

### Features

- Good sensitivity and selectivity to CO2
- Low humidity and temperature dependency
- Long stability and reproducibility

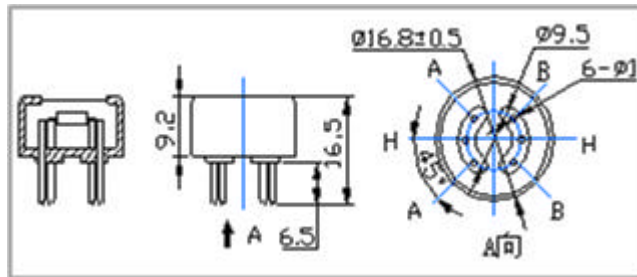
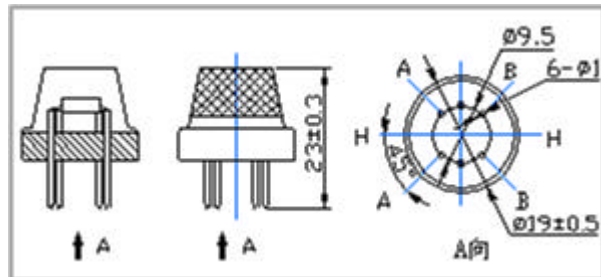
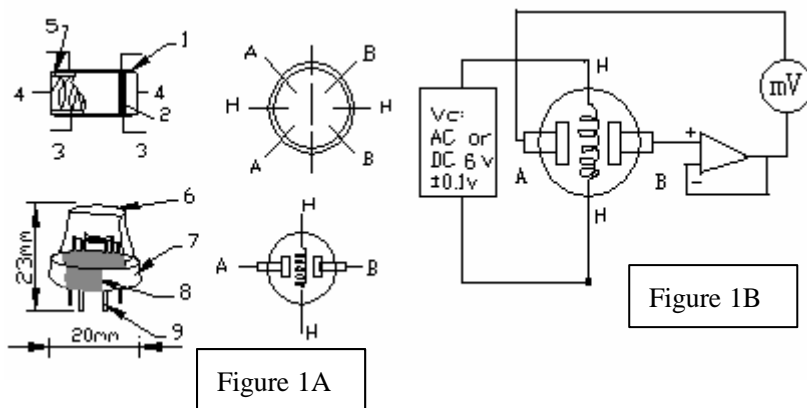
### Application

- Air Quality Control
- Ferment Process Control
- Room Temperature CO2 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 , CO2

When the sensor exposed to CO2 , the following electrodes reaction occurs :

Cathodic reaction :  $2Li + + CO2 + 1/2O2 + 2e^- = Li2CO3$

Anodic reaction :  $2Na + + 1/2O2 + 2e^- = Na2O$

Overall chemical reaction :  $Li2CO3 + 2Na + = Na2O + 2Li + + CO2$

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

$$EMF = Ec - (R \times T) / (2F) \ln (P(CO_2))$$

$P(CO_2)$ —CO2--- 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 Nernst ' s equation. In sensor testing, the impedance of amplifier should be within 100—1000G , Its testing current should be control below 1pA.

## Specifications :

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

## Sensitivity :

Figure 2 Shows gas sensor sensitivity curve. :

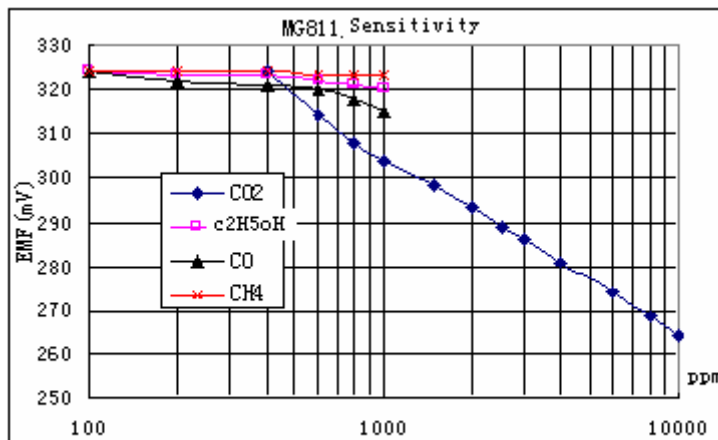
Conditions:

Tem : 28

RH : 65%

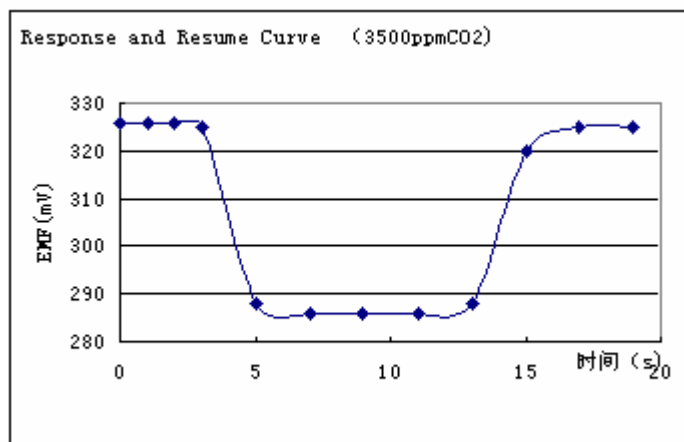
Oxygen : 21%

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 :

