

# RAK1904 WisBlock 3-Axis Acceleration Sensor Module Datasheet

## Overview

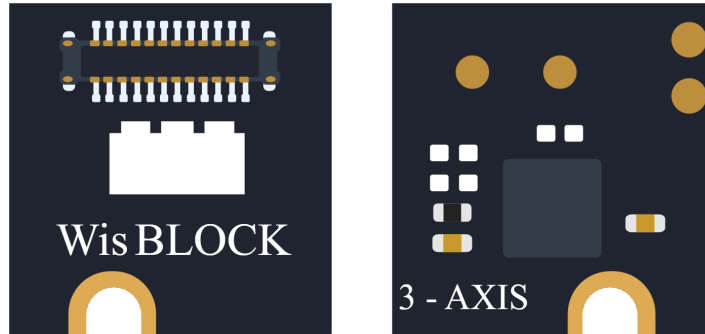


Figure 1: RAK1904 WisBlock Sensor Mounting

## Description

RAK1904 is a WisBlock Sensor that extends the WisBlock system with an ST LIS3DH 3-axis acceleration sensor. A ready-to-use SW library and tutorial make it easy to build up a motion detection and acceleration data acquisition system. It has an ultra-low-power high-performance three-axis linear accelerometer with a digital I2C interface. The device features ultra-low-power operational modes that allow advanced power saving and smart embedded functions.

The accelerometer of the RAK1904 module can be dynamically configured to work in the scales of  $\pm 2g/\pm 4g/\pm 8g/\pm 16g$  and is capable of measuring accelerations with output data rates from 1 Hz to 5.3 kHz.

## Features

- **User selectable scales:**  $\pm 2g/\pm 4g/\pm 8g/\pm 16g$
- **Data acquisition rates:** from 1 Hz to 5.3 kHz
- **Voltage Supply:** 3.3 V
- **Current Consumption:** 0.5  $\mu$ A to 11  $\mu$ A
- **Chipset:** ST LIS3DH
- **Module size:** 10 x 10 mm

## Specifications

### Overview

### Mounting

Figure 2 shows the mounting mechanism of the RAK1904 module on a [WisBlock Base](#) board. The RAK1904 module can be mounted on the slots: **A, C, D, E, & F**.

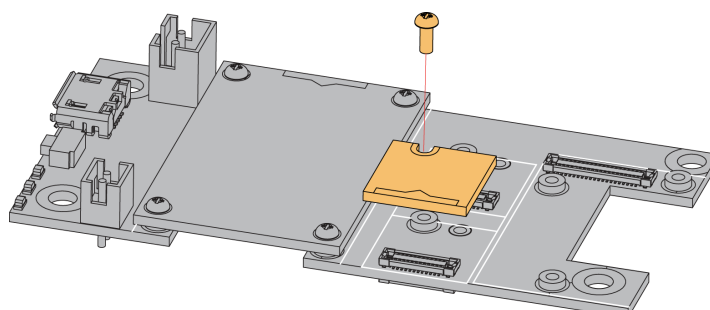


Figure 2: RAK1904 WisBlock Sensor Mounting

## 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 RAK1904 WisBlock 3-axis Acceleration Sensor Module.

## Chipset

Vendor	Part number
ST	LIS3DH

## Pin Definition

The RAK1904 WisBlock 3-axis Acceleration Sensor Module comprises a standard WisBlock connector. The WisBlock connector allows the RAK1904 module to be mounted to a WisBlock Base board. The pin order of the connector and the pinout definition is shown in **Figure 3**.

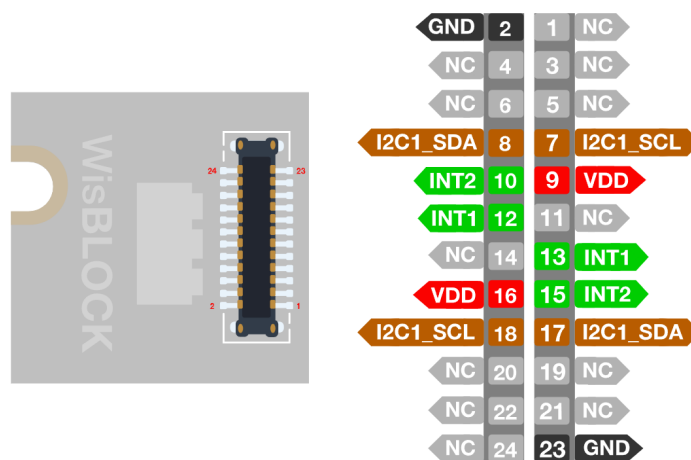


Figure 3: RAK1904 WisBlock Sensor Pinout Diagram

**NOTE:**

- Only the I2C related pins, interrupt pins, VDD, and GND are connected to this module.
- Pins 10, 12, 13, and 15 are connected to the interrupt pins of LIS3DH, refer to the datasheet of LIS3DH for details.

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

**NOTE:**

If there are other sensor modules connected on the base other than RAK1904 and are using the configurable 3V3\_S voltage source, you cannot use SLOT B since 3V3\_S is controlled via WB\_IO2 pin.

## Sensors

### Acceleration Sensor

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
FS	Measurement Range	FS bit set to 00		±2.0		g
		FS bit set to 01		±4.0		g
		FS bit set to 10		±8.0		g
		FS bit set to 10		±16.0		g
So	Sensitivity	FS bit set to 00 High-resolution mode		1		mg/digit
		FS bit set to 00 Normal mode		4		mg/digit
		FS bit set to 00 Low-power mode		16		mg/digit
		FS bit set to 01 High-resolution mode		2		mg/digit
		FS bit set to 01 Normal mode		8		mg/digit
		FS bit set to 01 Low-power mode		32		mg/digit
		FS bit set to 10 High-resolution mode		4		mg/digit
		FS bit set to 10 Normal mode		16		mg/digit
		FS bit set to 10 Low-power mode		64		mg/digit
		FS bit set to 11 High-resolution mode		12		mg/digit
		FS bit set to 11 Normal mode		48		mg/digit
		FS bit set to 11 Low-power mode		192		mg/digit

## 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
$I_{pdn}$	Power-down current	-	0.5	-	uA
$I_{DD}$	@50 Hz	-	11	-	uA
$I_{DD}$	@1 Hz	-	2	-	uA

## Mechanical Characteristics

### Board Dimensions

Figure 3 shows the dimensions and the mechanic drawing of the RAK1904 module.

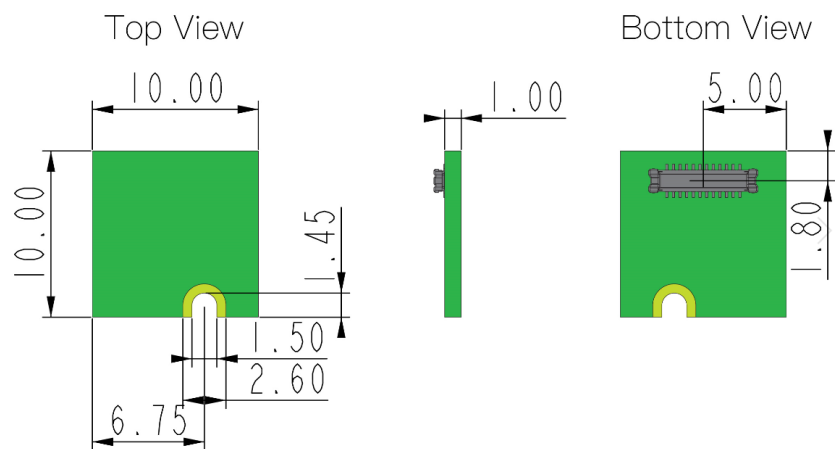


Figure 4: RAK1904 WisBlock Sensor Mechanic Drawing

### WisConnector PCB Layout

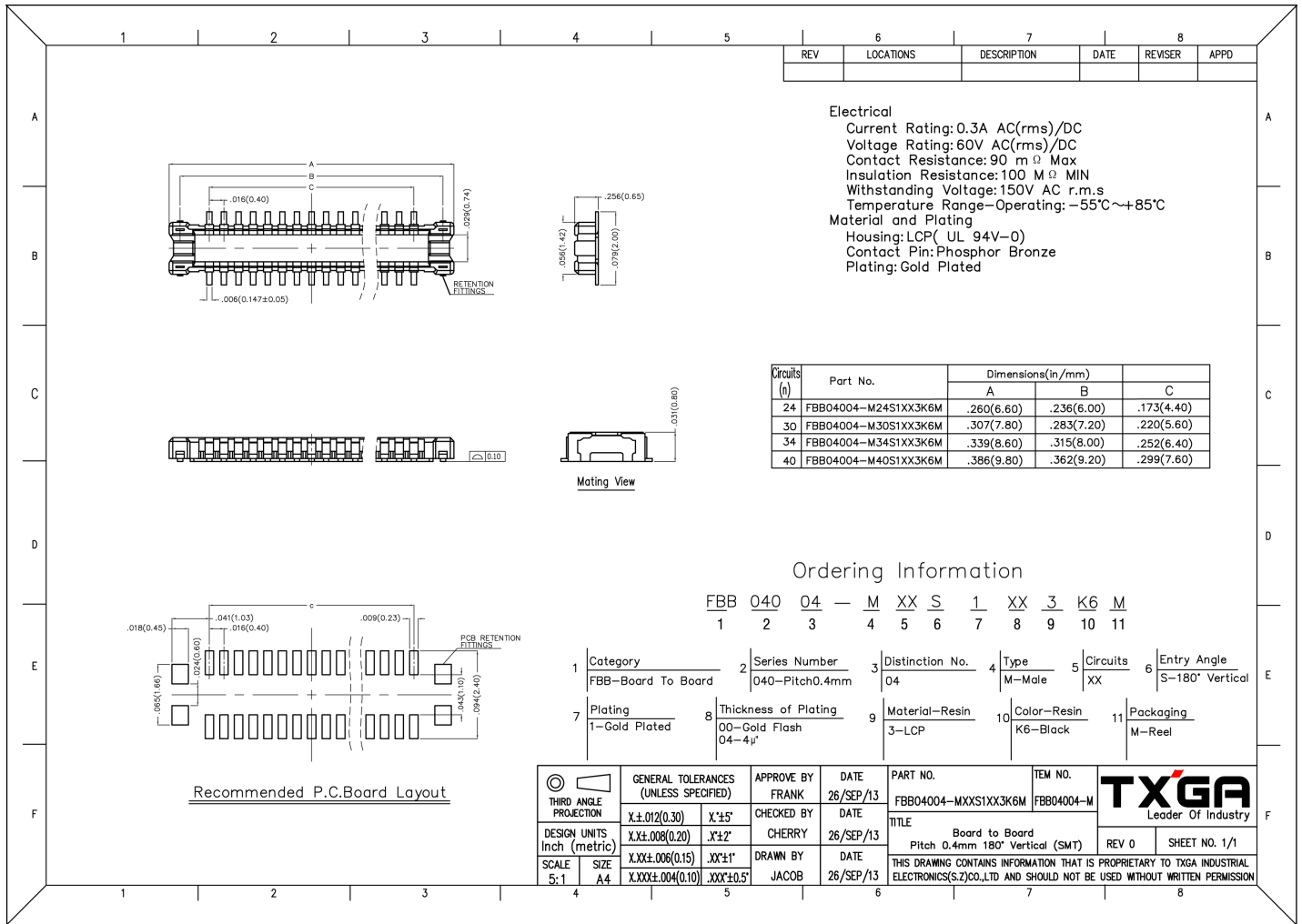


Figure 5: WisConnector PCB footprint and recommendations

## Schematic Diagram

Figure 5 shows the schematic of the RAK1904 module.

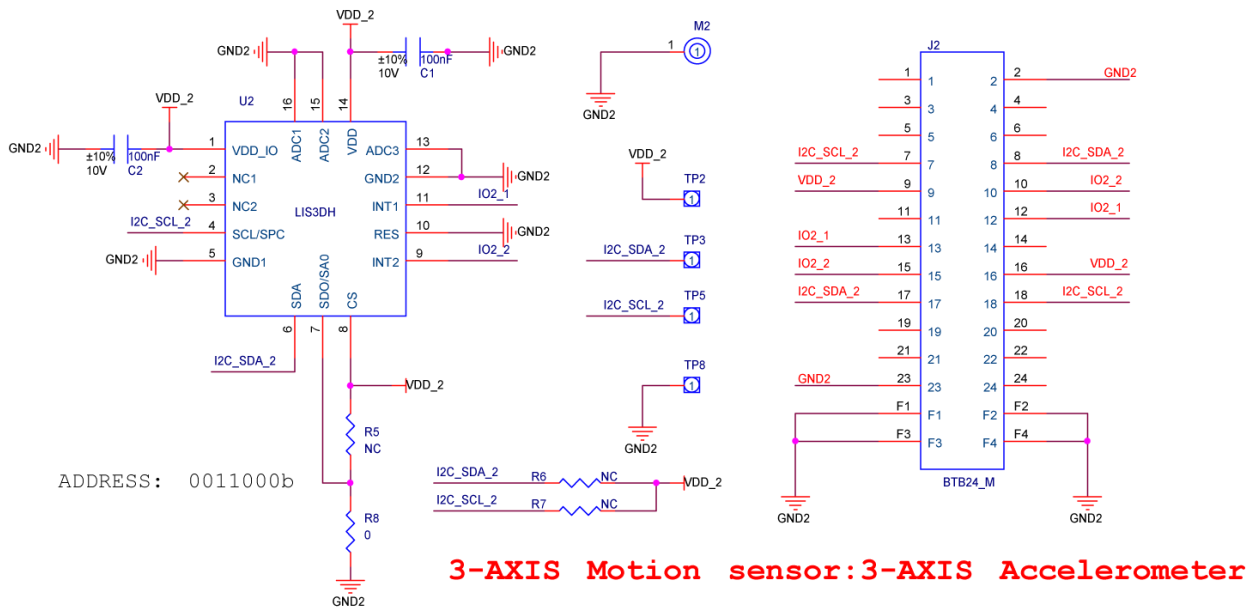


Figure 6: RAK1904 WisBlock Sensor schematics