

# MIX6070 Infrared Dust Sensor

Version No.:1.5

## Features:

- \* Small size
- \* Light weight
- \* Easy to install
- \* Simple maintenance

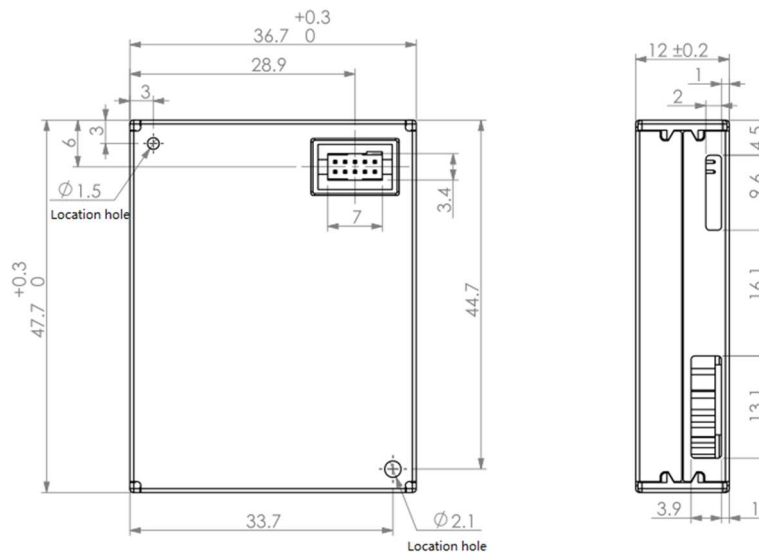
MIX6070 Laser Dust Sensor is used to measure the dust particle (Size: 0.3 $\mu\text{m}$ ~10 $\mu\text{m}$ ) in the environment and output the dust density real-time value ( $\mu\text{g}/\text{m}^3$ ) of PM1.0, PM2.5, PM10. The body of the sensor is designed with ultra-thin (12mm) structure for easy and diverse installation, full metal cover for electrical shielding and built-in advanced algorithm based on optical scattering technology with light source of Laser for accurate and steady output.

## Application:

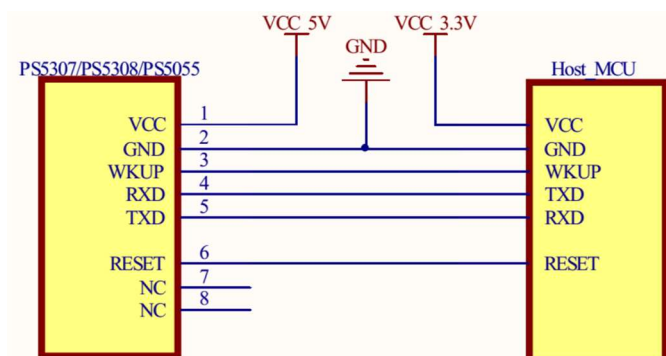
- \* Air purifier
- \* Air Quality Monitor
- \* HAVC refrigeration
- \* Environment Monitoring

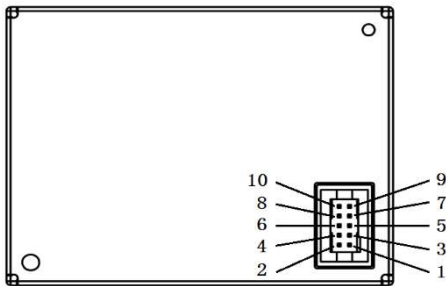


## Dimensions:



## Connection :





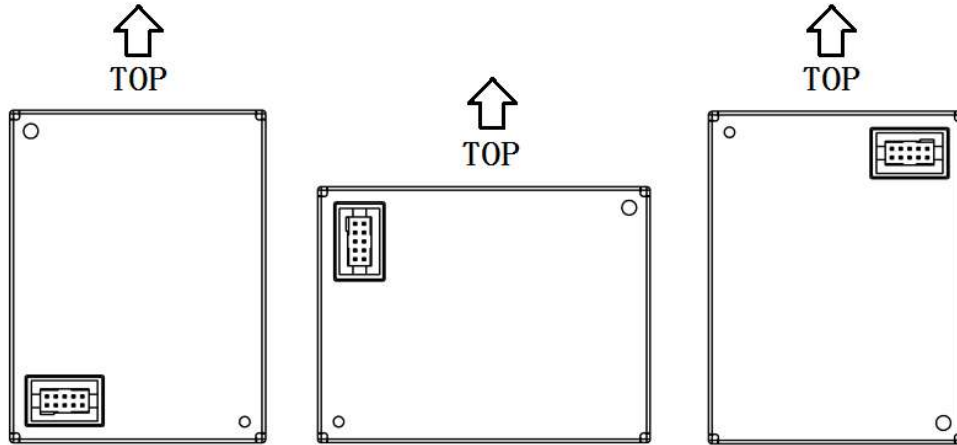
PIN1	VCC	+5V Power Supply
PIN2		
PIN3	GND	Ground
PIN4		
PIN5	RESET	Default: 3.3V Reset: 0V
PIN6	NC	Not connected
PIN7	RXD	TTL@3.3V
PIN8	NC	Not connected
PIN9	TXD	TTL@3.3V
PIN10	WKUP	ON: 3.3V or NC OFF : 0V

Item	Specification
Measurable Dust Size	0.3 $\mu$ m~10 $\mu$ m
Measurement Range	0-600 $\mu$ g/m <sup>3</sup>
Resolution	1 $\mu$ g/m <sup>3</sup>
Working Condition	-15 $^{\circ}$ C~50 $^{\circ}$ C, 0-95%RH (non-condensing)
Storage Condition	-30 $^{\circ}$ C~70 $^{\circ}$ C, 0-95%RH (non condensing)
Measurement Accuracy (PM1.0 and PM2.5)	0~80 $\mu$ g/m <sup>3</sup> , $\pm$ 8 $\mu$ g/m <sup>3</sup> 80 $\mu$ g/m <sup>3</sup> ~ 600 $\mu$ g/m <sup>3</sup> , $\pm$ 15% Condition : 23 $\pm$ 3 $^{\circ}$ C, 50 $\pm$ 10%RH Reference Instrument : PULSE Standard Dust Source : Cigarette (8mg)
Measurement Accuracy (PM10)	0~100 $\mu$ g/m <sup>3</sup> , $\pm$ 30 $\mu$ g/m <sup>3</sup> 100 $\mu$ g/m <sup>3</sup> ~ 600 $\mu$ g/m <sup>3</sup> , $\pm$ 30% Condition : 23 $\pm$ 3 $^{\circ}$ C, 50 $\pm$ 10%RH Reference Instrument : PULSE Standard Dust Source : Cigarette (8mg)
Output Interval	1s
Time of first Reading	$\leq$ 5s
Power Supply	DC 5V $\pm$ 0.3V, Ripple wave<50mV
Working Current	$\leq$ 90mA
Standby Current	$\leq$ 50 $\mu$ A
Dimension	48x37x12mm
Digital output mode	UART TTL 3.3V
MTTF	30000 Hours

## Installation Guide

### 1. Directions:

Please install the sensor as 3 suggested directions as below:



2. Avoid any external Power Supply on the Stainless-Steel shell, since the outside shell is connected to the GND of the internal Power Supply.
3. The air inlet and air outlet shall align with the vent on the inner wall of the user's device. In case of gap, an air isolation structure must be considered between inlet and outlet, otherwise the accuracy of the measurement might be affected.
4. Avoid placing the sensor in the air flow channel of the device. In case of being unavoidable, do design an isolation space for sensor, otherwise, the reading value might be higher.
5. Do place the sensor at least 20cm above the ground during measurement, otherwise the heavy dust or light floating material (i.e. cotton) might stuck the fan and affect the functionality of the sensor.
6. The sensor is suggested to be used for the indoor applications. Special protection design might be considered for applications outdoors.
7. Do not disassemble the sensor without the guidance of expert, otherwise the sensor might be permanently damaged.
8. Situations below might affect the life of the sensor:
  - a) 50% of the time with dust density over  $300 \mu\text{g}/\text{m}^3$  or 20% of the time with dust density over  $500 \mu\text{g}/\text{m}^3$ .
  - b) Existence oil dust (i.e. kitchen)
  - c) High humidity (i.e. Spring Pool, Bathroom)
  - d) Long time outdoor applications without special protection design.

## Communication Setup:

### 1.General Statement

- a. The sensor is working on passive mode: real-time Dust Value is output at 1Hz.
- b. The data steam is hexadecimal. For Example, [46] stands for [70] in decimal.
- c. [xx] is single-byte data (unsigned, 0-255); for double data, high byte is in front.
- d. Baud Rate: 9600; Data Bits: 32bit; Stop Bits: 1; Parity: No

### 2.Communication Protocol definition:

Byte Number	Date	Definition
0	0x44	Starting Symbol 1
1	0x4D	Starting Symbol 2
2	0x00	Date Frame
3	0x1C	
4	xx	PM1.0 Value (with #50 Mesh)
5	xx	
6	xx	PM2.5 Value (with #50 Mesh)
7	xx	
8	xx	PM10 Value (with #50 Mesh)
9	xx	
10	xx	PM1.0 Value (without Mesh)
11	xx	
12	xx	PM2.5 Value (without Mesh)
13	xx	
14	xx	PM10 Value (without Mesh)
15	xx	
.	.	NA
.	.	
.	.	
30	xx	Checksum =
31	XX	sum (byte0+byte1+byte2+...+byte31)

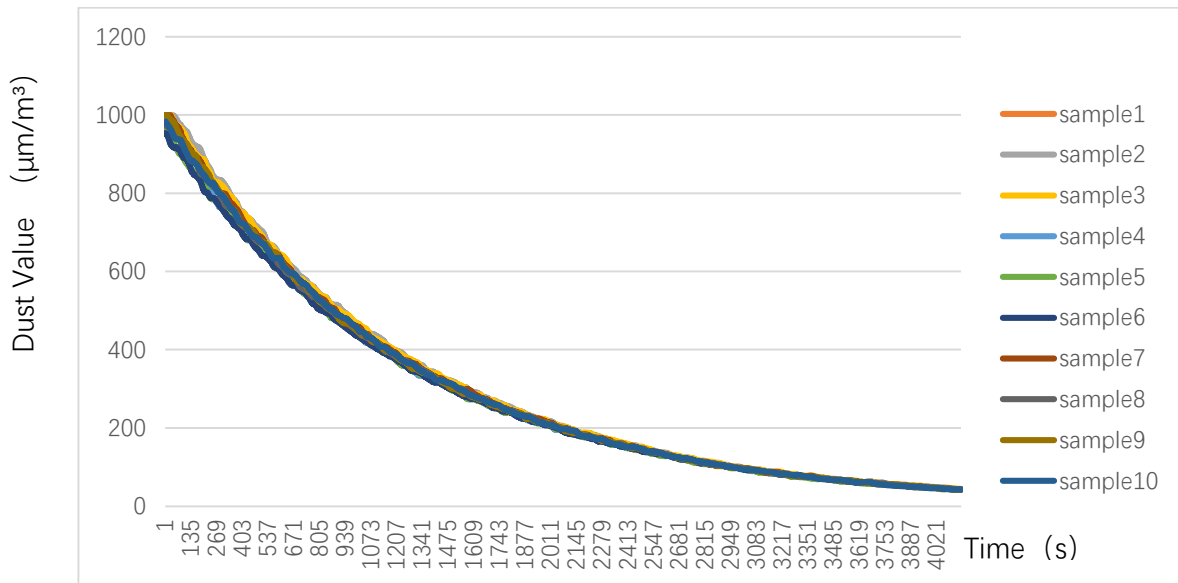
#### Notes:

1. The output Value comes with the Unit of  $\mu\text{m}/\text{m}^3$
2. Byte 10 ~ Byte 29 are vacant and not defined.
3. Without Mesh means that the airflow of the inlet/outlet of the sensor is free of shelter
4. The MIX6070 is originally with built-on with #50 mesh.

**Reliability Test:**

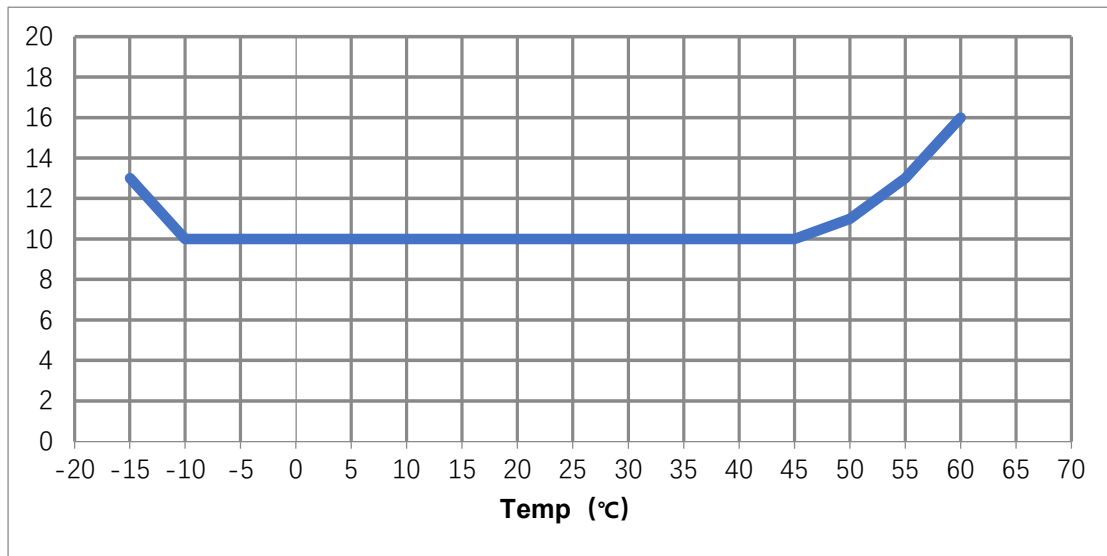
No	Test Name	Method	Judgement	Number of Samples
1	High Temp & High Temperature Test	Place the sensor in the Environment ( $45\pm 2^{\circ}\text{C}$ , $90\pm 2\%\text{RH}$ ) for 72 hours. Then place the sensor in room temp for 2 hours	No function Failure. No Abnormal Noise, No Shrink of Plastic	N=5, C=0
2	High Temp	Place the working sensor in the Environment ( $50\pm 2^{\circ}\text{C}$ ) for 72 hours. Check the sensor working status every 4 hours	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0
3	Low Temp	Place the working sensor in the Environment ( $-15\pm 2^{\circ}\text{C}$ ) for 72 hours. Check the sensor working status every 4 hours	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0
4	Thermo Shock	High Temp: $50^{\circ}\text{C}$ , 60min Low Temp: $-15^{\circ}\text{C}$ , 60min Shifting Time: 15 Cycles: 10 Then place the sensor in room temp for 2 hours	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0
5	Low Temp Storage	$-30\pm 2^{\circ}\text{C}$ , 72Hours Then place the sensor in room temp for 2 hours	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0
6	High Temp Storage	$70\pm 2^{\circ}\text{C}$ , 72Hours Then place the sensor in room temp for 2 hours	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0
7	Vibration	@ X, Y, Z 3 axis Frequency: 10~55~10Hz/1min, Amp: 1.5mm, Time: 2 hours	No function Failure	N=5, C=0
8	Drop	Assemble the sensor in the Customer Product and free drop from 100CM above the ground @ 1 corner, 3 edges, 6 surfaces.	No function Failure, No Abnormal Noise, No Shrink of Plastic	N=5, C=0

**Typical Output Distribution:**



Notes: The dust source is Cigarette (8% tar), T = 20 ± 10°C, H = 55 ± 15%RH

**Typical Variation (Temp):**



Notes:

1. Unit of Y axis is µg/m³ for dust density ≤ 100ug.
2. Unit of Y axis is % (percent) for dust density > 100ug.

**Shenzhen Mixsen Electronics Co., Ltd**  
 Add.: 4A, No. B Building, Dalangyongtai Industrial Park, Huawang Road, Longhua District, Shenzhen, Guangdong, China  
 Post: 518000  
 Tel: 86-755-86635585  
 Mail: sales@mixsen.com  
 Website: www.mixsensensors.com