

PM2.5 Infrared Sensor

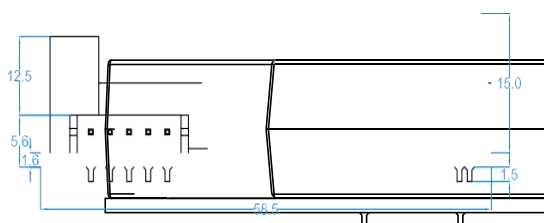
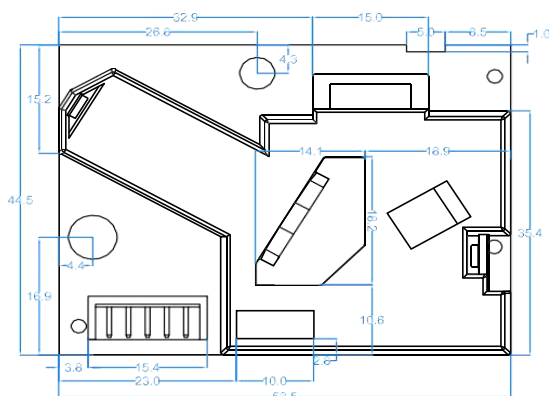
MMD206 Product Datasheet



1. Product Introduction

The MMD206 dust sensor module uses the optical scattering Technology to detect the concentration of dust in the air. The sensor has a built-in infrared light emitting diode and a highly sensitive photoelectric sensor. The light emitted by the light-emitting diode will produce reflected light when it encounters dust. The photoelectric sensor reflects the concentration of dust in the air by detecting the intensity of the reflected light. The sensor outputs a PWM signal; it can also output the dust concentration value through the IIC serial port signal, and the unit is $\mu\text{g}/\text{m}^3$. This sensor is suitable for air purifiers, air conditioners with purification functions, fresh air systems and air quality detection instruments.

2. Product Dimension



Unit: mm

3. Performance

3.1 Specification

Table 1

Operating Voltage	DC 5V $\pm 10\%$. Voltage ripple below 55mV
Working current	90mA
Working temperature and humidity	0 ~ 50°C; below 95% RH (no condensation)
Storage temperature	-20~60°C
Dimension	W59 x H45 x D22(mm)
Weight	26g
Detection particle diameter	About 0.5 μ m or more
Detection range	1000 μ g/m ³
Consistency error	$\pm 25\%$ (@ 100~500 μ g / m ³), ± 25 μ g/m ³ (@ 0~100 μ g/m ³)
Output method	PWM pulse output or UART
Detection start time	About 1 minute after power on(resistance temperature stabilization)

3.2 Pin definition

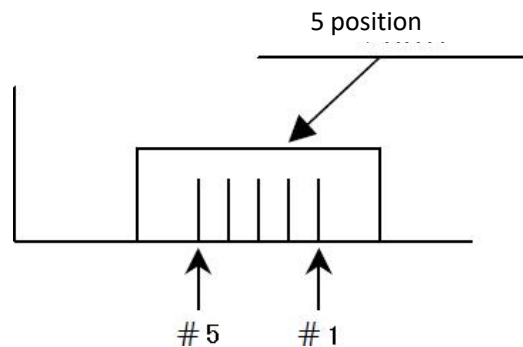


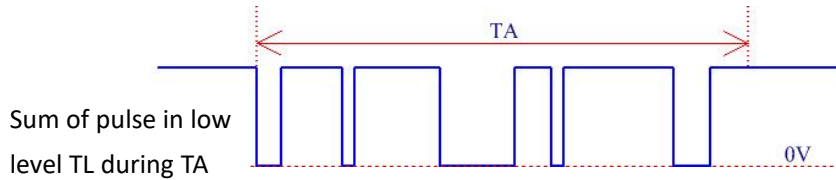
Table 2

PIN#	Name	Comment
1	GND	Ground
2	RX	UART_RX
3	+5V	Power Supply (+5V)
4	TX	UART_TX
5	PWM	1. PWM signal output (active upload) or suspend. 2. GND if use IIC output.

3.3 Lifespan

Light emitter: more than 5 years of continuous power on.

4. Signal Outputs



4.1 PWM signal output (average value)

The relationship between TL and dust concentration:

$$\text{Dust concentration } (\mu\text{g}/\text{m}^3) = \text{TL}/\text{TA} * 4000 * 0.4 \text{ (TA can be 8 to 32 seconds)}$$

It also can read the width of a single low pulse and convert it into a dust concentration value:

$$\text{Dust concentration } (\mu\text{g}/\text{m}^3) = \text{single low pulse width (ms)} * 0.4$$

Note: The original PM2.5 dust level of the dust sensor read by the user needs to be calibrated with a K coefficient based on the TSI instrument photometry. It is generally recommended to be 0.4.

4.2 UART signal output:

When the PWM pin is connected to the MCU input or suspend, and the UART digital output method is selected. The UART_TX output pin automatically upload data once every second.

The data format refers to <Table 3-1>. Default baud rate: 9600bps; Chaity bit: None; Stop bit: 1 bit; Total data length: 12 bytes.

Table 3-1, UART output interface data format

UART output	Function Description
0x24	Fixed 0x24
0x4d	Fixed 0x4d
0x00	Frame length byte number high byte (starting from data 1, including checksum byte)
0x08	The low byte of the frame length bytes (counting from data 1, including checksum bytes)
Data 1	Sensor type identifier, read as fixed character "I"
Data 2	If Bit7 is 1, the sensor's dust concentration data is available. If it is 0, the data is not available. The bit3 to bit0 are concentration data. If the value changes, it means the concentration data been updated, which used for further data processing. Bit6 to bit4 are reserved bits.
Data 3	High 8 bits of concentration data (average value)
Data 4	Low 8 bits of concentration data (average value)
Data 5	High 8 bits of concentration data (real-time value)
Data 6	Low 8 bits of concentration data (real-time value)
Data 7	Checksum high bits (calculated start from the first byte 0x24)
Data 8	Checksum low bits (calculated start from the first byte 0x24)

Note: 1. The dust concentration is measured using a digital dust meter (TSI8534 made in USA) to measure the smoke concentration value of 8mg Zhongnanhai cigarettes.

2. The output coefficient of TSI instrument is 1.

5. Precautions for use

- Since this product uses the Joule heating of the resistor to generate an upward airflow inside the shell, the sensor should be installed vertically (with an error less than $\pm 5^\circ$). The air inlet with the heating resistor sit at the lower end; ensure the air flow between inlet and outlet.
- If the airflow inside the housing not stable, it will affect the sensor characteristics. Please consider the airflow around the sensor.

- The sensor is installed inside the device, and a black sponge needs to be installed on the front window to ensure that it is in a dark environment to reduce the influence of interfering light.
- Do not use the sensor in an environment with organic gas or flammable gas.
- Please do not use organic agents or detergents to clean the lens surface. Also, please do not scratch the lens surface and avoid scratching it with hard objects. For cleaning, wipe with clean water with a cotton swab, then wipe with a dry cotton swab. Do not use alcohol.

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