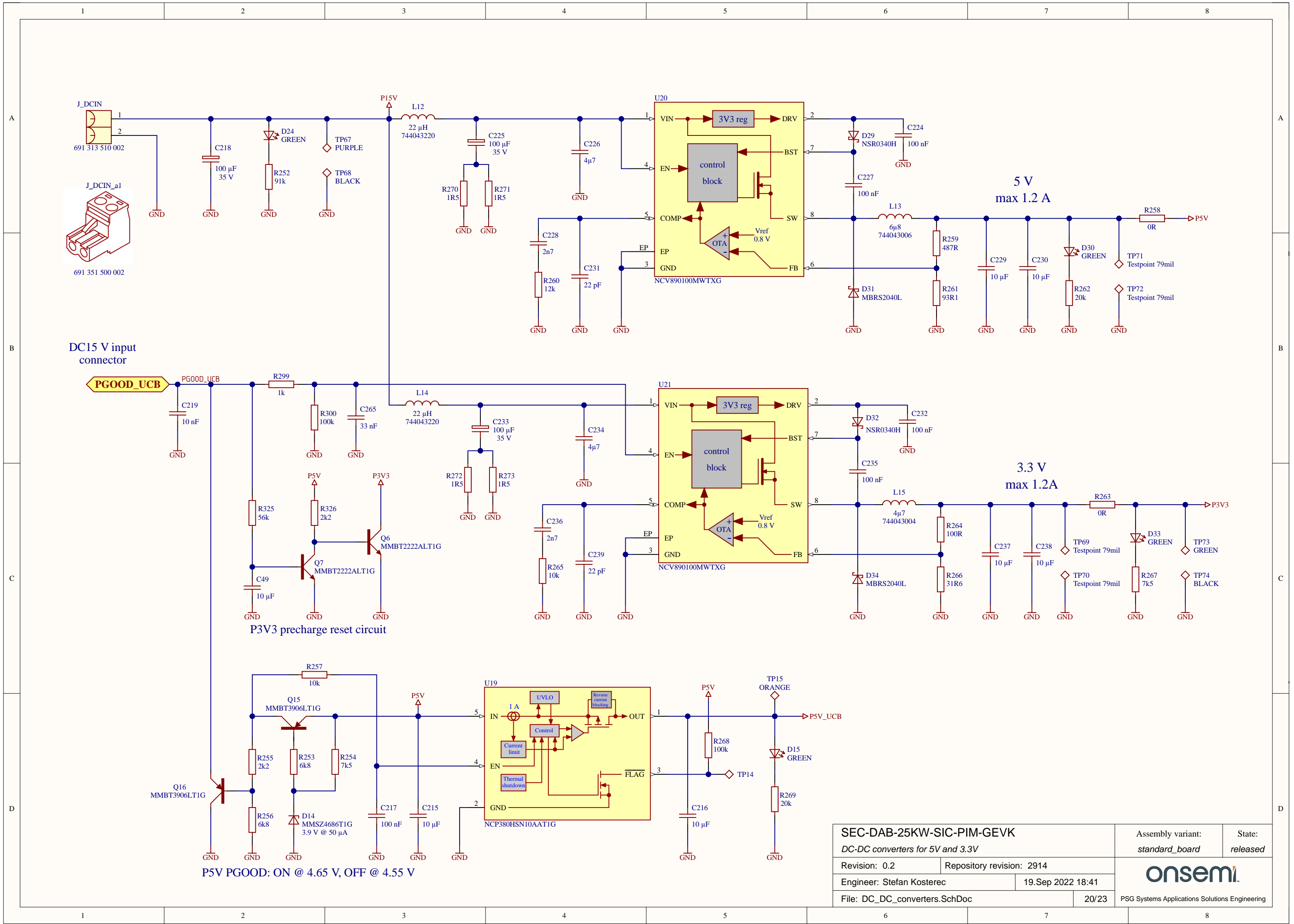
onsemi

PSG Systems Applications Solutions Engineering

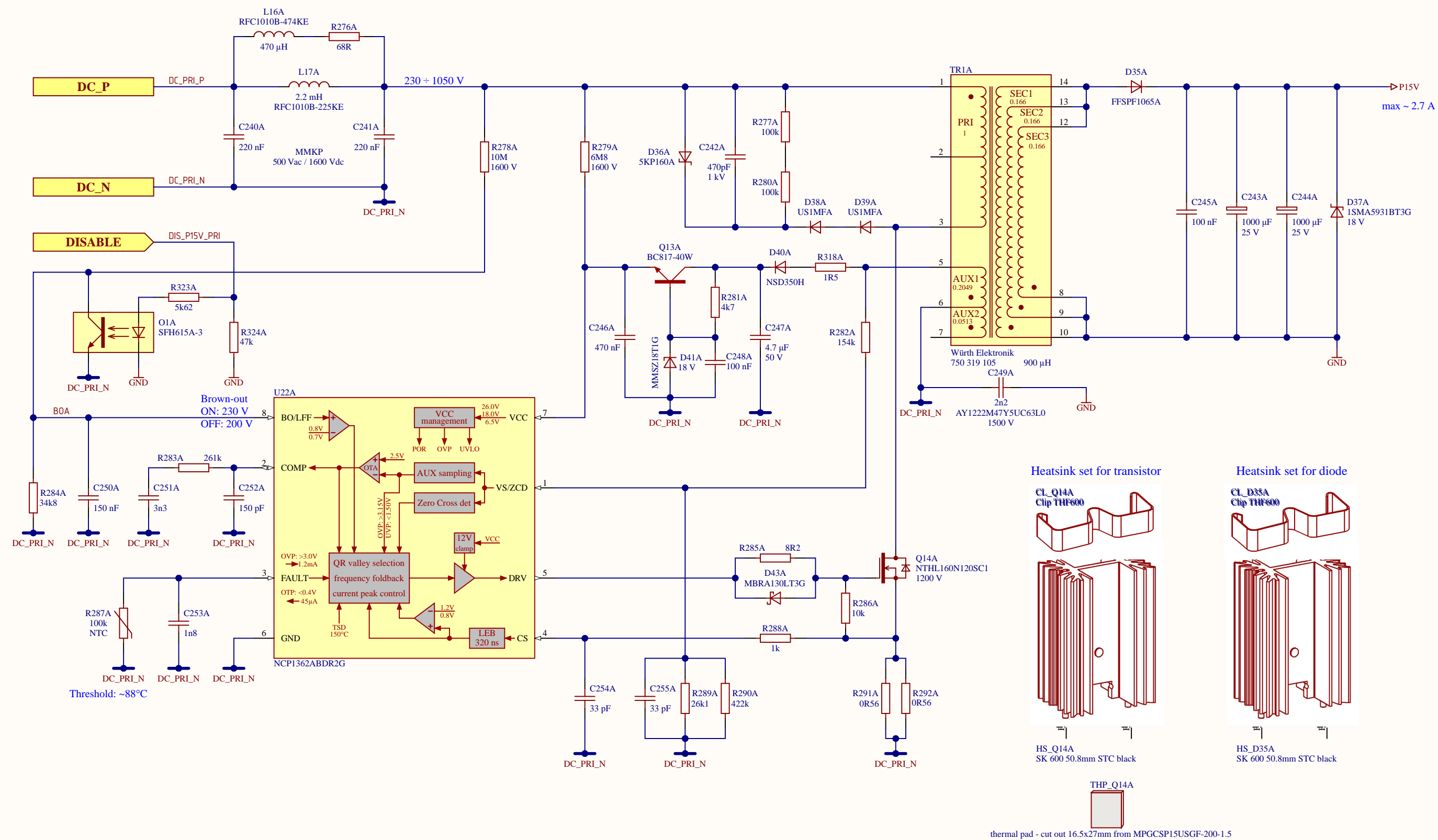



Note: Solder J1 and J2 pads for termination connection

SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
Communication interfaces - CAN and Ethernet		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec		19.Sep 2022 18:39	
File: communication_if.SchDoc		19/23	PSG Systems Applications Solutions Engineering



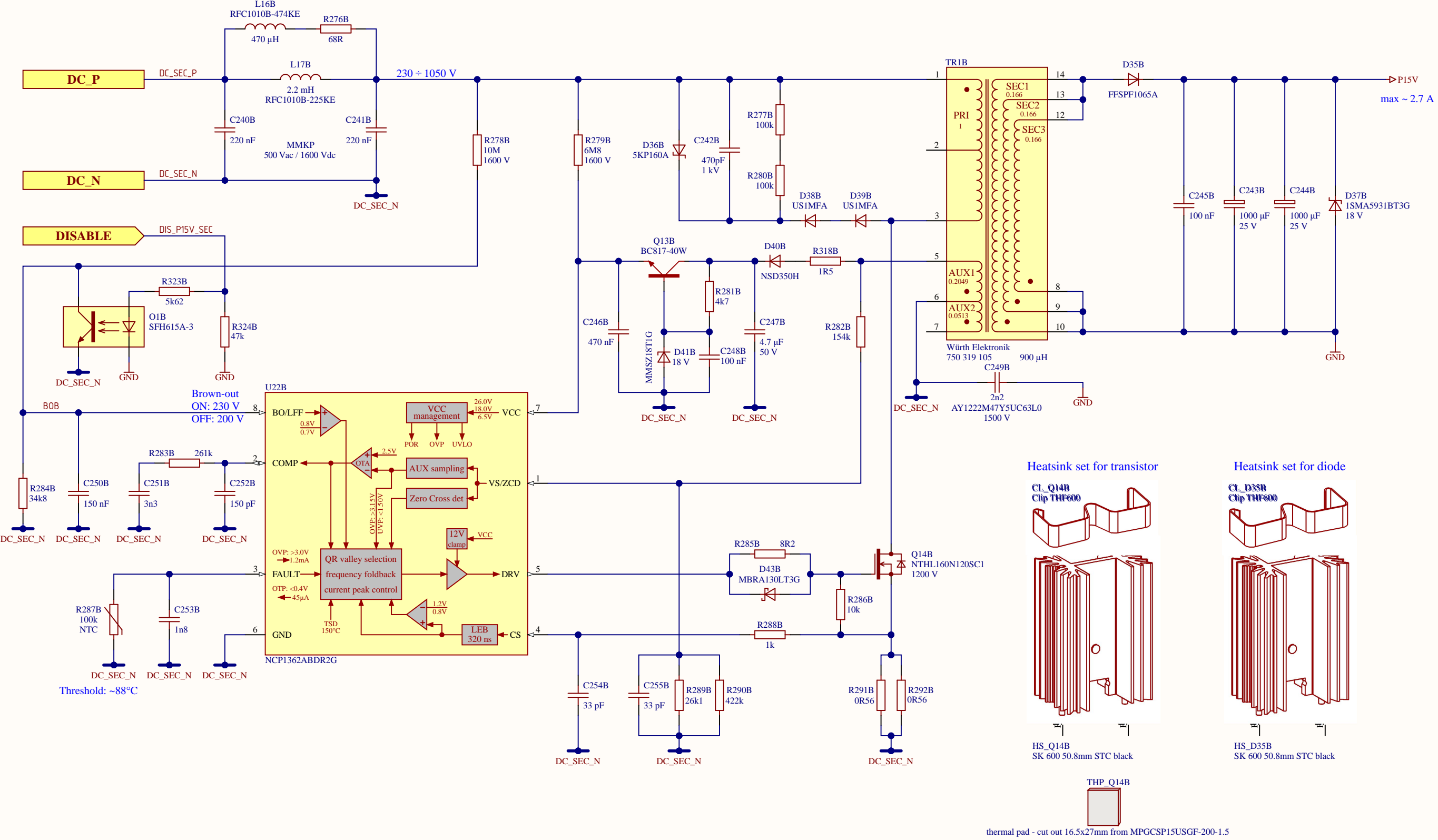
Primary side HV Supply 900V / 15V 40W




SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
High voltage DC-DC converter 230 ÷ 920 V to 15 V 40 W		standard_board	released
Revision: 0.2	Repository revision: 2914		
Engineer: Stefan Kosterec	19.Sep 2022 18:41		
File: HV_supply_15V.SchDoc	21/23		

PSG Systems Applications Solutions Engineering

Secondary side HV Supply 900V / 15V 40W



SEC-DAB-25KW-SIC-PIM-GEVK		Assembly variant:	State:
High voltage DC-DC converter 230 ÷ 920 V to 15 V 40 W		standard_board	released
Revision: 0.2	Repository revision: 2914	 PSG Systems Applications Solutions Engineering	
Engineer: Stefan Kosterec	19.Sep 2022 18:41		
File: HV_supply_15V.SchDoc	22/23		

1	2	3	4	5	6	7	8		
<p>PIM PRI A to heatsink fixing</p> <div><div>SAPA screw M4x12 DIN7984</div><div>WSAPA spring washer M4 DIN127B</div><div>WPAPA plain washer M4 DIN433</div></div>		<p>PIM PRI B to heatsink fixing</p> <div><div>SAPB screw M4x12 DIN7984</div><div>WSAPB spring washer M4 DIN127B</div><div>WPAPB plain washer M4 DIN433</div></div>		<p>PIM SEC A to heatsink fixing</p> <div><div>SASA screw M4x12 DIN7984</div><div>WSASA spring washer M4 DIN127B</div><div>WPASA plain washer M4 DIN433</div></div>		<p>PIM SEC B to heatsink fixing</p> <div><div>SASB screw M4x12 DIN7984</div><div>WSASB spring washer M4 DIN127B</div><div>WPASB plain washer M4 DIN433</div></div>			
<p>Primary side PIMs heatsink to PCB fixing</p> <div><div>S1HSP screw M3x20 ISO7045</div><div>SPIHSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S2HSP screw M3x20 ISO7045</div><div>SP2HSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S3HSP screw M3x20 ISO7045</div><div>SP3HSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S4HSP screw M3x20 ISO7045</div><div>SP4HSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S5HSP screw M3x20 ISO7045</div><div>SP5HSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S6HSP screw M3x20 ISO7045</div><div>SP6HSP SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><p>HSP</p><p>LA 6 200 12 - modified for E066 DAB</p></div>				<p>Secondary side PIMs heatsink to PCB fixing</p> <div><div>S1HSS screw M3x20 ISO7045</div><div>SPIHSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S2HSS screw M3x20 ISO7045</div><div>SP2HSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S3HSS screw M3x20 ISO7045</div><div>SP3HSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S4HSS screw M3x20 ISO7045</div><div>SP4HSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S5HSS screw M3x20 ISO7045</div><div>SP5HSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><div>S6HSS screw M3x20 ISO7045</div><div>SP6HSS SMD spacer 03.3 x 12.5 9774125960R</div></div> <div><p>HSS</p><p>LA 6 200 12 - modified for E066 DAB</p></div>					
<p>Spacers for board mechanical support</p> <div><div>SPTT1</div><div>SPTB1</div><div>SPB1</div></div> <div><div>SPTT2</div><div>SPTB2</div><div>SPB2</div></div> <div><div>SPTT3</div><div>SPTB3</div><div>SPB3</div></div> <div><div>SPTT4</div><div>SPTB4</div><div>SPB4</div></div> <div><div>SPTT5</div><div>SPTB5</div><div>SPB5</div></div> <div><div>SPTT6</div><div>SPTB6</div><div>SPB6</div></div> <div><div>S_top</div><div>onsemi</div><div>onsemi logo</div><div>S_bot</div><div>onsemi</div><div>onsemi logo</div></div> <div><div>UCB</div><div>Universal Controller Board SECO-TE0716-GEVB</div></div>									
<p>SEC-DAB-25KW-SIC-PIM-GEVK</p> <p>Mechanical and enclosed in package parts</p> <p>Revision: 0.2 Repository revision: 2914</p> <p>Engineer: Stefan Kosterec 19.Sep 2022 18:42</p> <p>File: mechanical_parts.SchDoc 23/23</p>						<p>Assembly variant:</p> <p>standard_board</p>		<p>State:</p> <p>released</p>	
						<p>onsemi</p>		<p>PSG Systems Applications Solutions Engineering</p>	
1	2	3	4	5	6	7	8		