DL-4 semiconductor gas sensor

版本号：V1.1

characteristic:

*high sensitivity
*Stable performance
*Fast response and recovery time
*excellent seismic performance
*Strong anti-jamming capability

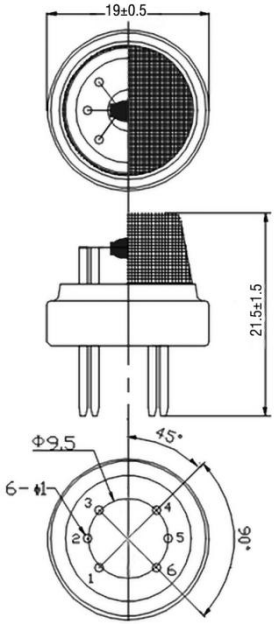
apply:

*Civil Gas Leak Detector and Alarm
*Portable gas detector

DL-4 The gas-sensitive material in gas sensors is tin dioxide (SnO2), which exhibits low electrical conductivity in clean air. When the sensor is exposed to a detectable gas, its conductivity increases proportionally with the concentration of the flammable gas in the air. A simple circuit can convert these conductivity changes into an output signal corresponding to the gas concentration. The YM-04 gas sensor demonstrates high sensitivity to methane and strong resistance to interference from alcohol and other interfering gases.

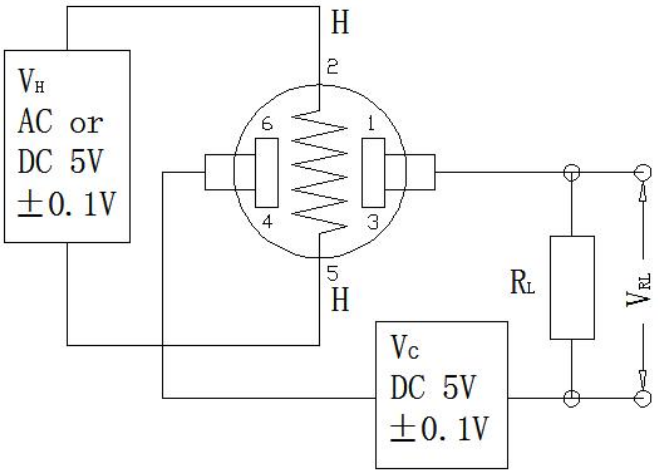
External dimensions

Figure 1 Sensing Structure Diagram



test circuit ：

Figure 2 Test Circuit



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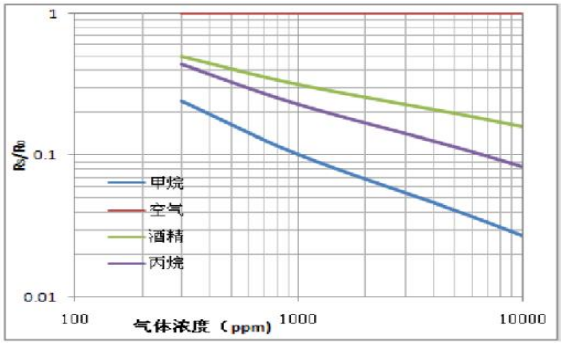
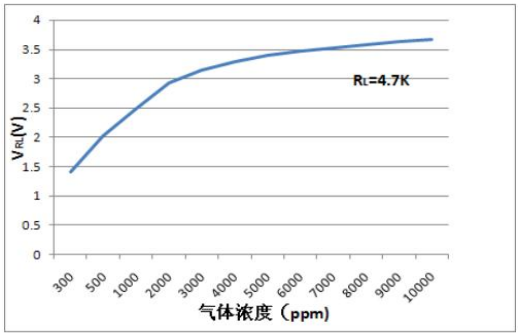
the key technical indexes :

project	parameter
tracer gas	methane
Detection concentration	300～10000ppm（methane）
heater voltage(VH)	5V±0.1V AC OR DC
loop voltage	≤24V DC
heating resistor（RH）	28Ω±3Ω（room temperature）
heating power consumption(PH)	≤1W
sensitivity（S）	Rs(in air)/Rs(5000ppm CH4)≥ 5
output voltage（VS）	2.5V～4.0V（in 5000ppmCH4）
concentration slope	≤0.6(R5000ppm/R1000ppm CH4)
testing environment	20℃±2℃；55%±5%RH
life span	10years

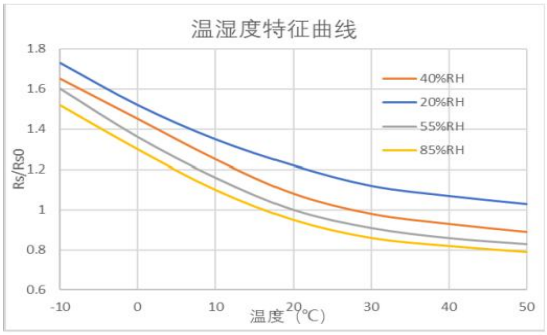
sensitivity characteristic：



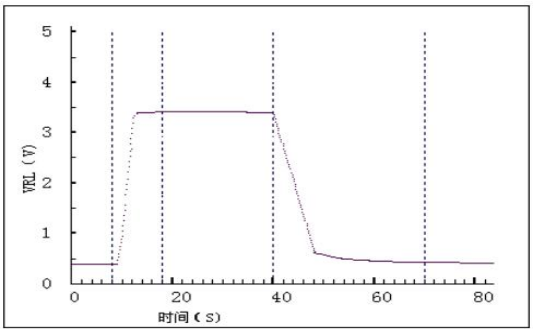
Different concentration change curves：



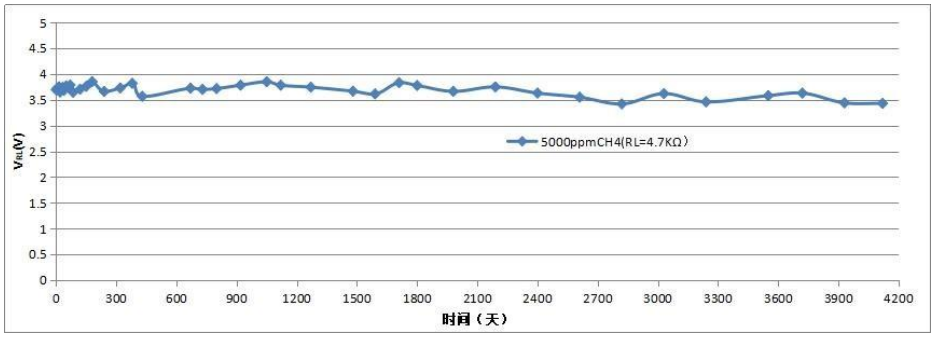
temperature and humidity variation curve:



response recovery curve:



long term stability curve:



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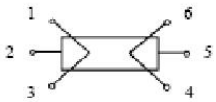
matters need attention:

Do not apply high voltage. If the applied voltage exceeds the specified value, it may damage the sensor and reduce its sensitivity.

*Avoid exposure to volatile silicon compounds. Refrain from contact with silicone adhesives, hair sprays, silicone rubber, putty, or any materials containing volatile silicon compounds. If the sensor surface accumulates silicon compound vapors, the sensitive material will be encapsulated by silicon dioxide formed through decomposition, resulting in irreversible loss of sensitivity. *Avoid exposure to highly corrosive environments. When exposed to high concentrations of corrosive gases (e.g., H2S, SOX, C12, HCl), the sensor may suffer corrosion or damage to heating elements and leads, along with irreversible degradation of sensitive materials.*Contamination by alkali, alkali metal salts, or halogens is prohibited. Exposure to alkali metal, particularly salt spray, or halogen compounds such as Freon may also lead to performance degradation.

*Do not expose to water or gaseous liquids. Spill or immersion in water may cause sensitive materials to detach, leading to performance changes or failure of the sensor.



传感器引线示意图

*Freezing is prohibited. Ice formation on the sensor's sensitive material surface may cause the sensitive layer to crack and lose its sensitivity. *Incorrect pin voltage application is prohibited (applicable only to side-heated series). For 6-pin sensors, pins 2 and 5 are heating electrodes, while pins (1,3) and (4,6) are test electrodes. Pins 1 and 3 should be connected, and pins 4 and 6 should be connected. Applying voltage to pins 1,3, or 4,6 may cause lead burnout, while pins 2 and 4 will not receive the signal.

Avoid prolonged storage. When left without power for extended periods, sensors may develop reversible resistance drift due to storage conditions. Store sensors in airtight bags free from volatile silicon compounds. For long-term stored sensors, allow sufficient power exposure before use to achieve stabilization. Recommended storage duration and corresponding aging time are advised:

period of storage	Recommended aging time
Less than 1 month	No less than 48 hours
1-6 months	No less than 72 hours
Over 6 months	No less than 168 hours

*Usage conditions: Manual welding is the most ideal method. The recommended welding conditions are as follows:

item	condition
scaling powder	Rosin flux with the least chlorine content
soldering iron	constant temperature
temperature	250℃
time	≤3S

The following conditions must be met during wave soldering:

One pass through the wave soldering machine

project	condition
scaling powder	Rosin flux with the least chlorine content
velocity	1-2M/minute
preheat temperature	100±20℃
welding temperature	250±10℃

Violating the above usage conditions will degrade the sensor performance。