



Digital MEMS VOC Gas Sensor

(Model No.:ZM01)

Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Zhengzhou Winsen Electronics Technology CO., LTD

GM-502B MEMS VOC Gas Sensor

Product description

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. The sensor has high sensitivity and small size, and adopts I2C digital signal output mode to facilitate the observation of multiple sensor networks. It also pre-sets a pin for alarm trigger signal output, which can be widely used in many fields such as environmental safety and portable instruments



Characteristics:

- MEMS technology
- Stable and strong structure
- Low power consumption
- High sensitivity
- Anti-electromagnetic interference

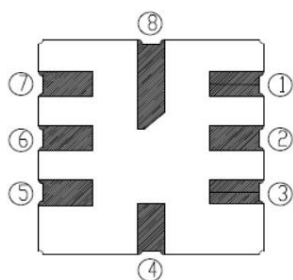
Applications:

- Environmental monitoring
- Portable device
- Health care
- Site control

Parameters

Working voltage	3.0V	Working current	≤25mA
Max heating power	80mW	Detection range	5ppm (alcohol)
Output mode	I2C slave mode	Default address	0x55
I2C rate	10-100kbps	Pull-up resistor	Need external pull-up resistor

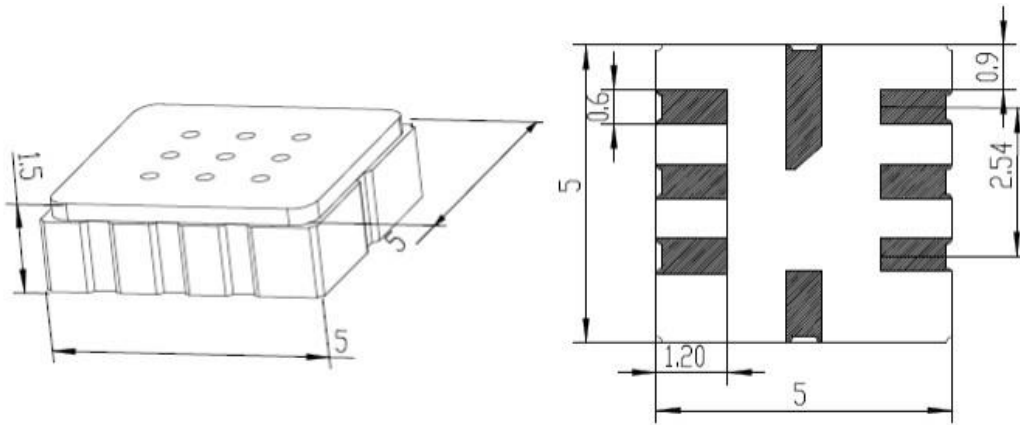
Pin definition



1	INT	5	NC
2	SCL	6	FAULT
3	SDA	7	VCC
4	GND	8	GND

Figure 1: pin definition of sensor

Size



Size of the sensor

Sensitivity curve

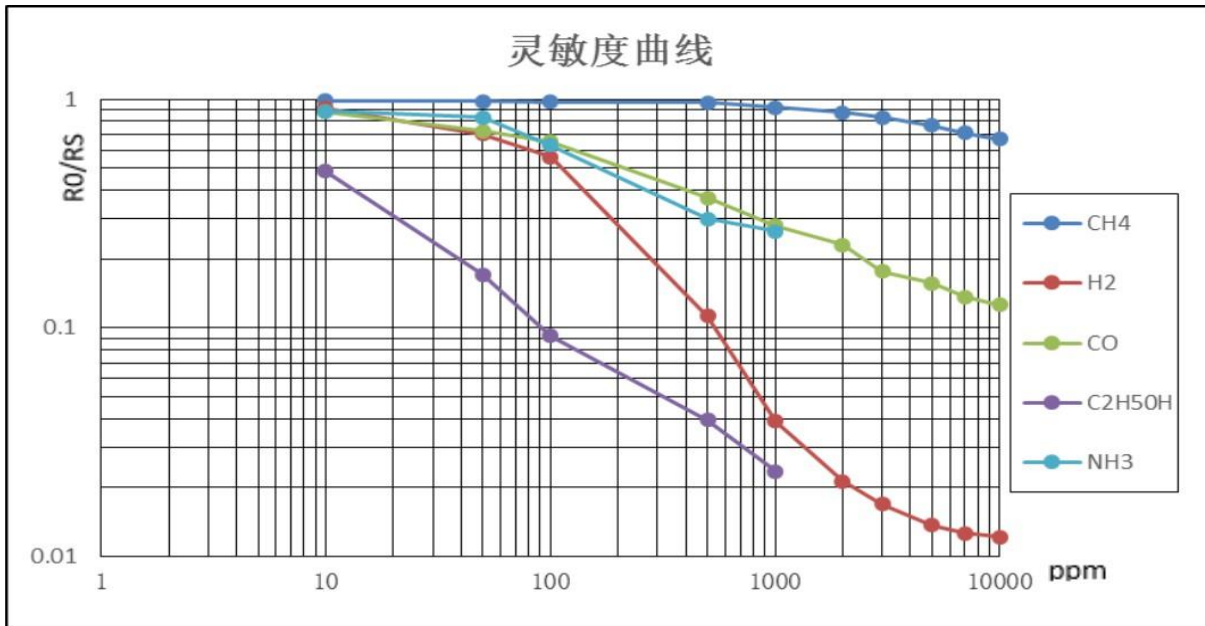


Figure 3: sensitivity curve

Application Method:

The sensor needs warm-up after power-on for about 60 seconds. After preheating is completed, the sensor enters into normal working condition.

Connecting the sensor to the I2C bus, the host sends a read command 0x55 0Xaa (hexadecimal) for the sensor address in turn, and the sensor returns an 8-bit data value immediately, which indicates the larger of current VOC concentration value, the higher of the VOC concentration.

The lowest value is 1, while the highest value is 200. If the range is 5 ppm, the reading value is 50, then the current concentration is $5 * 50/200 = 1.25$ ppm.

INT pin is often low, when the VOC concentration exceeds the preset concentration, INT pin will output high level. The default concentration is the highest range of the sensor. The following figure

is a complete waveform of I2C communication process for reference.

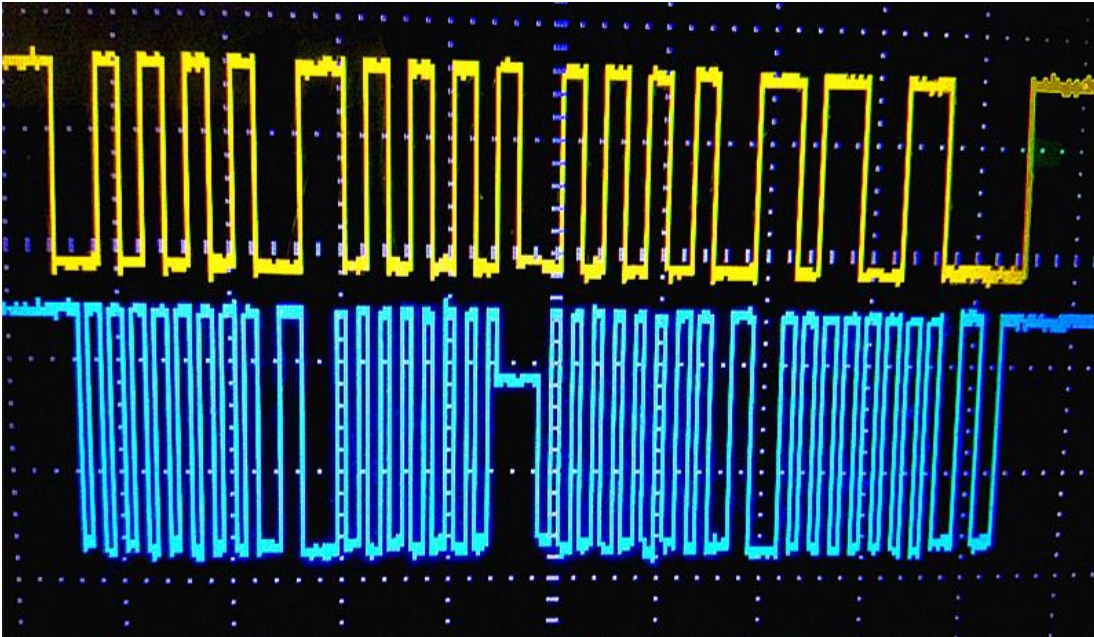


Figure 4: I2C communication waveform

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 H₂S, SO_x, Cl₂, 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.

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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