T218
24GHz Millimeter Wave Radar Module

Product Manual

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I. Product Overview

The T218 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 UART protocol.

II. Application Fields

- Smart sanitation
- Intelligent lighting
- Smart home systems

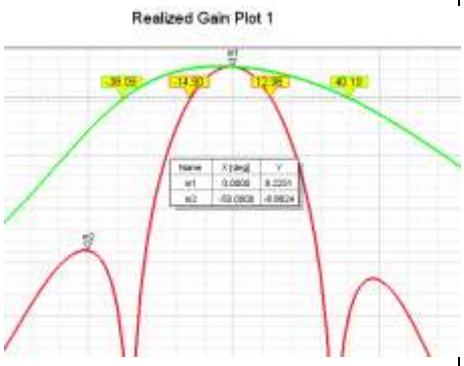
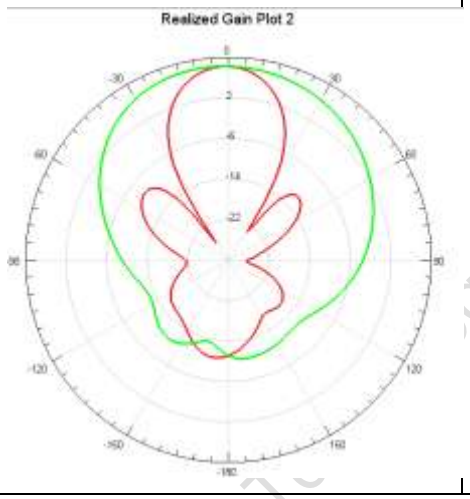
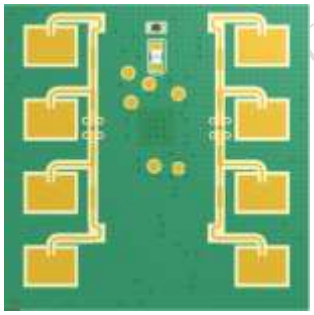
III. Feature Specifications

- 24GHz frequency band
- FMCW (Frequency-Modulated Continuous Wave) mode
- High-performance MMIC transceiver
- Advanced 32-bit MCU
- UART communication
- The working voltage supports 5V DC/12V DC(PS1 POWER SUPPLY)
- Capable of penetrating certain thicknesses of ceramics, glass, plastics, and other media without requiring openings
- Unaffected by temperature, humidity, noise, airflow, dust, or light, suitable for harsh environments

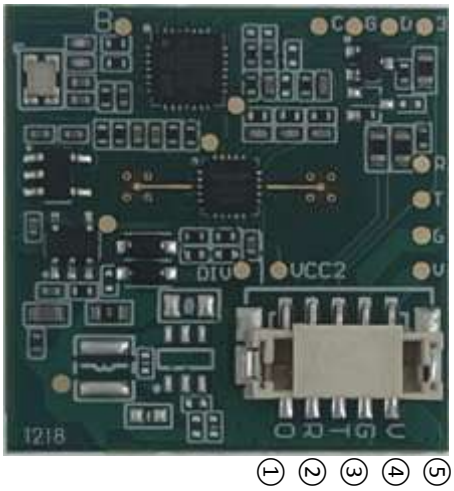
IV. Product Parameters

Parameter	Typical Value	Unit
Operating Band/Frequency	24.035-24.225	GHz
Maximum e.i.r.p:	0.15	dBm
Motion Ranging Range	0.6~6	m
Motion Ranging Accuracy	±0.1	m
Antenna Beam Angle Range	-38°~ +40°	°
	-15°~ +13°	°
Operating Voltage (PS1 POWER SUPPLY)	5/12V DC	V
Operating Current	5V：45 12V：23	mA
Module power consumption	5V：0.23 12V：0.28	W
Dimensions	25.2*25.2	mm
Weight	2.0	g
Operating Temperature	-20~85	℃
Operating Humidity	<85% non-condensing	%

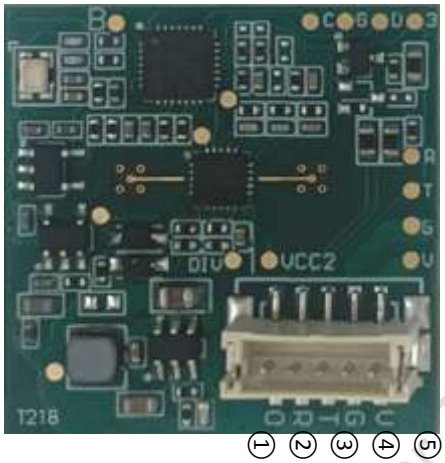
V. Antenna Angle Description

Product Model	Antenna Beam Pattern	Module Placement Diagram	Antenna Angle Description
T218	 		Horizontal angle： -38°~ +40° Vertical angle： -15°~ +13°

VI. Port Description



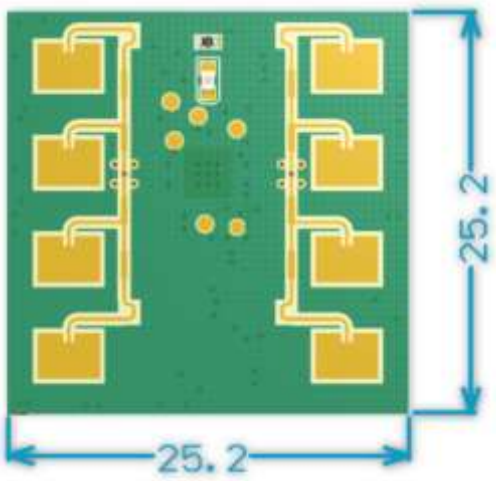
Number	Interface	Interface Definition	Description
1	VCC		5V
2	GND	Ground	
3	TX	UART Transmit	TTL
4	RX	UART Receive	TTL
5	GPIO	Level Signal	



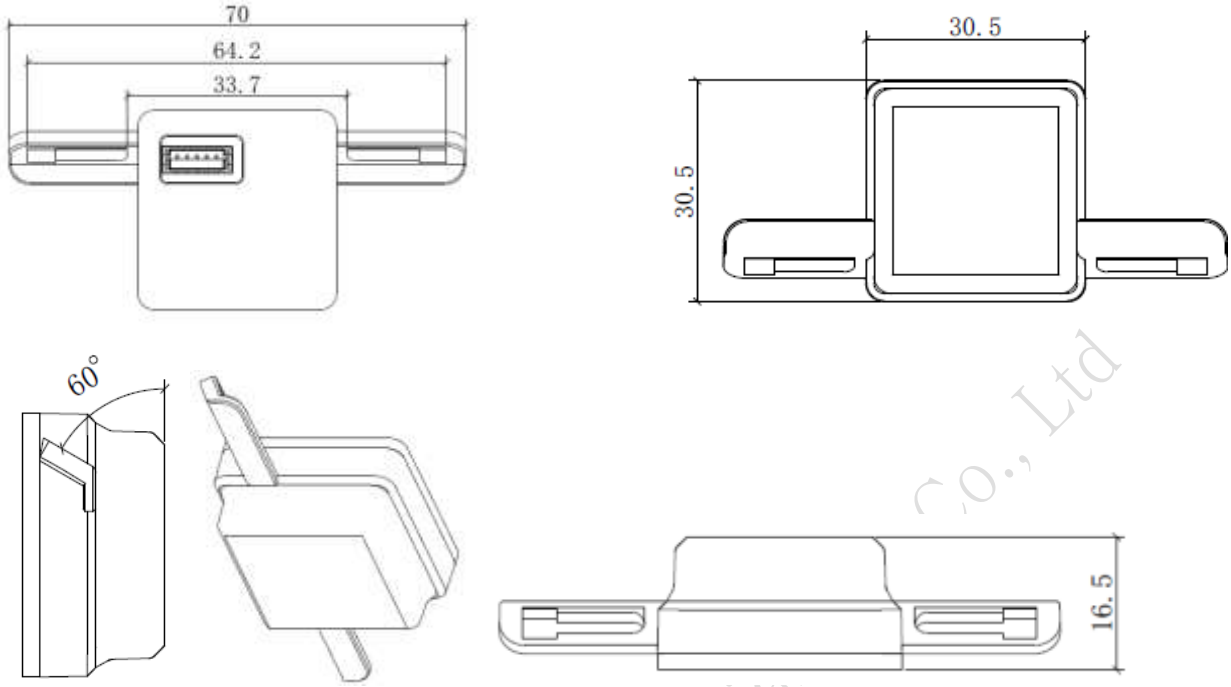
Number	Interface	Interface Definition	Description
1	VCC		12V
2	GND	Ground	
3	TX	UART Transmit	TTL
4	RX	UART Receive	TTL
5	GPIO	Level Signal	

VII. Dimension Diagram

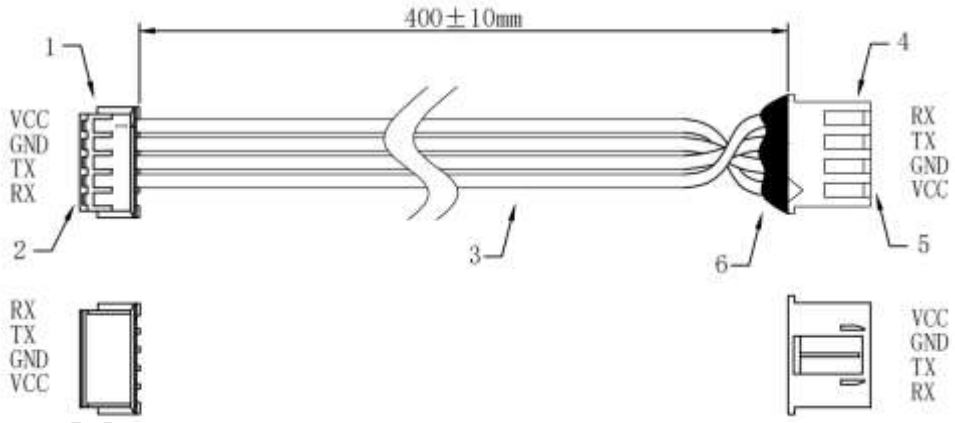
- Module Dimension Diagram



- Standard housing (ultrasonic) dimensional drawing



- Standard Wiring Harness Specification



VIII. Finished Product Photo

IX. Function Description

- Motion Target Detection: Range 0.6 – 6 m, detects target distance and reflected energy
- Speed Detection: Measures target speed and direction
- Micro-Motion Detection: Detects subtle movements within 4 m
- Output Options: Supports UART serial communication, multiple protocols, and IO level output
- Parameter Tuning: Adjustable via host software for various applications and environments
- Firmware Updates: Supports convenient OTA upgrades

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 thickness. For the 24GHz millimeter-wave radar, according to experience, the recommended thickness of plastic materials (such as ABS, PE, PVC, etc.) for the casing is 3mm. When the thickness exceeds 3mm, the increase in loss should be taken into account.
3. If you need to design the casing by yourself, try to maintain a distance of about 6mm between the casing and the antenna surface.

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

5. Specifications, technical parameters, and compatibility in this manual are subject to change without notice due to technology updates, supply-chain adjustments, or regulatory revisions. Please visit our website or contact your sales representative periodically for the latest information. Thank you for your understanding and continued support as we keep improving our products and services.

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 two conditions:

(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.

XII. 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.