

TECHNICAL DATA

MQ-3 GAS SENSOR

FEATURES

- * High sensitivity to alcohol and small sensitivity to Benzine .
- * Fast response and High sensitivity
- * Stable and long life
- * Simple drive circuit

APPLICATION

They are suitable for alcohol checker, Breathalyser.

SPECIFICATIONS

A. Standard work condition

Symbol	Parameter name	Technical condition	Remarks
V _c	Circuit voltage	5V±0.1	AC OR DC
V _H	Heating voltage	5V±0.1	AC OR DC
R _L	Load resistance	200KΩ	
R _H	Heater resistance	33Ω ± 5%	Room Tem
P _H	Heating consumption	less than 750mw	

B. Environment condition

Symbol	Parameter name	Technical condition	Remarks
T _{ao}	Using Tem	-10°C-50°C	minimum value is over 2%
T _{as}	Storage Tem	-20°C-70°C	
R _H	Related humidity	less than 95%Rh	
O ₂	Oxygen concentration	21%(standard condition)Oxygen concentration can affect sensitivity	

C. Sensitivity characteristic

Symbol	Parameter name	Technical parameter	Remarks
R _s	Sensing Resistance	1MΩ - 8 MΩ (0.4mg/L alcohol)	Detecting concentration scope: 0.05mg/L—10mg/L Alcohol
α (0.4/1 mg/L)	Concentration slope rate	≤0.6	
Standard detecting condition	Temp: 20°C ± 2°C Humidity: 65% ± 5%	V _c : 5V ± 0.1 V _H : 5V ± 0.1	
Preheat time	Over 24 hour		

D. Structure and configuration, basic measuring circuit

Parts	Materials
1 Gas sensing layer	SnO ₂
2 Electrode	Au
3 Electrode line	Pt
4 Heater coil	Ni-Cr alloy
5 Tubular ceramic	Al ₂ O ₃
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

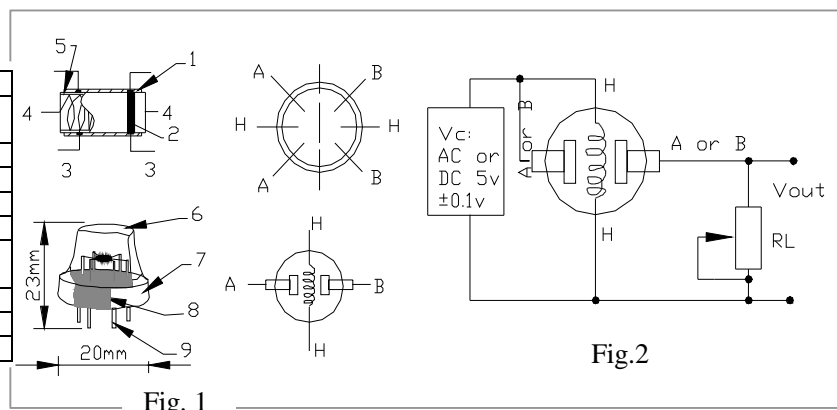
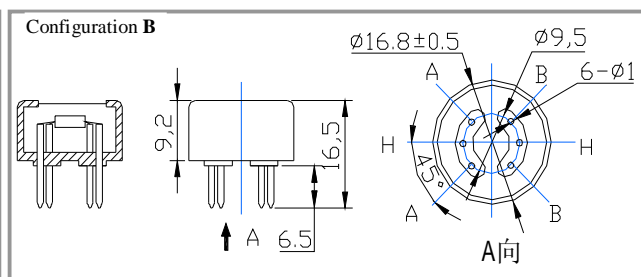
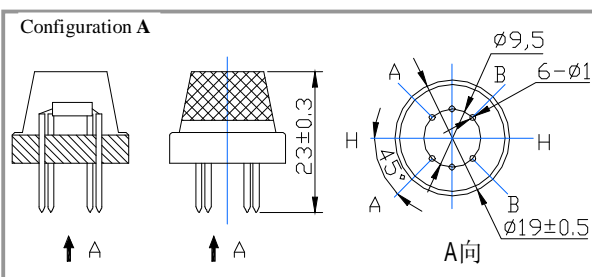


Fig. 1

Fig.2



Structure and configuration of MQ-3 gas sensor is shown as Fig. 1 (Configuration A or B), sensor composed by micro Al_2O_3 ceramic tube, Tin Dioxide (SnO_2) 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-3 have 6 pin ,4 of them are used to fetch signals, and other 2 are used for providing heating current.

Electric parameter measurement circuit is shown as Fig.2

E. Sensitivity characteristic curve

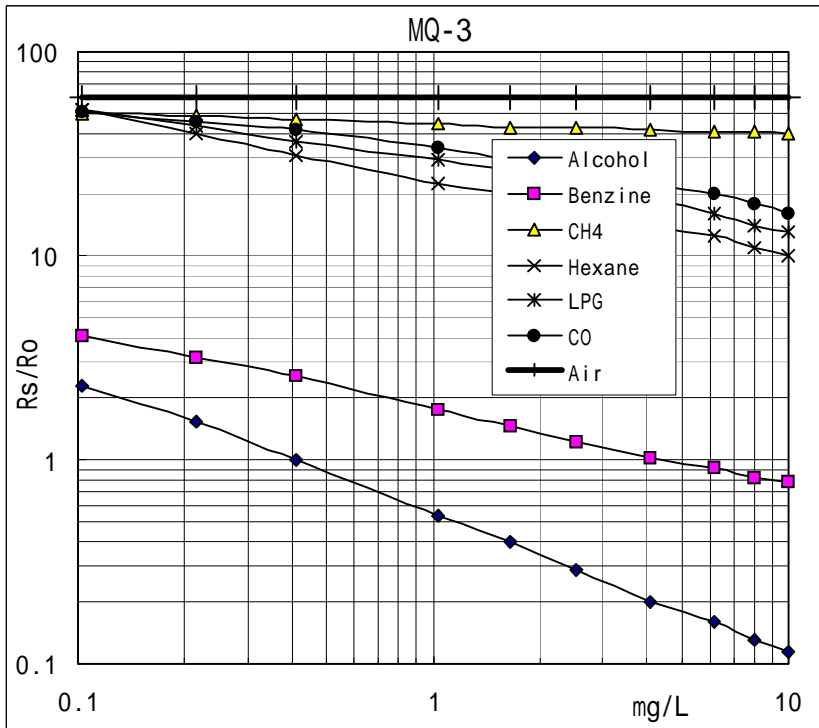


Fig.2 sensitivity characteristics of the MQ-3

Fig.3 is shows the typical sensitivity characteristics of the MQ-3 for several gases.

in their: Temp: 20°C,
Humidity: 65% ,
O₂ concentration 21%
RL=200k Ω

Ro: sensor resistance at 0.4mg/L of Alcohol in the clean air.

Rs:sensor resistance at various concentrations of gases.

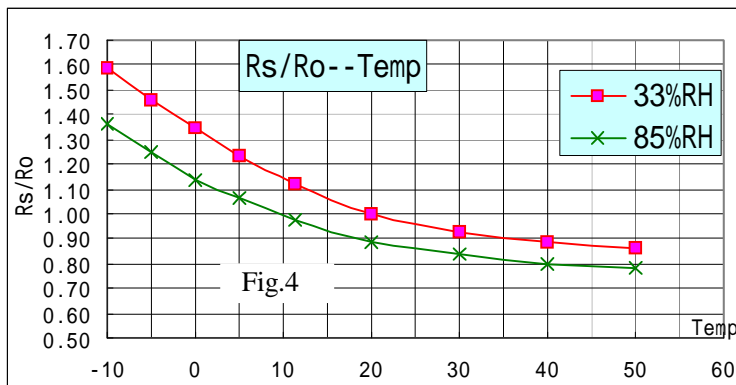


Fig.4 is shows the typical dependence of the MQ-3 on temperature and humidity.

Ro: sensor resistance at 0.4mg/L of Alcohol in air at 33%RH and 20 °C

Rs: sensor resistance at 0.4mg/L of Alcohol at different temperatures and humidities.

SENSITIVITY ADJUSTMENT

Resistance value of MQ-3 is difference to various kinds and various concentration gases. So,When using this components, sensitivity adjustment is very necessary. we recommend that you calibrate the detector for 0.4mg/L (approximately 200ppm) of Alcohol concentration in air and use value of Load resistancethat(R_L) about 200 K Ω (100K Ω to 470 K Ω).

When accurately measuring, the proper alarm point for the gas detector should be determined after considering the temperature and humidity influence.

TECHNICAL DATA

MP-3 Flat Surfaced GAS SENSOR

MP-3 model with advanced planar construction is comprised of heater and metal oxide semiconductor material of subminiature Al₂O₃ ceramic plate, fetch out electrode down-lead, encapsulation in metal base and cap. When the target gas (Alcohol) 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 gas concentration.

Features:

- * Full solid state semiconductor alcohol sensor
- * Lower voltage and consumption
- * Small size
- * Fast response and resume
- * Highest sensitivity
- * Excellent stability and long life
- * Easy circuit and big signal output
- * Excellent selectivity

Application

It is used for detecting whether the driver and other people who drink alcohol, or detecting whether ethanol steamy exist in other places.



Sensitivity

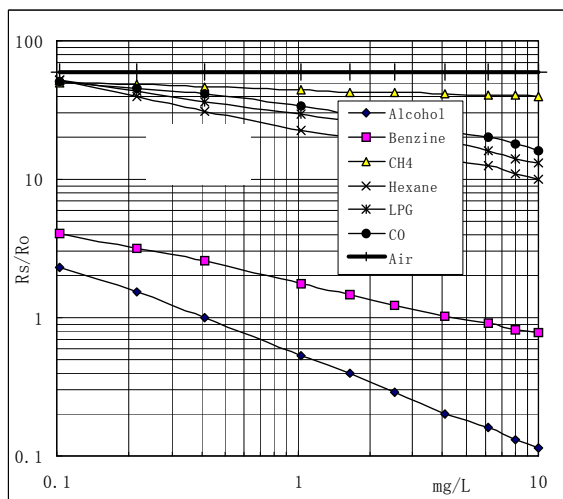


Fig.1 is the typical curve for sensor sensitivity. The horizontal ordinate is gas concentration, the vertical is gas resistance ratio. (Rs/Ro). Ro: sensor resistance in the clean air. All the data got from the testing in the standard conditions. The sensitivity of smoke is got from burn 10pcs cigarettes in 8cbm space, its output correspond with 0.1mg/L alcohol.

Tem./ Hum

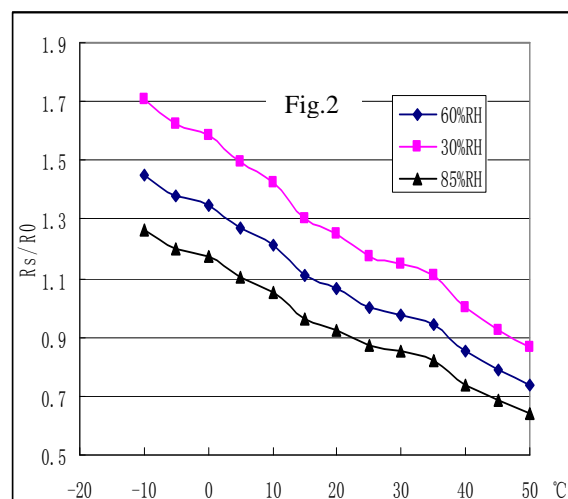
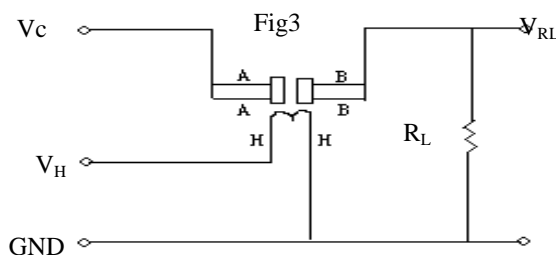


Fig.2 shows the typical dependence on temperature and humidity. The horizontal ordinate is test temperature, the vertical is gas resistance ratio. (Rs/Ro). Rs is resistance in 0.4mg/L alcohol. Tem./Hum. Ro is resistance 0.4mg/L alcohol, 20°C/65%RH.

BASIC CIRCUIT

Fig.3 shows the basic sensor. Two voltage sensor, heating voltage (Vc). V_H is used temperature and V_c is



MEASURING

measuring circuit of should be applied to this voltage (V_H) and circuit for supplying a certain used for testing the

voltage(V_{RL}) of load resistance(R_L) that connect to the sensor in series. Due to the tight polarity of sensor, V_c should be used in DC. Also, V_c and V_H could share one power supply circuit if it can meet the electronic characteristic of sensor. In order to make better use of sensor, a proper R_L is very important.

SPECIFICATIONS:

A. Standard work condition

Symbol	Parameter name	Technical condition	Remarks
V_c	Circuit voltage	$\leq 24V$	DC
V_H	Heating voltage	$2.5V \pm 0.1V$	AC or DC
R_L	Load resistance	adjustable	
R_H	Heater resistance	$29\Omega \pm 3\Omega$	Room Tem.
P_H	Heating consumption	$\leq 250mW$	

B.Environment condition

Symbol	Parameter name	Technical condition	Remark
Tao	Using Temperature	$-10^\circ C - +50^\circ C$	
Tas	Storage Temperature	$-20^\circ C - +70^\circ C$	
R_H	Related humidity	less than 95% Rh	
O_2	Oxygen concentration	21% (standard condition) Oxygen concentration can affect sensitivity	minimum value $>2\%$

C. Sensitivity characteristic

Symbol	Parameter name	Technical parameter	Ramark
T_{res}	Respond Time	$\leq 5S(70\% \text{ Response})$	Detecting concentration scope: 0.04 – 4mg/L Alcohol
T_{rec}	Resume Time	$\leq 30S(70\% \text{ Response})$	
R_s	Sensing Resistance	5K Ω -50K Ω (0.4mg/L Alcohol)	
$\alpha(R_{300}/R_{100ppm} \text{ Alcohol})$	Concentration slope rate	≤ 0.6	
Standard working condition	$V_c: 2.5V \pm 0.1V$ $V_H: 2.5V \pm 0.1V$ $Temp: 20^\circ C \pm 2^\circ C$ Humidity: 65% $\pm 5\%$		
Preheat time	Over 48 hour		

Formula of sensitivity power consumption P_s : $P_s = V_c^2 \times R_s / (R_s + R_L)^2$

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

B. Structure and configuration

Structure and configuration of MP-3 gas sensor is shown as Fig. 4, sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2), sensitive layer, measuring electrode and heater are fixed into a crust made by metal net. The heater provides necessary work conditions for sensitive components. The enveloped MP-4 have 4pins ,2 of them (3#, 4#) are used to fetch signals, and other 2 (1#, 2#) are used for providing heating current.

