Pyroelectric Infrared Sensor
（Model： RD-623）

User's Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Zhengzhou Winsen Electronics Technology CO., LTD.

RD-623 Pyroelectric Infrared Sensor

Pyroelectric Infrared Sensor detects the infrared radiation by using the temperature-dependent feature. It suppresses the interference caused by temperature change adopts the method of dual sensing elements complementary which improves the stability of the sensor. This PIR sensor can be widely used in safety device, burglar alarm, automatic door, auto light control

and intelligent toys.
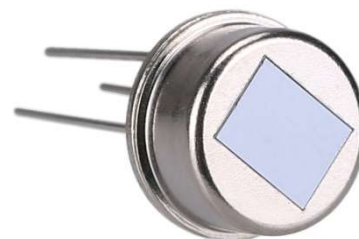
Features:
* High sensitivity and excellent signal to noise ratio
* High temperature-dependent stability
* Strong anti-jamming ability (e.g. vibration, radio-frequency interference etc.)
* High value with competitive price

Applications
Safety Alarm
Electricity Lighting
House-hold and other smart home fields

Parameters   Table 1

Model No.	RD-623
Standard Encapsulation:	TO-5
Infrared receiving Electrode	2×1mm, 2 sensitive elements
Window Size:	3.8×5mm
Receiving Wavelength:	5～14μm
Transmittance	>75%
Output signal peak[Vp-p]	3500mV
Sensitivity	3200V/W
Detection Rate (D*):	1.4×10^8 cmHz$^{1/2}$/W
Noise peak[Vp-p]:	<70mV
Output balance degree:	<10%
Source Voltage:	0.3～1.1V
Current	<25uA @Rs=47K
Working Voltage:	3～15V
Working temperature:	-30～70ºC
Storage temperature:	-40～80ºC
Incidence angle map:	145° X-X 134° Y-Y
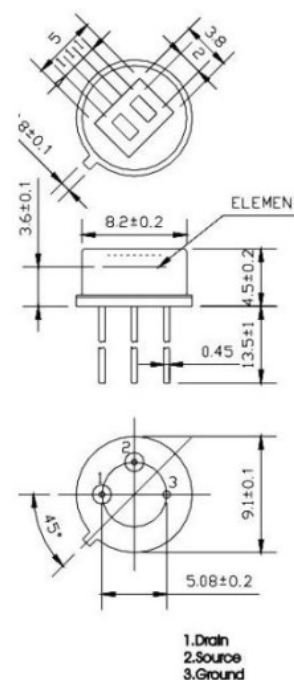
Component structure

1.Drain
2.Source
3.Ground
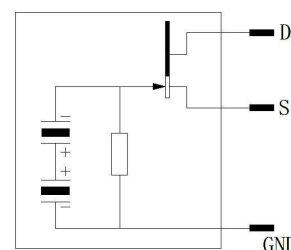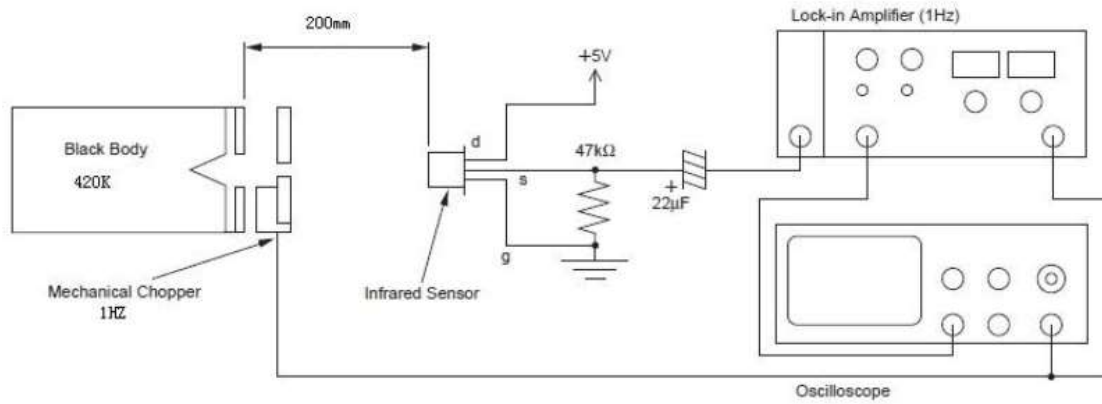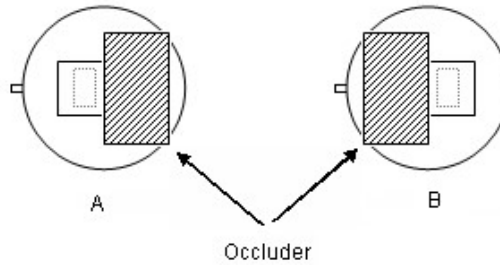
Internal equivalent circuit

Test Method:

Testing Conditions:

♦ Environment Temperature: 25ºC

♦ Blackbody temperature: 420K

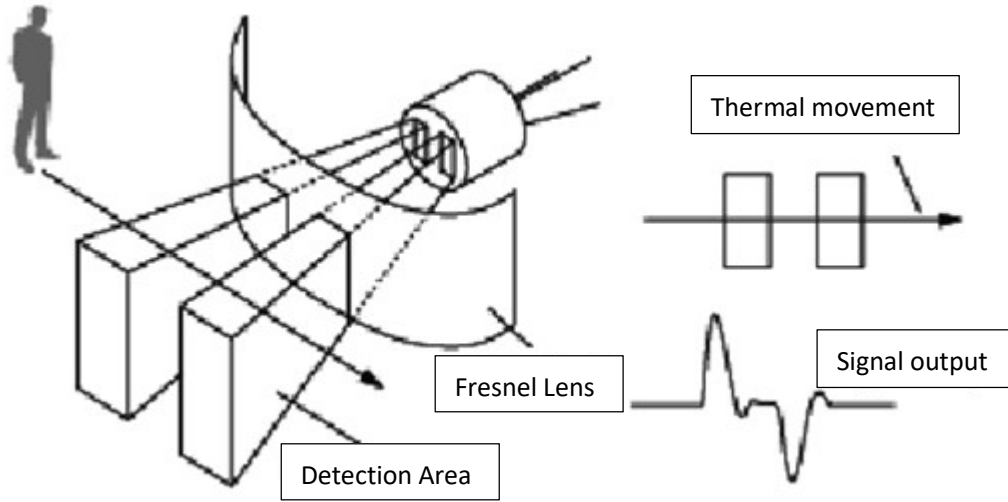♦ Modulation frequency 1HZ, 0.3 ~ 3.5HZ △f

♦ Magnification: 72.5 dB

Dual sensor sensitivity can be got by detecting each cell's sensitivity and calculate in following formula:

Balance degree = $|V_A - V_B|/(V_A + V_B) \times 100\%$

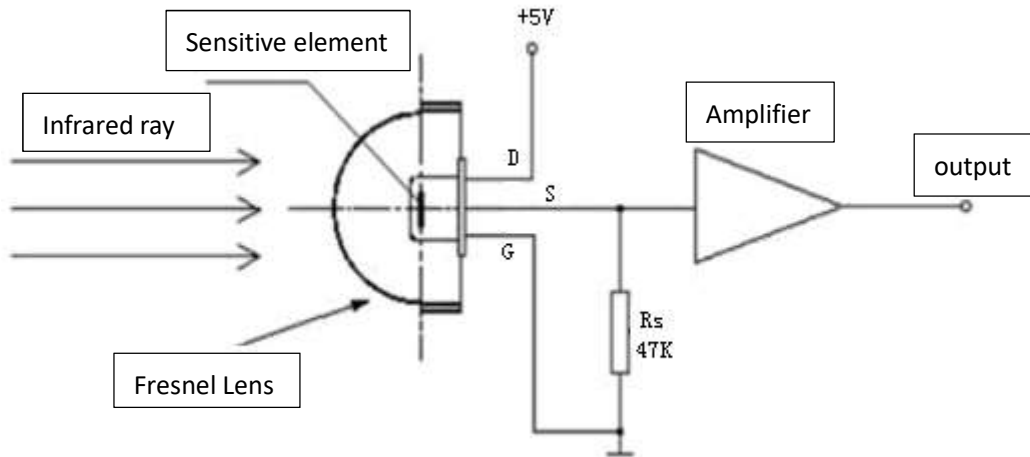V_A = Surface A sensitivity (mVp-p)
V_B = Surface B sensitivity (mVp-p)

Frequency Characteristic

Thermal movement

Fresnel Lens

Signal output

Detection Area

Fresnel Lens

+5V

Sensitive element
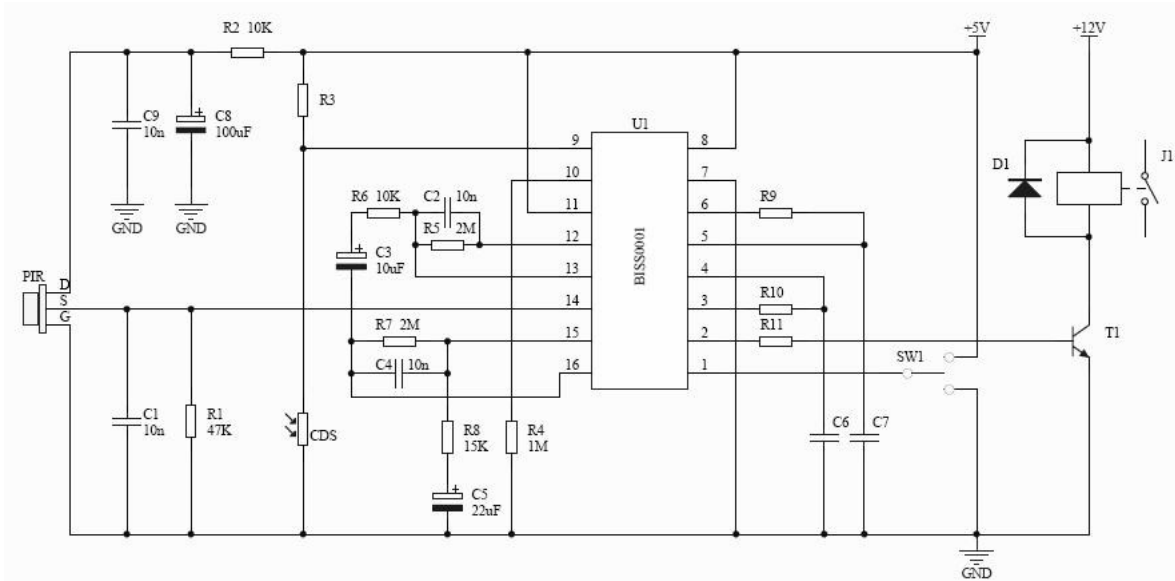
Infrared ray

D

S

Amplifier

output

G

Fresnel Lens
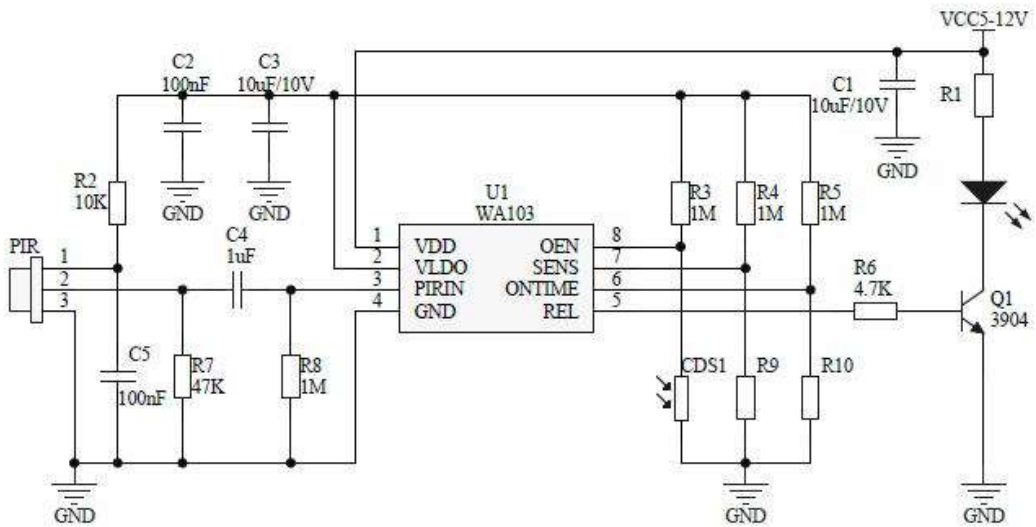
Rs
47K

By using different Fresnel lens, the detection range and distance can be determined. According to customer's requirement, it can response to various detection range and distance.

16.3

16.0

5.2

Horizontal view

Vertical view
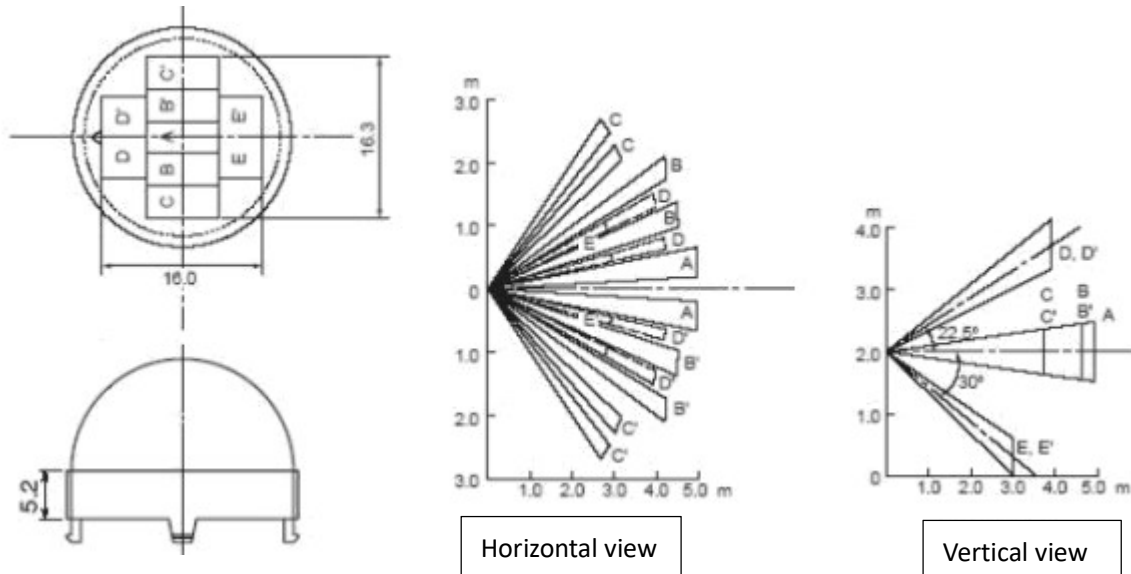
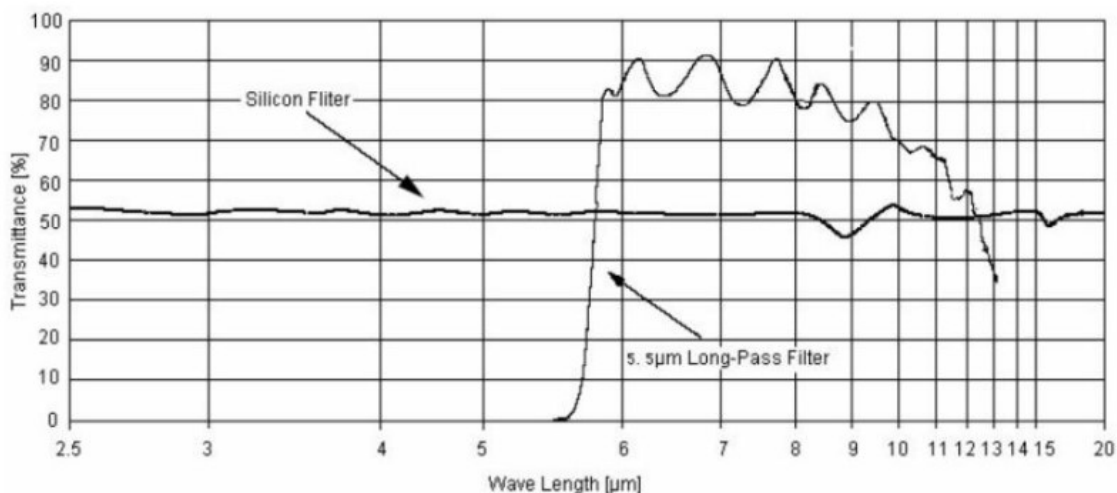## Typical application circuit:

Note: R9, R10, C6, C7 value can be adjusted upon actual needs.

Note: R9, and R10 value can be adjusted upon actual needs.

The receiving wavelength of the window material:

Note: This chart is typical 5um infrared filter, and the curve is the average value of infrared pass rate. This window material is a semiconductor wafer, which is processed by special vacuum coating.

Reliability Test

Test Items	Test Conditions	Criteria
High Temperature	85ºC, for 500 hours	After reliability testing, place the sensors in room temperature condition for 3hours, then test them again: 1. **Appearance: no remarkable damage** 2. **Sensitivity: within 20% of initial sensitivity value (acceptable tolerance)** 3. **Noise: +100mV of initial value (max tolerance)**
Low Temperature	-40ºC, for 500 hours	
Humidity	60ºC, 95%RH, for 500 hours	
High Temperature Loading	85ºC, 5V applied, 47k load, for 48 hours	
Heat Shock	-10ºC, 30min ←→50ºC, 30min*10 cycles	
Anti-static	200p F, 0Ω, 200V	
Vibration	Apply vibration of amplitude of 1.5mm with 10 to 55Hz to each of 3 perpendicular directions for 60min	
Lead Strength	1kg strain force along lead, 5sec	
Drop Test	Dropping from 750mm high, 3 times	
Soldering Heat	260±5ºC, 10±1sec, dipping leads submerge into solder down to 3.0mm below stem	
Hermetic Seal	125±5ºC FC-40, 20min	**No bubble visible**

Cautions:

1.The sensor's parameter is obtained by standard testing condition after 1 minute's settling time.

2. Please pay attention on Sensor's window direction, must combine with Fresnel lens to get a perfect detecting angle.

3. Sensors detecting distance is affected by ambient temperature, moving objects' temperature ,Fresnel lens, Amplifier amplification factor, the comparator threshold voltage setting etc. please take a comprehensive consideration of various parameters when using the sensors.

4. Please do not touch the window area to avoid damaging to the optical filter.

5. Please handle the sensor with care when using it. Frequent and excessive vibration can cause the sensitive body inside to break

6. Please add Rc filter circuit to the sensor's power supply side when design the circuits.(please take typical application circuits for R2,C8 and C9 as reference).

7. Please try to use manual soldering, the soldering temperature should be below 300℃, and the soldering time should be less than 3 seconds.

8. Applying static electricity above ±800V may cause damage to the sensor. Please take electrostatic protection measures when using this product.

Note: To keep continual product development, we reserve the right to change design features without prior notice.