XENSIV™ PAS CO2 mini-board description and application hints

About this document

This application note should enable the user to integrate the XENSIV™ PAS CO2 mini-board into a system.

Scope and purpose

This application note will give a complete overview of the XENSIV™ PAS CO2 mini-board.

Intended audience

Application engineers, system engineers and system architects of an application where the XENSIV™ PAS CO2 mini-board will be integrated.

Order information

SP005577475 (XENSIV™ PAS 1.0 mini-board)

SP006037150 (XENSIV™ PAS 1.5 mini-board)

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1 Introduction to XENSIV™ PAS CO2 mini-board

The XENSIV™ PAS CO2 is a real CO_2 sensor that improves on the size and performance of existing CO_2 sensor solutions. The sensor's high accuracy level makes it the right choice for indoor air-quality monitoring stations, HVAC systems and IoT applications. To ensure successful evaluation of the sensor, multiple evaluation platforms are offered. Among them, the XENSIV™ PAS CO2 Sensor2Go kit has been covered in a separate application note. The second evaluation platform is called the XENSIV™ PAS CO2 mini-board, which is covered in this application note.

The XENSIV™ PAS CO2 mini-board comes with the following features:

- Easy connection to the application board with a standard 2.54 mm pin header. There is no need to go through a reflow process during the evaluation phase.
- Access to all signals and functions of the product.
- Compatible with a combined PCB layout, supporting reflow assembly for later use.
- Compatible with XENSIV™ PAS CO2 Sensor2Go kit for easy lab evaluation.

We encourage use of the combi-layout feature to evaluate the application fit of the sensor. The footprint of the original PAS should already be envisioned during the design-in phase. The evaluation can be carried out with the mini-board and, after primary evaluation, the XENSIV™ PAS CO2 can be used directly for the final product. The example combi-layout is shown in Figure 1. The reference Altium file can be downloaded from the download section of the product page.

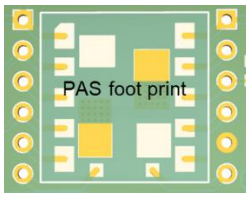

Figure 1 Example combi-layout of XENSIV™ PAS CO2 mini-board

The XENSIV™ PAS CO2 mini-board can be connected using two methods:

- **Method 1:** Connect with the XENSIV™ PAS CO2 Sensor2Go kit

The Sensor2Go kit is offered as a combination of a motherboard with a power management circuit, and a mini-board as shown in Figure 2. The Sensor2Go kit is powered via USB, and 5 V from the USB is stepped down to 3.3 V and stepped up to 12 V to ensure appropriate input voltage for the XENSIV™ PAS CO2. The Sensor2Go kit also comes with a user-friendly GUI, which can be downloaded from Infineon Toolbox.

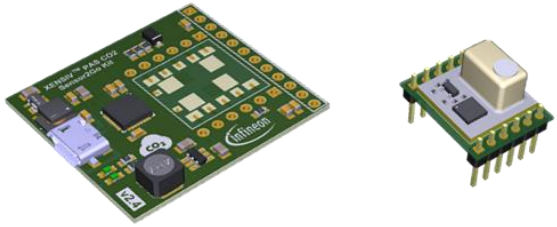

Figure 2 The connection between the Sensor2Go kit and the mini-board

- **Method 2:** Connect with an external microcontroller separately

The mini-board can also be treated as an actual XENSIV™ PAS CO2 with a connector. Therefore, a standalone mini-board needs to be powered separately. The relevant pins of the sensor are extended to a connector pin set, as shown in Figure 3.

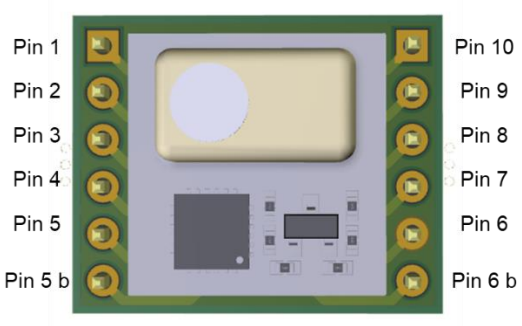

Figure 3 Top view of the XENSIV™ PAS CO2 mini-board

The relevant pin description of the XENSIV™ PAS CO2 mini-board is identical to the standalone sample, shown in the following table.

Pin	Symbol	Type	Description
1	VDD3.3	Power supply (3.3 V)	3.3 V digital power supply
2	RX	Input	UART receiver pin
3	SCL	Input/Output	I^2C clock pin (3.3 V domain)
4	TX/SDA	Input/Output	UART transmitter pin (3.3 V domain)/I^2C data pin (3.3 V domain)
5	PWM_DIS	Input	PWM disable input pin (3.3 V domain)
5b	SWD	N/A	Do not connect
6b	SWCLK	N/A	Do not connect
6	GND	Ground	Ground
7	INT	Output	Interrupt output pin (3.3 V domain)
8	PSEL	Input	Communication interface select input pin (3.3 V domain)
9	PWM	Output	PWM output pin (3.3 V domain)
10	VDD12 / VDD5*	Power supply (12 V / 5V*)	12 V / 5V* power supply for the IR emitter

Note: Before performing the evaluation, it is recommended to perform Forced Compensation (FC) or enable Automatic Baseline Offset Correction (ABOC).

*Is referring to XENSIV™ PAS CO2 Gen 1.5 which is using 5 V for the emitter instead of the 12 V compared to XENSIV™ PAS CO2 Gen 1.

2 Example connection with the PSoC® 6 WiFi-BT Pioneer Kit

The mini-board can be connected to a PSoC® 6 microcontroller to investigate the application fit of the XENSIV™ PAS CO2. In this example, the mini-board has been connected with the PSoC® 6 WiFi-BT Pioneer Kit. The PSoC® 6 microcontroller contains a dual-CPU architecture, with both CPUs on a single chip. It has an ARM® Cortex®-M4 for high-performance tasks and an ARM® Cortex®-M0+ for low-power tasks. With security built in, your IoT system is protected.

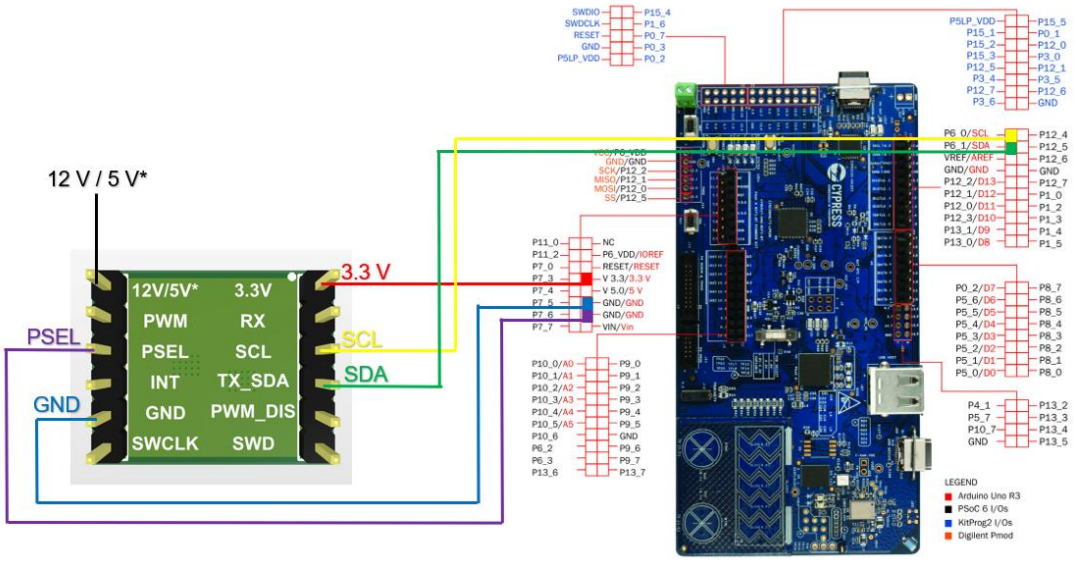

Figure 4 XENSIV™ PAS CO2 mini-board connected to the PSoC® 6 WiFi-BT Pioneer Kit

Mini-board pin	Mini-board signal	PSoC®6 WiFi-BT Pioneer Kit signal	Comment
1	VDD3.3	V 3.3	3.3 V digital power supply
2	RX	–	Not connected
3	SCL	P6_0/SCL	I²C clock pin (3.3 V domain)
4	TX_SDA	P6_1/SDA	I²C data pin (3.3 V domain)
5	PWM_DIS	–	Not connected
5b	SWD	–	Not connected
6b	SWCLK	–	Not connected
6	GND	GND	Ground
7	INT	–	Not connected
8	PSEL	GND	Ground
9	PWM	–	Not connected
10	VDD12 / VDD5*	–	External 12 V / 5 V* power supply

Further details on programming can be found in a separate application note, “Programming guide for XENSIV™ PAS CO2”.

*Is referring to XENSIV™ PAS CO2 Gen 1.5 which is using 5 V for the emitter instead of the 12 V compared to XENSIV™ PAS CO2 Gen 1.

Revision history

Document version	Date of release	Description of changes
V1.0	02.06.2021	Creation
V1.1	26.08.2021	Updated notes
V1.2	01.03.2024	Added XENSIV™ PAS CO2 Gen 1.5 relevant information

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