# Pyroelectric Infrared

# Radial Sensor



**TYPE: AS612**

**NANYANG SENBA OPTICAL AND ELECTRONIC CO.，LTD.**

Digital Smart Pyroelectric Detector AS612

AS612 is a newest smart digital motion detector with a small window size.

It offers a complete motion detector solution, with all electronic circuitry built into the detector housing. Only a power supply and power-switching components need to be added to make the entire motion switch.

AS612 includes the setting for time, sensitivity and ambient light level.

## ■ Features and Benefits

- Digital signal processing（DSP）
- Power adjustable, save more energy
- Two-way differential high impedance sensor input
- Built-in filter, screen the interference by other frequency
- Excellent power supply rejection, Insensitive to RF interference
- Schmidt REL output
- Low voltage, low power consumption, instantaneous settling after power up

## ■ Applications

- Toys
- Digital photo frame
- TV, Refrigerator, Air-conditioner
- USB Alarms
- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights
- Computer monitor
- Security system
- Automatic control
- Corridor
- Stairs Lights etc.

## ■ Dimension



PIR Dimension

1. SENS
2. OEN
3. VSS
4. VDD
5. REL
6. ONTIME
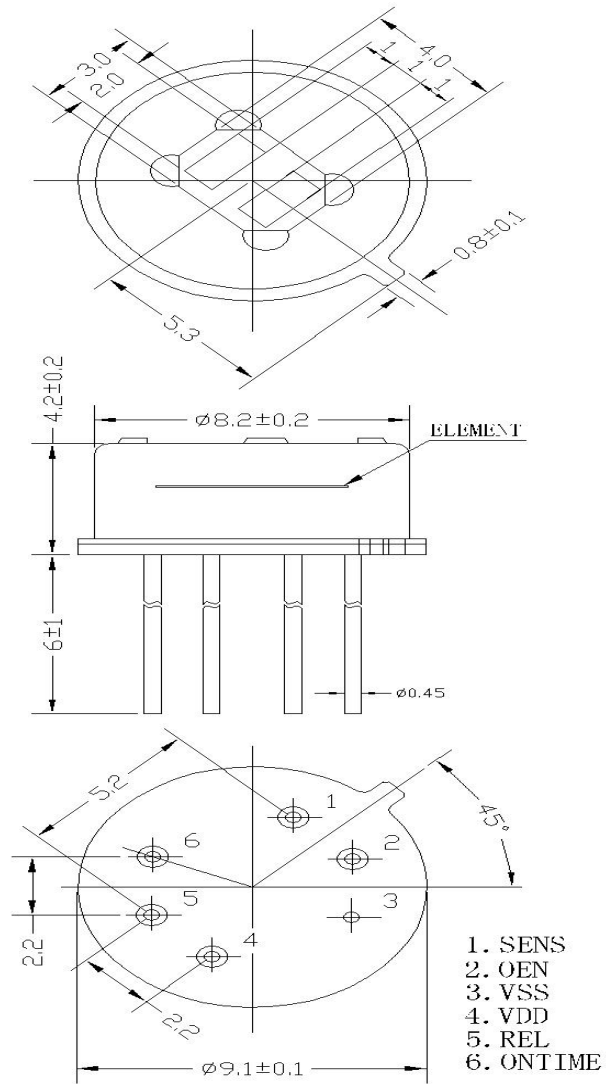
■ **Technical Data**

**1. Maximum Ratings**

| Characteristics | Symbol | Min. Value | Max. Value | Unit | Remarks |
|---|---|---|---|---|---|
| Supply Voltage | VDD | -0.3 | 3.6 | V | |
| Working Temperature | TST | -20 | 85 | °C | |
| Max.current for pin | Into | -100 | 100 | mA | |
| Storage Temperature | TST | -40 | 125 | °C | |

**2.Working Conditions (T=25°C, Vdd=3V，Except other requirements)**

| Characteristics | Symbol | Min. | Type | Max. | Unit | Remarks |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | 2.7 | 3 | 3.3 | V | IR=0.5mA |
| Working Current | $I_{DD}$ | 12 | 15 | 20 | μA | |
| Sensitivity | $V_{SENS}$ | 120 | | 530 | μV | |
| **Output REL** | | | | | | |
| Output Low Current | $I_{OL}$ | 10 | | | mA | $V_{OL}<1V$ |
| Output High Current | $I_{OH}$ | | | -10 | mA | $V_{OL}>(V_{DD}-1V)$ |
| Lock time | $T_{OL}$ | | 2.3 | | s | |
| On-time | $T_{OH}$ | 2.3 | | 4793 | s | |
| **SENS/ONTIME** | | | | | | |
| Input voltage | | 0 | | $V_{DD}$ | V | 0V to ¼ $V_{DD}$ |
| Input Bias Current | | -1 | | 1 | μA | |
| **OEN** | | | | | | |

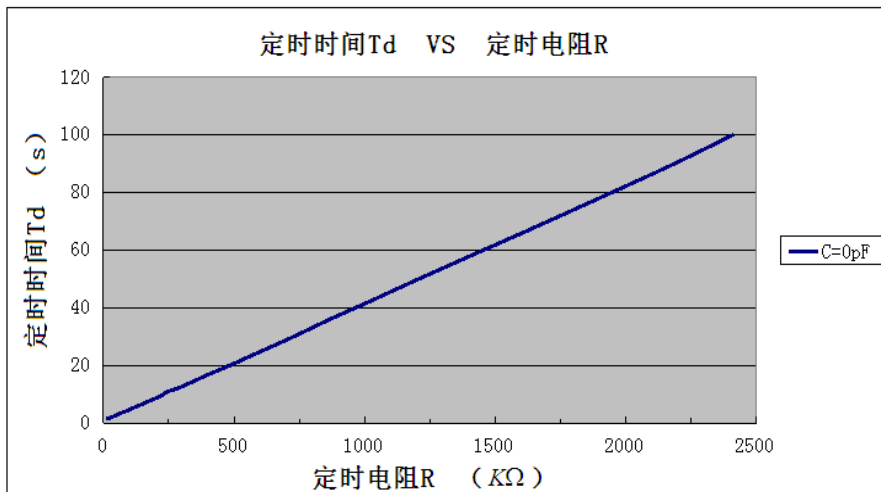| Input Low Voltage | $V_{IL}$ | | | 0.2 | Vdd | |
|---|---|---|---|---|---|---|
| Input High Voltage | $V_{IH}$ | 0.4 | | | Vdd | |
| Input Current | $I_I$ | -1 | | 1 | µA | $V_{SS}<V_{IN}<V_{DD}$ |
| **Oscillator & Filter** | | | | | | |
| Low pass filter cut-off frequency | | | | 7 | Hz | |
| High pass filter cut-off frequency | | | | 0.44 | Hz | |
| Oscillator frequency on Chip | $F_{CLK}$ | | | 64 | kHz | |
| Interior Block Diagram |  | | | | | |

### ■ On-time Setting

**1.Analog setting style for on-time**

Td: On-time time

R: On-time Resistor

C: On-time Capacitor

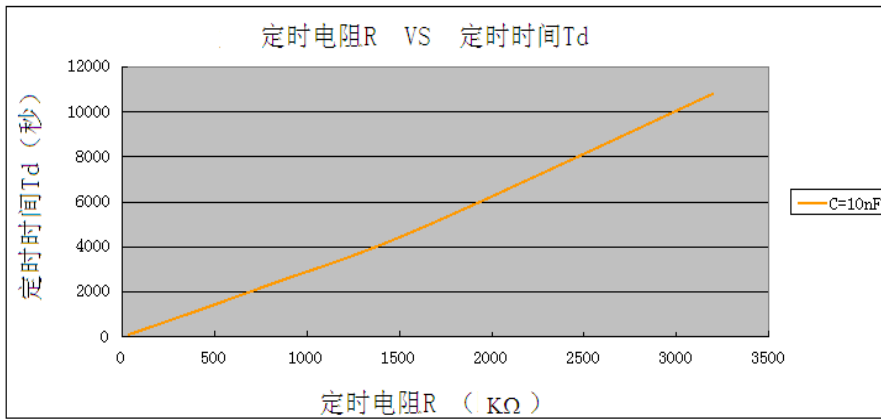## 定时时间Td VS 定时电阻R



* **C=0pF**

## 定时时间Td VS 定时电阻R



* **C=0pF**

## 定时电阻R VS 定时时间Td



* **C=100pF**

**\* C=1npF**
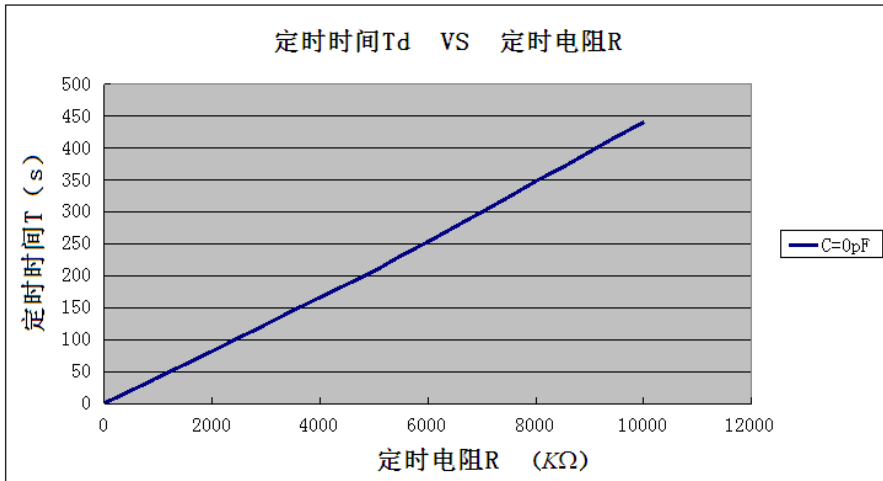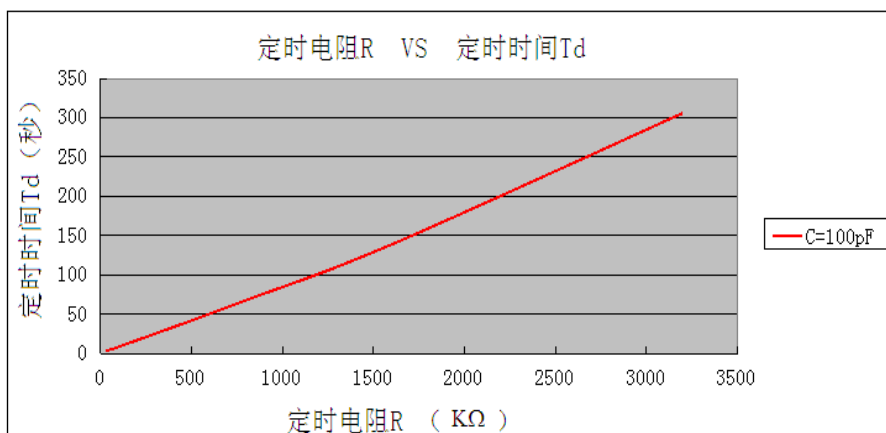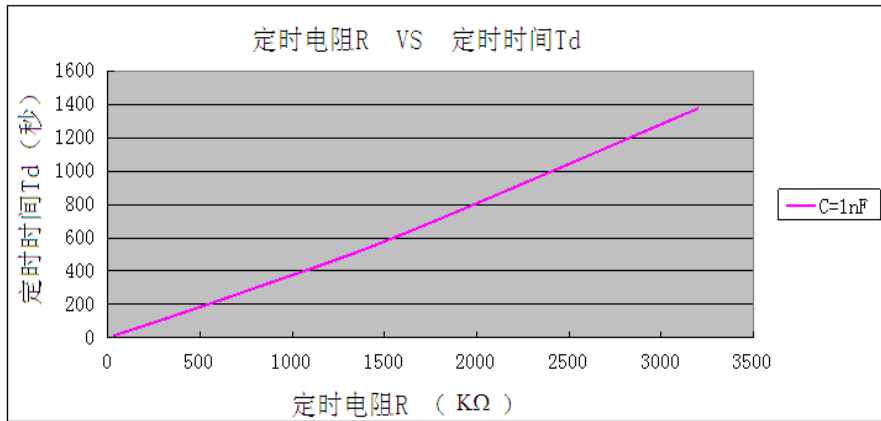


**\* C=10npF**

## 2. Digital setting style for on-time

| No | On-time Voltage （VDD） | On-time center Voltage（VDD） | Pull-down-Resistor ($\Omega$) (Pull-up=1M) | Time (Td) （sec） |
|----|----|----|----|----|
| 0 | 0~1/32 | 1/64 | 0K | 1.8 |
| 1 | 1/32~2/32 | 3/64 | 51k | 3.6 |
| 2 | 2/32~3/32 | 5/64 | 91k | 5.4 |
| 3 | 3/32~4/32 | 7/64 | 120k | 7.2 |
| 4 | 4/32~5/32 | 9/64 | 180k | 14.4 |
| 5 | 5/32~6/32 | 11/64 | 220k | 29 |
| 6 | 6/32~7/32 | 13/64 | 270k | 43 |
| 7 | 7/32~8/32 | 15/64 | 330k | 58 |
| 8 | 8/32~9/32 | 17/64 | 360k | 115 |
| 9 | 9/32~10/32 | 19/64 | 430k | 230 |
| 10 | 10/32~11/32 | 21/64 | 510k | 346 |
| 11 | 11/32~12/32 | 23/64 | 560k | 461 |
| 12 | 12/32~13/32 | 25/64 | 680k | 922 |
| 13 | 13/32~14/32 | 27/64 | 750k | 1843 |
| 14 | 14/32~15/32 | 29/64 | 910k | 2765 |
| 15 | 15/32~16/32 | 31/64 | 1M | 3686 |

■ **Sensitivity Setting**

| | $V_{SENS}$ | | | $V_{SENS}$ | |
|---|---|---|---|---|---|
| | Voltage Range ($V_{DD}$) | Center Voltage ($V_{DD}$) | | Voltage Range ($V_{DD}$) | Center Voltage ($V_{DD}$) |
| 0 | 0~1/64 | 1/128 | 16 | 16/64~17/64 | 33/128 |
| 1 | 1/64~2/64 | 3/128 | 17 | 17/64~18/64 | 35/128 |
| 2 | 2/64~3/64 | 5/128 | 18 | 18/64~19/64 | 37/128 |
| 3 | 3/64~4/64 | 7/128 | 19 | 19/64~20/64 | 39/128 |
| 4 | 4/64~5/64 | 9/128 | 20 | 20/64~21/64 | 41/128 |
| 5 | 5/64~6/64 | 11/128 | 21 | 21/64~22/64 | 43/128 |
| 6 | 6/64~7/64 | 13/128 | 22 | 22/64~23/64 | 45/128 |
| 7 | 7/64~8/64 | 15/128 | 23 | 23/64~24/64 | 47/128 |
| 8 | 8/64~9/64 | 17/128 | 24 | 24/64~25/64 | 49/128 |
| 9 | 9/64~10/64 | 19/128 | 25 | 25/64~26/64 | 51/128 |
| 10 | 10/64~11/64 | 21/128 | 26 | 26/64~27/64 | 53/128 |
| 11 | 11/64~12/64 | 23/128 | 27 | 27/64~28/64 | 55/128 |
| 12 | 12/64~13/64 | 25/128 | 28 | 28/64~29/64 | 57/128 |

| 1 3 | 13/64~14/64 | 27/128 | 2 9 | 29/64~30/64 | 59/128 |
|---|---|---|---|---|---|
| 1 4 | 14/64~15/64 | 29/128 | 3 0 | 30/64~31/64 | 61/128 |
| 1 5 | 15/64~16/64 | 31/128 | 3 1 | 31/64~32/64 | 63/128 |

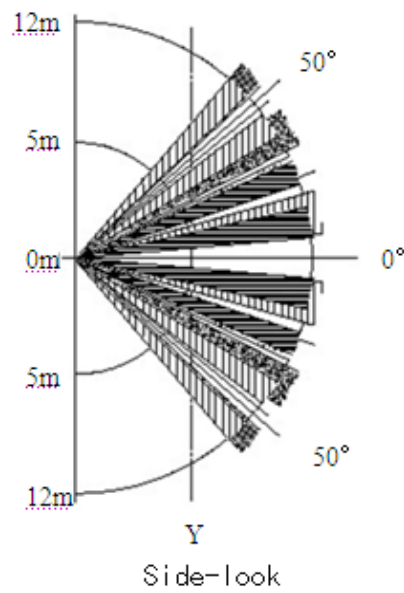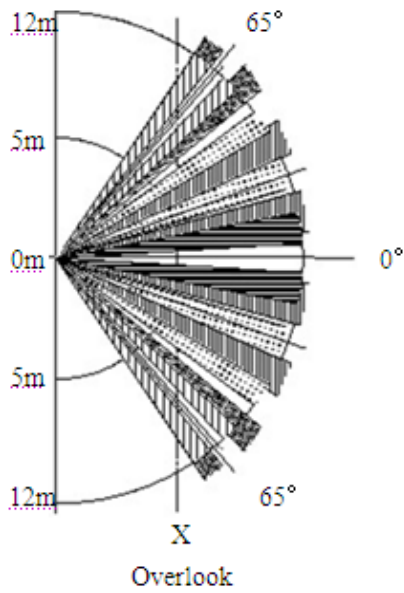■ **Typical Application**
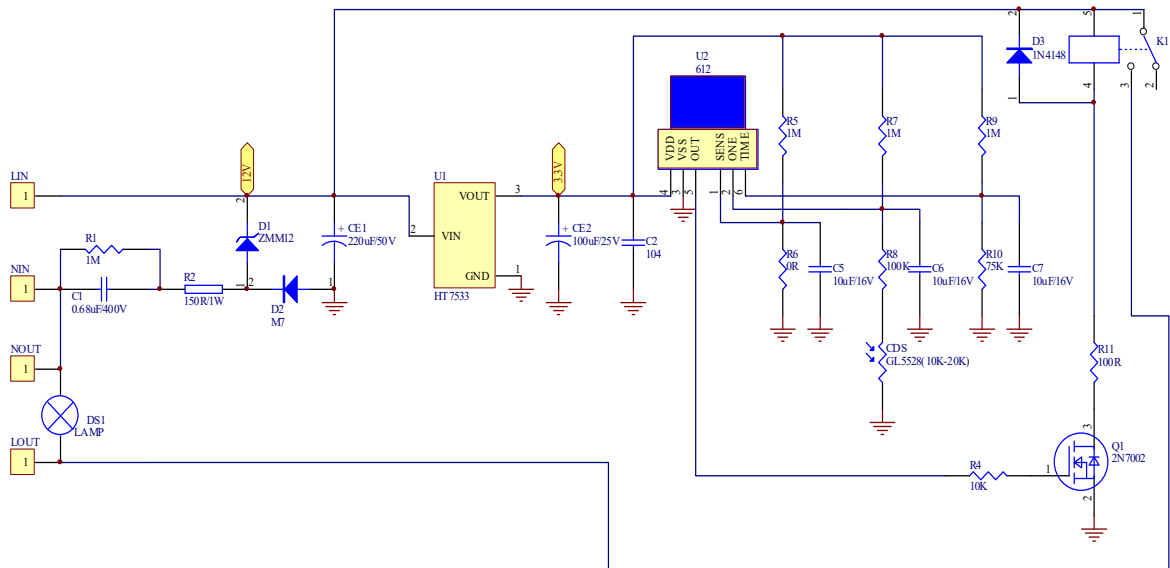


**Notes: The circuit design for PIR Sensor AS612 .**
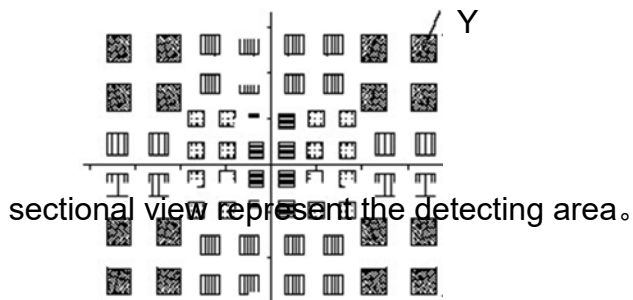
■  **Spectral Response of Window Materials**
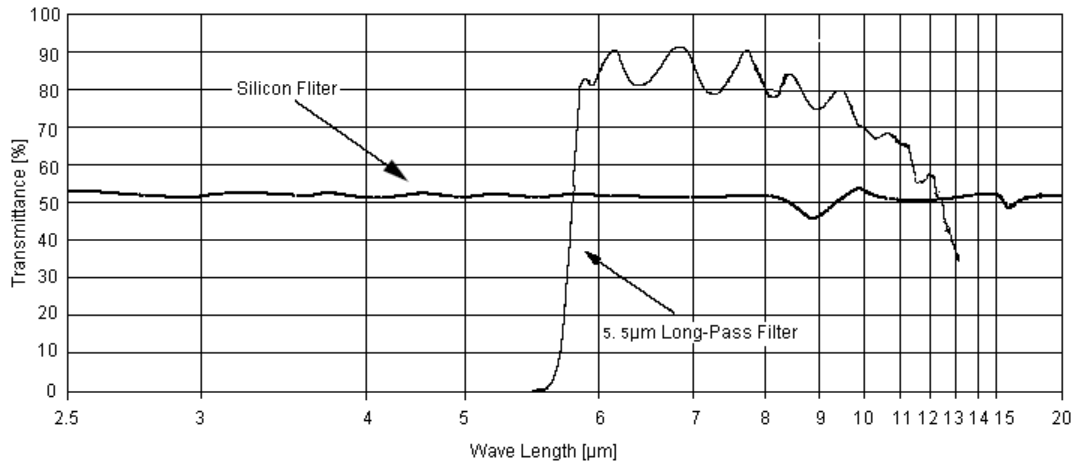


**Notes: The average transitivity curve for silicon filter with 5.5μm pass IR filter**

## ■ Detection View



X    Overlook    Y    Side-look

X-Y sectional view



detecting zone

Notes：1.X-Y sectional view represent the detecting area。

2.Objects with temperature difference can be Detected in the vertical level.

12m    9    6    3         3    6    9    12m

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