Burnt Smell Gas Sensor Module

(**Model: ZP101**)

User's Manual Version 1.0

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Zhengzhou Winsen Electronics Technology Co., Ltd

ISO9001 Certificated Company

Statement

Thanks for purchasing our product. In order to let customers use it better and reduce the faults caused by misuse, please read the manual carefully and operate it correctly in accordance with the instructions. If users disobey the terms or remove, disassemble, change the components inside of the sensor, we shall not be responsible for the loss.

The specific such as color, appearance, sizes &etc., please in kind prevail.

We are devoting ourselves to products development and technical innovation, so we reserve the right to improve the products without notice. Please confirm it is the valid version before using this manual. At the same time, users' comments on optimized using way are welcome.

Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD.

ZP101 Burnt Smell Detection Module

Profile

The ZP101 burnt odor detection module adopts advanced chip semiconductor gas sensor. This module can adapt to different food burnt processes and has a very high sensitivity to the smell of food in burnt state; the module has been aged, After debugging and calibration, it has good consistency and high sensitivity.

Main Features

*Fast response, support serial communication.

Main applications

It is suitable for detecting the burnt smell of food cooked in household microwave ovens, ovens, air fryers, etc.

Main parameters

Table1.

Model No.	ZP101
Detection Gas	food burnt gas
Sensor Type	Flat Semiconductor Series
Response Time T90①	＜ 10s
Preheat Time	≥1min
Zero Range (AD0)	300～1100 (20℃～26℃/30%RH～70%RH)
Response Change (Ads - AD0)	820 ~ 1300(10ppm alcohol) (20℃-26℃ /30%RH ~ 70%RH)
Operating Voltage	DC 5±0.1V
Working Current	≤ 90 mA (@5V)
Anti-Interference Ability	8mW/cm2
Use Environment	-25° C～85° C (below 95%RH)
Storage Environment	-40℃～85℃
Dimensions	43.0mm×26.0mm×15.9mm (L×W×H)

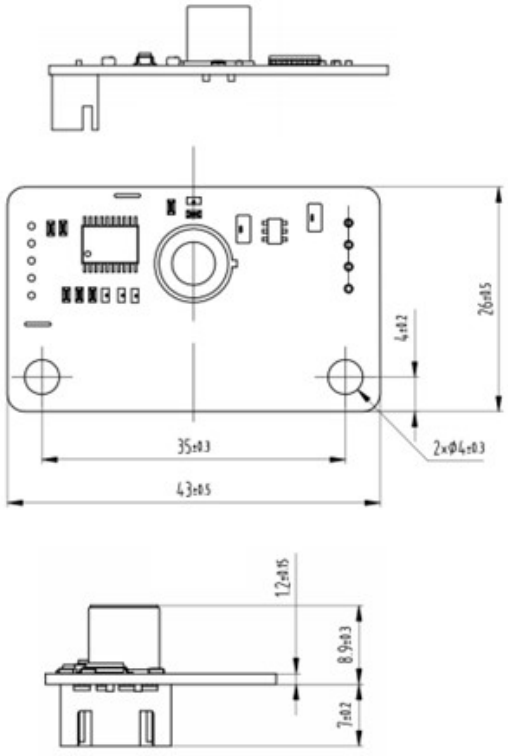

Figure 1 Module Structure Diagram

Note: ① put the module into a certain concentration atmosphere from the air state, the time taken for the reaction value to reach 90% of the steady state reaction value is T90.

Pin Function Description

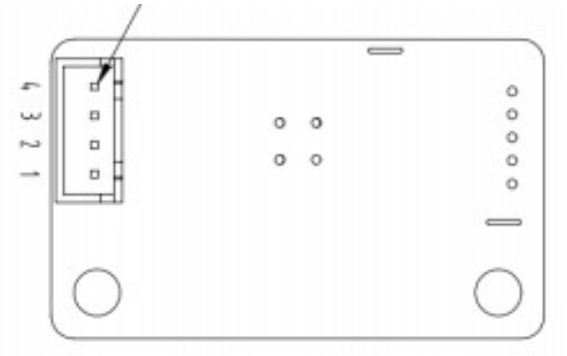

Figure 2 Pin diagram of burnt smell module

Table 2 Pin Function Description

Pin	Function	Function description
Pin 1	Vin	Module power input
Pin 2	UART (TXD)	UART (TXD) data transmission
Pin 3	UART (RXD)	UART (RXD) data reception
Pin 4	GND	DC power ground

Communication protocol

1. Communication settings

Table 3 Communication Setting Parameters

Baud Rate	9600
Data Bits	8 bits
Stop Bit	1 bit
Check Digit	None

2. Communication command

The communication mode is divided into two methods: active upload mode and response mode. The active upload mode is to send data every 500ms.

Note: 1. After sending query command to the module, the module will automatically switch to answer mode.

2. When the module is in the response mode, if the query command is not received within 20 seconds, the module will automatically switch to the active upload mode.

Table 4 Data format sent by the module in active upload mode

0	1	2	3	4	5	6	7	8
start bit	/	/	reserve	reserve	reserve	Real-time signal AD value high bit	Real-time signal AD value low bit	Check value
0xFF	0x01	0x03	0x00	0x0E	0x74	0x09	0x56	0x1B

Real-time signal AD value = real-time signal AD value high byte low 6 bits*256+real-time signal AD value low AD value and voltage value corresponding relationship: each AD represents 1.22mV

Table 5 Module query command data format

0	1	2	3	4	5	6	7	8
start bit	reserve	Order	reserve	reserve	reserve	reserve	reserve	Check value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79

Table 6 The data format returned in module response mode

0	1	2	3	4	5	6	7	8
start bit	Order	reserve	reserve	Real-time signal AD value high bit	Real-time signal AD value low bit	reserve	reserve	Check value
0xFF	0x86	0x0E	0x74	0x09	0x56	0x00	0x00	0x99

Real-time signal AD value = real-time signal AD value high byte low 6 bits*256+real-time signal AD value low AD value and voltage value corresponding relationship: each AD represents 1.22mV

Check value calculation

```
/**************************************************************************
* Function name: unsigned char FucCheckSum(uchar *i,ucharln)
* Function description: sum check (take the sum of 1\2\3\4\5\6\7 of the sending and receiving protocol and invert +1)
* Function description: add the element 1 to the penultimate element of the array and then invert +1 (the number of elements must be greater than 2)
**************************************************************************/
unsigned char FucCheckSum(unsigned char *i,unsigned char ln)
{
    unsigned char j,tempq=0;
    i+=1;
    for(j=0;j<(ln-2);j++)
    {
        tempq+=*i;
        i++;
    }
    tempq=(~tempq)+1;
    return(tempq);
}
```

Precautions

1. Situations to avoid

1.1 Exposure to volatile silicon compound vapor

The module should avoid exposure to silicon adhesives, hairspray, silicone rubber, putty or other places where volatile silicon compounds exist. If the silicon compound vapor is adsorbed on the surface of the sensor of the module, the sensitive material of the sensor will be decomposed by the silicon compound to form a silicon dioxide package, which will inhibit the sensitivity of the sensor and cannot be recovered, resulting in a decrease in the sensitivity of the module or even no response.

1.2 Highly corrosive environments

Exposure of the module to high concentrations of corrosive gases (such as H2S, SOX, Cl2, HCl, etc.) will cause corrosion or damage to the sensor heating material and sensor leads in the module, and cause sensitive Irreversible deterioration of material properties will affect the performance and accuracy of the module.

1.3 Pollution by alkali, alkali metal salt, and halogen

After the module sensor is polluted by alkali metal, especially salt water spray, or exposed to halogen such as Freon, it will also cause performance deterioration.

1.4 Exposure to water

If the sensor in the module is immersed in water, the sensitivity of the sensor will decrease, which will affect the measurement accuracy of the module.

1.5 Icing

Icing on the sensor sensitive material surface of the module will cause the sensitive layer to crack and lose its sensitive characteristics.

2. Situations to avoid as much as possible

2.1 Condensed water

Under indoor use conditions, slight condensed water will have a slight impact on the performance of the sensor in the module. However, if water condenses on the surface of the sensitive layer and remains for a period of time, the sensor characteristics in the module will decrease, and the measurement error of the module will also increase.

2.2 In high-concentration gas

No matter whether the module is powered on or not, long-term placement in high-concentration gas will affect the sensor characteristics in the module.

3. Packaging method: Do not completely seal the packaging, vacuum packaging.

Sealing and vacuum packaging will affect the oxygen adsorption on the surface of sensitive materials and affect the initial recovery characteristics of the module sensor.

4. The module has been treated with anti-corrosion. Before the module is installed, make sure that the surrounding environment has no source of irritating gas. For example, the anti-corrosion paint on the control board must be completely dry.

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