Product Specifications

Model: TX210-T52

Version: V1.0

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Taiyuan Tengxing sensor technology Co., Ltd

1.Description

TX210-T52 module is an odor detection module developed specifically for pet odor detection applications. It utilizes an advanced chip-type thick-film semiconductor gas-sensitive element, which exhibits extremely high sensitivity to hydrogen sulfide, simulated pet odor gases, VOCs, ammonia, and other similar substances. Before leaving the factory, the module undergoes aging, debugging, and calibration. It features UART digital output functionality, making communication simple and convenient to use.

2. Module Features

High sensitivity, excellent long-term stability, factory calibrated, long lifespan, and high cost-effectiveness.

3. Main applications:

Air purifiers, air quality monitors, smart litter boxes, smart pet houses, pet deodorizers and disinfectors, etc.

4. Technical specifications

Model	TX210-T52
Detection gas	H2S、Pet odor simulation gas、VOCs、NH3,etc.
Physical interface	XH2.54-4P terminal
Output	1-500 level
Operating voltage	5.0±0.2V DC(No voltage reverse connection protection）
Preheating time	15minutes（Trend detection can be performed within 15 minutes.）
Output data type	UART（5.0V）output
Operating current	≤70mA
Operating temperature	0-50℃
Operating humidity	≤95%RH（No condensation）
Storage temperature	-20-60℃
Storage humidity	≤60%RH
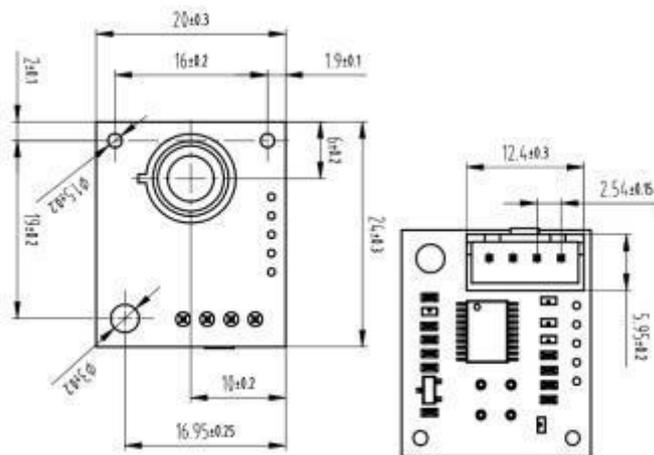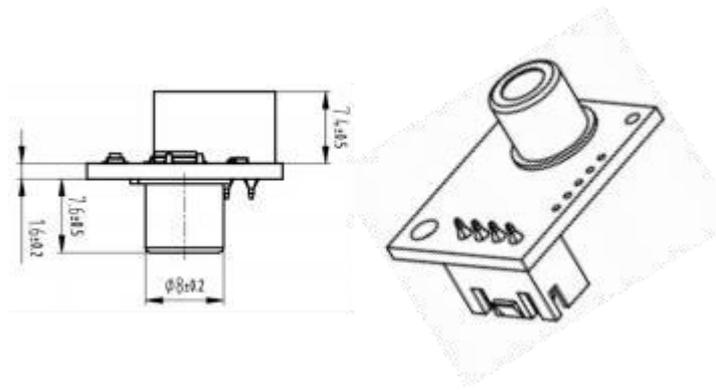
5.Pin Definition
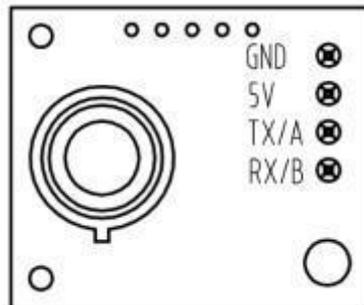
Name	Function
GND	Input power negative terminal
5V	Input power positive terminal
A	UART (TX) 5V data output
B	UART (RX) 5V data input

6.Communication Protocol

General Settings:

Baud rate	9600
Data bits	8 bits
Stop bits	1 bit
Parity	none

Communication commands:

The communication mode has two options: active upload mode and question-and-answer mode. In active upload mode, data is uploaded approximately every 1 second.

Note: 1. When a query command is sent to the module, the module will automatically switch to question-and-answer mode.

2. In question-and-answer mode, if no query command is received within 30 seconds, the module will automatically switch back to active upload mode.

The data format for active upload is as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
start bit	Gas Name (Odor)	reserve	reserve	Level value (high rank)	Level value (low rank)	reserve	reserve	Check value
O*FF	0*3A	0*00	0*00	0*00	0*78	0*00	0*00	0*4E

Note: Level value = High byte of level value * 256 + Low byte of level value
Example: FF 3A 000000 78 00 00 4E
Level value = 0 * 256 + 120 = 120 Level

Module query command format is as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
start bit	reserve	Commands	Q&A	reserve	reserve	reserve	reserve	Check value
O*FF	0*01	0*86	0*00	0*00	0*00	0*00	0*00	0*79

The returned sensor data is displayed in the following format:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
start bit	Commands	Level value (high rank)	Level value (low rank)	reserve	reserve	reserve	reserve	Check value
O*FF	0*86	0*00	0*78	0*00	0*00	0*00	0*00	0*02

Note: Level value = High byte of level value * 256 + Low byte of level value

Example: FF 86 00 78 0000 00 00 02

Level value = 0 * 256 + 120 = 120 Level

3. Checksum Calculation

Checksum = (Invert (byte 1 + byte 2 + ... + byte 7)) + 1

Example code is as follows:

Function Name: unsigned char FucCheckSum(uchar *i,ucharln)

Function Description: Calculates the sum of the first, second, third, fourth, fifth, sixth, and seventh bytes of the transmit and receive protocols, inverts it, and adds 1.

Function Description: Adds the elements from 1 to the second-to-last element of the array, inverts it, and adds 1 (the number of elements must be greater than 2).

```
* unsigned char FucCheckSum(unsigned char *i,unsigned char In)

unsigned char j,tempq=0;

i+=1;

for(j=0;j<(In-2):j++)

tempq+=*i;

i++;

tempq=(~tempq)+1;return(tempq);
```

Instructions for Use:

Aging Time: It is recommended to test the sensor at least 2 hours after initial power-on. If the sensor is stored for an extended period without power, its resistance will experience reversible drift. Therefore, the sensor needs to be powered on and aged before use to achieve internal chemical equilibrium. The recommended storage time and corresponding aging time are as follows:

Storage time	Recommended aging time
Less than 1 month	No less than 24 hours
1-6 months	No less than 48 hours
Over 6 months	No less than 72 hours

7.Precautions

1.Situations that must be avoided:

1.1 Avoid volatile silicon compound vapors. The module should be kept away from silicone adhesives, hairspray, silicone rubber, putty, or other environments containing volatile silicon compounds. If silicon compound vapors adsorb onto the surface of the sensor's sensitive material in the module, the sensitive material will be coated with silica formed from the decomposition of the silicon compounds, resulting in irreversible suppression of sensitivity.

1.2 Avoid highly corrosive environments. Exposure of the module to high concentrations of corrosive gases (such as Cl_2, HCl, etc.) will not only cause corrosion or damage to the heating materials and leads of the sensor in the module, but will also cause irreversible deterioration of the performance of the sensor's sensitive material, thus affecting the module's performance and accuracy.

1.3 Avoid contamination by alkali metal salts and halogens. Contamination of the sensor in the module by alkali metals, especially salt water spray, or exposure to halogens such as Freon, will also cause performance degradation.

1.4 Avoid contact with water. Splashing water or immersing the sensor in the module will cause a decrease in sensitivity.

1.5 Icing: Icing on the surface of the sensor's sensitive material can cause the sensitive layer to crack and lose its sensing properties.

1.6 The module lacks a reverse voltage protection circuit; therefore, reverse voltage connection will damage the module. Furthermore, apply the appropriate voltage as per this instruction manual to avoid excessive voltage damage. Static electricity can also

damage the module, so take anti-static measures when handling it.

2. Situations to Avoid If Possibly

2.1 Avoid condensation: Under indoor conditions, slight condensation may have a minor impact on the sensor's performance. If water condenses on the sensitive layer and remains there for a period, the sensor's characteristics will deteriorate, and the module's measurement error will increase.

2.2 Regardless of whether the module is powered on, prolonged exposure to high-concentration gases will affect the sensor's characteristics.

2.3 Avoid prolonged exposure to extreme environments: Regardless of whether the module is powered on, prolonged exposure to extreme conditions such as high humidity, high temperature, or high pollution will severely affect the module's performance.

2.4 Avoid subjecting the module to frequent and excessive vibration. Frequent and excessive vibration can cause resonance and breakage of the internal leads and sensitive materials of the module's sensors.

2.5 Avoid subjecting the module to strong impacts. Strong impacts or collisions can cause breakage of the internal leads and sensitive materials of the module's sensors.

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