

# RAK11310 WisBlock LPWAN Module Datasheet

## Overview

### Description

**RAK11310** is a **WisBlock Core** module for the RAK hardware IoT platform **WisBlock**. It is powered by an RP2040 ARM microcontroller developed by the Raspberry Pi Foundation, combined with the SX1262 LoRa transceiver from Semtech. **RAK11310** can be programmed via the Arduino™ IDE, PlatformIO or MicroPython.

The RAK11310 WisBlock Core module has a RAK11300 LoRa stamp module in it together with a high-quality connector that is compatible with WisBlock Base boards. It allows an easy way to access the pins of the RAK11310 module in order to simplify the development of IoT devices.

The module complies with LoRaWAN 1.0.2 protocols, and also supports LoRa point-to-point communication.

The RF communication characteristic of the Lora module makes it suitable for a variety of applications in the IoT field such as home automation, sensor networks, building automation, personal area networks applications (health/fitness sensors, and monitors, etc.).

### Features

- Based on RAK11300
- Uses the RP2040 as the main processor
- Semtech SX1262 low power high range LoRa transceiver
- LoRaWAN 1.0.2 protocol stack
- **I/O ports:** UART/I2C/GPIO/USB
- Serial Wire Debug (SWD) interface
- **Module Size:** 20 x 30 mm
- **Supply Voltage:** 2.0 V ~ 3.6 V
- **Temperature Range:** -20 °C ~ 70 °C

## Specifications

### Overview

The overview covers the RAK11310 board overview and the mounting mechanics of the board into the baseboard.

### Board Overview

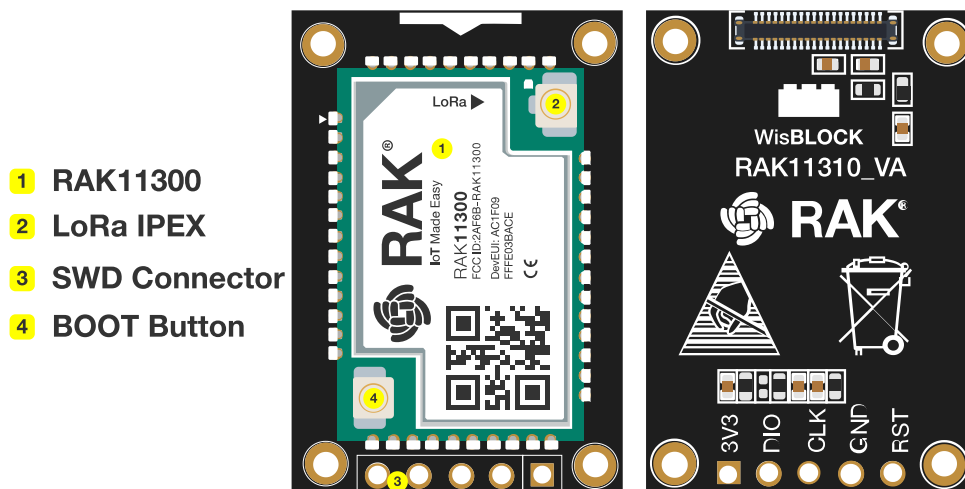


Figure 1: RAK11310 Overview

## Mounting Sketch

The RAK11310 module is designed to work with the RAK5005-O base board. **Figure 2** shows how a RAK11310 module should be mounted on top of the RAK5005-O.

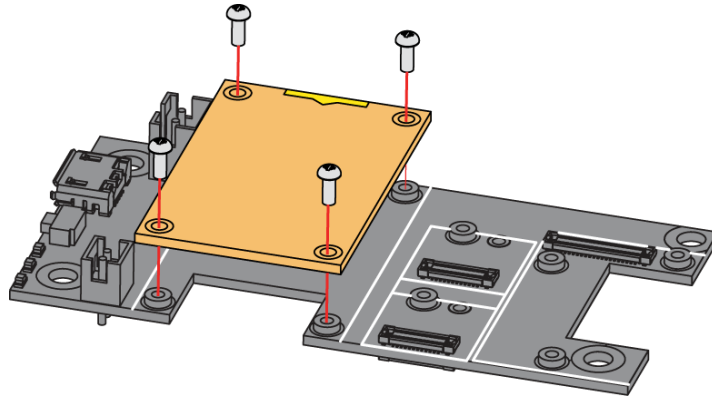


Figure 2: RAK11310 Mounting Sketch

## Hardware

The hardware specification is categorized into four parts. It covers the RF, electrical, and mechanical parameters, which include the tabular data of the functionalities and standard values. It also shows and discusses the diagram of the RAK11310 WisBlock LPWAN Module.

## RF Characteristics

The RAK11310 module supports the LoRaWAN bands, as shown in the table below. There are two types RAK11310 module: **RAK11310(L)** is for the low-frequency band regions and **RAK11310** (no extra suffix) is for the high-frequency band regions.

### NOTE

Check the frequency and band regions, as shown in the table, when ordering your RAK11310 WisBlock Core.

Module	Core Module	Region	Frequency
RAK11310(L)	RAK11300(L)	Europe	EU433
	RAK11300(L)	China	CN470
RAK11310	RAK11300	Europe	EU868
	RAK11300	North America	US915
	RAK11300	Australia	AU915
	RAK11300	Korea	KR920
	RAK11300	Asia	AS923
	RAK11300	India	IN865
	RAK11300	Russia	RU864

## Electrical Characteristics

### Power Consumption

#### NOTE

The power consumption will be published after the hardware test results.

Feature	Condition	Minimum	Typical	Maximum	Unit
Operating Average Current	TX	-	24.6	-	mA
Sleep Current		-	3.8	-	mA

### Voltage Ratings

Feature	Minimum	Typical	Maximum	Unit
VCC	2.0	3.3	3.6	V

## Mechanical Characteristics

### Board Dimensions

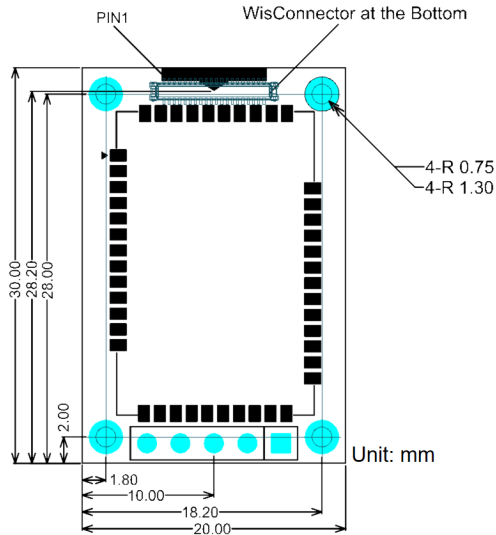


Figure 3: Mechanical Dimensions

## WisConnector PCB Layout

REV	LOCATIONS	DESCRIPTION	DATE	REVISER	APPD

Recommended P.C. Board Layout

**Electrical**  
 Current Rating: 0.3A AC(rms)/DC  
 Voltage Rating: 60V AC(rms)/DC  
 Contact Resistance: 90 mΩ Max  
 Insulation Resistance: 100 MΩ MIN  
 Withstanding Voltage: 150V AC r.m.s  
 Temperature Range—Operating: -55°C~+85°C

**Material and Plating**  
 Housing: LCP( UL 94V-0)  
 Contact Pin: Phosphor Bronze  
 Plating: Gold Plated

Circuits (n)	Part No.	Dimensions(in/mm)		
		A	B	C
24	FBB04004-F24S1XX3K6M	.287(7.30)	.244(6.20)	.173(4.40)
30	FBB04004-F30S1XX3K6M	.335(8.50)	.291(7.40)	.220(5.60)
34	FBB04004-F34S1XX3K6M	.366(9.30)	.323(8.20)	.252(6.40)
40	FBB04004-F40S1XX3K6M	.413(10.50)	.370(9.40)	.299(7.60)

**Ordering Information**

FBB 040 04 — F XX S 1 XX 3 K6 M

1 2 3 4 5 6 7 8 9 10 11

1 Category FBB—Board To Board	2 Series Number 040—Pitch 0.4mm	3 Distinction No. 04	4 Type F—Female	5 Circuits XX	6 Entry Angle S—180° Vertical
7 Plating 1—Gold Plated	8 Thickness of Plating 00—Gold Flash 04—4μ"	9 Material—Resin 3—LCP	10 Color—Resin K6—Black	11 Packaging M—Reel	

THIRD ANGLE PROJECTION	GENERAL TOLERANCES (UNLESS SPECIFIED)	APPROVE BY FRANK	DATE 26/SEP/13	PART NO. FBB04004-FXXS1XX3K6M	ITEM NO. FBB04004-F
DESIGN UNITS Inch (metric)	X.±.012(0.30) X'±5" X.X±.008(0.20) .X'±2"	CHECKED BY CHERRY	DATE 26/SEP/13	TITLE Board to Board Pitch 0.4mm 180° Vertical (SMT)	REV 0 SHEET NO. 1/1
SCALE 5:1	SIZE A4	X.XX±.006(0.15) .XX'±1" X.XXX±.004(0.10) .XXX'±0.5"	DRAWN BY JACOB	DATE 26/SEP/13	THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO TXGA INDUSTRIAL ELECTRONICS(SZ)CO.,LTD AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

Figure 4: WisConnector PCB footprint and recommendations

## Schematic Diagram

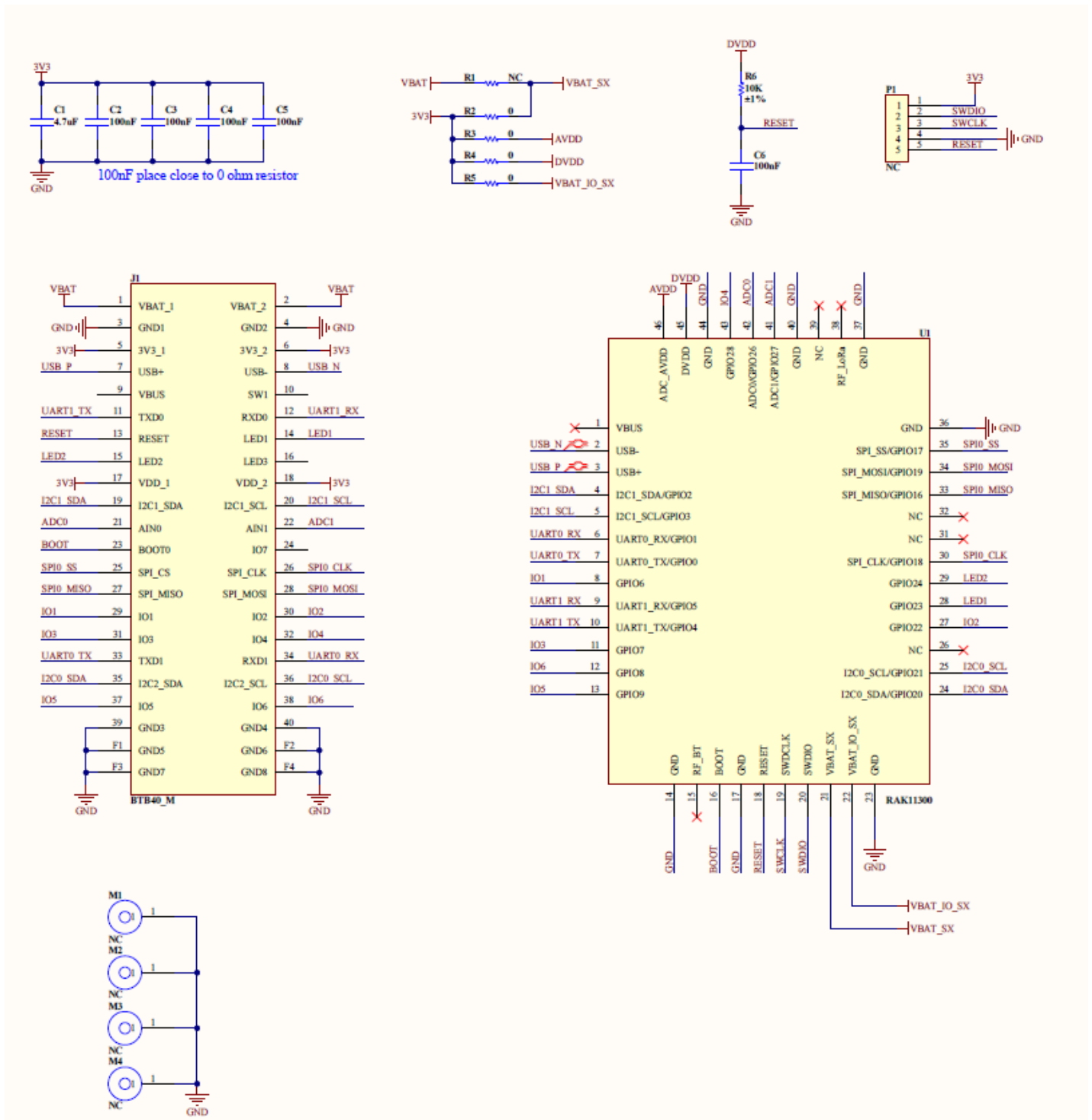


Figure 5: RAK11310 Schematic Diagram

- **WisConnector:** The breakout module exposes the RAK11310 stamp module pinout to the board-to-board WisConnector.
- **WisConnector Pin Order:** The pin order of the WisConnector is located on the bottom layer of the module.
- **Core Module:** The breakout module itself has a RAK11310 at its core, and it shows the core module pin and connection information. By default, the NFC function is disabled to preserve the low-power characteristic of this core.
- **SWD Interface:** The breakout module exposes an SWD debug interface. Additionally, the RST pin is used to reset the RAK11310 core module.
- **Power Up Automatic Reset:** The breakout module has a power-up automatic reset circuit, and the schematic shows the automatic reset mechanism. This module also can be reset through the WisBlock Base reset pin.