24GHz Microwave sensor specification

[This document describes in detail the performance parameters of the sensor module developed and produced on the basis of the 24GHz radar sensor technology independently developed by our company, and the instructions for use.]

[Shenzhen Quansheng Technology Co.Ltd]

[Sense is not yet, guard life]

	Shenzhen Quansheng Technology Co.Ltd Specification
product name	Microwave sensor assembly
product model	TFW5-ADS27

一、概述

TFW5-ADS27 microwave sensor assembly is a millimeter wave sensor that senses the movement of objects. By transmitting and receiving microwaves with a frequency of 24GHz, it can sense the proximity and distance of moving objects, as well as the real-time distance of moving objects, and can output the information required by the host in real time, so as to achieve intelligent control.

Specification revision record

version number	release date	author	document description
V1.0	2024/03/19	LYH	first draft

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1、Basic parameter

parameter / project	Parameter scale
working frequency	24.00-24.25GHz
working voltage	4.75-5.25 V/DC
Suitable for power ripple	0-60mV
working current	20-40mA
operating temperature	-20——+60° C
Detection target type	mobile

2、Reliability Test

Certification project	Detection Results	
temperature	Conform: GB/T2423 standard: -36° C test for 4h; +60° C test for 12 h; +70° C test for 4h; +80° C test for 4h; +85° C test for 12h. The sample works fine.	
Waterproof rating	Conform: GB/T4208-2017 IPX7	
ROHS	Conform: ROHS2.0	
EMC	ESD Immunity RF Electromagnetic Field Immunity EFT Conducted Immunity To RF Field Sensing	Conform: EN 55014-2:2015

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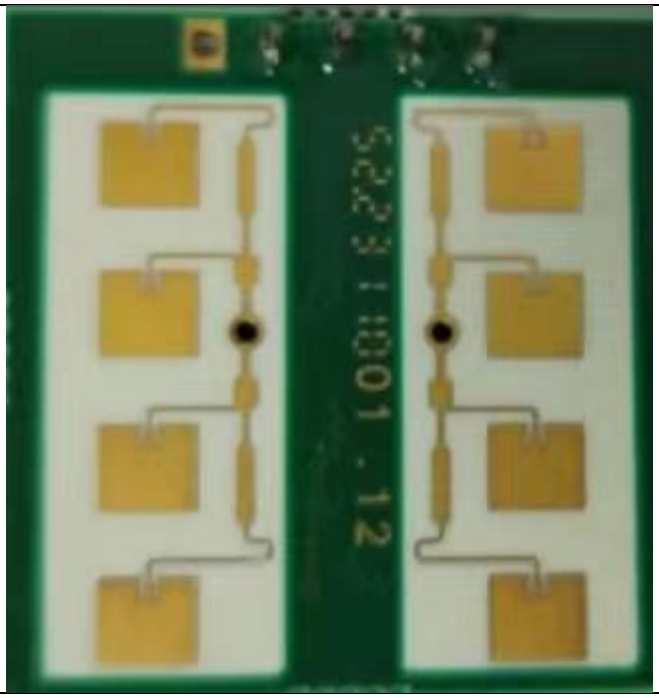
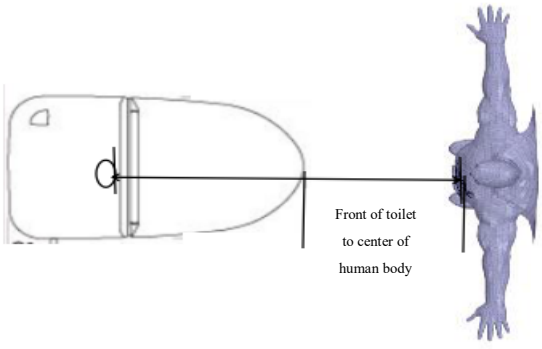
3、Antenna Installation Direction And Radiation Angle

Installation Method	Antenna Installation Direction And Radiation Angle
The antenna surface is placed vertically (80 ° horizontally and 40 ° vertically)	

4、Detection Distance Description

parameters / Gear	Measurement Example	Distance	Note
1st		20	Unit: cm Test conditions: 0.3~0.5m/s for the moving human body
2nd		40	
3rd		60	
4th		80	
5th		100	

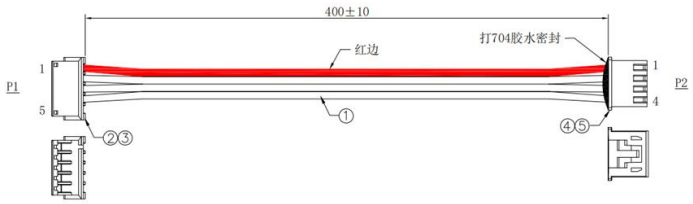
Note: The test distance is subject to the verification of the cover plate by both parties. If the client changes the material and structure of the cover plate, changes the microwave installation position and installation angle,

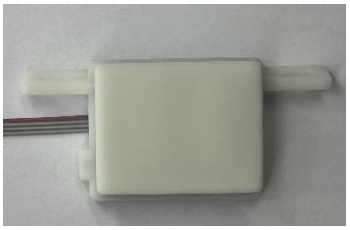
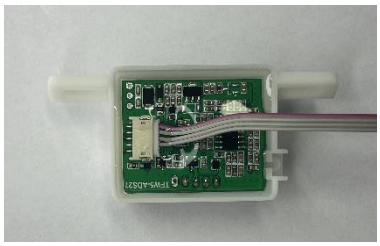
and changes the main board circuit and components, the microwave detection distance may be affected. The microwave detection distance is subject to the measured distance after the change.

5、Agreement Description

Communication protocol	
Serial Port Configuration	Baud Rate: 4800, Data: 8-bit, no check bit, Stop bit: 1-bit.
Communication Mechanism	Using master-slave UART, the whole machine control board is the mainstay, the microwave module is the slave, the whole machine control board sends instructions to the microwave module at a time interval of >=100 milliseconds, and the data bit is data in HEX format.
Microwave Receiving Command	The whole machine control board sends (microwave module receives) Data format:<address code+gear code+reserved+reserved+check code> address code: 0xaa; gear code: 0x01~0x05 (representing gears 1 to 5) check code: sum verification; Example: aa 01 00 00 ab 1th aa 02 00 00 ac 2th aa 03 00 00 ad 3th aa 04 00 00 ae 4th aa 05 00 00 af 5th
Microwave Sending Command	The whole machine control board receives(microwave module sends) Data format:<address code+gear code+reserved+reserved+check code> address code:0x55 address code: 0xaa; gear code: 0x01~0x05 (representing gears 1 to 5) check code: sum verification; Example: 55 00 05 00 5A : No moving object state , ward 5 55 01 05 00 5B : The state of an object approaching , ward 5 55 02 03 00 5A : There is an object away from the state , ward 3

6、Product Diagram

<table>
<tr><td>parameters
item</td><td>Product View</td></tr>
<tr><td>Wire Diagram</td><td>


技术要求：
1. 线材无脏污，杂色，刮伤，破损，色差等不良.
2. 端子无压伤，刮伤，电镀不良，氧化，变形等不良.
3. 接线位正确，无误配，缺线，胶壳变形等不良.
4. 尺寸准确，无超出公差范围.
5. 电气测试：100%导通测试，无短路，断路，错位等.
导通阻抗：2Ω MAX. 绝缘阻抗：5MΩ MIN.
测试电压：DC300V.
6. 端子与线材之间的拉力≥1.1KG.
7. 所有材料符合"RoHS"环保标准.
接 线 图
P1 P2
1 红色 1
2 灰色 2
3 灰色 3
4 灰色 4
5 空
<table>
<tr><td colspan="6">Pin Definition</td></tr>
<tr><td>Pin Name</td><td>5V</td><td>TX</td><td>RX</td><td>GND</td><td>NC</td></tr>
<tr><td>Function</td><td>VCC</td><td>Uart Tx</td><td>Uart Rx</td><td>GND</td><td></td></tr>
</table>
</td></tr>
<tr><td>End Product</td><td>

Front View

Back View
</td></tr>
</table>

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instructions

1. When the input voltage of the main board to the microwave sensor assembly exceeds the marked maximum value, the circuit may be permanently damaged, resulting in product function failure.
2. When the input voltage of the main board to the microwave sensor assembly exceeds the marked minimum value, the microwave sensor assembly may start abnormally or run abnormally.
3. Microwave sensor is an electrostatic sensitive device, in order to avoid damaging the circuit. ESD electrostatic protection measures shall be taken at all stages of storage, handling, assembly and testing.
4. It is possible to change the detection distance due to unstable power supply and unstable voltage input.
5. Before connecting the microwave sensor assembly to the power supply, please confirm that the positive pole, negative pole, input and output pins of the microwave sensor correspond to the pins of the main board one by one. If the microwave sensor assembly is wrongly connected, it will not work or be damaged. It is recommended to use anti-dazzle measures to prevent the power supply from being connected reversely.
6. During installation, in order to avoid weakening the induction distance of the microwave sensor, the shell of the microwave sensor cannot be made of metal materials or metal layers, but can be made of non carbon plastic materials or plastic foam;
   Note: If the shell is made of plastic materials (ABS, PVC, etc.), the thickness and space of the shell should be correctly estimated, and the antenna should be wrapped in a way that does not directly contact with the radar antenna structure.
   When the shell is made of foam material (such as Stypopor), the relative dielectric constant of the material shall be close to 1
   Recommended shell: 3mm thick plastic material and 3-6mm distance from the radar antenna surface
7. There should be no other moving objects within the radiation range of the microwave sensor assembly during the use and test after the installation of the microwave sensor assembly to avoid the deviation of the microwave sensor sensing distance.
8. Unless otherwise specified, all tests will be conducted indoors. The test data of each microwave sensor only reflects its own function and performance.
9. Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
   * —Reorient or relocate the receiving antenna.
   * —Increase the separation between the equipment and receiver.
   * —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
   * —Consult the dealer or an experienced radio/TV technician for help.
10. This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
11. Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
12. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.
13. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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