Pyroelectric Infrared Sensor



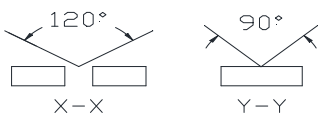
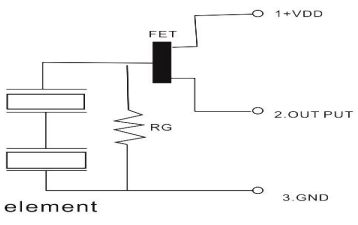
Model： D203S

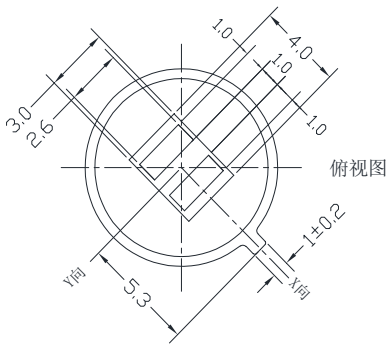
PIR SENSOR

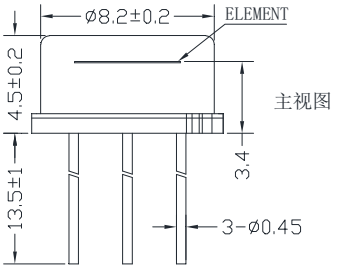
The Pyroelectric Infrared (PIR) Sensor detects infrared radiation by sensing changes in the material's spontaneous polarization caused by temperature variations. It features a dual-element design to suppress interference from ambient temperature changes, ensuring stable operation. It is widely used in smart toys, automatic light switches, sensor doors, and more, and is particularly suitable for smart toy applications.

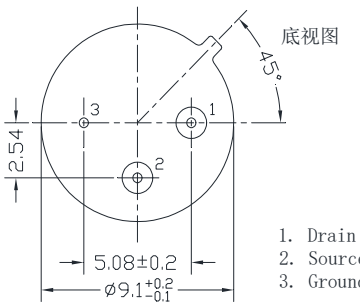
Note: Senba Sensing reserves the right to make changes, corrections, enhancements, modifications, and improvements to the product specifications at any time without prior notice.

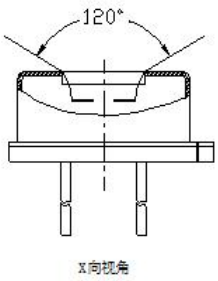
Technical Data

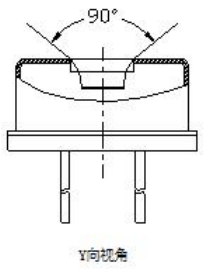
Window Size	3*4mm
IR Receiving Electrode	2.6*1mm，2elements
Package Type	TO-5
Spectral Response	5—14μ m
Transmittance	≥ 75%
Signal Output[Vp-p]	≥ 3500mV
Sensitivity	≥ 3300V/W
Detectivity (D*)	1.4 ×10^{8} cm$Hz^{1/2}$/W
Noise[Vp-p]	<80mV
Output Balance	<10%
Offset Voltage	0.3~1.2V
Supply Voltage	2~15V
Operating Temp.	-30~+70°C
Storage Temp.	-40~+80°C
Incident Angle of View	
Equivalent Circuit	





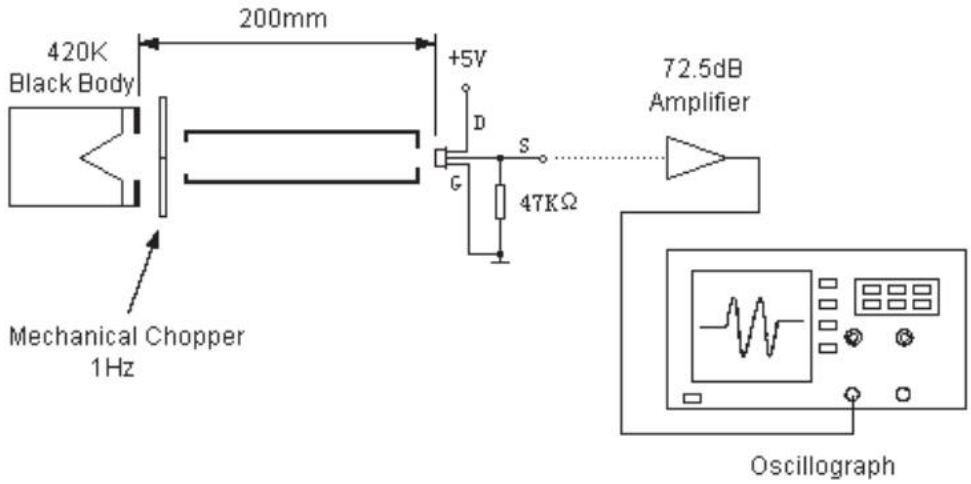






1. Drain
2. Source
3. Ground

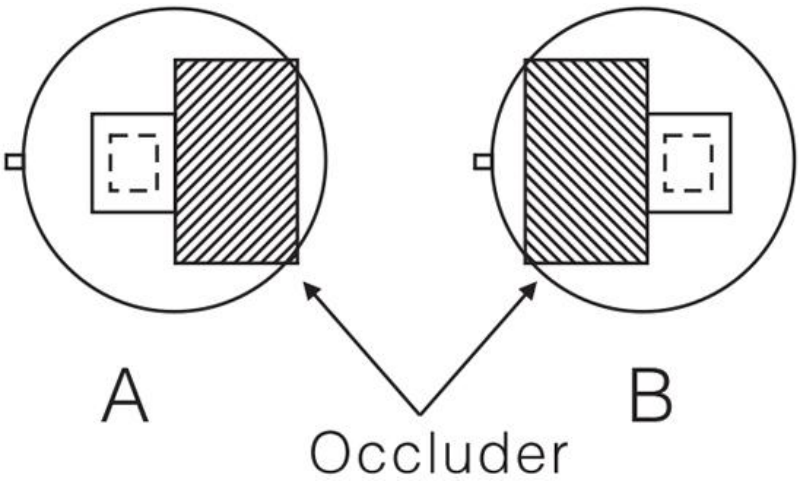
Test Method



Test Conditions

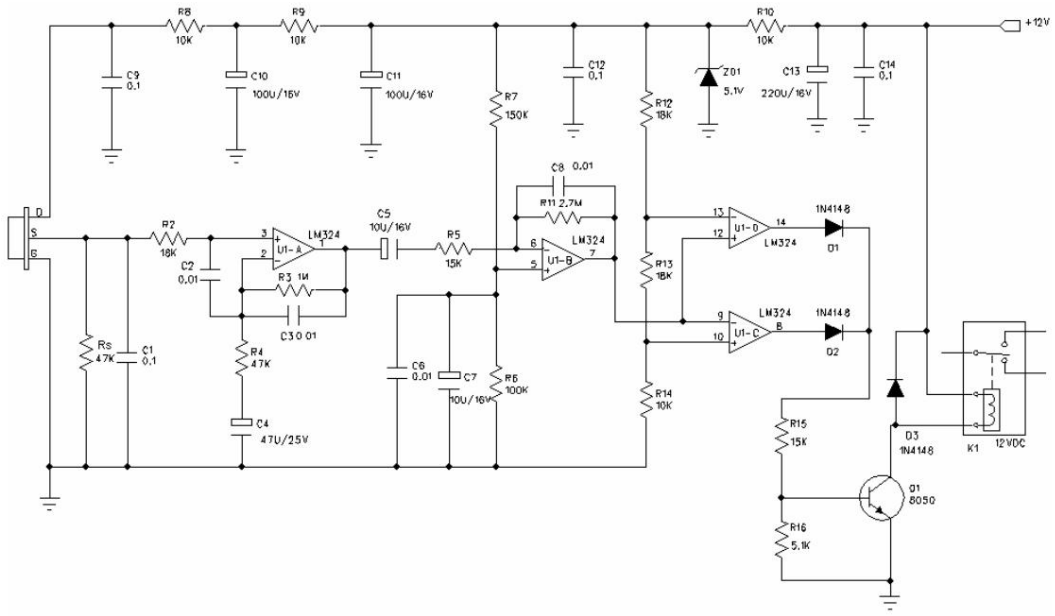
- Ambient temperature 25°C
- Black-body temperature 420K (@147° C)
- Modulating frequency 1Hz, 0.3-3.5Hz △ f
- 72.5 dB Amplifier

Test Conditions



- The sensitivity balance of dual element sensor is calculated through testing the sensitivity (single signal output voltage) of each element and using the following formula:
- Balance=$|V_A-V_B|/(V_A+V_B)$ ×100%
- V_A=Sensitivity of side A(mVp-p)
- V_B=Sensitivity of side B(mVp-p)

Typical Application



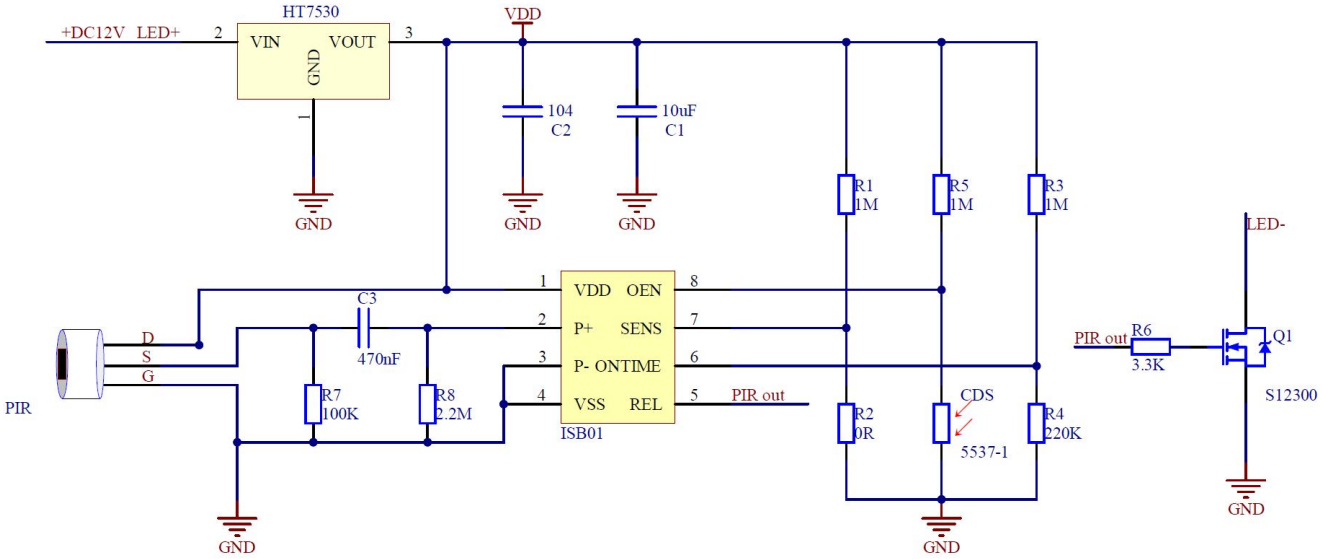
Notice:

U1A-D: LM324

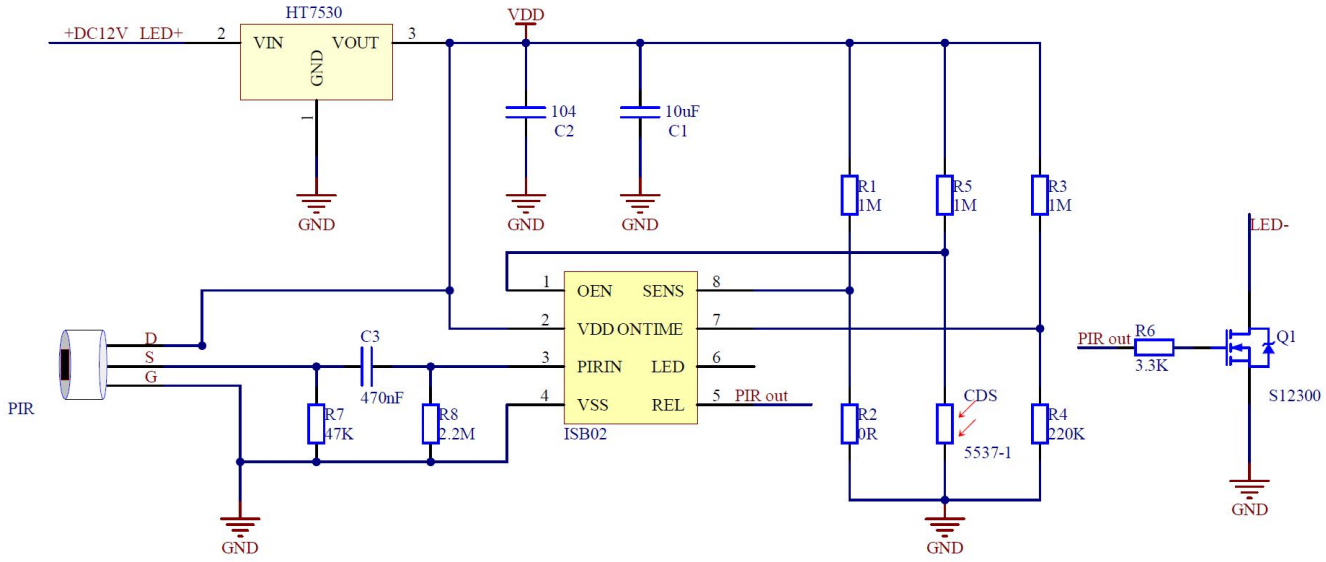
Vdd: 12VDC

Rs=47KΩ, as the reference voltage setting resistor

Analog PIR+Digital IC Application



Analog PIR+Digital IC （ISB01）



Analog PIR+Digital IC （ISB02）

Use Directions

Circuit design

1. The connection between PIR Sensor and other devices should be as short as possible. On the multi-panel or multi-layer board, try not to trace the line below the connection, especially no large current.

2. The circuit of the PIR human sensing part should be made in one single PCB board to avoid interference. If done on the same board, the PIR body sensing part of the circuit should be isolated and have a separate ground; only connect the other circuits through the positive, negative and output three lines.

3. VDD of the PIR Sensor should connect to ground with 100NF capacitor as close as possible.

Soldering Requirment

Soldering requirements

Manual soldering requirements

1. For manual soldering, soldering must be completed within 3 seconds and the soldering iron temperature is below 350℃。

Reflow soldering:

1. The wave soldering temperature is set at 260±5℃ and the speed 1500± 300mm/ min.

2. The furnace temperature should not exceed 260℃, and the time should not exceed 3S. (Note: The induction performance will be degraded or the function will be invalid by high temperature.)

3. During wave soldering, the PIR should not be tightly close to the PCB. It is recommended that 1mm or more distance, to prevent short-circuited.

4. Wipe the widow with dry cloth or absolute ethanol if there is stain.

Application

1. The PIR sensor detect changes of infrared ray. The sensor can only detect the heat source which is changing or moving from human body. The following items should be noticed. Please confirm the performance and reliability by practical application.

1.1 When detect the heat source besides human body

(1)Pet get into detection area.

(2)In a place exposed directly to sunlight or headlight of automobile.

(3)In a place exposed directly to blow from air-conditioner or heater which make drastic change of temperature in detection area.

1.2 The heat source is hardly detected

(1)In such a place where infrared ray is shaded by glass, propenyl, etc.

(2)The heat source does not move or high-speed move in the detection area.

2. The detection area extended

Even outside the designated detection area, there also exists broad detection area when there is a large temperature difference(above 20 ℃) between environment and human body.

3. Other usage

3.1 Optical filter of sensor should not be soiled because it may cause failure or malfunction.

3.2 The lens is made by polyethylene. Please avoid stress or impact on the lens, or it will cause performance reduction and work unusually.

3.3 Electronics(above ±200) should be avoid. Please do not touch terminal by hand.

3.4 Please avoid cleaning the sensor. The cleaning fluid may cause malfunction.

3.5 In order to avoid the interference effect of wires, the shielded wire is recommended and tries to make it short.

3.6 Each Fresnel lens has a fixed focal length. Be careful to adjust its focal length when installing,or the sensitivity will be reduced.

3.7 Be sure the Fresnel lens and the finished casing installed then to test. Otherwise, the induction effect is poor and the wind blows easily(the sensor's iron shell and pins cannot be exposed).