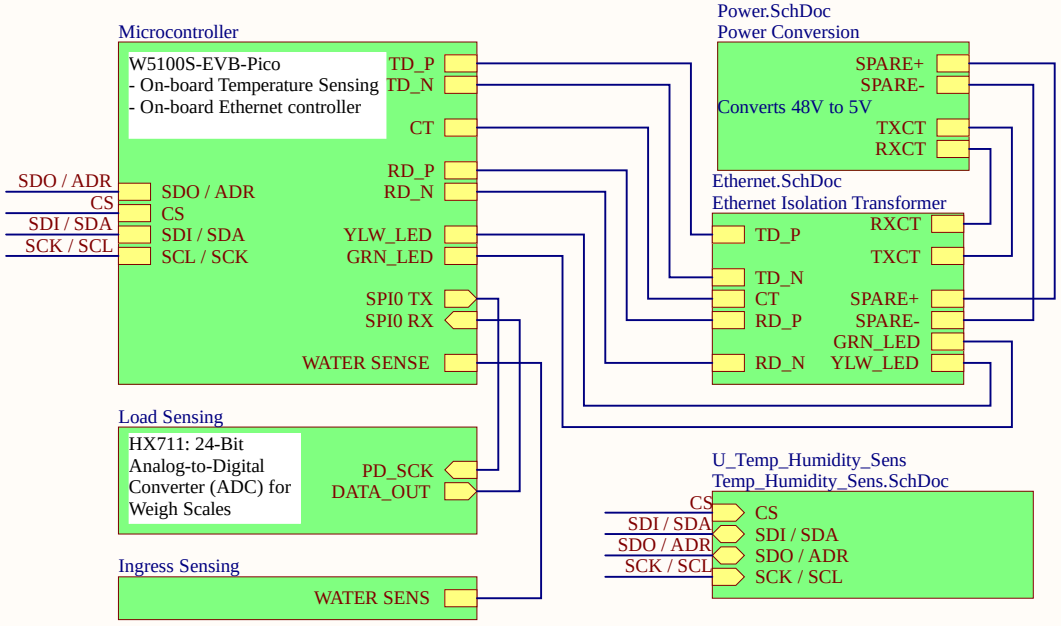

This design is inspired by this Post on HacksterIO

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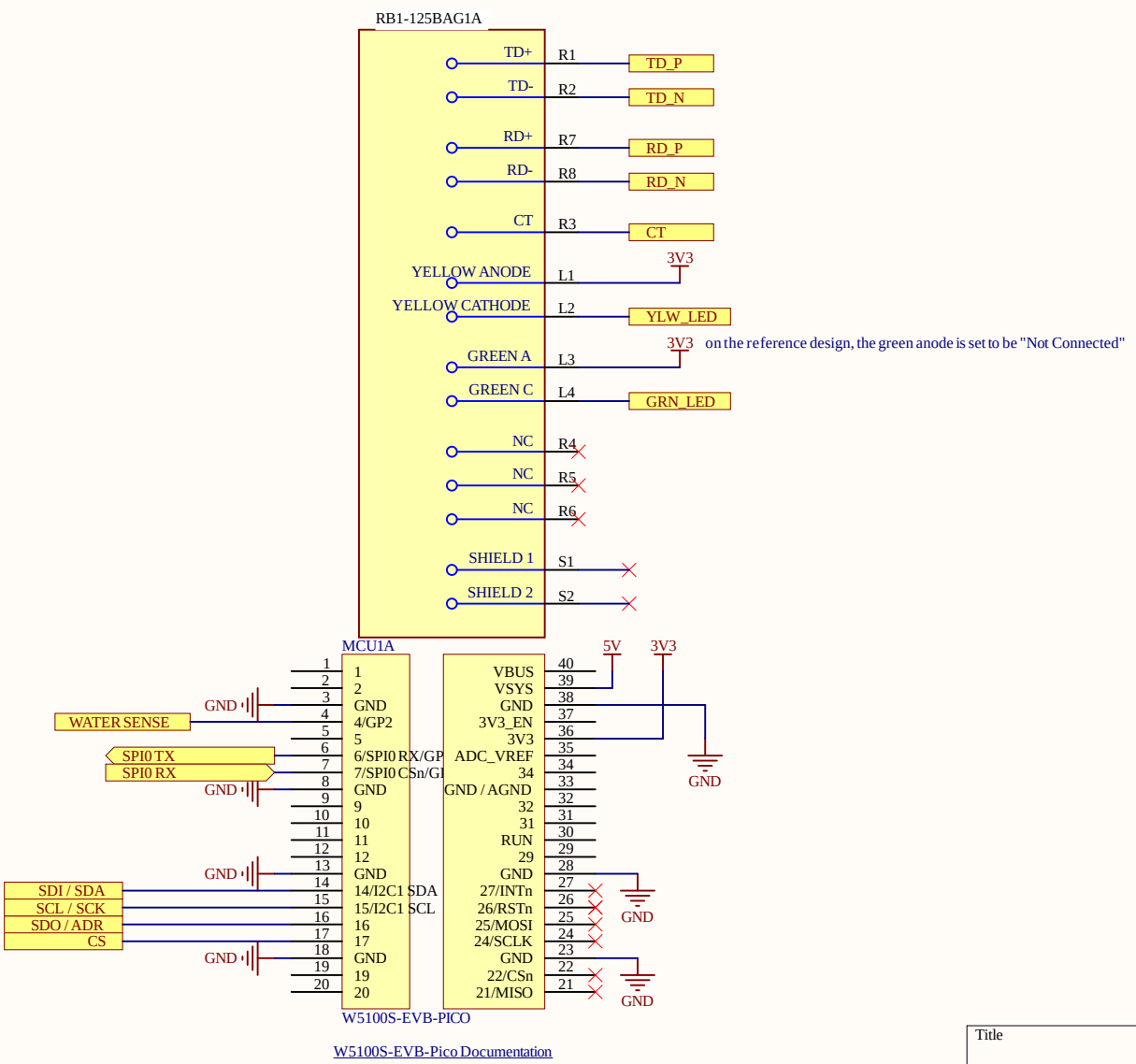
Date: 5/30/2023		Sheet of
File: C:\Users\..\Main.SchDoc		Drawn By:



W5100S-EVB-Pico Documentation

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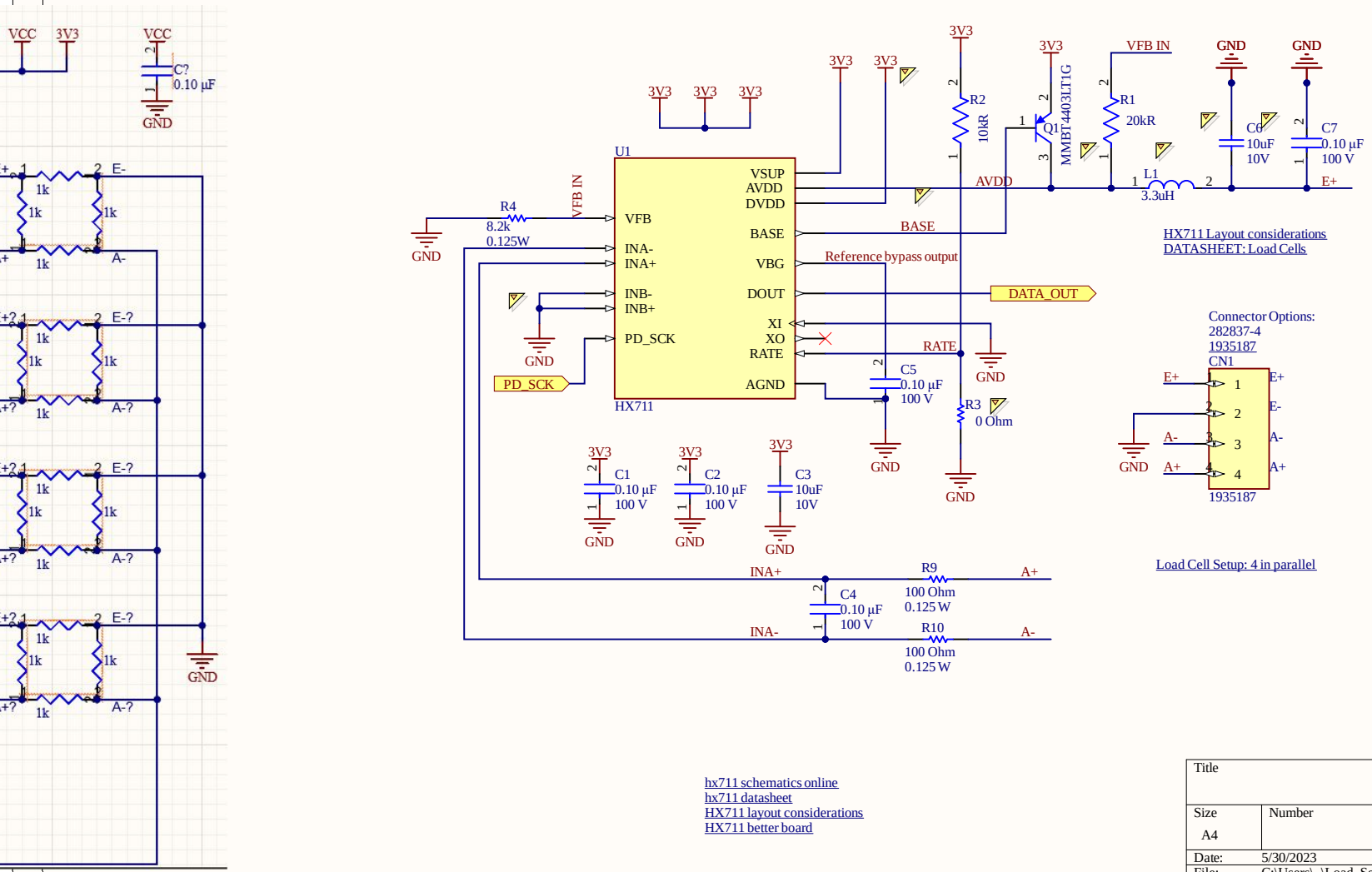
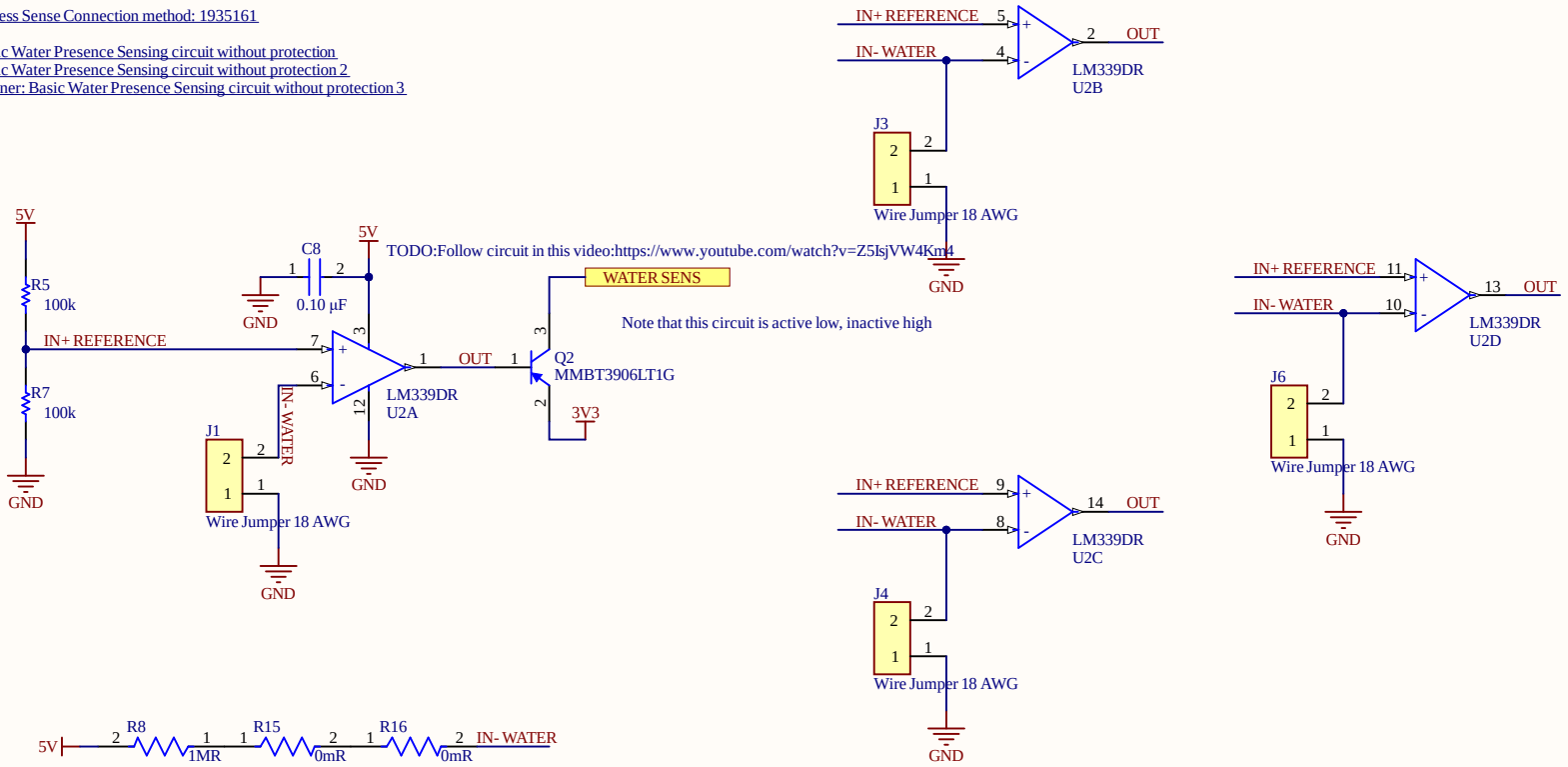

VCC
3V3
VCC
C?
0.10 µF
GND
E-
1k
A-
E-?
A-?
GND
U1
VSUP
AVDD
DVDD
BASE
VBG
DOUT
XI
XO
RATE
AGND
VFB
INA-
INA+
INB-
INB+
PD_SCK
HX711
R4
8.2k
0.125W
VFB IN
R2
10kR
R1
20kR
Q1
MMBT4403LT1G
L1
3.3uH
C6
10uF
10V
C7
0.10 µF
100 V
E+
AVDD
BASE
Reference bypass output
DATA_OUT
RATE
C5
0.10 µF
100 V
R3
0 Ohm
C1
C2
C3
10uF
10V
PD_SCK
INA+
INA-
R9
R10
100 Ohm
0.125 W
C4
A+
A-
HX711 Layout considerations
DATASHEET: Load Cells
Connector Options:
282837-4
1935187
CN1
Load Cell Setup: 4 in parallel
hx711 schematics online
hx711 datasheet
HX711 layout considerations
HX711 better board
Title
Size
A4
Number
Revision
Date:
5/30/2023
Sheet of
File:
C:\Users\..\Load_Sens.SchDoc
Drawn By:

Ingress Sense Connection method: 1935161

Basic Water Presence Sensing circuit without protection
Basic Water Presence Sensing circuit without protection 2
Winner: Basic Water Presence Sensing circuit without protection 3



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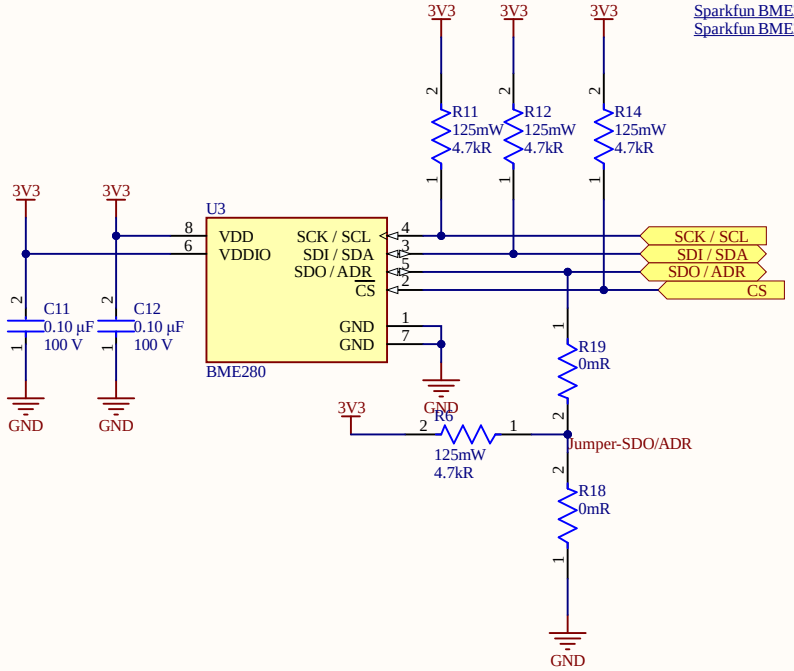
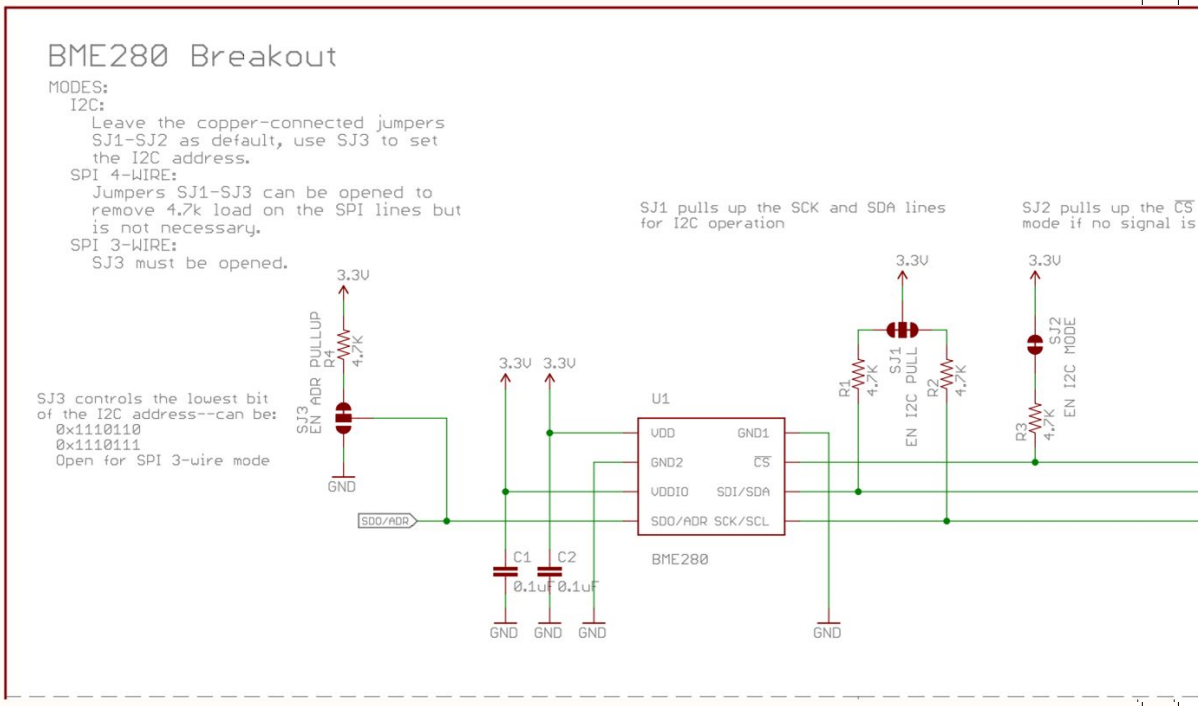
Date: 5/30/2023		Sheet of
File: C:\Users\..\Ingress_Sens.SchDoc		Drawn By:

Adafruit Black BME280

Adafruit Purple BME280

Sparkfun BME280 breakout board schematic
Sparkfun BME280 breakout board product page





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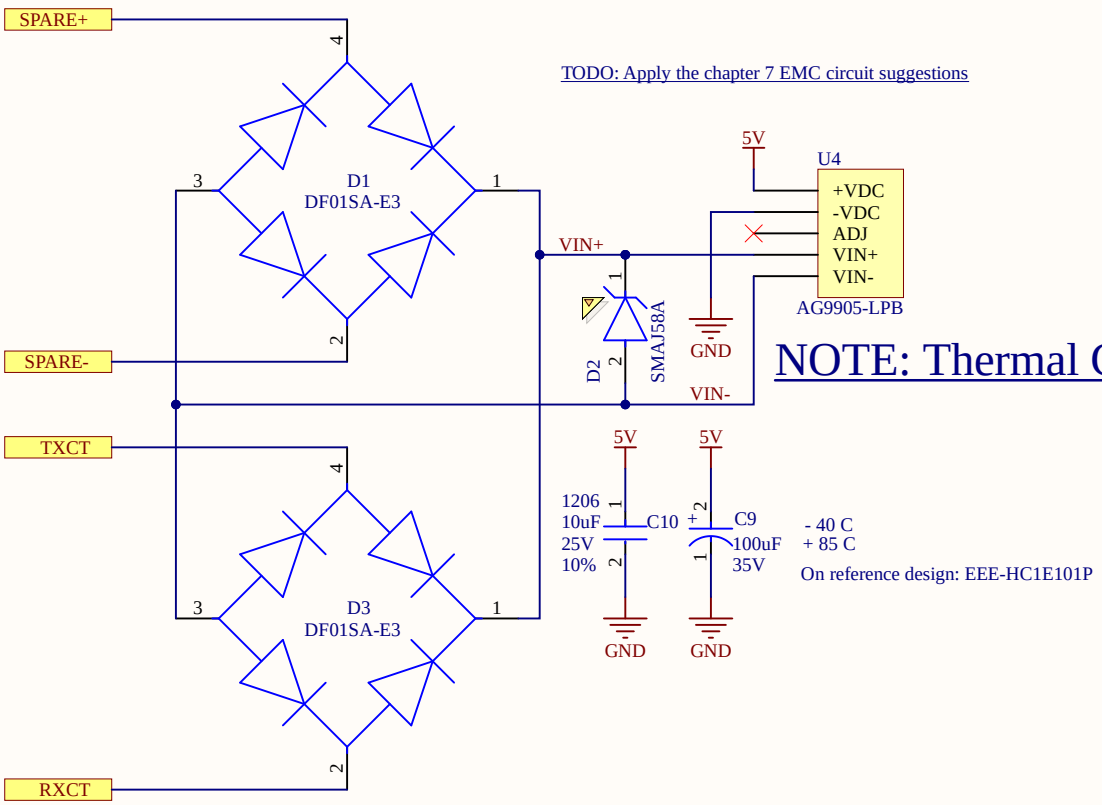
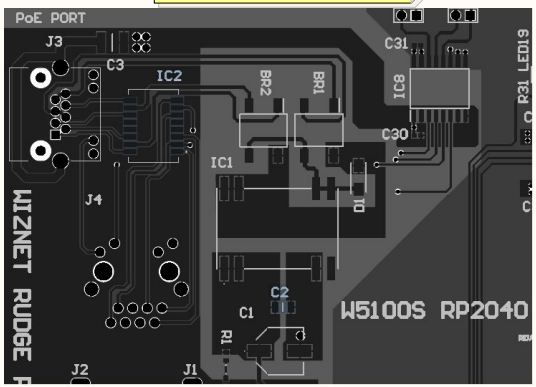


NOTE: Thermal Considerations (Section 3.1 of Datasheet)

Figure out whether to place these capacitors close to the supply or the load... Check the datasheet of the AG9905-LPB for that???



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Date: 5/30/2023		Sheet of
File: C:\Users\..\Power.SchDoc		Drawn By:

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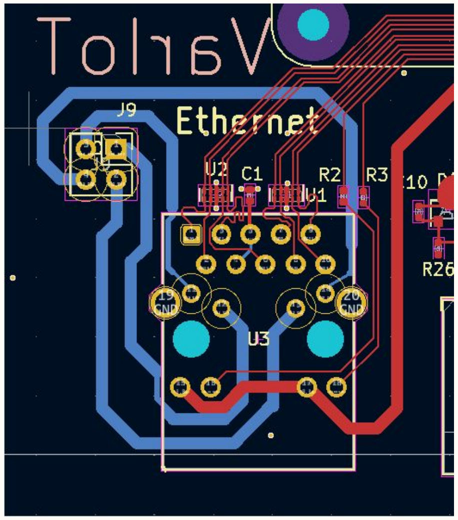
Find the data sheet here, it has the IEEE802.3 compliant pinout spec



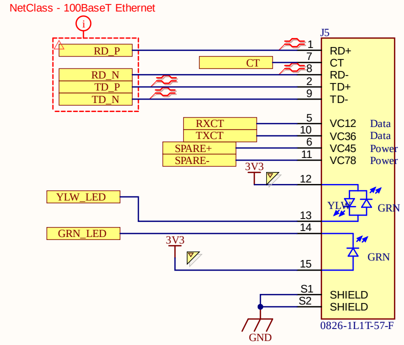
Drexel VarIoT (reference design for PoE)

Ethernet PHY PCB Design Layout Checklist by Texas Instruments

Power Over Ethernet (PoE) for Connected IoT by Texas Instruments

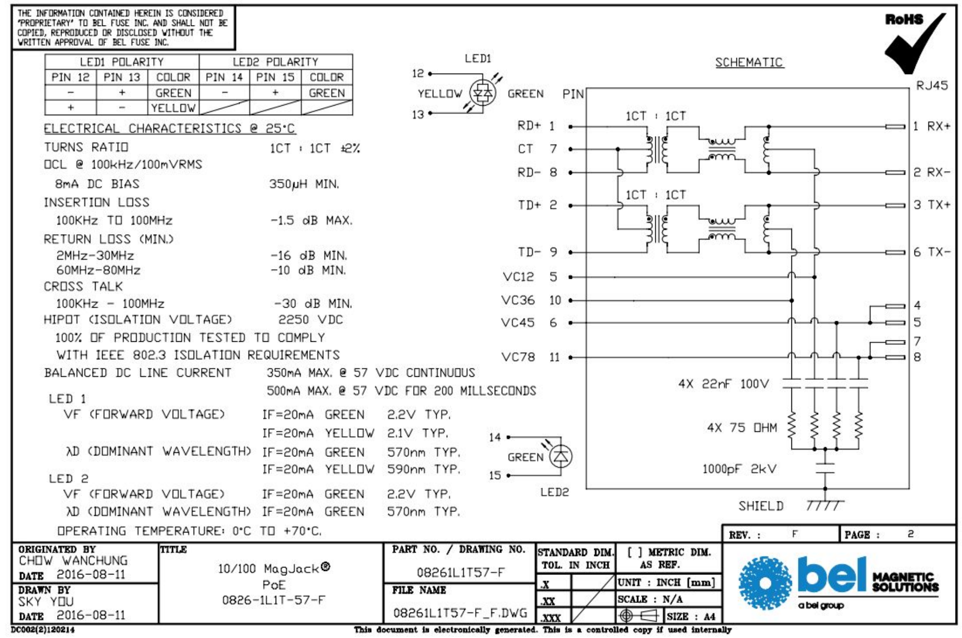
VIDEO:Ethernet Length Tuning in Altium
Length Tuning

NetClass - 100BaseT Ethernet



Current connector choice

https://www.belfuse.com/resources/drawings/magneticsolutions/dr-mag-0826-1l1t-57-f.pdf



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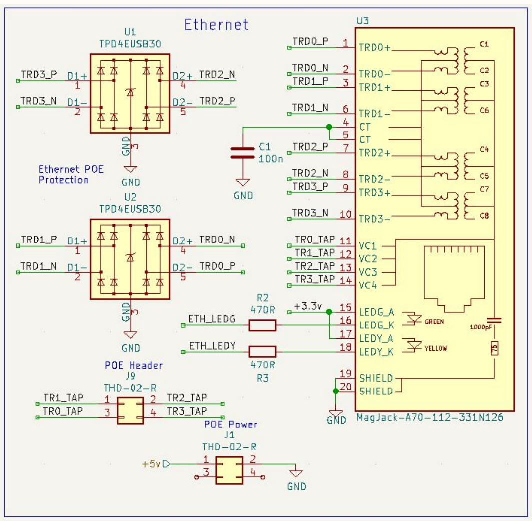
LED1 POLARITY			LED2 POLARITY		
PIN 12	PIN 13	COLOR	PIN 14	PIN 15	COLOR
–	+	GREEN	–	+	GREEN
+	–	YELLOW			

ELECTRICAL CHARACTERISTICS @ 25°C

TURNS RATIO	1CT : 1CT ±2%
OCL @ 100kHz/100mVRMS	
8mA DC BIAS	350µH MIN.
INSERTION LOSS	
100KHz TO 100MHz	-1.5 dB MAX.
RETURN LOSS (MIN.)	
2MHz-30MHz	-16 dB MIN.
60MHz-80MHz	-10 dB MIN.
CROSS TALK	
100KHz - 100MHz	-30 dB MIN.
HIPOT (ISOLATION VOLTAGE)	2250 VDC
100% OF PRODUCTION TESTED TO COMPLY WITH IEEE 802.3 ISOLATION REQUIREMENTS	
BALANCED DC LINE CURRENT	350mA MAX. @ 57 VDC CONTINUOUS
	500mA MAX. @ 57 VDC FOR 200 MILLSECONDS
LED 1	
VF (FORWARD VOLTAGE)	IF=20mA GREEN 2.2V TYP.
	IF=20mA YELLOW 2.1V TYP.
λD (DOMINANT WAVELENGTH)	IF=20mA GREEN 570nm TYP.
	IF=20mA YELLOW 590nm TYP.
LED 2	
VF (FORWARD VOLTAGE)	IF=20mA GREEN 2.2V TYP.
λD (DOMINANT WAVELENGTH)	IF=20mA GREEN 570nm TYP.
OPERATING TEMPERATURE: 0°C TO +70°C.	

REV. : F | PAGE : 2

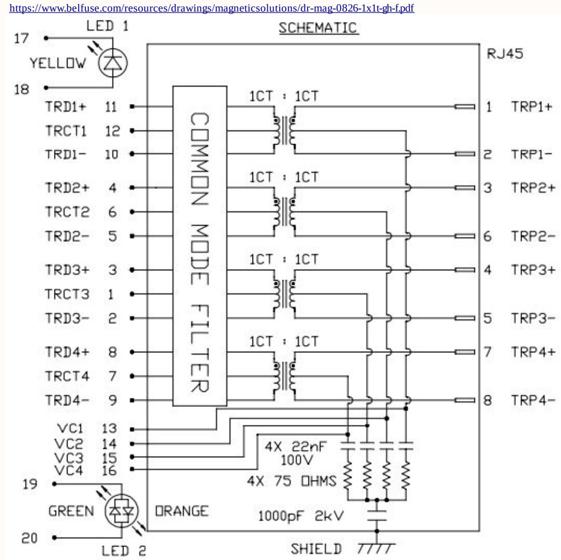
ORIGINATED BY CHOW WANCHUNG DATE 2016-08-11
DRAWN BY SKY YOU DATE 2016-08-11
TITLE 10/100 MagJack® PoE 0826-1L1T-57-F
PART NO. / DRAWING NO. 0826IL1T57-F
FILE NAME 0826IL1T57-F_F.DWG
STANDARD DIM. TOL. IN INCH; [ ] METRIC DIM. AS REF.; UNIT : INCH [mm]; SCALE : N/A; SIZE : A4
.X .XX .XXX
bel MAGNETIC SOLUTIONS a bel group
DC002(2)120214
This document is electronically generated. This is a controlled copy if used internally



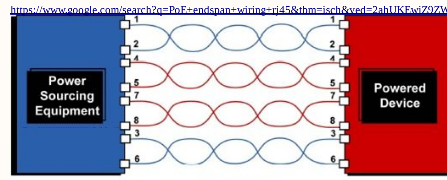
Alternative Connector Choice

0826-1X1T-GH-F

https://www.belfuse.com/resources/drawings/magneticsolutions/dr-mag-0826-1x1t-gh-f.pdf



https://www.google.com/search?q=PoE+endspan+wiring+rj45&tbm=isch&ved=2ahUKEwiZ9ZWyhuL9AhW6F2IAHUsgD0oQ2-cCegQIABAA&oq=PoE+endspan+wiring+rj45&gs



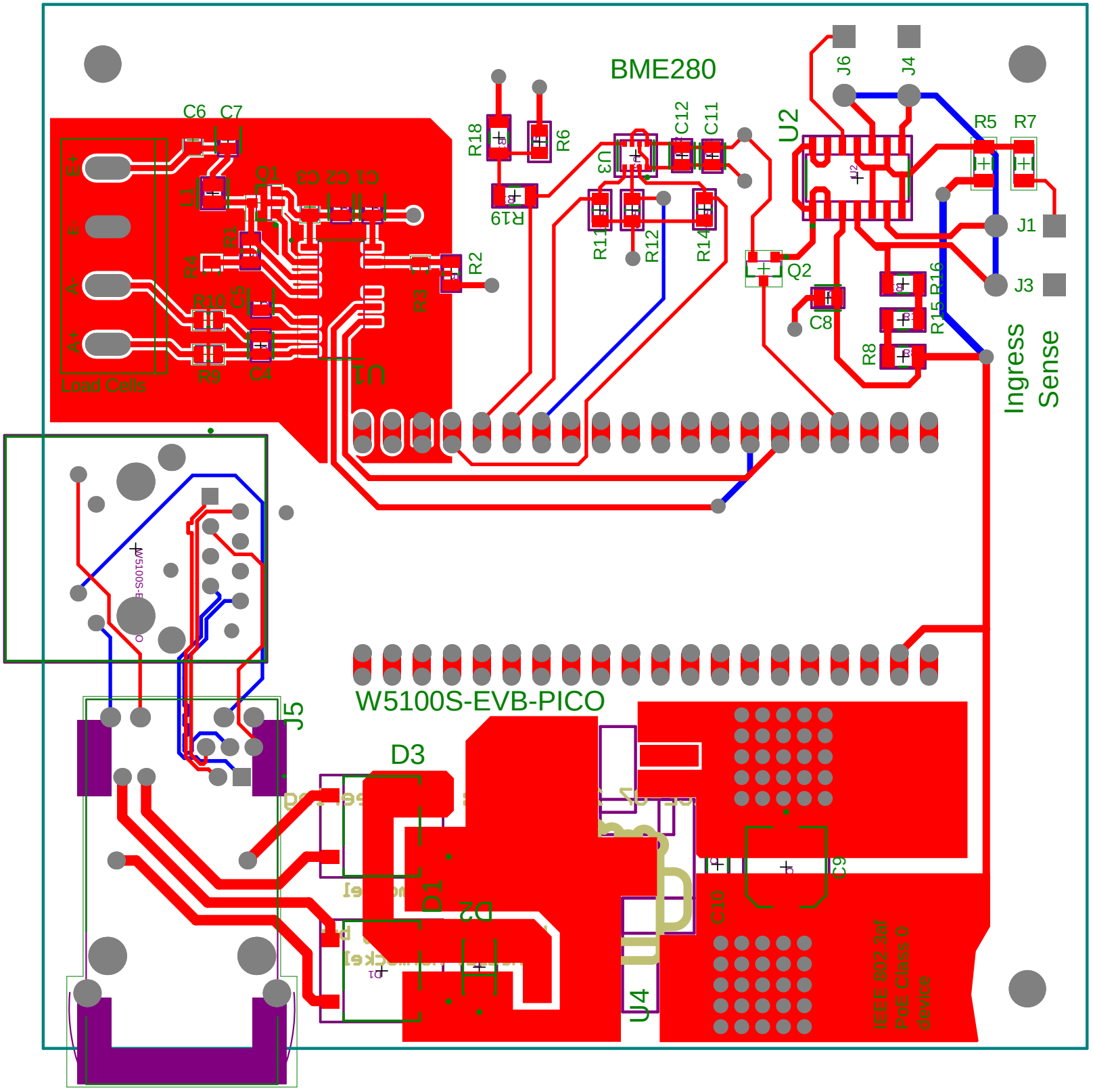
REVISION | DESCRIPTION | DATE | APPROVED

<SCH DWG NO> 7

Altium

DOCUMENT REVISION: 725a27945004a5d... DESIGN ITEM: ...1b14e692c940b05c

ASSY DWG: <ASSY DWG NO>	SIZE B	CAGE CODE ?????	DWG NO. <SCH DWG NO>	REV
FAB DWG: <FAB DWG NO>				
PCB DWG: <PCB DWG NO>	SCALE:	FILE NAME Ethernet.SchDoc	SHEET 7 OF 7	


BME280
U2
J6
J4
J1
J3
R5
R7
C6
C7
Q1
L1
C1
C2
C3
R1
R4
R10
C5
R9
C4
R2
R3
U1
Load Cells
E+
E-
A-
A+
R18
R6
R19
U3
C12
C11
R11
R12
R14
Q2
C8
R8
R15
R16
Ingress
Sense
W5100S-EVB-PICO
J5
D3
D1
D2
U4
C9
C10
IEEE 802.3af
PoE Class 0
device

Line #	Name	Description	Designator	Quantity	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	C0805C104K1RACTU	CAP CER 0.1UF 100V X7R 0805	C1, C2, C4, C5, C7, C8, C11, C12	8	KEMET	C0805C104K1RAC	Volume Production				
	C0805C106K8RACTU		C3, C6	2	KEMET	C0805C106K8RACTU	Volume Production				
	EEE-1VA101XP	CAP ALUM 100UF 20% 35V SMD	C9	1	Panasonic	EEE-1VA101XP					
	GRM31CR71E106KA12L	Chip Multilayer Ceramic Capacitors for General Purpose, 1206, 10uF, X7R, 15%, 10%, 25V	C10	1	Murata	GRM31CR71E106KA12L	Volume Production				
	1935187	4 Position Wire to Board Terminal Block Horizontal with Board 0.197 (5.00mm) Through Hole	CN1	1							
	DF01SA-E3	IC BRIDGE RECT 1PHASE 100V 1A DFS 4-SMD	D1, D3	2	Vishay Semiconductors	DF01SA-E3/77	Volume Production				
	SMAJ58A	TVS DIODE 58VWM 93.6VC SMA	D2	1	Littelfuse	SMAJ58A	Volume Production				
	Wire Jumper 18 AWG	Wire Jumper 18 AWG	J1, J3, J4, J6	4							
	0826-1L1T-57-F	MagJack 10/100BASE-T	J5	1							
	LBM2016T3R3J	SMD Inductors 3.3uH ±5% 0.29A 0.884Ω 0806	L1	1	Taiyo Yuden	LBM2016T3R3J	Volume Production				
	W5100S-EVB-PICO	board to board solder pads for Castelated pads of W5100S-EVB-PICO	MCU1	1							
	MMBT4403LT1G	Switching Transistor, PNP Silicon, 3-Pin SOT-23, Pb-Free, Tape and Reel	Q1	1	ON Semiconductor	SMMBT4403LT1G	Volume Production				
	MMBT3906LT1G	General Purpose Transistor, PNP Silicon, 3-Pin SOT-23, Pb-Free, Tape and Reel	Q2	1	ON Semiconductor	MMBT3906LT1G	Volume Production				
	CRCW080520K0FKEA	RES Thick Film, 20kΩ, 1%, 0.125W, 100ppm/°C, 0805	R1	1	Vishay	CRCW080520K0FKEA	Volume Production				
	CRCW080510K0FKEA	RES Thick Film, 10kΩ, 1%, 0.125W, 100ppm/°C, 0805	R2	1	Vishay	CRCW080510K0FKEA	Volume Production				
	CRCW08050000Z0EA		R3	1	Vishay	CRCW08050000Z0EA					
	CRCW08058K20FKEA		R4	1	Vishay	CRCW08058K20FKEA	Volume Production				
	CRCW1206100KFKEA		R5, R7	2	Vishay Dale	CRCW1206100KFKEB	Volume Production				
	CRCW08054K70FKEA	RES Thick Film, 4.7kΩ, 1%, 0.125W, 100ppm/°C, 0805	R6, R11, R12, R14	4	Vishay	CRCW08054K70FKEA	Volume Production				
	CRCW12061M00FKEA	RES Thick Film, 1MΩ, 1%, 0.25W, 100ppm/°C, 1206	R8	1	Vishay	CRCW12061M00FKEA	Volume Production				
	CRCW0805100RFKEA		R9, R10	2	Vishay Dale	CRCW0805100RFKEA	Volume Production				
	CRCW12060000Z0EA	RES Thick Film, 0Ω, 0.25W, 1206	R15, R16, R18, R19	4	Vishay	CRCW12060000Z0EAC	Volume Production				
	HX711	Precision 24-bit analog-to-digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor.	U1	1	Avia Semiconductor	HX711					
	LM339DR	IC QUAD DIFF COMP 14-SOIC	U2	1	Texas Instruments	LM339DR	Volume Production				
	BME280	SENSOR PRESSURE HUMIDITY TEMP	U3	1	Bosch Tools	BME280					
	AG9905-LPB	PD Module, Isolated DC-DC converter, IEEE802.3af compliant, Over Temp. Protection, Ind Temp. Range, Low Profile, SMT....	U4	1	Silvertel	AG9905-LPB					