Iflabel IR60TR1A 60GHz mmWave FMCW Radar Sensor Module User Manual

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Overview

IR60TR1A radar module is a radar module t hat uses 60g millimeter wave radar technology t o realize t he functions of moving human body percept ion, posit ion detect ion and t rack t racking. This module is based on FM CW radar system t o realize w ireless percept ion of personnel st at us in specific places. The radar module has t he following working characteristics:

1. Realize t he function of posit ion detect ion and t rack t racking of moving personnel;
2. Limit t he detect ion object t o people w it h biological characteristics (moving or stationary), and eliminate t he interference of ot her inanimate object s in t he environment ;
3. This module can effectively eliminate the interference of non living object s, and can also realize t he detect ion of non living moving object s;
4. The product support s secondary development and adapt s t o a variet y of scenarios
5. General UART communication interface, providing general protocol;
6. Four groups of I o are reserved, which can be input and out put according t o user-defined L or simple interface simulation;
7. The out put pow er is small and does no harm t o human body;
8. The module is not affected by temperature, light, dust and other factors, with high sensitivity and w ide application fields.

Main Parameters

Detection Angle and Distance

Parameter Contents	Minimum	Typical	Maximum	Unit
:R60TR1A				
Detection Range of Moving Der so n ne l	–	12	–	m
Deception Distance of Static ‘ Sliaht-moving Personnel	–	6		m
Radar Detection Ang le ‘Horizontal)	–	100	–	**0**
Radar Detection Ang le (Pitch)	–	100	–	**0**

Electrical Characteristics

Operating Parameters	Minimum	Typical	Maximum	Unit
Operating Voltage (VC C)	4.5	5.0	6	V
Operating Current (I C C)	90	93	100	mA
Operating Temperatur e (TOP)	-20	–	+60	·c
Storage Temperature CT ST)	-40	–	+80	“C

RF Performance

Transmit Parameters				
Operating Frequency (FTX)	58	–	63.5	GHz
Transmitting Power <Po ut }	–	–	6	dBm

Module Dimension and Pin Definition

Outline Dimension

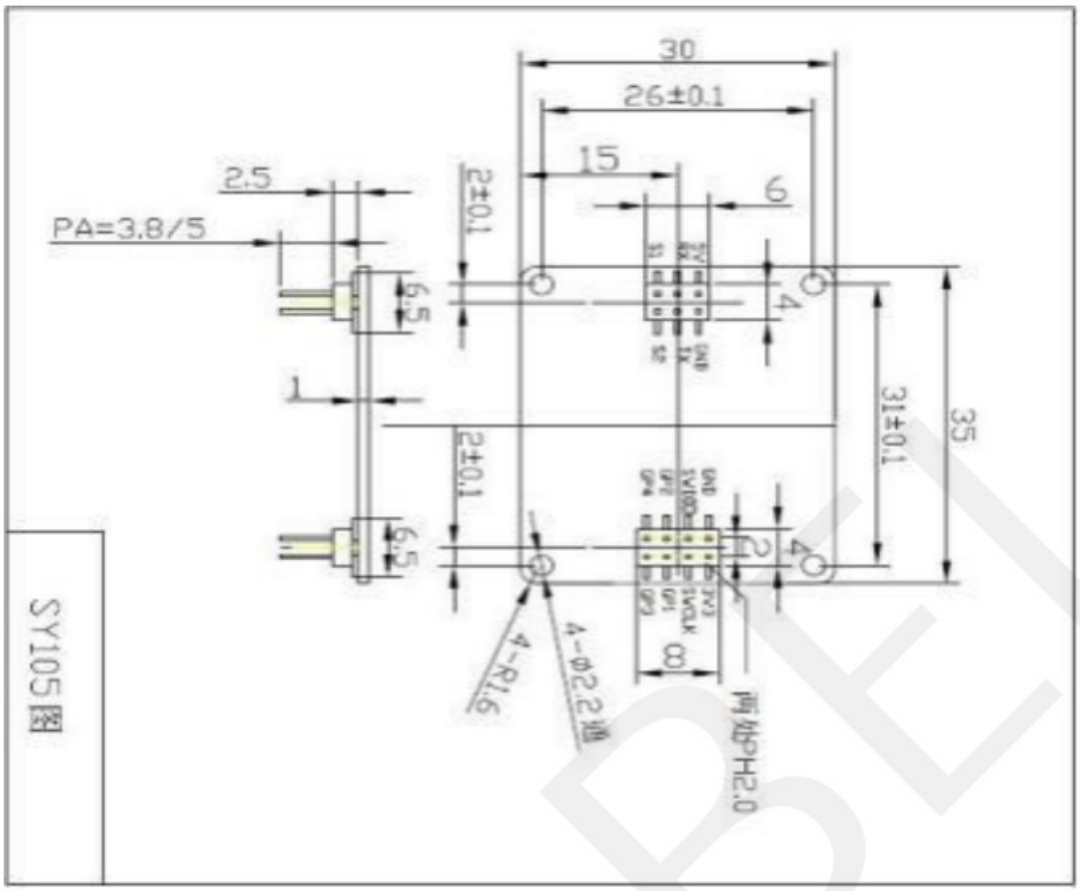


Figure 1 Diagram of Radar Module Outline Dimension

Pin Definition

Interface	Pin	Description	Typical	Remark
Interface1	1	5v	5.0V	Positive end of power input
	2	GND		Ground
	3	RX		Serial port receive
	4	TX		Serial port send
	5	51	3.3V/0V	
	6	52	3.3V/0V	
Interface 2	1	3V3	3.3V	Output **power** supply
	2	GND		Ground
	3	SL		Reserve
	4	SD		Reserve
	5	GP1		Spare extension pin
	6	GP2		Spare extension pin
	7	GP3		Spare extension pin
	8	GP4		Spare extension pin

Wiring Diagram

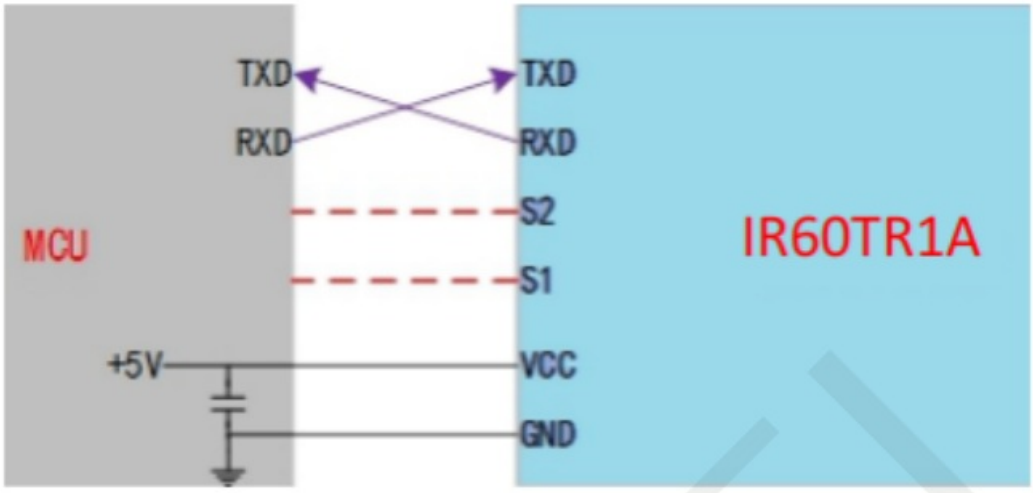
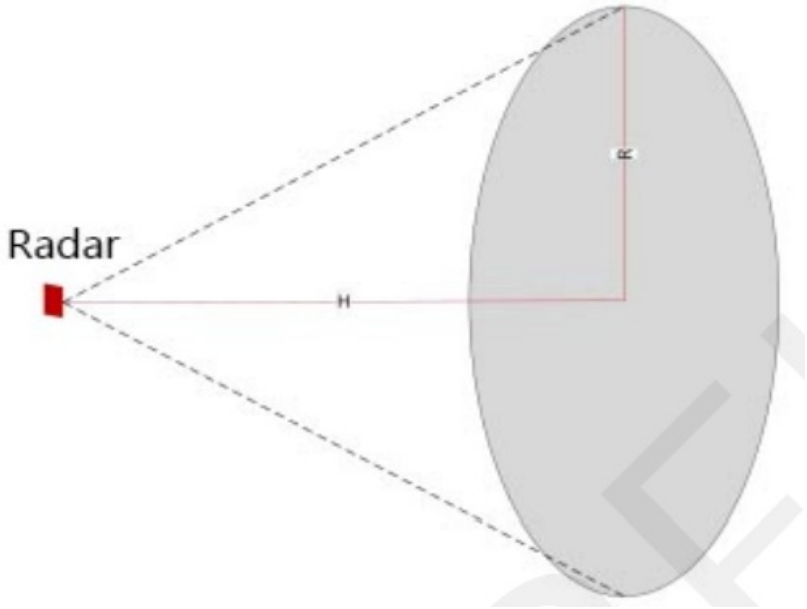


Figure 2 Wiring Diagram of Radar Module and Peripheral Equipment

Main Operating Performance

Radar Module Operating Coverage

The beam coverage of radar module is shown in. The radar coverage is a three-dimensional sector area with 100 ° horizontal and 100 ° pitch.



Due to the influence of radar beam characteristics, the radar operates far in the normal direction of the antenna surface, but the operating distance deviates from the normal direction of the antenna will become shorter.

Main Functions and Performance

Main Functions

1. Moving target detection
2. Slight motion target detection

3. Statistics function for counting people number

Main Parameters for Performance

1. **Max Detection Range:** ≤12m moving objects, limited to adults
2. **Stationary Detection Range** ≤8m (sitting, radial direction
3. **Ranging Accuracy** ≤0.5m
4. **Angle Measurement Accuracy** ≤5° object ≥2m
5. **Refresh Rate for Motion Detection** ≥10Hz
6. **Response Time for Stationary Detection** ≤30s
7. **Maximum of Counting Personnel Number** 10
8. **Maximum of Tracking of Personnel** 3

Radar Operation and Installation Mode

Installation

There commended installation method of this radar module is horizontal installation.

Horizontal-mounted
The radar is installed horizontally (as shown in the Figure), and the radar is fixed on the wall or placed on the desktop, and the radar beam irradiates the human body in a positive direction.

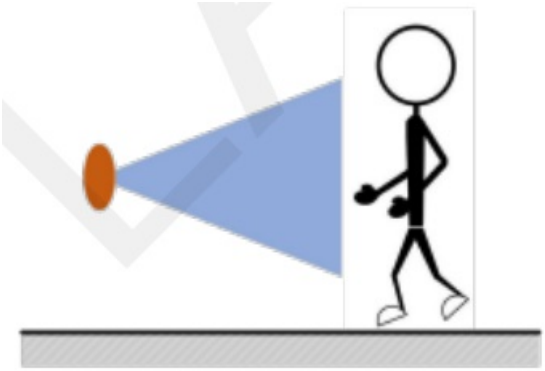


Figure Horizontal-mounted

Precautions

Start Time

When the module starts to work when it is initially powered on, it is necessary to completely reset the internal circuit of the module and fully evaluate the environmental noise to ensure the normal operation of the module. Therefore, when the module is initially powered on, it needs a startup stability time of ≥20s to ensure the validity of subsequent output parameters.

Radar biological detection performance

Because human biological characteristics belong to ultra-low frequency and weak reflection character is the signals, radar processing requires a relatively long cumulative processing. During the cumulative process, many factors may affect the radar parameters, so occasional detection failure is normal.

Power

The radar module requires higher power quality than conventional low frequency circuits. When powering the module, it is required that the power supply has no threshold glitches or ripples and that it effectively shields the power supply noise caused by accessory equipment. The radar module needs to be well grounded. Due to the ground noise brought by other circuits, the performance of the radar module may even be reduced or even work abnormally; the most common cause is a shorter detection d instance or an increased false alarm rate.
In order to ensure the normal operation of the VCO circuit inside the module, the power supply requirement for this module is + 5V- + 9V power supply, voltage of power supply no less than 5V. The external power supply must provide sufficient current output capability and transient response capability

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Documents / Resources

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