

RAK1905 WisBlock 9-Axis Sensor Module Datasheet

Overview

Description

RAK1905 is a 3-axis gyroscope, 3-axis accelerometer, and 3-axis magnetometer, part of the RAKwireless WisBlock Sensor series. It is based on MPU-9250 from TDK and designed for 9-axis motion tracking. The data can be obtained via I2C interface.

Features

- Chipset: **TDK MPU-9250**
- Supply voltage: **3.3 V**
- Current consumption: **8 μ A - 2.7 mA**
- Accelerometer output: **± 2 g, ± 4 g, ± 8 g, and ± 16 g**
- Gyroscope output: **± 250 , ± 500 , ± 1000 , and ± 2000 $^{\circ}$ /sec**
- 16-bit ADCs
- Magnetometer full-scale measurement range: **± 4800 μ T**
- Digital Motion Processor (DMP)
- I2C Interface
- Module size: **10 mm x 10 mm**

Specifications

Overview

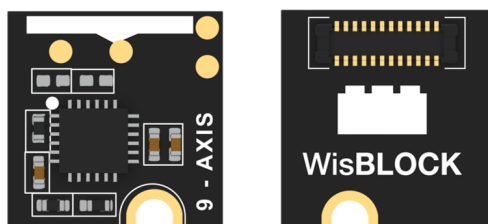


Figure 1: RAK1905 WisBlock 9-Axis Sensor Module top and bottom view

Mounting

Figure 2 shows the mounting mechanism of the RAK1905 module on a [WisBlock Base](#) board. The RAK1905 module can be mounted on the slots: **A, B, C, D, E, & F**.

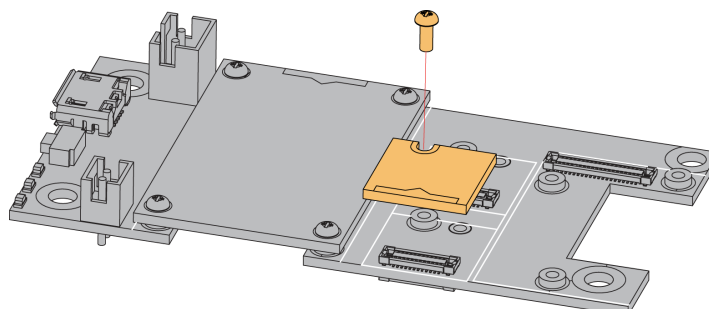


Figure 2: RAK1905 WisBlock 9-Axis Module mounting

Hardware

The hardware specification is categorized into five parts. It presents the chipset of the module and the pinouts and their corresponding functions and diagrams of the module. It also covers the electrical and mechanical characteristics that include the tabular data of the functionalities and standard values of the RAK1905 9-Axis Sensor Module.

Chipset

Vendor	Part Number
TDK	MPU-9250

Pin Definition

The RAK1905 9-Axis Sensor WisBlock Module comprises a standard WisBlock connector. The WisBlock connector allows the RAK1905 module to be mounted to a WisBlock Base board. The pin order of the connector and the pinout definition is shown in **Figure 3**.

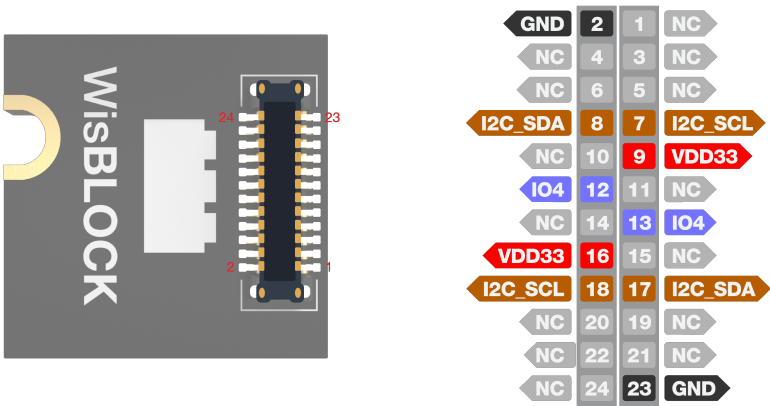



Figure 3: RAK1905 WisBlock 9-Axis Sensor Module pinout


 **NOTE**

If **I2C** related pins, **INT**, **VDD33**, and **GND** are connected to WisBlock Sensor connector.

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:

INT (Interrupt Pin)

SLOT A	SLOT B	SLOT C	SLOT D	SLOT E	SLOT F
IO1	IO2	IO3	IO5	IO4	IO6

 **NOTE:**

If there are other sensor modules connected on the base other than RAK1905 and are using the configurable 3V3_S voltage source, you cannot use SLOT B since 3V3_S is controlled via WB_IO2 pin.

Electrical Characteristics

Symbol	Description	Min.	Nom.	Max.	Unit
VDD	Power supply voltage	-	3.3	-	V
IDD	9-axis (no DMP), 1 kHz gyro ODR, 4 kHz accel ODR, 8 Hz mag. repetition rate	-	2.7	-	mA
IDDL	Full Chip Idle Mode supply current	-	8	-	uA

Mechanical Characteristics

Board Dimensions

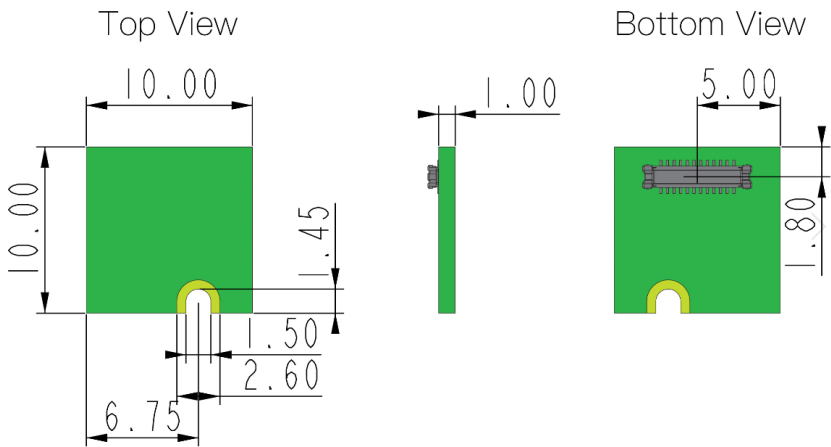


Figure 4: RAK1905 WisBlock 9-Axis Module mechanical drawing

WisBlock Connector PCB Layout

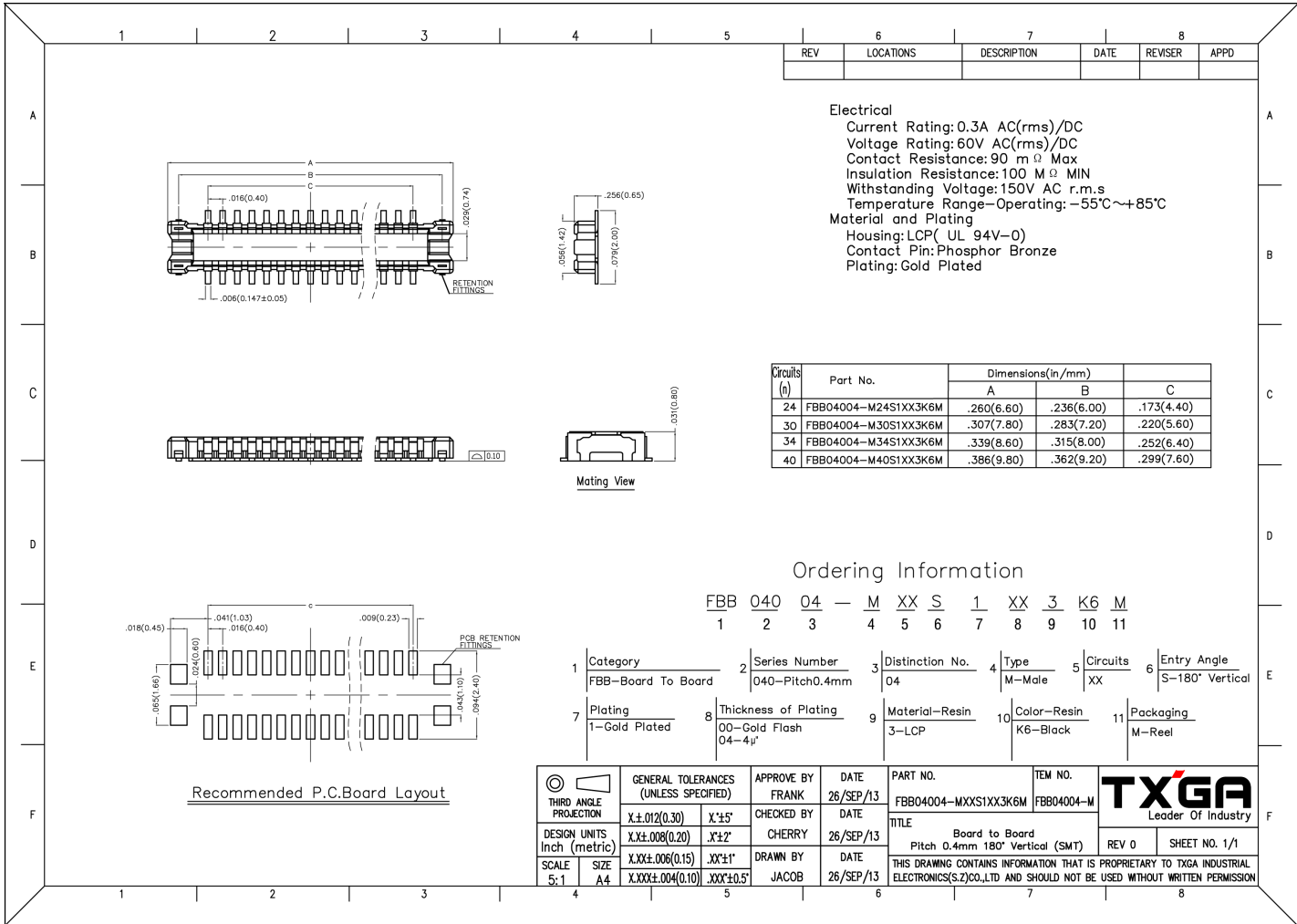


Figure 5: WisBlock Connector PCB footprint and recommendations

Schematic Diagram

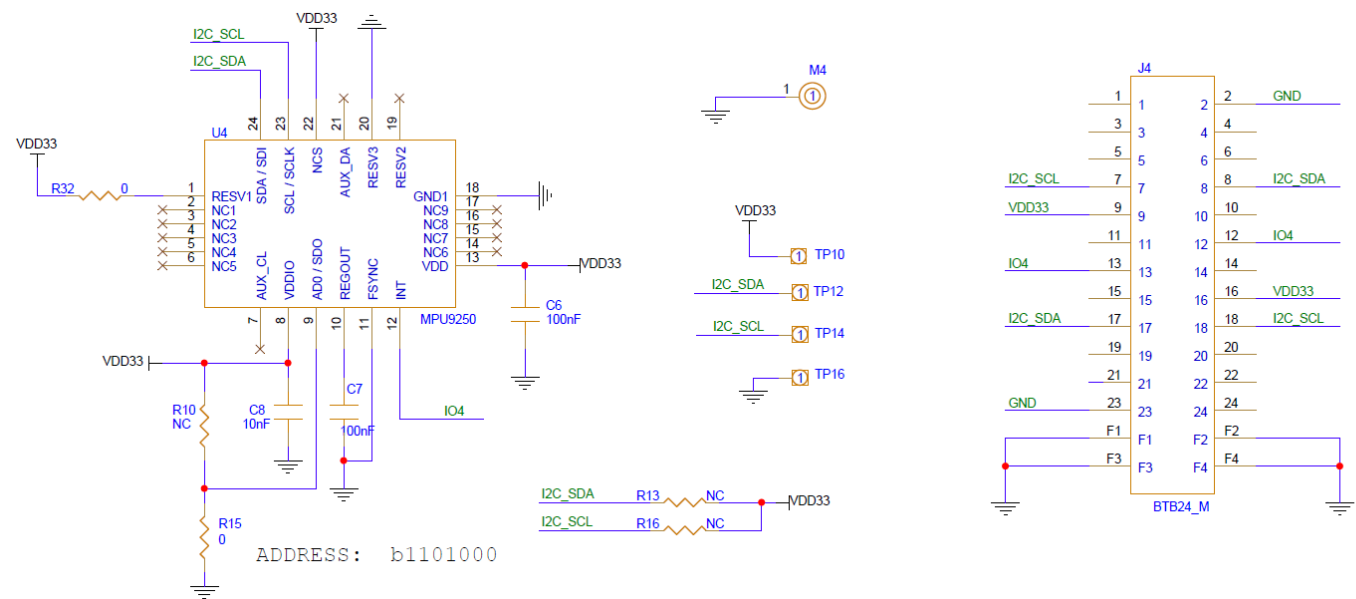


Figure 6: RAK1905 WisBlock 9-Axis Sensor Module schematic diagram

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