TRMK216
24GHz Millimeter Wave Radar Module

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TTC全耀传感科技

Toplight Sensor Technology （Xiamen）Co., Ltd

I. Product Overview

The TRMK216 module operates in the 24GHz frequency band. It emits millimeter-waves through the onboard microstrip antenna and receives the echo signals reflected from the target. When an object within the signal coverage area moves relative to the signal and the echo is detected, the signal is first amplified by the high-gain intermediate-frequency amplifier inside the module. Then, after the signal is collected and processed by the microcontroller, it is output via an I/O level signal or a serial port protocol.

II. Application Fields

- Smart bathroom appliances
- Smart lighting
- Home automation

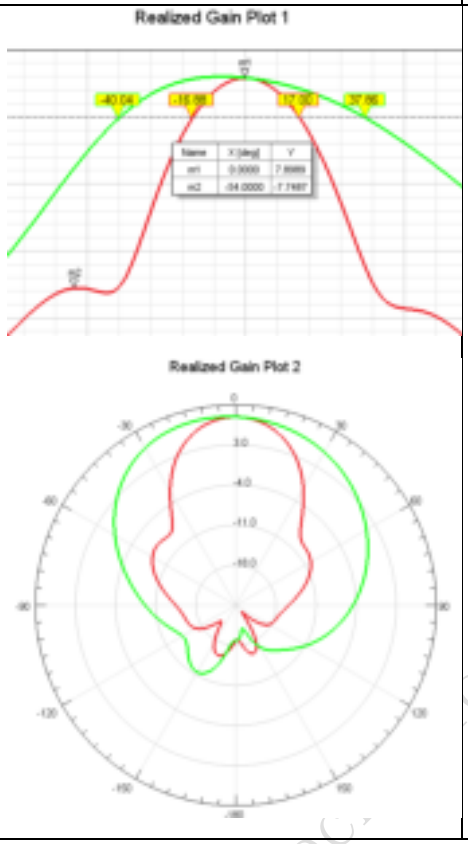
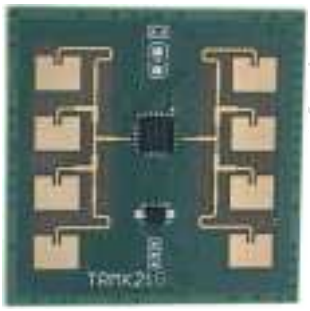
III. Feature Description

- Operating in the 24GHz frequency band.
- Adopting the FMCW mode.
- Equipped with a high-performance MMIC transceiver.
- Featuring a high-performance 32-bit MCU.
- Supporting serial communication.
- Capable of penetrating certain-thickness media such as ceramics, glass, and plastics without the need for drilling holes.
- Unaffected by factors like temperature, humidity, noise, airflow, dust, and illumination, making it suitable for harsh environments.

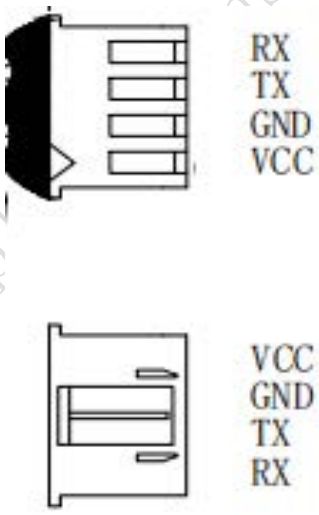
IV. Product Parameters

Parameter	Typical Value	Unit
Transmit Frequency	24-24.250	GHz
Motion Ranging Range	0.5~8	m
Motion Ranging Accuracy	±0.1	m
Antenna Beam Angle Range	-40°~ +38°	°
	-17°~ +17°	°
Operating Voltage	5	V
Operating Current	0.1	A
Peak Current	100	mA
Dimensions	25.2*25.2	mm
Weight	2.6	g
Operating Temperature	-20~85	℃
Operating Humidity	85	%

V. Antenna Angle Description

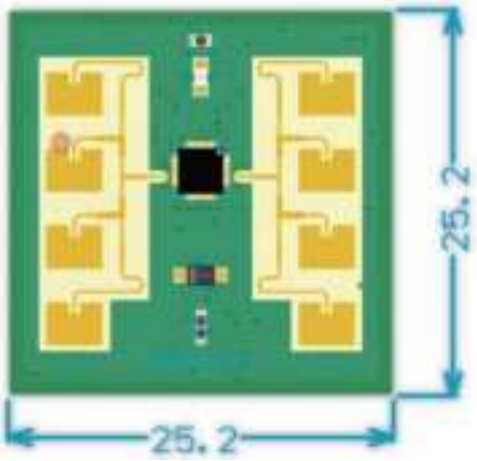
Product Model	Antenna Beam Pattern	Module Placement Diagram	Antenna Angle Description
TRMK216			Horizontal angle： -40°~ +38° Vertical angle： -17°~ +17°

VI. Port Description



Number	Interface	Interface Definition	Description
1	VCC		5V
2	GND	Ground	
3	TX	UART Transmit	LVTTL
4	RX	UART Receive	LVTTL

VII. Module Dimension Diagram

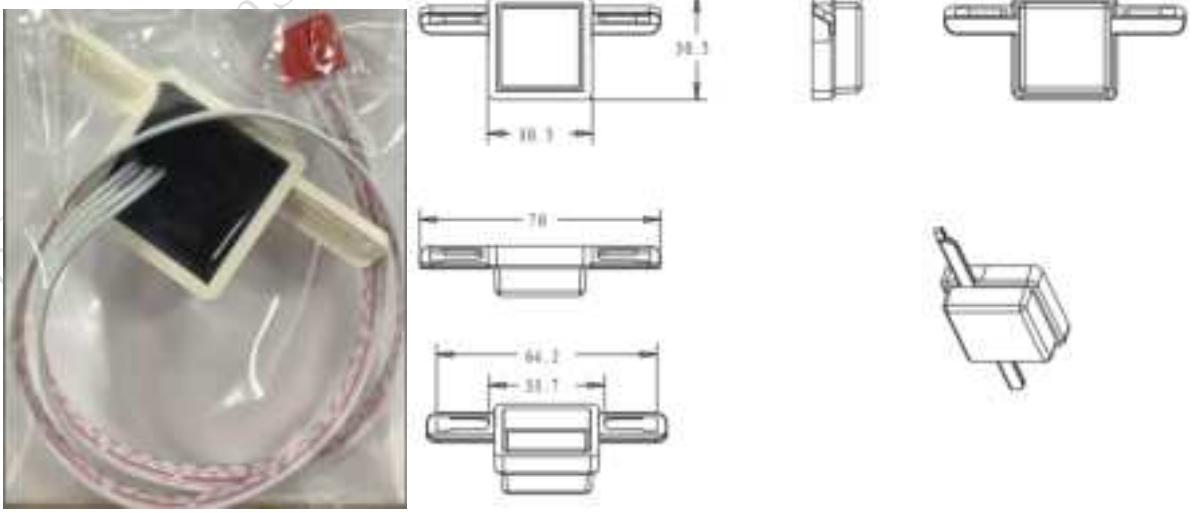


VIII. Function Description

- Moving Target Detection: It can detect targets within a range of 0.5m to 8m, and identify the target distance and the energy reflected by the target.
- It supports UART serial communication.

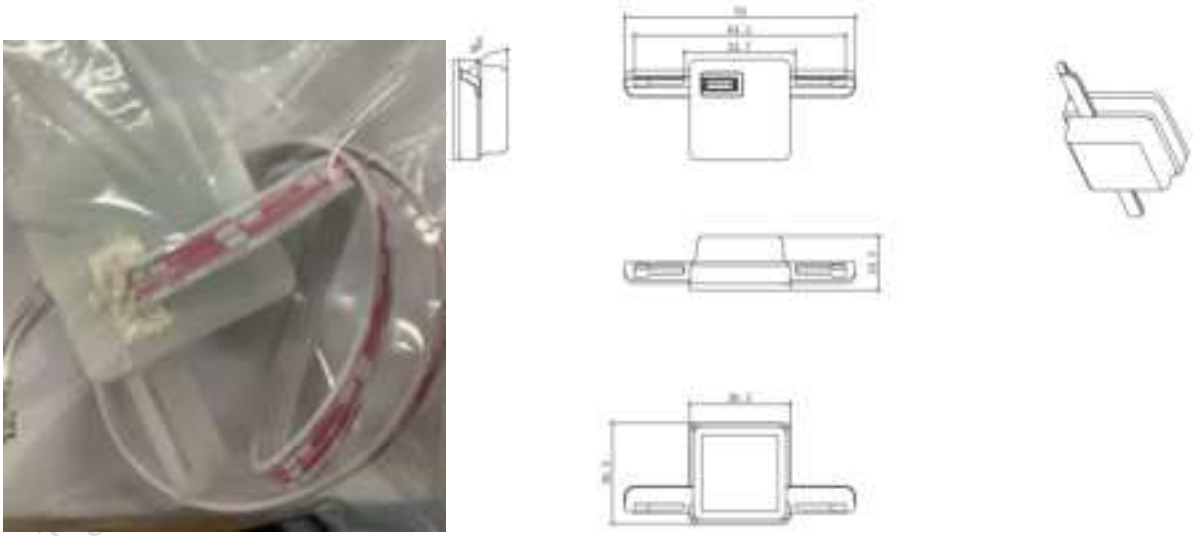
IX. Product & Casing Instructions

- **Product photos 1**



- **Product photos 2**

- **Product photos 3**



X. Precautions

1. There should be no metallic materials covering or blocking the antenna in front of the radar module.

2. The radiation range of the radar is affected by the covering material and its thi ckness. For the 24GHz millimeter-wave radar, according to experience, the recommen ded thickness of plastic materials (such as ABS, PE, PVC, etc.) for the casing is 3m m. When the thickness exceeds 3mm, the increase in loss should be taken into acco unt.

3. If you need to design the casing by yourself, try to maintain a distance of abo ut 6mm between the casing and the antenna surface.

4. The farthest detection distance of the radar is related to the antenna and the i nstallation position. The farthest detection distance refers to the situation where an ad ult is used as the detection target under the bare-board test conditions.

XI. FCC Warning

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following twoconditions:

(1) This device may not cause harmful interference,

(2) this device must accept any interference received, including interference that may cause undesired operation.

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.

FCC Radiation Exposure Statement

This equipment should be installed and operated with minimum distance 20cm between the radiator& your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.