



USER MANUAL

EVALUATION BOARD FOR
DIFFERENTIAL PRESSURE SENSOR
PDMS

25131308xxx95

VERSION 1.0

NOVEMBER 27, 2025

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

Revision history

Manual version	HW version	Notes	Date
1.0	1.0	<ul style="list-style-type: none">Initial release of the manual	November 2025

Abbreviations

Abbreviation	Description
EV-Board	Evaluation board
I ² C	Inter integrated circuit
MCU	Microcontroller Unit
MEMS	Micro electro mechanical system
SPI	Serial Peripheral Interface

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Overview of helpful application notes and software resources

Application notes

Application note ANM001 - MEMS Sensor PCB design and soldering guideline

<http://www.we-online.com/ANM001>

This technical document provides necessary information and general guidelines for soldering and PCB design for the Würth Elektronik eiSos MEMS sensor products with an LGA surface-mount package.

Application note ANR034 - How to use Zephyr sensor drivers

<http://www.we-online.com/ANR034>

The application note shows how to integrate the Zephyr drivers of Würth Elektronik eiSos sensors into the user's application source code to use Würth Elektronik eiSos sensors in the user's end device.

Software resources

Sensor software development kit (SDK)

https://github.com/WurthElektronik/Sensors-SDK_STM32

The Sensor SDK facilitates rapid prototyping and evaluation of Würth Elektronik eiSos GmbH & Co. KG sensors. It includes libraries specifically designed for the STM32 platform. While the example projects in this repository were developed using STM32CubeIDE, they can be adapted for use with other MCU platform if preferred.

Zephyr sensor driver

<https://github.com/zephyrproject-rtos/zephyr/tree/main/drivers/sensor/wsen/>

The Zephyr sensor driver provides native support for integrating Würth Elektronik eiSos sensors into applications running on the Zephyr RTOS.

1.2 Ordering Information

WE order code	Pressure range [kPa]	Sensor Marking	Sensor Part Nr.	Pressure ports
2513130810195	± 1	PDB101DAXM	2513130810105	Horizontal-barbed
2513130810295	± 10	PDB102DAXM	2513130810205	
2513130835295	± 35	PDB352DAXM	2513130835205	
2513130810395	0 to 100	PDU103DAXM	2513130810305	Vertical-straight
2513130810495	-100 to 1000	PDU104DAXM	2513130810405	

Table 1: Ordering information for EV-Board



EV-Board with horizontal-barbed pressure ports do not include the adapter, o-rings and snap-rivets.

1.3 Vertical Nozzles

Sensors with vertical straight nozzles are recommended to be used for manifold mounting. For the EV-Boards with vertical straight nozzles, additional mounting accessories are also provided.

1.3.1 Material Contents

- **1 differential pressure sensor board:** With digital I²C, SPI and analog output; includes all necessary de-coupling capacitors and SMT pin header
- **1 Adapter:** With barbed nozzles that can fit the pneumatic tubes with inner diameter 4 mm. (recommended tube: Festo PUN-6x1-XX)
- **2 O-rings:** 1.8 x 2 mm rubber (NBR-70) O-ring for sealing
- **2 Snap-rivets or Screws:** Provides quick and robust connection of the adapter with the PCB. Snap-rivets for operating pressure <500 kPa and screws (M3) for higher operating pressure >500 kPa.



EV-Board with order codes 2513130810195, 2513130810295 and 2513130835295 are shipped with snap-rivets.



EV-Board with order code 2513130810395 and 2513130810495 are shipped with screw fasteners.

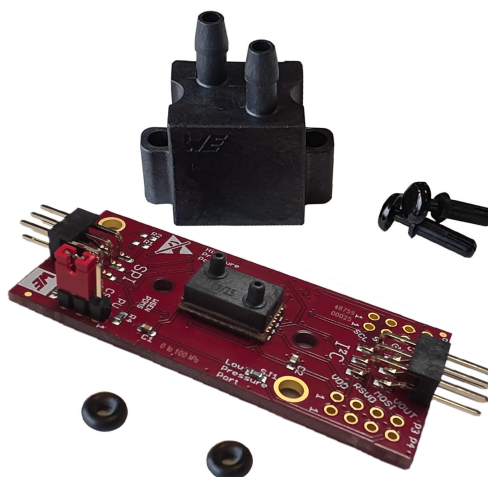


Figure 3: EV-Board for the differential pressure sensor

1.3.2 Assembly

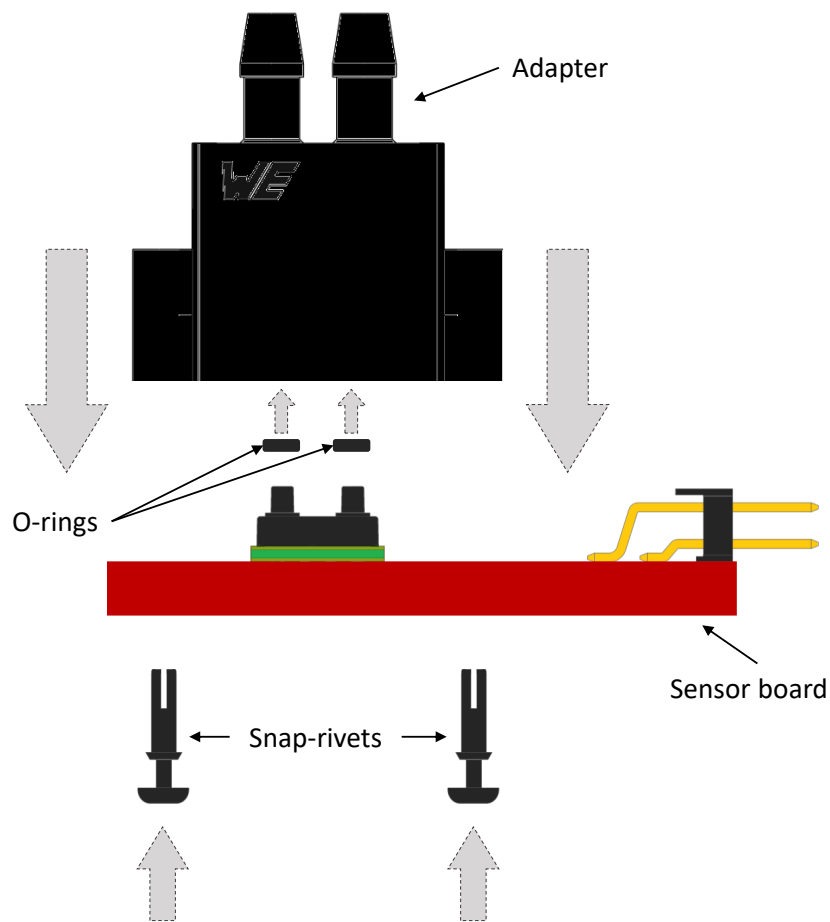


Figure 4: Assembly of the EV-Board



Warning: The adapter can withstand pressure upto 1000 kPa. Do not apply more than 1000 kPa to the adapter.

1.4 Horizontal Nozzles

The EV-Boards featuring horizontal-barbed nozzle sensors do not come with additional adapter, O-rings, and snap-rivets. The design of the barbed nozzle enables a direct tube connection to the sensor, eliminating the need for manifold mounting. For a secure and reliable connection to the sensor, it is advised to use a tube with a 2 mm inner diameter.

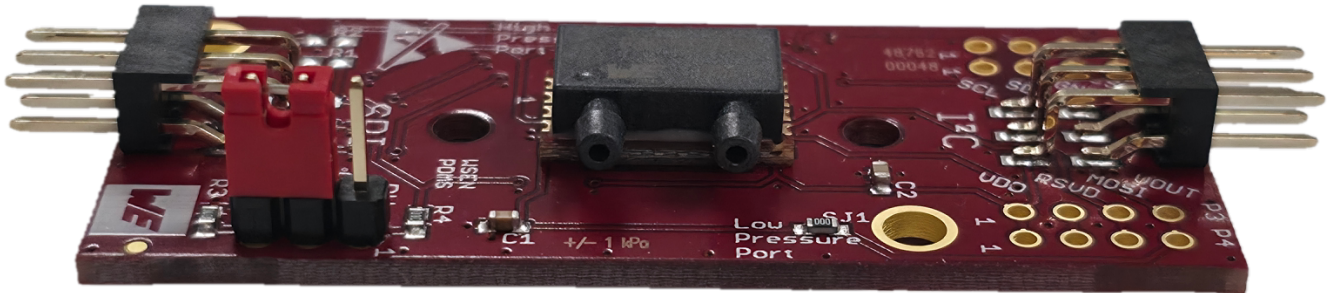


Figure 5: Assembly of the EV-Board (horizontal-barbed nozzles)

2 Functional description

The differential pressure sensor EV-Board supports the standard I²C communication interface and 4-wire SPI communication as well as analog voltage output.

- A positive supply voltage between 3 V and 5.5 V is applied to the sensor through *VDD* pin.
- The I²C interface pins *SDA* and *SCL* are connected with the interface pins on the host controller side.
- For I²C communication 7-bit slave address of the differential pressure sensor on the board is 0x6C.
- If SPI interface is used, *MISO*, *MOSI* and *CS* are connected with the corresponding interface pins on the host controller side



In I²C interface, *SDA* and *SCL* pins must be connected to the *VDD* through pull-up resistors on the host controller (master) side. There are no pull up resistors on the sensor board (slave)

Pin description

Pin No.	Name	Function	Input/output	Comments
1	<i>SCL</i>	I ² C /SPI serial clock	Input	
2	<i>SDA / MISO</i>	I ² C serial data /SPI data out	Input/Output	
3	<i>GND</i>	Negative supply voltage	Supply	
4	<i>VOU</i>	Analog output	Output	
5	<i>VDD</i>	Positive supply voltage	Supply	
6	<i>RSVD</i>	Reserved		Do not connect
7	<i>MOSI</i>	SPI data in	Input	
8	<i>SA0 / CS</i>	I ² C address select / SPI chip select	Input	

Table 2: Pin description



Please refer to the corresponding data sheet of the sensor (Part No: 25131308xxxxx) for more information about the sensor parameters and electrical properties.

2.1 EV-Board in operation

Resistor functionality

Resistor	Value	Description
R1	-	not mounted; optional pull-up resistor for MISO in SPI operation; recommended value: 10 k Ω
R2	-	not mounted; optional pull-up resistor for MOSI in SPI operation; recommended value: 10 k Ω
R3	10 k Ω	Pull-down resistor. Connect <i>CS/SA0</i> to enable I ² C at power up. I ² C 7-bit primary slave address 0x6C
R4	10 k Ω	Pull-up resistor. Connect <i>CS/SA0</i> to enable SPI at power up. In I ² C operation, can be used to select secondary 7-bit slave address 0x6E
SJ1	0 Ω	Analog output routed to pin 5 of I ² C pin header

Table 3: Resistor functionality EV-Board

2.1.1 I²C connection

Pin no.	Description
1	GND
2	SCL
3	SDA/MISO
4	Not connected
5	VOUT
6	VDD

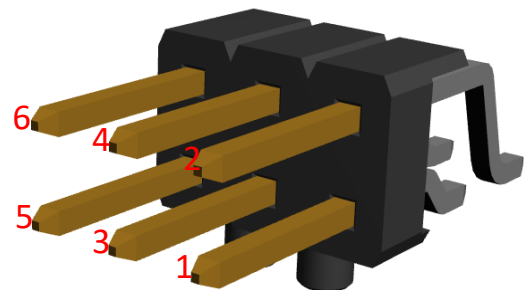


Table 4: Pin header connection to external boards

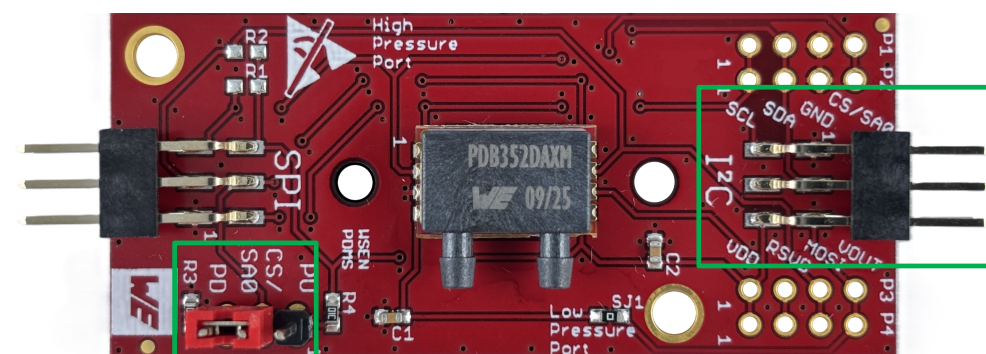


Figure 6: I²C Pin header connection to the external boards



For I²C communication the CS/SA0 pin must be pulled-down to VDD at the start (jumper must be placed between CSA/SA0-PD).

2.1.2 SPI connection

Pin no.	Description
1	GND
2	SCL
3	MOSI
4	CS/SA0
5	SDA/MISO
6	VDD

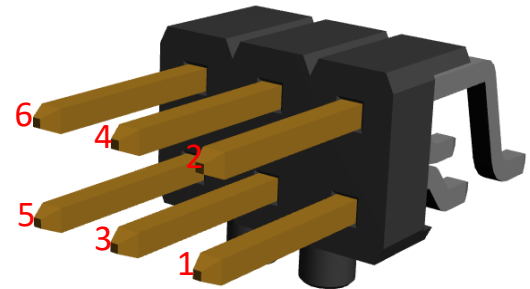


Table 5: Pin header connection to external boards

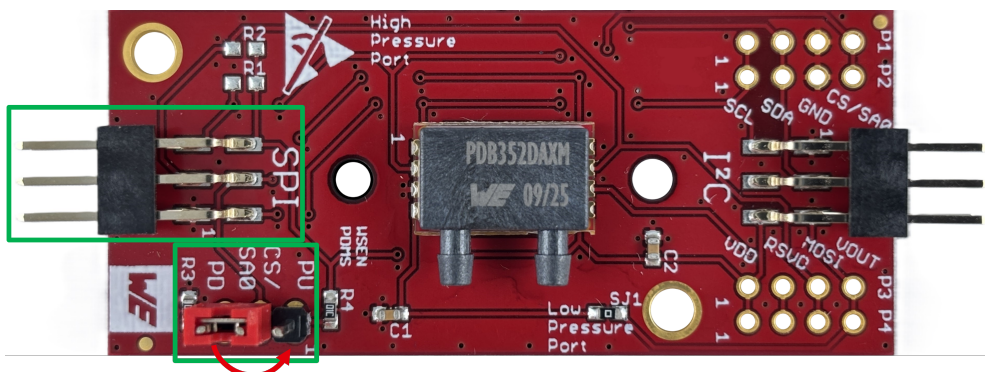


Figure 7: SPI Pin header connection to the external boards



For SPI communication the CS/SA0 pin must be pulled-up to VDD at the start (jumper must be placed between CSA/SA0-PU). CS pin is then controlled by the host controller (master) during the communication

2.1.3 Analog Output

SJ1 is assembled with a $0\ \Omega$ resistor enabling the analog voltage output. The analog output can be read directly through the pin 5 (*VOUT*) of the I²C pin header connection.

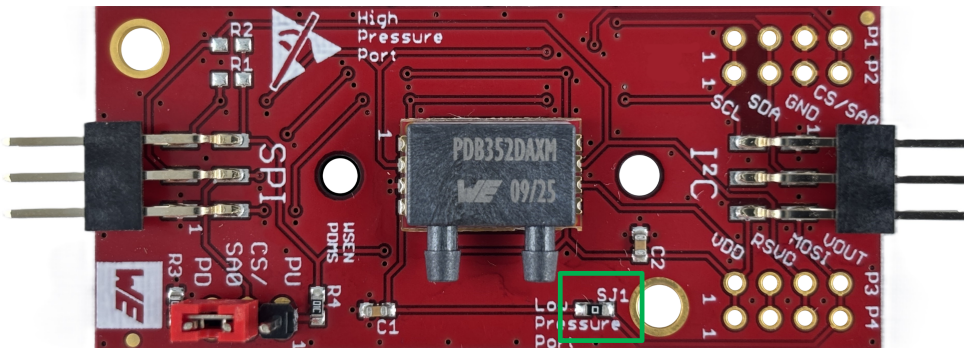


Figure 8: Analog output resistor



By removing the $0\ \Omega$ resistor (SJ1), the analog output can be disconnected from I²C pin header.

2.1.4 Through hole connection

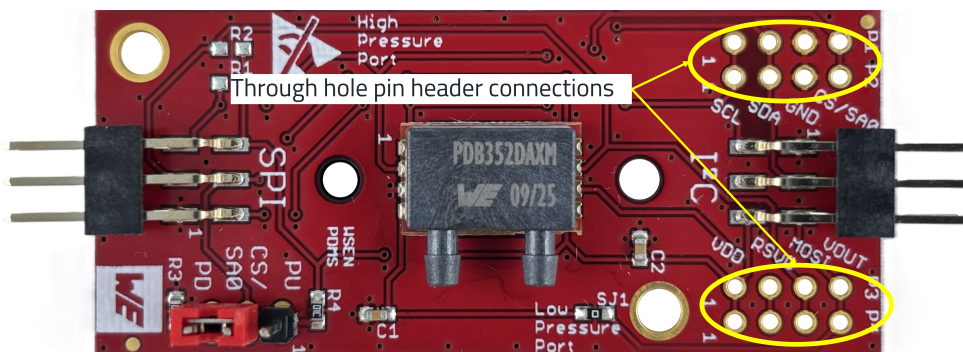


Figure 9: Through hole connection

Please refer to Table 2 for the pin description of the sensor.



Please refer to the user manual of the differential pressure sensor for information regarding the conversion of digital and analog values into pressure SI unit.

2.2 Schematic diagram

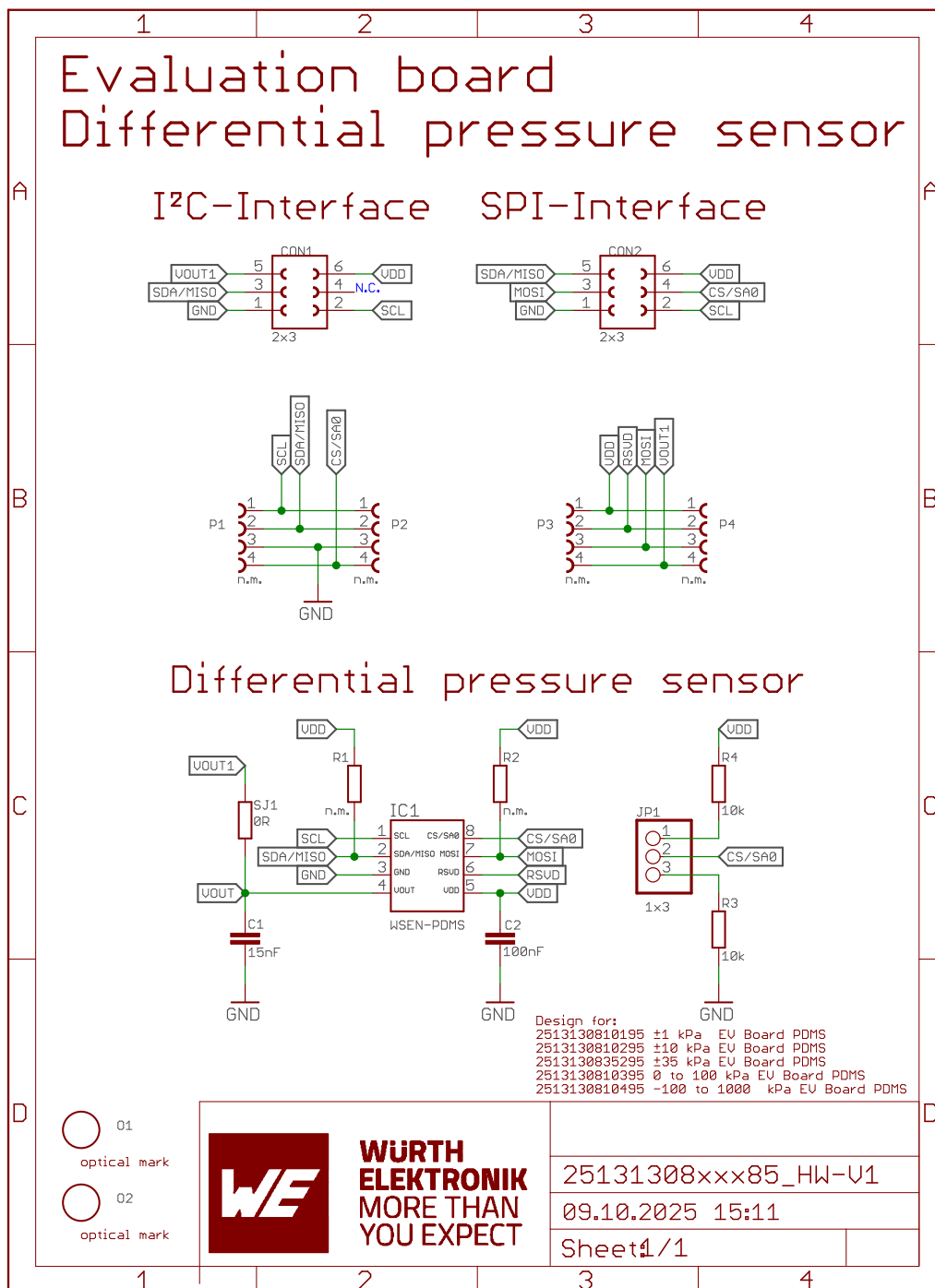


Figure 10: Schematic diagram

2.3 Layout

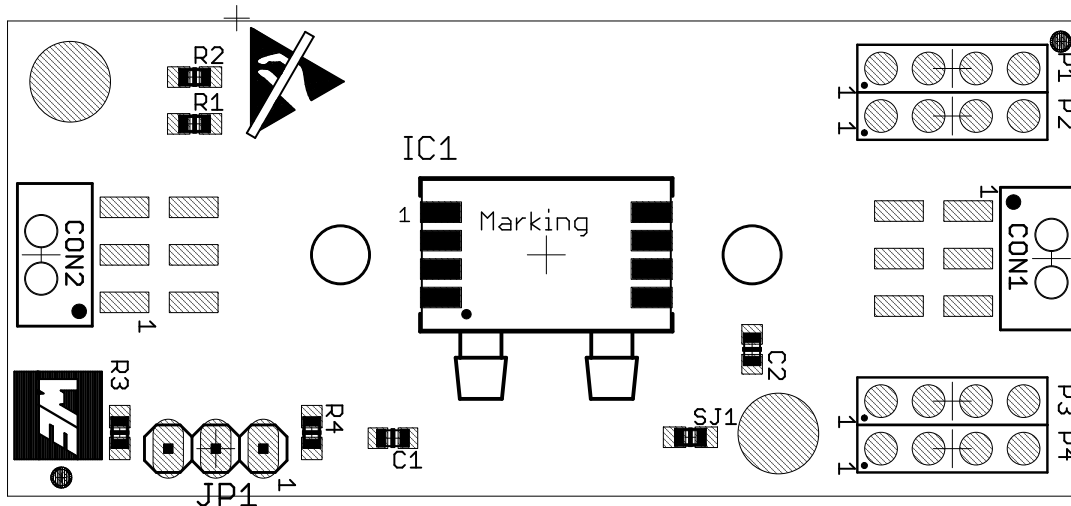


Figure 11: Assembly diagram: Horizontal nozzles

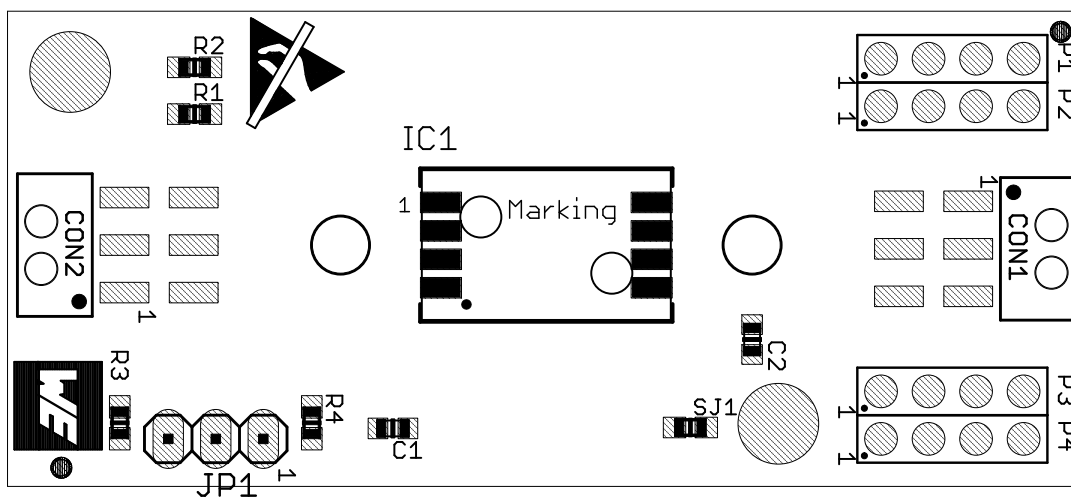


Figure 12: Assembly diagram: Vertical nozzles

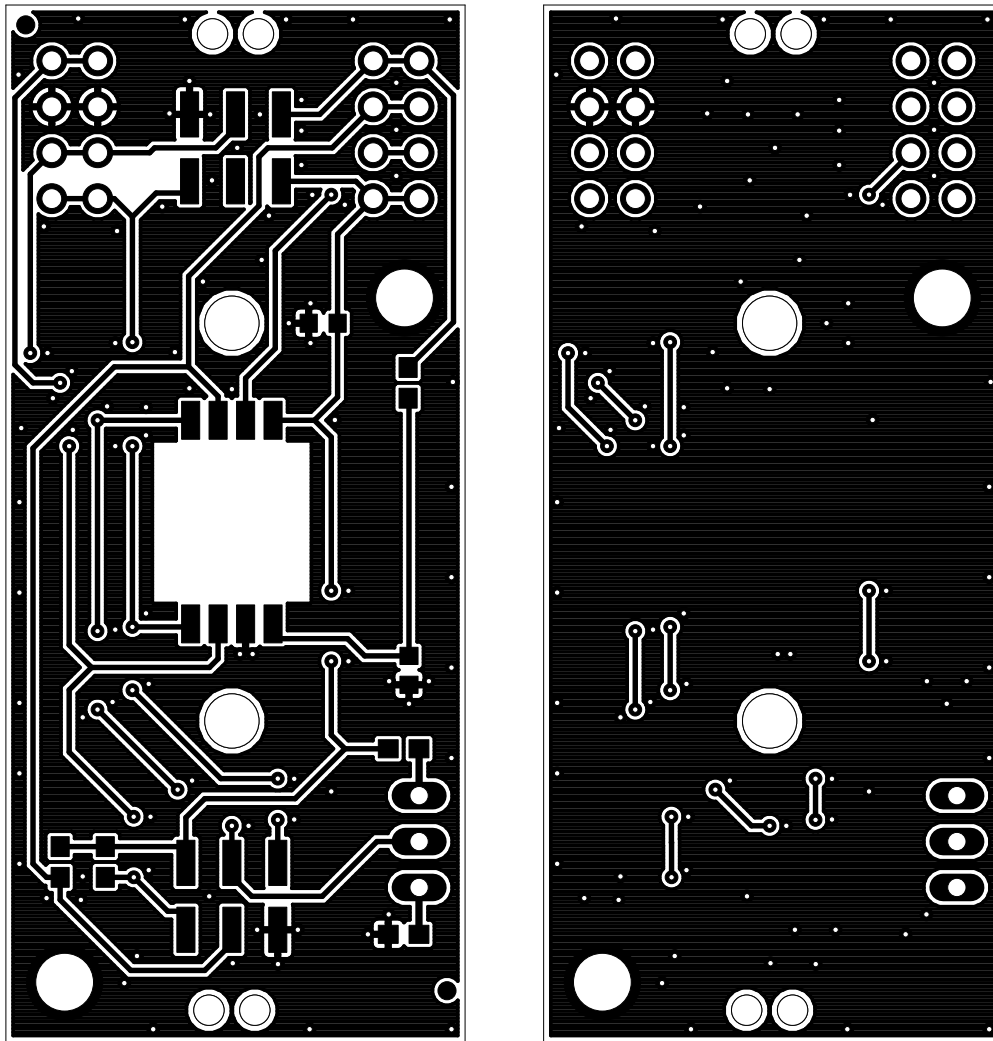


Figure 13: Top (left) and bottom (right) layers

2.4 Bill of materials

Part	Value	Pack	Manufacturer	NR
C1	15 nF	0603	Würth Elektronik eiSos	885012206041
C2	100 nF	0603	Würth Elektronik eiSos	885012206095
CON1	2x3	THT	Würth Elektronik eiSos	610106249121
CON2	2x3	THT	Würth Elektronik eiSos	610106249121
IC1	WSEN-PDMS	SMT	Würth Elektronik eiSos	25131308xxx05
P1	n.m.	THT	n.m.	n.m.
P2	n.m.	THT	n.m.	n.m.
P3	n.m.	THT	n.m.	n.m.
P4	n.m.	THT	n.m.	n.m.
R1	n.m.	SMT	n.m.	n.m.
R2	n.m.	SMT	n.m.	n.m.
R3	10 k Ω	0603	Würth Elektronik eiSos	560112116005
R4	10 k Ω	0603	Würth Elektronik eiSos	560112116005
SJ1	0 Ω	0603	Würth Elektronik eiSos	560112116001

Table 6: Bill of materials

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Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

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It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software source code and firmware parts contained in or used with or for products in the wireless connectivity and sensor product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

Best care and attention

Any product-specific data sheets, manuals, application notes, PCNs, warnings and cautions must be strictly observed in the most recent versions and matching to the products revisions. These documents can be downloaded from the product specific sections on the wireless connectivity and sensors homepage.

Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the Business Development Engineer (BDM) or the internal sales person in charge should be contacted who will be happy to support in this matter.

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Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes. In case of further queries regarding the PCN, the Business Development Engineer (BDM), the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 3 and 3 remains unaffected.

All software like "wireless connectivity SDK", "Sensor SDK" or other source codes as well as all PC software tools are not subject to the Product Change Notification information process.

Product life cycle

Due to technical progress and economical evaluation, we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the Business Development Engineer (BDM) or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

The approach named above does not apply in the case of EV-Boards. EV-Boards may be changed without any notification.

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Do not touch the EVB when it is live, and allow charged components, such as capacitors, to discharge completely before handling the EVB. Depending on the individual application, high voltages can occur on the EVB and some components can reach temperatures above 50 °C. Even after disconnecting the EVB from the power source, these conditions remain for a significant time. Please ensure that the appropriate safety precautions are taken when installing and operating this EVB, as one of the following may occur if you handle or use this EVB without observing the relevant safety precautions: - Death - Serious injury - Electric shock - Electric burns - Severe heat burns -

When using the EVB, you undertake to read the instructions for use in full together with the relevant information supplied and/or available on the homepage www.we-online.de/wcs-manuals before putting this EVB into operation. The following points have to be observed in particular:

- Do not touch the EVB while it is live.
- The EVB must be fully assembled and all devices to be tested must be connected before voltage is applied to the EVB.
- The EVB should never be left unattended during operation.
- Capacitors must be completely discharged. The capacitors must be actively discharged using a suitable resistor.

Protection against static electricity

Use the unpackaged product only in ESD protected areas. Wear the ESD personal protective equipment prescribed for these areas. Ground all conductive components, including personnel, as prescribed in ESD protected areas. Ensure that the product is only used by trained personnel.

Purpose and use

The EVB is not a finished product and is not intended for general use by the consumer. The EVB is intended exclusively for use in the evaluation of WE components in the lab or in development environments by highly qualified technicians or engineers, familiar with the risks involved in handling electrical or mechanical components, systems and subsystems. The use of the EVB is your full and independent responsibility. The EVB is expressly not intended to be installed in a terminal device or to be part of a terminal device in whole or in part. WE reserves the right, at its own discretion, to make corrections, improvements, adjustments or other changes to the EVB or to discontinue the EVB. The EVB is not intended for use in devices and applications for which a higher safety and reliability standard is prescribed. It is also not approved for use in safety-relevant applications or where personal injury or fatal consequences must be expected in the event of failure.

Operation of the EVB

The EVB may only be operated within the specifications and environmental parameters recommended by WE, as described in the instructions for use. Exceeding the specified parameters (including, but not limited to, input and output voltage, current, power, and ambient conditions) may result in damage to property. If you have questions about these electrical parameters, please contact WE at (regulatory-compliance@we-online.com) prior to connecting peripheral electronics (including the input voltage and intended loads). Any load outside a certain power range may lead to negative consequences, including, but not limited to, unintended or inaccurate evaluations or possibly permanent damage to the EVB or the electronics connected to it. Please ensure that the appropriate safety precautions are taken when working with the EVB, as serious injuries, including severe or even fatal injuries from electric shock or electric burns, may occur if you do not follow the appropriate safety precautions. Under no circumstances should the EVB be touched while live. When the EVB is connected to a power source, some of its components are electrically charged and/or have temperatures above 50 °C. This condition also applies for a short time after disconnecting from the supply voltage until the capacitors are completely discharged and hot components have cooled down. These components include connectors, linear regulators, switching transistors, heat sinks, resistors, diodes, inductors and other components, which can be identified from the documentation in the instructions for use. As with all electronic lab work, only qualified persons with knowledge of electronic performance evaluation, measurement and diagnostic tools, should use the EVB.

Hazards and warnings

Before putting the EVB into operation, please read the instructions for use and especially the various hazards and warnings described therein. The instructions for use contain important safety information on voltages and temperatures. You take full responsibility and liability for the proper and safe handling of the EVB. You agree to comply with all safety requirements, rules and regulations related to the use of the EVB. You also take full responsibility for: (1) establishing safeguards to ensure that the use of the EVB does not cause damage to property, personal injury or death, even if the EVB does not function as described, intended or expected, (2) the test setup in which the EVB is integrated, all safety requirements, rules and regulations and also that no damage to property, personal injury or other hazardous situation occurs even if the EVB fails, and (3) ensuring the safety of all activities performed by you or your employees when using the EVB. In particular, this means that the technical rules VDE [German Electrical Engineering, Electronic and Information Technology Association] 0105-100 and BGI [German trade association information] 891 (or corresponding applicable safety regulations outside Germany) for the operation of electrical test setups must be observed, the test area is protected against unauthorized access or accidental touching, current limitations, and emergency stop mechanisms are functional and test setups are never operated unattended. If you have any questions about the safe use of the EVB, please contact WE at regulatory-compliance@we-online.com for more information.

Your responsibility with regard to the applicable laws

- You are responsible for being sufficiently informed about and complying with all international, national, state and local applicable laws, rules and regulations that apply to the handling or use of the EVB by you or your employees.
- The EVB generates, uses and radiates radio frequency energy, but has not been tested for conformity with the limits applicable to the product category, which are applicable according to the European Union regulations for protection against radio frequency interference. Operation of the EVB may cause interference with radio communication. In this case, the costs incurred for necessary measures to remedy the interference are to be borne by the user.

As the EVB is not a finished product, it may not comply with applicable regulatory, safety or certification standards that are normally as-

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