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Odor detection module

MMD3005

Product Description

Ver 1.01

Suzhou Huiwen Nano Technology Co., Ltd.

IDM Technology Inc.

1. Product Introduction

The MMD3005 gas sensor module is a gas sensor module developed based on the smart sensor independently developed by Huiwen Technology. It can be used to simultaneously identify and detect the composition and content of ammonia, TVOC and hydrogen sulfide in the air. The sensor module has both temperature and humidity detection function. The sensor of the MMD3005 series module is a multi-channel gas sensor composed of different material systems. It uses specific conditioning circuits and precise algorithms to convert the response to conductivity changes into electrical signals corresponding to gas types and concentrations.

2. Module Features

It can simultaneously identify and detect the content of ammonia, hydrogen sulfide and TVOC in the odor, and also has the function of temperature and humidity detection. The module has

Features of high sensitivity, high resolution, low power consumption, long service life Provide UART, analog voltage signal, PWM with Waveform and other output methods, high stability, excellent anti-interference ability, temperature compensation, excellent linear output.

3. Main application

Odor detection in the kitchen and bathroom, odor monitoring of rotten food, can be directly embedded in home appliances such as sterilizing and deodorizing machines, refrigerators, etc., and realize alarm prompts

And turn on the function of sterilization and deodorization.

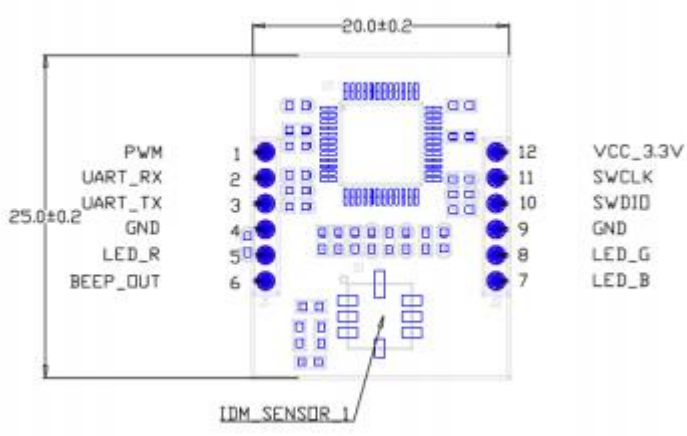
4. Product description

4.1 Product parameters

Table 1

sensor name	MMD3005		
Gas detection	NH3	TVOC	H2S
examination range	0~300ppm	0-100ppm	0-10ppm
maximum allowable concentration	1000ppm	500ppm	100ppm
resolution	2ppm	0.2ppm	0.05ppm
Response time	<60s	<30s	<60s
Recovery Time	<120s	<60s	<120s
loop voltage	3.3V		
output signal	UART		
Operating temperature	- 10~55℃		
Working humidity	10~95%RH		
power consumption	Less than 200mW		
size	30*20*9mm		
life	3 years		
Preheat time	30min		
Temperature and humidity test interval	Temperature: -10-70℃, Humidity: 10%-90%RH		
Module alarm mode	Sound and light alarm (can output sound and light alarm signal)		

4.1 Pin Definition Diagram



Pins	pin name	Remark
1	PWM	I/O
2	URAT_RX	UART
3	UART_TX	GND
4	GND	
5	LED_R	I/O
6	BEEP_OUT	I/O
7	LED_B	I/O
8	LED_G	I/O
9	GND	GND
10	SWDIO	SWD
11	SWCLK	
12	VCC_3.3V	3.3V Supply

Pin 6 state output S: S is high level in normal operation state. Output low level in alarm state. Other unused pins can be added according to the actual needs of users, such as buzzer, relay, solenoid valve and other output signals.

4.3 Communication protocol

General settings: use the uart communication interface, the settings are as follows

table 3

baud rate	38400
data bit	8 bits
stop bit	1 person
Check Digit	none
hardware flow control	none

Communication command: The communication is active uploading, and the data is sent every 3S. The format of the data actively sent is hexadecimal, and the format is as follows

1 Character Festival	1 Character Festival	4 Character Festival	4 bytes	4 bytes	4 bytes	2 bytes	4 bytes	1 byte	4 bytes	4 bytes	4 Character Festival	1 Character Festival	1 Character Festival	1 Character Festival
frame head	land site code	temperature Spend	channel 1 Voltage	channel 2 Voltage	channel 3 Voltage	Gas type	Strong ammonia Spend	Call the police/ grade	TVOC concentration	hydrogen sulfide concentration	wet Spend	Save Keep	frame tail	school test bit

The length of the data replied by the lower computer is fixed at 40 bytes, and the current effective bits are:

Frame header (0xAA)+address (1 byte)+temperature (4 bytes)+voltage 1+voltage 2+voltage 3 (both voltages are 4 bytes)+gas type (2 bytes)

+concentration (4 bytes) + alarm/level (1 byte) + reserved bit defaults to 0 (multi-sensor is the remaining concentration 2, concentration 3)

+ Frame end (0xBB) + the 40th byte is fixed as the cumulative check code

When the 4-byte data such as temperature, voltage and concentration are parsed from hexadecimal to decimal,The high position is behind, the low position is in front, and the final result is divided by 1000 to obtain a decimal floating point number.

Example:

AA 00A8 61 00 00DC 02 00 004B 03 00 00BA 03 00 0000 0020 4E 01 0000A8 61 00 0030 75 00 0050 C3 00 0000BB87

frame header AAA

address 00

temperature A8 61 00 00 - - > 61 A8 (hexadecimal) - - > 25000 (decimal) - - > 25.000 (divided by 1000)

voltage 1 DC 02 00 00 - - > 02 DC - - > 732 - - > 0.732

voltage 2 4B 03 00 00 - - > 03 4B - - > 843 - - > 0.843

Voltage 3 BA 03 00 00 - - > 03 BA - - > 954 - - > 0.954

gas type 00 00 - - > 0

Gas concentration 1 (ammonia) 20 4E 00 00 - - > 4E 20 (hexadecimal) - - > 20000(decimal) - - > 20.000 (divide by 1000)

Alarm level 00

Retention (Concentration 2 TVOC) A8 61 00 00 - - > 61 A8 -->25000 - - > 25.000

Retention (concentration 3 hydrogen sulfide) 30 75 00 00 - - > 75 30 -->25000 - - > 30.000

retention (humidity) 50 C3 00 00 - - > C3 50 - - > 50000 --> 50.000

reserve 00

end of frame BB

Check code (cumulative) 87

Accumulated check code (including frame header and frame tail) parsing procedure is as follows:

```
uint8_t CheckSum(uint8_t *p, uint8_t len) {

    uint8_ti;
    uint32_t sum = 0; for(i =
    0;i < len;i++)
```

```
    {
      sum += p[i];
    }
    sum = sum & (0xFF);
    return sum;
}
```

Serial command:

The module can send instructions through the serial port to achieve some functions, as

follows: (1) AA 00 FA

Make the module switch to question-and-answer mode or active upload, the module initializes the default active upload mode, and this command can be used to switch between the two modes.

(2) AA 00 F9

In the question-and-answer mode, the module data is fetched through this command, and the data return format is consistent with the active

upload format. (3) AA 00 FE BB

algorithm reset

(4) AA 00 FB

toggle decimal floating point output

The decimal output format is as follows:

Table 4

String	String	String	String	String	String	String	String	String
temperature	humidity	Voltage value (Sensor1	Voltage value (Sensor2	Voltage value (Sensor3	Ammonia concentration	TVOC concentration	Hydrogen sulfide concentration	Call the police

Note: The data is sent in string type, and the data is separated by spaces.

Precautions

1. Things to avoid

1.1 Exposure to Vapors of Volatile Silicon Compounds

The module should avoid exposure to silicone adhesives, hair gel, silicone rubber, putty or other places where volatile silicon compounds exist. Otherwise, the sensitivity of the module will be reduced or even not respond.

1.2 Highly corrosive environment

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

1.3 Exposure to water

The sensor in the module will be splashed or immersed in water, which will cause the sensitivity of the sensor to drop, which will affect the measurement accuracy of the

module. 1.4 Icing

Icing on the surface of the sensor sensitive material of the module will cause the sensitive layer to crack and lose its sensitive properties. 2 Situations

to avoid as much as possible

2.1 Condensate

Under indoor use conditions, slight condensation will have a slight impact on the performance of the sensors in the module. But if water condenses on the sensitive surface

surface and keep it for a period of time, the characteristics of the sensor in the module will decrease, and the measurement error of the module will also increase.

2.2 In high concentration gas

Regardless of whether the module is powered on or not, long-term placement in high-concentration gas will affect the sensor characteristics in the module. If the lighter gas is sprayed directly to the sensor in the module, it will cause great damage to the sensor in the module and cause the sensitivity of the module to decrease.

2.3 Long-term storage

If the module is stored for a long time without power on, the resistance of the sensor will have a reversible drift, which is related to the storage environment. Modules should be stored in airtight bags that do not contain volatile silicon compounds. Modules that have been stored for a long time need to be powered on for a longer period of time to stabilize them before use. The storage time and corresponding aging time are recommended as follows:

storage time	Recommended Aging Time
under 1 month	not less than 12 hours
1-6 months	Not less than 24 hours
over 6 months	Not less than 72 hours

2.4 Long-term exposure to extreme environments

Regardless of whether the module is powered on or not, the performance of the module will be seriously affected if it is exposed to extreme conditions such as high humidity, high temperature or high pollution for a long time.

Suzhou Huiwen Nano Technology Co., Ltd.

http://www.idmsensor.com/

Room 17#302, Suzhou Nano City, No. 99, Jinjihu Avenue, Suzhou Industrial Park

Tel: 0512-62749655

Fax: 0512-65924822

E-Mail:sales@idmsensor.com