

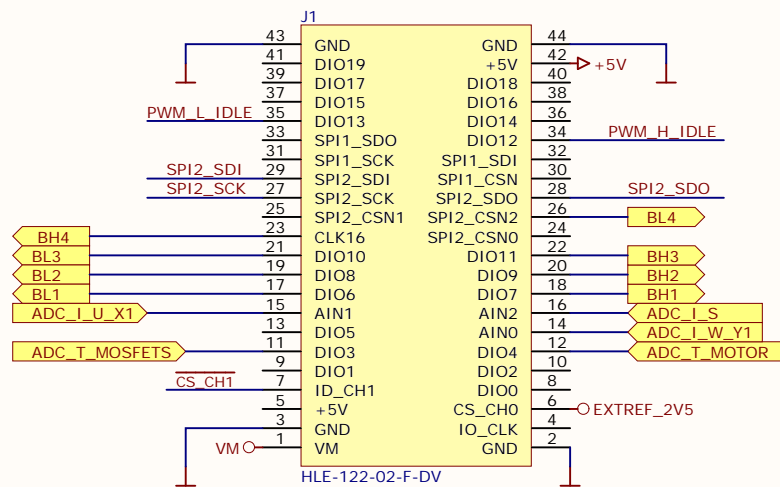
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2

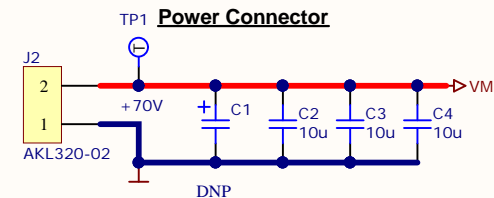
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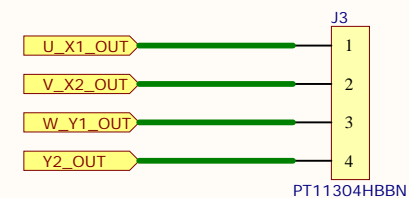
uC or Motor Controller Connector



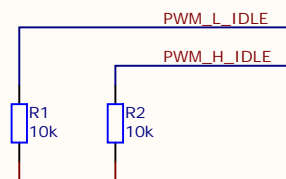
Power Connector



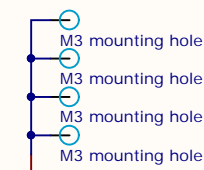
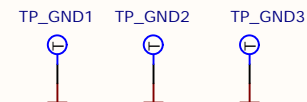
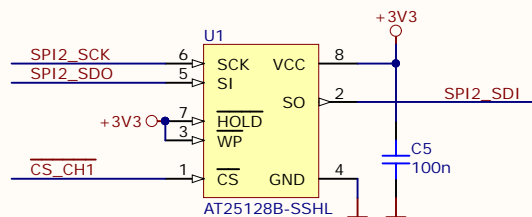
Motor Connector



Bridge Idle State



Ident EEPROM



Title **Universal Power Stage 10A EVAL**

Size: **A4** Revision: Initial

Date: 18.10.2017 Time: 18:31:38 Sheet 1 of 5

File: UPS 10A EVAL V11 Main.SchDoc

Main & I/O

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MOTION CONTROL

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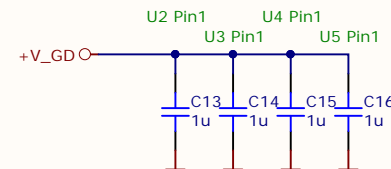
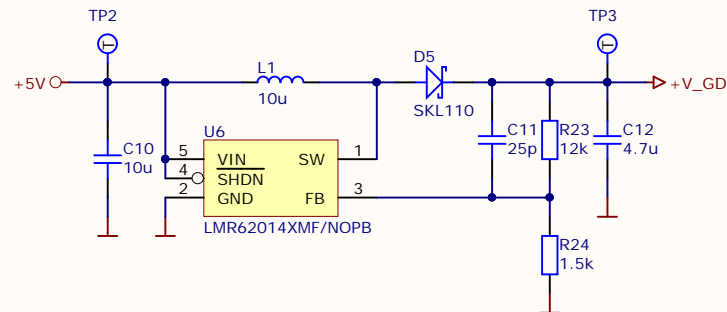
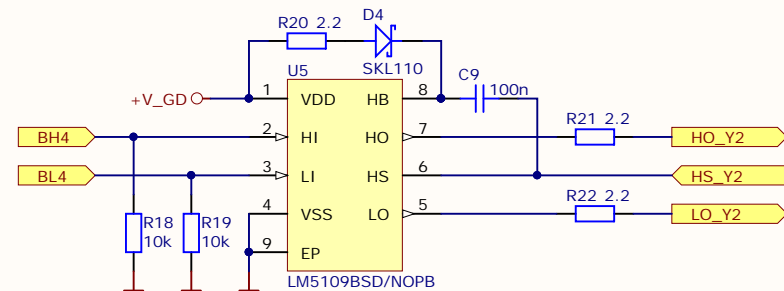
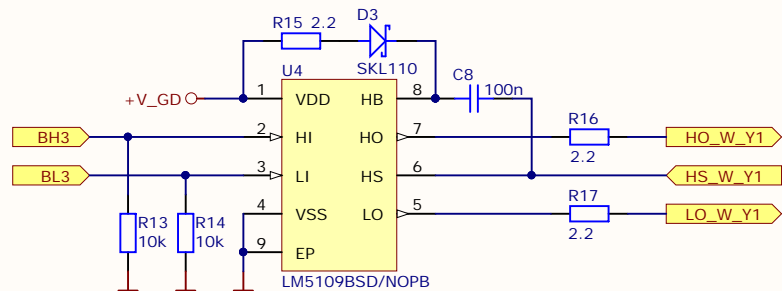
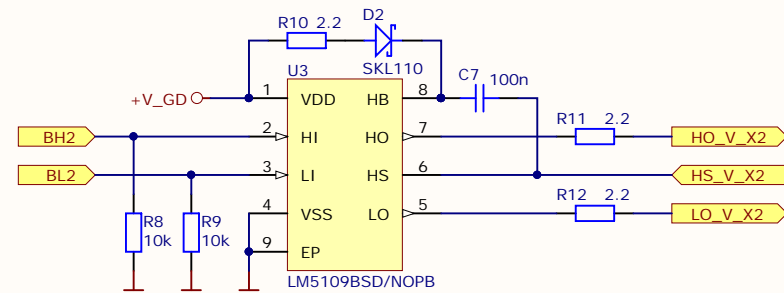
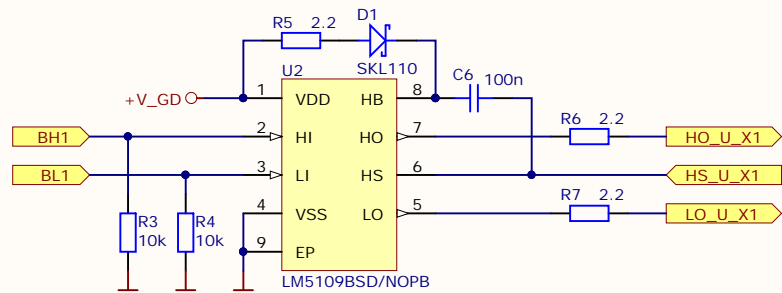
1

2

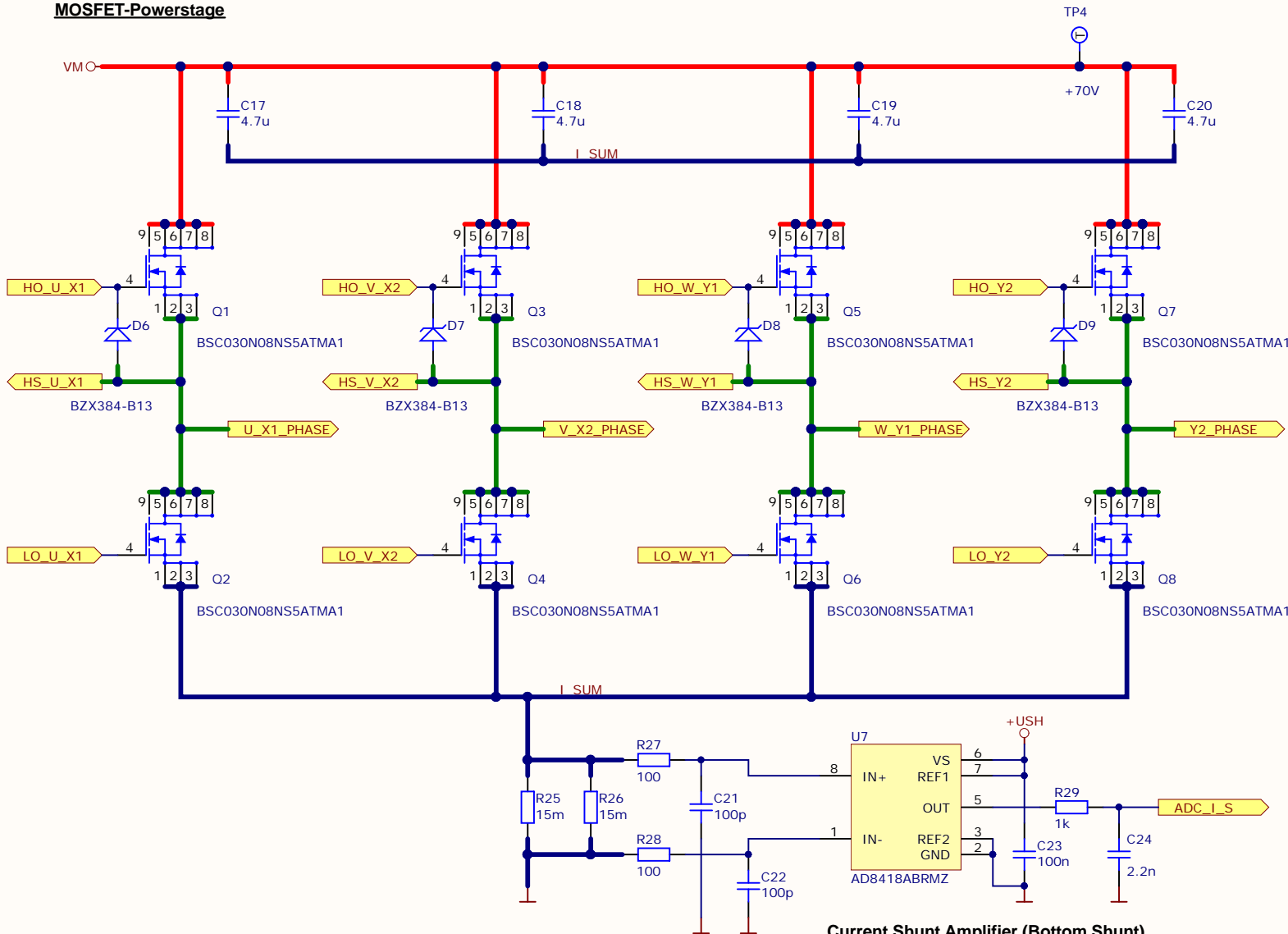
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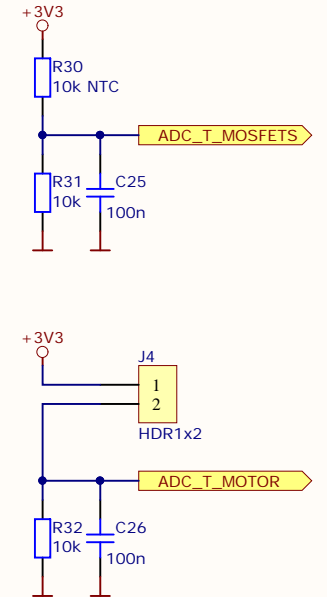
MOSFET Predrivers



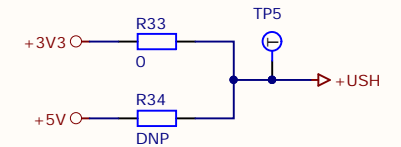
MOSFET-Powerstage




Temp sensing



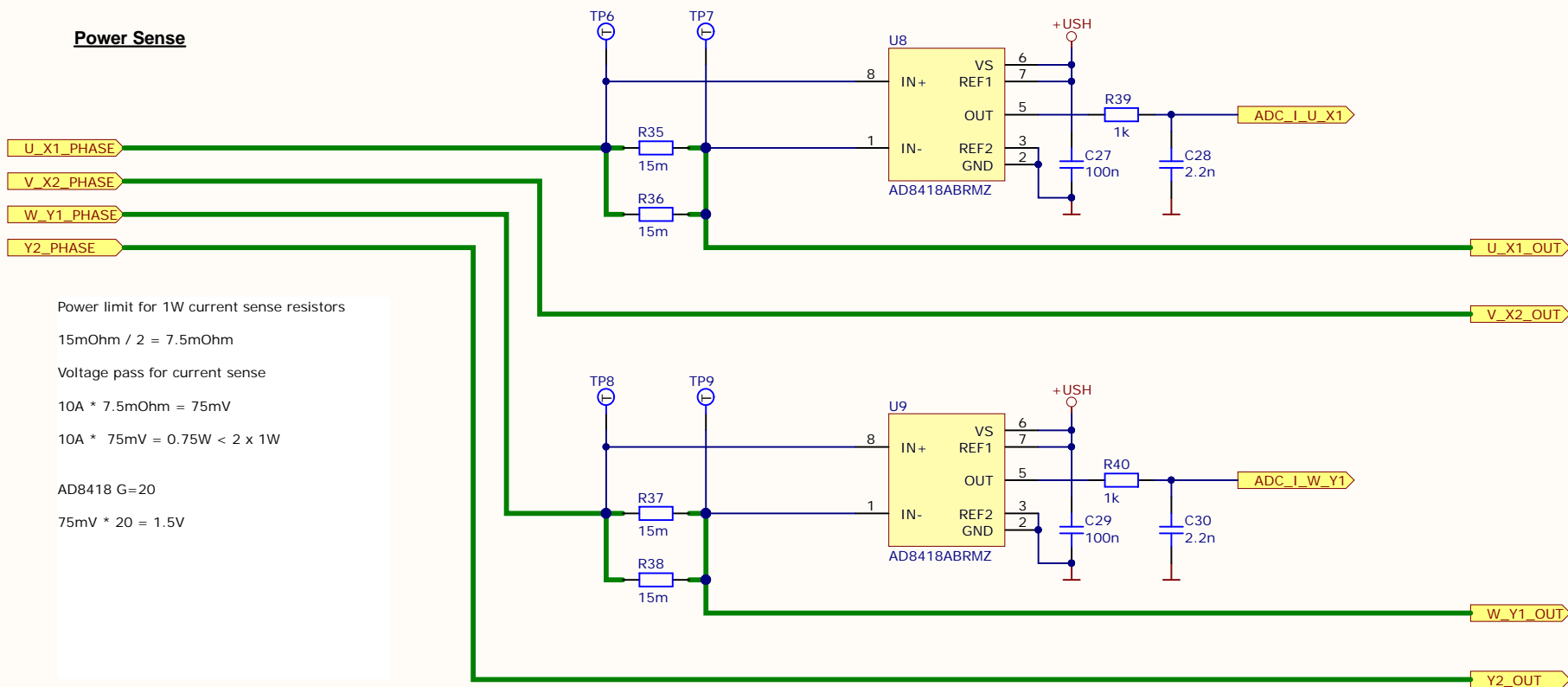
Shunt Amplifier power select (default +3.3V)



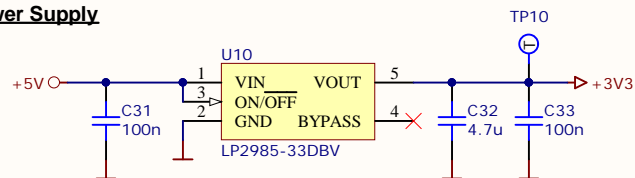
Current Shunt Amplifier (Bottom Shunt)

Title Universal Power Stage 10A EVAL			<div>MOSFETs</div> <div></div> <div>TRINAMIC</div> <div>MOTION CONTROL</div>	<div>Waterloohain 5</div> <div>22769 Hamburg</div> <div>Germany</div> <div>tmc_info@trinamic.com</div>
Size: A4	Revision:	Initial		
Date: 18.10.2017	Time: 18:31:39	Sheet 3 of 5		
File: UPS 10A EVAL V11 MOSFETs.SchDoc				

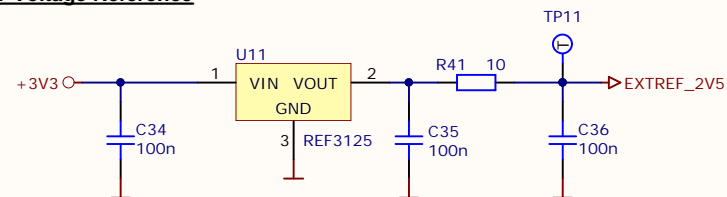
Power Sense



3.3V Power Supply



Ext 2.5V Voltage Reference



Title	Universal Power Stage 10A EVAL		
Size:	A4	Revision:	Initial
Date:	18.10.2017	Time:	18: 31: 39
File:	UPS 10A EVAL_V11_Power_Sense.SchDoc		

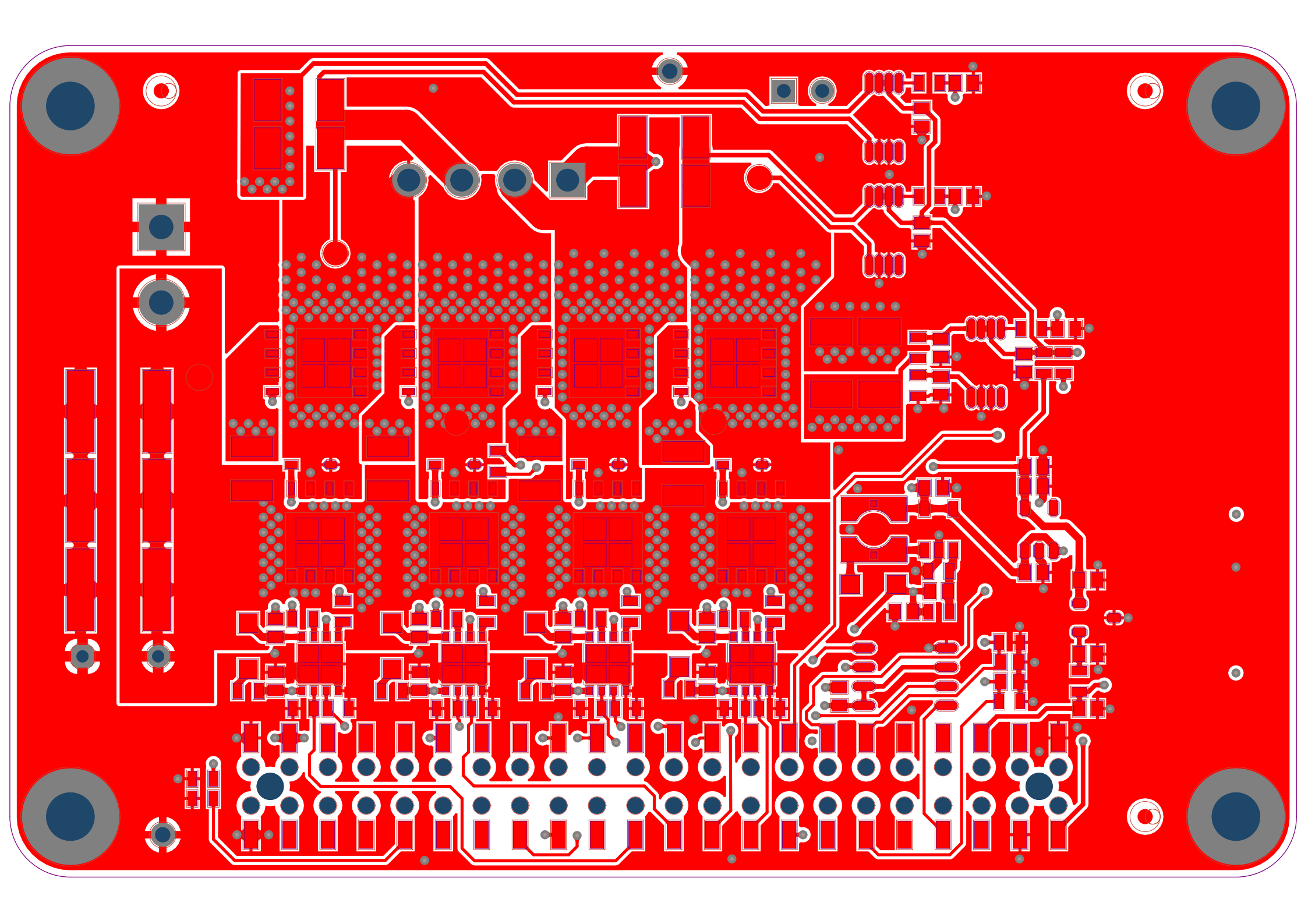


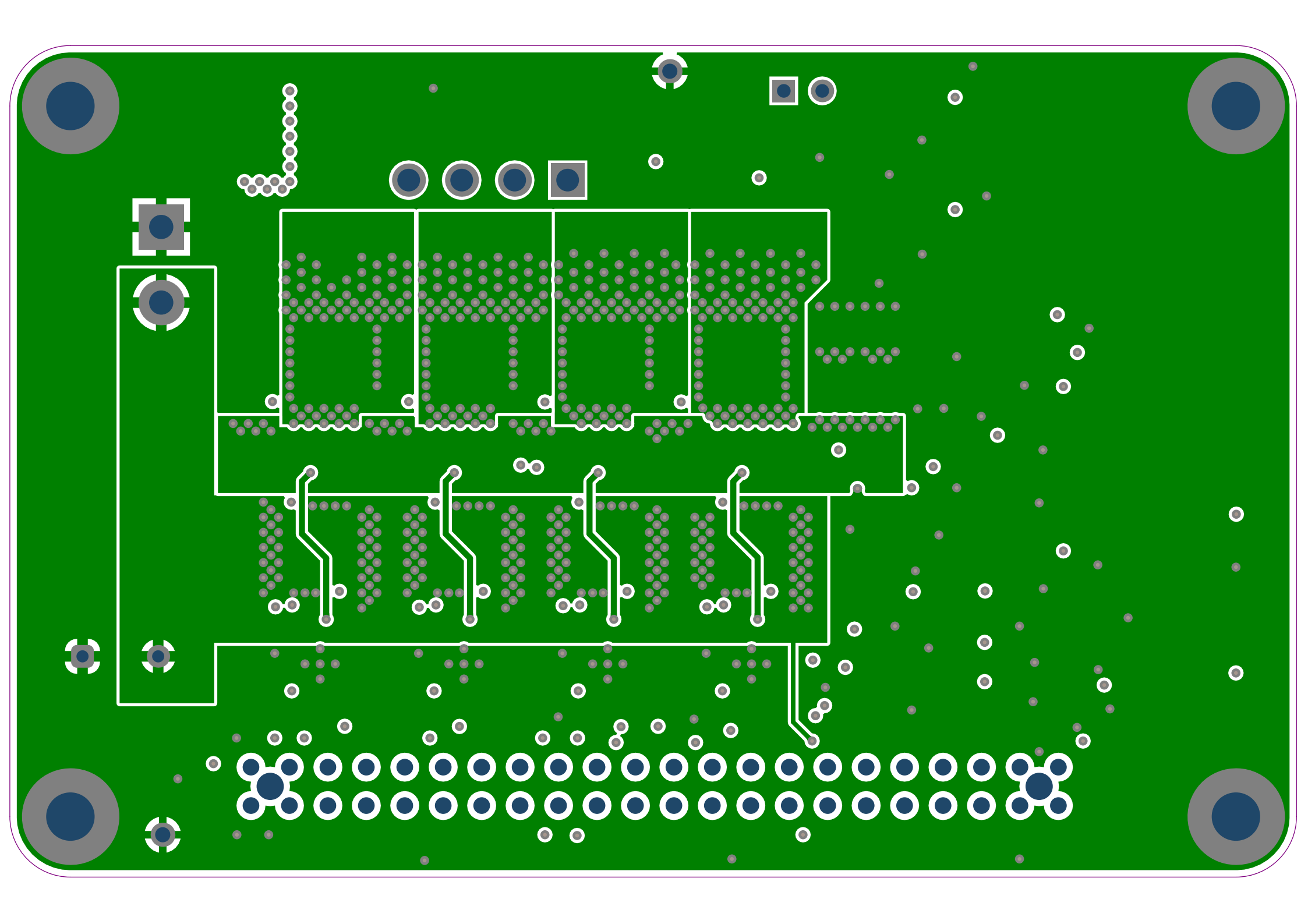
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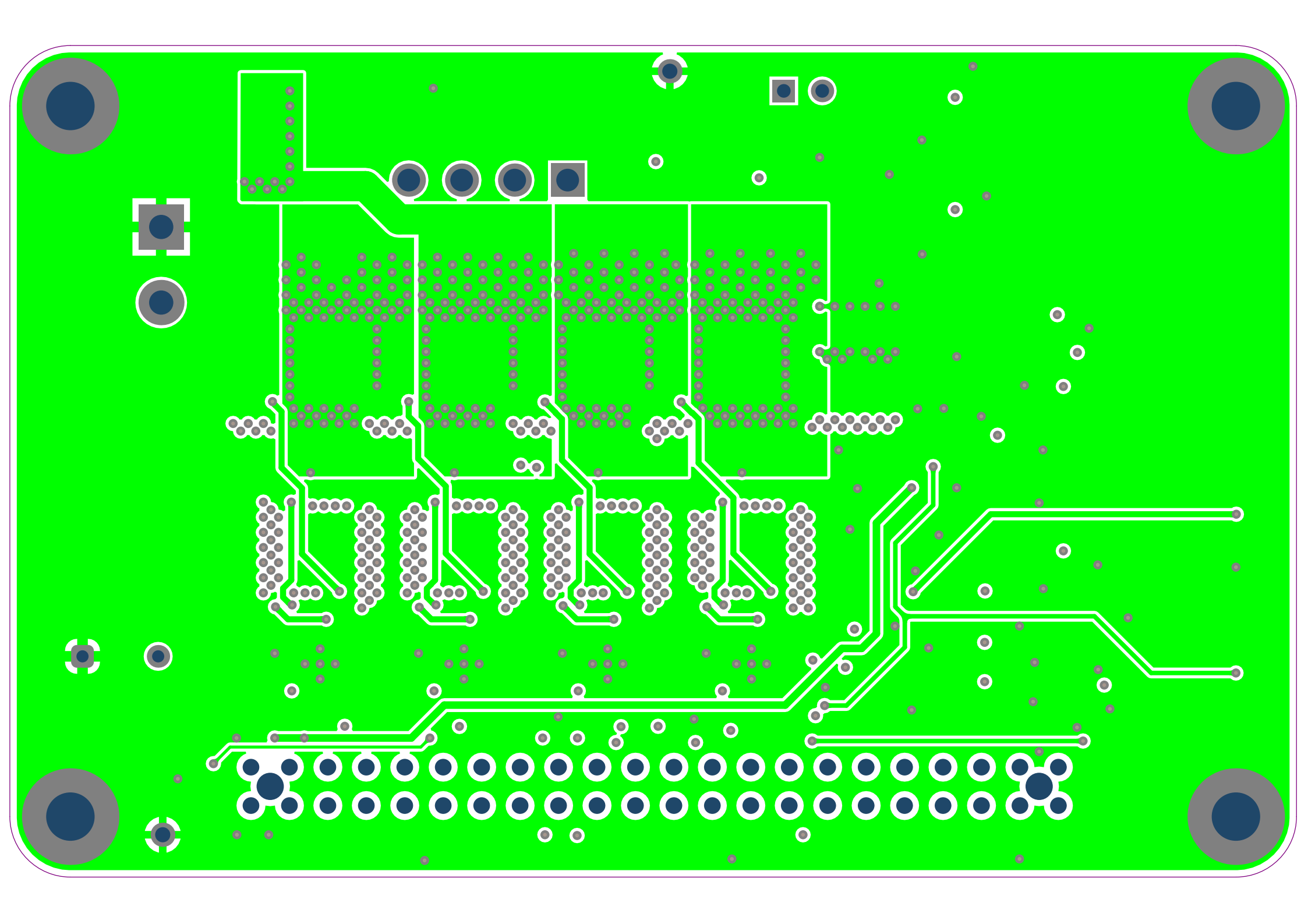
Designator	Quantity	Manufacturer	Part Number	Description	LibRef
C1	1	DNP	DNP	Polarized capacitor, pin 1 neg	50527
C2, C3, C4	3	Any	10u, 100V, X5R, 2220 (5750 metric) chip capacitor	Ceramic chip capacitor	20116
C5, C23, C25, C26, C27, C29, C31, C33, C34, C35, C36	11	Any	100n, 50V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20027
C6, C7, C8, C9	4	Any	100n, 100V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20110
C10	1	Any	10u, 10V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20111
C11	1	Any	25p, 50V, C0G/NP0, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20112
C12	1	Any	4.7u, 25V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20113
C13, C14, C15, C16	4	Any	1u, 25V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20077
C17, C18, C19, C20	4	Murata	GRM32ER71K475KE14L	Ceramic chip capacitor	30006
C21, C22	2	Any	100p, 100V, C0G/NP0, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20083
C24, C28, C30	3	Any	2.2n, 50V, C0G/NP0, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20056
C32	1	Any	4.7u, 10V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	20084
D1, D2, D3, D4, D5	5	Diotec Semiconductor	SKL110	Schottky Diode, pin1 cathode	50491
D6, D7, D8, D9	4	Nexperia	BZX384-B13	Zener, pin1 cathode	50513
J1	1	Samtec	HLE-122-02-F-DV	Trinamic 44-pin connector	50289
J2	1	Metz Connect	AKL320-02	1X2 pin connector	50537
J3	1	Metz Connect	PT11304HBBN	1X4 pin connector	50511
J4	1	Any	1x2 2.54mm pin header	1X2 pin connector	50023
L1	1	Wuerth	744031100	Molded inductor	60031
Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	8	Infineon	BSC030N08NS5ATMA1	N-ch Enh-MOSFET; 5,6,7,8D 4G 1,2,3S	50489
R1, R2, R3, R4, R8, R9, R13, R14, R18, R19, R31, R32	12	Any	10k, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10028
R5, R6, R7, R10, R11, R12, R15, R16, R17, R20, R21, R22	12	Any	2.2, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10041
R23	1	Any	12k, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10078
R24	1	Any	1.5k, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10152
R25, R26, R35, R36, R37, R38	6	Any	15m, 1%, 750mW, 2010 (5025 metric) chip resistor	Chip Resistor	10157
R27, R28	2	Any	100, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10016
R29, R39, R40	3	Any	1k, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10049
R30	1	Epcos	B57330V2103J260	Chip Resistor	40000
R33	1	Any	0, -, -, 0603 (1608 metric) chip resistor	Chip Resistor	10054
R34	1	DNP	DNP	Chip Resistor	40007
R41	1	Any	10, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	10002
U1	1	Atmel	AT25128B-SSHL	SPI Serial Flash Memory	50499
U2, U3, U4, U5	4	Texas Instruments	LM5109BSD/NOPB	High Voltage 1A Peak Half Bridge Gate Driver	50490
U6	1	Texas Instruments	LMR62014XMF/NOPB	LMR62014 SIMPLE SWITCHER® 20Vout, 1.4A Step-Up Voltage Regulator in SOT-23	50495
U7, U8, U9	3	Analog Devices	AD8418ABRMZ	Bidirectional, Zero Drift, Current Sense Amplifier	50496
U10	1	Texas Instruments	LP2985-33DBV	150-mA Low-noise LDO	50426
U11	1	Texas Instruments	REF3125	Series voltage reference	50316

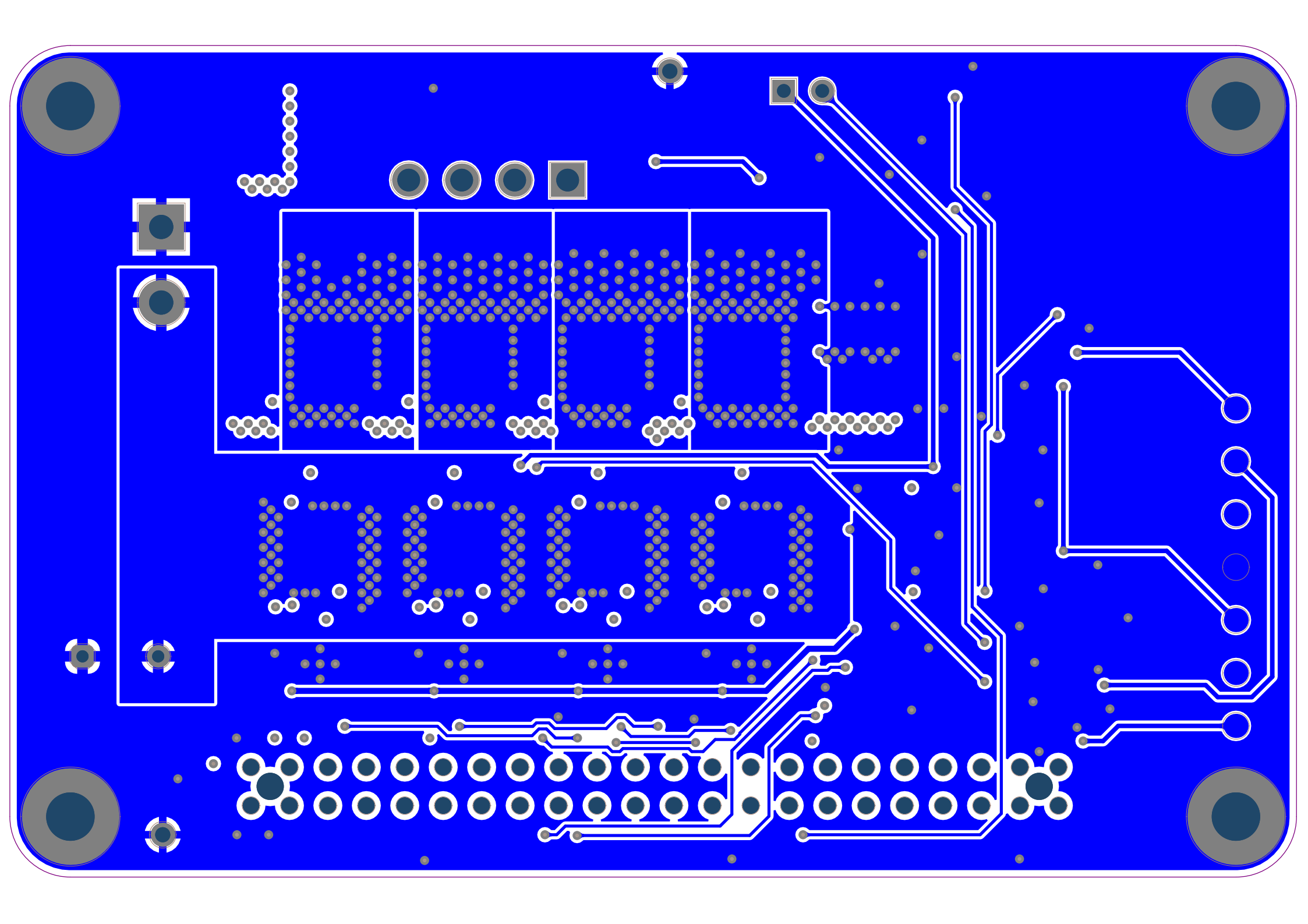
Board Stack Report

Stack Up		Layer Stack			
Layer	Board Layer Stack	Name	Material	Thickness	Constant
1		Top Paste			
2		Top Overlay			
3		Top Soldermask	Solder Resist	0.010mm	3.5
4		Top Layer	Copper	0.035mm	
5		Prepreg 7628-45		0.360mm	4.6
6		Mid1	Copper	0.036mm	
7		High Tg 1,08mm 35??m/35??m	FR-4	0.710mm	4.6
8		Mid2	Copper	0.036mm	
9		Prepreg 7628-45		0.360mm	4.6
10		Bottom Layer	Copper	0.035mm	
11		Bottom Soldermask	Solder Resist	0.010mm	3.5
12		Bottom Overlay			
13		Bottom Paste			
	Height : 1.592mm				











TRINAMIC

MOTION CONTROL

Universal Power
Stage 10/70 – EVAL

Interface:
Inverter PWM

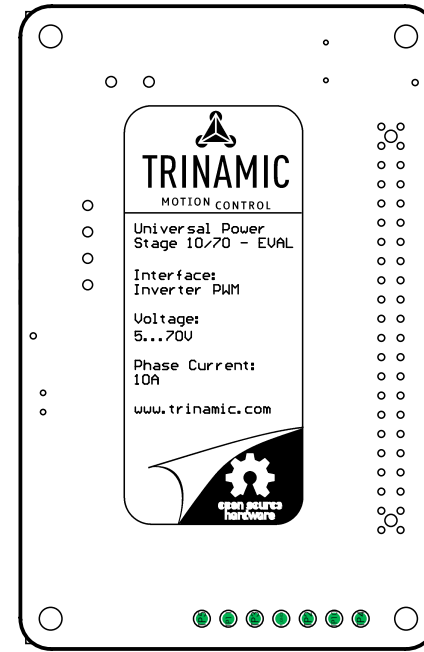
Voltage:
5...70V


Phase Current:
10A

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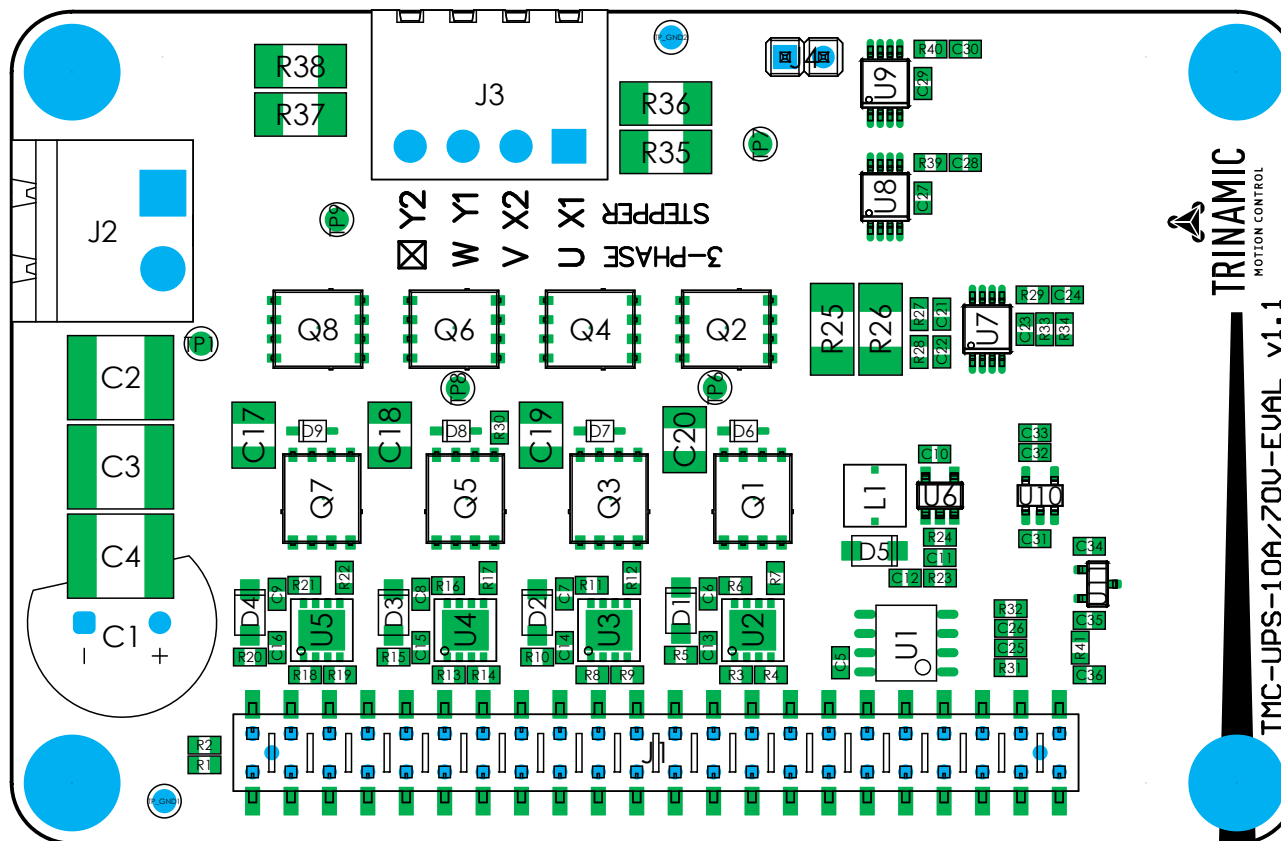


- +USH
- EXTREF 2V5
- +V_GD
- GND
- +5V
- +3V3
- +70V



Title			 TRINAMIC MOTION CONTROL Waterloohain 5 22769 Hamburg Germany tmc_info@trinamic.com
Size	Revision	Project	
A4		Universal Powerstage 10A	
Date	18.10.2017	18:33	
File	UPS 10A EVAL V11-A.PCBDwf		
Sheet 1 of 2			

Top Side View (2:1)



Title		
Assembly Drawing		
Size	Revision	Project
A4		Universal Power Stage 10A
Date	18.10.2017 18:33	Sheet 2 of 2
File	UPS_10A_EVAL_V11-A.PCBDwf	



TRINAMIC
 MOTION CONTROL

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A

B

C

D

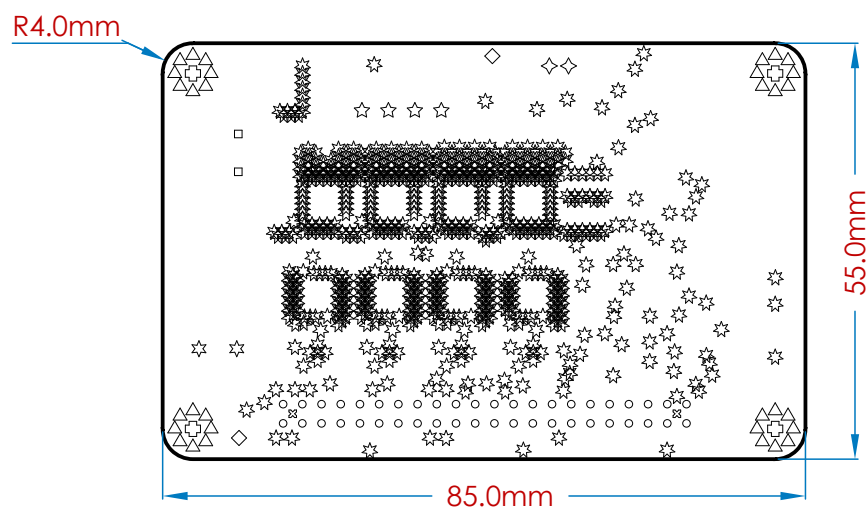
Layer Stack Legend

Material	Layer	Thickness	Gerber
	Top Paste		GTP
	Top Overlay		GTO
Surface Material	Top Soldermask	0.010mm	GTS
Copper	Top Layer	0.035mm	GTL
Prepreg		0.360mm	
Copper	Mid1	0.036mm	G1
Core		0.710mm	
Copper	Mid2	0.036mm	G2
Prepreg		0.360mm	
Copper	Bottom Layer	0.035mm	GBL
Surface Material	Bottom Soldermask	0.010mm	GBS
	Bottom Overlay		GBO
	Bottom Paste		GBP
Total thickness: 1.592mm			

Notes:

1. Use current revision of all standards.
2. Board is to be manufactured in accordance to IPC-6012 Class 2.
3. Laminate (core) and prepreg to be in accordance with IPC-4101/126
4. Board finish shall be ENIG
5. Soldermask colour shall be WHITE
6. Silkscreen colour shall be BLACK
7. All hole dimensions apply after plating
8. All copper dimensions apply after plating

Drill Drawing View (Scale 1:1)



Drill Table

Symbol	Count	Hole Size	Plated	Via / Pad	Hole Tolerance
☆	699	0.25	Plated	Via	None
△	32	0.60	Plated	Via	None
☆	2	0.80	Plated	Pad	None
◇	2	0.90	Plated	Pad	None
◇	2	1.00	Plated	Pad	None
○	44	1.10	Non-Plated	Pad	None
☆	4	1.50	Plated	Pad	None
□	2	1.60	Plated	Pad	None
⊗	2	1.80	Non-Plated	Pad	None
⊕	4	3.20	Plated	Pad	None
793 Total					

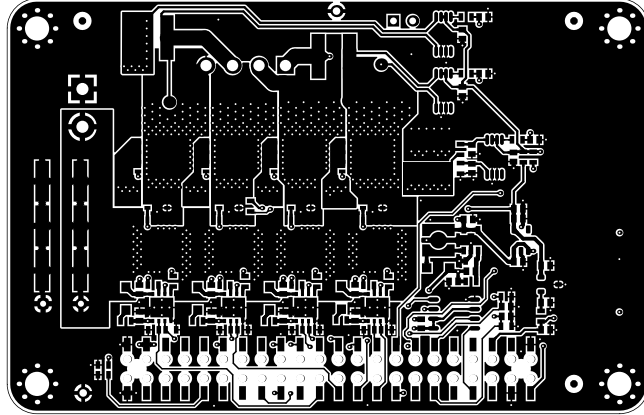
A

B

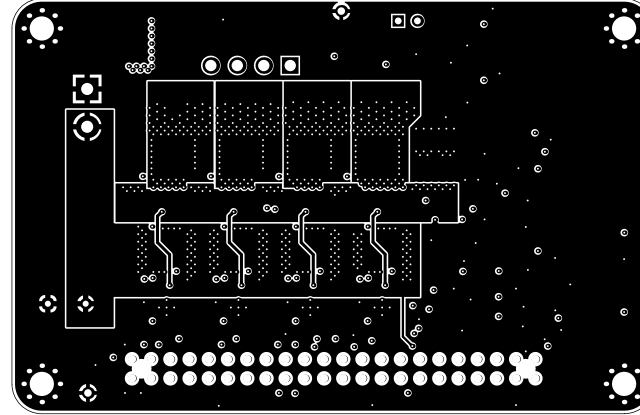
C

D

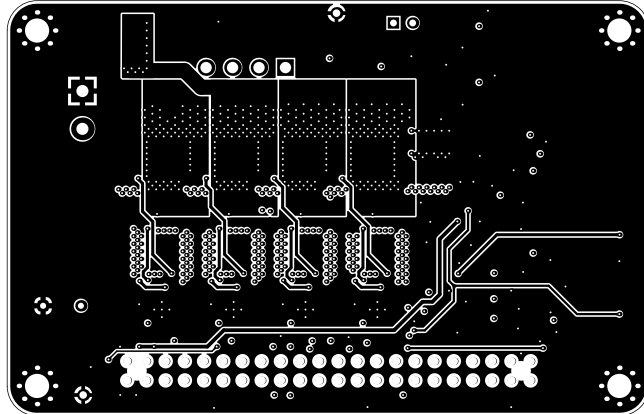
Top Layer (Scale 1:1)



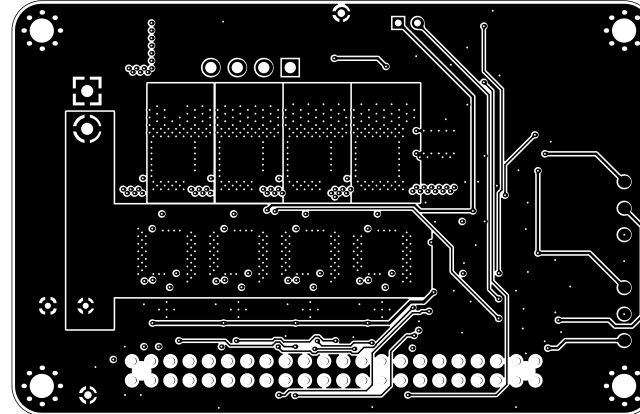
Mid1 (Scale 1:1)



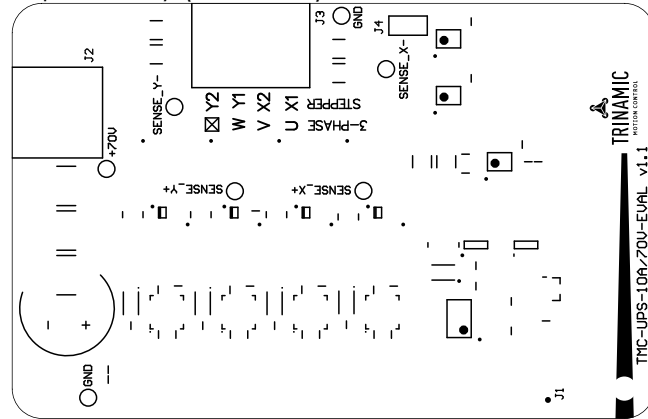
Mid2 (Scale 1:1)



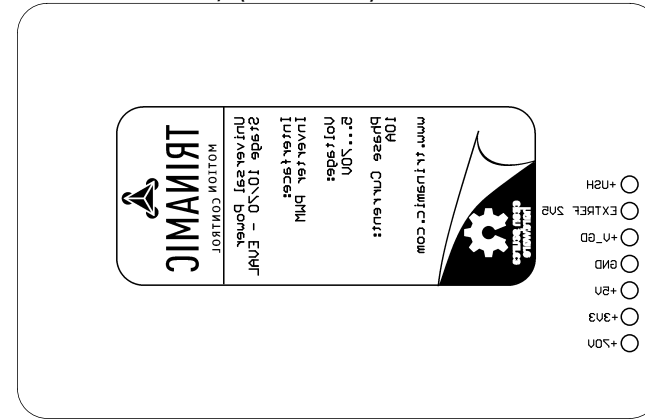
Bottom Layer (Scale 1:1)



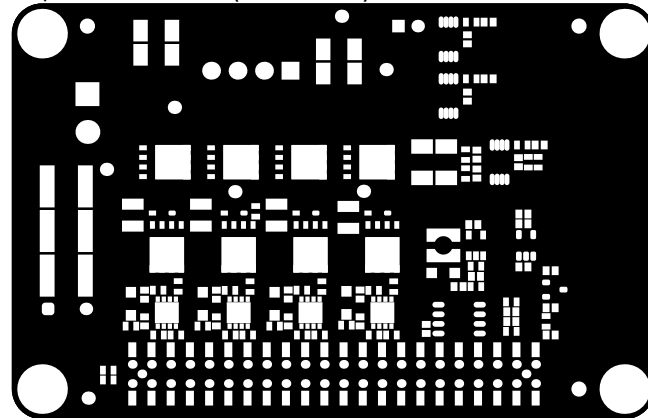
Top Overlay (Scale 1:1)



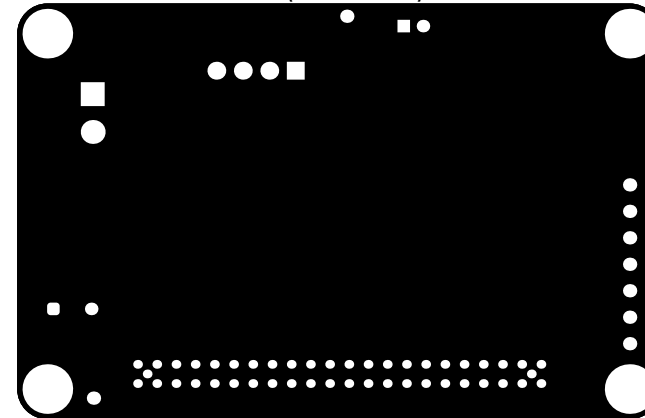
Bottom Overlay (Scale 1:1)



Top Soldermask (Scale 1:1)



Bottom Soldermask (Scale 1:1)



Title		
Fabrication Drawing		
Size	Revision	Project
A4		
Date	18.10.2017 18:33	Sheet 3 of 4
File	UPS 10A EVAL V11-F.PCBDwf	



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A

B

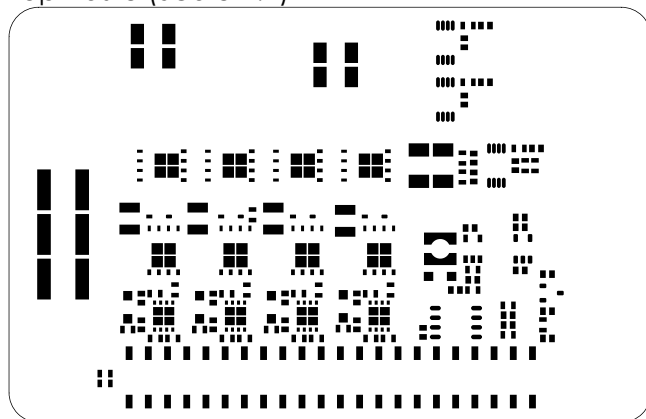
C

D

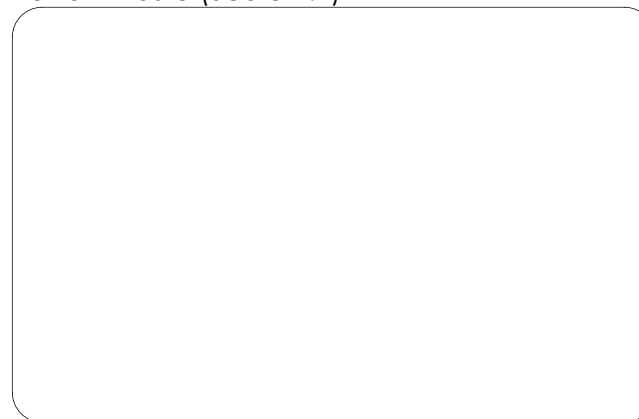
1

1

Top Paste (Scale 1:1)



Bottom Paste (Scale 1:1)



2

2

3

3

4


4

A

B

C

D

Title			Fabrication Drawing	
Universal Power Stage 10A			 TRINAMIC MOTION CONTROL	
Size	Revision	Project		
A4				
Date	18.10.2017 18:33		Sheet 4 of 4	
File	UPS_10A_EVAL_V11-F.PCBDwf			

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