



Pyroelectric Flame Sensor

(Model: RP911 series)

User's Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Please keep the manual properly, in order to get help if you have questions during the usage in the future.

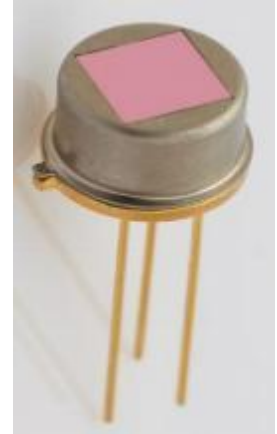
Zhengzhou Winsen Electronics Technology CO., LTD.

RP911 Series Pyroelectric Flame Sensor

Product description

The RP911 pyro-electric flame sensor uses lithium tantalate single crystal as the sensitive element material. The Curie temperature of lithium tantalate crystal material is above 600°C, the relative dielectric constant is small, and the specific detectivity is high.

In a wide range of room temperature, the pyroelectric coefficient of the material changes very little with temperature, and the temperature change rate of the output signal is only 1-2%. The temperature stability of the sensor performance is very good, and the spectral response consistency is very good in the wavelength range of 1-20μm.



Product Features

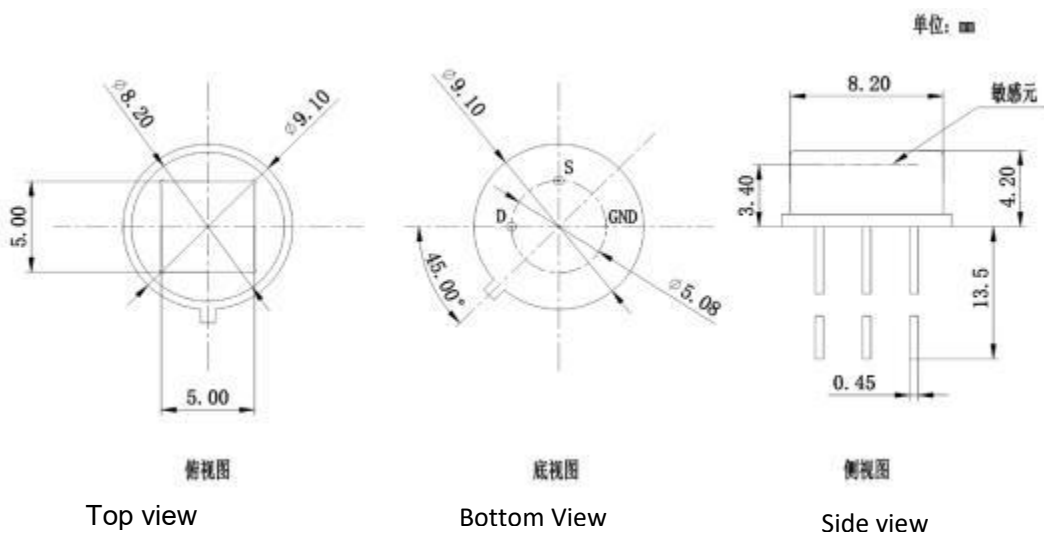
- Detection bands: 2.7 μm, 4.3 μm, 4.4 μm, 4.48 μm; Reference bands: 3.8 μm, 5.0 μm;
- Single-channel; TO-5 package; Voltage mode;
- Temperature compensation included; low microphone effect; wide field of view; high detection rate.

Product Application

It's widely used in various oil storage stations, large warehouses, factory workshops, forests, charging piles; and standard configuration for high fire risk areas such as petroleum, chemical, paper-making, forests, and garages.

It also becomes popular in high-end residential, commercial, and general industrial fields.

Packaging size (unit: mm)

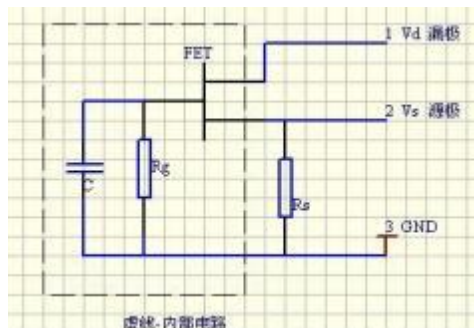


Parameter

Qualification	Representative value	Representative value	Representative value	Representative value	Representative value	Representative value	Unit
Central wavelength of the filter	2.7	3.8	4.3	4.4	4.48	5.0	μm
Window size	5*5						mm
Sensitive Element Size	3*3						mm
Electrical time constant	5						s
Thermal time constant	150						ms
Source voltage	0.4~0.7						v
Working voltage	2~15						v
Recommended Voltage	3~5						v
Output signal Vo (500K, 10HZ, 25°C)	2.1±5%	2.3±5%	5.2±5%	5.0±5%	6.6±5%	3.6±5%	v
Output noise voltage V _N (10 Hz, BW 1 Hz, 25°C)	≤150						mv
Voltage response rate (without window) R _v (500K, 10HZ, 25°C)	≥500						v/w
Compared to the detection rate (without window): D* (500 K, 10 Hz, BW 1 Hz, 25 °C)	≥5×10 ⁸						cmHz ^{1/2} /W
Angle of field	>115						°
Detection range	>50						m
Working/Storage Temperature	-40~+85						°C
Note: The test machine has an amplification gain of 80 dB.							

Interior circuit

Sensor pin 1 (V_d) serves as the drain of the field-effect transistor, to which voltage is applied; pin 2 (V_s) provides the output signal; and pin 3 (GND) is connected to ground. A lithium tantalate sheet and a high-resistance resistor R_g form a parallel circuit, which is then connected to the gate of the field-effect transistor.



Filter parameters for common sensor models:

Sensor Type	RP911-2.7μm	RP911-3.8μm	RP911-4.3μm	RP911-4.4μm	RP911-4.48μm	RP911-5.0μm
Central wavel-length (nm)	2700±40	3800±40	4300±50	4400±40	4480±40	5000±40
Half-width (nm)	180±20	180±20	600±40	400±20	620±20	180±20
Light transmittance (%)	>90%	>90%	>90%	>90%	>90%	>90%

Attention :

(1) Pyroelectric infrared sensors possess piezoelectric properties and are highly sensitive to sound, electromagnetic waves, and vibrations. When using such sensors, appropriate vibration damping and shielding measures are essential.

(2) To prevent air turbulence interference that may cause false alarms, window protection materials (e.g., white sapphire, calcium fluoride, or infrared glass) must be incorporated when designing sensors for flame detectors.

(3) When welding pyroelectric infrared sensors, it is recommended to weld at a depth of over 3 mm. For manual soldering with soldering iron, the iron tip temperature should be kept below 350°C, with each welding session lasting less than 3 seconds. Use tweezers to hold the base of the pins to facilitate heat dissipation and prevent damage to the sensor's electronic components under high temperatures.

(4) During the installation and use of pyroelectric infrared sensors, care must be taken to prevent the sensor components from falling. Backup sensor components should be stored in a dry environment.

(5) When operating a pyroelectric infrared sensor, hand contact—particularly after welding — changes its temperature. Therefore, the sensor requires a brief waiting period to allow its temperature to stabilize before resuming normal operation.

(6) Do not touch the sensor window directly with hands or hard objects. Maintain cleanliness of the window; if contaminated, gently wipe it clean with an alcohol-soaked cotton ball.

(7) When installing the sensor, do not apply mechanical pressure to prevent damage to its sensitive components, window, or other parts caused by pressure.

(8) When removing sensors from packaging boxes, conducting measurements, or installing sensors, static electricity protection equipment must be used. The static electricity protection threshold should be <2000 V to prevent high-voltage breakdown of the sensors' field-effect transistors.