MQ131 Semiconductor Sensor for Ozone

Sensitive material of MQ131 gas sensor is SnO_2, which with lower conductivity in clean air. When Ozone gas exists. 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.

MQ131 gas sensor has high sensitity to Ozone, also sensitive to CL2, NO2, etc.

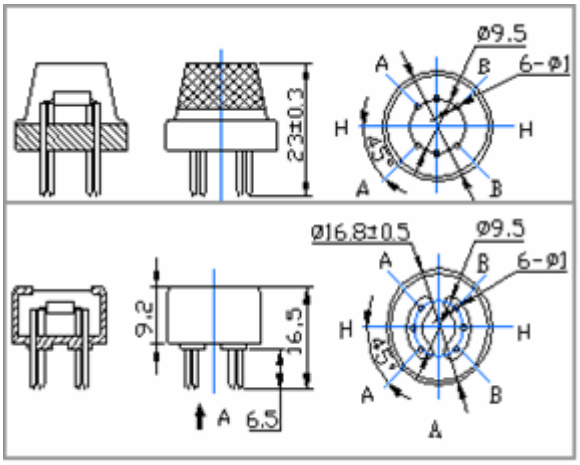
Character

* Good sensitivity to Ozone in wide range
* High sensitivity to Ozone
* Long life and low cost
* Simple drive circuit

Application

* Domestic Ozone concentration overload Detector
* Industrial Ozone concentration overload Detector
* Portable Ozone concentration overload Detector

Configuration



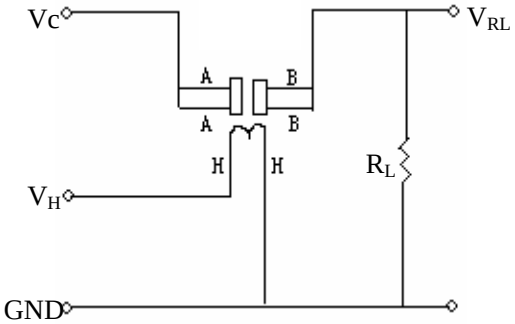
Technical Data

Model No.			MQ131
Sensor Type			Semiconductor
Standard Encapsulation			Bakelite (Black Bakelite)
Detection Gas			Ozone
Concentration			10-1000ppm Ozone
Circuit	Loop Voltage	V_c	≤24V DC
	Heater Voltage	V_H	5.0V±0.2V AC or DC
	Load Resistance	R_L	Adjustable
Character	Heater Resistance	R_H	31Ω±3Ω（Room Tem.）
	Heater consumption	P_H	≤900mW
	Sensing Resistance	R_s	50KΩ-500KΩ(in 50ppm O_3)
	Sensitivity	S	Rs(in air)/Rs(in 50ppm O_3)≥3
	Slope	α	(R_{50ppm}/R_{10ppm} O_3)
Condition	Tem. Humidity		20℃±2℃；65%±5%RH
	Standard test circuit		Vc:5.0V±0.1V； V_H: 5.0V±0.1V
	Preheat time		Over 48 hours

Power of Sensitivity body(Ps): $Ps=Vc^2\times Rs/(Rs+RL)^2$

Resistance of sensor(Rs): $Rs=(Vc/VRL-1)\times RL$

Basic test loop



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

Sensitivity Characteristics

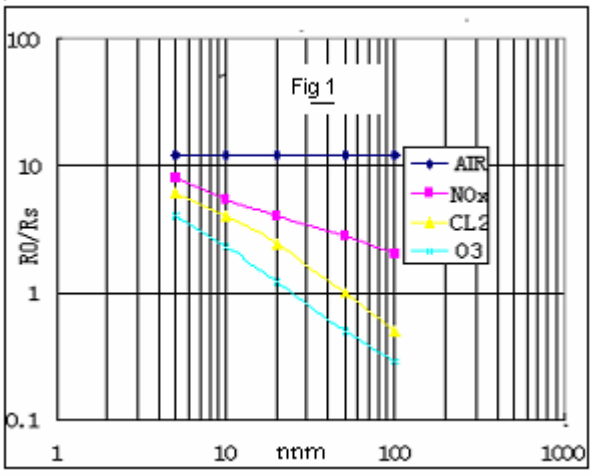


Fig.1 shows the typical sensitivity characteristics of the MQ131, ordinate means resistance ratio of the sensor **(**Rs/Ro**),** abscissa is concentration of gases. Rs means resistance in different gases, Ro means resistance of sensor in 50ppm CL2. All test are under standard test conditions.

Influence of Temperature/Humidity

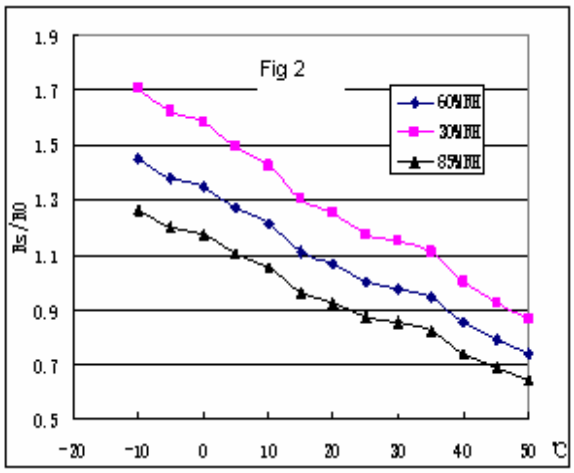


Fig.2 shows the typical temperature and humidity characteristics. Ordinate means resistance ratio of the sensor (Rs/Ro), Rs means resistance of sensor in 50ppm Ozone under different tem. and humidity. Ro means resistance of the sensor in environment of 50ppm Ozone, 20℃/65%RH

Structure and configuration

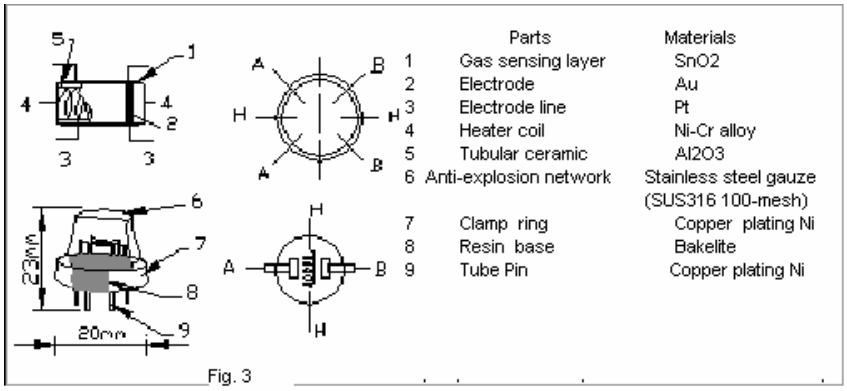


Fig. 3

Structure and configuration of MQ131 gas sensor is shown as Fig. 3, sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) 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-4 have 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.

Notification

1 Following conditions must be prohibited

1.1 Exposed to organic silicon steam

Organic silicon steam cause sensors invalid, sensors must be avoid exposing to silicon bond, fixature, 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_2Sz, 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

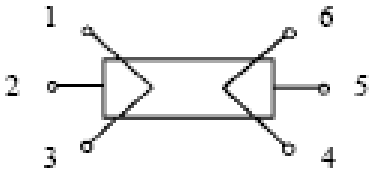
Do avoid icing on sensor'surface, otherwise sensor would lose sensitivity.

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' 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, if 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 stbility 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 repture. 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±20℃
2.7.4 Welding temperature：250±10℃
2.7.5 1 time pass wave crest welding machine

If disobey the above using terms, sensors sensitivity will be reduced.