



# Digital MEMS Combustible Gas Sensor

(Model No.: ZM02)

# Manual

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

Zhengzhou Winsen Electronics Technology CO., LTD

## ZM02 Digital MEMS combustible gas sensor

### Product description

Digital MEMS combustible gas sensor is using MEMS micro-fabrication hot plate on a Si substrate base, gas-sensitive materials used in the clean air with low conductivity metal oxide semiconductor material. When the sensor exposed to gas atmosphere, the conductivity is changing as the detected gas concentration in the air. The higher the concentration of the gas, the higher the conductivity. Use simple circuit can convert the change of conductivity of the gas concentration corresponding to the output signal. The sensor is high sensitivity, compact and precise. There are 2 pins are preset as alarm trigger signal output. It can be widely used in environmental safety, portable instruments and many other areas.



### Character

- MEMS technology
- Ultra-low power consumption
- High sensitivity
- Fast response and resume
- Anti - electromagnetic interference

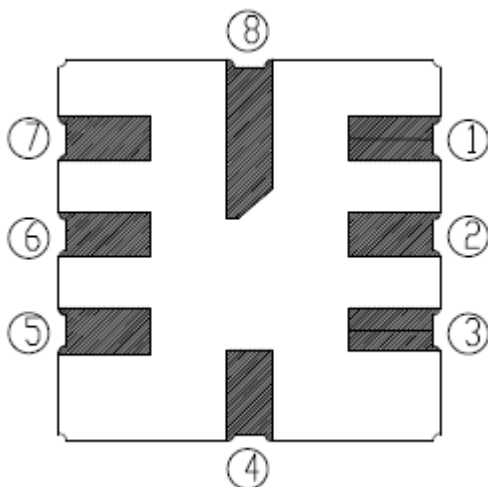
### Detection gas

Methane ( $\text{CH}_4$ ) : 1 – 10000ppm  
Propane ( $\text{C}_3\text{H}_8$ ): 1-5000ppm

### Application

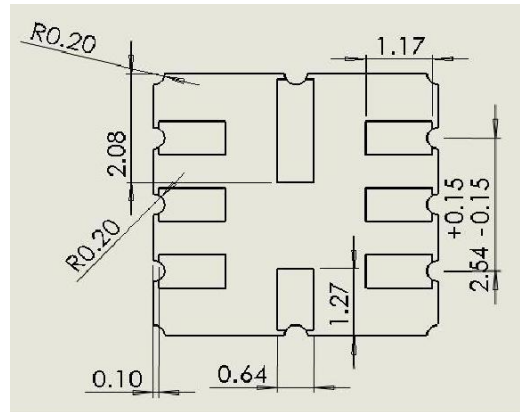
Gas leak detection for mobile phones, computers and other consumer electronics applications; also apply for home, commercial use of the combustible gas leakage monitoring devices, gas leak detectors, fire / security detection system.

### Pin Definition

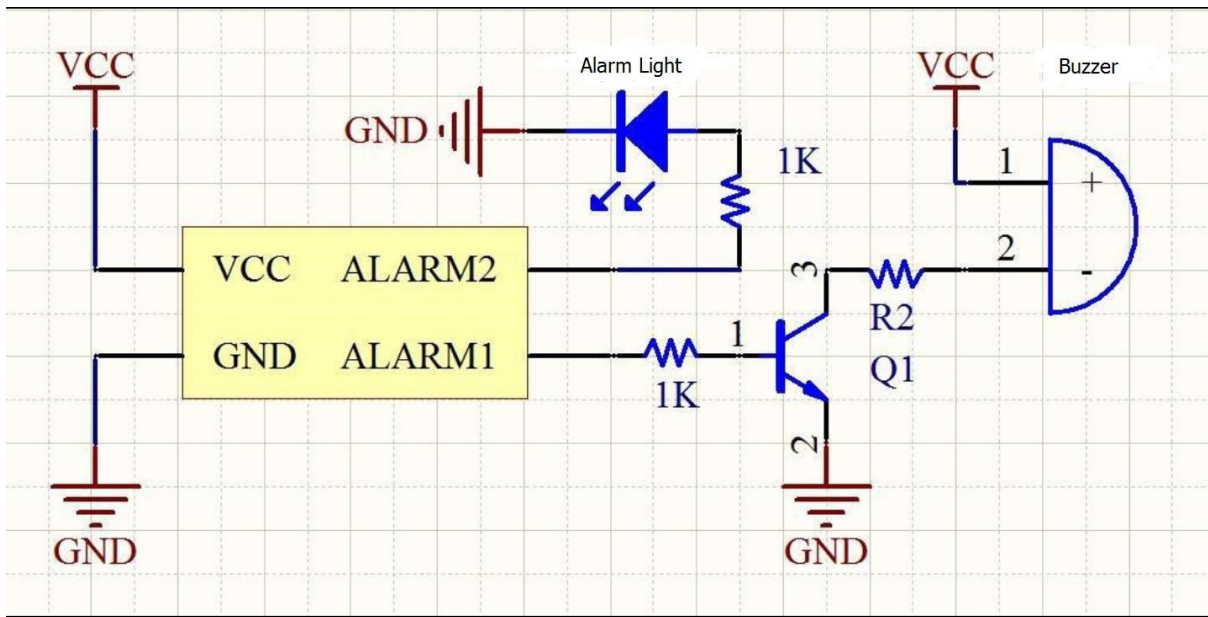


Pins	Connection
①	Alarm2
②	WARM-UP/FAUT
③	Alarm1
④	GND
⑤	NC
⑥	NC
⑦	VCC
⑧	GND

## Sensor Structure



## Typical Application (for example)



## Main Parameter

Working Voltage	2.8-3.3V	Working Current	0.3mA
Heater current	25mA	Max. heating power	80mW
Min. Detection Level	1%LEL	Max. Detection level	25%LEL
Working humidity	5%-95% Rh	Storage humidity	5%-95% Rh
Working Temperature	-20-70°C	Storage Temperature	-40-85°C

**Instructions:**

1. Before entering the normal working mode, the products should be warmed up for several seconds
2. When the flammable gas is exceeded, the sensor starts to alarm:

ALARM2 pin continues to output high level, ALARM1 pin output is square wave, frequency 2Hz.

3. When the combustible gas concentration drops to the normal value, the sensor ends the alarm:

the ALARM2 pin returns to the low level and the ALARM1 pin returns to the low level as well.

**Notes:****1. Preheating time**

Sensor needs some time to reach inside chemical equilibrium so it takes some preheating time. Generally, the sensor at a relatively high temperature will reach equilibrium faster, so you can boot in the first tens of seconds, it can give a higher voltage sensor to warm up. In general, the longer the preheating time, the better the accuracy of the sensor.

**2. Sensor Calibration**

For absolute concentration measurement, sensors accuracy can be affected by many factors such as reference resistance difference, the sensitivity difference, temperature, humidity, interfering gases, aging time, therefore they need regular calibration. For relative measurement calibration is not required. Because the sensor characteristic curve is not linear, it is recommended in the whole range of multi-point calibration and consider the influence of temperature and humidity. Once the calibration data obtained can be linear or polynomial fit to organize the data.

**Cautions****1. Following conditions must be prohibited****1.1 Exposed to organic silicon steam**

Sensing material will lose sensitivity and never recover if the sensor absorbs organic silicon steam. Sensors must be avoid exposing to silicon bond, fixture, silicon latex, putty or plastic contain silicon environment.

**1.2 High Corrosive gas**

If the sensors are exposed to high concentration corrosive gas (such as H<sub>2</sub>S, SO<sub>2</sub>, Cl<sub>2</sub>, HCL etc.), it will not only result in corrosion of sensors structure, also it cause sincere sensitivity attenuation.

**1.3 Alkali, Alkali metals salt, halogen pollution**

The sensors performance will be changed badly if sensors be sprayed polluted by alkali metals salt especially brine, or be exposed to halogen such as fluorine.

**1.4 Touch water**

Sensitivity of the sensors will be reduced when spattered or dipped in water.

**1.5 Freezing**

Do avoid icing on sensor's surface, otherwise sensing material will be broken and lost sensitivity.

**1.6 Applied voltage**

Applied voltage on sensor should not be higher than 120mW, it will cause irreversible heater damaged, also

hurt from static, so anti-static precautions should be taken when touching sensors.

## **2 .Following conditions must be avoided**

### **2.1 Water Condensation**

Indoor conditions, slight water condensation will influence sensors' performance lightly. However, if water condensation on sensors surface and keep a certain period, sensors' sensitive will be decreased.

### **2.2 Used in high gas concentration**

No matter the sensor is electrified or not, if it is placed in high gas concentration for long time, sensors characteristic will be affected. If lighter gas sprays the sensor, it will cause extremely damage.

### **2.3 Long time exposed to adverse environment**

No matter the sensors electrified or not, if exposed to adverse environment for long time, such as high humidity, high temperature, or high pollution etc., it will influence the sensors' performance badly.

### **2.4 Vibration**

Continual vibration will result in sensors down-lead response then break. In transportation or assembling line, pneumatic screwdriver/ultrasonic welding machine can lead this vibration.

### **2.5 Concussion**

If sensors meet strong concussion, it may lead its lead wire disconnected.

### **2.6 Soldering**

Soldering flux: Rosin soldering flux contains least chlorine and safeguard procedures.

If disobey the above using terms, sensors sensitivity will be reduced.

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