

## MQ-9 Semiconductor Sensor for CO/Combustible Gas

Sensitive material of MQ-9 gas sensor is SnO<sub>2</sub>, which with lower conductivity in clean air. It make detection by method of cycle high and low temperature, and detect CO when low temperature (heated by 1.5V). The sensor's conductivity is more higher along with the gas concentration rising. When high temperature (heated by 5.0V), it detects Methane, Propane etc combustible gas and cleans the other gases adsorbed under low temperature. Please use simple electrocircuit, Convert change of conductivity to correspond output signal of gas concentration.

MQ-9 gas sensor has high sensitivity to Carbon Monoxide, Methane and LPG. The sensor could be used to detect different gases contains CO and combustible gases, it is with low cost and suitable for different application.

### Character

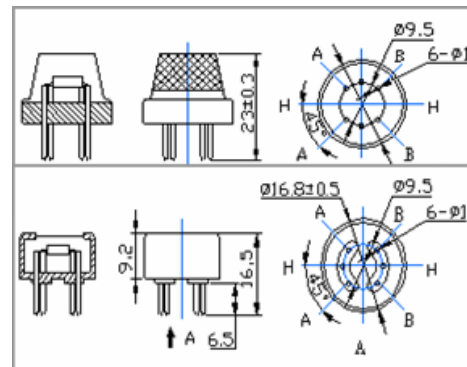
- \* Good sensitivity to CO/Combustible gas
- \* High sensitivity to Methane, Propane and CO
- \* Long life and low cost
- \* Simple drive circuit

### Application

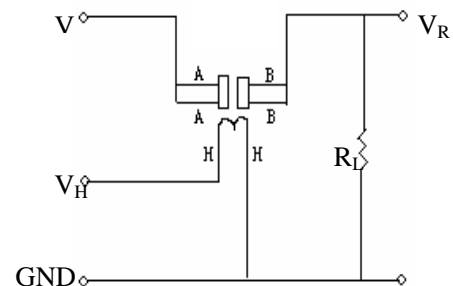
- \* Domestic gas leakage detector
- \* Industrial gas detector
- \* Portable gas detector

### Technical Data

### Configuration



### Basic test loop



The above is basic test circuit of the sensor. The sensor need to be put 2 voltage, heater voltage (V<sub>H</sub>) and test voltage (V<sub>C</sub>). V<sub>H</sub> used to supply certified working temperature to the sensor, while V<sub>C</sub> used to detect voltage (V<sub>R</sub>) on load resistance (R<sub>L</sub>) whom is in series with sensor. The sensor has light polarity, V<sub>c</sub> need DC power. V<sub>C</sub> and V<sub>H</sub> could use same power circuit with precondition to assure performance of sensor. In order to make the sensor with better

Model No.		MQ-9	
Sensor Type		Semiconductor	
Standard Encapsulation		Bakelite	
Detection Gas		CO and combustible gas	
Concentration		10-1000ppm CO 100-10000ppm combustible gas	
Circuit	Loop Voltage	V <sub>c</sub>	≤10V DC
	Heater Voltage	V <sub>H</sub>	5.0V±0.2V AC or DC (High) 1.5V±0.1V AC or DC (Low)
	Heater Time	T <sub>L</sub>	60±1S (High) 90±1S (Low)
	Load Resistance	R <sub>L</sub>	Adjustable
Character	Heater Resistance	R <sub>H</sub>	31Ω±3Ω (Room Tem.)
	Heater consumption	P <sub>H</sub>	≤350mW
	Sensing Resistance	R <sub>s</sub>	2KΩ-20KΩ(in 100ppm CO)
	Sensitivity	S	R <sub>s</sub> (in air)/R <sub>s</sub> (100ppm CO) ≥ 5
	Slope	α	≤0.6(R <sub>300ppm</sub> /R <sub>100ppm</sub> CO)
Condition	Tem. Humidity	20°C±2°C; 65%±5%RH	
	Standard test circuit	V <sub>c</sub> : 5.0V±0.1V; V <sub>H</sub> (High) : 5.0V±0.1V; V <sub>H</sub> (Low) : 1.5V±0.1V	
	Preheat time	Over 48 hours	

performance, suitable R<sub>L</sub> value is needed:

Power of Sensitivity body(P<sub>s</sub>):  $P_s = V_c^2 \times R_s / (R_s + R_L)^2$

Resistance of sensor( $R_s$ ):  $R_s=(V_c/V_{RL}-1)\times R_L$

**Sensitivity Characteristics**

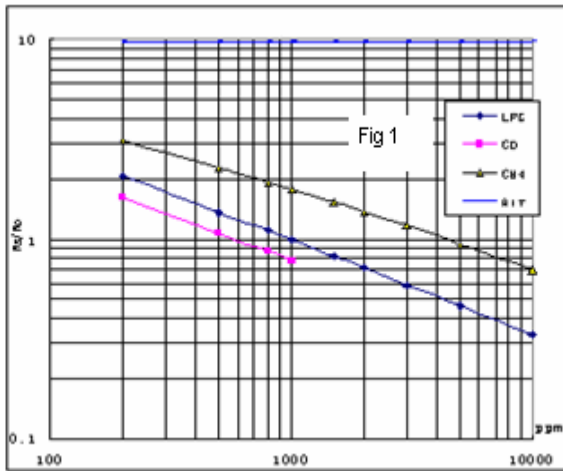


Fig.1 shows the typical sensitivity characteristics of the MQ-9, ordinate means resistance ratio of the sensor ( $R_s/R_o$ ), abscissa is concentration of gases.  $R_s$  means resistance in different gases,  $R_o$  means resistance of sensor in 1000ppm LPG. All test are under standard test conditions.

**Influence of Temperature/Humidity**

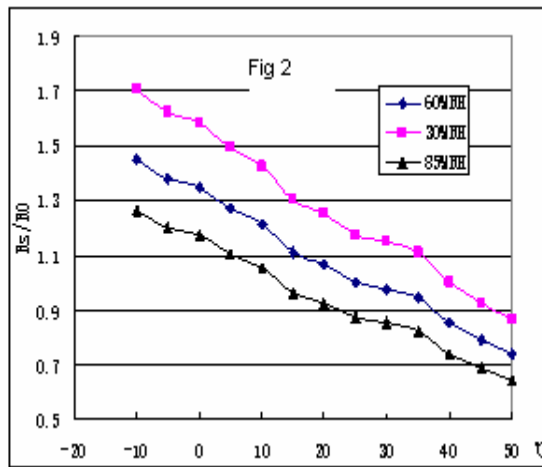
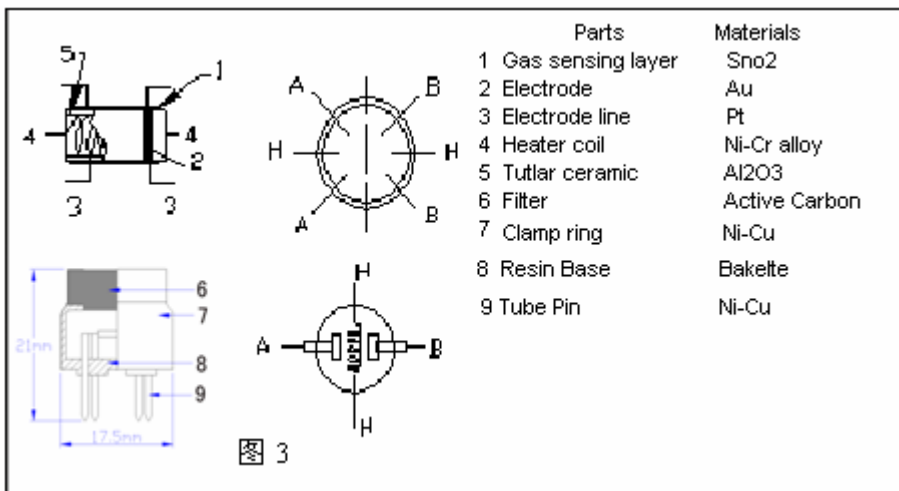


Fig.2 shows the typical temperature and humidity characteristics. Ordinate means resistance ratio of the sensor ( $R_s/R_o$ ),  $R_s$  means resistance of sensor in 1000ppm Propane under different tem. and humidity.  $R_o$  means resistance of the sensor in environment of 1000ppm Propane, 20°C/65%RH

**Structure and configuration**



Structure and configuration of MQ-9 gas sensor is shown as Fig. 3, sensor composed by micro AL2O3 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 MQ-7 have 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.