



### Description

Sensitive material of MQ-5 gas sensor is  $\text{SnO}_2$ , which with lower conductivity in clean air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electrocircuit, Convert change of conductivity to correspond output signal of gasconcentration.

MQ-5 gas sensor has high sensitivity to Methane, Propane and Butane, and could be used to detect both Methane and Propane. The sensor could be used to detect different combustible gas especially Methane, it is with low cost and suitable for different application.

### Application:

Domestic gas leakage detector  
Industrial Combustible gas detector  
Portable gas detector

### Character:

Good sensitivity to Combustible gas in wide range  
High sensitivity to Methane, Butane and Propane  
Long life and low cost  
Simple drive circuit

### Technical Data

Sensor Type	Standard Encapsulation	Detection Gas	Concentration
Semiconductor	Bakelite (Black Bakelite)	LPG, Methane, coal gas	300-10000ppm (Methane, Propane, Butane, $\text{H}_2$ )

### Ordering Information

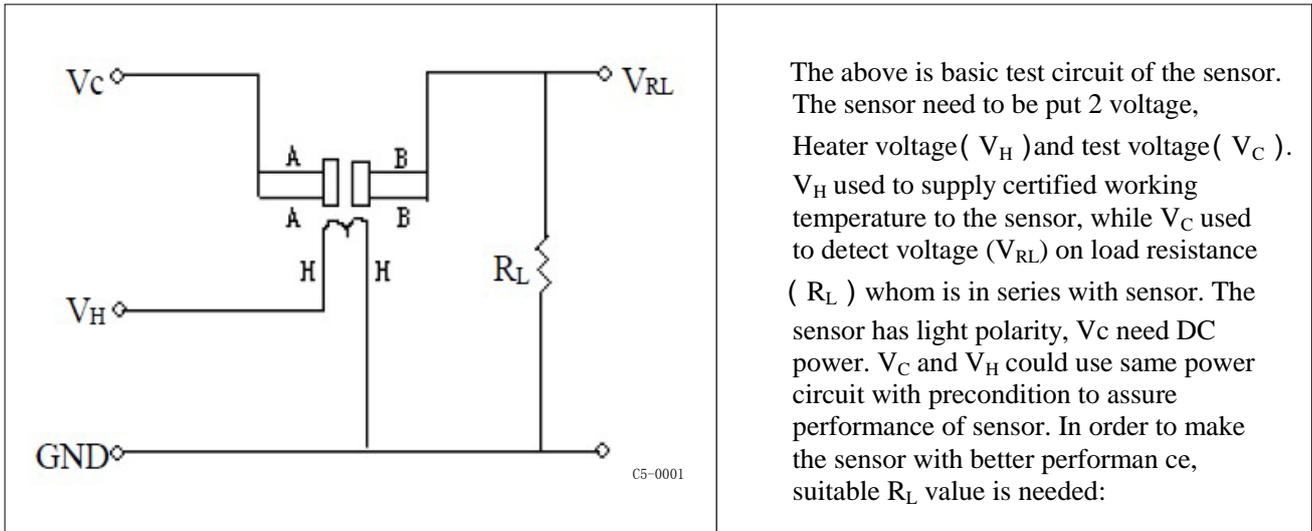
Packaging	Each Bulk	MOQ	Package
Bulk	1000pcs	1000pcs	$\phi 19$

### Standard Circuit Condition

Loop Voltage	Heater Voltage	Load Resistance	Preheat time
$\leq 24\text{V}$	$5.0 \pm 0.2\text{V}$	Adjustable	Over 48 hours

**Test circuit**

**Circuit Description**



The above is basic test circuit of the sensor. The sensor need to be put 2 voltage, Heater voltage (  $V_H$  ) and test voltage (  $V_C$  ).  $V_H$  used to supply certified working temperature to the sensor, while  $V_C$  used to detect voltage (  $V_{RL}$  ) on load resistance (  $R_L$  ) whom is in series with sensor. The sensor has light polarity,  $V_C$  need DC power.  $V_C$  and  $V_H$  could use same power circuit with precondition to assure performance of sensor. In order to make the sensor with better performance, suitable  $R_L$  value is needed:

**Electrical Specification**

Standard Circuit Condition return circuit DC Voltage:  $V_C \leq 24V$  heating voltage (AC or DC)  $5.0V \pm 0.2V$   
load resistance  $R_L$  adjustable

Parameter	Symbol	Test Conditions	Typ	Units
Heater Resistance	$R_H$	DC $V_C \leq 24V$	$31 \pm 3$	$\Omega$
Heater consumption	$P_H$	AC or DC $V_H = 5.0 \pm 0.2V$ $R_L$ : adjustable	$\leq 900$	mW
Sensing Resistance	$R_S$	in 2000ppm C3H8	2 ~ 20	K $\Omega$
Sensitivity	S	$R_S(\text{in air})/R_S(1000\text{ppm C3H8})$	$\geq 5$	
Slope	$\alpha$	$(R_{1000\text{ppm}}/R_{500\text{ppm H}_2})$	$\leq 0.6$	
Tem	$T_0$		$20 \pm 2$	$^{\circ}C$
Humidity	$R_H$		$65 \pm 5$	%

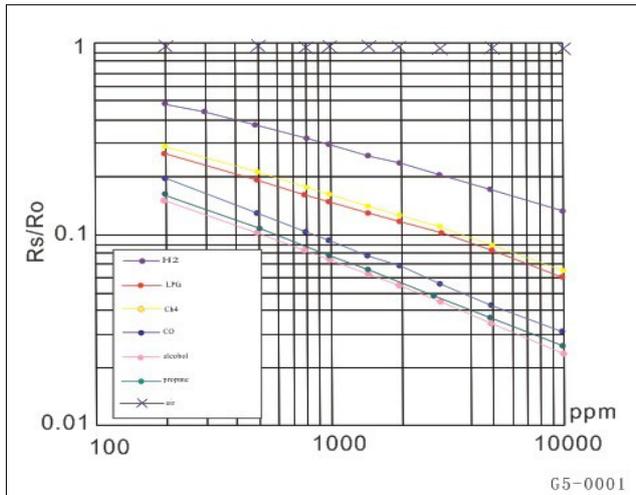
Power of Sensitivity body( $P_S$ ):

$$P_S = V_C^2 \times R_S / (R_S + R_L)^2$$

Resistance of sensor( $R_S$ ):

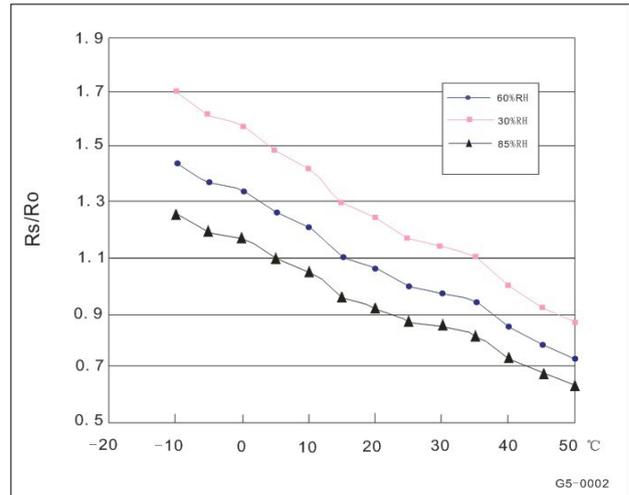
$$R_S = (V_C / V_{RL} - 1) \times R_L$$

Sensitivity Characteristic

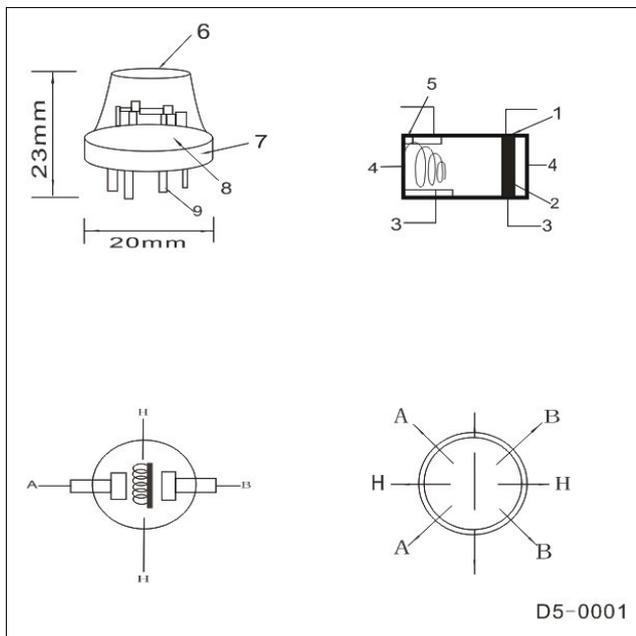


Ordinate means resistance ratio of the sensor (Rs/Ro), abscissa is concentration of gases. Rs means resistance in different gases, Ro means resistance of sensor in 1000ppm H2. All test are under standard test conditions.

Temperature VS Humidity



Ordinate means resistance ratio of the sensor (Rs/Ro), Rs means resistance of sensor in 1000ppm Propane under different tem. and humidity. Ro means resistance of the sensor in environment of 1000ppm Propane, 20°C / 65% RH



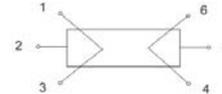
	Parts	Materials
1	Gas sensing layer	SnO <sub>2</sub>
2	Electrode	Au
3	Electrode line	Pt
4	Heater coil	(Ni-Cr) alloy
5	Tubular ceramic	Al <sub>2</sub> O <sub>3</sub>
6	Anti-explosion network	Stainless steel gauze(SUS316 100-mesh)
7	Clamp ring	Copper plating Ni
8	Resin base	Bakelite
9	Tube Pin	Copper plating Ni

Structure and configuration of GW5-QM gas sensor is shown as D5-0001, sensor composed by micro Al<sub>2</sub>O<sub>3</sub> ceramic tube, Tin Dioxide (SnO<sub>2</sub>) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped GW5-QM Have 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.

## Following conditions must be Prohibited

### 1 Exposed to organic silicon steam

- 1.1 Organic silicon steam cause sensors invalid, 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 exposed to high concentration corrosive gas (such as  $H_2S$ ,  $SO_x$ ,  $Cl_2$ ,  $HCl$  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 fluorin.
- 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 sensor would lose sensitivity.
- 1.6 Applied voltage higher  
Applied voltage on sensor should not be higher than stipulated value, otherwise it cause down-line or heater damaged, and bring on sensors' sensitivity characteristic changed badly
- 1.7 Voltage on wrong pins  
For 6 pins sensor, if apply voltage on 1、3 pins or 4、6 pins, it will make lead broken, and without signal when apply on 2、4 pins



### 2 Following conditions must be avoided

- 2.1 Water Condensation  
Indoor conditions, slight water condensation will effect sensors performance lightly. However, if water condensation on sensors surface and keep a certain period, sensor's sensitivity will be decreased.
- 2.2 Used in high gas concentration  
No matter the sensor is electrified or not, if long time placed in high gas concentration, it will affect sensors characteristic.
- 2.3 Long time storage  
The sensors resistance produce reversible drift if it's stored for long time without electrify, this drift is related with storage conditions. Sensors should be stored in airproof without silicon gel bag with clean air. For the sensors with long time storage but no electrify, they need long aging time for stability before using.
- 2.4 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 effect the sensors performance badly.
- 2.5 Vibration  
Continual vibration will result in sensors down-lead response then repute. In transportation or assembling line, pneumatic screwdriver/ultrasonic welding machine can lead this vibration.
- 2.6 Concussion  
If sensors meet strong concussion, it may lead its lead wire disconnected.
- 2.7 Usage  
For sensor, handmade welding is optimal way. If use wave crest welding should meet the following conditions:
  - 2.7.1 Soldering flux: Rosin soldering flux contains least chlorine
  - 2.7.2 Speed: 1-2 Meter/ Minute
  - 2.7.3 Warm-up temperature :  $100 \pm 20^\circ C$
  - 2.7.4 Welding temperature :  $250 \pm 10^\circ C$
  - 2.7.5 1 time pass wave crest welding machine If disobey the above using terms, sensors sensitivity will be reduced.