

# SPECIFICATION

Dust Sensor Module

Model No.

DSM501A

This specification consists of 9 pages including cover.

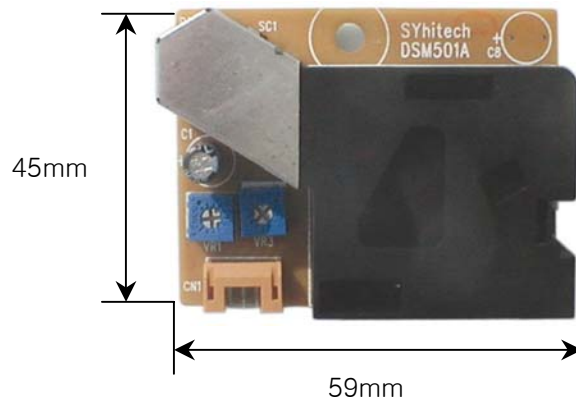
## DSM501A Dust sensor module

### ■ Features

PWM output  
Compact size and Lightweight  
Easy installation  
Single power supply

### ■ Application

Air cleaner or Air purifier  
Air conditioner  
Air quality monitor  
Ventilator etc



### ■ Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Supply voltage	Vcc	-0.3 to +7	V
Operating temperature	Topr	-10 to +65	°C
Storage temperature	Tstg	-20 to +80	°C

### ■ Operating supply voltage

Parameter	Symbol	Rating	Unit
Operating supply voltage	Vcc	5 ± 0.5	V

### ■ Electro-optical characteristics

Vcc=5V, Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Sensitivity		> 1µm *1	-	15,000/283ml	-	pcs

\*1 : At condition that the particle diameter is over than one micro meter.

## 1.0. DEVICE OVERVIEW

This specification applies to the characteristics of model No. DSM501A.

The dust sensor module DSM501A is low cost, compact size for a particle density sensor.

- \* Quantitative particle density measurement with the principle of particle counter.
- \* Fine particles of which diameters are bigger than one micron could be detected with high sensitivity.
- \* Inside heater realizes the self-air taking.
- \* One control contact and two output contacts

A block diagram is illustrated in figure 1.1. The DSM501A consists of :

- \* Light Emitting Diode (LED) Lamp
- \* Detector
- \* Signal amplifier circuit
- \* Output drive circuit 1
- \* Output drive circuit 2
- \* Heater

FIGURE 1.1. BLOCK DIAGRAM

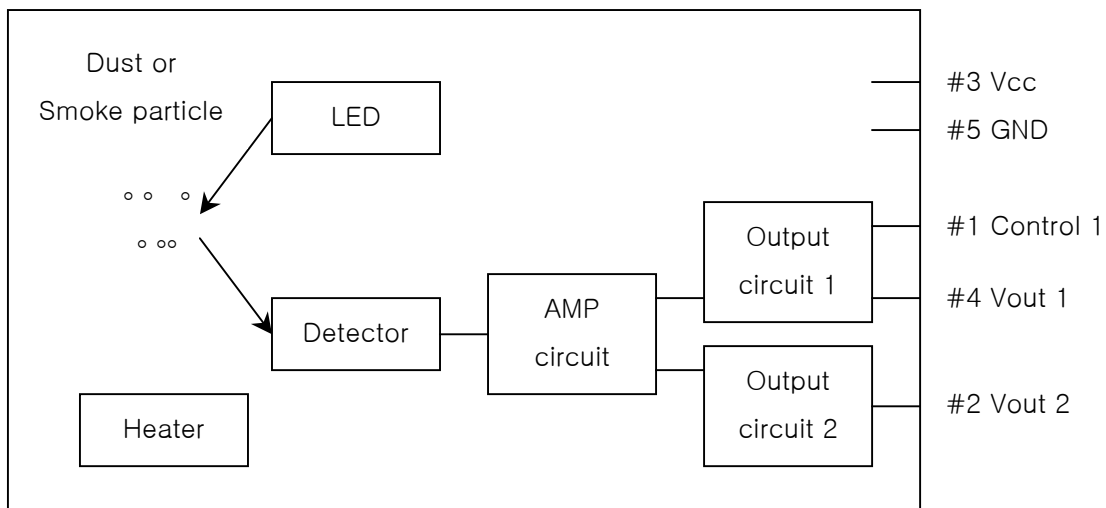
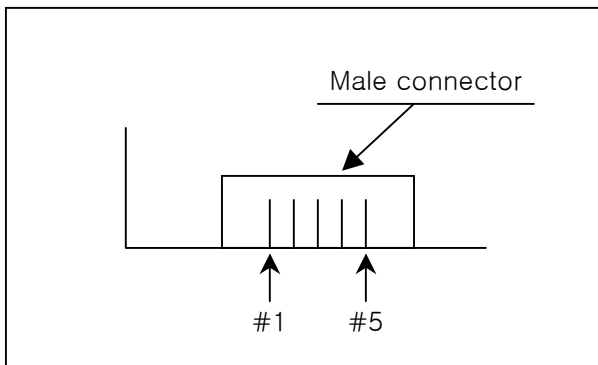


TABLE 1.1. PINOUT I/O DESCRIPTION

Pin number	Pin name	Description
#1	Control 1	Vout 1 control
#2	Vout 2	Vout 2 output
#3	Vcc	Positive power supply
#4	Vout 1	Vout 1 output
#5	GND	Ground

FIGURE 1.2. PIN ARRAY (component view)



The male and female connector's maker is **LG cable** in korea.

TABLE 1.2. CONNECTOR PART NUMBER

	Part No.	Description
Male	GIL-S-5P-S2L2-EF	2mm pitch, angle
Female	<b>GIL-S-5S-S2C2</b>	2mm pitch

## 2.0. CIRCUIT DESCRIPTION

This section gives a circuit description of the external connections and components of the DSM501A. The following connections and external components provide starting points for designs.

### 2.1. Vout 2

The Vout 2 is normal output port.

The sensitivity of Vout 2 pin is preset up. This port is detect particle which is over 1 micrometer.

### 2.2. Vout 1

Use this pin when sensitivity of Vout 2 is sensitive.

The sensitivity of Vout 1 is dull than Vout 2 about 2.5times. (Vout 1's sensitivity x 2.5times = Vout 2's sensitivity) It means size of particle is 2.5 micrometers.

Vout 1 is adjustable output. You can adjust to detecting level of particle size.

### 2.3. Control 1

This pin is adjustable sensitivity of Vout 1.

Use this pin when output of Vout 1 is not proper.

> How to control

Add a resistor between Control 1 pin and ground. And you can tune resistor's value.

TABLE 2.1. RESISTOR VALUE

Resistor value	Description
open	Preset sensitivity (over 2.5 micrometer)
100K	Half sensitivity
27K	Equal sensitivity of Vout 2 (over 1 micrometer)

### 3.0. APPLICATION

This section provides general information on application for the DSM501A.

#### 3.1. Heater

This module has a heater (resistor) to generate heat. Heat creates updraft (upward current of air) which draw air outside of the module into the module.

#### 3.2. Detect particle

This module is designed to detect the particle whose size is over one micrometer, which means it can detect cigarette smoke, house dust, tick, spore, pollen and mildew.

#### 3.3. Install

The dust sensor module DSM501A should be installed vertically and kept away from any artificial current of air by fans. In case it is used for air purifier of which fan located in front or rear part, we request it to be installed at ether side of the housing, not too much deep inside of the housing. Also need to have slit around the module so that air can come inside.

In addition, please pay attention to structure and placing location of the application to avoid any adhesive particle like oil, etc. to get into the module. If it sticks to optical part, malfunction may occur.

When inside of the module is moisturized, it does not keep its proper function. Please design the application so that moisturization of the module does not happen.

#### 3.4. Lens

Lens needs to be cleaned depending on the condition. (once a six months) Cigarette tar on the lens should affect the sensitivity of the sensor. Wet one side of swab with water and rub the lens with it and then dry lens with the other end of swab.

#### 4.0. ELECTRICAL CHARACTERISTIC

Vcc=5V, Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Vout 1, 2 at high *1	Voh	No particle	4.0	4.3		V
Vout 1, 2 at low *2	Vol	Particle		0.7	1.0	V
Supply current	Icc		-	-	90	mA
Time for stabilization *3			1	-	-	minute

\*1 : Vout 1 and Vout 2 are high state when not detect particle. (=clean room)

\*2 : Vout 1 and 2 are go to low state when detect particle.

\*3 : after the power turned on.

FIGURE 4.1. VOLTAGE VS CURRENT

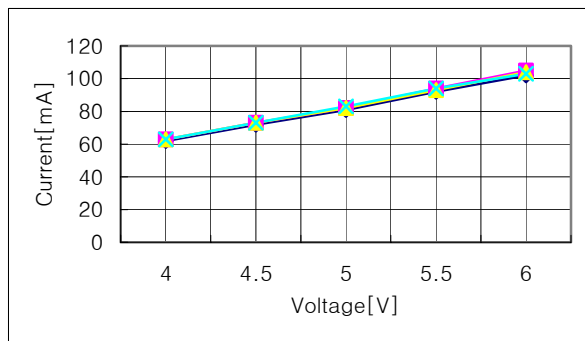
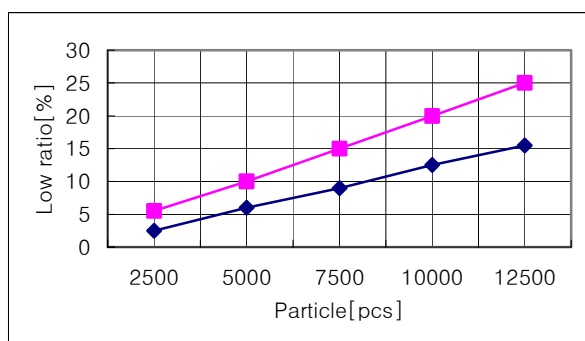


FIGURE 4.2. VOLTAGE LOW RATIO VS PARTICLE



X-axis shows number of particles and y-axis shows output characteristics. Upper curve shows upper limit output characteristics and lower one shows lower limit.

## 5.0. PACKAGING INFORMATION

### 5.1. Package marking information

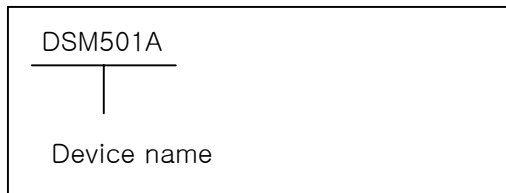
### 5.2. Package details

Package dimensions : W59 x H45 x D20 mm

Weight : Approx. 24g

## 6.0. PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the listed sales office.





■ Notes

VR trimmer for sensitivity adjustment is set up at shipping from SYhitech. Please don't touch the VR trimmer.

Please don't disassemble the device. Even if the device is reassembled, it may not satisfy the specification.

There is a case that it does not detect the dust density correctly, since the dust adhered to the outside of the lens. When the dust is adhered, please consider the maintenance such as vacuuming or blowing off the dust by air.

Please don't use this device for an emergency application or fire alarm application.

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