

RAK1902 WisBlock Barometer Pressure Sensor Module Datasheet

Overview

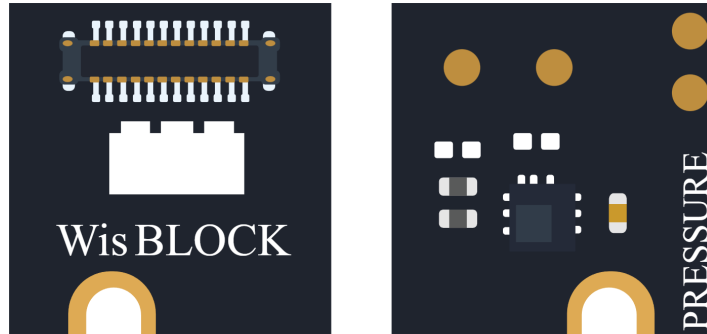


Figure 1: RAK1902 WisBlock Sensor

Description

The RAK1902 WisBlock Barometer Pressure Sensor Module, part of the RAK Wireless WisBlock series, is an ultra-compact piezo-resistive pressure sensor that functions as a digital barometer with an I2C interface. The sensing element, which detects absolute pressure, consists of a suspended membrane manufactured through a delicate process developed by ST®. The pressure measurement covers the range from 260 hPa to 1260 hPa and the temperature measurement covers the range from -40 °C to 85 °C. Measurements accuracy is ± 0.1 hPa for pressure and ± 1.5 °C for temperature.

Features

- **Pressure range:** 260-1260 hPa
- **Pressure sensor accuracy:** ± 0.1 hPa
- **Temperature range:** -40 °C to +85 °C
- **Temperature sensor accuracy:** ± 1.5 °C
- **Voltage Supply:** 3.3 V
- **Current Consumption:** 1 uA to 12 uA
- **Chipset:** ST LPS22HB
- **Module Size:** 10 x 10 mm

Specifications

Overview

Mounting

Figure 2 shows the mounting mechanism of the RAK1902 module on a [WisBlock Base](#) board. The RAK1902 module can be mounted on the slots: **A, B, C, D, E, & F**.

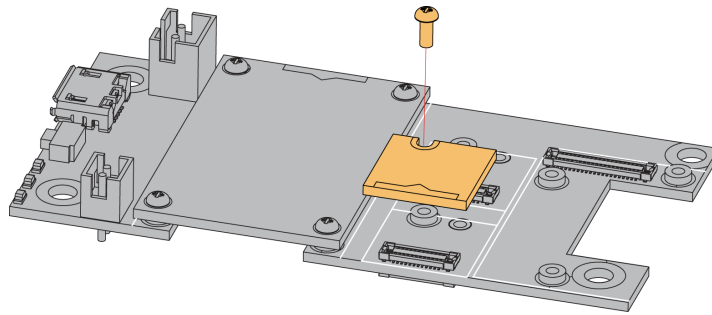


Figure 2: RAK1902 WisBlock Sensor Mounting

Hardware

The hardware specification is categorized into four 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 RAK1902 WisBlock Barometer Pressure Sensor.

Chipset

Vendor	Part number
ST	LPS22HB

Pin Definition

The RAK1902 WisBlock Barometer Pressure Sensor Module comprises a standard WisBlock connector. The WisBlock connector allows the RAK1902 module to be mounted to a WisBlock Base board. The pin order of the connector and the pinout definition is shown in **Figure 3**.

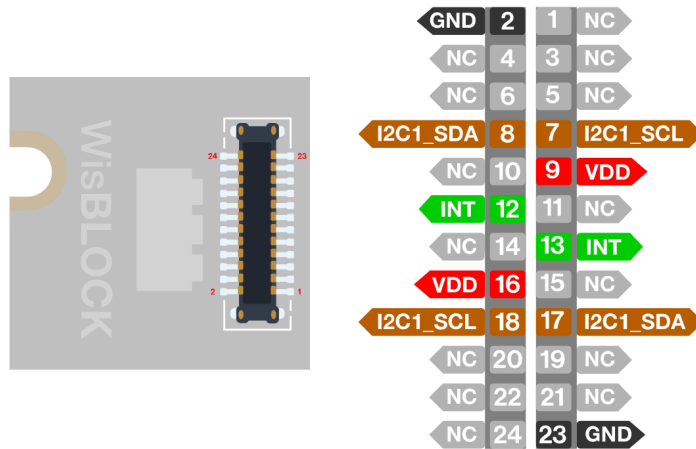


Figure 3: RAK1902 WisBlock Sensor connector pinout

NOTE:

Only the **I2C** related pins, **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

Pressure Sensor

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
P_{Top}	Operating Temperature Range		-40		+85	°C
$P_{T_{full}}$	Full Accuracy Temperature Range		0		+65	°C
P_{op}	Operating Pressure Range		260		1260	hPa
P_{bits}	Pressure Output Data			24		bits
P_{sens}	Pressure Sensitivity			4096		LSB/hPa
P_{AccRel}	Relative Accuracy over Pressure	P = 800 – 1100 hPa T = 25 °C		±0.1		hPa
P_{AccT}	Absolute Accuracy over Temperature	$P_{op} = 0$ to 65 °C after OPC $P_{op} = 0$ to 65 °C no OPC		±0.1 ±1		hPa
P_{noise}	RMS Pressure Sensing Noise	with embedded filtering		0.0075		hPa RMS
ODR_{Pres}	Pressure Output Data Rate			1/10/25/50/75		Hz

Temperature Sensor

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
T_{op}	Operating Temperature Range		-40		+85	°C
T_{sens}	Temperature Sensitivity			100		LSB/°C
T_{acc}	Temperature Absolute Accuracy	T = 0 to 65 °C		±1.5		°C
ODR_T	Output Temperature Data Rate			1 10 25 50 75		Hz

Electrical Characteristics

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
V_{DD}	Power supply for the module	1.7	3.3	3.6	V
I_{shut}	shutdown current	-	1	-	uA
I_{DD}	@ ODR 1 Hz LC_EN bit = 0	-	12	-	uA
I_{DD}	@ ODR 1 Hz LC_EN bit = 1	-	3	-	uA

Mechanical Characteristics

Board Dimensions

Figure 3 shows the dimensions and the mechanic drawing of the RAK1902 module.

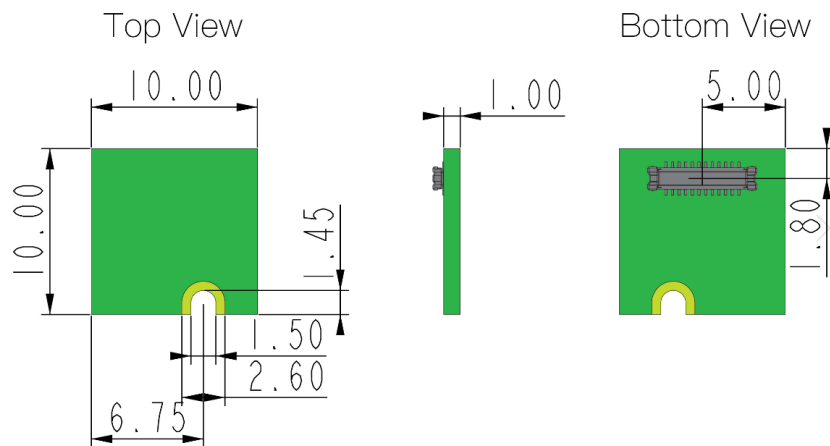


Figure 4: RAK1902 WisBlock Sensor Mechanic Drawing

WisConnector PCB Layout

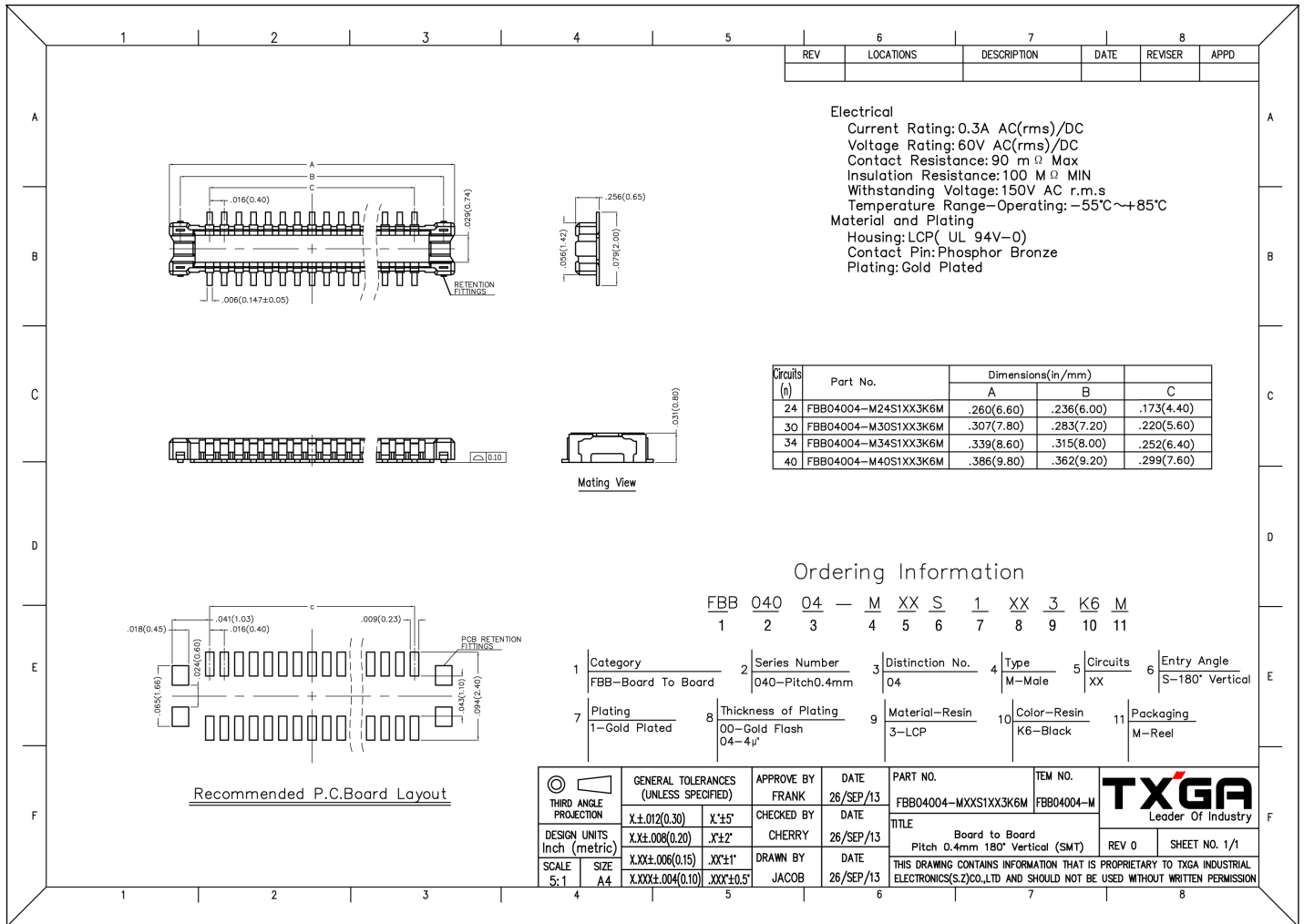


Figure 5: WisConnector PCB footprint and recommendations

Schematic Diagram

Figure 5 shows the schematic of the RAK1902 module.

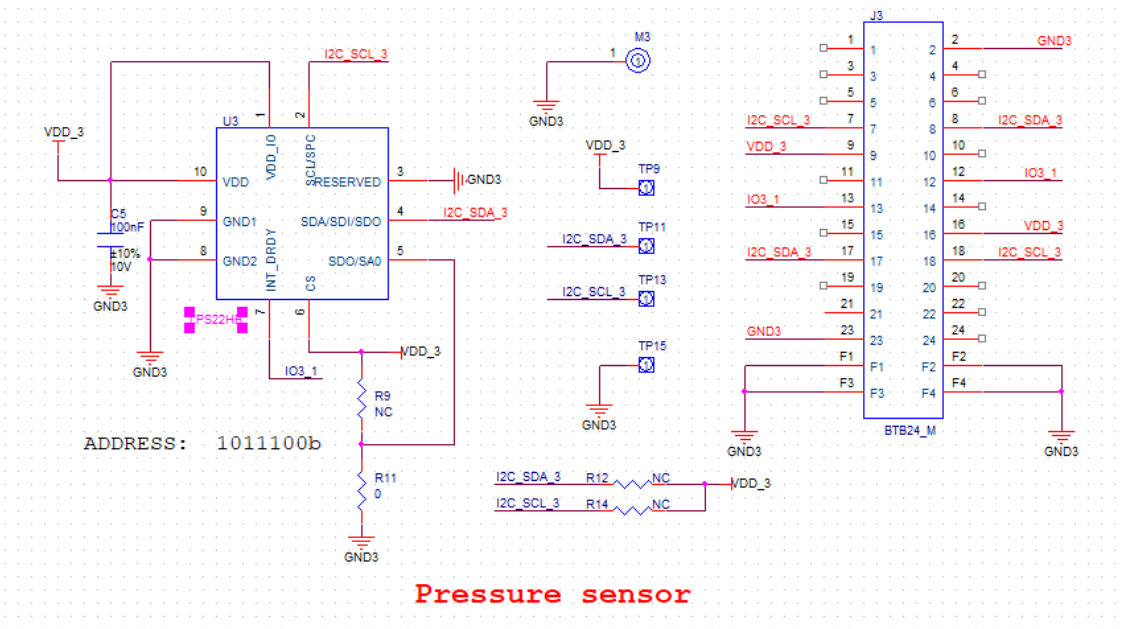


Figure 6: RAK1902 WisBlock Sensor schematics