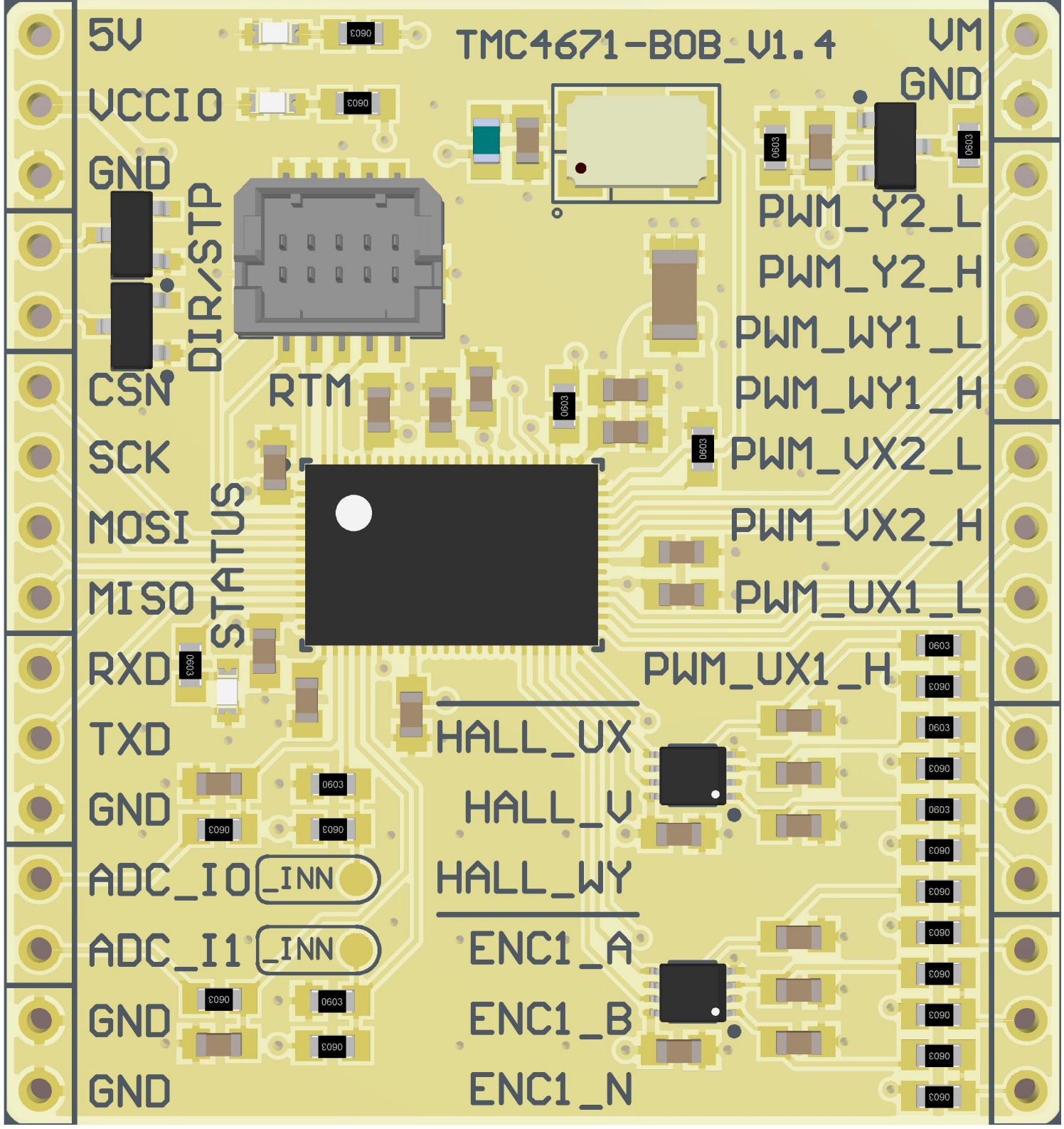
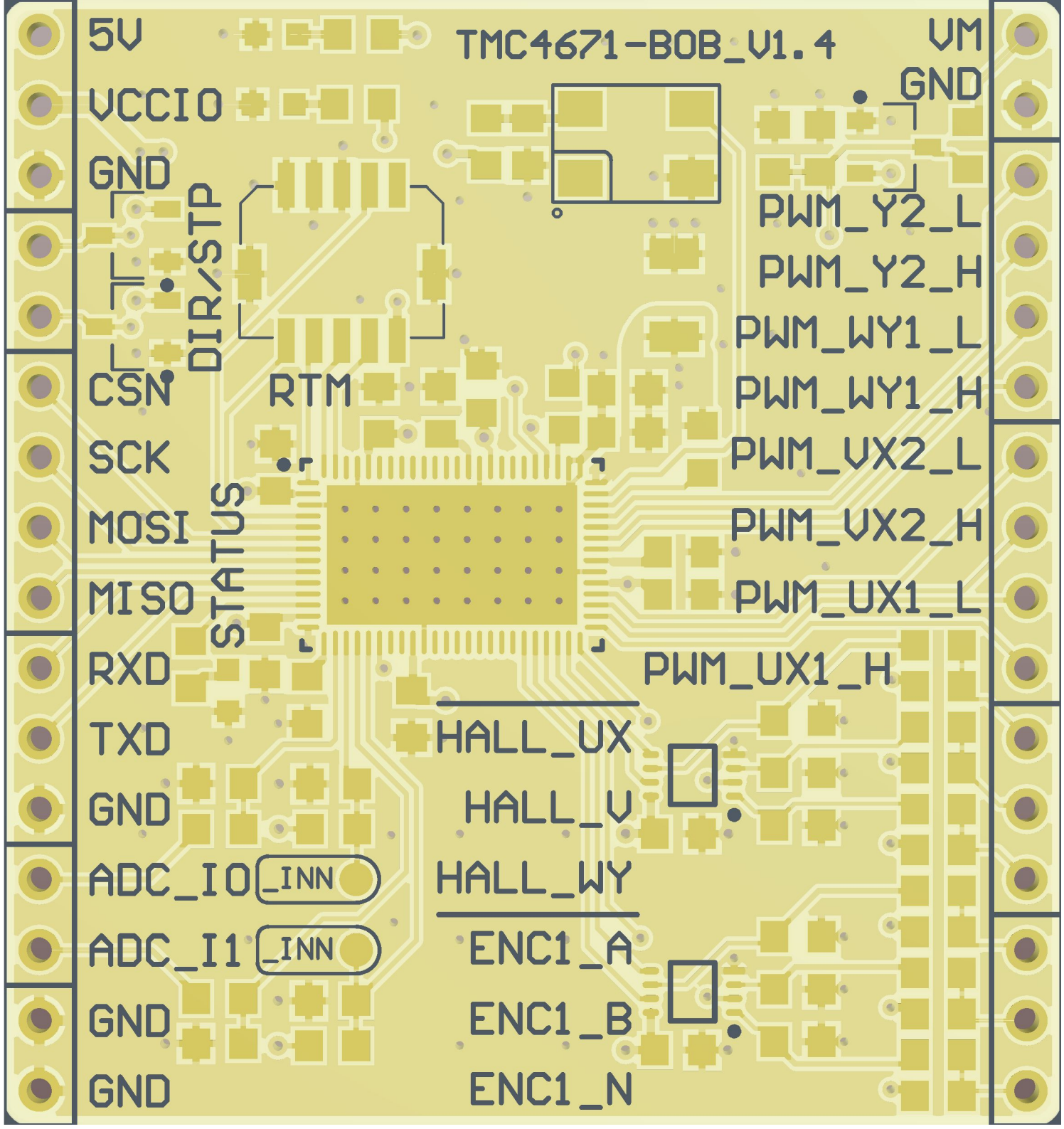
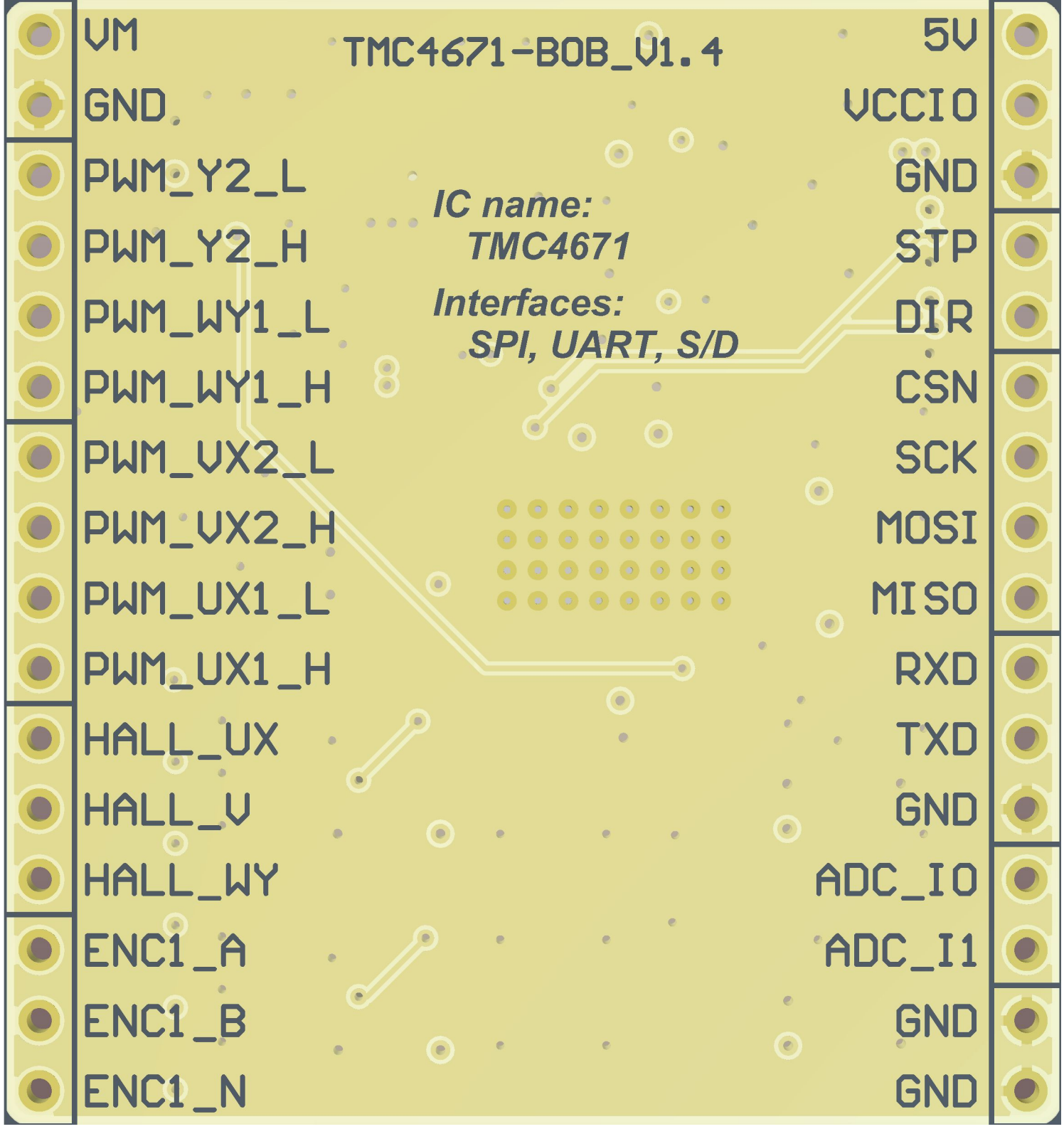
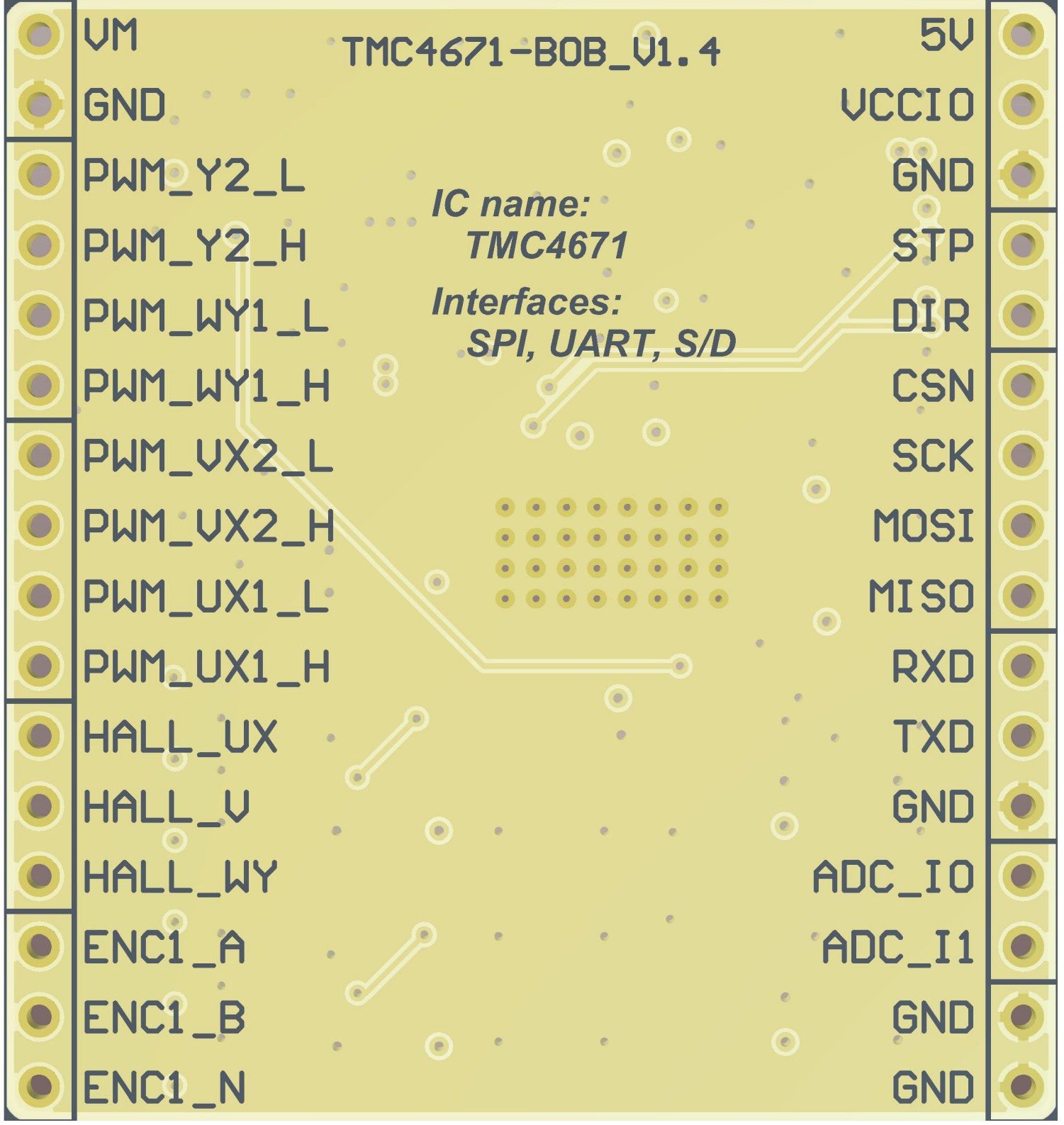
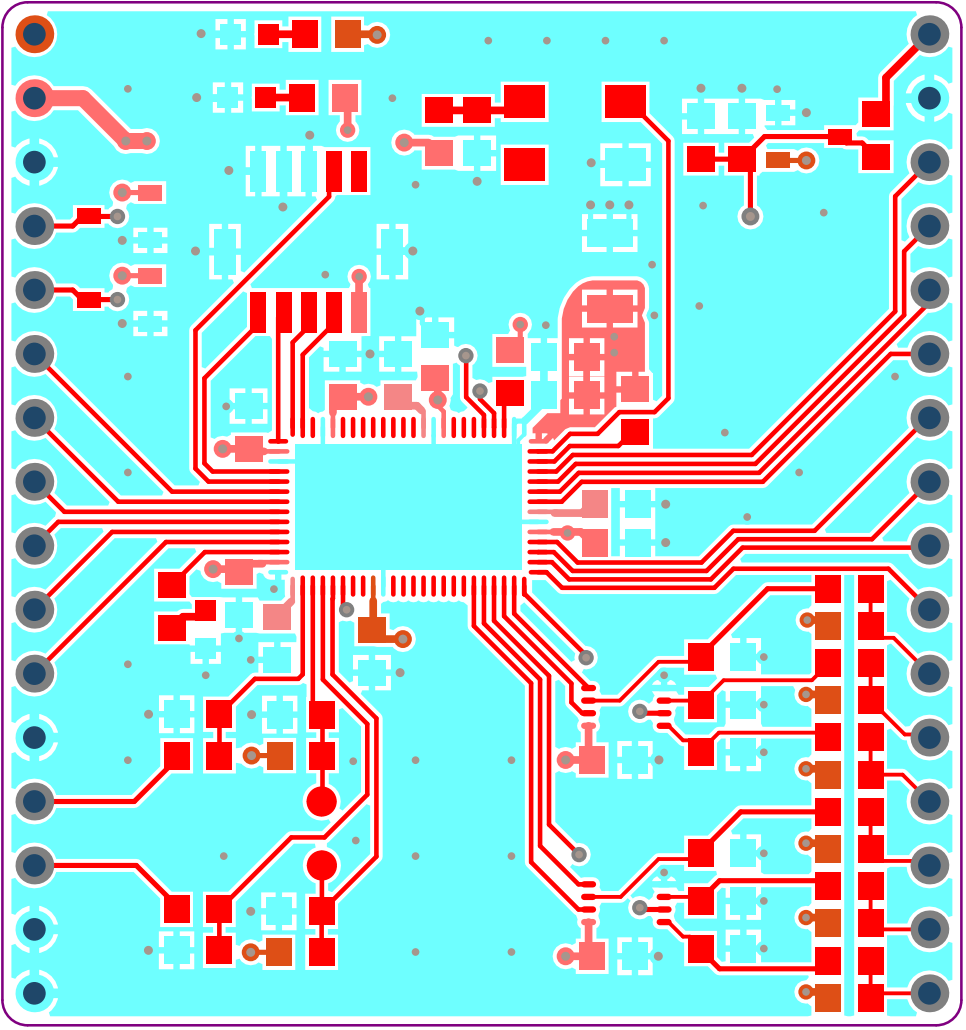
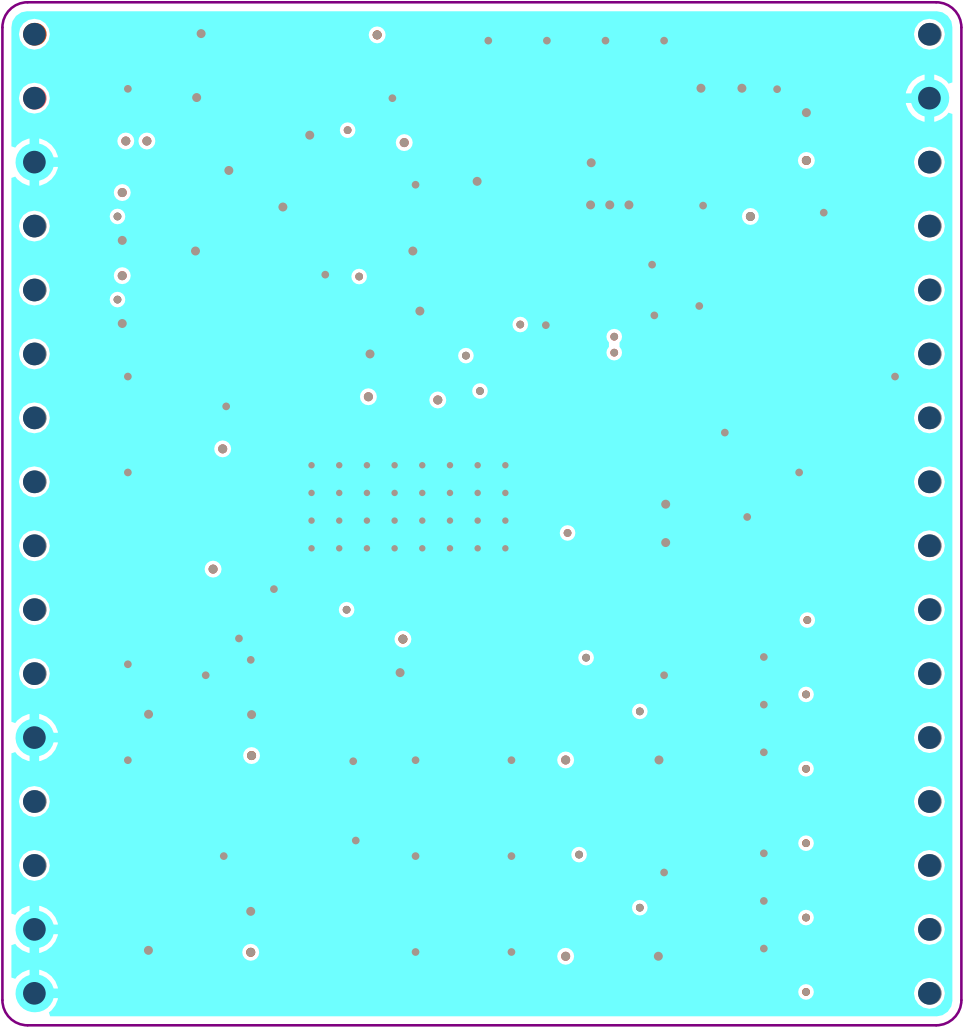

TMC4671-BOB_V1.4
5V
VCCIO
GND
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ADC_I0
ADC_I1
GND
GND
DIR/STP
STATUS
RTM
_INN
_INN
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_UX2_L
PWM_UX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N

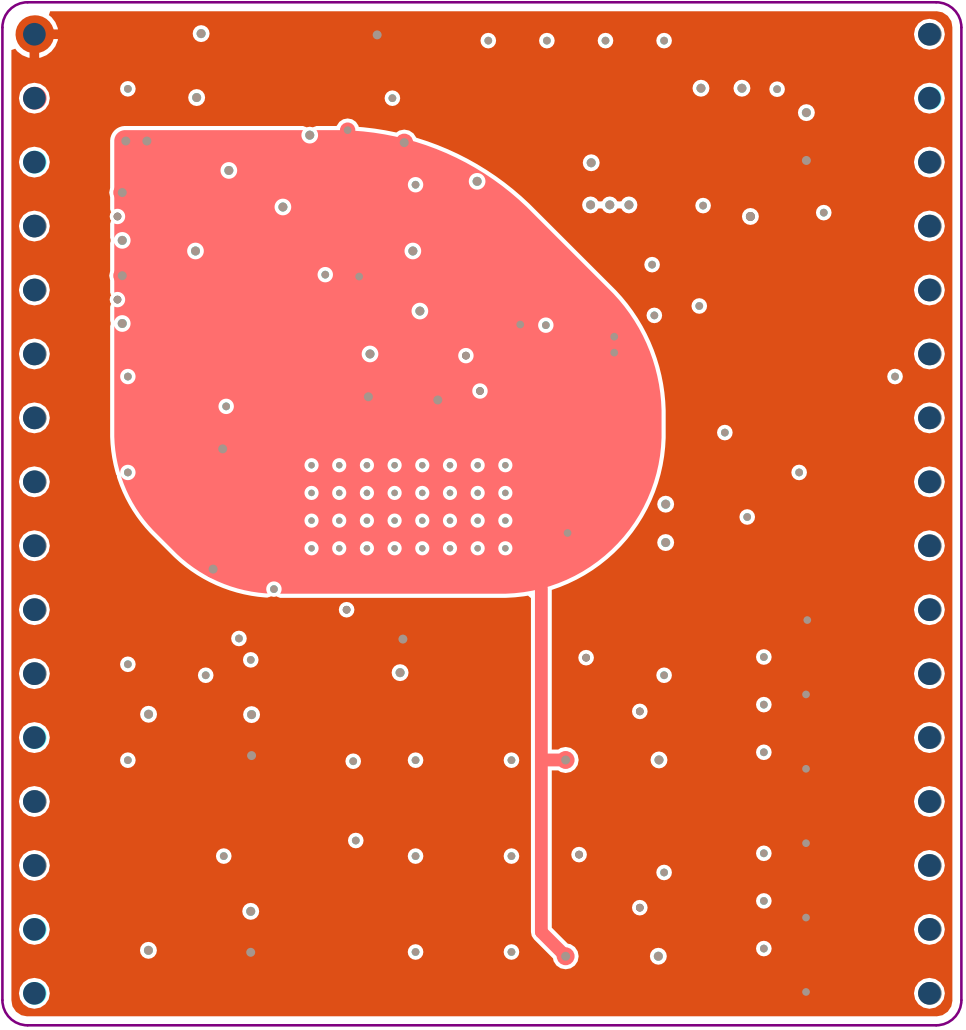

5V
VCCIO
GND
DIR/STP
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ADC_I0
_INN
ADC_I1
_INN
GND
GND
TMC4671-BOB_V1.4
RTM
STATUS
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_UX2_L
PWM_UX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N

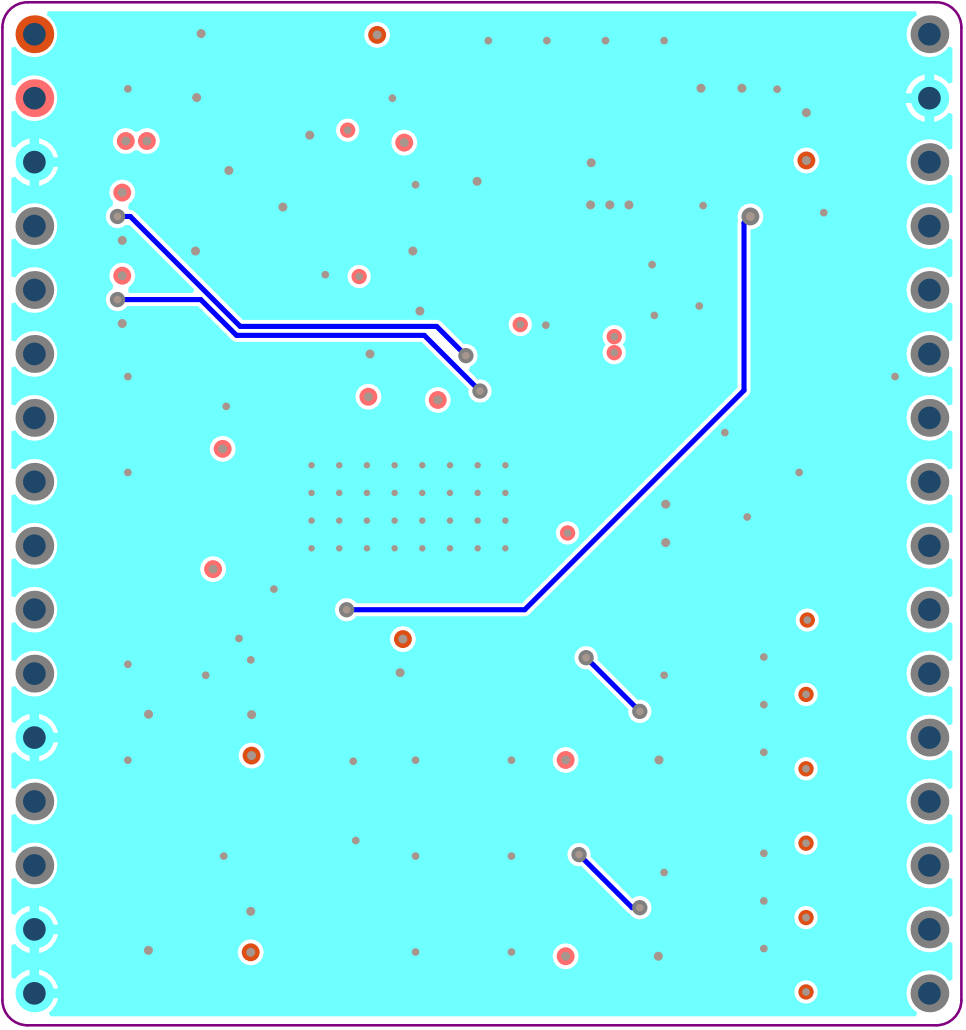

TMC4671-BOB_V1.4
IC name:
TMC4671
Interfaces:
SPI, UART, S/D
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_UX2_L
PWM_UX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N
5V
VCCIO
GND
STP
DIR
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ADC_I0
ADC_I1
GND
GND

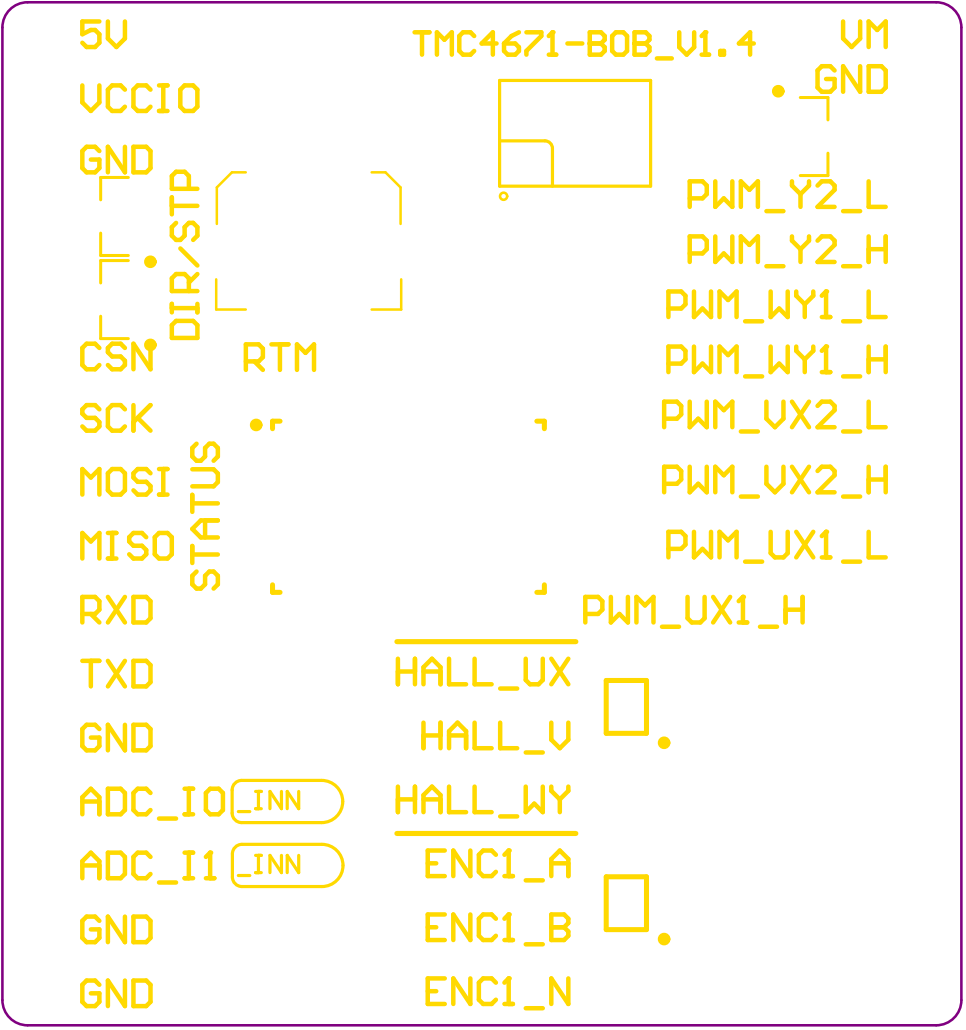

TMC4671-BOB_V1.4
IC name:
TMC4671
Interfaces:
SPI, UART, S/D
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_UX2_L
PWM_UX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N
5V
VCCIO
GND
STP
DIR
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ADC_I0
ADC_I1
GND
GND

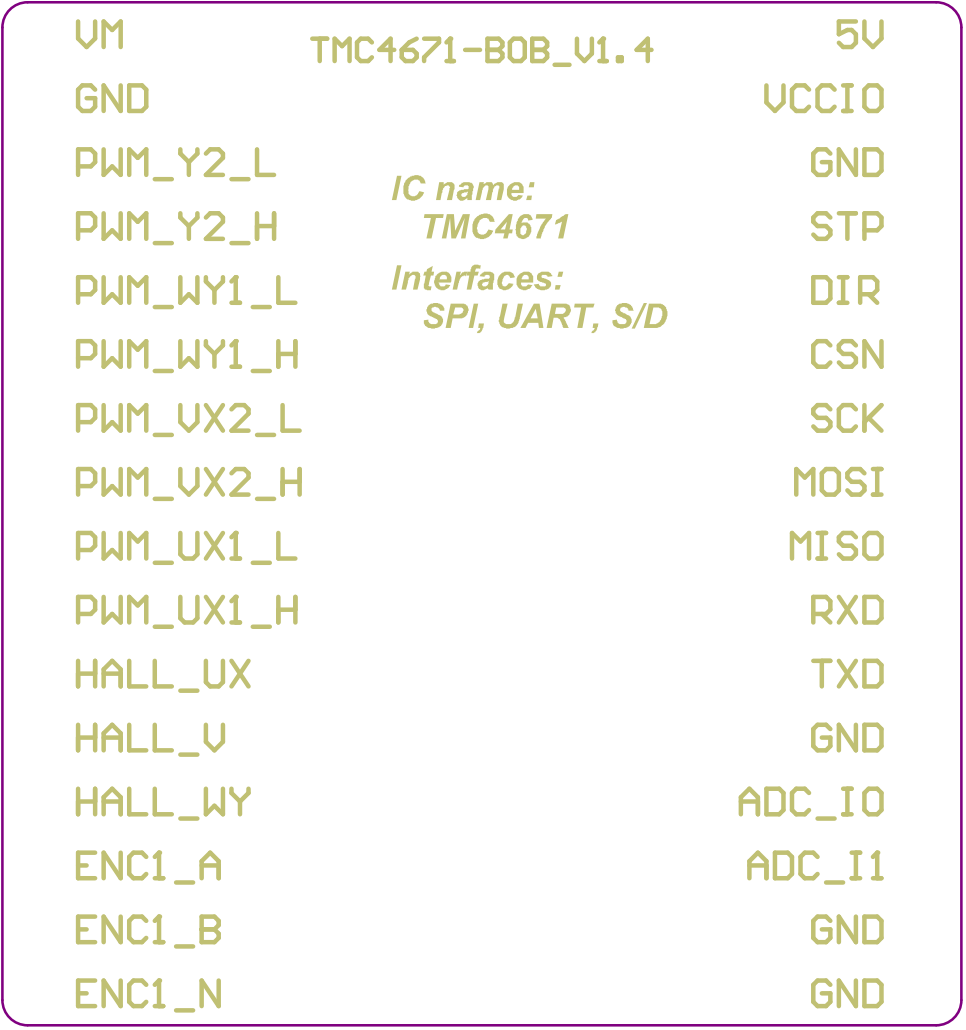


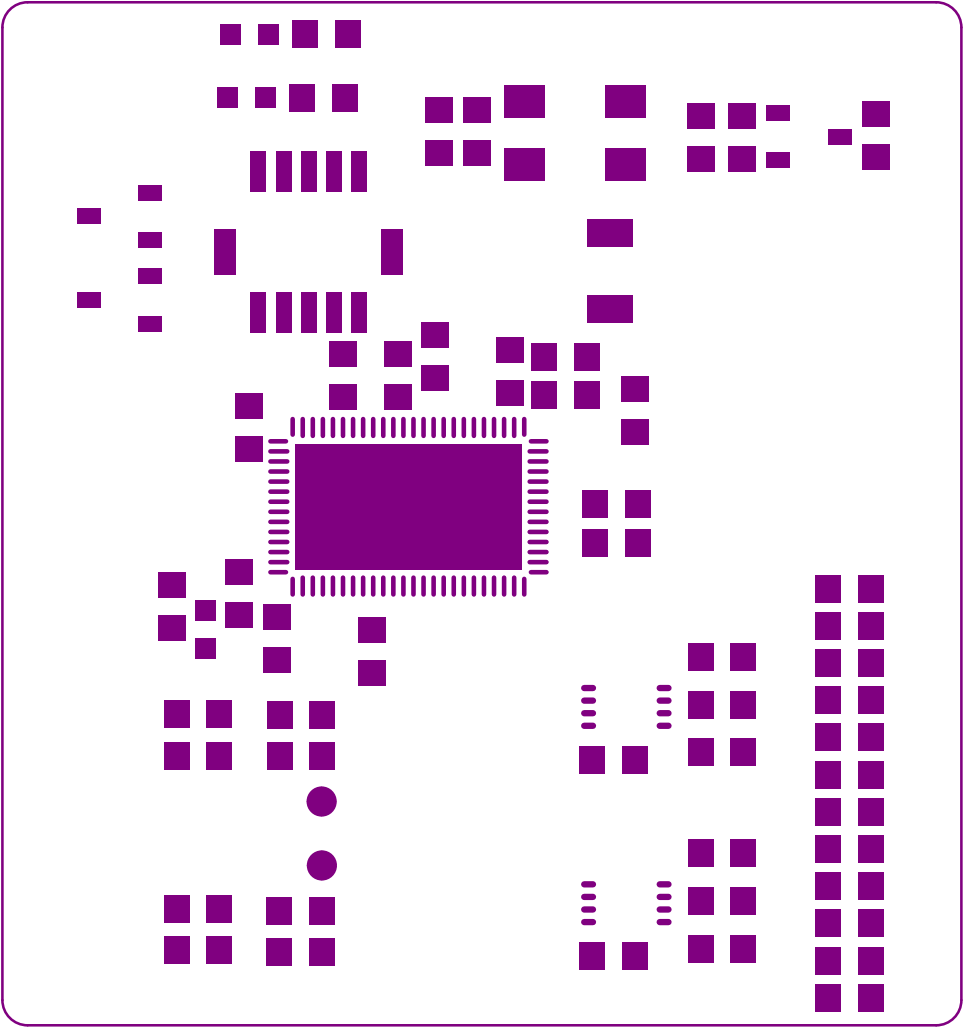


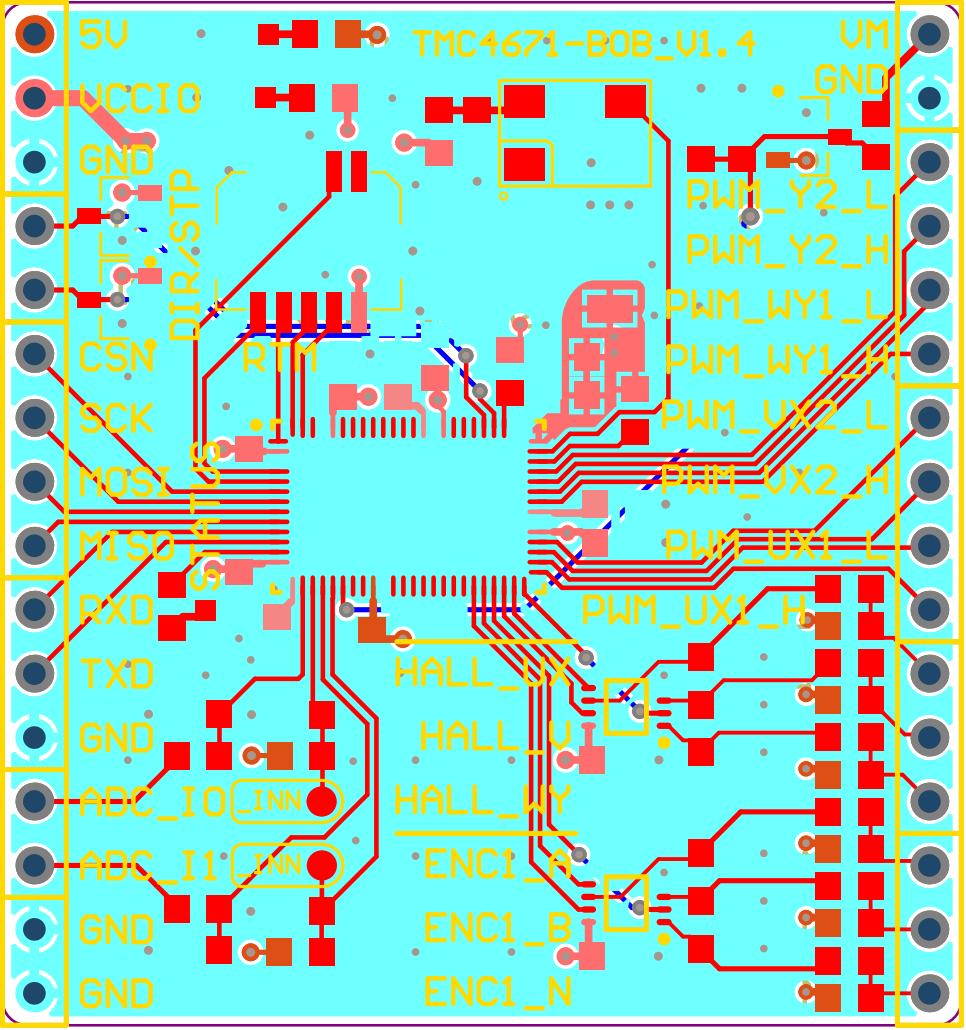





5V
VCCIO
GND
DIR/STP
CSN
RTM
SCK
MOSI
STATUS
MISO
RXD
TXD
GND
ADC_I0
_INN
ADC_I1
_INN
GND
GND
TMC4671-BOB_V1.4
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_VX2_L
PWM_VX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N

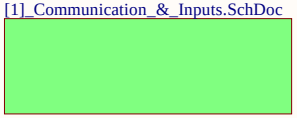

VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_VX2_L
PWM_VX2_H
PWM_UX1_L
PWM_UX1_H
HALL_UX
HALL_V
HALL_WY
ENC1_A
ENC1_B
ENC1_N
TMC4671-BOB_V1.4
IC name:
TMC4671
Interfaces:
SPI, UART, S/D
5V
VCCIO
GND
STP
DIR
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ADC_I0
ADC_I1
GND
GND



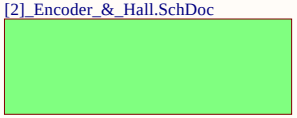

TMC4671-BOB_V1.4
5V
VCCIO
GND
DIR/STP
CSN
SCK
MOSI
MISO
RXD
TXD
GND
ABC_I0
ABC_I1
GND
GND
RTM
INN
INN
HALL_UX
HALL_VI
HALL_WY
ENC1_A
ENC1_B
ENC1_N
VM
GND
PWM_Y2_L
PWM_Y2_H
PWM_WY1_L
PWM_WY1_H
PWM_UX2_L
PWM_UX2_H
PWM_UX1_L
PWM_UX1_H

TMC4671-BOB_V1.2

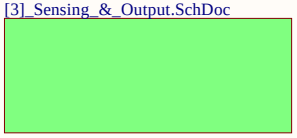
U_[1]_Communication_&_Inputs
[1]_Communication_&_Inputs.SchDoc



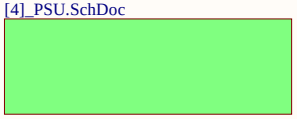
U_[2]_Encoder_&_Hall
[2]_Encoder_&_Hall.SchDoc



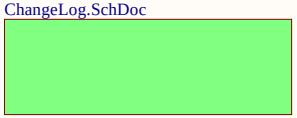
U_[3]_Sensing_&_Output
[3]_Sensing_&_Output.SchDoc



U_[4]_PSU
[4]_PSU.SchDoc



ChangeLog
ChangeLog.SchDoc



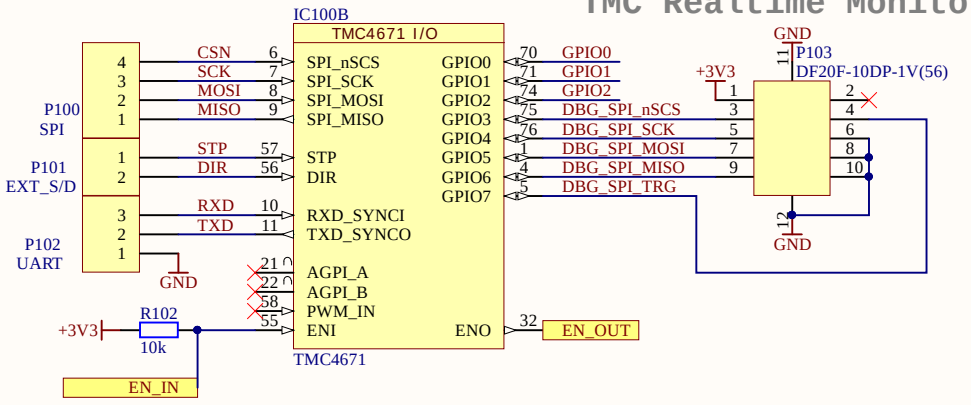
Title: TMC4671-BOB_V1.2			
Size: A4	Project: TMC4671-BOB	Version: 1.4	
Date: 2/27/2020	Time: 11:39:42 AM	Sheet 0 of 6	
File: TMC4671-BOB_V1_4.SchDoc			

TRINAMIC MOTION CONTROL

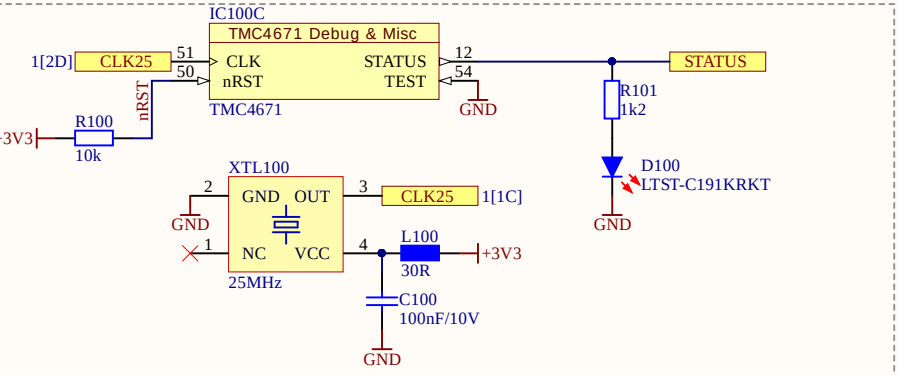
Communication & Inputs

TMC4671 I/O

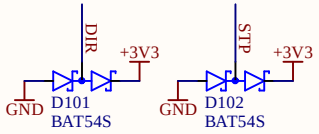
TMC Realtime Monitoring Interface



Clock & Misc



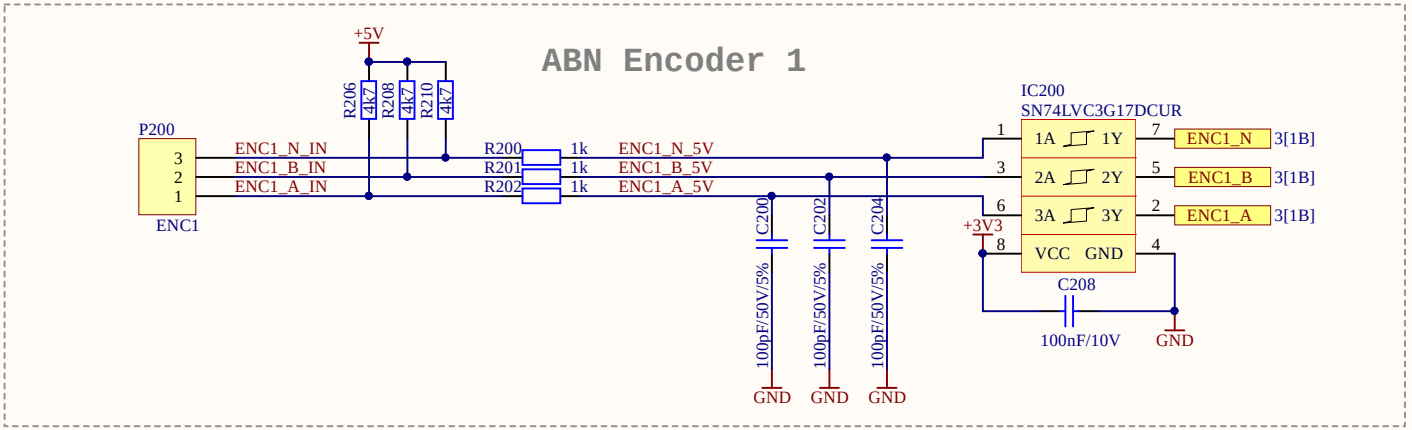
STEP/DIR TVS

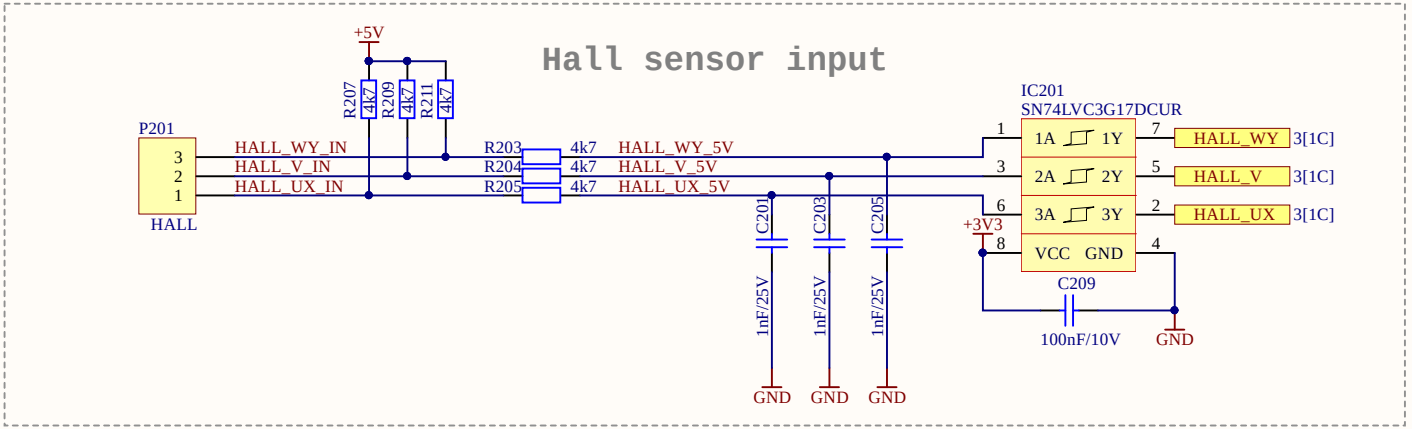


Title:	Communication & Inputs		
Size: A4	Project: TMC4671-BOB		Version: 1.4
Date: 2/27/2020	Time: 11:39:42 AM	Sheet 1 of 6	
File: [1]_Communication_&_Inputs.SchDoc			

TRINAMIC MOTION CONTROL

Encoder & Hall sensor inputs



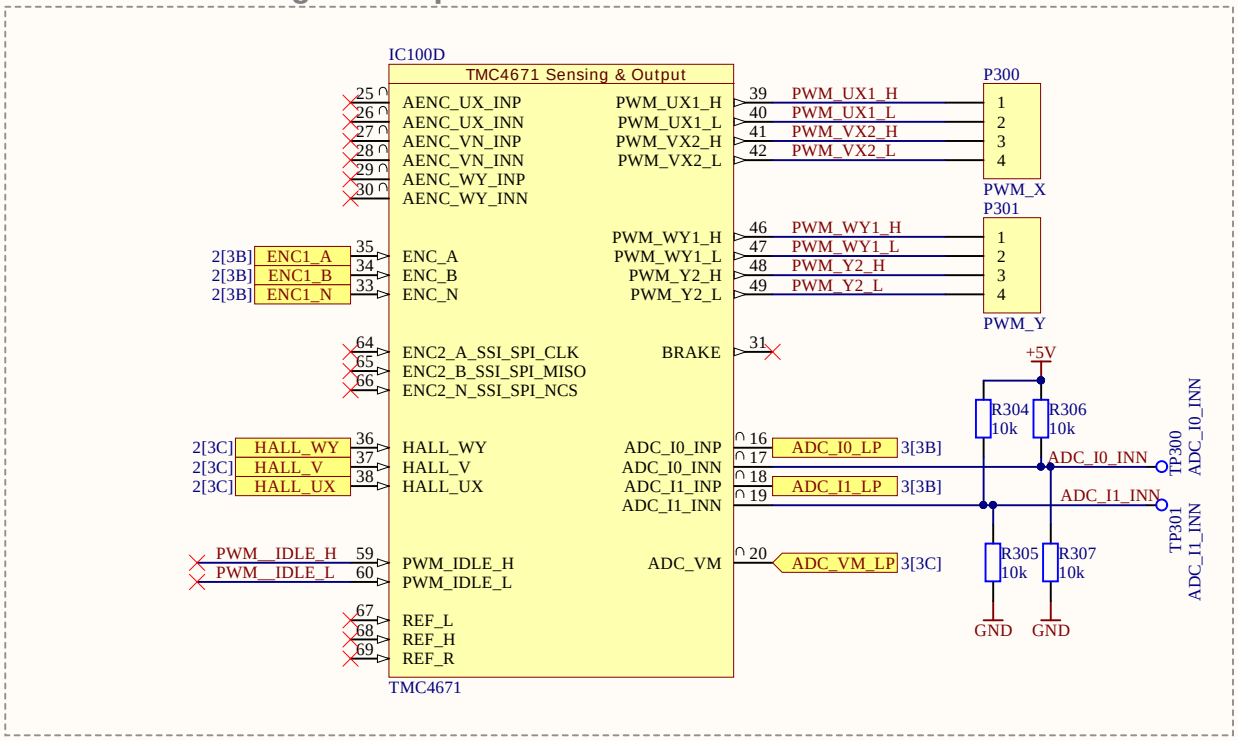


Title:	Encoder & Hall sensor inputs		
Size: A4	Project: TMC4671-BOB	Version: 1.4	
Date: 2/27/2020	Time: 11:39:42 AM	Sheet 2 of 6	
File:	[2]_Encoder_&_Hall.SchDoc		

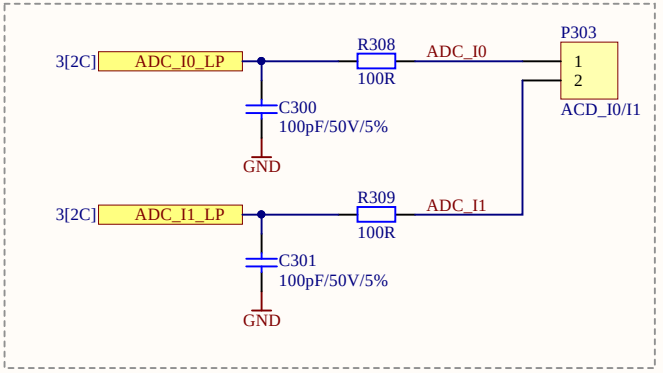
TRINAMIC MOTION CONTROL

Sensing & Output

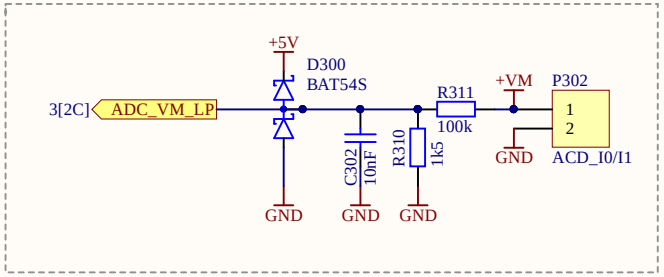
TMC4671 Sensing & Output



ADC Filter



VM ADC Filter

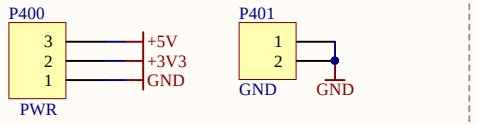


Title: Sensing & Output			
Size: A4	Project: TMC4671-BOB		Version: 1.4
Date: 2/27/2020	Time: 11:39:42 AM	Sheet 3 of 6	
File: [3]_Sensing_&_Output.SchDoc			

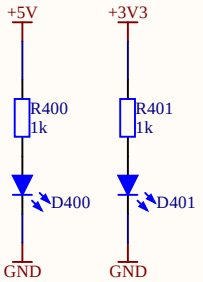
TRINAMIC MOTION CONTROL

PSU

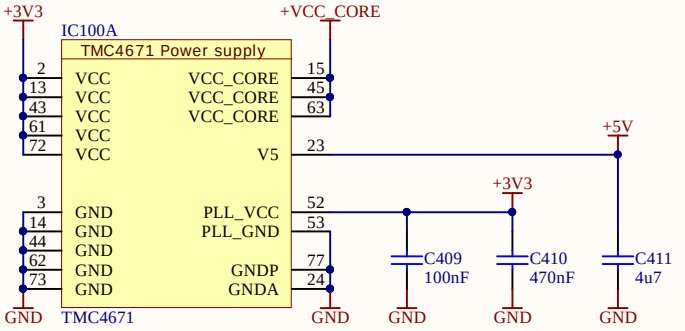
Power input



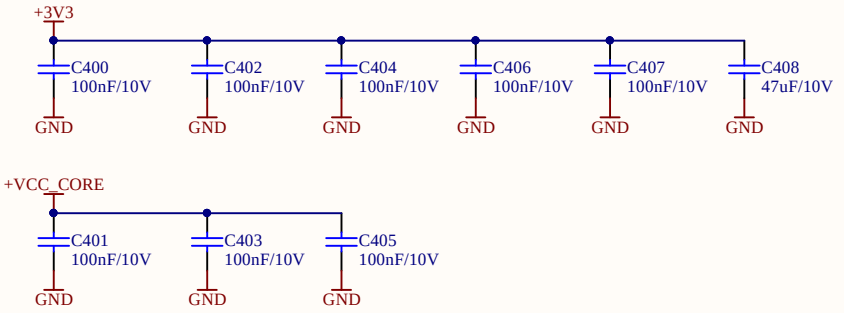
Power indicators



TMC power



Bypass capacitors



Title: PSU			
Size: A4	Project: TMC4671-BOB		Version: 1.4
Date: 2/27/2020	Time: 11:39:42 AM	Sheet 4 of 6	
File: [4]_PSU.SchDoc			

TRINAMIC MOTION CONTROL

ChangeLog

V1.0 - Initial design
25.09.2017 - Fixed XTL100 FOX924B pinout bug (swapped pins 3 & 4).

V1.1 - Silkscreen and layout fixes
05.10.2017 - Improved layout for better top side silkscreen readability.

V1.2 - Bugfix
04.12.2017 - Connected ENI via a pull-up resistor to VCCIO.
21.12.2017 - Changed Top and Bottom copper thickness to 0.035mm.
- Reduced TMC4671 footprind pad widths by 0.7mil.
22.12.2017 - Increased TMC4671 pad clearances from 6mil to match pad spacing 8.5mil.

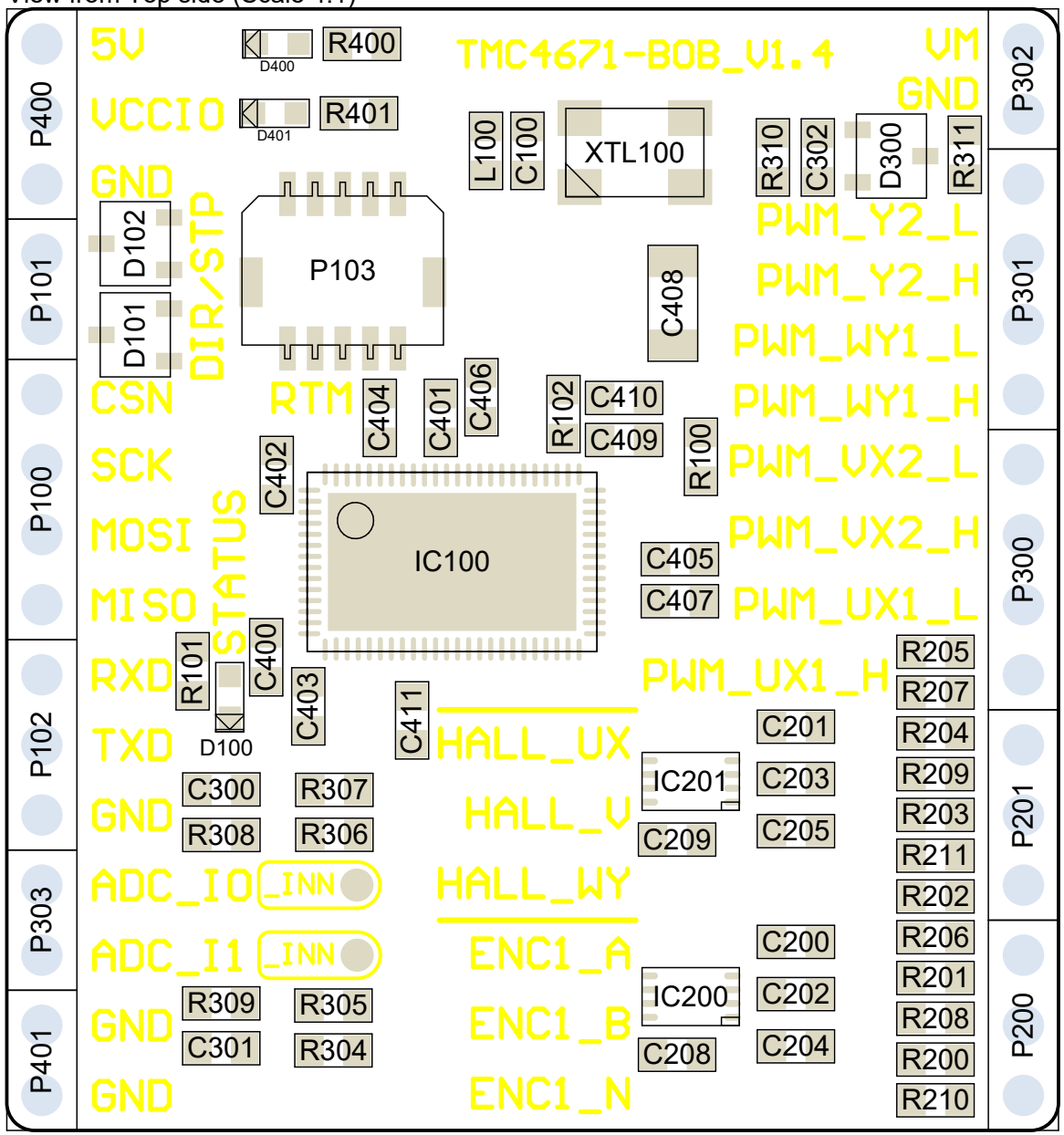
V1.3 - Bugfixes
03.09.2019
- Removed SRV05-4 protection ICs.
- Removed R300-R303 from PWM_IDLE_L/H pins (left unconnected).
- Moved all 4k7 pull-ups next to pinheaders on page 4.
- Changed encoder filter values to 1k/100pF.
- Changed hall sensor and reference input filter values to 4k7/1nF.

V1.4 - 27.02.2020 Bugfix for shorted 3V3 and GND polygons

Title: ChangeLog		
Size: A4	Project: TMC4671-BOB	Version: 1.4
Date: 2/27/2020	Time: 11:39:43 AM	Sheet 5 of 6
File: ChangeLog.SchDoc		

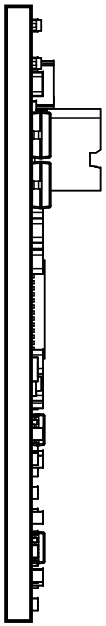
TRINAMIC MOTION CONTROL

View from Top side (Scale 4:1)

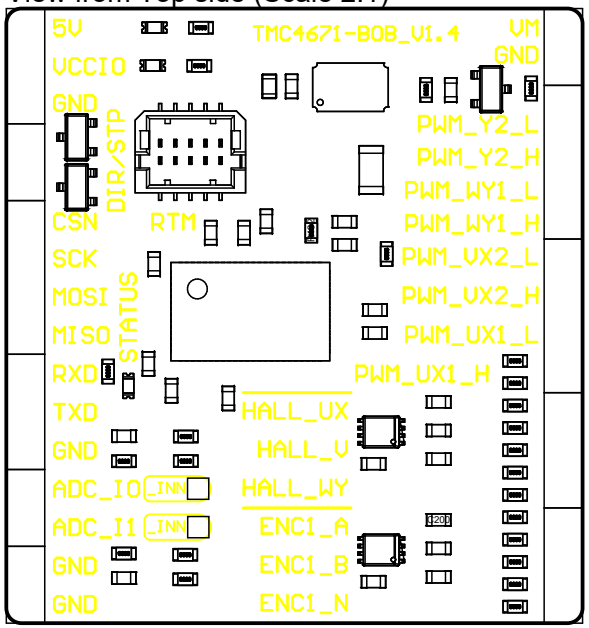


Title: TMC4671-BOB	
Version: 1.4	
Date: 2/27/2020 Time: 11:39 AM 11:39	

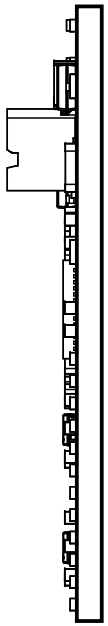
View from Left side (Scale 2:1)



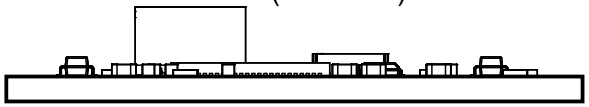
View from Top side (Scale 2:1)



View from Right side (Scale 2:1)

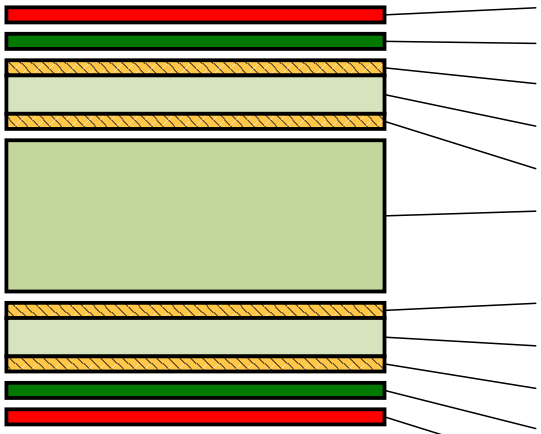


View from Front side (Scale 2:1)



Title: TMC4671-BOB	
Version: 1.4	
Date: 2/27/2020 Time: 11:39 AM 11:39	

Layer Stack Legend

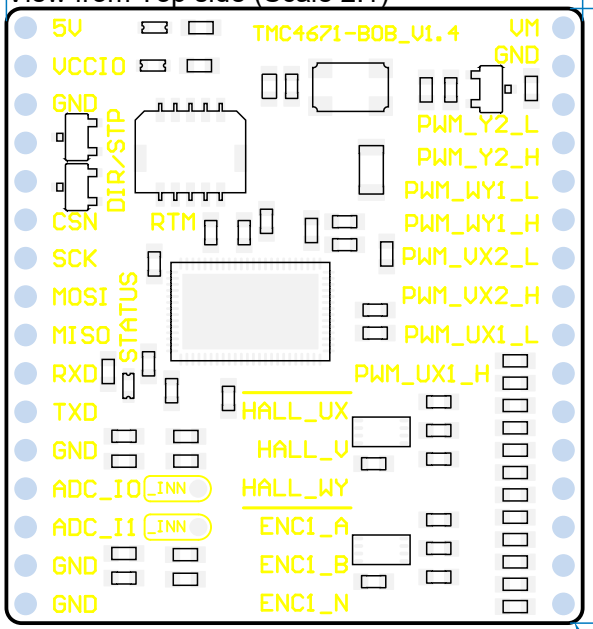


Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Solder	0.010mm(0.400mil)	Solder Resist	Solder Mask	GTS
Copper	Top	0.035mm(1.378mil)		Signal	GTL
Core		*0.254mm(10.000mil)*	*FR-4*	*Dielectric*	
Copper	GND	0.035mm(1.378mil)		Signal	G1
Prepreg		*1.000mm(39.370mil)*	*FR-4*	*Dielectric*	
Copper	VM	0.035mm(1.378mil)		Signal	G2
Core		*0.254mm(10.000mil)*	*FR-4*	*Dielectric*	
Copper	Bottom	0.035mm(1.378mil)		Signal	GBL
Surface Material	Bottom Solder	0.010mm(0.400mil)	Solder Resist	Solder Mask	GBS
	Bottom Overlay			Legend	GBO

Total thickness: 1.668mm(65.682mil)

[1.500in]
38.100mm

View from Top side (Scale 2:1)



[1.600in]
40.640mm

4 x [R0.039in]
R1.000mm

Notes:

1. MATERIAL : FR-4-2 NATURAL EPOXY/FIBERGLASS
2. APPLY SOLDERMASK ON BOTH SIDES
   COLOR: WHITE
   FABRICATOR SHALL MAKE NECCESSAY MODIFICATIONS TO SOLDERMASK PHOTOPLOT FILES FOR OPTIMAL SOLDERMASK COVERAGE BETWEEN FINE PITCH COMPONENT LEADS.
3. FINISH ALL EXPOSED COPPER SURFACES WITH IMMERSION GOLD.
4. HOLE SIZES APPLY AFTER PLATING.
5. APPLY SILKSCREEN TO BOTH SIDES
   COLOR: BLACK
   FABRICATOR SHALL MAKE NECESSARY MODIFICATIONS TO LEGEND PHOTOPLOT FILES TO ENSURE NO LEGEND INK COVERS ANY COMPONENT PAD OR VIA PAD.
6. MODIFIED PHOTOPLOT FILES ARE TO BE RETURNED BEFORE ORDER DELIVERED.
7. ALL PRINTED CIRCUITBOARD NETS SHALL BE ELECTRICALLY TESTED FOR OPENS AND SHORTS.
8. FABRICATION OF PCB TO COMPLY WITH IPC-A-600 CLASS II . CURRENT REVISION.

Title: TMC4671-BOB	TRINAMIC MOTION CONTROL
Version: 1.4	
Date: 2/27/2020 Time: 11:39 AM 11:39	

BOM

Project: TMC4671-BOB
Version: 1.4
Date: 2/27/2020

#	Quantity	MPN	Comment	Designator	FootPrint	Description	Note	MF
1	11	MC0603B104K100CT	100nF/10V	C100, C208, C209, C400, C401, C402, C403, C404, C405, C406	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.1 uF, 10 V, ± 10%, X7R, MC Series		Multicomp
2	5	MC0603N101J500CT	100pF/50V/5%	C200, C202, C204, C300, C301	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 100 pF, 50 V, ± 5%, C0G / NP0, MC Series		MULTICOMP
3	3	MC0603B102K250CT	1nF/25V	C201, C203, C205	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 1000 pF, 25 V, ± 10%, X7R, MC Series		MULTICOMP
4	1	MCSH18B103K100CT	10nF	C302	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.01 uF, 10 V, ± 10%, X7R, MCSH Series		MULTICOMP
5	1	GRM31CR61A476ME15L	47uF/10V	C408	C1206	SMD Multilayer Ceramic Capacitor, 1206 [3216 Metric], 47 uF, 10 V, ± 20%, X5R, GRM Series		MURATA
6	1	MC0603B104K100CT	100nF	C409	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.1 uF, 10 V, ± 10%, X7R, MC Series		Multicomp
7	1	MC0603X474K160CT	470nF	C410	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.47 uF, 16 V, ± 10%, X5R, MC Series		Multicomp
8	1	MC0603X475K100CT	4u7	C411	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 4.7 uF, 10 V, ± 10%, X5R, MC Series		MULTICOMP
9	1	LTST-C191KRKT	LTST-C191KRKT	D100	LED_0603	Green 631nm LED Indication - Discrete 2V 0603 (1608 Metric)		Lite-On
10	3	BAT54S	BAT54S	D101, D102, D300	SOT95P237X130-3N	Small Signal Schottky Diode, Dual Series, 30 V, 200 mA, 1 V, 600 mA, 125 °C		TAIWAN SEMICONDUCTOR
11	2	LTST-C191TBKT-5A	LED, Blue, SMD, 20mA, 2.8V, 465 nm	D400, D401	LED_0603	LED, Blue, SMD, 20mA, 2.8V, 465 nm		Lite-On
12	1	TMC4671	TMC4671	IC100	QFN40P1050X650X90_HS-77N			TRINAMIC
13	2	SN74LVC3G17DCUR	SN74LVC3G17DCUR	IC200, IC201	TSSOP50P310X90-8L	Triple Schmitt-Trigger Buffer, 74LVC3G17, 1.65 V to 5.5 V, VSSOP-8		TEXAS INSTRUMENTS
14	1	MFB-160808-0030PQ	30R	L100	L0603	Ferrite Bead, 30 ohm, 0603 [1608 Metric], MFB Series, 3 A, 0.04 ohm, ± 25%		MEC MARCOM
15	1	DF20F-10DP-1V(56)	DF20F-10DP-1V(56)	P103	CON, TMC Debug SPI	Wire-To-Board Connector, 1 mm, 10 Contacts, Header, DF20 Series, Surface Mount, 2 Rows		Hirose Electric Co Ltd
16	6	MC0063W0603110K	10k	R100, R102, R304, R305, R306, R307	R0603	SMD Chip Resistor, Thick Film, 10 kohm, 50 V, 0603 [1608 Metric], 63 mW, ± 1%, MC Series		MULTICOMP
17	1	MCWR06X1201FTL	1k2	R101	R0603	SMD Chip Resistor, Thick Film, 1.2 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
18	5	MCWR06X1001FTL, MC0063W060311K	1k	R200, R201, R202, R400, R401	R0603	SMD Chip Resistor, Thick Film, 1 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series, 1 kohm		MULTICOMP
19	9	WR06X4701FTL	4k7	R203, R204, R205, R206, R207, R208, R209, R210, R211	R0603	SMD Chip Resistor, 4.7 kohm, 75 V, 0603 [1608 Metric], 100 mW, ± 1%, WR06 Series		WALSIN
20	2	MCWR06X1000FTL	100R	R308, R309	R0603	SMD Chip Resistor, Thick Film, 100 ohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
21	1	MCWR06X1501FTL	1k5	R310	R0603	SMD Chip Resistor, Thick Film, 1.5 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
22	1	MCWR06X1003FTL	100k	R311	R0603	SMD Chip Resistor, Thick Film, 100 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
23	1	FOX924B-25.000	25MHz	XTL100	FOX924B-25.000	TCXO, 25 MHz, 2.5 ppm, SMD, 5mm x 3.2mm,		FOX ELECTRONICS

Approved | **Notes** | 61