

MFM Sensor board

Hardware Documentation

Project: P22296-2
Product: P4758
Variant: Production Onewire

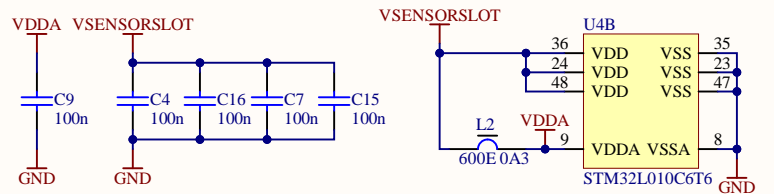
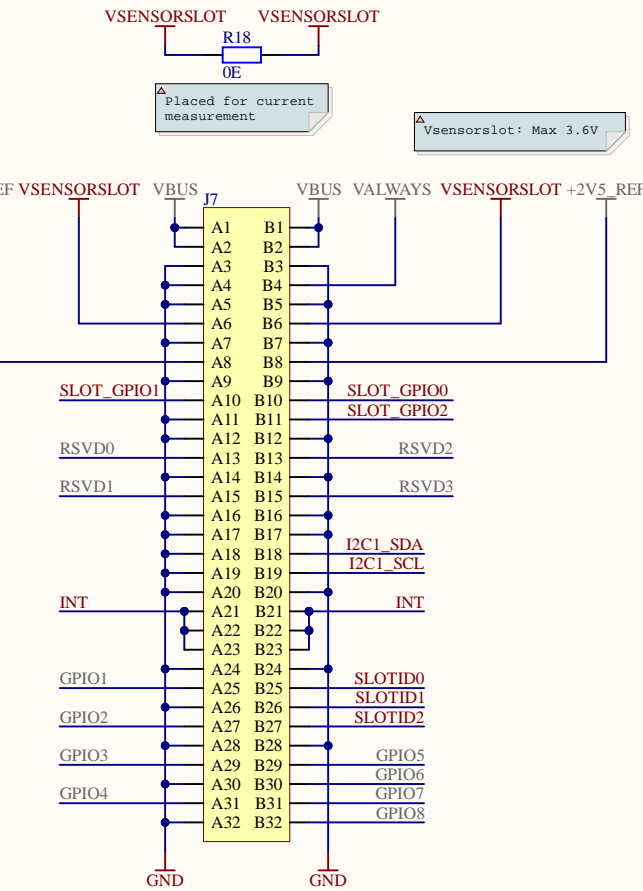
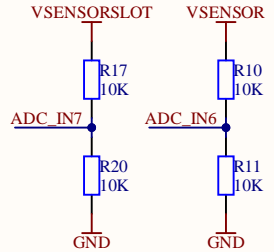
History Table

Date	Revision	Remarks/Changes
26-09-2023	1.0	Initiële versie
8-12-2023	1.1	<ul style="list-style-type: none">- Fixed SWDIO- Added mosfets to enable the sensors individually- Split schematic into multiple pages
23-5-2024	1.2	<ul style="list-style-type: none">- Added pullup on uart RX- Added TVS diodes on the powerlines to the sensors- Added resistors on sensor ground to prevent ground loops
7-10-2024	1.3	<ul style="list-style-type: none">- Changed T1 and T2 from TRA BSS84 to TRA FDN336P for improved Rds on- Changed R23 from 27E to 15E to improve Vsensord stability- Changed ground loop resistors R28 and R29 to 0E- Changed Vsensord from 3V3 to 3V6
11-11-2024	1.4	<ul style="list-style-type: none">- Added T3 and R30 to enable/disable current limiting resistor- Added chamfering drawing to fabrication notes- Changed R21 and R22 to 10K for faster switch on/off time <p>The following changes are only made in the schematic. The layout and schematic are not in sync for this version:</p> <ul style="list-style-type: none">- Moved pullups to after the P-Fet (Schematic only)- Added R31 and R32 to limit current to MCU IO pin (Schematic only)
2-12-2024	1.5	<p>Implemented modifications made in Revision 1.4 into the PCB:</p> <ul style="list-style-type: none">- Moved pullups to after the P-Fet (Layout)- Added R31 and R32 to limit current to MCU IO pin (Layout)
30-1-2025	1.6	<ul style="list-style-type: none">- Removed copyright disclaimer from frontpage

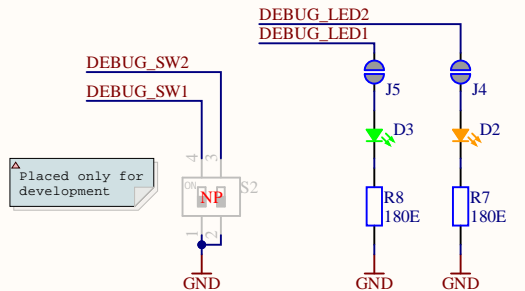
Sensorslot connector

Microcontroller

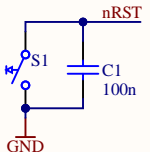
ADC



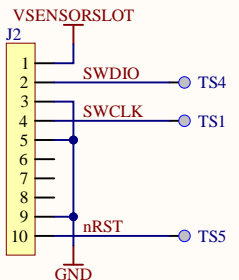
DEBUG



Reset button



Progammig Header



MFM Sensor board
MCU.SchDoc

Designed by: KRS
Date: 28-10-2024

Drawing number: P22296-2-DES

Rev: 1.6

Variant: Production Onewire

Page: 1 Of 4

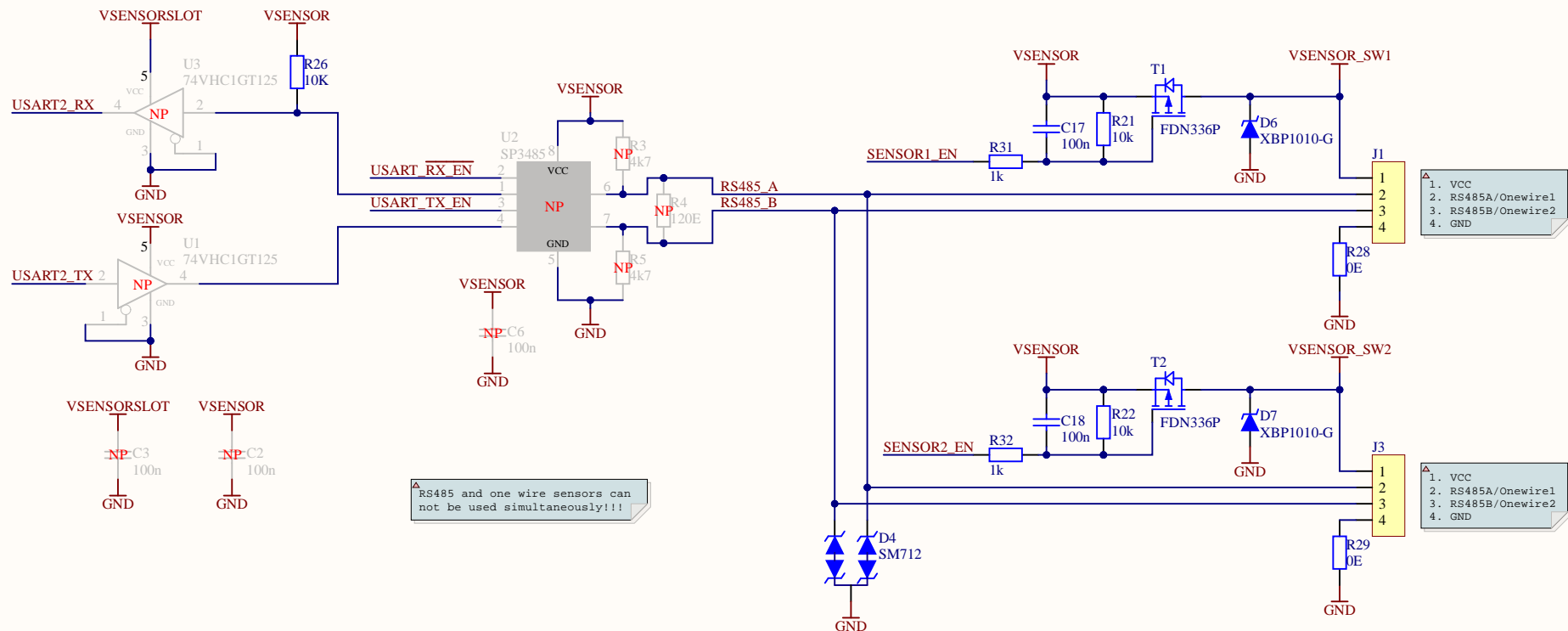


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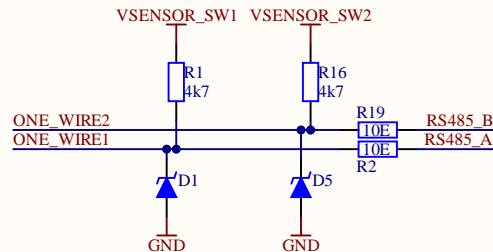
- General
- Design
- Layout
- Power

EXTRA NOTES #NAME? REMOVE AT THE

RS485 interface

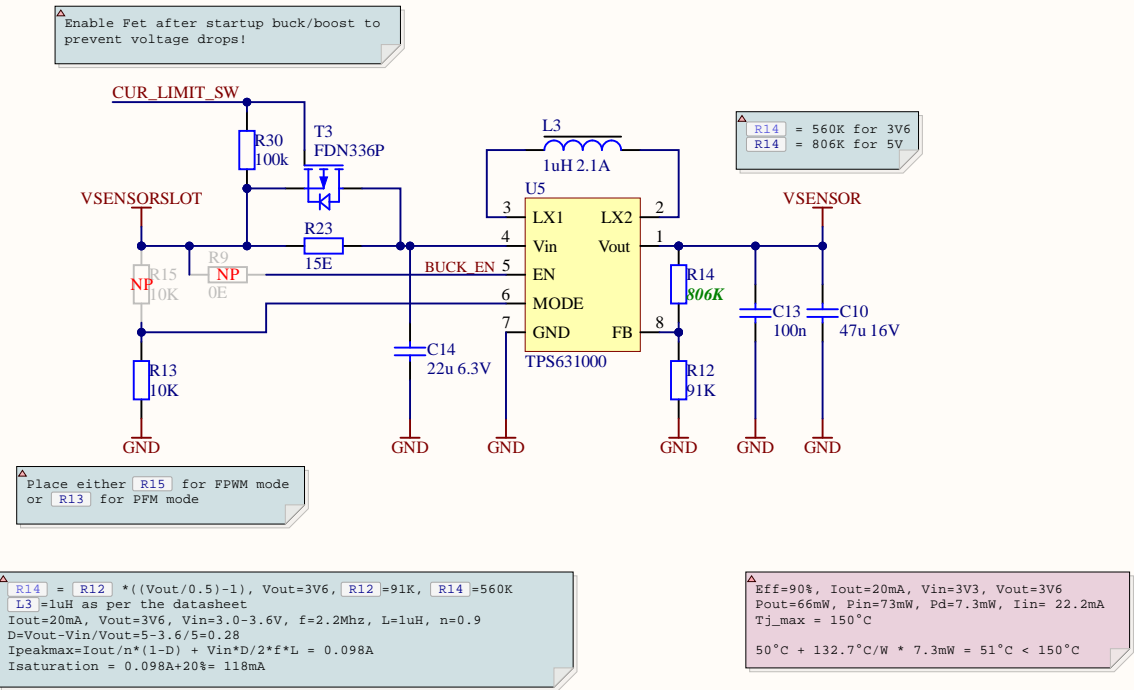


One-Wire interface



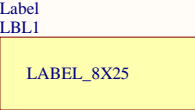
MFM Sensor board Sensor Interface.SchDoc	Designed by: KRS
	Date: 11-11-2024
Drawing number: P22296-2-DES	Rev: 1.6
Variant: Production Onewire	Page: 2 Of: 4
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Buck/Boost Converter



MFM Sensor board Power.SchDoc	Designed by: KRS
	Date: 28-10-2024
Drawing number: P22296-2-DES	Rev: 1.6
Variant: Production Onewire	Page: 3 Of: 4
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A



P22296-2

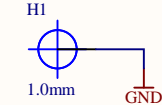
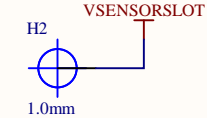


WR-TBL Series 361



WR-TBL Series 361

B



C



D

MFM Sensor board Mechanical.SchDoc	Designed by: KRS
	Date: 28-10-2024
Drawing number: P22296-2-DES	Rev: 1.6
Variant: Production Onewire	Page: 4 Of: 4
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A

B

C

D

A

B

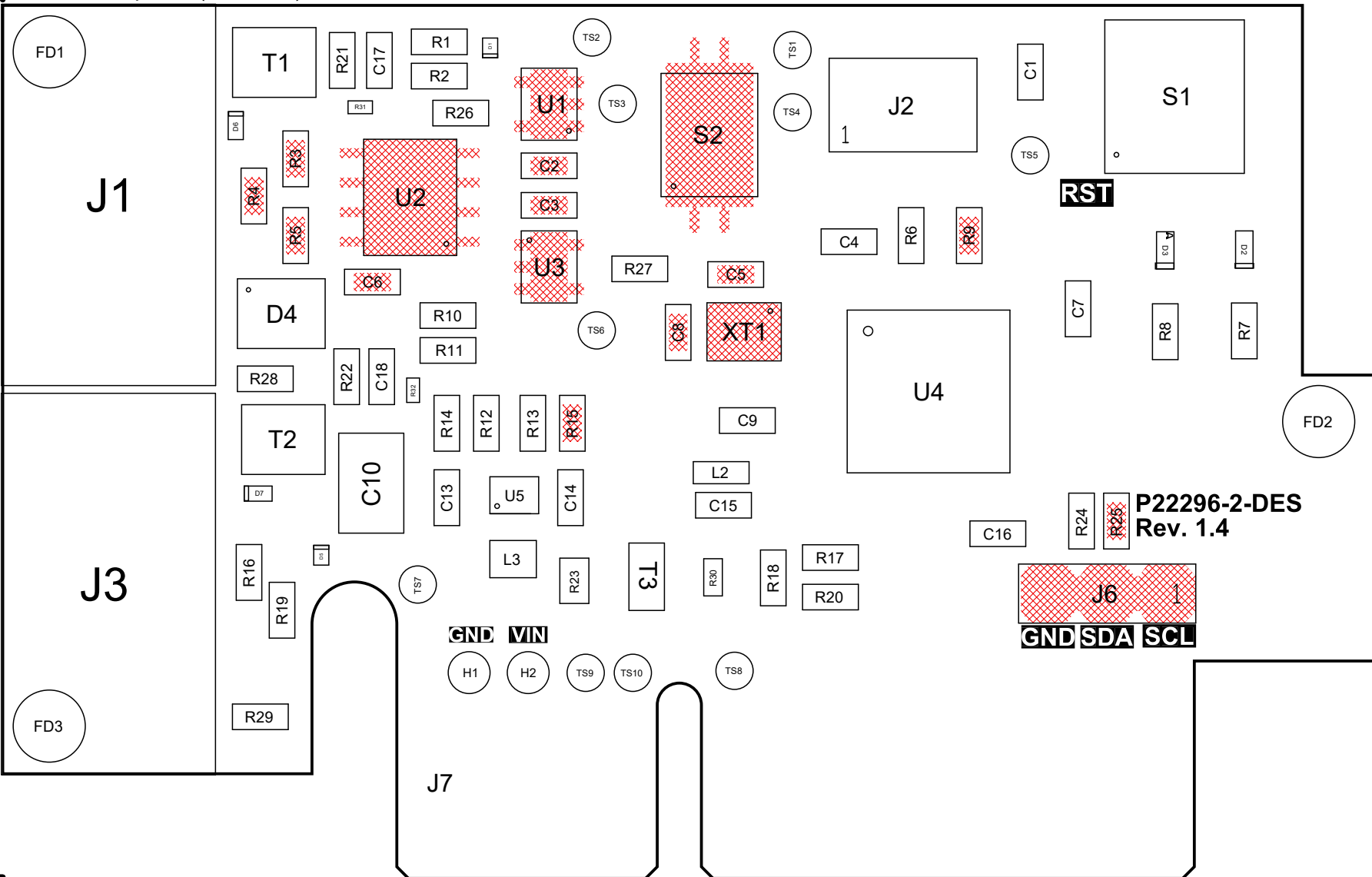
C

D

59.25mm

View from Top side (Scale 4:1)

37.50mm



MFM Sensor board
Assembly

Drawing number: P22296-2-DES

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Designed by: *

Date: 30-1-2025

Page: 1 of 2 Rev.1.6

ELECTRONICS
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MECHATRONICS
MANUFACTURING

A

B

C

D

View from Bottom side (Scale 4:1)

multifleximeter

Waterpressure Sensor

LBL1

LBL2

Sensor1**3V3****A/OW1****B/OW2****GND****Sensor2****3V3****A/OW1****B/OW2****GND**

MFM Sensor board
Assembly

Drawing number: P22296-2-DES

Designed by: *

Date: 30-1-2025

Page: 2 of 2 Rev.1.6

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ELECTRONICS
SOFTWARE
MECHATRONICS
MANUFACTURING

Partlist

Project Name: MFM Sensor board
Project Number: P22296-2-DES-1.6

Product Number: P4758
Variant: Production Onewire

Designator	Amount	Type	Description	Dekimo Part Code	Manufacturer Part Code	Fitted	Remark
C1		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C2		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Not Fitted	
C3		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Not Fitted	
C4		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C5		Capacitor ceramic SMD	10pF 50V 5% C0G/NP0	CKE 10P/60	C1608C0G1H100D080AA-TDK	Not Fitted	
C6		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Not Fitted	
C7		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C8		Capacitor ceramic SMD	10pF 50V 5% C0G/NP0	CKE 10P/60	C1608C0G1H100D080AA-TDK	Not Fitted	
C9		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C10		Capacitor ceramic SMD	47uF 16V 20% X5R	CKE 47UV16/15	EMK325BJ476MM-P-TAI	Fitted	
C13		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C14		Capacitor ceramic SMD	22uF 20% 6.3V X5R	CKE 22UV6.3/60	GRM188R60J226MEA0D-MUR	Fitted	
C15		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C16		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C17		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
C18		Capacitor ceramic SMD	100nF 50V 10% X7R	CKE 100N/60	CC0603KRX7R9BB104-YAG	Fitted	
D1		Diode suppressor SMD	TVS diode 3.3V unidirec	DIO D3V3M1U2S9	D3V3M1U2S9-7-DIO	Fitted	
D2		LED SMD	Led Orange 0603	LED SMDO/3	150060AS75000-WE	Fitted	
D3		LED SMD	Led Groen 0603	LED SMDG/16	150060VS75003-WE	Fitted	
D4		Diode suppressor SMD	7/12V, 400W bidir.	DIO SM712	SM712-LTL	Fitted	
D5		Diode suppressor SMD	TVS diode 3.3V unidirec	DIO D3V3M1U2S9	D3V3M1U2S9-7-DIO	Fitted	
D6		Diode suppressor SMD	TVS Unidirectional 5V 40w	DIO XBP1010-G	XBP1010-G-TOR	Fitted	
D7		Diode suppressor SMD	TVS Unidirectional 5V 40w	DIO XBP1010-G	XBP1010-G-TOR	Fitted	
J1		Plug-in term. block	PCB,BOX,RY1,PEN4,HA,P3.81	CON PTB4/31	691322310004-WE	Fitted	
J2		Connector pinhdr SMD	pinh 2x5/straight/Au/1.27pitch	CON PHDR2X5S/10	M50-3600542-HAR	Fitted	
J3		Plug-in term. block	PCB,BOX,RY1,PEN4,HA,P3.81	CON PTB4/31	691322310004-WE	Fitted	
J6		Connector Pinheader	pinh 1x3/straight/h=5.8/Au	CON PHDR1X3S/1	0-826629-3	Not Fitted	
L2		Ferrite bead SMD	600E @100Mhz 0.3A	IND 600E 0A3/1	742792653-WE	Fitted	
L3		Inductor choke SMD	Power inductor 2.1A	IND 1U 2A1/1	74479276210C-WE	Fitted	
LBL2		Standard Label	Multi-funct labels12.7 x25.4mm	LBL STCK/20	-	Fitted	
R1		Resistor metalfilm SMD	4k7 100mW 1% 0603	R 4K7/60	RC0603FR-074K7L-YAG	Fitted	
R2		Resistor metalfilm SMD	10E 0.1W 1%	R 10E/60	RC0603FR-0710RL-YAG	Fitted	
R3		Resistor metalfilm SMD	4k7 100mW 1% 0603	R 4K7/60	RC0603FR-074K7L-YAG	Not Fitted	
R4		Resistor metalfilm SMD	120E 0.1W 1%	R 120E/60	RC0603FR-07120RL-YAG	Not Fitted	

Partlist

Project Name: MFM Sensor board
Project Number: P22296-2-DES-1.6

Product Number: P4758
Variant: Production Onewire

Designator	Amount	Type	Description	Dekimo Part Code	Manufacturer Part Code	Fitted	Remark
R5		Resistor metalfilm SMD	4k7 100mW 1% 0603	R 4K7/60	RC0603FR-074K7L-YAG	Not Fitted	
R6		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R7		Resistor metalfilm SMD	180E 0.1W 1%	R 180E/60	RC0603FR-07180RL-YAG	Fitted	
R8		Resistor metalfilm SMD	180E 0.1W 1%	R 180E/60	RC0603FR-07180RL-YAG	Fitted	
R9		Resistor metalfilm SMD	0E 100mW, 1%	R 0E/60	RC0603FR-070RL-YAG	Not Fitted	
R10		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R11		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R12		Resistor metalfilm SMD	91k 0.06W 1%	R 91K/60	RC0603FR-0791KL-YAG	Fitted	
R13		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R14		Resistor metalfilm SMD	806K 0.1W 1%	R 806K/60	RC0603FR-07806KL-YAG	Fitted	
R15		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Not Fitted	
R16		Resistor metalfilm SMD	4k7 100mW 1% 0603	R 4K7/60	RC0603FR-074K7L-YAG	Fitted	
R17		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R18		Resistor metalfilm SMD	0E 100mW, 1%	R 0E/60	RC0603FR-070RL-YAG	Fitted	
R19		Resistor metalfilm SMD	10E 0.1W 1%	R 10E/60	RC0603FR-0710RL-YAG	Fitted	
R20		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R21		Resistor metalfilm SMD	10kΩ 100mW 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R22		Resistor metalfilm SMD	10kΩ 100mW 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R23		Resistor metalfilm SMD	15Ω 125mW 1%	R 15E/11	RC0805FR-0715RL-YAG	Fitted	
R24		Resistor metalfilm SMD	100k 100mW, 1%	R 100K/60	CRG0603F100K-TEC	Fitted	
R25		Resistor metalfilm SMD	100k 100mW, 1%	R 100K/60	CRG0603F100K-TEC	Not Fitted	
R26		Resistor metalfilm SMD	10k 100mW, 1%	R 10K/60	RC0603FR-0710KL-YAG	Fitted	
R27		Resistor metalfilm SMD	100k 100mW, 1%	R 100K/60	CRG0603F100K-TEC	Fitted	
R28		Resistor metalfilm SMD	0Ω 100mW 1%	R 0E/60	RC0603FR-070RL-YAG	Fitted	
R29		Resistor metalfilm SMD	0Ω 100mW 1%	R 0E/60	RC0603FR-070RL-YAG	Fitted	
R30		Resistor metalfilm SMD	100kΩ 100mW 1%	R 100K/60	CRG0603F100K-TEC	Fitted	
R31		Resistor metalfilm SMD	1kΩ 62.5mW 1%	R 1K/70	RC0402FR-071KL-YAG	Fitted	
R32		Resistor metalfilm SMD	1kΩ 62.5mW 1%	R 1K/70	RC0402FR-071KL-YAG	Fitted	
S1		Switch push button SMD	PCB SPNO 6x6.6mm, h=4,3mm refl	SW PBSPNO/25	B3S-1000P-OMR	Fitted	
S2		Switch slide SMD	DIP,2p,Straight,H=2,3mm,SMD,AU	SW DIP2SO/G2	GDH02S04-TYC	Not Fitted	
T1		FET P-channel SMD	20V 1.3A 200mΩ logic level	TRA FDN336P	FDN336P-FCH	Fitted	
T2		FET P-channel SMD	20V 1.3A 200mΩ logic level	TRA FDN336P	FDN336P-FCH	Fitted	
T3		FET P-channel SMD	20V 1.3A 200mΩ logic level	TRA FDN336P	FDN336P-FCH	Fitted	
U1		IC interface SMD	buffer/ levelshifter	IC 74VHC1GT125	M74VHC1GT125DT1G-ONS	Not Fitted	

Partlist

Project Name:

MFM Sensor board

Product Number: P4758

Project Number:

P22296-2-DES-1.6

Variant:

Production Onewire

Designator	Amount	Type	Description	Dekimo Part Code	Manufacturer Part Code	Fitted	Remark
U2		IC interface SMD	RS485/RS422, 3v3, 10Mbps	IC MAX3485/ETSO	SP3485EN-L-SIP	Not Fitted	
U3		IC interface SMD	buffer/ levelshifter	IC 74VHC1GT125	M74VHC1GT125DT1G-ONS	Not Fitted	
U4		IC microcontroller SMD	STM32L010C6T6	IC STM32L010C6T	STM32L010C6T6-STM	Fitted	
U5		IC regulator SMD	Buck/boost 1.5-5.5V, 1A5	IC TPS631000	TPS631000DRLR-TI	Fitted	
XT1		Quarz crystal SMD	8 MHz, 10%, 30ppm	XT 8MHZ/1	ECS-80-10-33-CGN-TR3-ECS	Not Fitted	
ZZDIV1		\$PCB	MFM Sensor(druk)	PCB P22296-2	P22296-2	Fitted	
ZZDIV2		Plug terminal block	Screw,4p,Fem,P3.81,Straight	CON STB4F/32 WE	691361300004-WE	Fitted	
ZZDIV3		Plug terminal block	Screw,4p,Fem,P3.81,Straight	CON STB4F/32 WE	691361300004-WE	Fitted	