

# HLK-LD112-24G RADOR MODULE

Version: V1.0  
Date: 2019/11/10

## 1. DESCRIPTION

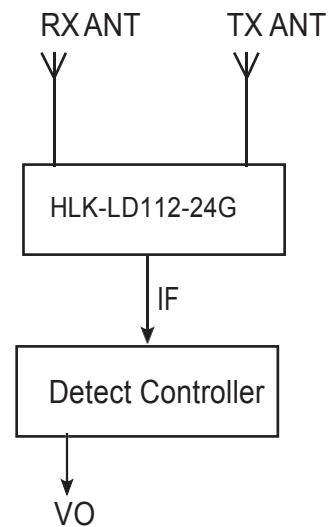
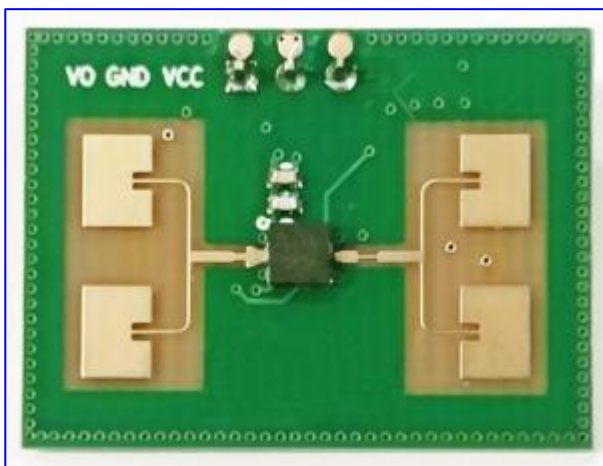
The 24GHz IoT radar module provides a low cost solution using detect controllerm,can be used in lot applications and Industrial applications.

### 1.1 FEATURES

- TX frequency range: 24~24.25GHz
- TX EIRP: 9dBm
- Phase noise: -96dBc/Hz@1MHz offset
- RX noise figure: 10 dB DSB
- Current at 5V power supply:55mA
- Small dimension: 22.95mm\*20mm

### 1.2 APPLICATIONS

- IoT application
- Industrial application



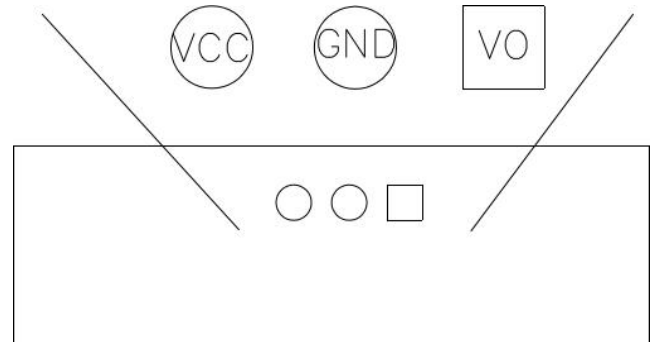
### 1.3 ELECTRICAL CHARACTERISTICS(at 25°C )

Parameter	MIN	TYP	MAX	UNIT	CONDITIONS
<b>Power Supply</b>					
VCC	3.6	5	5.5	V	
Current		55		mA	
<b>Transmitter</b>					
TX frequency range	24		24.25	GHz	
Output power EIRP		9		dBm	@24.125GHz
Phase noise		-96		dBc/Hz	@1MHz offset
<b>Receiver</b>					
Noise figure		10		dB	DSB
<b>Antenna</b>					
TX antenna gain		4		dB	
RX antenna gain		4		dB	
TX antenna pattern (3dB)		±57		deg	azimuth
		±24		deg	elevation
RX antenna pattern (3dB)		±57		deg	azimuth
		±24		deg	elevation
TX antenna pattern (10dB)		±100		deg	azimuth
		±45		deg	elevation
RX antenna pattern (10dB)		±100		deg	azimuth
		±45		deg	elevation

### 1.4 CONNECTOR INFORMATION

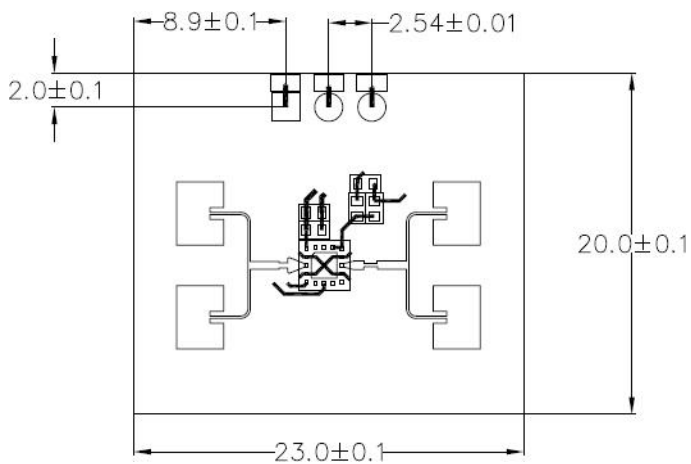
The connector is a 2.54mm 1\*3 pin header connector.

pin	name	notes
1	VO	Detect controller output pin
2	GND	Ground
3	VCC	Power supply

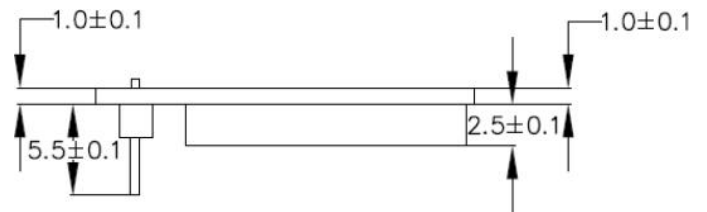


BOTTOM VIEW

### 1.5 MECHANICAL OUTLINES(mm)



TOP VIEW



SIDE VIEW

## 2 Parameter Debug Method

VO : Detection level output. Detected human or object movement, output high level. Low level when nobody moves. High level maintenance time about 1 second.

GND: ground

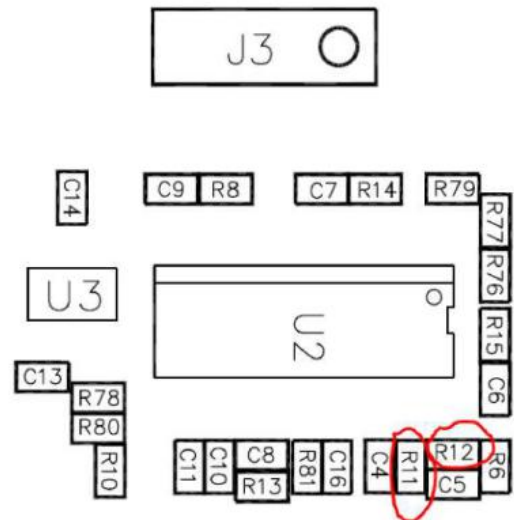
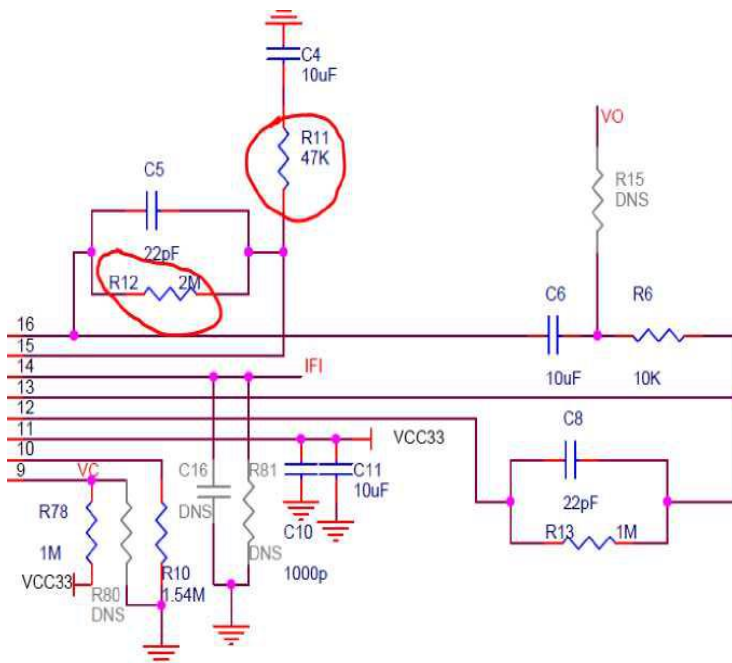
VCC : Power. Power supply with LDO version is 5 V

### 2.1 Sensitivity debugging method

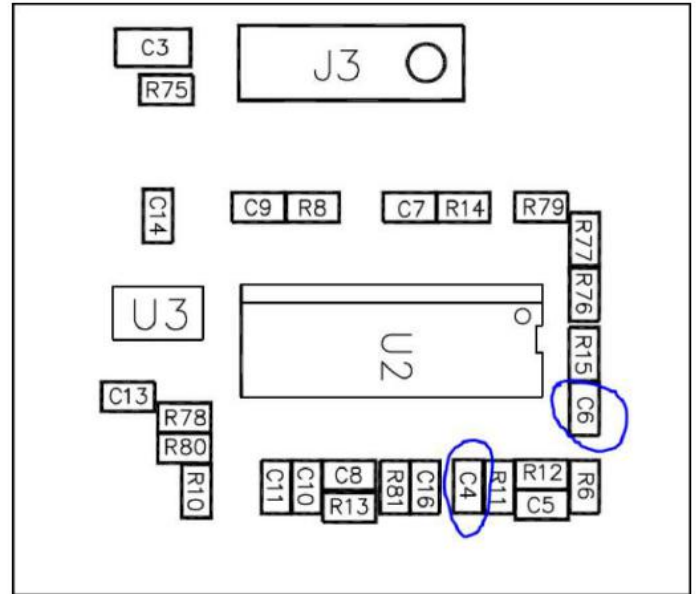
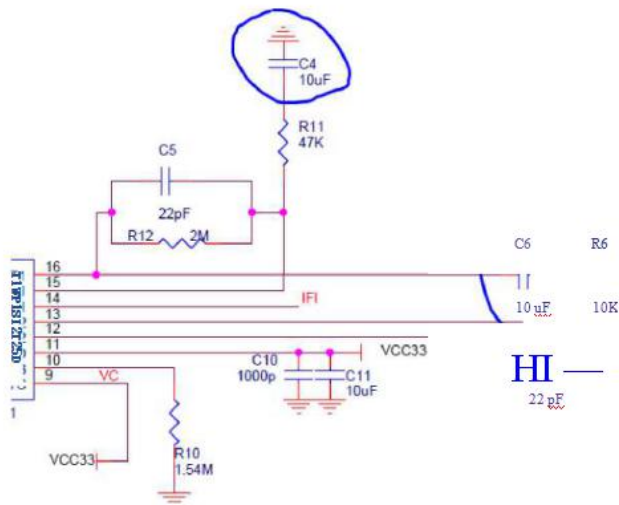
#### 2.1.1 Method 1

A. The current sensitivity magnification  $= (R12/R11) * (R13/R6) = (1\text{ M}/20\text{K}) * (1\text{M}/10\text{K})$  is 5000 times. considering that some shell materials have a large attenuation to electromagnetic waves, the default sensitivity is 5000 times, which is a more sensitive value. sensitivity can be modified according to the actual application scenario.

B. If the sensitivity needs to be reduced, it is recommended to change the R11 resistance value directly and increase the R11 resistance value. such as if need to revise to 2000 times, then just change R11 to 50 k.

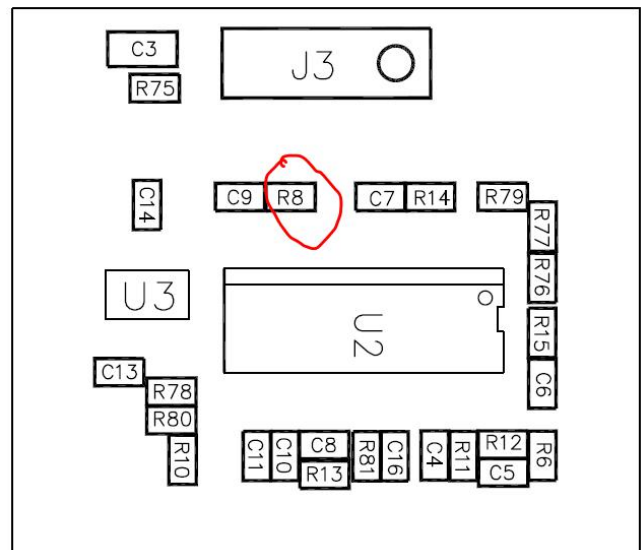
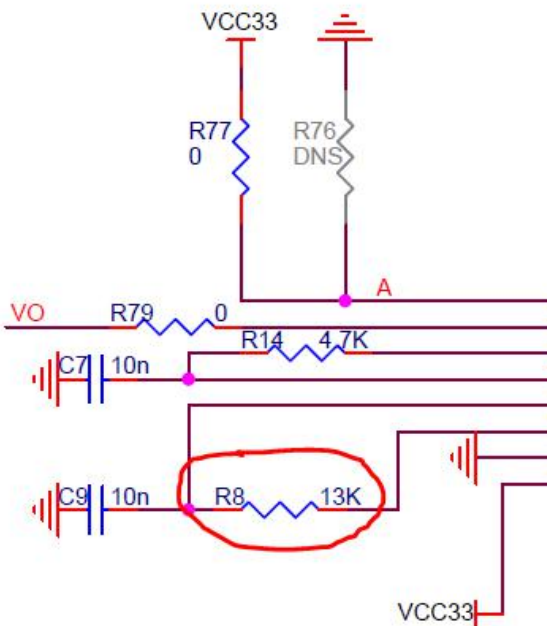


## 2.1.2 Method 2



If the C4,C6 capacitance value is reduced, the link bandpass characteristics can be changed and the high pass cutoff frequency can be improved, so that the module will be insensitive to some minor actions, and the module will be more stable and not easy to trigger. At the same time, the starting time of module power-on initialization can be greatly reduced. Recommendation changed to **2.2 uF or 1 uF**. The concrete effect can be debugged according to the actual. The side effect is that the sensing distance decreases by about 20%

## 2.2 Block Time Debugging Method



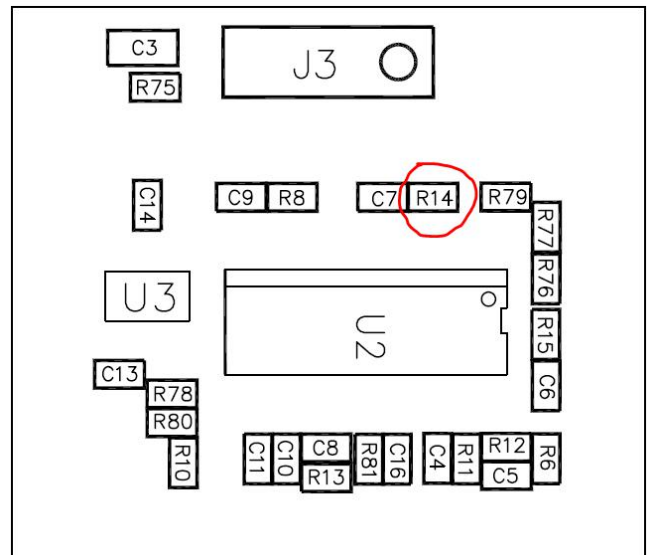
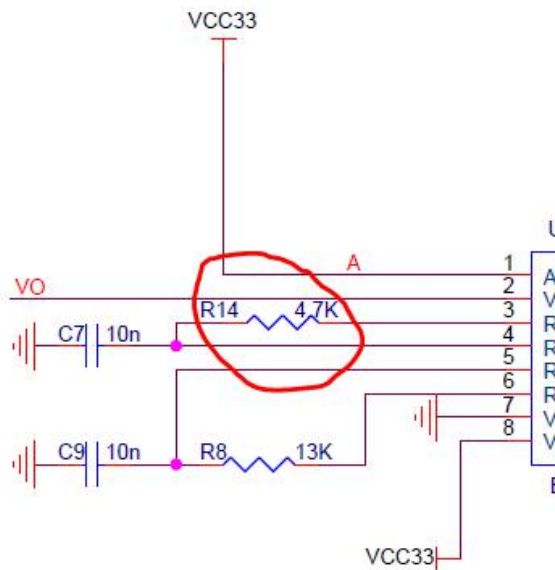
Blocking time refers to the time when the next test takes effect after the detection is completed and the output level is restored to 0 level. Change R8 resistance to adjust this time.

The current blocking time is about 0.8 seconds, corresponding **R8=39 k.** Not recommended. Too small block time will cause the module to be easily disturbed and accidentally touched Hair. and too large R8, will cause the module to fail to report.

Close time and R8 roughly correspond:

47KΩ	1.0 sec
62KΩ	1.4 sec
91KΩ	2.0 sec
120KΩ	2.6 sec
150KΩ	3.3 sec
180KΩ	3.9 sec

### 2.3 High level maintenance time Debugging Method



High level maintenance time after trigger is the maintenance time of 3.3 high level output by module after moving object is detected.

The current high-level output lasts about 1 second, corresponding **R14=4.7 k**. Output Maintenance Time corresponds to R14 values, see next page Forms.

output maintenance time corresponding to the value of the R14.

The current module 5 V power supply, there is LDO on the module change 5 V to 3.3 V.

电阻	VDD=5V	VDD=3.3V
	Tx 时间	Tx 时间
22KΩ	6.0 sec	4.6 sec
47KΩ	13 sec	10 sec
100KΩ	26 sec	20 sec
200KΩ	53 sec	40 sec
330KΩ	87 sec	66 sec
680KΩ	179 sec	135 sec
1MΩ	283 sec	198 sec