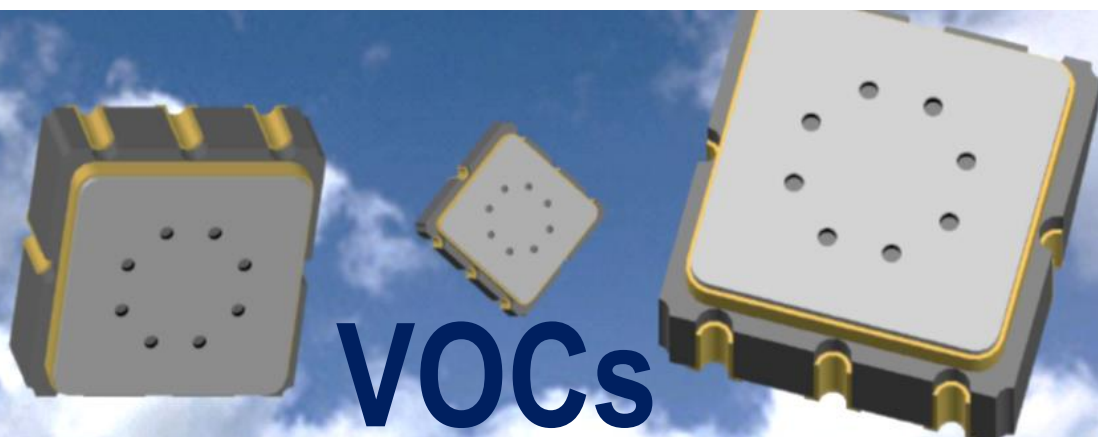# iS-MM-VOCs-4 Gas Sensor Data Sheet

General Description

iS-MM-VOCs-4 is a miniature metal oxide semiconductor gas sensor based on MEMS micro hotplate technology for detection a wide rang of VOCs gas in air. Sensor production combined with silicon substrate MEMS technology, thin film technology, thick film technology and ceramic packaging technology. The gas sensitive layer is deposited at the top of the hotplate and interdigitated electrodes, resulting in a conductivity dependent on the concentration of harmful gases.

Features:
- High sensitivity to VOCs (0.1~1000ppm)
- Quick response (~10Sec.)
- Very low power consumption (~35mW)
- Small size （3.8mm × 3.8mm × 1.5mm)
- Long operating life (~10 Years)
- Reflow soldering

Applications:
- Indoor harmful gases detection
- Alcohol detection
- IoT, wearable devices, smart home

Performance parameter

Parameter	Signal	Spec.	Unit
Typical sensor resistance in unpolluted air [*1]	R_0	10~1000	kΩ
Optimal Detection concentration	FS	0.1~1000	ppm
Sensitivity [*2]	S_5	>1.2	-
Response Time [*3]	T_S	< 20	Sec.
Recovery Time [*3]	T_R	< 60	Sec.

Package outline

Bottom View (Unit: mm)
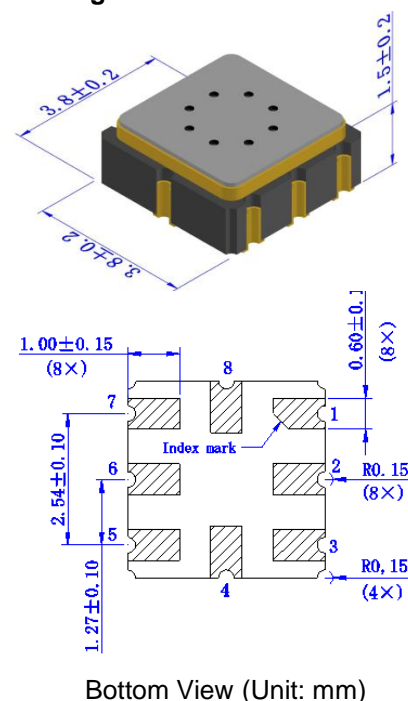
Pin connections

Pin	Function
1	Heater Electrode 1
2	NA
3	Sensor Electrode 1
4	NA
5	Heater Electrode 2
6	NA
7	Sensor Electrode 2
8	NA

iS-MM-VOCs-4 Gas Sensor   Data Sheet

Heater Circuit

Parameter	Signal	Spec.	Unit
Heater Resistance*4	R_H	180~220	Ω
Circuit Voltage	V_H	2.6~2.8	V
Heater Power Consumption*4	P_H	34~36	mW

Sensor Circuit

| Parameter	Signal	Spec.	Unit
Sensor Voltage *5	V_S	≤ 5.5	V
Sensor Power Consumption *6	P_S	≤ 1	mW

Remarks：

1, R_0 is tested under standard environmental conditions, i.e., in a clean air with a temperature of 25 ± 3 ℃ and a humidity of 50 ± 10%.

2, S_5 is defined as R_0/R_g, R_g is the sensor resistance in the air of 5ppm EtOH concentration, 25 ± 3 ℃, 50 ± 10%.

3, The response time and recovery time is defined as the time interval from the contact the specified gas concentration to the 70% of the stable resistance variation.

4, R_H is measured in the condition of heating power 34~36mW, and will change with heating power changes. This feature can be used to do temperature compensation.

5, V_S is the voltage applied to the sensor electrodes, and should be kept ≤ 5.5V in working condition. Too high voltage will shorten the service life of the gas sensor and even damage the gas sensor.

6, Ps is the power applied to the sensor electrodes, and should not be greater than 1mW.

Operating Environment

Parameter	Signal	Spec.	Unit
Operating Temp.	T_{OP}	-10 ~ +50	℃
Operating Humidity	RH_{OP}	5 ~ 95	%RH
Storage Temp.	T_{STO}	-40 ~ +85	℃
Storage Humidity	RH_{STO}	5 ~ 95	%RH
Airflow Velocity	AF	0 ~ 4	m/s

Typical measurement circuit
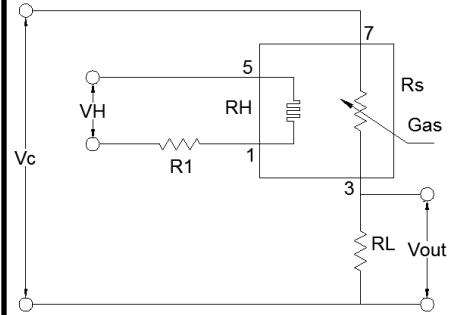
Remarks:

VH: 3.3VDC ± 2%

Vc: 3.3VDC ± 2%

R1: 47Ω. The heating power can be adjusted by R1. In order to obtain ideal gas sensing characteristics, the heating power of the gas sensor under standard ambient conditions should be within the target range.
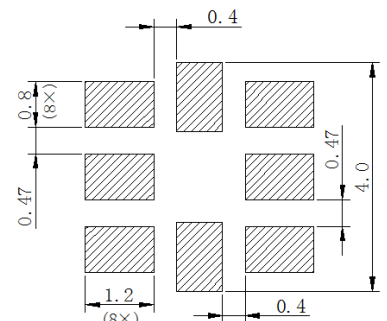
R_L: 10~50 kΩ R_L ≥5 kΩ to avoid the gas sensor damage.

The sensor has no polarity. Pin 1 and 5 are interchangeable, and Pin 3 and 7 are also interchangeable.

In order to maximize the performance advantages of the gas sensor, the temperature compensation of the heating circuit can be carried out. Please contact us for more detailed information.
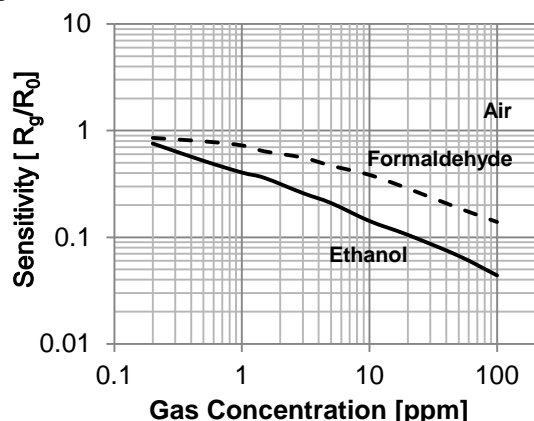
Recommended pad size
(Unit: mm)

Sensitivity characteristics

The figure below shows a typical gas sensor sensitivity characteristic curve. The Y-axis shows the ratio R_g/R_0. The X-axis shows the test gas concentration. where R_g is the resistance value of the gas sensor in various concentrations of gas.


Attentions

Please read the following terms carefully to avoid product data errors and prevent product damage.

1. The gas sensor must be reflow soldering in neutral atmosphere. The welding furnace should have sufficient flow of clean air to maintain the air clean. The maximum temperature is 260 ℃. Manual soldering conditions are recommended for a maximum temperature of 350 ℃ for 5 seconds. it is recommended that it should be aged for more than 4 hours to eliminate the influence of welding process on the gas sensor.
2. The vacuum adsorption hole should be in the non porous area of the sensor upper cover during SMT process. Select appropriate nozzle size and SMT parameters to avoid the sensor damage.
3. Products should not be exposed to high concentrations of organic solvent vapor, silicone vapor, in order to prevent sensitive material poisoning.
4. The product should be placed in the filter protected space to prevent water and dust. If necessary, the installation direction can be used to prevent dust deposition.
5. The sensor resistance will experience a continuous increase after power on. The time span of this process depends on the sensor heat history and storage environment. The longer time is needed when off time is long. It is recommended to preheat at least 60 min. to get a reliable results.
6. It is recommended to use ESD protection equipment when handling the products.
7. It is recommended to use our filter cover to realize waterproof, oil drainage and dust prevention.

Temperature and humidity dependence

The figure below show a typical characteristic curve of gas sensor is influenced by temperature and humidity. The Y-axis shows the ratio R_a/R_0. The X-axis shows the working temperature. Where R_a is the resistance value of the gas sensor under various temperatures and humidity in the clean air.
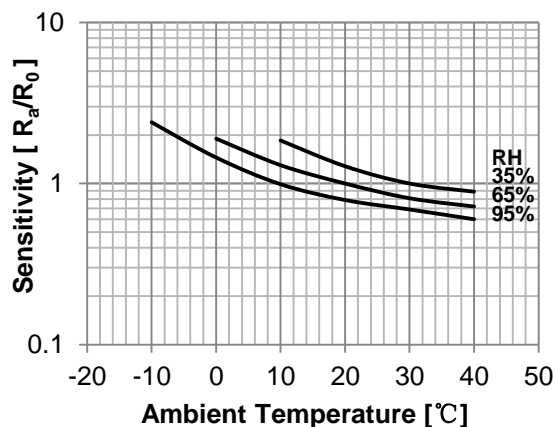
Package

Tape and reel. (1000 pcs). Other packaging methods can also be provided according to customer requirements.

Environmental Protection

This product conforms to the current RoHS directive and can pass REACH certification. The product does not contain environmentally restricted chemicals.

More information, Please contact:

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