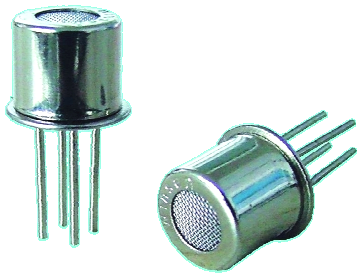
MP135 Flat Surfaced Gas Sensor

Overview

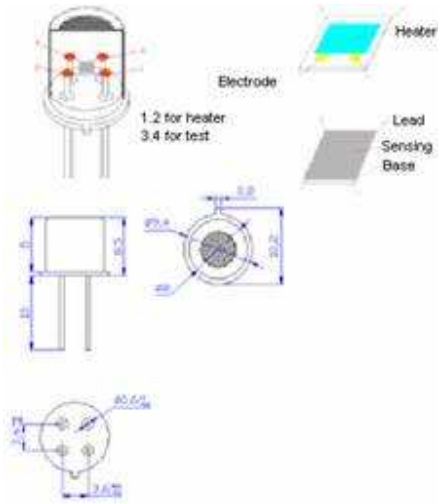
MP135 flat surfaced sensor is used for flammable gas detection, which adopts advanced flat production technology. The heater and metal oxide semiconductor material on the ceramic substrate of subminiature Al_2O_3 are fetched out by electrode down-lead, encapsulated in metal socket and cap. When the target gas exists, the higher the concentration of target gas in the air, the higher conductivity of sensor is. Use simple electro circuit to convert the variation of conductivity to output signal corresponds to gas concentration.



Features

* High selectivity to H2
* Small size
* 5V rated voltage, low consumption
* Fast response and resume
* Good stability and long life
* Simple drive circuit

Configuration



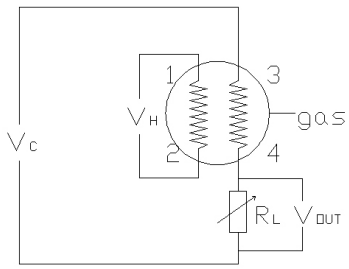
Application

Widely used for household harmful gas detection and
Air fresh

Performance parameters

Model			MP135
Type			Semiconductor flat surfaced gas sensor
Standard encapsulation			Metal
Target gas			H2, Alcohol, CO
Detection concentration			10-1000ppm H_2 10-1000ppm Alcohol 10-500ppmCO
Standard circuit	Loop voltage	V_c	≤24V DC
	Heating voltage	V_H	5.0V±0.2V ACorDC
	Load resistance	R_L	Adjustable
Standard features of sensor	Heating resistance	R_H	110Ω±10Ω（Room Tem.）
	Heating consumption	P_H	≤240mW
	Surface resistance	R_s	10KΩ-100KΩ (in 50ppm H_2)
	Sensitivity	S	Rs(in air)/Rs(50ppmH_2)≥3
	Concentration slope	α	≤0.6($R_{50ppm}/R_{30ppm\ H2}$)
Standard condition of test	Temperature, humidity		20℃±2℃；65%±5%RH
	Standard testing circuit		Vc:5.0V±0.1V； V_H: 5.0V±0.1V
	Warm-up time		More than 48 hours

Basic testing circuit



Calculation formula of sensor's consumption:

$Ps=Vc^2\times Rs/(Rs+R_L)^2$

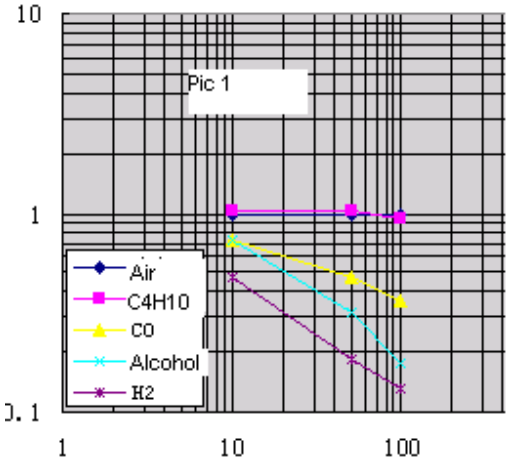
Calculation formula of sensor's resistance:

$Rs=(Vc/V_{RL}-1)\times R_L$

Shock resistance

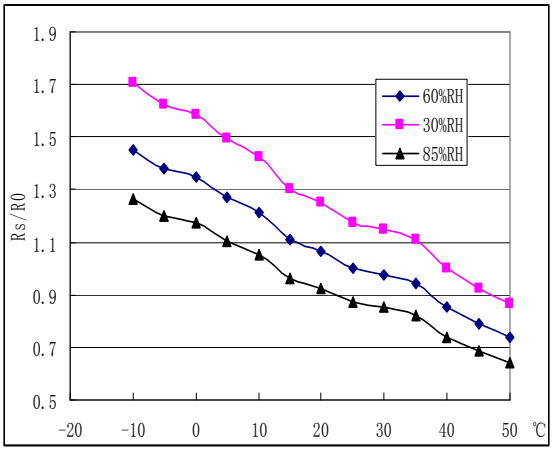
Vibration: frequency-1000 times/min，full swing-4mm, duration time-1 hour, vertical direction
Impact: acceleration-100G, vertical direction, repeat 5 times

Sensitivity features



Pic1: Rs expresses the resistance of sensor in different concentration of gas. Ro expresses the resistance of sensor in clean air. All the tests in the picture are all finished under the standard testing condition.

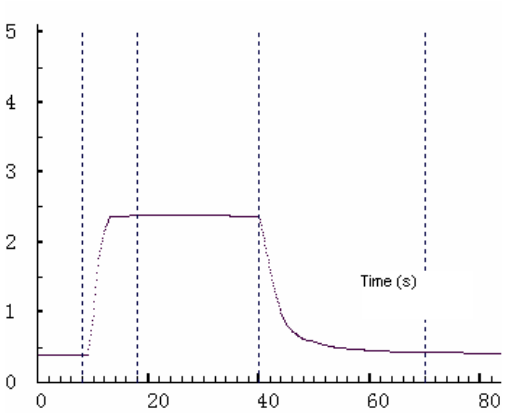
Effects of temperature and humidity



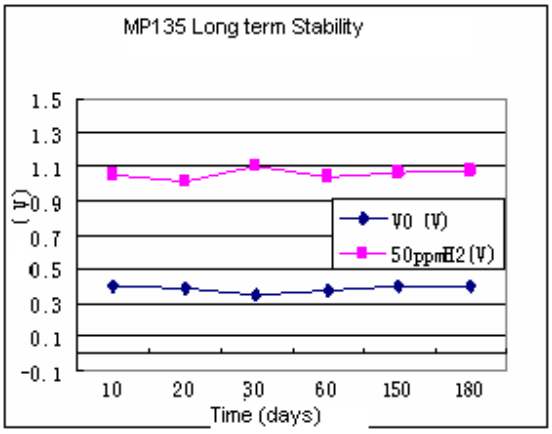
Pic 2

Pic2: Rs expresses the resistance under 50ppmH2 and various temperature and humidity conditions. Ro expressed the resistance under 50ppmH2 and 20℃/65%RH conditions.

Response and resume



Long-term stability



Note

1 Following conditions must be avoided.

1.1 Exposed to organic silicon steam.

If organic silicon steam is adsorbed on the surface of sensor, sensitive material of sensor will be coated, which will restrain sensitivity of sensor and beyond retrieve. The sensor should avoid exposing to where existing of silicon adhesive, fixature, silicon latex, putty or other plastic additive contains silicon.

1.2 High corrosive gas environment

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 will make the sensitive materials changed irreversibly.

1.3 Alkali, Alkali metals salt, halogen pollution

The sensors performance will lead to deterioration if sensors are sprayed polluted by alkali metals salt especially brine, or exposed to halogen such as fluorin.

1.4 Exposed to the water

The sensitivity of sensor will be reduced when spattered or dipped in water.

1.5 Freezing

If icing up on surface of sensor, it will lead sensitive material disintegrate then lose sensitivity.

1.6 Applied voltage overhigh

If applied voltage on sensors or heater higher than specified value, it will lead to wire lead and heater broken, and reduce its sensitivity, even if sensors have no physics damage.

2 Following conditions should be possibly avoided

2.1 Condensation water

Under indoor conditions, slight condensation water will effect performance of sensor lightly. However, if condensation water on the surface of sensor and keep a certain period, sensitiviy of sensor will decrease.

2.2 Used in high gas concentration

No matter the sensor is electrified or not, if placed in high gas concentration for a long time, it will effect features of sensor.

2.3 Long time storage

If stored for long time without being electrified, the resistance of sensor produces reversible drift, which is related with storage conditions. Sensor should be stored in airproof without silicon gel bag with clean air. For the sensor 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 sensor 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 performance of sensor badly.

2.5 Vibration

Continual vibration will result in sensor down-lead resonance then rupture. 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 sensors, handmade wielding is optional way. If use wave crest wielding 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 A single pass wave crest welding machine

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