



RDWM15209 Datasheet

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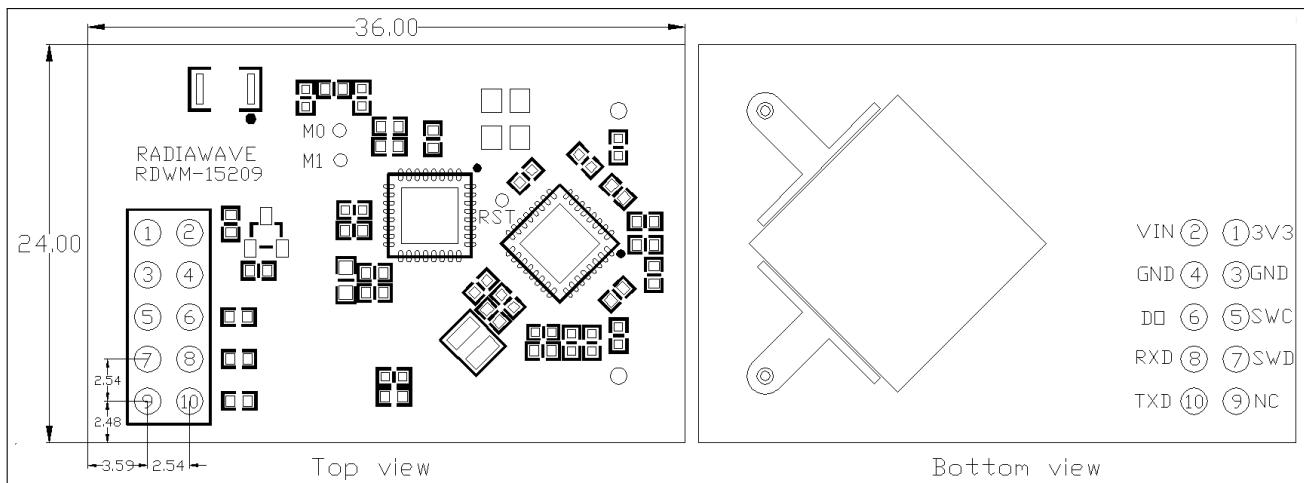
1 Product description

1.1 Summary

RDWM15209 is a small-sized 5.8GHz ranging radar module, developed with Radiwave RDW1502 QFN32 chip. The module can detect the distance, speed and direction of movement of moving targets. With the SoC chip solution, the module ensures the consistency of frequency, power, detection distance, angle of view, and is effectively immune to co-frequency interference and environmental interference. The frequency, power, trigger delay, and detection distance, can be reconfigurable, and the sensor is suitable for a variety of sensing applications. The module meets the FCC/CE/RS certification testing standards.

The overall appearance and dimensions are as follows:

Figure 1.1: RDWM15209 simplified diagram



Note: Unit: mm

1.2 Features

- 5.8GHz ranging and speed radar detector, which can penetrate non-metallic media such as plastic and glass.
- High sensitivity, high reliability, immune to external environment such as light, dust, temperature.
- With efficient radar algorithm, the module can detect the distance, speed and direction of movement of the moving target.
- Support UART port communication and parameter setting.
- The detection distance is adjustable, up to 9 meters max.
- Ranging accuracy 25~50cm, depending on the maximum distance and sensitivity of detection.
- Speed measurement accuracy is 0.2m/s, and can detect the moving direction of the target, i.e. approaching or moving away from the radar.
- Input DC voltage 3.8~5.5V, maximum transient current 200mA <100uS, typical current 75mA@5V.
- Comply to FCC/CE/RS certification testing standards.

- The output port is 5*2PIN 2.54mm pin.
- Dimensions: 36mm × 24mm × 12mm (including terminal height).
- Moisture Sensitivity Level (MSL, Moisture Sensitivity Level): Level 3.
- Electrostatic sensitivity classification (ESD classification HBM): Class 1.

1.3 Application

• Smart home	• Intelligent monitoring
• Sensor lighting	• Inductive door lock
• Digital Frame	• Electronic billboards
• Intrusion detection	• Motion detection and control

2 Specifications

2.1 Pin definition

Table 2.1: Pin definition

Pin Number	Pin Name	Description
PIN1	3V3	Dedicated to be programming port, output 3.3V 300mA to external.
PIN2	VIN	3.8~5.5V Supply voltage input
PIN3	GND	Power and signal ground
PIN4	GND	Power and signal ground
PIN5	SWC	Programming clock
PIN6	DO	Power control, power off when low level, internal pull-up, floating when not in use
PIN7	SWD	Programming data
PIN8	RXD	Data receiving port
PIN9	NC	No Connection
PIN10	TXD	Data sending port

2.2 Interface size

Table 2.2: Interface size

Item	Mark	Value	Unit	Note
Size	-	36 x 24 x 12	mm	Including terminal height
Weight	-	6	g	
UART Speed	-	115200	Bit/s	PIN8/PIN10 is the UART interface

2.3 Parameters

Table 2.3: parameters

Item	Mark	Value			Unit	Note
		Min	Typical	Max		
Refresh rate	-	-	30	-	Hz	
Ranging accuracy	-	0.25	0.35	0.5	m	Adjust the maximum detection distance required by the application, the ranging accuracy will change.
Speed accuracy	V_{DET}	0.1	0.2	5	m/s	
Detection distance	-	0.3	-	9	m	Adjustable according to the maximum distance required by the application.
Operating temperature	T_A	-20	-	+85	°C	
Storage temperature	T_{STG}	-20	-	+85	°C	
Supply voltage	V_{dd}	3.8	5	5.5	V	Minimum support 3.8V
Supply current	I_{dd}	-	60	85	mA	$V_{dd}=5V$

2.4 RF parameters

Table 2.4: RF parameters

Item	Mark	Value			Unit	Note
		Min	Typical	Max		
Frequency Range	f_{RF}	5.725	-	5.875	GHz	The working frequency is adjustable, the minimum interval is 1MHz
Transmit power	P_{out}	-13	-	8	dBm	Adjustable by software
Stray power	P_{spur}	-	-	-60	dBm	Comply with FCC/CE/RS certification standards
Sensitivity	P_{sen}	-	-60	-	dBm	$f_{IF}=20Hz, B=1KHz, S/N=6dB$

3 Antenna

Figure 3.1: RDWM15209 Antenna direction

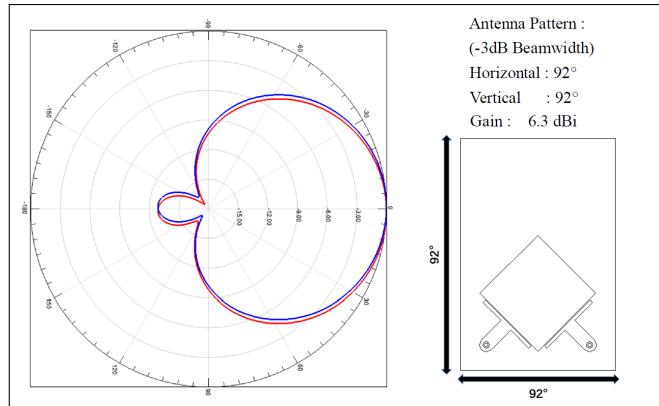
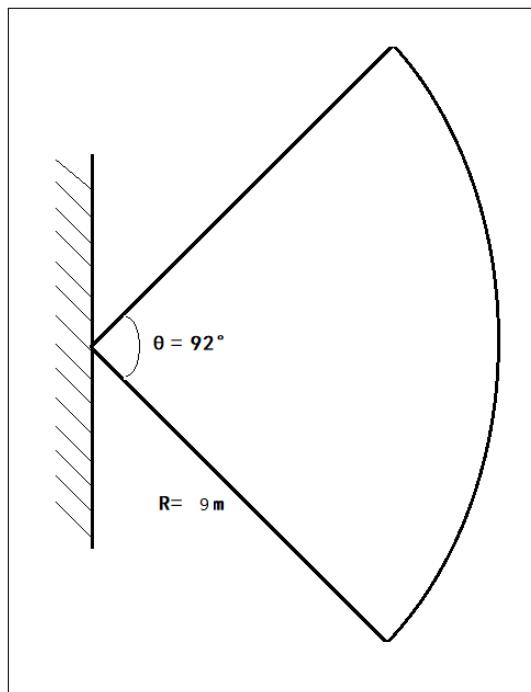


Figure 3.2: RDWM15209 Antenna angle



4 Precautionary note

- The power supply voltage is higher than the rated voltage or static electricity damage will cause permanent damage to the module.
- The maximum driving current of terminal DO switch output is 500mA.
- It is recommended to use a qualified power supply, that is, a DC power supply whose output voltage, current and ripple meet the standards, otherwise it will affect the normal operation of the module. work.
- The module antenna needs to keep a certain distance from the metal plane, and it should not be close to the metal material, otherwise it will affect the normal operation of the module.
- When the modules are densely distributed, try to ensure that the radar antennas are parallel to each other and avoid facing each other. For aging tests and other scenarios that require dense distribution, it is recommended that the spacing be greater than 30cm.
- The module cannot be installed in a metal shell, and there should be no obstacles such as metal and walls in front of the antenna surface and the object under test.
- Keep the module as far away as possible from sources of interference such as flashing indicators, horns, buzzers, relays, and alternating current.
- There should be no high-current circuit under the antenna, so as not to cause interference.
- Avoid installing radar sensor products in areas such as air-conditioning outlets to avoid vibration affecting the sensing effect.

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Phone: 86-0755-28217535

Email: sales@radiwave.com

Address: Chuangtou Building 1302, No. 9 Tengfei Road, Longgang, Shenzhen, Guangdong, 518172, P. R. China

Warning: Changes or modifications to this unit 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, and
- (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.

If the FCC ID is not visible with the module is installed inside another device, then it must be still responsible for the FCC compliance requirement of the end product which referring to the enclosed module and it also must display a label

Innovation, Science and Economic Development Canada Statement

This device complies with ISED's licence-exempt RSSs. 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.

Ce dispositif est conforme à la norme CNR- standards d'Industrie Canada applicable aux appareils radio exempts de licence.

Le présent appareil est conforme aux CNR d' ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) le dispositif ne doit pas produire de brouillage préjudiciable, et
- (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

The device should be installed and operated with distance more than 20cm between the radiator and your body. L'appareil doit être installé et utilisé avec une distance plus de 20 cm entre le radiateur et votre corps.