

## PRODUCT INFORMATION

### Sensor for Air quality control

# VOCs Sensor

- for the detection of Formaldehyde
- Toluene, Organic Solvent
- Semi conductor type,

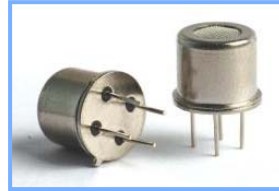
● General

It is applied detection of VOCs gases (toluene, formaldehyde, benzene, ect.)

● Application : Ventilator, Air cleaner, Hood.

● Operation range

- Working temperature : -10℃ ~ 50℃
- Working humidity : below saturation point
- Storage temperature : -20℃ ~ 80℃

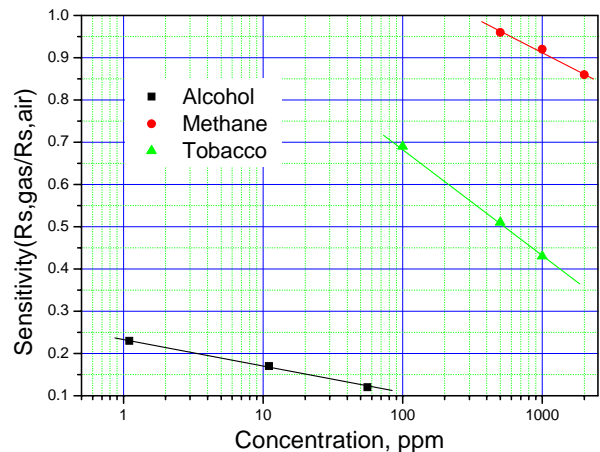
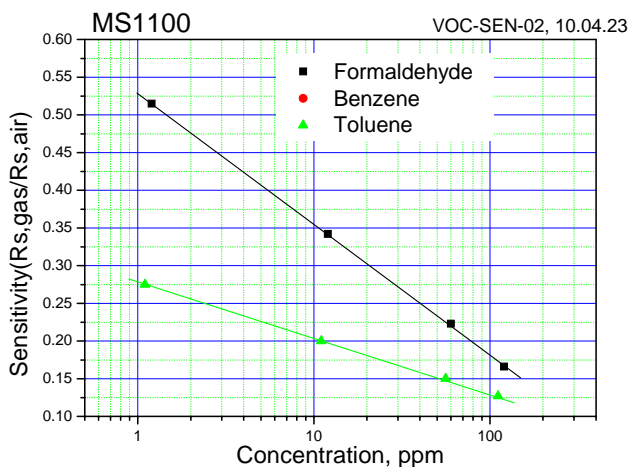


<MS1100>

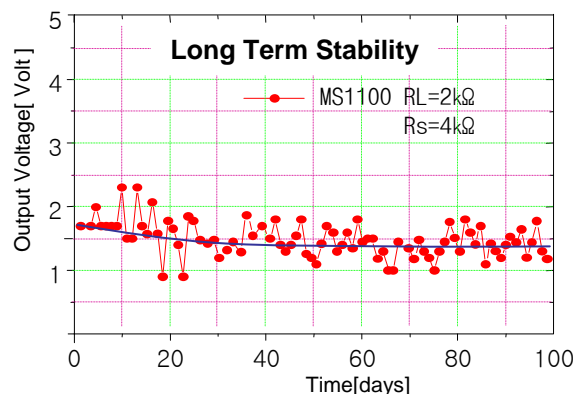
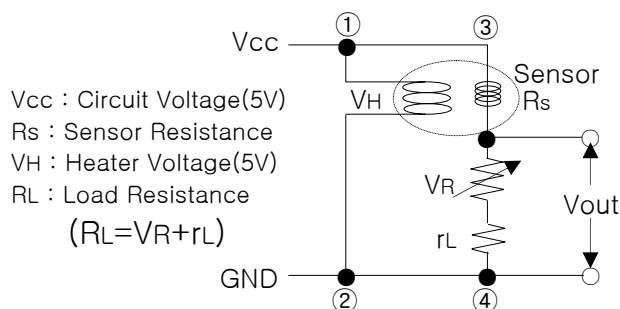
● Products characteristics

Product code		Characteristics	Output data	Warm-up time, PH
Pac- kage	MS1100	Wide detection of VOCs gases Application : Air cleaner, Hood	Analogue (1 ~ 5Volt) Basic circuit	5min 350mW
	MS1100 - P1XX	Standard, Op-amp amplifying Relay output : fixed concentration	Analogue (0.5 ~ 5Volt) Relay : Hi(4V), Low(0V)	5min 380mW

### 1. Sensitivity Characteristic Slope ( $\beta = R_{s,gas} / R_{s,air}$ )



### 2. Basic Measuring Circuit Stability



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### Sensor for Air quality control

### 3 Module

#### a. Characteristics

Index		Spec. & Test condition	
		MS1100-P1XX	MS1101-PX
Circuit Voltage	Vc	Module input Voltage : $5 \pm 0.1$ Volt	←
	PH	Power consumption : 380mW Inrush current : Less than 195mA	Power consumption : 450mW Inrush current : Less than 215mA
Characteristics of Output data		- Analogue output (refer to 3.1, f.) - Relay output (Special ppm)	- Digital output ppm (Open collect)
Guarantee		- 3years over - Calibration interval 1years recommended	
Operating environment		- Temp. : $-10 \sim 50^{\circ}\text{C}$ , Humidity : $5 \sim 90\%RH$ , Non-condensing - Storage → Temp. : $-20 \sim 70^{\circ}\text{C}$ , Humidity : $0 \sim 90\%RH$	
Reaction time(T90)		- Reaction Time(T90) : Less then 10sec - Recovering Time(T90) : Less then 180sec	

#### b. Product code

c. Relay Output      Max. Output range 1ppm : Hi(4.0~4.1volt) output at 1ppm(Toluene)



<MS1100-P1XX>



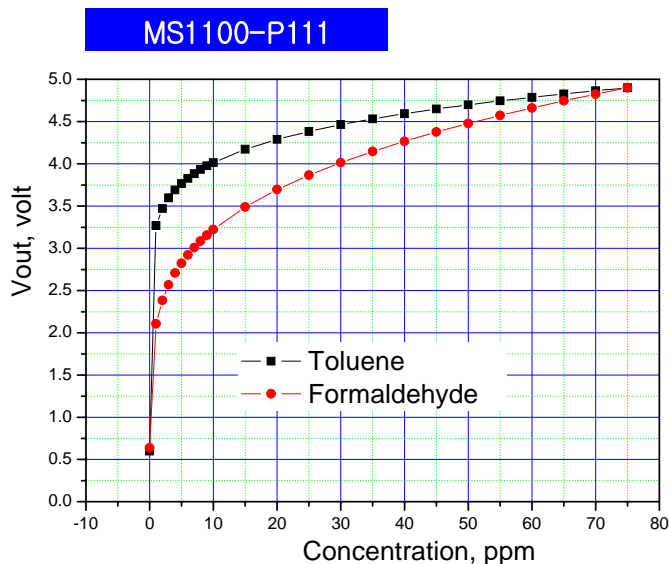
<MS1101-P3XX>

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#### d. Characteristics (Module)

- Error :  $\pm 7\%$
- No compensation of Humidity & temperature



Formaldehyde 100322		Toluene 100322	
Con. (ppm)	output (Volt)	Con. (ppm)	Output (Volt)
0	0.64	20	3.69
1	2.10	25	3.87
2	2.38	30	4.02
3	2.57	35	4.15
4	2.71	40	4.27
5	2.82	45	4.38
6	2.92	50	4.48
7	3.01	55	4.57
8	3.09	60	4.66
9	3.16	65	4.74
10	3.22	70	4.82
15	3.49	75	4.90

#### \*\* Formulation of Formaldehyde

$$\text{Log(ppm)} = (-1.095) + 0.627 * (\text{Vout})$$

$$\text{Log(ppm)} = (-2.631) + 1.528 * (\text{Vout}) + (-0.125) * (\text{Vout})^2$$

#### \*\* Formulation of Toluene

$$\text{Log(ppm)} = (-3.478) + 1.104 * (\text{Vout})$$

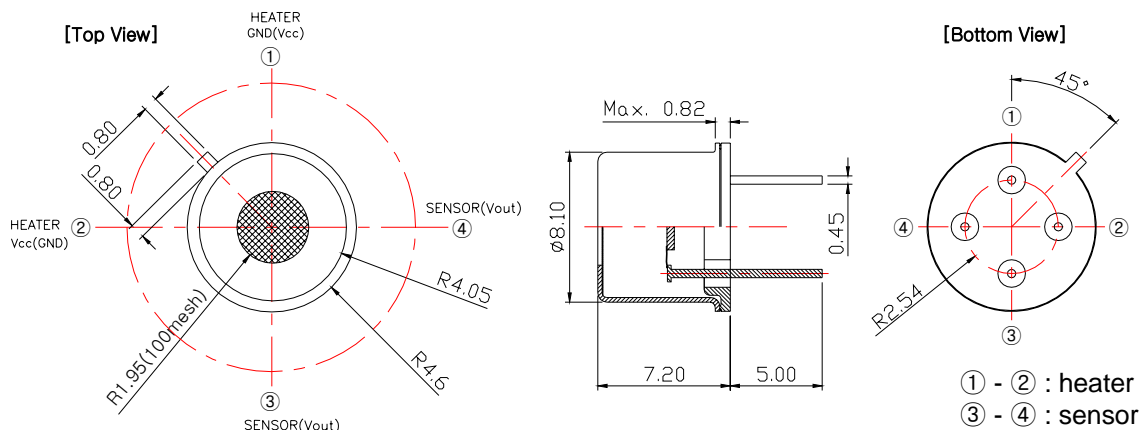
$$\text{Log(ppm)} = (-7.071) + 2.852 * (\text{Vout}) + (-0.210) * (\text{Vout})^2$$

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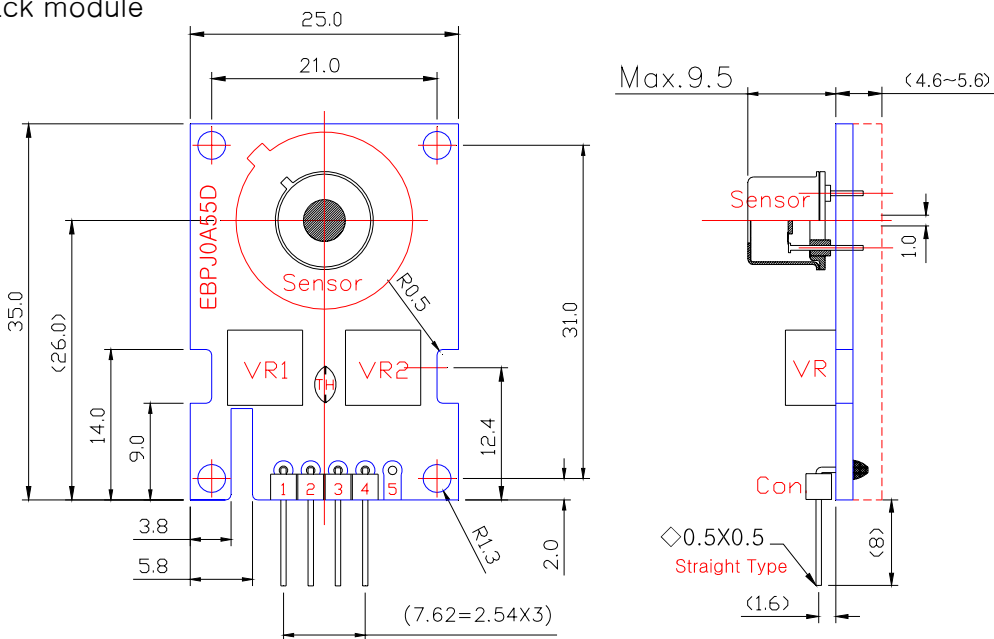
### Sensor for Air quality control

#### 4. Structure and Dimensions

##### 4.1 Package



##### 4.2 Pack module



##### a. Data output



- ① Vcc : 5.0volt
- ② GND
- ③ Data(Vout, analogue signal)
- ④ Relay

##### b. Relay Output

- Max. output range H2 340ppm : Hi(4.0~4.1volt) output at 70ppm(H2)
- : Hi(4.0~4.1volt) output at 480ppm(Smoke)