

Title **TMC5130-HBS-REF PSU**

Size: **A4**

Revision: **V1.0**

[No Variations]

Date: **16-Mar-21**




Time: **14:59:36**

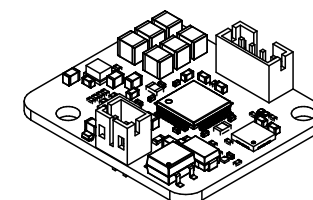
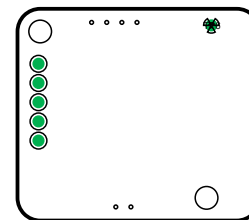
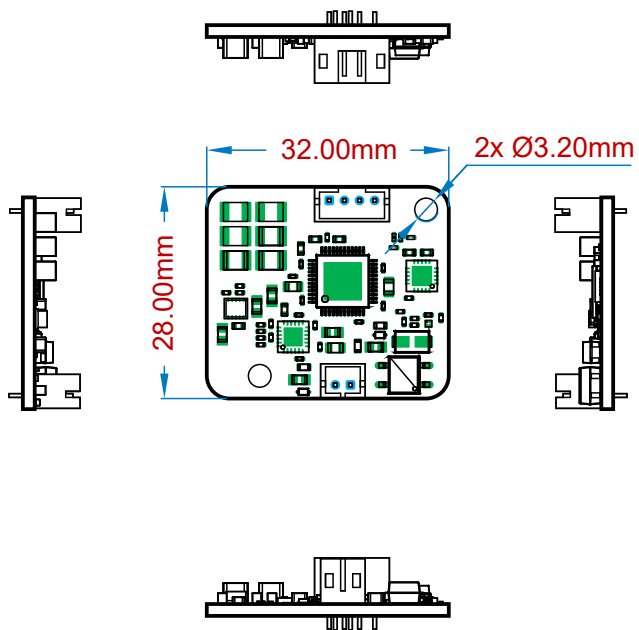
Sheet **4** of **5**

File: **REF-PSU.SchDoc**




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1	2	3	4																		
A	<div>Changelog:</div> <div>From V1.0A to V1.0B:</div> <div>- Replace electrolytic capacitor with 4x 10u ceramic</div> <div>From V1.0pre1 to V1.0A:</div> <div>- Red LED label to DRV_EN. Changed label size to fit the copper area</div> <div>- Added J3 mating connector to the BOM</div> <div>From V0.9 to V1.0pre1:</div> <div>- Added Driver (R) and Power (B) LEDs</div> <div>- Added VRAW test point</div> <div>From V0.9pre4 to V0.9:</div> <div>- Added board name to top soldermask</div> <div>Form V0.9pre3 to V0.9pre4:</div> <div>- Board size to 32x28mm</div> <div>- Adjusted the bulk capacitance to 220u+20u</div> <div>From V0.9pre2 to V0.9pre3:</div> <div>- Changed motor current sense resistors to 750m</div> <div>- Replaced the programming connector with P100 pogo test pads</div> <div>- Removed Excess SPI pull-ups</div> <div>- Connected driver SPI_MODE to +3.3V</div> <div>- Removed R25 from driver ENCN_DCO, now floating</div> <div>- Connected driver SWSEL to GND</div> <div>- Connected driver DIAG1/0 to MCU</div> <div>- Changed 3.3V PSU to MAXM15065AMB+</div> <div>- Changed HBS connector to JST 2-pin PH</div> <div>- Changed D1 TVS from SMBJ to SMAJ</div> <div>- Changed D3/D4 TVS to PESD5V0L1UB</div> <div>- Reduced the bulk capacitance on VRAW to 30u</div> <div>- Removed 10u capacitor from +5V</div> <div>- Reduced the board size to 28x28mm</div>			A																	
B				B																	
C				C																	
D				D																	
		<table><tr><td colspan="3">Title TMC5130-HBS-REF LOG</td></tr><tr><td>Size: A4</td><td>Revision: V1.0</td><td>[No Variations]</td></tr><tr><td>Date: 16-Mar-21</td><td>Time: 14:59:36</td><td>Sheet 5 of 5</td></tr><tr><td colspan="3">File: REF-LOG.SchDoc</td></tr></table>		Title TMC5130-HBS-REF LOG			Size: A4	Revision: V1.0	[No Variations]	Date: 16-Mar-21	Time: 14:59:36	Sheet 5 of 5	File: REF-LOG.SchDoc			<table><tr><td rowspan="2"></td><td colspan="2">Waterloohain 5 22769 Hamburg Germany</td></tr><tr><td colspan="2">tmc_info@trinamic.com</td></tr></table>		Waterloohain 5 22769 Hamburg Germany		tmc_info@trinamic.com	
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View from Front side (Scale 1:1)

Title			Assembly drawing		
Size	Revision	Project	TMC5130-HBS-REF		
A4	V1.0				
Date	16-Mar-21	14:59	Sheet 1 of 2		
File	TMC5130-HBS-REF.Assembly.PCBdwf				



TRINAMIC
MOTION CONTROL

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Title				Assembly drawing			
Size	Revision		Project		TMC5130-HBS-REF		
A4	V1.0						
Date	16-Mar-21		14:59		Sheet 2 of 2		
File	TMC5130-HBS-REF.Assembly.PCBdWf						



Hedgehog OÜ
Riia 185A, 51014 Tartu
Eesti/Estonia
info@hedgehog.ee

Designator	Quantity	Manufacturer	Part Number	Description	Value	LibRef
BOM1	1	JST	PHR-2	BOM item	2 pin, 2mm housing	51641
C1, C13, C15, C30, C31	5	Any	100n, 50V, X7R, 0402 (1005 metric) chip capacitor	Ceramic chip capacitor	100n	20203
C2, C4, C5, C7, C23, C25	6	Samsung	CL32B106KBJNNN	Ceramic chip capacitor	10u	30010
C3, C14, C27	3	Any	1u, 50V, X5R, 0805 (2012 metric) chip capacitor	Ceramic chip capacitor	1u	20079
C6	1	Any	10u, 10V, X7R, 0805 (2012 metric) chip capacitor	Ceramic chip capacitor	10u	20166
C10, C16, C28, C29	4	Any	1u, 16V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	1u	20005
C11, C12	2	Any	2.2u, 50V, X7R, 0805 (2012 metric) chip capacitor	Ceramic chip capacitor	2.2u	20202
C32	1	Any	4.7u, 6.3V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	4.7u	20024
C33	1	Any	22n, 50V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	22n	20030
C34	1	Any	470n, 50V, X5R, 0603 (1608 metric) chip capacitor	Ceramic chip capacitor	470n	20031
C35, C36, C37, C38	4	Any	100p, 50V, C0G/NP0, 0402 (1005 metric) chip capacitor	Ceramic chip capacitor	100p	20046
D1	1	ST	SMAJ24A	TVS, Pin1 Cathode	24V,400W	51521
D2	1	ON Semiconductor	MB1S		Bridge 100V 0.5A	51476
D3, D4	2	NXP	PESD5VOL1UB	TVS, Pin1 Cathode	5V, 42W, 30pF	50463
J2	1	JST	B4B-PH-K-S(LF)(SN)	1X4 pins header	4 pin	50083
J3	1	JST	B2B-PH-K-S(LF)(SN)	1X2 pin connector	2 pin	50191
LED1	1	ROHM	SML-P12VTT86R	LED, pin 1 cathode	Red	51637
LED2	1	ROHM	SMLP13BC8TT86	LED, pin 1 cathode	Blue	51638
R1, R3	2	Any	0, -, -, 0402 (1005 metric) chip resistor	Chip Resistor	0	10052
R2, R7, R18, R21	4	Any	20k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	20k	10083
R4	1	Any	1, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	1	10031
R5, R10	2	Any	4.7, 1%, 100mW, 0603 (1608 metric) chip resistor	Chip Resistor	4.7	10140
R6	1	Any	2.7k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	2.7k	10061
R8, R15	2	Any	100k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	100k	10010
R9	1	Any	1k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	1k	10014
R11	1	Any	82, 0.1%, 125mW, 0805 (2012 metric) chip resistor	Chip Resistor	82	10446
R12	1	Any	62k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	62k	10447
R13	1	Any	180k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	180k	10180
R14	1	Any	27k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	27k	10241
R16, R19, R20	3	Any	4.3k, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	4.3k	10448
R17	1	DNP	DNP	Chip Resistor	DNP	40006
R22	1	Any	2.2, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	2.2	10053
R23, R24	2	Any	0.75, 1%, 250mW, 0805 (2012 metric) chip resistor	Chip Resistor	0.75	10451
R25	1	Any	300, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	300	10332
R26	1	Any	100, 1%, 62mW, 0402 (1005 metric) chip resistor	Chip Resistor	100	10009
U2	1	Maxim Integrated	MAXM15065AMB+		3.3V, 300mA buck PSU module	51519
U3	1	Maxim Integrated	MAX22088GTG+	Home Bus System (HBS) Compatible Transceiver	Home Bus System transceiver	51469
U4	1	Maxim Integrated	MAX31875R0TZS+		I2C temp sensor	51473
U5	1	Maxim Integrated	MAX32660GTP+		ULP M4F MCU	51470
U6	1	Trinamic	TMC5130A-TA	Universal high voltage controller/driver for two-phase bipolar stepper motor. stealthChop™ for quiet movement. Integrated MOSFETs for up to 2 A motor current per coil. With Step/Dir Interface and SPI.	2A	50048

A

B

C

D

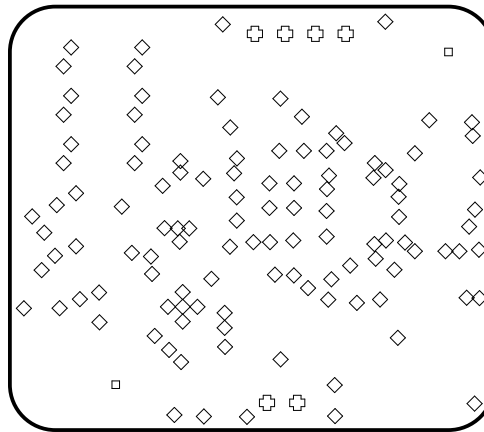
Layer Stack Legend

Material	Layer	Thickness	Gerber
	Top Overlay		GTO
Surface Material	Top Solder	0.010mm	GTS
Copper	Top Layer	0.018mm	GTL
Prepreg		0.180mm	
Copper	Mid1	0.035mm	G1
Core		1.080mm	
Copper	Mid2	0.035mm	G2
Prepreg		0.180mm	
Copper	Bottom Layer	0.018mm	GBL
Surface Material	Bottom Solder	0.010mm	GBS
	Bottom Overlay		GBO
Total thickness: 1.566mm			

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 2:1)



Drill Table


Symbol	Count	Hole Size	Plated	Via / Pad	Hole Tolerance
◇	115	0.25	Plated	Via	
⊕	6	0.70	Plated	Pad	
□	2	3.20	Non-Plated	Pad	
123 Total					

A

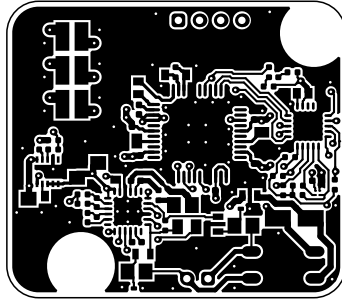
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C

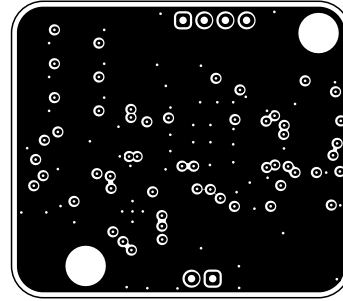
D

Title			Fabrication Drawing			 TRINAMIC MOTION CONTROL Waterloohain 5 22769 Hamburg Germany tmc_info@trinamic.com
Size	Revision	Project	TMC5130-HBS-REF			
A4	V1.0					
Date	16-Mar-21 14:59				Sheet 1 of 2	
File	TMC5130-HBS-REF.Fabrication.PCBDwf					

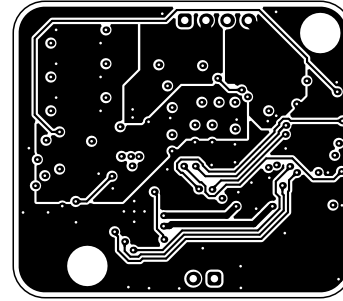
Top Layer (Scale 1.4)



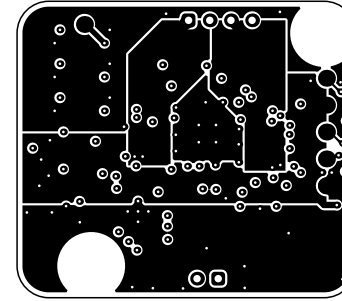
Mid1 (Scale 1.4)



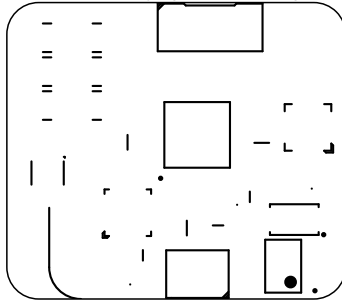
Mid2 (Scale 1.4)



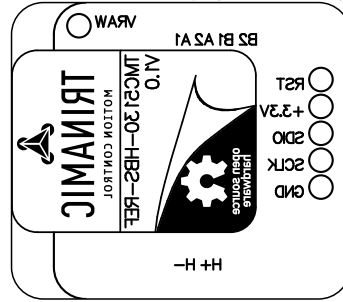
Bottom Layer (Scale 1.4)



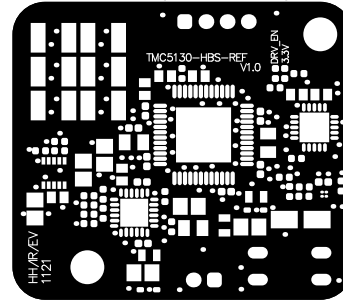
Top Overlay (Scale 1.4)



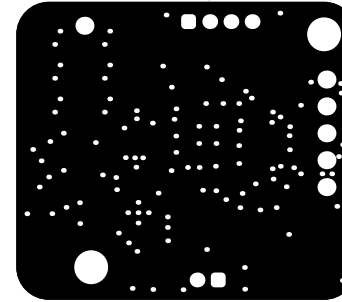
Bottom Overlay (Scale 1.4)



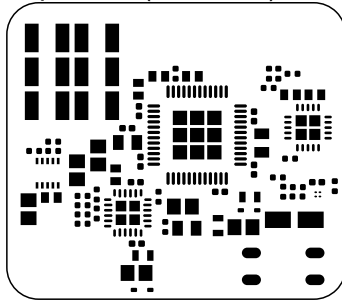
Top Solder (Scale 1.4)




Bottom Solder (Scale 1.4)



Top Paste (Scale 1.4)



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