

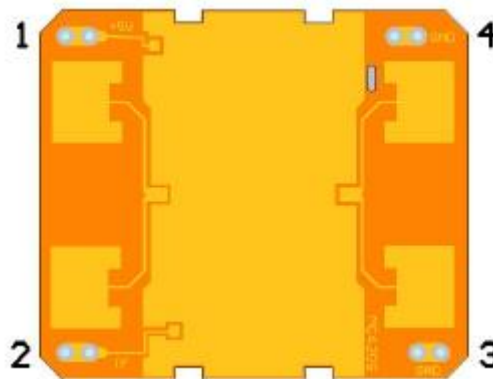
## MC420S Microwave Sensor Specification

### 1. Working principle

A microwave sensor includes a transmitting antenna, a receiving antenna, an oscillator, a mixer, and a filter. It vibrates through The oscillator generates a high-frequency microwave signal and emits high-frequency electromagnetic waves through the transmitting antenna, which is called the detection signal number. The high-frequency electromagnetic waves emitted are reflected upon encountering the detection target, and the microwave sensor receives them through the receiving antenna Reflected electromagnetic waves, i.e. feedback signals, are mixed by a mixer to output the detection signal and feedback signal A Doppler signal with intermediate frequency signal characteristics, which is then filtered by a filter to produce the final output Send a signal.

According to the principle of Doppler effect, the detection signal will Transmission occurs, and the receiving antenna receives the feedback signal reflected by the detection target, and the frequency of the reflected wave is the same as that of the transmitted wave There is a variable difference between the frequencies. When the detection target moves away from the microwave sensor, the transmission frequency is compared to the receiver High frequency of collection; When the detection target moves close to the microwave sensor, the transmission frequency is lower than the reception frequency. The above difference The value is related to the relative motion speed between the microwave sensor and the detection target, and the relative motion speed between the two is The higher the rate, the greater the frequency difference.

### 2. Pin description

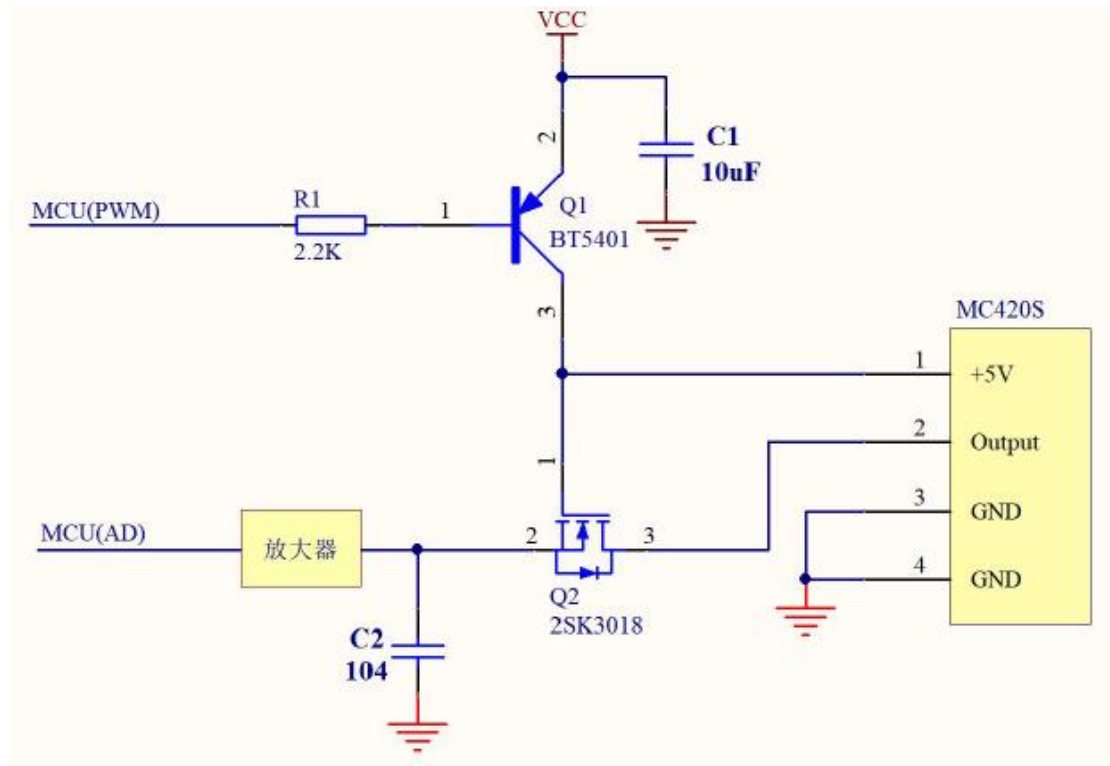


No.	symbol	Note
1	+5V	Positive pole of power supply
2	IF	Analog signal output
3	GND	Negative pole of power supply
4	GND	Negative pole of power supply

As shown in the above figure, the sensing surface is oriented towards the detection target area.

### 3. Application reference

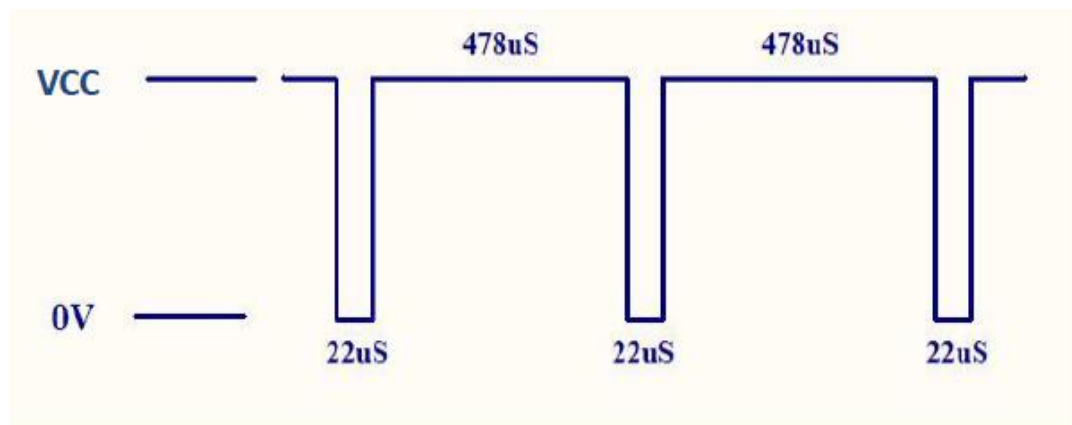
#### 3.1 Pulse working mode reference circuit:



Among them, C1 should be as close as possible to Q1.

#### 3.2. Electrical parameters for intermittent microwave operation:

The MCU (PWM) output is shown in the following figure:



Note: After the above pulse signal is reversed by transistor Q1, the 22uS pulse width becomes the working duration of the microwave part.

#### 3.3. Speed measurement application instructions:

In speed measurement applications, the MC420S module must operate in DC mode.

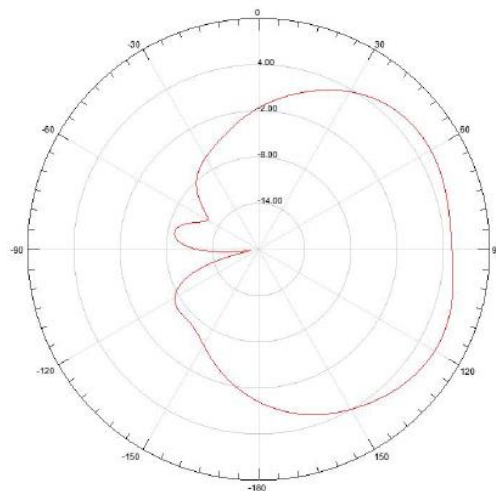
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4. Technical parameters

Parameter	symbol	minimum value	typical value	maximum value	unit	description
Transmission frequency	fStandard	10.500	10.525	10.550	GHz	X-band
Output power	Pout	11	13	18	dBm	
Start time	St	1	3	5	uS	Microwave start time
Working voltage	VCC	4.75	5	5.25	V	
Working current	ICC		33		mA	5V continuous operation
	ICC		1.8		mA	5% intermittent operation
Sensing angle	Horizontal angle		124		°	Left and right corners
	Vertical angle		27		°	up and down
Antenna gain			7		dBi	
Working temperature		-20		+60	°C	
Dimensions	46.5 x 40 x 8.0				mm	

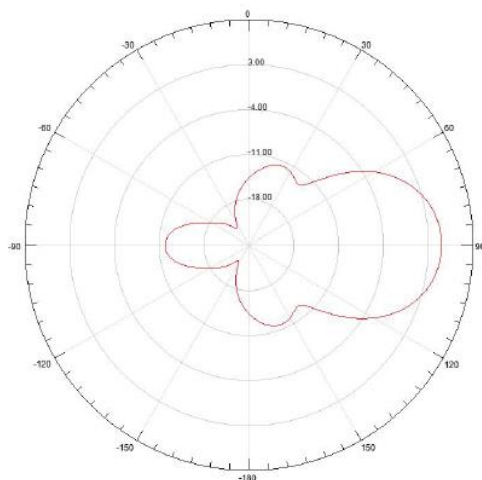
5. Microwave radiation azimuth map

5.1 Horizontal direction



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## 5.2 Vertical Direction



## 6. Module installation instructions

During installation, it is not allowed to wrap the antenna with metal materials or metal layers;  
For plastic materials and plastic foam, As long as it does not contain conductive components, it  
can be used as a protective shell for modules;

The following materials or methods are not applicable to the housing of sensors:

Cover the front of the antenna surface with metal foil or partial metal components;

Spray microstrip antennas with any type of paint or varnish;

Cover the antenna surface with any conductive film;

Corrosive materials come into direct contact with the antenna.

## 7. ESD protection and precautions

When handling independent modules or using soldering iron and other equipment, ESD  
precautions must be followed When the module is removed from the anti-static packaging, it is  
necessary to start doing a good job of electrostatic protection;

When a module malfunctions, it is not recommended to repair it yourself. Please send it back  
to our company for processing in order to collect relevant information Obstacle information, in  
order to provide improvement basis for improving product quality in the future.