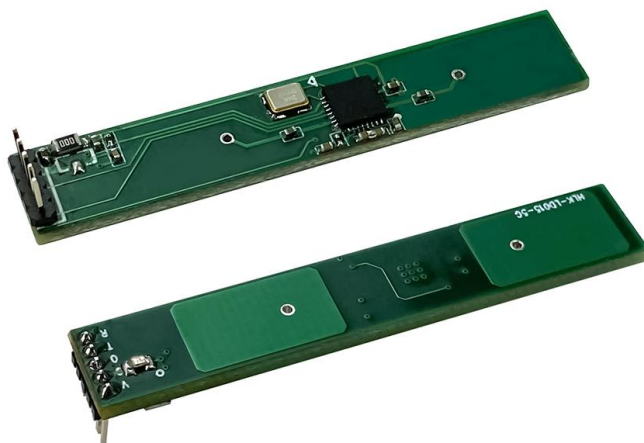




Shenzhen Hi-Link Electronic Co., Ltd.

HLK-LD015-5G Radar Module

User Manual



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1. Brief Introduction

HLK-LD015-5G is a miniaturized 5.8G radar sensor launched by Hi-Link. The module size is 46*8mm. The module fully integrates 5.8G microwave circuit, intermediate frequency amplifier circuit and signal processor, with high integration and good production consistency. The peripheral is matched with a miniaturized planar antenna, which greatly reduces the overall size while ensuring the performance of the sensor. The sensor can be used to detect the presence of human body or various scenes of moving target sensing, including smart home, Internet of Things, and smart lighting. Especially in the field of lighting, it has been widely used in standard lighting products such as induction bulbs and tubes.

2. Module Picture

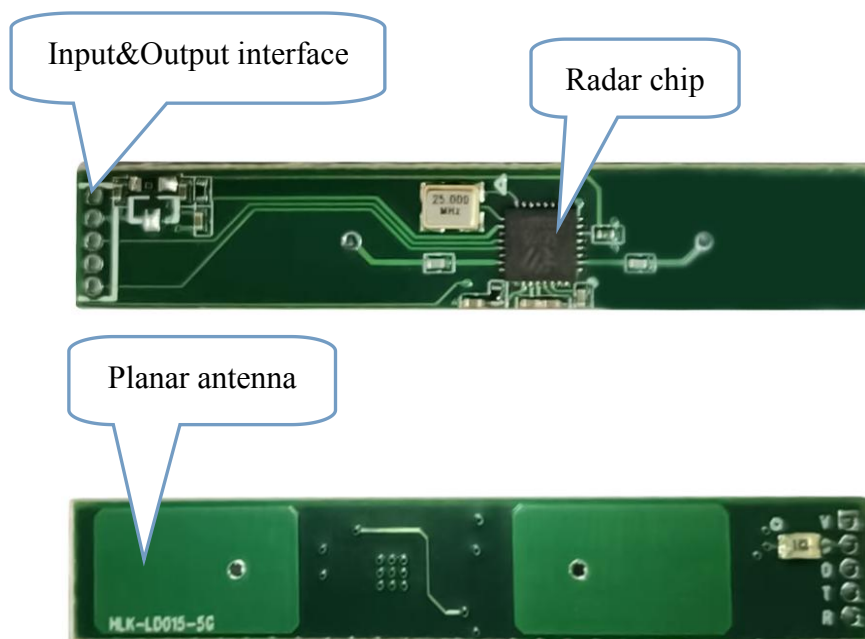


Figure 1. HLK-LD015-5G Radar Module physical picture

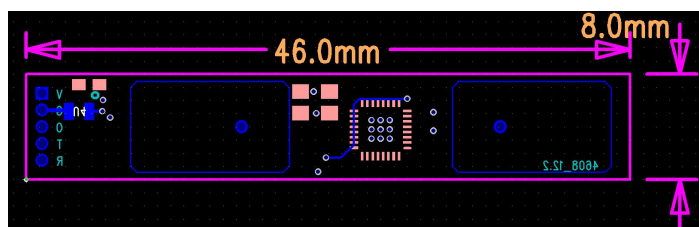
3. Input and Output Interface

The module reserves 5 pin holes with a PIN distance of 1.2mm. The three PINs VCC, GND and OUT are used by default. If parameters such as distance and delay time need to be modified, they can be flexibly configured through the serial port RX and TX. When there is no host computer, RX and TX can also be used as I/O ports to adjust parameters. The following table shows the definition of each PIN

Pin Name	Function	Remarks
VCC	Module Power Supply	The default LDO is not attached, VCC is 5V, and the version with LDO attached, VCC is 7~12V, the default power consumption of the module is 35mA, and the recommended power drive capability is over 50mA
GND	Ground PIN	
OUT	Output Signal	The default output 5V high and low level, can be modified to PWM output as needed
TX	Serial port/burn tDio/IO	Can be used for software upgrade or performance parameter
RX	Serial port/burn tClk/IO	Can be used for software upgrade or performance parameter

4. Mechanical Dimensions

The figure 2 below is a schematic diagram of the module's size and pin position. The module length and width are 46mm*8mm. There are no pins and the overall thickness is 2.5mm by default. If you need pins, the default pin height is 12mm.



Unit: mm

Figure 2

5. Electrical parameters

Parameters	Minimum Value	Typical Value	Maximum Value	Unit	Remarks
Transmit frequency	5725		5875	MHz	
Transmit power		0.5	1	mW	
Input voltage	4.5	5	5.5	V	LDO is not attached by default
Output high level		5		V	
Output low level		0		V	
Working current		38	50	mA	
Hanging height		3	5	M	Adjustable according to specific needs
Sensing radius		4	6	M	Related to sensitivity and hanging height
Delay time		30		S	Adjustable according to specific needs
Photosensitive threshold		10		Lux	Adjustable according to specific needs
Operating temperature	-30		85	°C	

6. Sensing time and sensing distance adjustment

HLK-LD015-5G requires 3 pins by default, namely VCC, GND and OUT. At this time, the induction delay and induction distance are fixed values. If you need to adjust the induction delay and induction distance and other related parameters, you need to add 2 pins, RX and TX, on the hardware as shown in Figure 3. In software configuration, RX and TX can be used as I/O ports or UART ports to adjust module parameters. These two PINs are regarded as I/O ports by default, where TX is used to adjust the sensing distance, its sensing distance is 4~6 meters at low level while 3~5 meters at high level; RX is used to adjust the delay time, its sensing delay time is 30S at low level while 2s at high level. When the sensing is triggered again within the delay time, the timing will restart. RX and TX can also be used both as UART port to adjust the module parameters, and serial ports.

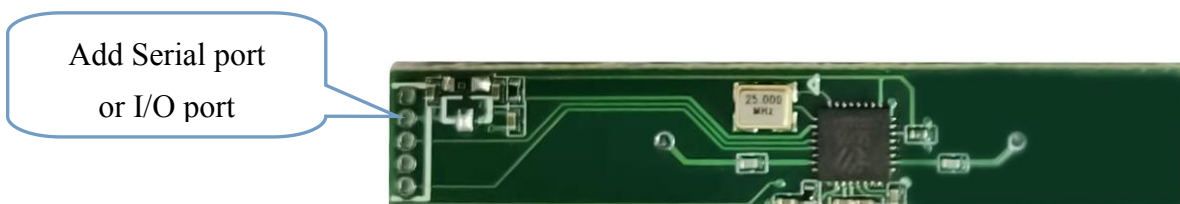


Figure 3. PIN Foot of Parameter Adjustment

7. Photosensitive detection

The module supports photosensitive detection, but photosensitivity can be optional. If photosensitive function is required, a photosensitive diode and regulation resistor can be added to the position shown in Figure 4. The photosensitive detection function should also be enabled in the software. The photosensitive threshold can be adjusted by the regulation resistor. In the version with photosensitive function, the radar sensor will be activated only when the ambient light is lower than the set illuminance. If the light is too bright, the module will not activate the sensor function. When testing the radar performance separately, you can cover the photosensitivity with black tape to avoid photosensitive effect, which affects the activation of the radar sensor function.



Figure 4. Photosensitive adjustment

8. Module power-on sequence diagram

The module has a power-on self-check function, that is, after the module is powered on, the OUT pin first outputs a high level, and then outputs a low level after 1s delay. The low level enters the normal induction mode after 1s delay. The following is the sequence diagram of the control signal after the module is powered on



Figure 5. Module power-on sequence diagram

9. Schematic diagram of detection range

The sensing sensitivity of the radar sensor can be configured through the MCU, and its limit sensing distance is 10 meters, and the actual sensing distance can be adjusted appropriately as required. The following is a schematic diagram of the radar detection range under the condition of hanging height. If the sensitivity is set higher, the detection range will increase accordingly. The dark area in the figure is the high sensitivity area, which can be fully detected in the area, and the light color area is the low sensitivity detection area, objects can be basically detected in this area.

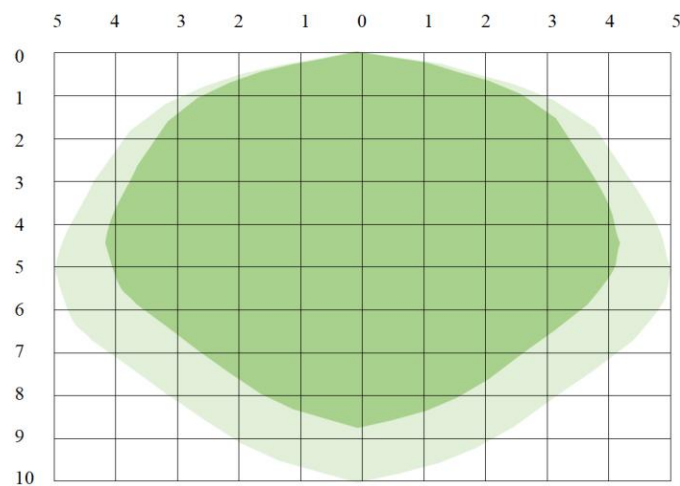


Figure 6. Schematic diagram of HLK-LD015-5G detection range (unit: m)

Precautions

When installing, avoid metal shells or parts on the front of the antenna to avoid shielding the signal. Plastic or glass is allowed, but the obstruction should not be close to the front of the

antenna;

Try to avoid directing the radar antenna direction to large metal equipment or pipelines, etc.;

When installing multiple radar modules, try to ensure that the antennas of each radar module are parallel to each other, avoid direct illumination between the antennas, and keep a distance of more than 1m between the modules;

The radar sensor should be avoided facing the AC drive power supply, and try to stay away from the rectifier bridge of the drive power supply to avoid power frequency interference with radar signals;

The power supply driving capability of the radar module needs to be more than 50mA, otherwise it will cause the sensor to work abnormally.

Appendix A Document revision history

Version	Revision scope	Date
V1.0	Initial version.	Jun. 6 th , 2020