

WisNode Map products are now under WisGate Network Coverage Solutions. View the updated category.

[PRODUCT CATEGORIES](#)[WISBLOCK](#)[RAK1906](#)[DATASHEET](#)

RAK1906 WisBlock Environmental Sensor Module Datasheet

Overview

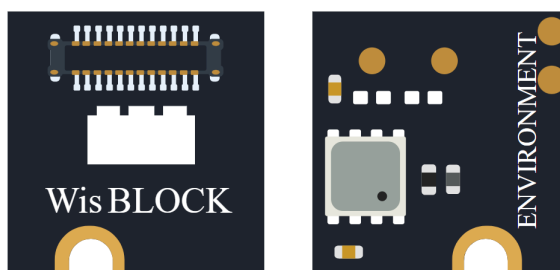


Figure 1: RAK1906 WisBlock Environmental Sensor

Description

The RAK1906 WisBlock Environmental Sensor Module, part of the RAK WisBlock Sensor series, is a 4-in-1 digital sensor board that comprises gas, humidity pressure, and temperature sensor, based on the Bosch® BME680 module. The RAK1906 is ideal for applications such as indoor air quality, home automation, and building IoT solutions.

Features

- **Sensor specifications**

- Voltage supply: 3.3 V
- Current consumption: 0.15 uA to 350 uA
- Chipset: BOSCH BME680
- Temperature range: -40 °C to 85 °C
- Humidity range: 0 to 100%
- Pressure range: 300 hPa to 1100 hPa
- Gas sensor response time < 1 sec
- Sensor outputs can be used with the [Bosch BSEC library](#)  algorithm to calculate the IAQ (Indoor Air Quality) index

- **Size**
 - 10 × 10 mm

Specifications

Overview

Mounting

Figure 2 shows the mounting mechanism of the RAK12001 module on a [WisBlock Base](#) board. The RAK12001 module can be mounted on the slots: **A, B, C, D, E, & F**.

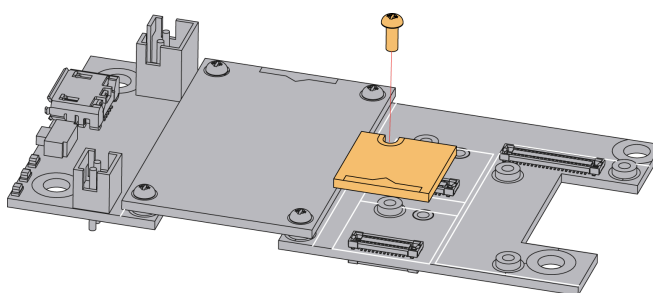


Figure 2: RAK1906 WisBlock Environmental Sensor Mounting

Hardware

The hardware specification is categorized into six parts. It shows the chipset of the module and discusses the pinouts, sensors, and the corresponding functions and diagrams. It also covers the electrical and mechanical parameters that include the tabular data of the functionalities and standard values of the RAK1906 WisBlock Environmental Sensor Module.

Chipset

Vendor	Part Number
BOSCH	BME680

Pin Definition

The RAK1906 WisBlock Environmental Sensor Module comprises a standard WisBlock connector. The WisBlock connector allows the RAK1906 module to be mounted to a WisBlock Base board. The pin order of the connector and the pinout definition is shown in Figure 3.

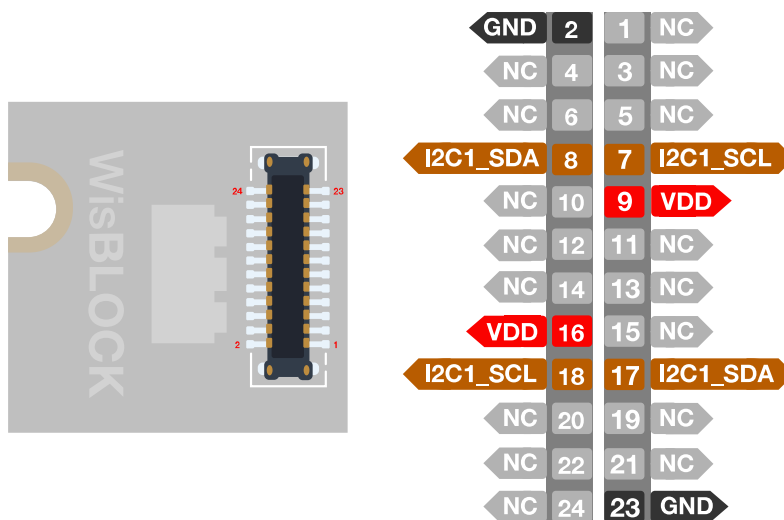


Figure 3: RAK1906 WisBlock Environmental Sensor Pinout

NOTE

Only the **I2C** related pin, **VDD**, and **GND** are connected to this module.

If a 24-pin WisBlock Sensor connector is used, the IO used for the output pulse depends on what slot the module is plugged in. The following table shows the default IO used for different slots:

SLOT A	SLOT B	SLOT C	SLOT D	SLOT E	SLOT F
WB_IO1	WB_IO2	WB_IO3	WB_IO5	WB_IO4	WB_IO6

Sensors

Temperature Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Temperature Range	T_A	Operational	-40	25	85	°C
Supply Current	$I_{DD,T}$	1 Hz Forced Mode, Temperature Measurement Only		1.0		μA
Absolute Accuracy	$A_{T,25}$	25 °C		±0.5		°C

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Temperature	$A_{T,full}$	0-65 °C		±1.0		°C
Output Resolution	R_T	API Output Resolution		0.01		°C

Humidity Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Range			-40	25	85	°C
			0		100	% r.H.
Full Accuracy Range			0		65	°C
			10		90	% r.H.
Supply Current	$I_{DD,H}$	1 Hz Forced Mode, Temperature and Humidity Measurement		2.1	2.8	μA
Absolute Accuracy	A_h	20-80% r.H., 25 °C, including hysteresis		±3		% r.H.

Pressure Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Temperature Range	T_A	Operational	-40	25	85	°C
		Full Accuracy	0		65	
Operating Pressure range	P	Full Accuracy	300		1100	hPa

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Supply Current	$I_{DD,LP}$	1 Hz Forced Mode, Pressure, and Temperature, Lowest Power		3.1	4.2	μA
Temperature Coefficient Of Offset	TCO_P	25-40 °C, 900 hPa		± 1.3		Pa/K
				± 10.9		cm/K
Absolute Accuracy Pressure	$A_{p,full}$	300-1100 hPa 0-65 °C		± 0.6		hPa

IAQ algorithm



NOTE

The IAQ is not calculated by the Bosch BME680 directly. The measured sensor values need to be send to the [Bosch BSEC library](#)  algorithm to calculate the IAQ (Indoor Air Quality) index.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Accuracy Status	AX_{IAQ}	Android Compatible	0		3	
IAQ Resolution	IAQ_{rs}			1		
IAQ Range	IAQ_{rg}		0		500	
Sensor-to-sensor Deviation	IAQ_{S2S}	All Operation Modes		$\pm 15\%$ ± 15		
Durability To Siloxanes	IAQ_{S2S}	Sensor-to-sensor Deviation		$\pm 15\%$ ± 15		

Parameter	Symbol	Condition	Min	Typ	Max	Unit
	IAQ _{drift}	Drift at Low & High Concentrations		±1% ±4		

Electrical Characteristics

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
V _{DD}	Power supply for the module	1.71	3.3	3.6	V
I _{sleep}	Sleep current	-	0.15	-	uA
I _{DD}	Humidity Measure current	-	340	-	uA
I _{DD}	Pressure Measure current	-	714	-	uA
I _{DD}	Temperature Measure current	-	350	-	uA

Mechanical Characteristics

Board Dimensions

Figure 4 shows the dimensions and the mechanic drawing of the RAK1906 module.

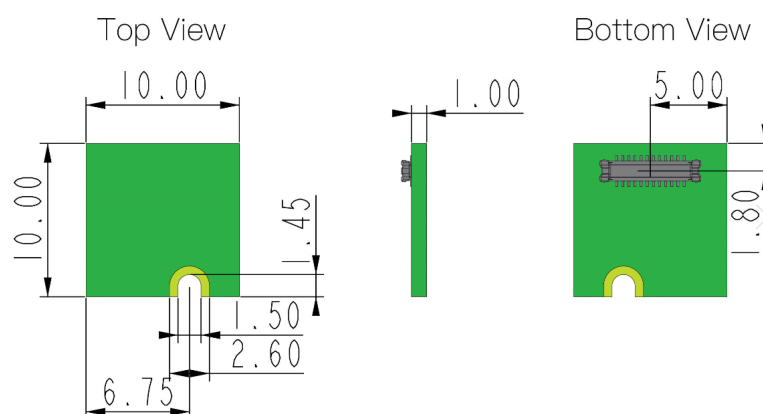


Figure 4: RAK1906 WisBlock Environmental Sensor mechanic dimensions

WisConnector PCB Layout

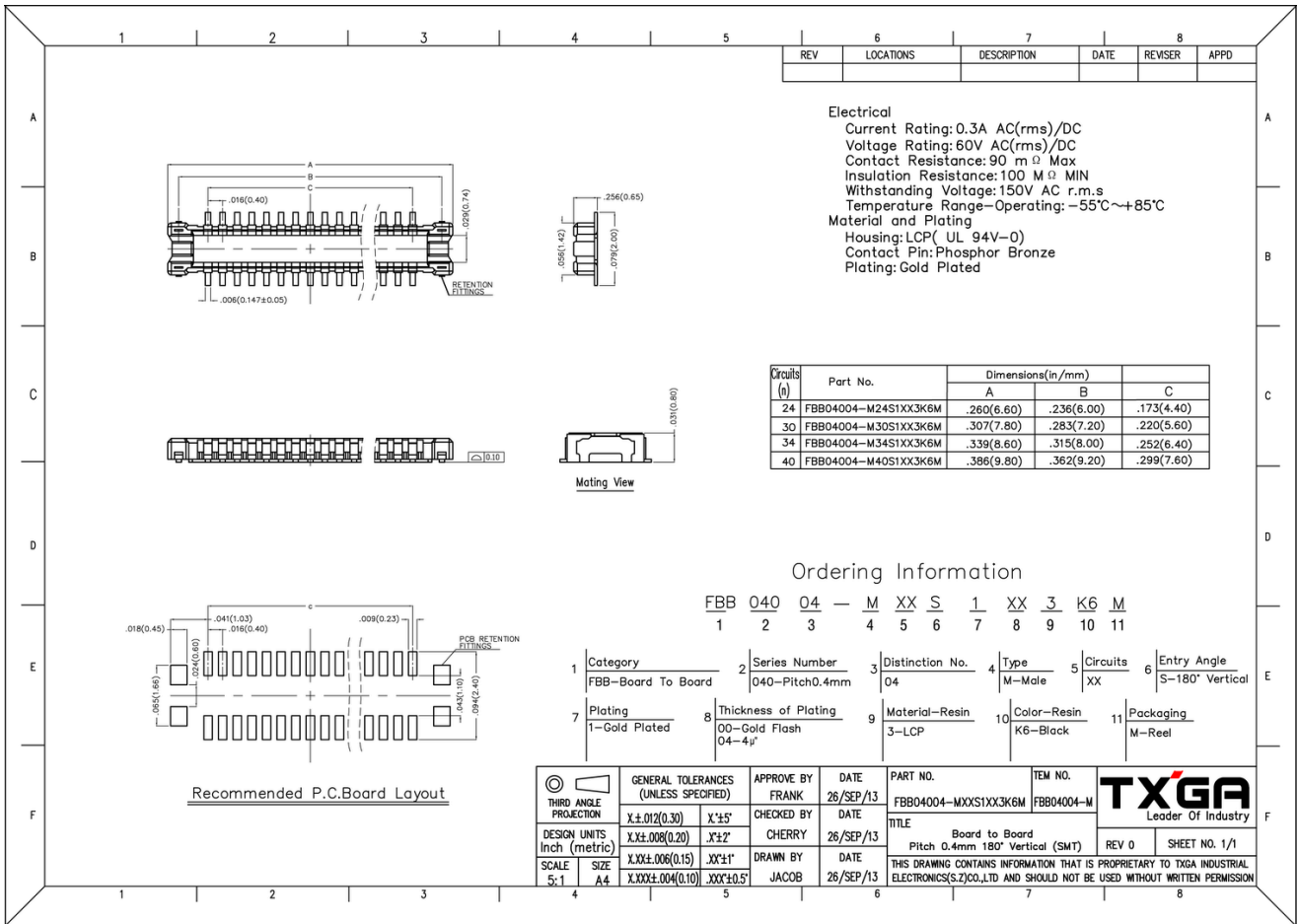


Figure 5: WisConnector PCB footprint and recommendations

Schematic Diagram

Figure 6 shows the schematic of the RAK1906 module.

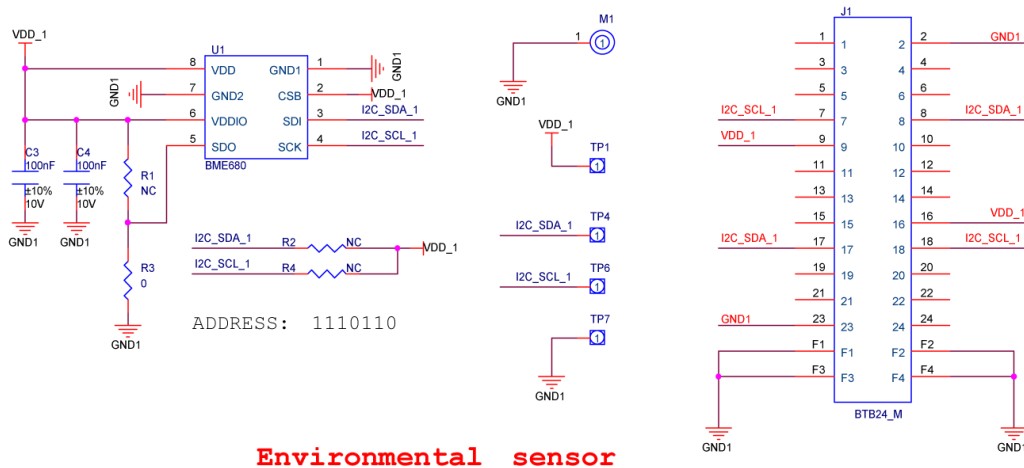


Figure 6: RAK1906 WisBlock Environmental Sensor schematics



LoRa® is a registered trademark or service mark of Semtech Corporation or its affiliates. LoRaWAN® is a licensed mark.



Copyright © 2014-2024 RAKwireless Technology Limited.
All rights reserved.

