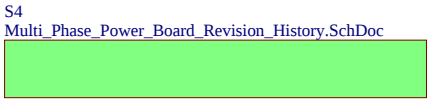
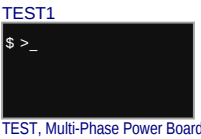
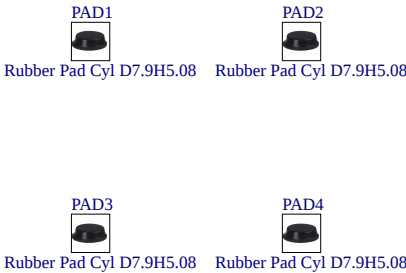
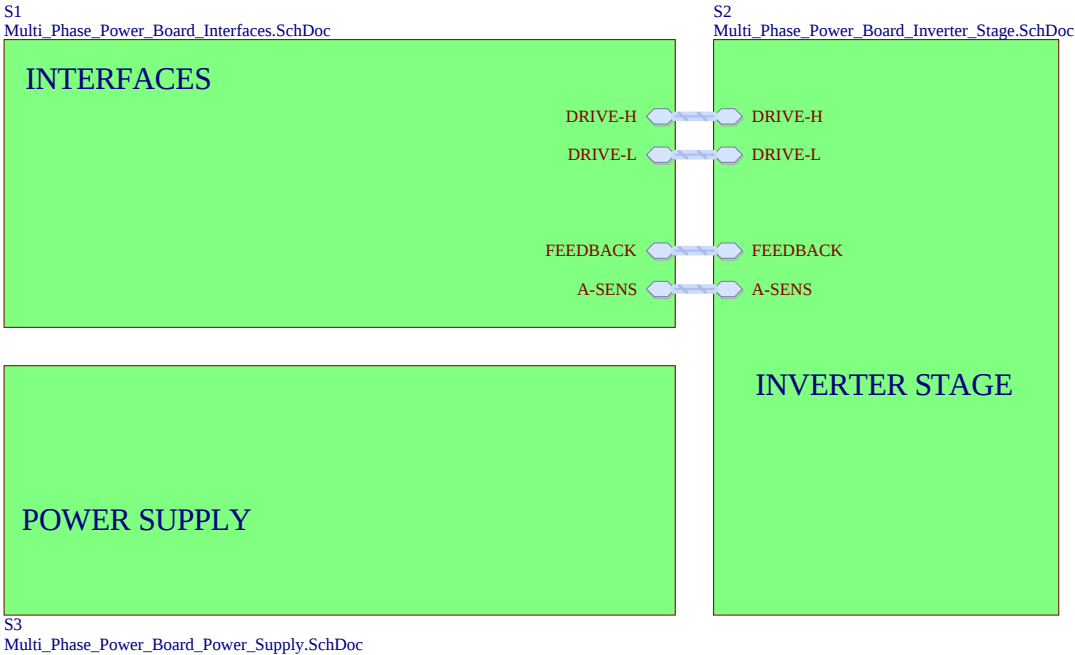
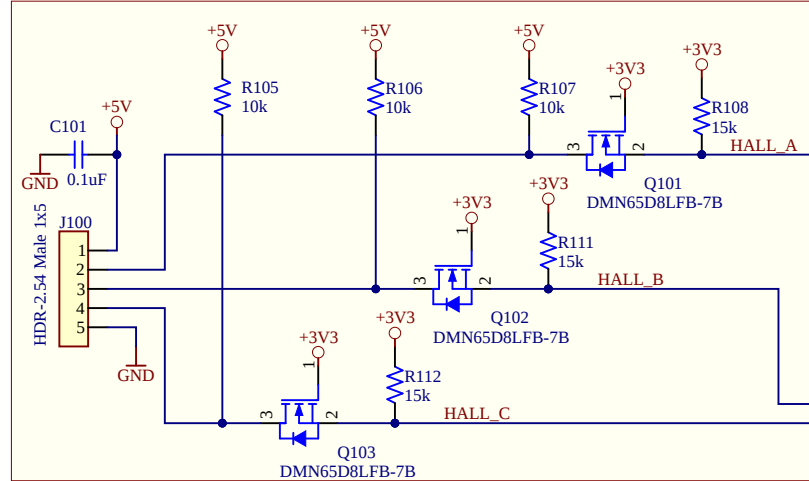


Multi-Phase Power Board

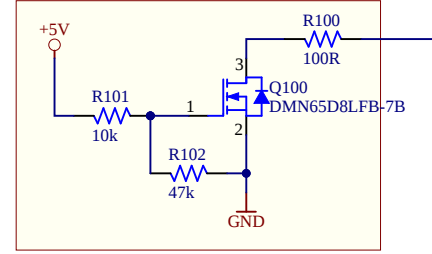


Project Owner: PB		 MICROCHIP		
PCB Layout Contact: HM				
PartNumber: EV35Z86A	Project Title Multi-Phase Power Board	Variant: Default Assembly		
Sheet Title Top Level		Designed with 		
Size A3	SCH #: 02-00671	Rev: 3	Date: 2024-06-26	
	PCB #: 04-11757	Rev: 1	Sheet 1 of 12	Altium.com
File: Multi_Phase_Power_Board_TopLevel.SchDoc				

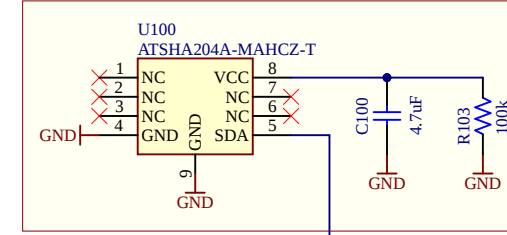
QEI/HALL SENSOR IN



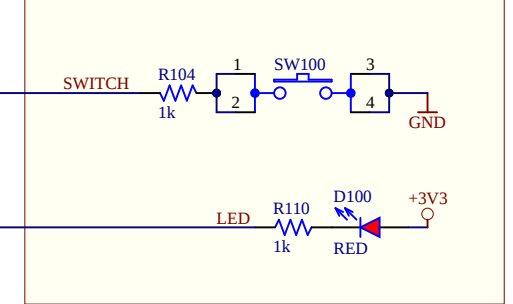
VOFF SWITCH



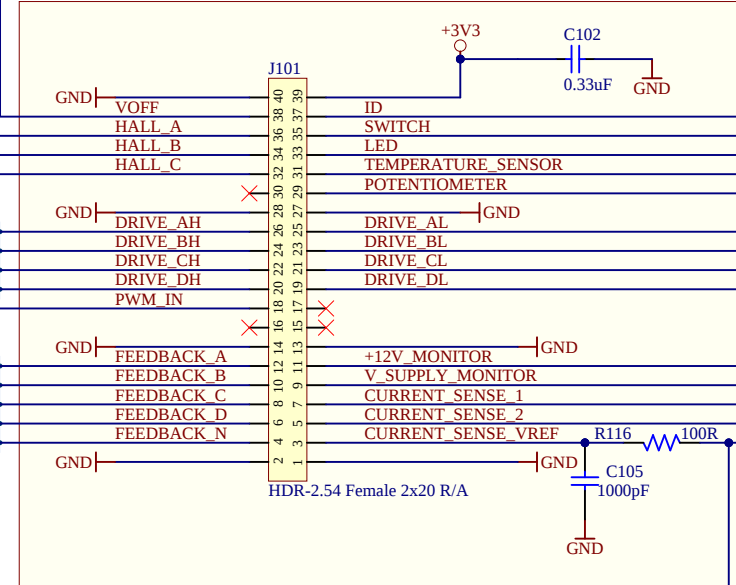
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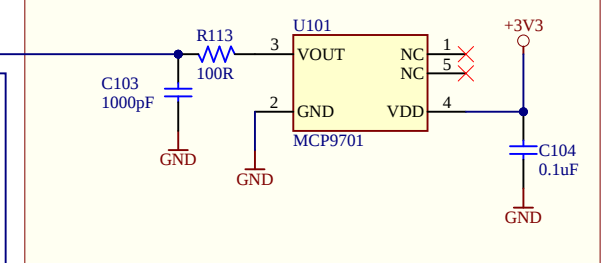
LED AND PUSH BUTTON



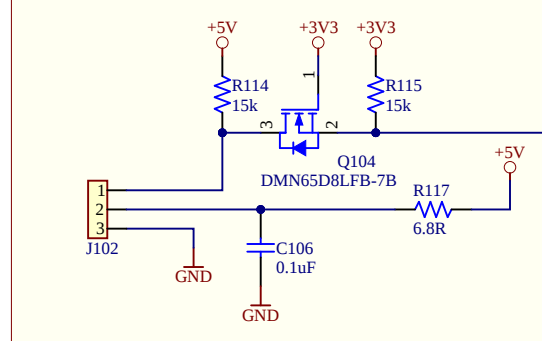
ADAPTER



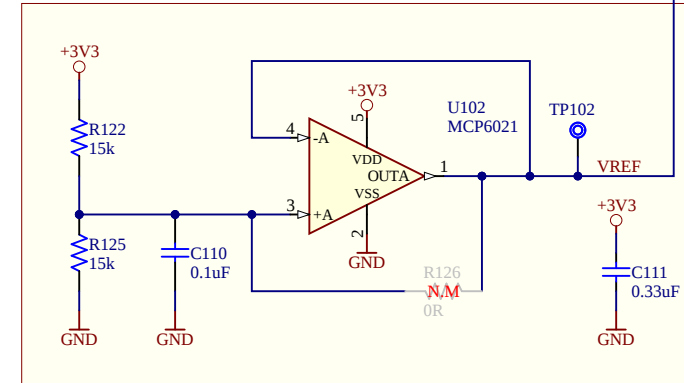
TEMPERATURE SENSOR



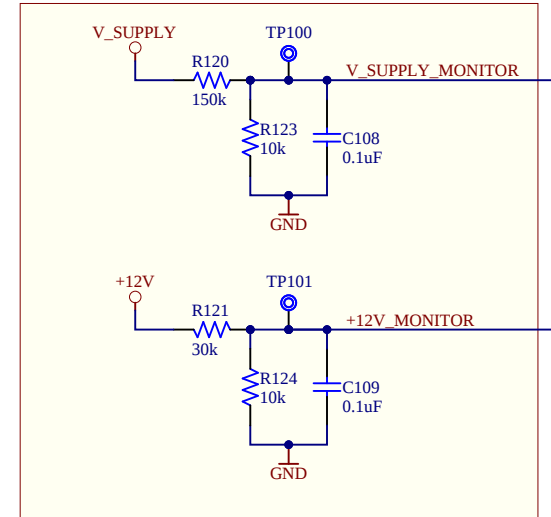
PWM IN



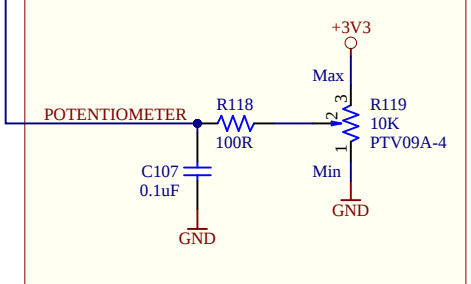
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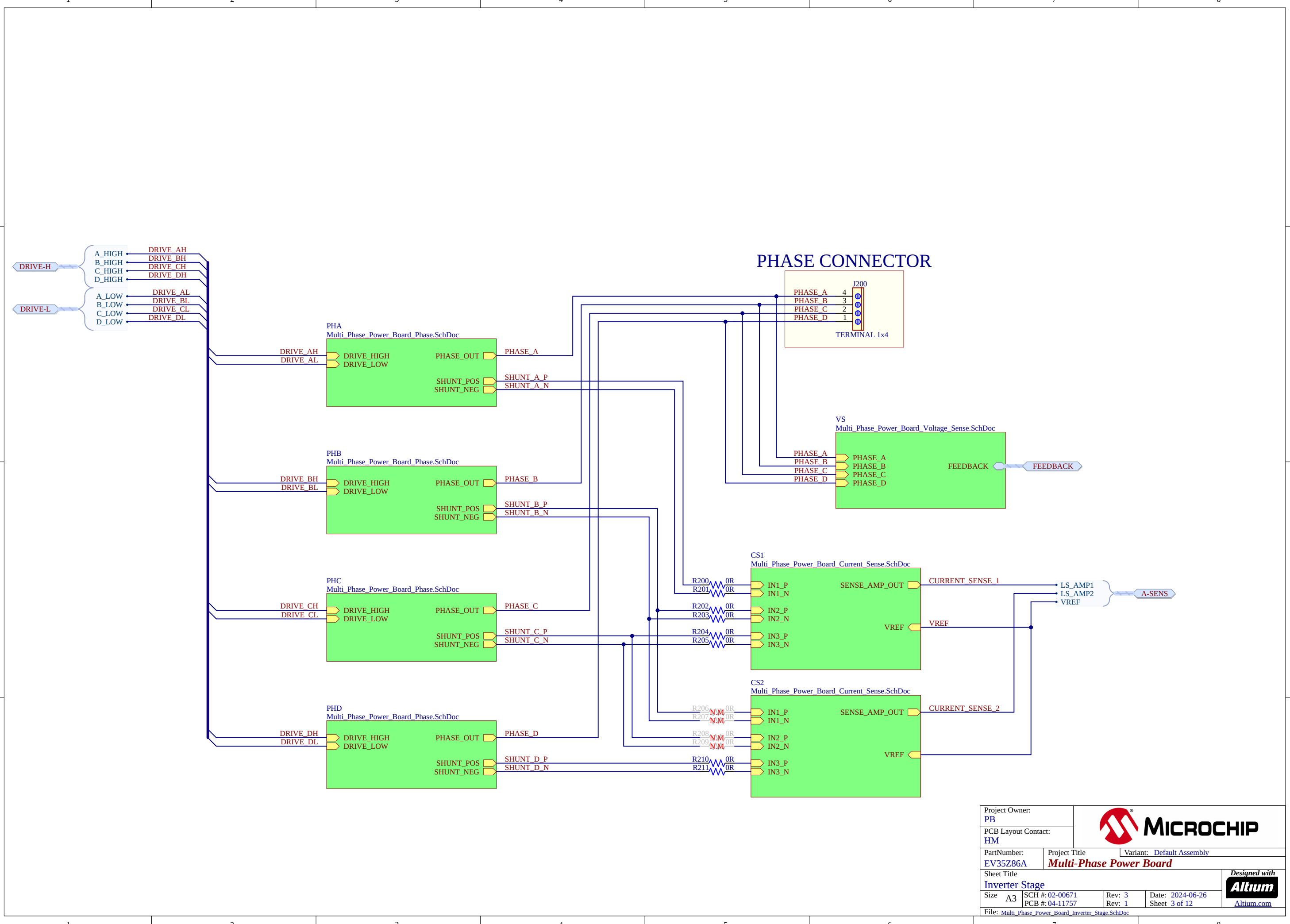


VOLTAGE MONITORING

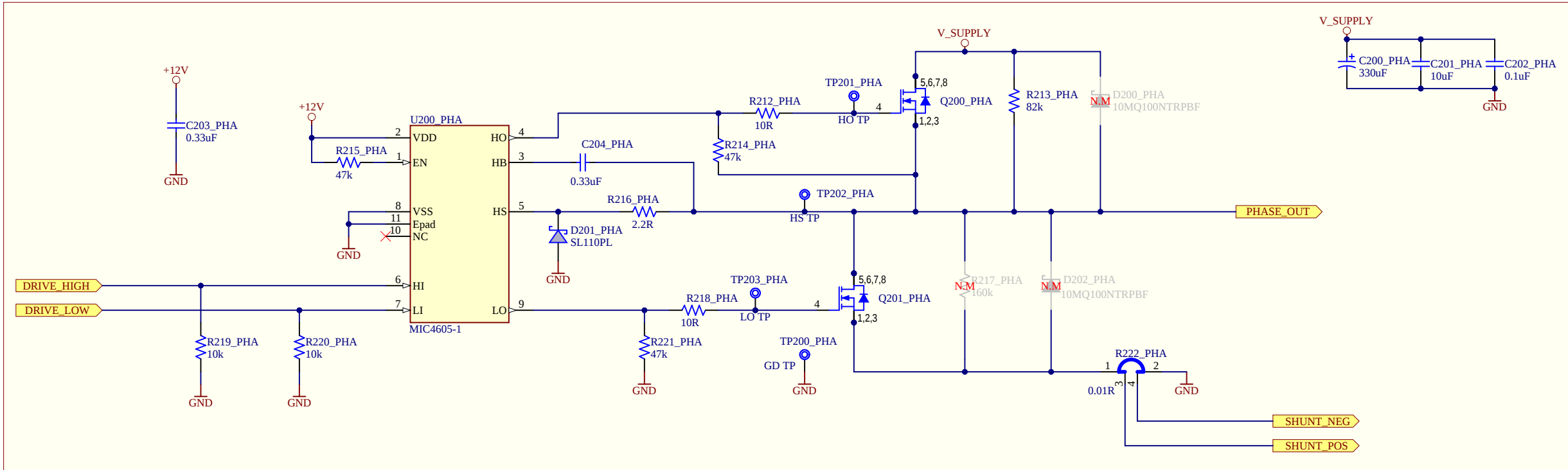


POTENTIOMETER





PHASE POWER STAGE

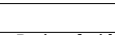


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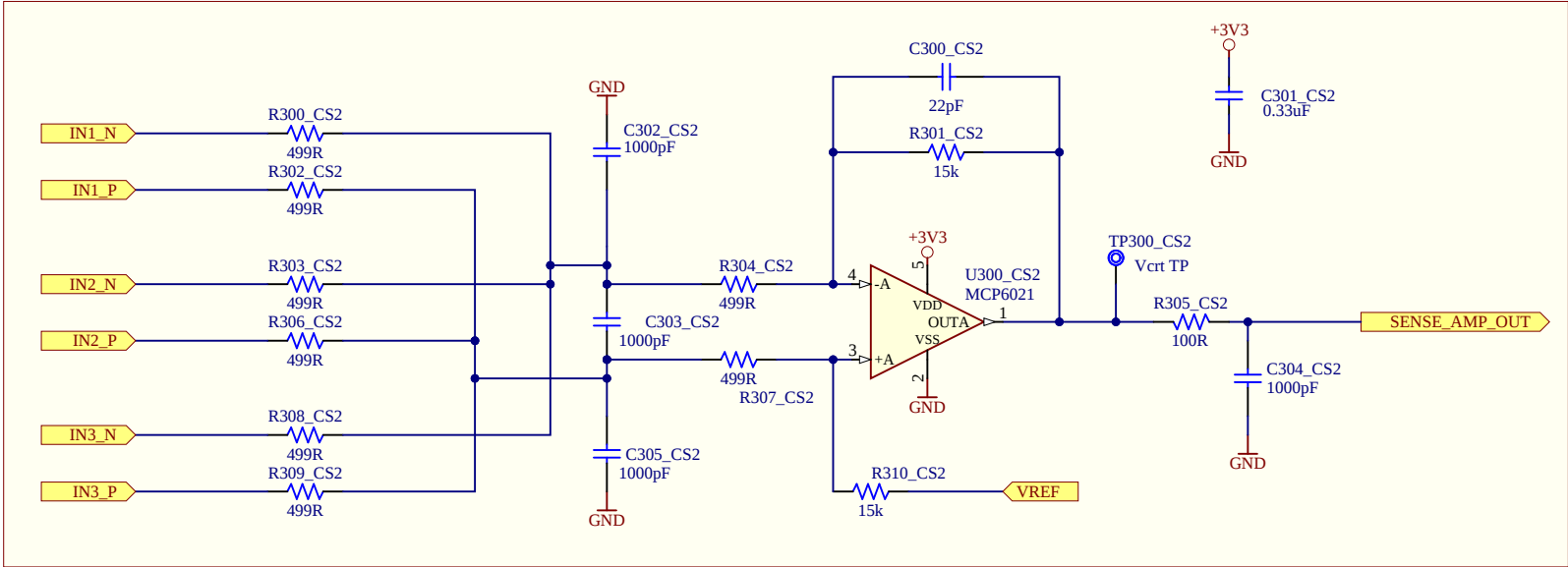
Project Owner: BP		 MICROCHIP	
PCB Layout Contact: HM			
PartNumber: EV35Z86A	Project Title Multi-Phase Power Board	Variant: Default Assembly	
Sheet Title Phase		Designed with 	
Size A3	SCH #: 02-00671	Rev: 3	Date: 2024-06-26
	PCB #: 04-11757	Rev: 1	Sheet 5 of 12
File: Multi Phase Power Board-Phase.SchDoc			
		Altium.com	

Project Owner: PB		 MICROCHIP				
PCB Layout Contact: HM						
PartNumber: EV35Z86A	Project Title <i>Multi-Phase Power Board</i>	Variant: <u>Default Assembly</u>				
Sheet Title Phase						<i>Designed with</i>  Altium.com
Size A3	SCH #: 02-00671 PCB #: 04-11757	Rev: 3 Rev: 1	Date: 2024-06-26 Sheet 6 of 12			
File: Multi_Phase_Power_Board_Phase.SchDoc						

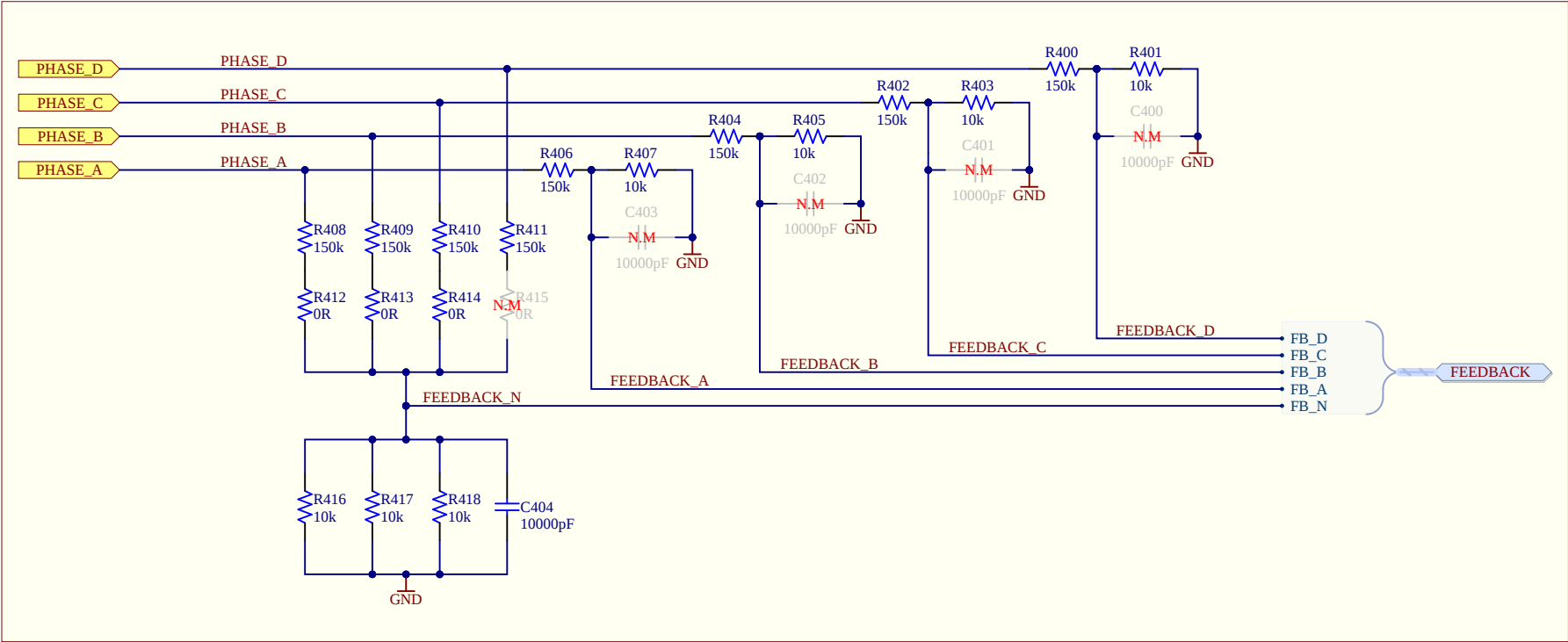
Project Owner: PB		 MICROCHIP	
PCB Layout Contact: HM			
PartNumber: EV35Z86A	Project Title <i>Multi-Phase Power Board</i>	Variant: <u>Default Assembly</u>	
Sheet Title Phase		Designed with  Altium.com	
Size A3	SCH #.: 02-00671 PCB #.: 04-11757		
File: Multi_Phase_Power_Board_Phase.SchDoc			

Project Owner: PB		 MICROCHIP		CINANO Template Revision: 2	
PCB Layout Contact: HM					
PartNumber: EV35Z86A		Project Title <i>Multi-Phase Power Board</i>		Variant: <u>Default Assembly</u>	
Sheet Title <u>Current Sense</u>				Designed with  <u>Altium.com</u>	
Size	A3	SCH #: 02-00671	Rev: 3	Date: 2024-06-26	Sheet 8 of 12
		PCB #: 04-11757	Rev: 1		
File: <u>Multi Phase Power Board_Current Sense_SchDoc</u>					

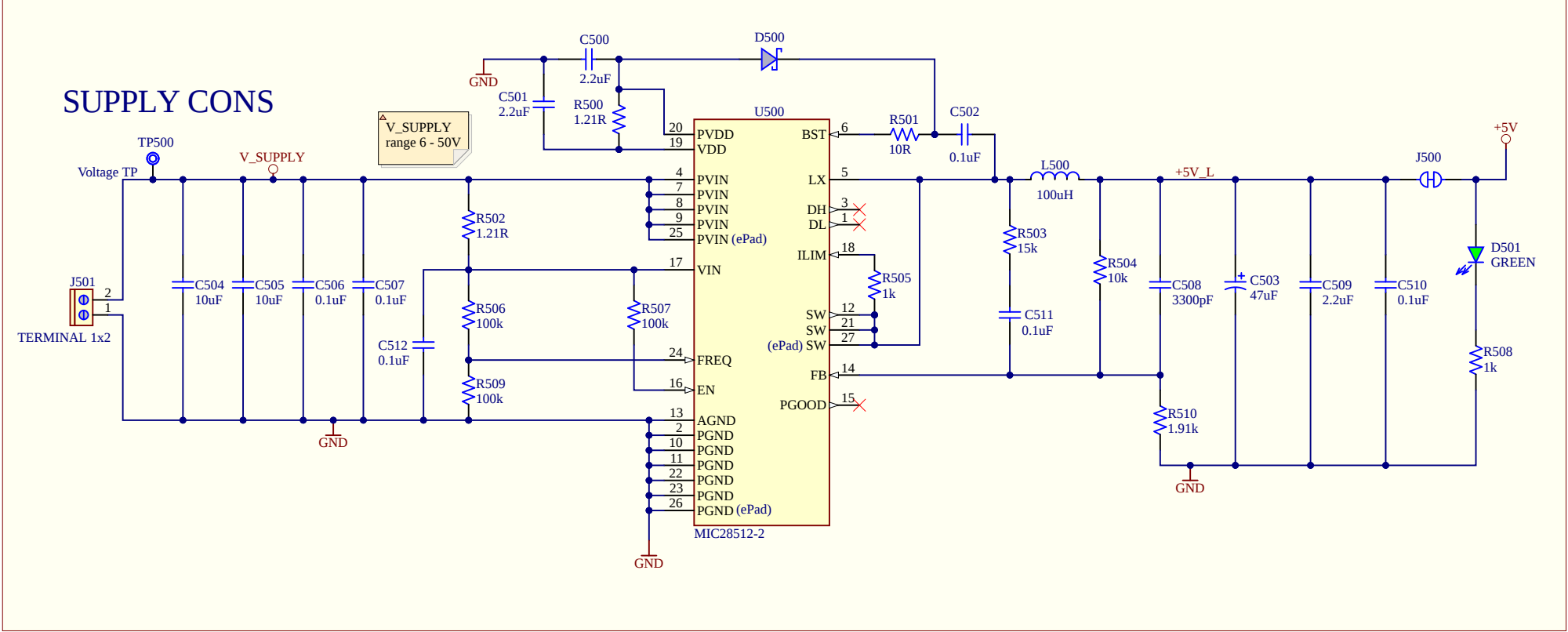
CURRENT SENSE AMPLIFIER



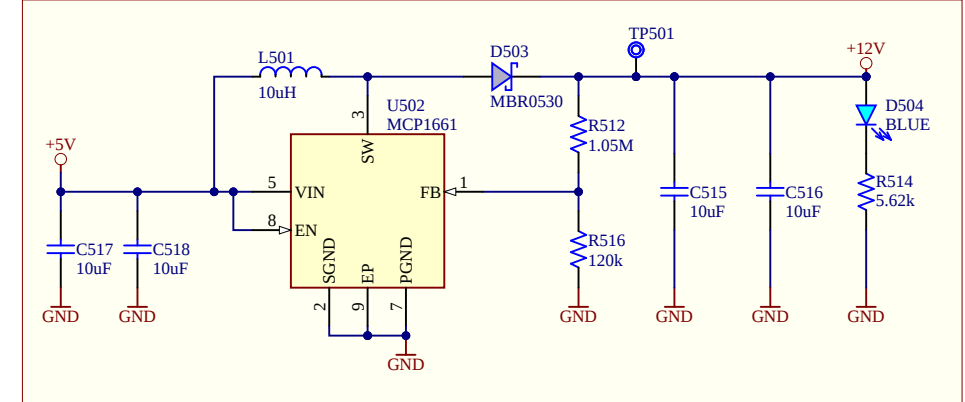
VOLTAGE DIVIDER AND VIRTUAL POINT



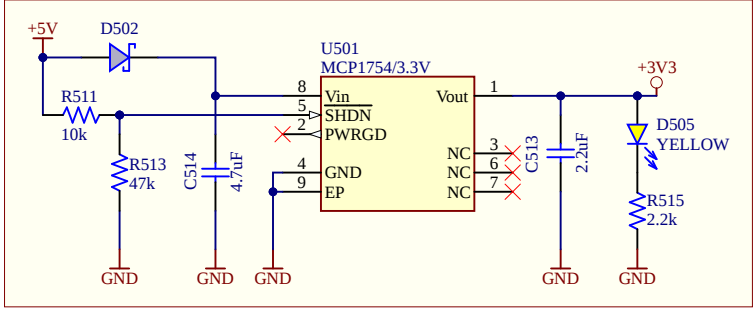
+5V STEP DOWN CONVERTER



+12V STEP UP CONVERTER



+3V3 LDO



Revision History

PCB Assembly Rev 1:

Design Changes:

Microchip Prototype

PCB:

PCB revision 1

PCB Assembly Rev 2:

Design Changes:

First released revision

PCB:

PCB revision 1

PCB Assembly Rev 3:

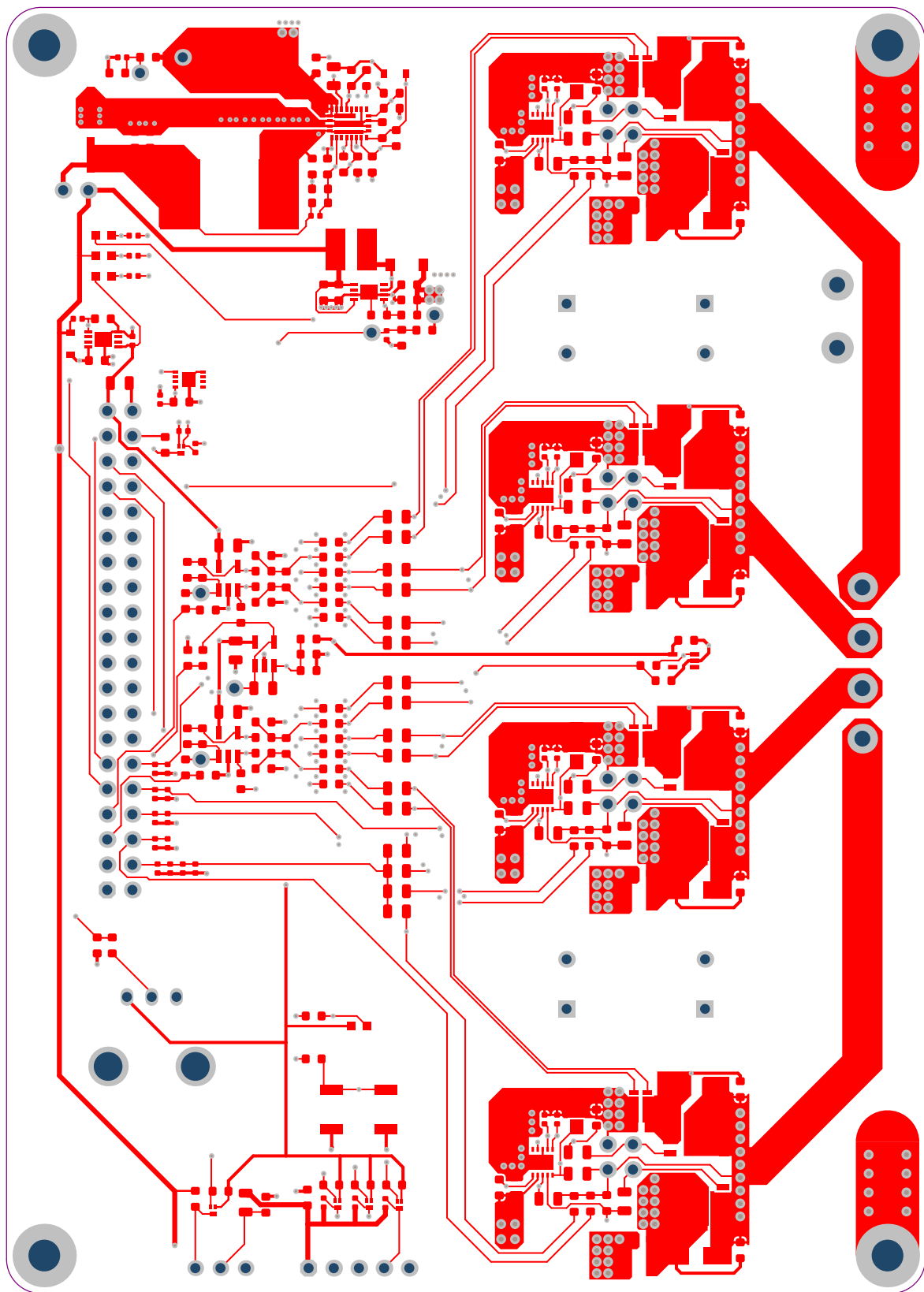
Design Changes:

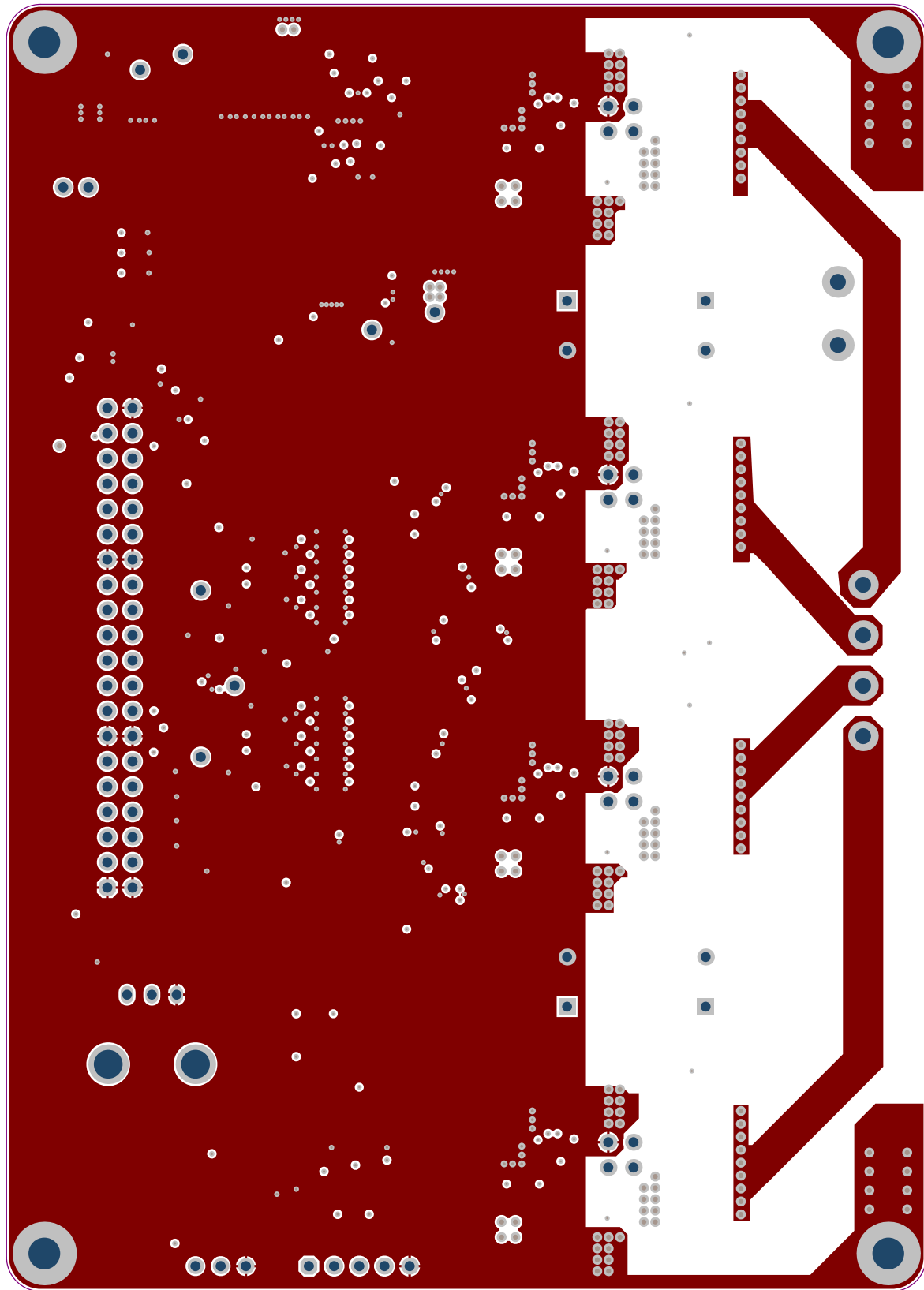
Replaced 5% tolerance resistors with 1% tolerance

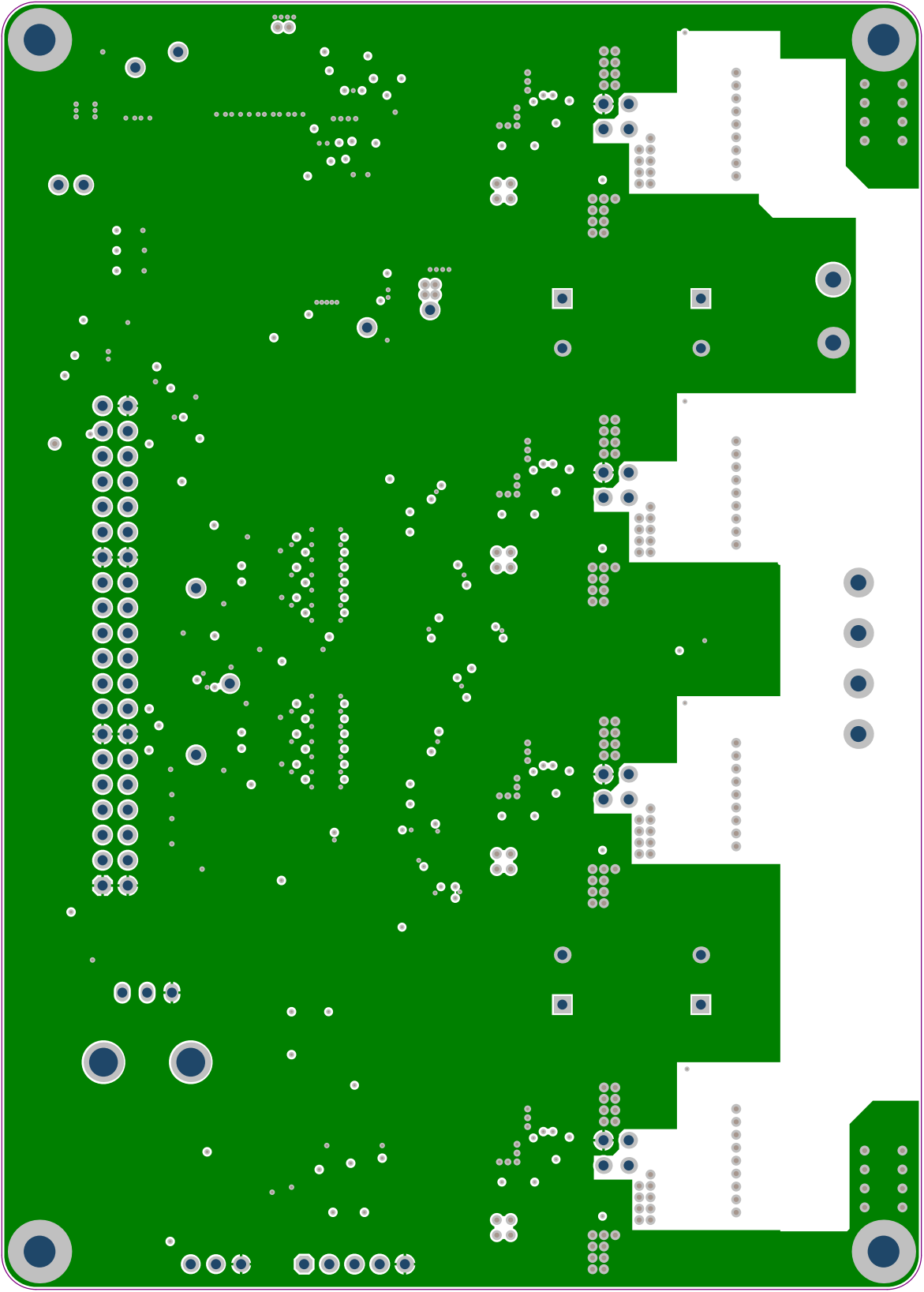
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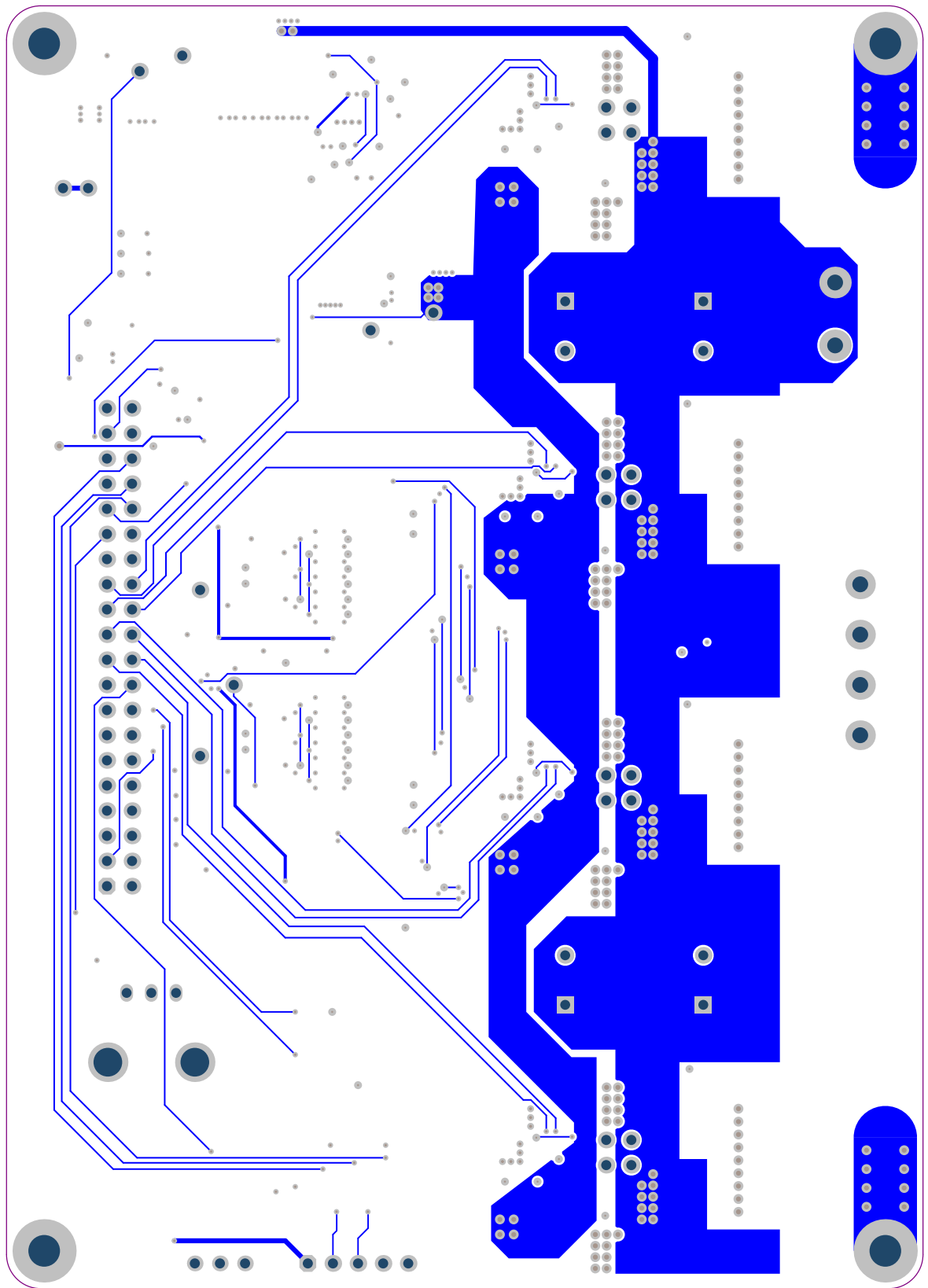
PCB revision 1

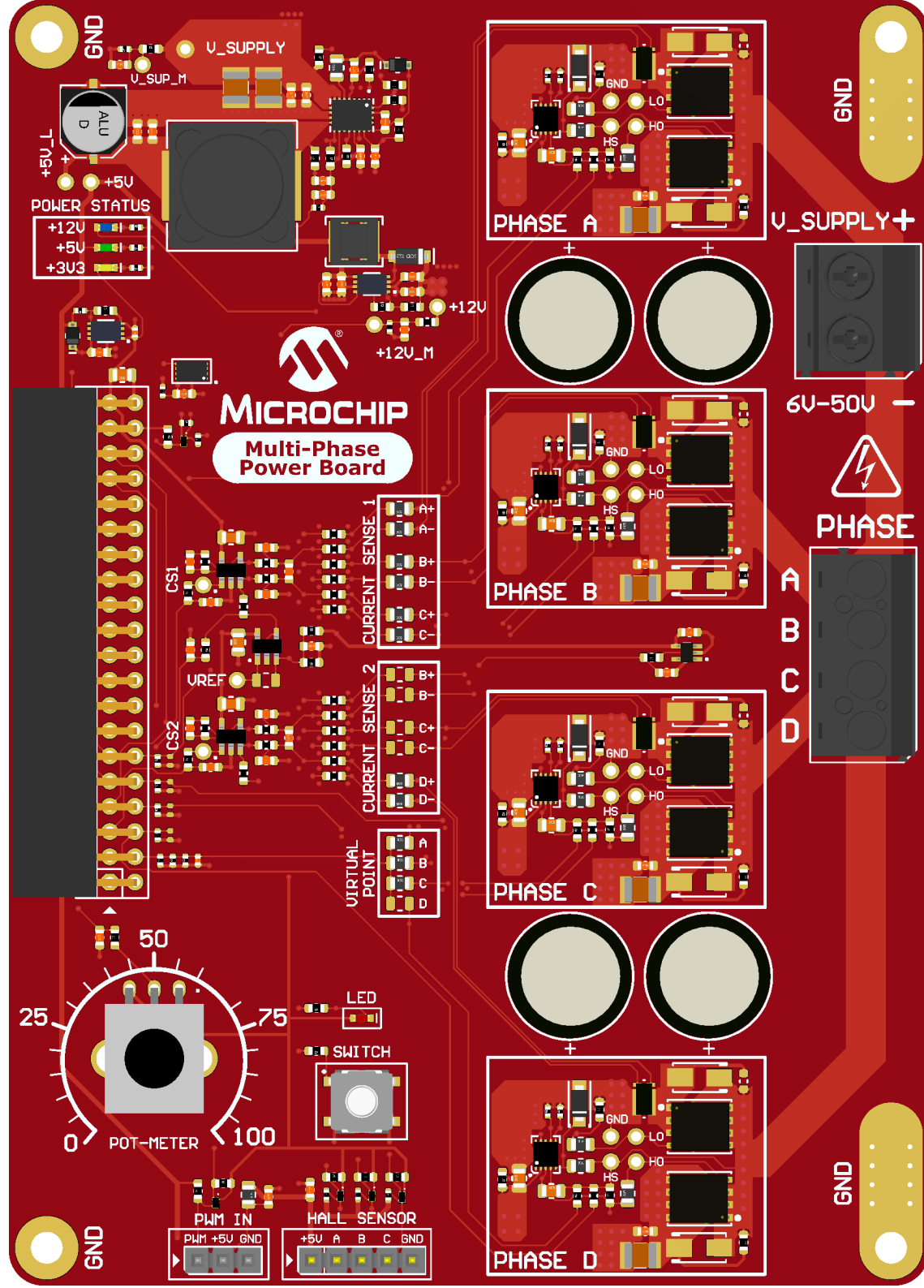
CNANO Template Revision: 2.2

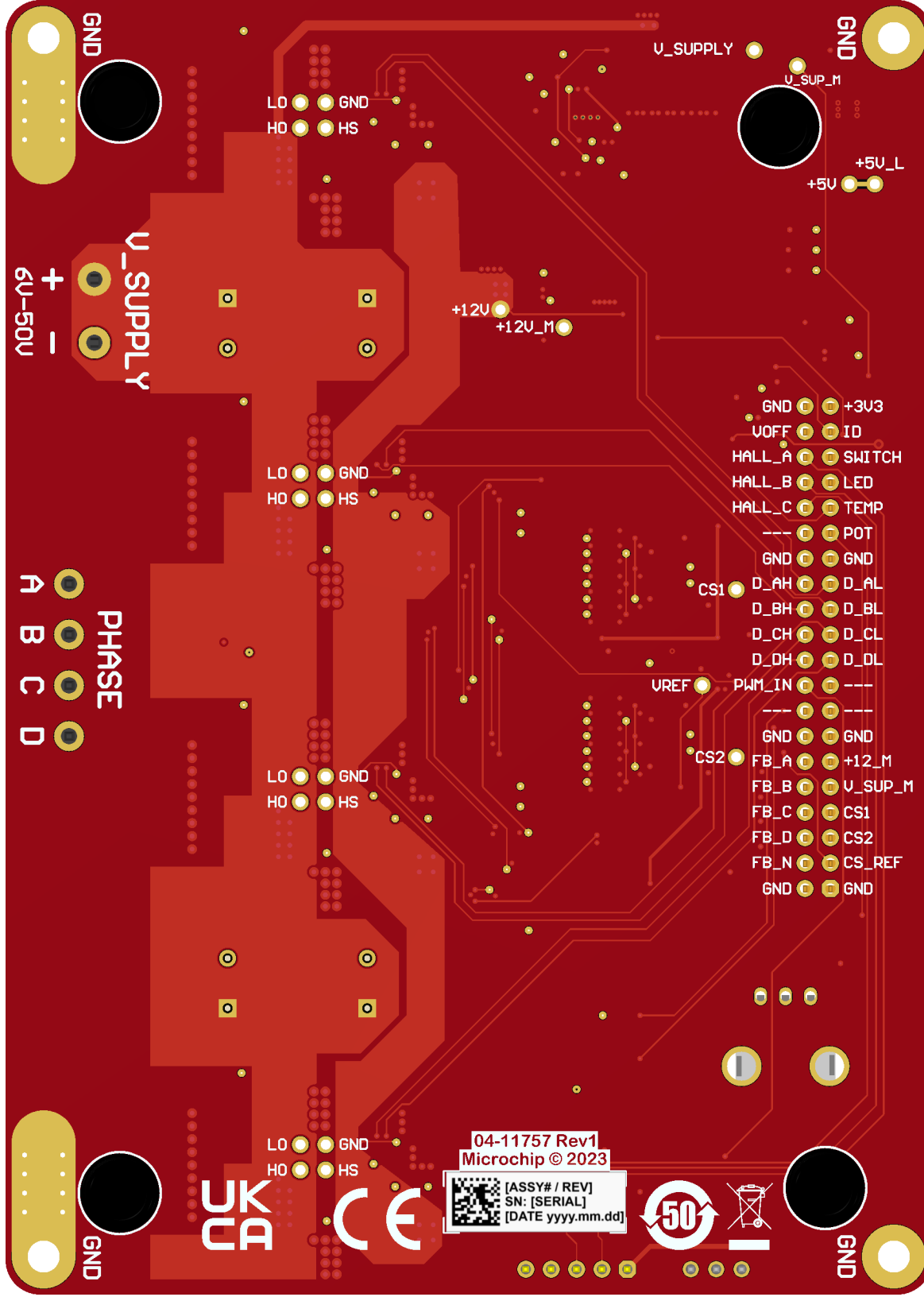












GND

U_SUPPLY
+
-
6V-50V

PHASE
A
B
C
D

GND

LO GND
HO HS

LO GND
HO HS

LO GND
HO HS

LO GND
HO HS

+12V
+12V_M

V_SUPPLY

U_SUPPLY
+5V
+5V_L

GND +3V3
VOFF ID
HALL_A SWITCH
HALL_B LED
HALL_C TEMP
--- POT
GND GND
D_AH D_AL
D_BH D_BL
D_CH D_CL
D_DH D_DL
UREF PWM_IN

GND GND
CS1 CS2
FB_A +12_M
FB_B U_SUPPLY
FB_C CS1
FB_D CS2
FB_N CS_REF
GND GND

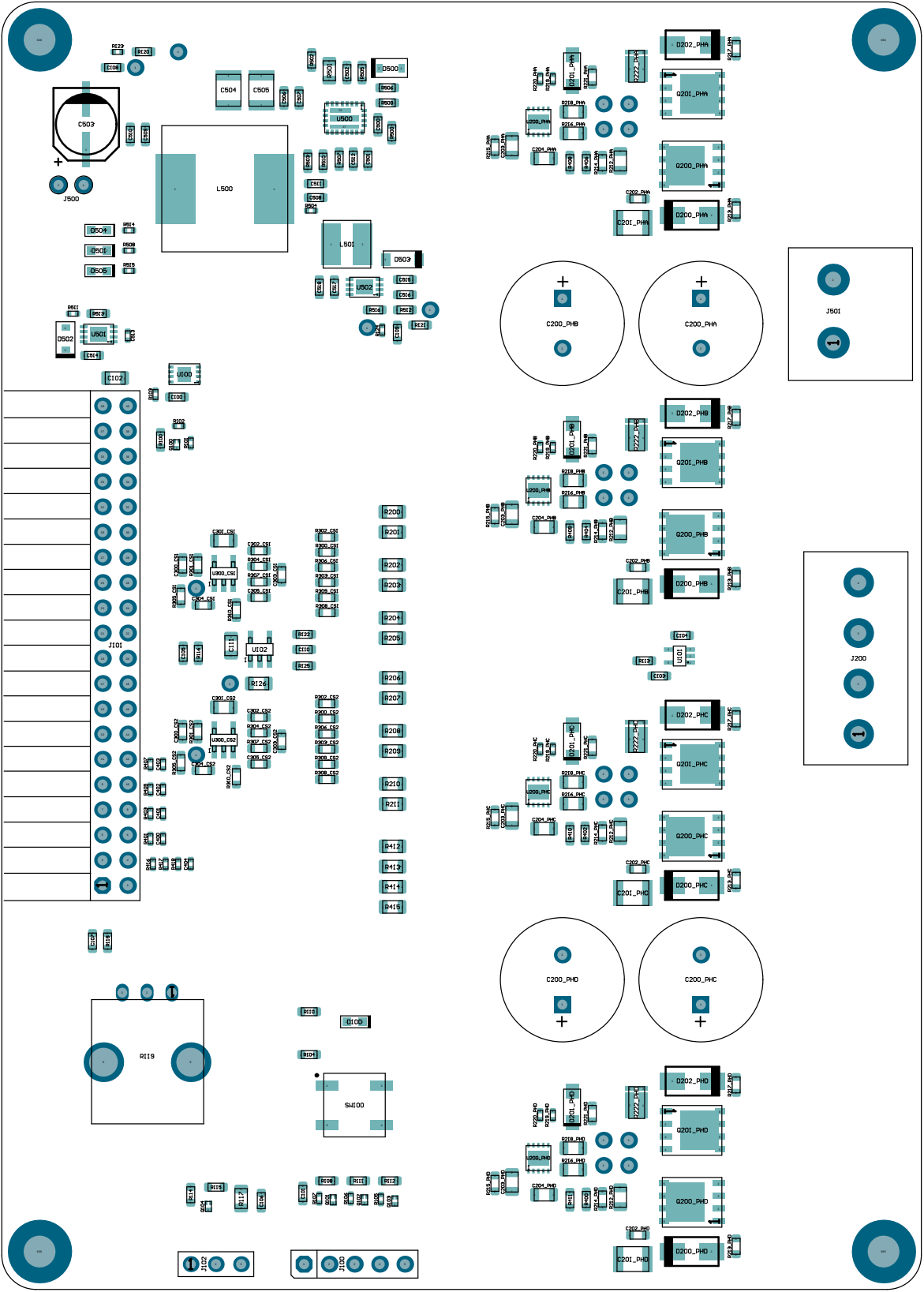
UK
A

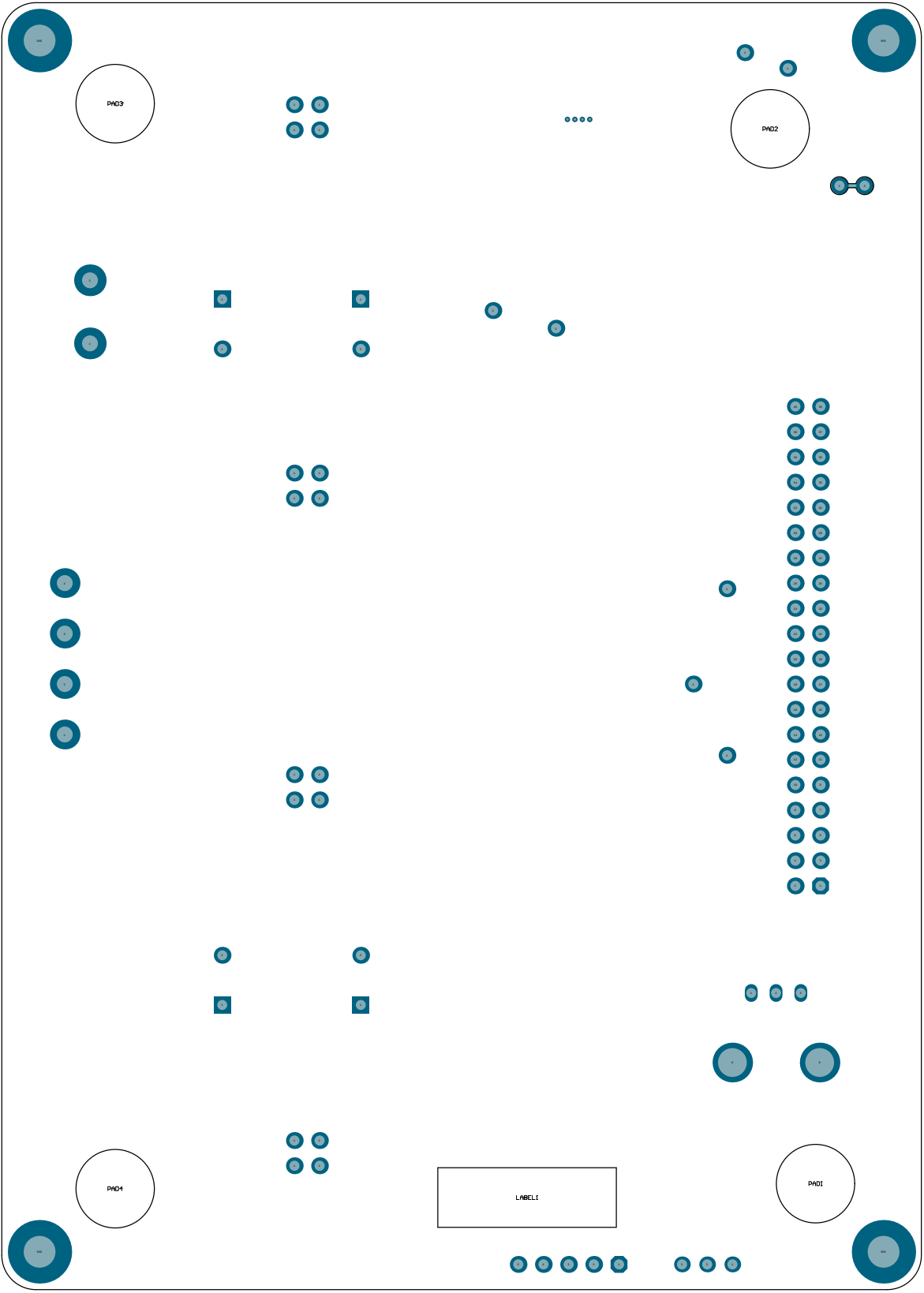


04-11757 Rev1
Microchip © 2023
[ASSY# / REV]
SN: [SERIAL]
[DATE yyyy.mm.dd]

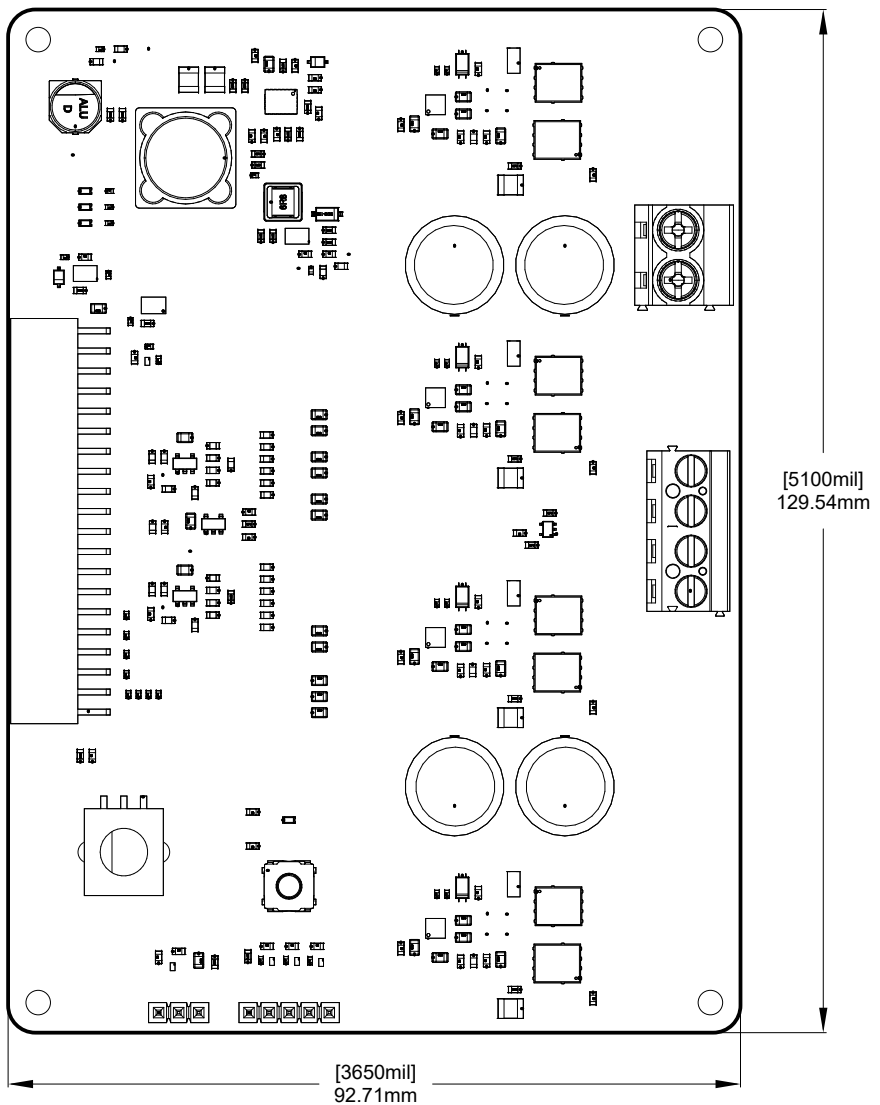


GND





Board Outline



PCB Stackup

Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Solder	0.010mm	Solder Resist	Solder Mask	GTS
Copper	Top Layer	0.035mm		Signal	GTL
Prepreg		0.110mm	PP-006	Dielectric	
CF-004	Phase	0.035mm		Signal	G1
Core		1.229mm	FR-4	Dielectric	
CF-004	GND	0.035mm		Signal	G2
Prepreg		0.110mm	PP-006	Dielectric	
Copper	Bottom Layer	0.035mm		Signal	GBL
Surface Material	Bottom Solder	0.010mm	Solder Resist	Solder Mask	GBS
	Bottom Overlay			Legend	GBO
Total thickness: 1.609mm					

Component list

Multi-Phase Power Board

PCBA Number:02-00671

PCBA Revision:3

Variant:Default Assembly



Print Date:		2024-06-26	12:09:07			
Fitted	Designator	Quantity	Value	Manufacturer 1	Manufacturer Part Number 1	Description_
Fitted	C100, C514	2	4.7uF	TDK Corporation	C1608X5R1C475K080AC	CAP CER 4.7uF 16V 10% X5R SMD 0603
Fitted	C101, C104, C106, C107, C108, C109, C110, C202_PHA, C202_PHB, C202_PHC, C202_PHD, C502, C506, C507, C510, C511, C512	17	0.1uF	Murata	GRM188R72A104KA35D	CAP CER 0.1uF 100V 10% X7R SMD 0603
Fitted	C102, C111, C203_PHA, C203_PHB, C203_PHC, C203_PHD, C204_PHA, C204_PHB, C204_PHC, C204_PHD, C301_CS1, C301_CS2	12	0.33uF	Samsung Electro-Mechanics	CL21B334KBFNNNE	CAP CER 0.33uF 50V 10% X7R SMD 0805
Fitted	C103, C105, C302_CS1, C302_CS2, C303_CS1, C303_CS2, C304_CS1, C304_CS2, C305_CS1, C305_CS2	10	1000pF	TDK Corporation	C1608X7R2A102K080AA	CAP CER 1000pF 50V 20% X7R SMD 0603
Fitted	C200_PHA, C200_PHB, C200_PHC, C200_PHD	4	330uF	Nichicon	UFW2A331MHD	CAP ALU 330uF 100V 20% RAD P5D12.5H25
Fitted	C201_PHA, C201_PHB, C201_PHC, C201_PHD, C504, C505, C515, C516, C517, C518	10	10uF	Murata	GRM32EC72A106KE05L, GRM188R61E106MA73D	CAP CER 10uF 100V 10% X7S SMD 1210, CAP CER 10uF 25V 20% X5R SMD 0603
Fitted	C300_CS1, C300_CS2	2	22pF	Murata	GRM1885C2A220JA01D	CAP CER 22pF 50V 5% COG SMD 0603
Fitted	C400	1	10000pF	Murata	GRM155R71E103KA01D	CAP CER 10nF 25V 10% X7R SMD 0402
Fitted	C500, C501, C509, C513	4	2.2uF	Murata	GRM188R61E225KA12D, GRM155R61C225KE44D	CAP CER 2.2uF 25V 10% X5R SMD 0603, CAP CER 2.2uF 16V 10% X5R SMD 0402
Fitted	C503	1	47uF	Würth Elektronik	8.65081E+11	CAP ALU 47uF 35V 20% SMD D6
Fitted	C508	1	3300pF	KEMET	C0603C32K5RAC7867	CAP CER 3300pF 50V 10% X7R SMD 0603
Fitted	D100	1	RED	Lite-On	LTST-C190CKT	DIO LED RED 1.8V 40mA 10mcd Clear SMD 0603
Fitted	D201_PHA, D201_PHB, D201_PHC, D201_PHD	4	SL110PL	Micro Commercial Co	SL110PL-TP	DIO SCKY SL110PL-TP 600mV 1A 100V SOD-123FL
Fitted	D500	1	1PS76SB70,115	Nexperia USA Inc.	1PS76SB70,115	DIO SCKY BAS70-1PS76SB70 410mV 70mA 70V SMD SC-76
Fitted	D501	1	GREEN	Luckylight	S192GC-1BG	DIO LED GREEN 2V 25mA 40mcd CLEAR SMD 0603
Fitted	D502	1	1PS76SB10	Nexperia USA Inc.	1PS76SB10,115	DIO SCKY 1PS76SB10 800mV 200mA 30V SOD-323
Fitted	D503	1	MBR0530	Micro Commercial Co	MBR0530-TP	DIO SCKY MBR0530 550mV 500mA 30V SOD-123
Fitted	D504	1	BLUE	Lite-On	LTST-C193TBKT-5A	DIO LED BLUE 2.8V 20mA 15mcd Clear SMD 0603
Fitted	D505	1	YELLOW	Luckylight	S192YC-1BG	DIO LED YELLOW 2V 25mA 120mcd CLEAR SMD 0603
Fitted	J100	1	HDR-2.54 Male 1x5	Samtec	TSW-105-07-T-S	CON HDR-2.54 Male 1x5 Tin 5.84MM TH VERT
Fitted	J101	1	HDR-2.54 Female 2x20 R/A	WCON	2185-220RS0CYNRI	CON HDR-2.54 Female 2x20 Gold Flash 8.5MH TH PIP R/A
Fitted	J102	1	HDR-2.54 Male 1x3	WCON	1125-1103S0S116CR01	CON HDR-2.54 MALE 1x3 GOLD FLASH TIN 6.10MM TH PIP VERT
Fitted	J200	1	TERMINAL 1x4	Cabcon A/S	CAEJHM508040A00	CON TERMINAL 5.08mm 1x4 Female 12-30AWG 20A TH R/A
Fitted	J501	1	TERMINAL 1x2	Cabcon A/S	CAFMHM635020000	CON TERMINAL 6.35mm 1x2 Female 10-30AWG 30A TH R/A
Fitted	L500	1	100uH	Bourns	SRR1208-101KL	INDUCTOR 100uH 1.5A 10% SMD L12.7W12.7H8.5
Fitted	L501	1	10uH	Bourns	SRF4828A-100M	INDUCTOR 10UH 1.5A 20% SMD L4.8W4.8H2.8 AEC-Q200
Fitted	LABEL1	1	PCBA LABEL 18X6mm	ACT Logimark AS	505462	LABEL PCBA 18x6mm Datamatrix Assy# / Rev / Serial / Date
Fitted	PAD1, PAD2, PAD3, PAD4	4	Rubber Pad Cyl D7.9H5.08	3M	SJ61A11	MECH HW RUBBER PAD CYLINDRICAL D7.9 H5.08 BLACK
Fitted	Q100, Q101, Q102, Q103, Q104	5	DMN65D8LFB-7B	Diodes Incorporated	DMN65D8LFB-7	TRANS FET N-CH DMN65D8LFB-7B 260mA 60V 430mW X1_DFN1006-3
Fitted	Q200_PHA, Q200_PHB, Q200_PHC, Q200_PHD, Q201_PHA, Q201_PHB, Q201_PHC, Q201_PHD	8	SIR120DP	Vishay	SIR120DP-T1-RE3	TRANS FET N-CH SIR120DP-T1-RE3 80V 106A 100W PPAK SO-8
Fitted	R100, R113, R116, R118, R305_CS1, R305_CS2	6	100R	Panasonic	ERJ-3EKF1000V	RES TKF 100R 1% 1/10W SMD 0603
Fitted	R101, R105, R106, R107, R119, R123, R124, R219_PHA, R219_PHB, R219_PHC, R219_PHD, R220_PHA, R220_PHB, R220_PHC, R220_PHD, R401, R403, R405, R407, R416, R417, R418, R504, R511	24	10k	TE Connectivity, Bourns Inc.	CRG0402F10K, PTV09A-4020S-B103	RES TKF 10k 1% 1/16W SMD 0402, RES VARIABLE 10K 20% 50mW TH
Fitted	R102, R214_PHA, R214_PHB, R214_PHC, R214_PHD, R215_PHA, R215_PHB, R215_PHC, R215_PHD, R221_PHA, R221_PHB, R221_PHC, R221_PHD, R513	14	47k	Yageo, Panasonic	RC0402FR-0747KL, ERJ-3BKF4702V	RES TKF 47k 1% 1/16W SMD 0402, RES TKF 47k 1% 1/10W SMD 0603
Fitted	R103, R506, R507, R509	4	100k	Yageo	RC0402FR-07100KL, RC0603FR-07100KL	RES TKF 100k 1% 1/16W SMD 0402, RES TF 100k 1% 1/10W SMD 0603
Fitted	R104, R110, R505, R508	4	1k	Vishay, Panasonic	CRCW06031K00FKEA, ERJ-2RKf1001X	RES TKF 1k 1% 1/10W SMD 0603, RES TKF 1k 1% 1/10W SMD 0402
Fitted	R108, R111, R112, R114, R115, R122, R125, R301_CS1, R301_CS2, R310_CS1, R310_CS2, R503	12	15k	Vishay	CRCW060315K0FKEA	RES TKF 15k 1% 1/10W SMD 0603 AEC-Q200
Fitted	R117	1	6.8R	Panasonic	ERJ-6RQF6R8V	RES TKF 6.8R 1% 1/8W SMD 0805
Fitted	R120, R400, R402, R404, R406, R408, R409, R410, R411	9	150k	Panasonic	ERJ-3BKF1503V	RES TKF 150k 1% 1/10W SMD 0603
Fitted	R121	1	30k	Stackpole Electronics Inc	RMCF0603FT30K0	RES TKF 30k 1% 1/10W SMD 0603
Fitted	R200, R201, R202, R203, R204, R205, R210, R211, R412, R413, R414	11	0R	Panasonic	ERJ-6GEY0R00V	RES TKF 0R 1/8W SMD 0805
Fitted	R212_PHA, R212_PHB, R212_PHC, R212_PHD, R218_PHA, R218_PHB, R218_PHC, R218_PHD, R501	9	10R	Vishay	CRCW080510R0FKEAC	RES TKF 10R 1% 1/8W SMD 0805
Fitted	R213_PHA, R213_PHB, R213_PHC, R213_PHD	4	82k	Stackpole Electronics Inc	RMCF0603FT82K0	RES TKF 82k 1% 1/10W SMD 0603 AEC-Q200
Fitted	R216_PHA, R216_PHB, R216_PHC, R216_PHD	4	2.2R	Stackpole Electronics Inc	RMCF0805FT2R20	RES TKF 2.2R 1% 1/8W SMD 0805 AEC-Q200
Fitted	R222_PHA, R222_PHB, R222_PHC, R222_PHD	4	0.01R	SUSUMU	PRL1632-R010-F-T1	RES SHUNT TF 0.01R 1% 1W SMD 0612
Fitted	R300_CS1, R300_CS2, R302_CS1, R302_CS2, R303_CS1, R303_CS2, R304_CS1, R304_CS2, R306_CS1, R306_CS2, R307_CS1, R307_CS2, R308_CS1, R308_CS2, R309_CS1, R309_CS2	16	499R	Panasonic	ERJ-3BKF4990V	RES TKF 499R 1% 1/10W SMD 0603
Fitted	R500, R502	2	1.21R	Vishay	CRCW06031R21FKEA	RES TKF 1.21R 1% 1/10W SMD 0603
Fitted	R510	1	1.91k	Panasonic Electronic Components Panasonic Electronic Components	ERJ-3BKF1911V	RES TKF 1.91k 1% 1/10W SMD 0603
Fitted	R512	1	1.05M	Vishay	CRCW06031M05FKEA	RES TKF 1.05M 1% 1/10W SMD 0603
Fitted	R514	1	5.62k	Vishay	CRCW04025K62FKED	RES TKF 5.62k 1% 1/16W SMD 0402 AEC-Q200
Fitted	R515	1	2.2k	Panasonic	ERJ-2RKf2201X	RES TKF 2.2k 1% 1/10W SMD 0402
Fitted	R516	1	120k	Panasonic Electronic Components	ERJ-PA3FL203V	RES TKF 120k 1% 1/3W SMD 0603 AEC-Q200
Fitted	SW100	1	TACT SPST	Dailyw ell Electronics Co.,Ltd.	TS604VM-L-035CR-R	SWITCH TACT SPST 12 50mA TS604VM-L-035CR-R SMD
Fitted	TEST1	1				TEST, Multi-Phase Pow er Board
Fitted	U100	1	ATSHA204A-MAHCZ-T	Microchip Technology	ATSHA204A-MAHCZ-T	MCHP MEMORY SERIAL EEPROM CRY PTO AUTH 4.5Kb I2C ATSHA204A-MAHCZ-T UDFN-8
Fitted	U101	1	MCP9701	Microchip	MCP9701T-E/LT	MCHP ANALOG TEMPERATURE SENSOR -40C to +125C MCP9701T-E/LT SC-70-5
Fitted	U102, U300_CS1, U300_CS2	3	MCP6021	Microchip	MCP6021T-E/OT	MCHP ANALOG OPAMP 1-Ch 10MHz MCP6021T-E/OT SOT-23-5
Fitted	U200_PHA, U200_PHB, U200_PHC, U200_PHD	4	MIC4605-1	Microchip Technology	MIC4605-1YMT-TR	MCHP ANALOG FET DRIVER Dual-Non-Inverting MIC4605-1YMT TDFN-10
Fitted	U500	1	MIC28512-2	Microchip Technology	MIC28512-2YFL-TR	MCHP ANALOG SWITCHER Buck ADJ 0.8V-70V MIC28512-2 FQCFN-24
Fitted	U501	1	MCP1754T-3302EMC	Microchip Technology	MCP1754T-3302EMC	MCHP ANALOG LDO 3.3V MCP1754T-3302EMC DFN-8
Fitted	U502	1	MCP1661	Microchip Technology	MCP1661T-EMNY	MCHP ANALOG SWITCHER Boost 32V MCP1661T-EMNY TDFN-8
Not Fitted	C400, C401, C402, C403	0	10000pF	Murata	GRM155R71E103KA01D	CAP CER 10nF 25V 10% X7R SMD 0402
Not Fitted	D200_PHA, D200_PHB, D200_PHC, D200_PHD, D202_PHA, D202_PHB, D202_PHC, D202_PHD	0	10MQ100NTRPBF	Vishay	VS-10MQ100NTRPBF	DIO SCKY 10MQ100NTRPBF 850mV 2.1A 100V DO-214AC_SMA
Not Fitted	R126, R206, R207, R208, R209, R415	0	0R	Panasonic	ERJ-6GEY0R00V	RES TKF 0R 1/8W SMD 0805
Not Fitted	R217_PHA, R217_PHB, R217_PHC, R217_PHD	0	160k	Vishay	CRCW0603160KPEA	RES TKF 160k 1% 1/10W SMD 0603
		244				
Approved			Notes			