RAK12007 WisBlock Ultrasonic Sensor Module Datasheet

Overview

Description

RAK12007 is an ultrasonic sensor module based on the CS100, an industrial-grade ultrasonic distance measurement chip. This chip integrates ultrasonic transmitter, ultrasonic receiver, and digital processing circuits. The distance measurement result output is in the form of pulse width.

For an ultrasonic detector, there are two main parts: **Emitter** and **Detector**. The emitter transmits an ultrasonic sound wave, and the detector receives back the signal from the emitter reflected by an object. By calculating the travel time and the speed of sound, the distance of the object can be determined.

Features

- Detect Range: 2 cm to 4 m
- 3.3 V Power supply
- Standby Current: < 170 uA
- Chipset: angoSense CS100
- **Module size**: 25 x 48 mm

Specifications

Overview

Figure 1 shows the operation of the RAK12007 Ultrasonic Sensor Module.

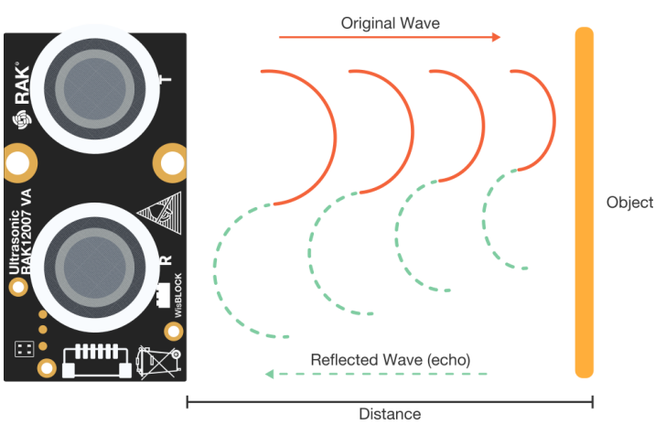


Figure 1: RAK12007 Ultrasonic Sensor Operation

Figure 2 and **Figure 3** display the RAK12007 front view (top) and bottom view, respectively.



Figure 2: RAK12007 Top View

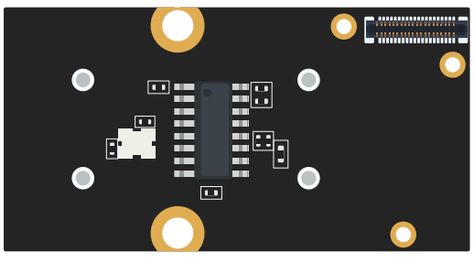


Figure 3: RAK12007 Bottom View

Mounting

The RAK12007 WisBlock Ultrasonic Sensor Module can be mounted to the IO slot of the WisBlock Base board. **Figure 4** shows the mounting mechanism of the RAK12007 on a WisBlock Base module.

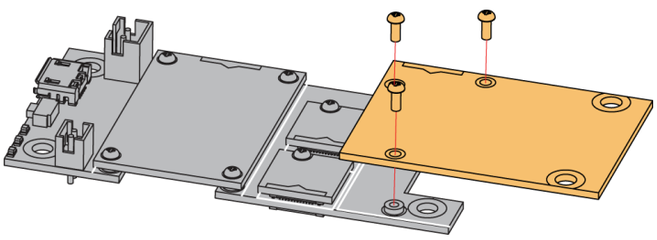


Figure 4: RAK12007 Mounting

Hardware

The hardware specification is categorized into five parts. It shows the chipset of the module and discusses the pinouts and its 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 RAK12007 Ultrasonic Sensor Module.

Chipset

Vendor	Part number
angoSense	CS100

Pin Definition

The RAK12007 WisBlock module has a 40-pin WisConnector that is compatible with the WisBlock Base IO Slot. The pin order of the connector and the pinout definition is shown in **Figure 5**

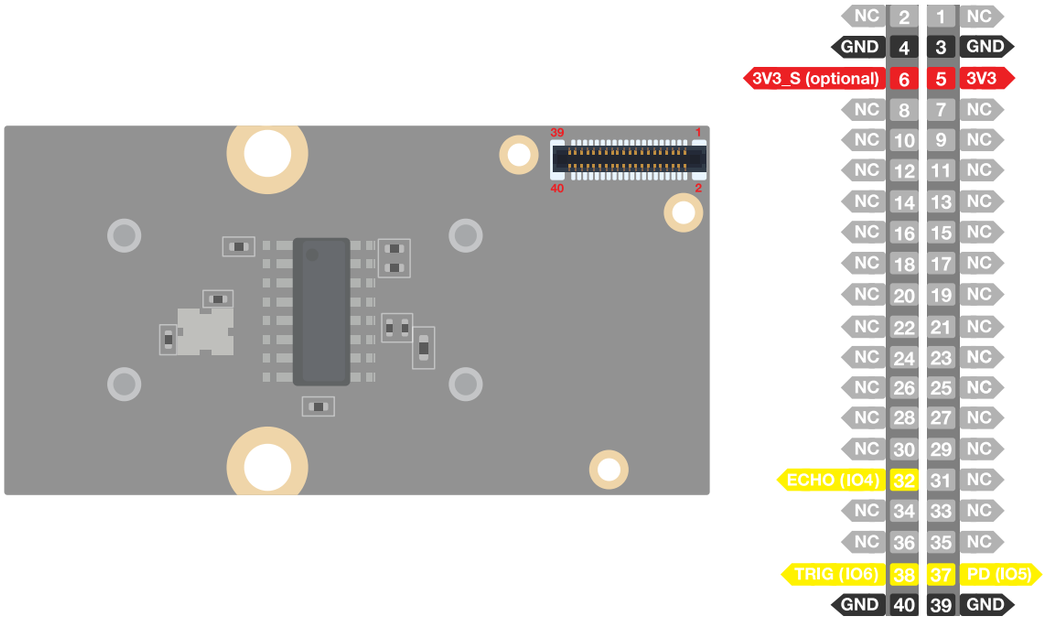


Figure 5: RAK12007 WisBlock Ultrasonic Sensor Module Pinout

> 📝 **NOTE:**
>
> - **PD**, **ECHO**, **TRIG**, **3V3_S (optional)**, **3V3 (default)**, and **GND** are connected to WisConnector.
> - **3V3_S (optional)** voltage output from the WisBlock Base that powers the RAK12007 module can be controlled by the WisBlock Core via WB_IO2 (WisBlock IO2 pin). This makes the module ideal for low-power IoT projects since the WisBlock Core can totally disconnect the power of the RAK12007 module.

Electrical Characteristics

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
V_{DD}	Power supply for the module	3.0		5.5	V
V_{POR}	Power-on reset voltage		1	1.3	V
I_{DD}	Capacitive Sensing Active	-	500	750	uA
I_{DSLEEP_3V}	Deep Sleep State current	-	5	-	uA
I_{STBY_DEF}	Standby state active 70 ms cycle time		120	170	uA
I_{STBY_LP}	Standby state active 140 ms cycle time		50		uA

Mechanical Characteristics

Board Dimensions

Figure 6 shows the dimensions and the mechanic drawing of the RAK12007 module.

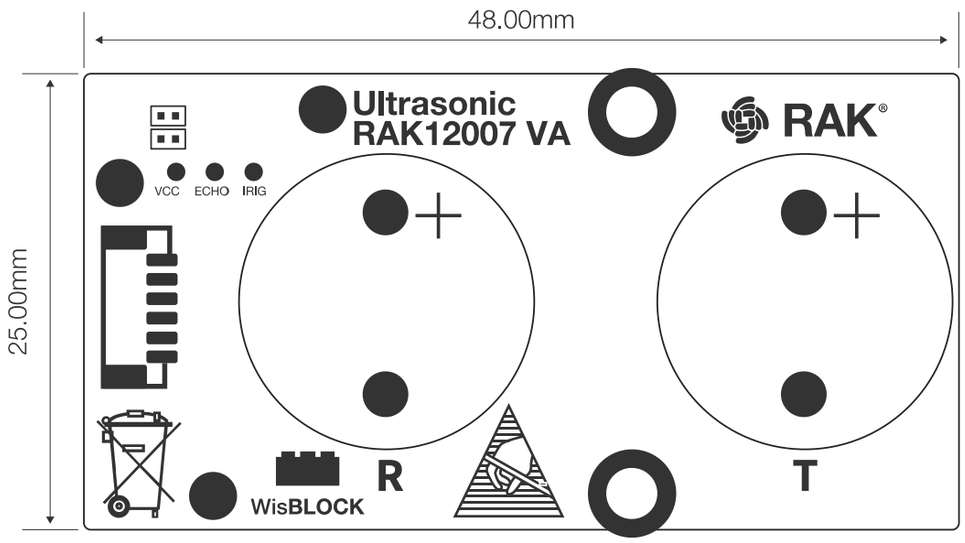


Figure 6: RAK12007 WisBlock Ultrasonic Sensor Mechanic Drawing

Figure 7 and **Figure 8** show the mounting holes location and diameter of RAK12007 module.

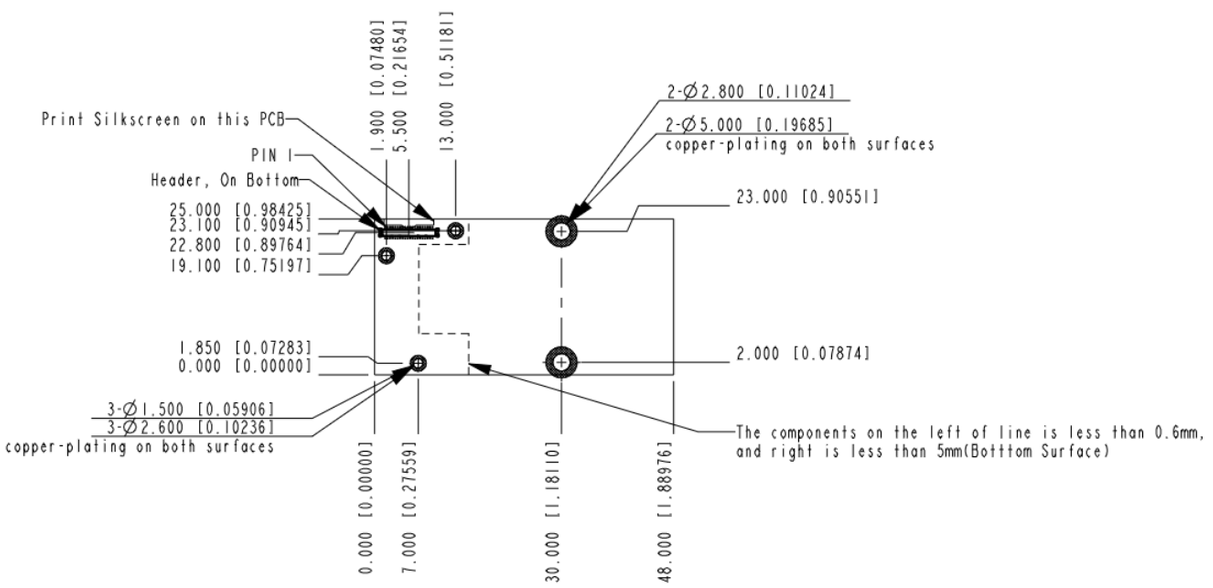
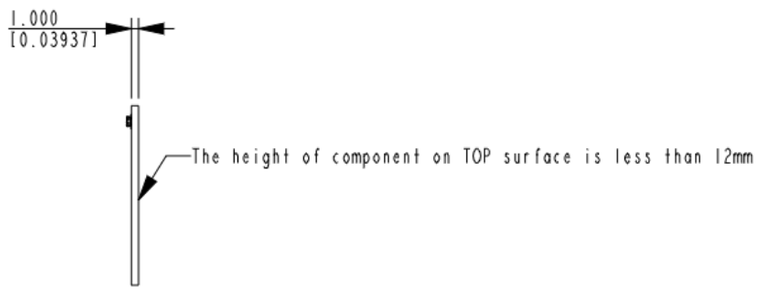


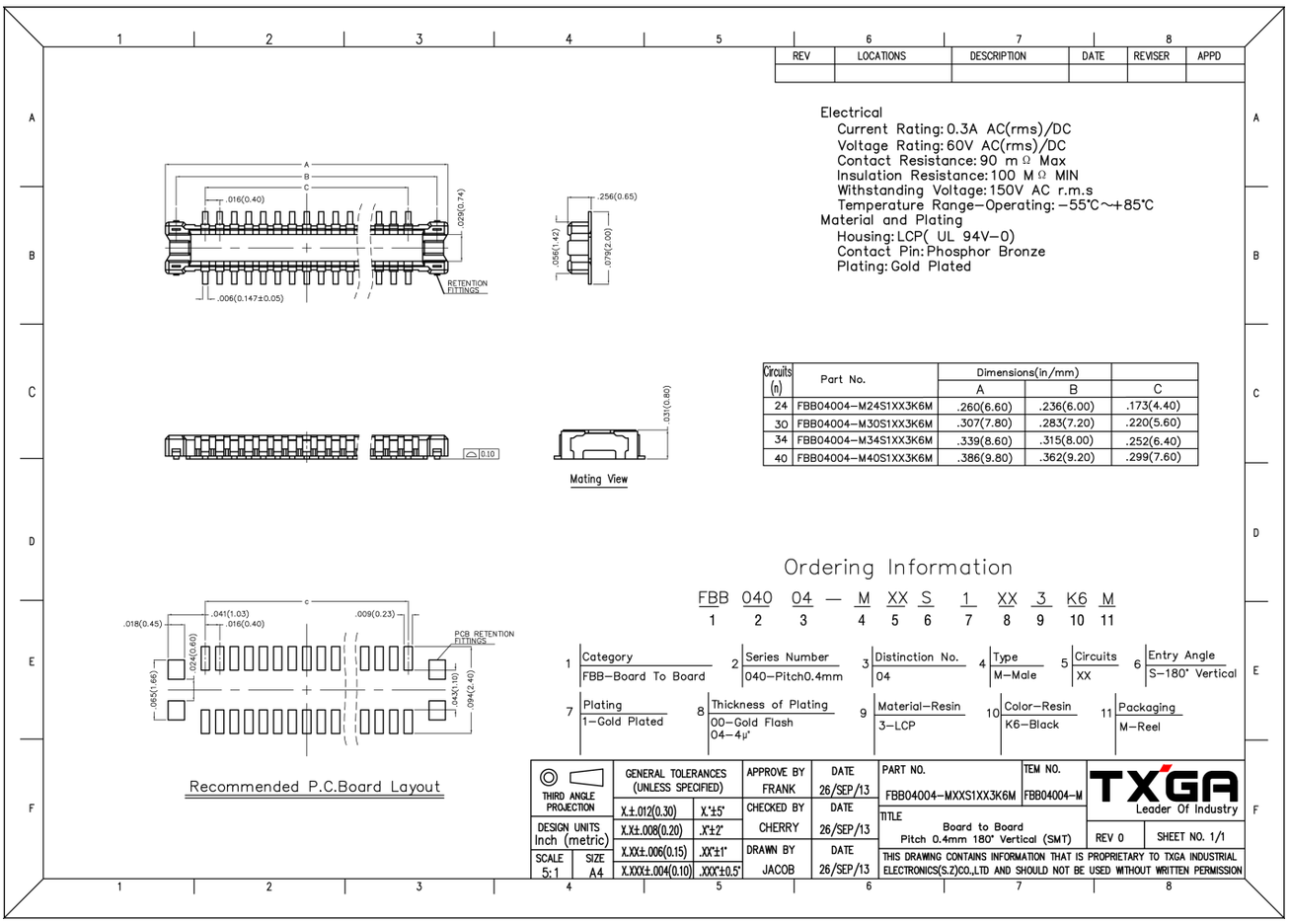
Figure 7: RAK12007 Mounting Holes Location and Diameter



Notes:(unless otherwise specified)
1. The cross shadow area represents copper-plating on both surfaces, and the single shadow area represents keepout components, non-ground vias and route on this surface.
2. Unit:mm(inch).

Figure 8: RAK12007 Mounting Holes Location and Diameter

WisConnector PCB Layout



Circuits (n)	Part No.	Dimensions(in/mm) A	B	C
24	FBB04004-M24S1XX3K6M	.260(6.60)	.236(6.00)	.173(4.40)
30	FBB04004-M30S1XX3K6M	.307(7.80)	.283(7.20)	.220(5.60)
34	FBB04004-M34S1XX3K6M	.339(8.60)	.315(8.00)	.252(6.40)
40	FBB04004-M40S1XX3K6M	.386(9.80)	.362(9.20)	.299(7.60)

Figure 9: WisConnector PCB Footprint and Recommendations

Schematic Diagram

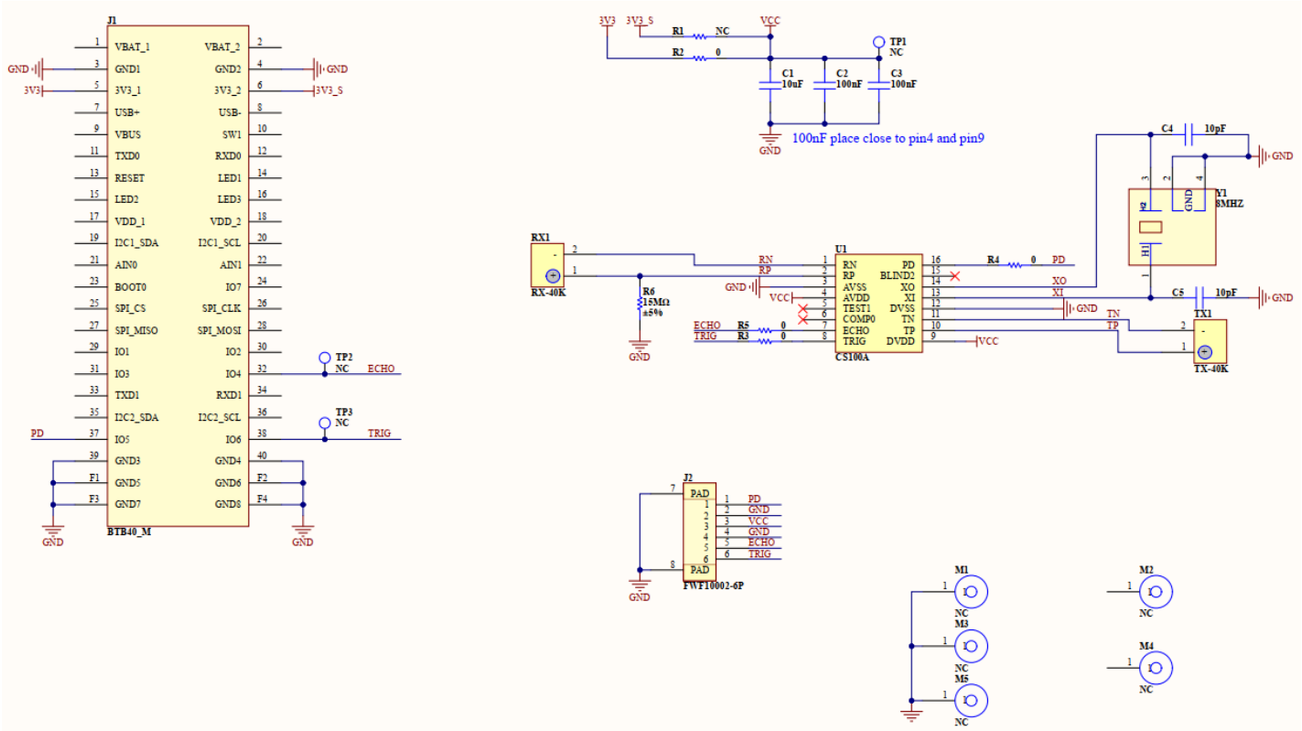


Figure 10: RAK12007 WisBlock Ultrasonic Sensor Schematic

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