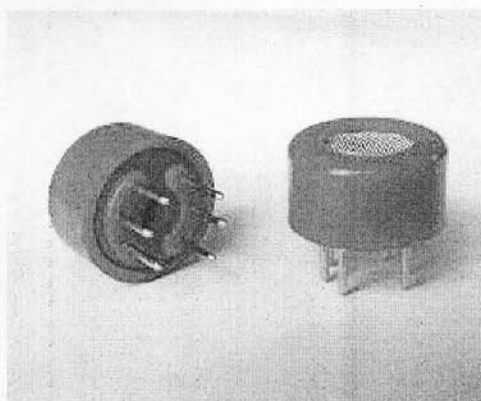


## Features

- Good sensitivity and selectivity to CO<sub>2</sub>
- Low humidity and temperature dependency
- Long stability and reproducibility

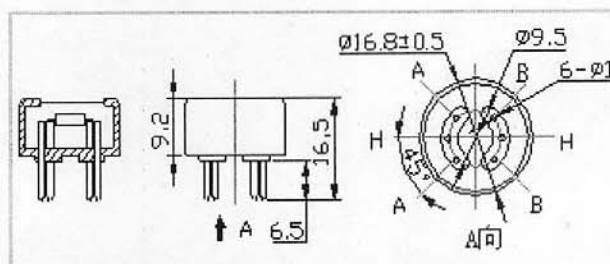
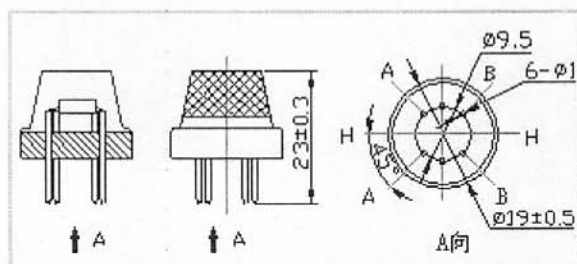
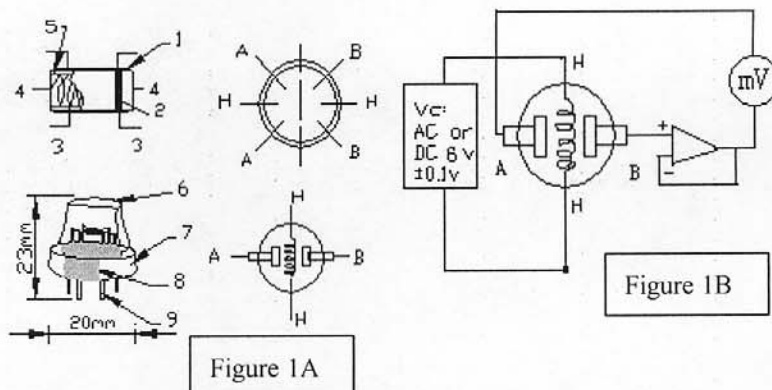
## Application

- Air Quality Control
- Ferment Process Control
- Room Temperature CO<sub>2</sub> concentration Detection



## Structure and Testing Circuit

Sensor Structure and Testing Circuit as Figure, It composed by solid electrolyte layer (1), Gold electrodes (2), Platinum Lead (3), Heater (4), Porcelain Tube (5), 100m double-layer stainless net (6), Nickel and copper plated ring (7), Bakelite (8), Nickel and copper plated pin (9).



## Working Principle

Sensor adopt solid electrolyte cell Principle. It is composed by the following solid cells:

Air, Au|NASICON|| carbonate|Au, air, CO<sub>2</sub>

When the sensor exposed to CO<sub>2</sub>, the following electrodes reaction occurs:

Cathodic reaction:  $2\text{Li} + \text{CO}_2 + 1/2\text{O}_2 + 2\text{e}^- = \text{Li}_2\text{CO}_3$

Anodic reaction:  $2\text{Na} + 1/2\text{O}_2 + 2\text{e}^- = \text{Na}_2\text{O}$

Overall chemical reaction:  $\text{Li}_2\text{CO}_3 + 2\text{Na} = \text{Na}_2\text{O} + 2\text{Li} + \text{CO}_2$

The Electromotive force(EMF) result from the above electrode reaction, accord with according to Nernst's equation:

$$\text{EMF} = E_c - (R \times T) / (2F) \ln (P(\text{CO}_2))$$

$P(\text{CO}_2)$ —CO<sub>2</sub> partial Pressure  $E_c$ —Constant Volume  $R$ —Gas Constant volume

$T$ — Absolute Temperature (K)  $F$ —Faraday constant

From Figure 1B, Sensor Heating voltage supplied from other circuit, When its surface temperature is high enough, the sensor equals to a cell, its two sides would output voltage signal, and its result accord with . In sensor testing, the impedance of amplifier should be within 100—1000GΩ, Its testing current should be control below 1pA.

## Specifications :

Symbol	Parameter Name	Technical	Remarks
$V_H$	Heating Voltage	$6.0 \pm 0.1 \text{ V}$	AC or DC
$R_H$	Heating Resistor	$30.0 \pm 5\% \Omega$	Room Temperature
$I_H$	Heating Current	@200mA	
$P_H$	Heating Power	@1200mW	
$T_{ao}$	Operating Temperature	-20—50	
$T_{as}$	Storage Temperature	-20—70	
$\Delta E M F$	Output	30—50mV	350—10000ppmCO <sub>2</sub>

## Sensitivity :

Figure 2 Shows gas sensor sensitivity curve. :

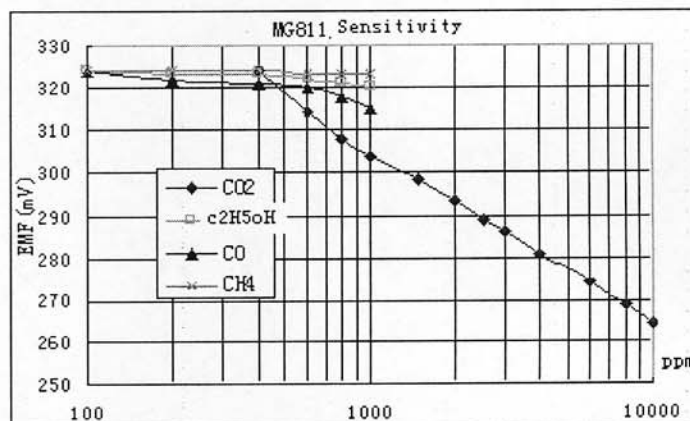
Conditions:

Tem : 28°C、

RH: 65%、

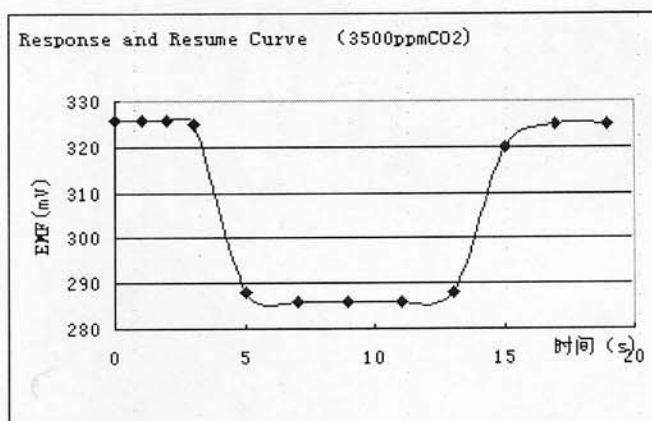
Oxygen : 21%

EMF: sensor EMF under different gas and concentration .



## Response and Resume Characteristic :

Figure 3 shows Solid electrolyte sensor response and resume characteristics.



## Temperature and Humidity Dependency :

