



Pyroelectric Flame Sensor (Model: RPFA913CE)

User's Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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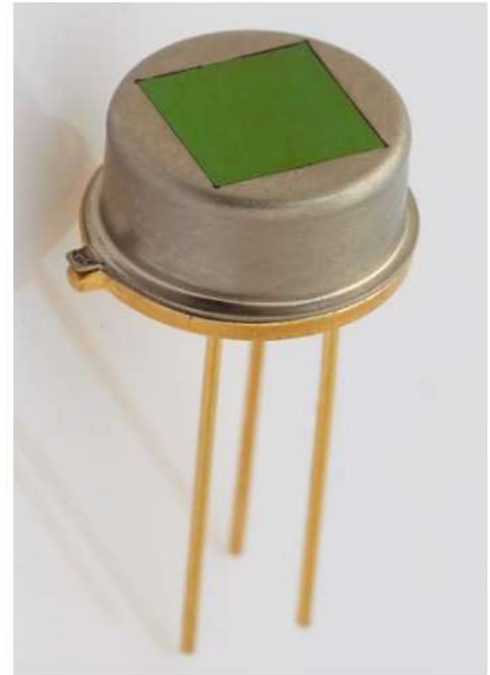
RPFA913CE Pyro-electric Flame sensor

RPFA913CE 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 1-20um.

Features:

- * 4.4um detection band;
- * TO-5 package, single channel, voltage mode;
- * Low microphone effect, large FOV, high detection rate;
- * Detection band measurement of flame signal;

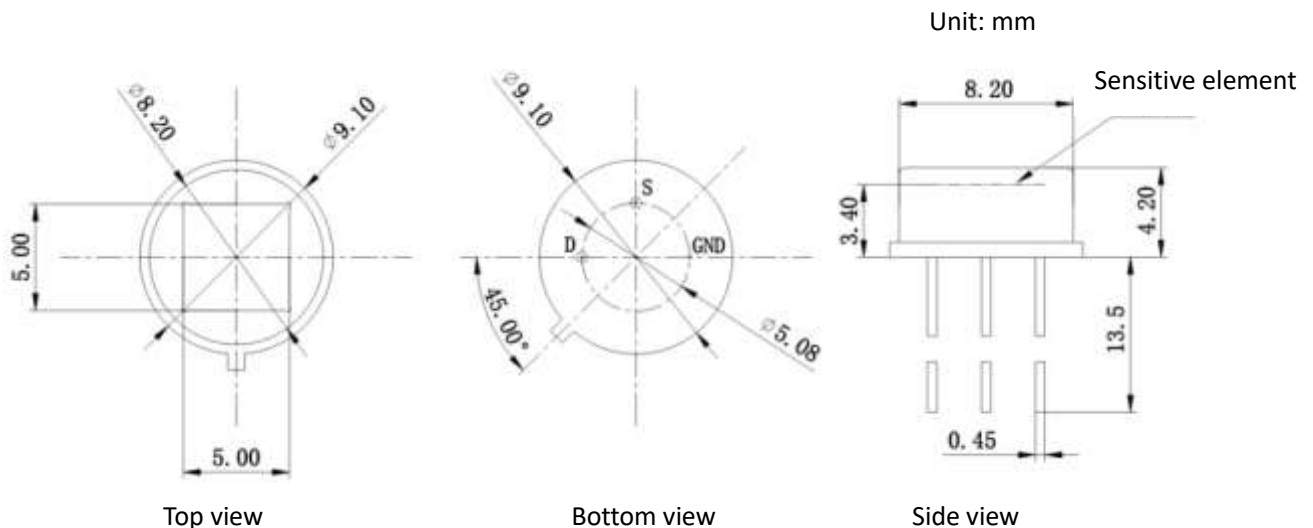


Applications:

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.

Size(Unit:mm)



Parameters

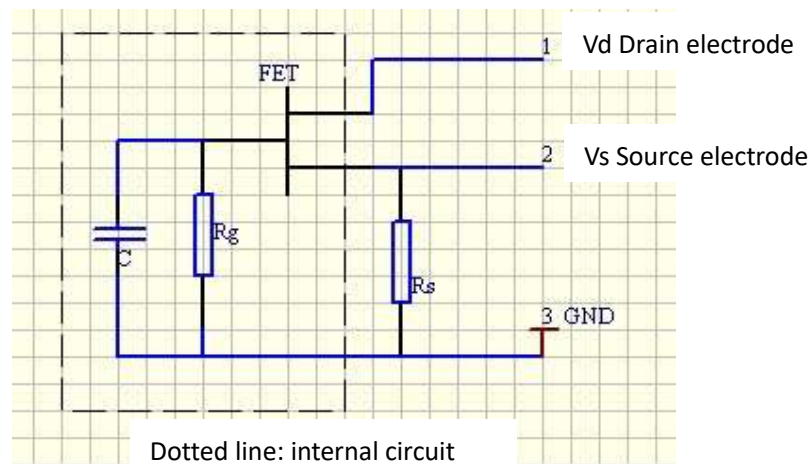
Table 1

| Item | Typical | Unit |
|---|--------------------|------------------------|
| Window Size | 5.0*5.0 | mm |
| Sensitive element size | 3*3 | mm |
| Filter center wavelength | 4.4 | um |
| Electrical time constant | 5 | s |
| Thermal time constant | 200 | ms |
| Source Voltage | 0.4~0.7 | v |
| Working Voltage | 2~15 | v |
| Recommended voltage | 3~5 | v |
| Output signal V0 (500K,10HZ,25°C) | 4.5±10% | v |
| Output noise voltage VN (10HZ, BW1HZ, 25°C) | ≤150 | mv |
| Voltage response rate (no window) Rv (500K, 10HZ, 25°C) | ≥500 | v/w |
| Specific detection rate (no window) D* (500K, 10HZ, BW1HZ, 25°C) | ≥5×10 ⁸ | cmHz ^{1/2} /W |
| Field of view(FOV) | >115 | ° |
| Detection distance | >35 | m |
| Working temperature/ Storage temperature | -40~+85 | °C |
| Remarks: The magnification of the testing machine is 80dB. | | |

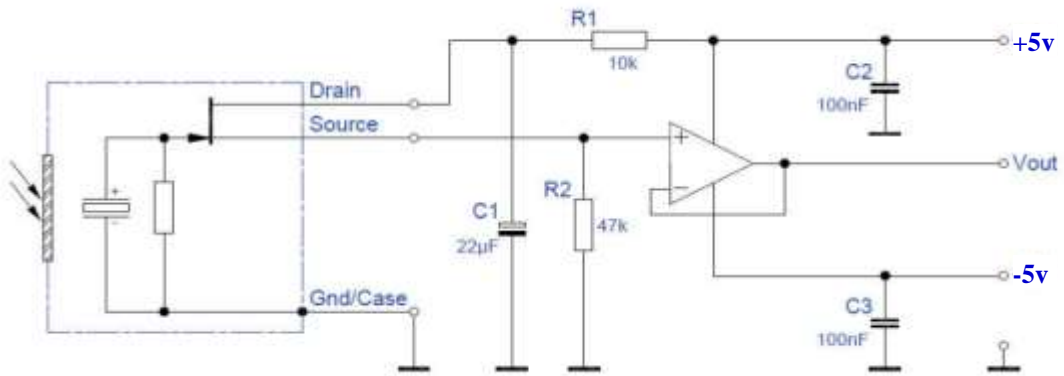
Internal circuit

Sensor 1 pin Vd is the drain of the field effect transistor, and voltage is applied; pin 2 Vs is the output signal; pin 3 GND is grounded.

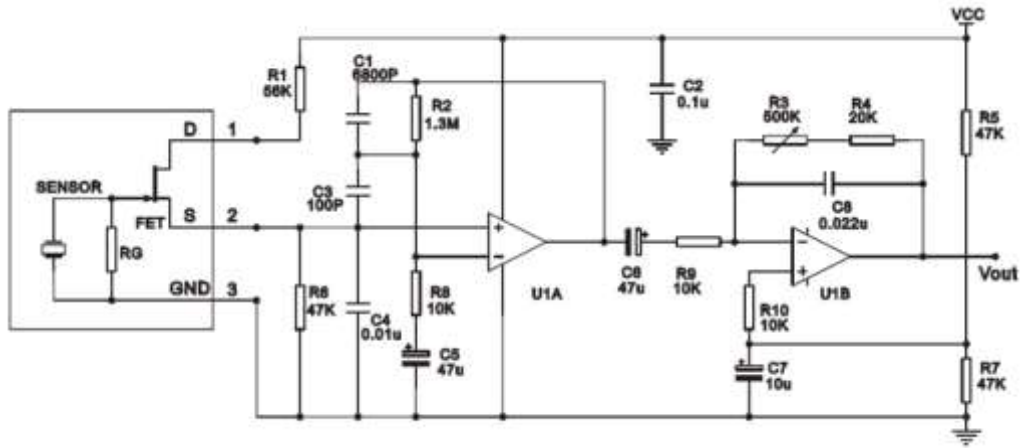
Lithium tantalate sheet and a high resistance Rg form a parallel circuit, and then connect to the gate of the field effect transistor.



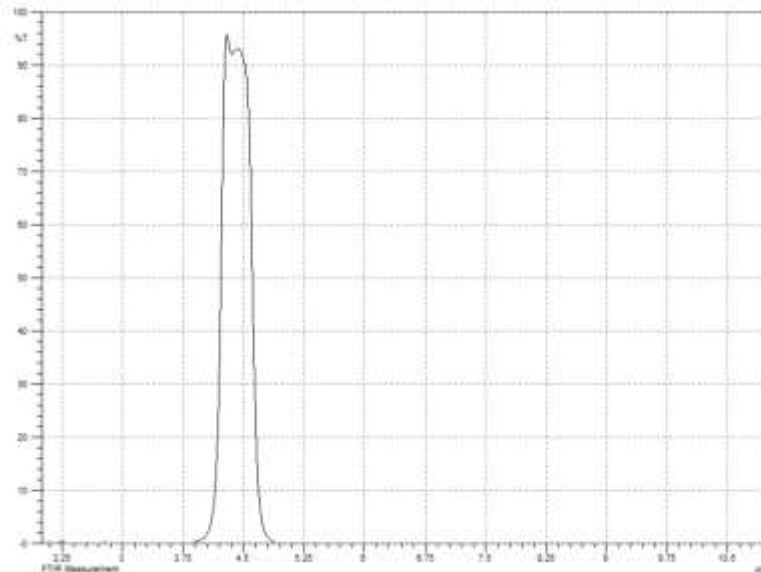
Testing circuit



Application circuit



Filter parameters



4.4µm narrow band filter spectral curve

Filter parameters of commonly used sensor models:

| Part No. | RPFA913CC | RPFA913CD | RPFA913CE | RPFA913CF | RPFA913CG |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Center wavelength (nm) | 3800±40 | 4300±50 | 4400±40 | 4480±40 | 5000±40 |
| Full width at half maximum FWHM (nm) | 180±20 | 600±40 | 400±20 | 620±20 | 180±20 |
| Transmittance (%) | >90% | >90% | >90% | >85% | >90% |

Notes:

- (1) Pyroelectric infrared sensors are piezoelectric and are very sensitive to sound, electromagnetic waves and vibration. When using pyroelectric infrared sensors, proper shock absorption and shielding are necessary.
- (2) In order to avoid turbulent air flow and crosstalk, which may cause false alarms, when the sensor is used in the design of the flame detector, window protection (such as white sapphire, calcium fluoride or infrared glass, etc.) must be added.
- (3) When welding the pyroelectric infrared sensor, it is recommended to solder at a position above 3mm. When using a soldering iron for manual soldering, the temperature of the soldering iron tip should be controlled below 350°C, and the soldering time for each location is less than 3 seconds, and the tube should be clamped with tweezers, to prevent damage to the electronic components under high temperature conditions.
- (4) During the installation and use of the pyroelectric infrared sensor, prevent the sensor components from falling. The sensor should be stored in a dry environment.
- (5) When operating the pyroelectric infrared sensor, the temperature of the pyroelectric infrared sensor is changed due to hand contact, especially through welding. Therefore, when the sensor is working again, it is necessary to wait for a period of time. After the temperature of the sensor is balanced, resume normal work.
- (6) Do not touch the sensor window directly with your hands and hard objects. Keep the window clean. When there is dirt, use an alcohol cotton ball to gently wipe it clean.
- (7) When installing the sensor, it is forbidden to apply mechanical pressure to prevent damage to the sensor's sensitive elements, windows and other components due to the existence of pressure.
- (8) When the sensor is taken out from the packaging box, and during measuring and installing, it must be equipped with electrostatic protection tools. The electrostatic protection requirement is less than 2000V to prevent the high voltage from breaking down the field effect tube of the sensor.

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

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