

## PM2.5 / Sensor

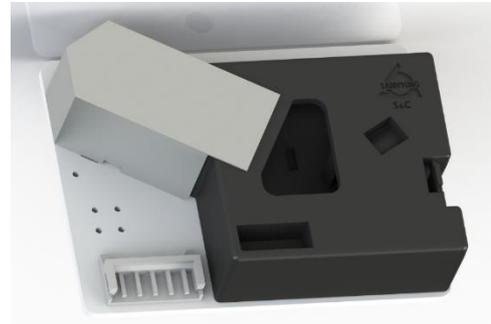
Particulate Matter Sensing Solution

## GPSML series

### FEATURES

- ✧ Minimum Detectable Particle Size -  $0.3\mu\text{m}$
- ✧ PWM Output (Low Pulse Occupancy)
- ✧ Enhanced Accuracy (LPO)<sup>1)</sup>
- ✧ Precise PM2.5 Level Classification
- ✧ High Linearity and Uniformity
- ✧ Market-proven Reliability and Durability
- ✧ Pin-to-Pin Compatibility with Existing Sensors

<sup>1)</sup> see page 2. Specifications



### PRODUCT SUMMARY

GPSML Series is PM2.5 dedicated sensor providing uniform performance and enhanced accuracy which assures precise PM2.5 level classification by detecting over  $0.3\mu\text{m}$  sized ultra-fine particle through **our company**'s proprietary optical structure with IrLED

### APPLICATION

- Air Solution Products  
(Air Purifier, Air Conditioner and etc.)
- HVAC Control System
- Smart IAQ Device
- Outdoor Particle Sensing Device

### KEYNOTE

GPSML Series, in which **our company**'s 20years knowledge and technology are concentrated, is a PM2.5 dedicated sensor with a radical improvement for detection capability at ultra-fine particle range –  $0.3\mu\text{m}\sim 1.0\mu\text{m}$ , which enables classifying PM2.5 level more precise than existing sensors.

GPSML Series which performs higher accuracy along with improved sensitivity than conventional sensors provides reliable information to users enabling more accurate and sophisticated control in the applications such as air purifiers, air conditioners and air quality measuring devices.

**our company** has developed a system to reliably mass-produce GPSML Series of uniform performance by a mass calibration technology which also contributes to efficient production. Moreover, the patented aerodynamic optical structure maximizes the performance of the sensor and improved the quality of the product. In addition, it is designed to be pin-to-pin compatible with existing sensors for user convenience.

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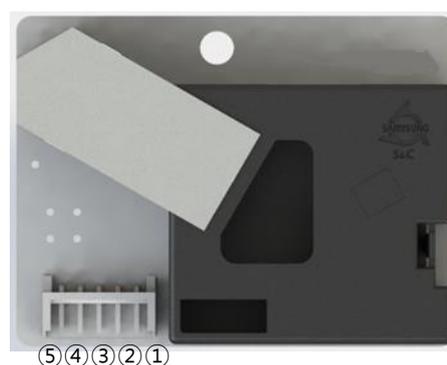
## 1. Product Specifications

Ta=25°C

Parameter	Index
Detectable Size	≥0.3μm
Effective Range	0~500μg/m <sup>3</sup>
Maximum Range	0~900μg/m <sup>3</sup>
Accuracy	±35%@100~500μg/m <sup>3</sup> ±3.5(LPO)@0~100μg/m <sup>3</sup>
Time for Initial Stabilization	60sec. after powered on
Response Time	1sec
Supply Voltage	DC5.0V±10% Ripple 30mV or Less
Current Consumption	Typ. 85mA
Output Signal	LPO(Low Pulse Occupancy:5V TTL)
Operating Temperature	-10~65°C
Operating Humidity	<95%RH(Non-Condensing)
Storage Temperature	-20~80°C
Storage Humidity	<95%RH(Non-Condensing)
Dimensions	59 x 45 x 17mm (W x H x D)
Light Source Life Time	Min. 5years
Weight	25g

## 2. Pin Map

Pin No.	Name	Description
1	GND	Ground
2	RX	Not Used (N.C)
3	VCC	DC 5V
4	TX	PM2.5 PWM
5	OPT	Not Used (N.C)



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### 3. Output Characteristics

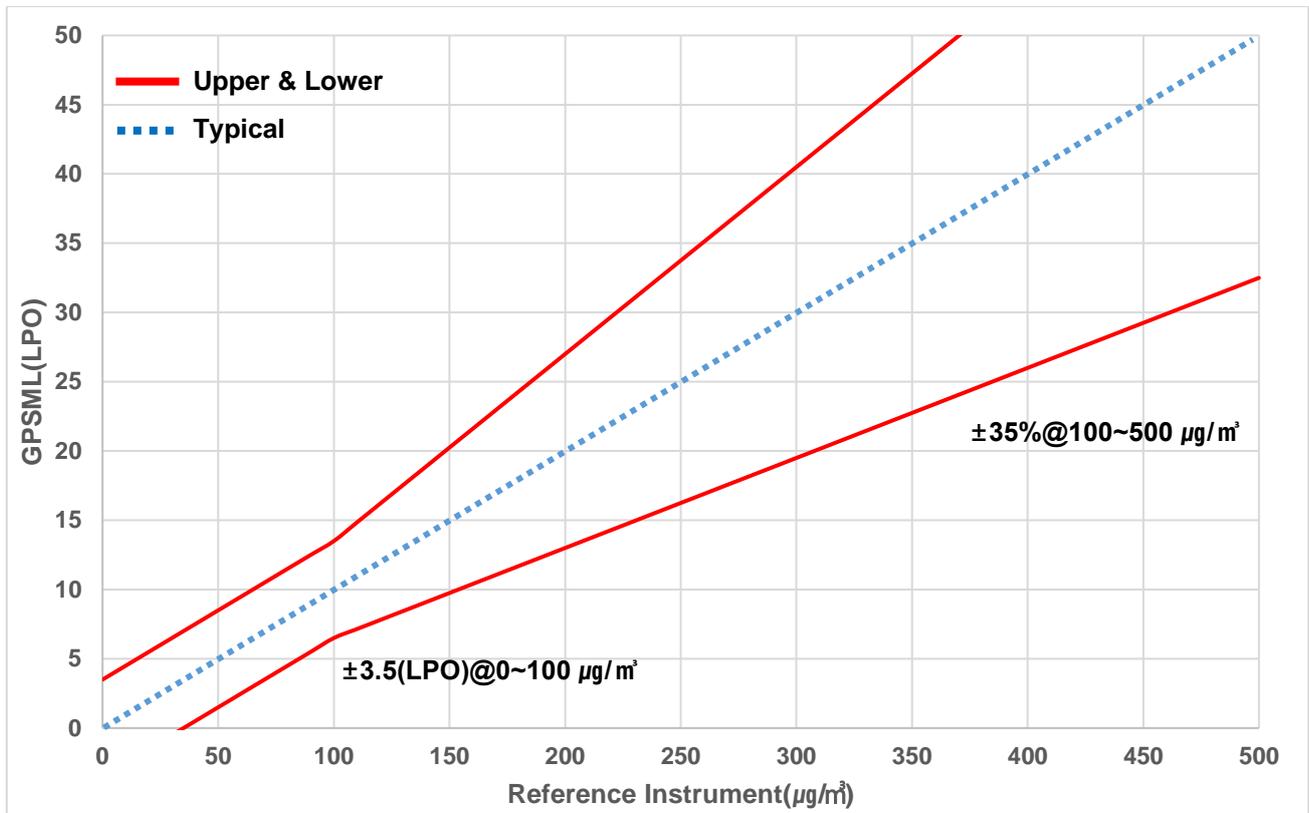


Figure 1. Output Characteristics

\*see 4. Standard Measurement Method for referential testing method

### 4. Standard Measurement Method

- ◆ Room Chamber : 27 m<sup>3</sup> @23±5°C, 50%RH
- ◆ Particle Source : Cigarette
- ◆ Reference Instrument : GRIMM 11-A
- ◆ Particle Saturation Time : 5mins
- ◆ Measurement Time : 60mins
- ◆ Sensor Placement : Center of Room Chamber

Spray cigarette smoke in room chamber; and measure weight concentration of the airborne particles while slowly purifying the air inside the chamber through HEPA filter.

## 5. Internal Schematic

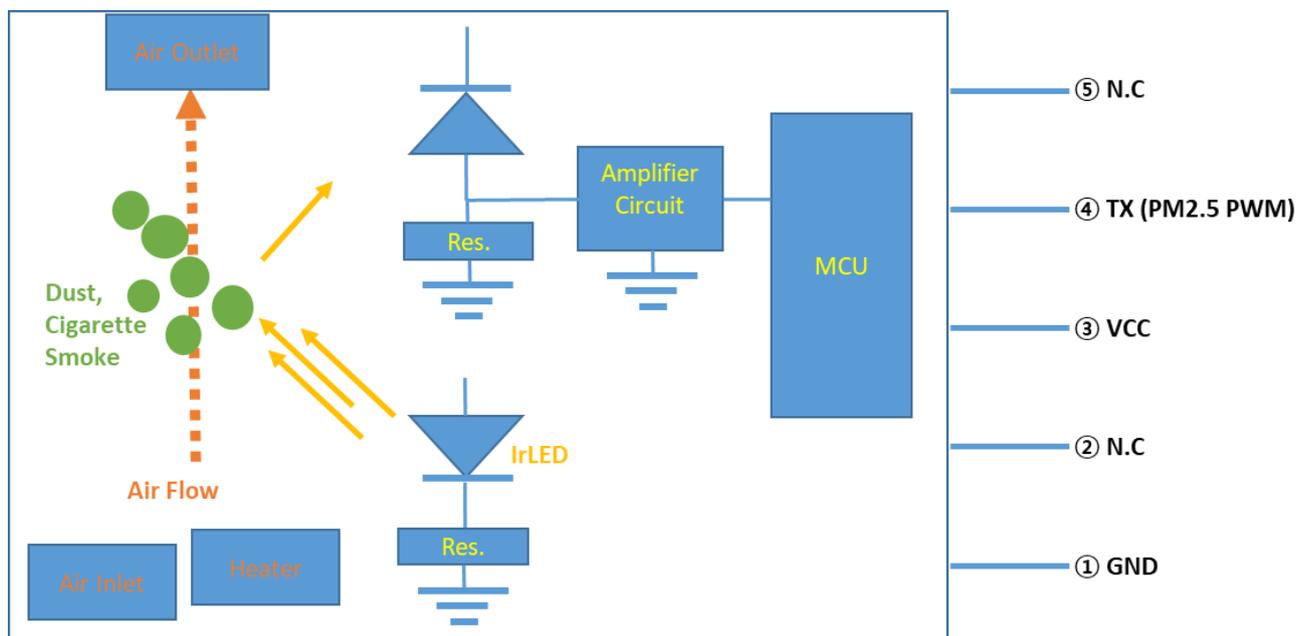


Figure2. Example of Internal Schematic

## 6. I/O Connector Specifications

Pin No.	Name	Description	Remark
1	GND	Ground	Ground
2	RX	Not Used (N.C)	Not Connected
3	VCC	DC 5V	Input Voltage
4	TX	PM2.5 PWM	LPO Output(5V)
5	OPT	Not Used (N.C)	Not Connected

## 7. Connector Description (Male/Female)

Model Name	Part No.		Description	Connector Maker
GPSML	Wafer	S5B-EH-2.5	2.5mm pitch	JST
	Housing	EHR-5		

## 8. Interface Circuit

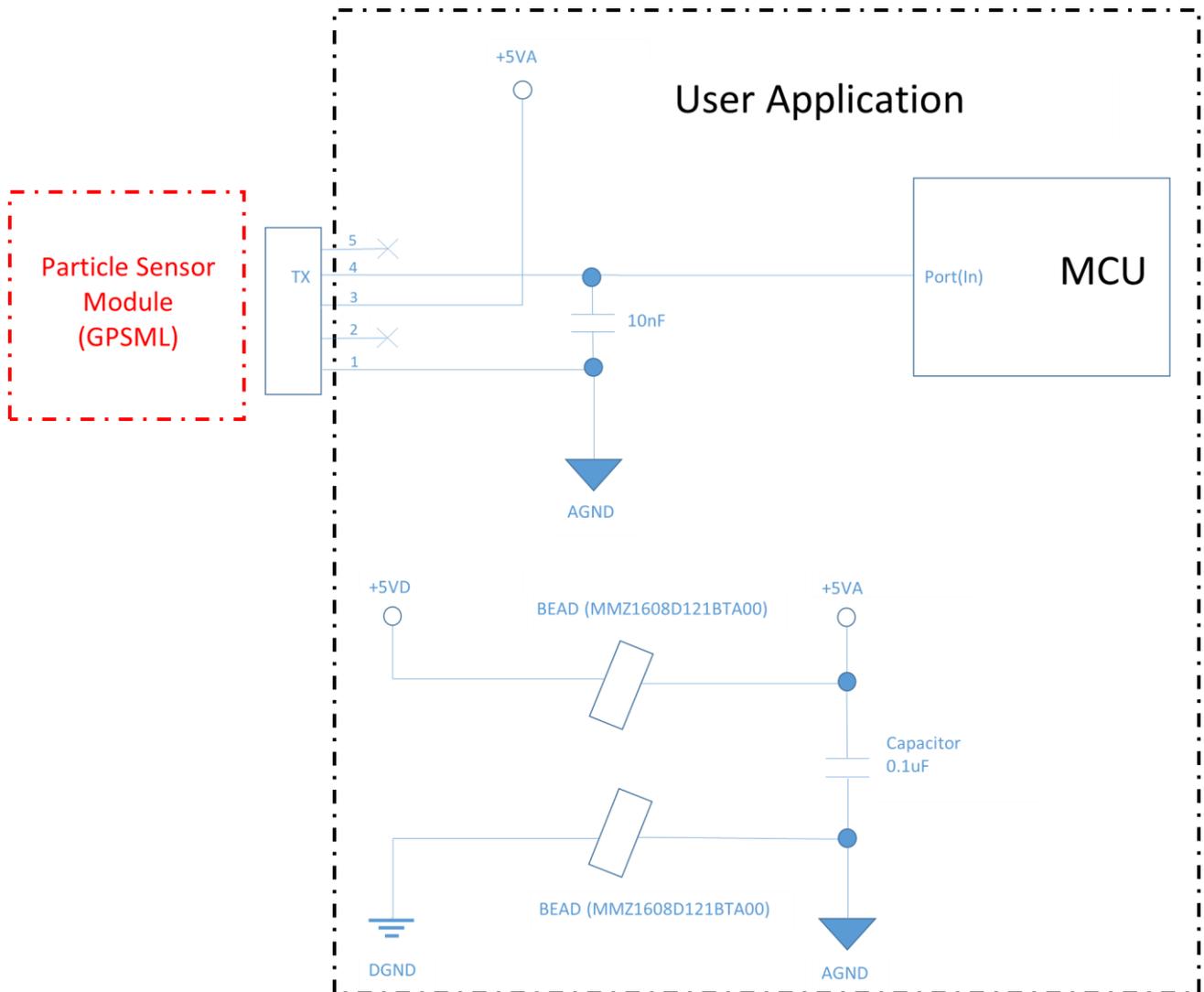


Figure3. Example of Interface Circuit

\*Please use an extra power regulator and/or a bypass capacitor(below 10nF) on the signal line in order to compensate noise if there is noise on the signal, or power line and/or signal line are longer than 50cm.

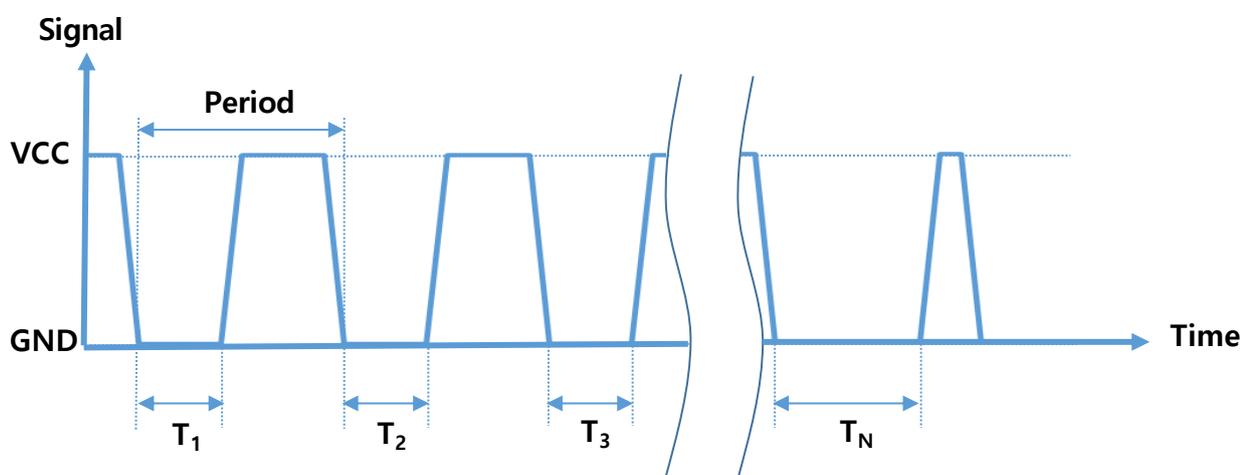
## 9. Output Signal (Tx)

### 9-1. LPO Output (PWM)

Properties	Value
Period	100ms
Duty Cycle	0%( $\mu\text{g}/\text{m}^3$ ) ~ 95%( $950\mu\text{g}/\text{m}^3$ )
Polarity	Active Low
Resolution	0.1ms (about $1\mu\text{g}/\text{m}^3$ )
Update Cycle	about 1 sec

## 10. Particle Concentration Calculation

$$\text{Particle Concentration}(\mu\text{g}/\text{m}^3) = ((T_1+T_2+T_3+\dots+T_N) \times 100 / \text{Period} / N) * 10$$



## 11. Dimensions

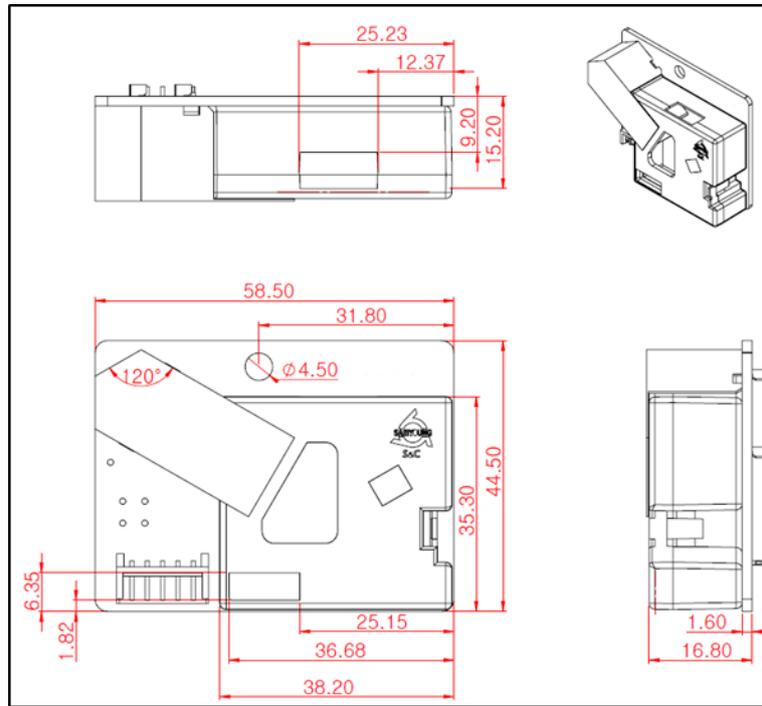
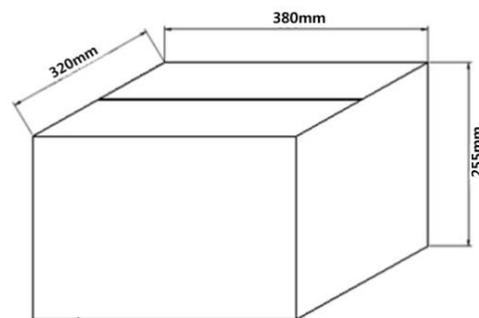
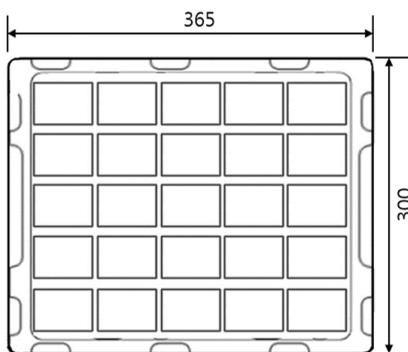


Figure4. Dimensions

## 12. Packaging Information

Tray : 25pcs / 1 Tray (PS, 365×300×25mm)    Out Box (KBL3SK, 380×320×255mm) : 10 Trays (250pcs, 7.85kg)



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## 14. Revision History

Date	Version	Page	Change
2019.11.07	Preliminary	All	First Edition