

# RSM741 – Methane (CH<sub>4</sub>) Sensor

## RSM741 for the detection of Methane (CH<sub>4</sub>)

**RSM741** is a semiconductor type gas sensor which combines very high sensitivity to methane gas with low power consumption and long life. RSM741 requires a heater current of only 56mA and the device is housed in a standard TO-5 package.



The **RSM741** is metal oxide semiconductor type sensor in which a sensor layer and a heater layer are formed on an alumina substrate. It can detect the methane (CH<sub>4</sub>) gas in the sensor, the sensing materials are placed on the alumina substrate, and the resistance of the sensing material is varied according to the concentration of the methane (CH<sub>4</sub>) gas.

**RSM741-T0** for gas leakage checkers. **RSM741-T5** uses filter material in its housing which eliminates the influence of interference gases such as alcohol, resulting in highly selective response to methane gas. This feature makes the sensor ideal for residential gas leakage detectors which require durability and resistance against interference gas.

RNSLab Co., LTD.

### CONTENTS

|   |   |
|---|---|
| 1. Features.....                          | 2 |
| 2. Applications .....                     | 2 |
| 3. Description .....                      | 3 |
| 4. Specifications.....                    | 3 |
| 5. Application Guide.....                 | 4 |
| 6. Pin Configuration and Dimensions ..... | 4 |
| 7. Typical Characteristics .....          | 5 |
| 8. Revision History .....                 | 6 |



### IMPORTANT NOTE:

OPERATING CONDITIONS IN WHICH RNSLAB PRODUCTS ARE USED WILL VARY WITH EACH CUSTOMER'S SPECIFIC APPLICATIONS. RNSLAB STRONGLY RECOMMENDS CONSULTING OUR TECHNICAL STAFF BEFORE DEPLOYING RNSLAB PRODUCTS IN YOUR APPLICATION AND, IN PARTICULAR, WHEN CUSTOMER'S TARGET VALUES ARE NOT LISTED HEREIN. RNSLAB CANNOT ASSUME ANY RESPONSIBILITY FOR ANY USE OF ITS PRODUCTS IN A PRODUCT OR APPLICATION FOR WHICH PRODUCT HAS NOT BEEN SPECIFICALLY TESTED BY RNSLAB.

**1. FEATURES**

- Low power consumption
  - Approx. 300mW @ 5.0V supply
- High sensitivity to Methane gas
- Small size
  - Metal Can Package (TO-5)
- Uses simple electrical circuit
- Low cost

**2. APPLICATIONS**

- Portable gas detectors
- IoT devices
- Ventilation control
- Gas alarm device



FIGURE 1. RSM741-T0

**Device information**

| Part No | Package        | Size (mm)  |
|---------|----------------|------------|
| RSM741  | TO-5 metal can | Φ9.1 x 7.2 |

The figure below represents typical sensitivity characteristics. All data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio ( $R_S/R_O$ ) which is defined as follows:

- $R_S$ =Sensor resistance in displayed gases at various concentrations
- $R_O$ =Sensor resistance in fresh air

**RSM741-T0 SENSITIVITY CHARACTERISTICS:**

**RSM741-T5 SENSITIVITY CHARACTERISTICS:**

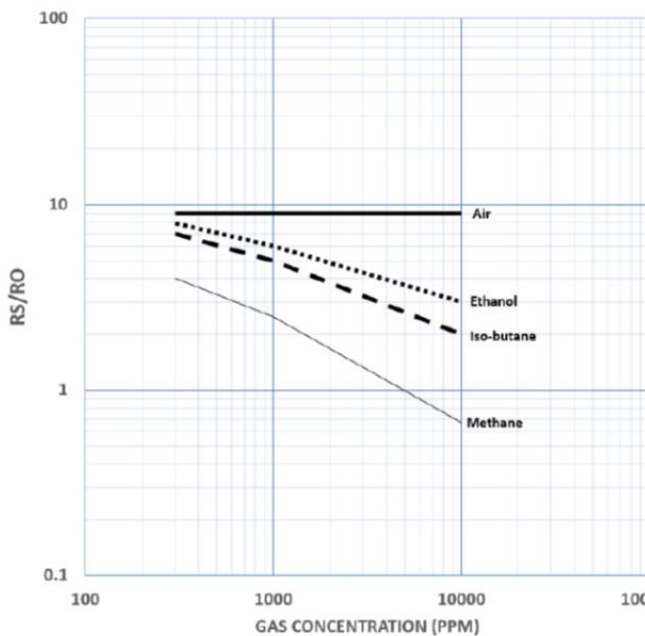


FIGURE 2. SENSITIVITY OF RSM741-T0

### 3. DESCRIPTION

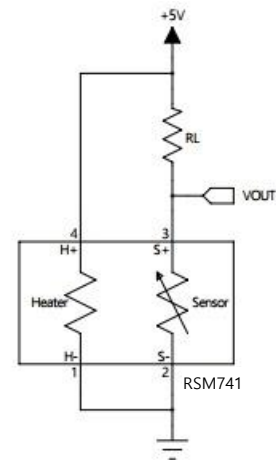
**RSM741** is a semiconductor type gas sensor which combines very high sensitivity to methane gas with low power consumption and long life. RSM741 requires a heater current of only 56mA and the device is housed in a standard TO-5 package. The RSM741 is metal oxide semiconductor type sensor in which a sensor layer and a heater layer are formed on an alumina substrate. It can detect the methane (CH<sub>4</sub>) gas in the sensor, the sensing materials are placed on the alumina substrate, and the resistance of the sensing material is varied according to the concentration of the methane (CH<sub>4</sub>) gas.

**RSM741-T0** for gas leakage checkers. **RSM741-T5** uses filter material in its housing which eliminates the influence of interference gases such as alcohol, resulting in highly selective response to methane gas. This feature makes the sensor ideal for residential gas leakage detectors which require durability and resistance against interference gas.

#### Basic measuring Circuit

The sensor requires voltage input: Heater voltage (+5V). The heater voltage (H+, H-) is applied to the integrated heater in order to maintain the sensing element at a specific temperature which is optimal for sensing.

Also, input voltage (+5V) is applied to allow measurement of voltage across a load resistor (R<sub>L</sub>) which is connected in series with the sensor. The value of the load resistor (R<sub>L</sub>) should be chosen to optimize the alarm threshold value, keeping power consumption of the semiconductor below a limit of 300mW. Power consumption will be highest when the value of R<sub>s</sub> is equal to R<sub>L</sub> on exposure to gas.



### 4. SPECIFICATIONS

|  |   |                |                                |
|--|---|----------------|--------------------------------|
| Model  |   |                | RSM741                         |
| Sensing principle                                    |   |                | MOS type                       |
| Standard package                                     |   |                | TO-5 metal can                 |
| Target gases   |   |                | Methane (CH <sub>4</sub> )     |
| Typical detection range                              |   |                | 500~10,000 ppm                 |
| Electrical characteristics under std test conditions | Heater voltage                                | V <sub>H</sub> | 5.0 V DC                       |
|  | Heater Resistance                             | R <sub>H</sub> | Approx. 59 Ω at RT             |
|  | Heater Current                                | I <sub>H</sub> | 56±5 mA                        |
|  | Heater Power consumption                      | P <sub>H</sub> | 280±25 mW (typical)            |
|  | Sensor Resistance                             | R <sub>S</sub> | 0.5~5.0 MΩ in Air              |
|  | Sensitivity (change ratio of R <sub>S</sub> ) |                |                                |
| Standard test conditions                             | Test gas conditions                           |                | Normal air at 25±2°C, 40±5% RH |
|  | Circuit conditions                            |                | Same as std circuit conditions |
|  | Conditioning period before test               |                | 3-days or longer               |

## 5. APPLICATION GUIDE

Heater voltage is applied to the heater to maintain a specific temperature at which the sensing material is optimized for detection. DC voltage is required for the circuit.

Since the output of the sensor is a resistance, a conventional measurement part should have a current source in parallel with the output of the sensor to convert the resistance to voltage.

The change of the sensor resistance ( $R_S$ ) is obtained as the change of the output voltage across a load resistor ( $R_L$ ) which is connected in series with the sensor.

## 6. PIN CONFIGURATION AND DIMENSIONS

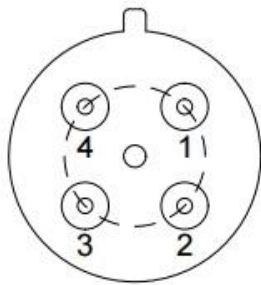


FIGURE 3. PIN CONFIGURATION

### Pin functions

| PIN   |     | Type <sup>1)</sup> | FUNCTION |
|-------|-----|--------------------|----------|
| NAME  | NO. | I/O                |          |
| HEAT- | 1   | G                  | Negative |
| SENS- | 2   | G                  | Negative |
| SENS+ | 3   | O                  | Positive |
| HEAT+ | 4   | P                  | Positive |

1) Type: I=input, O=output, I/O=input and output,  
P=power supply, GND=ground

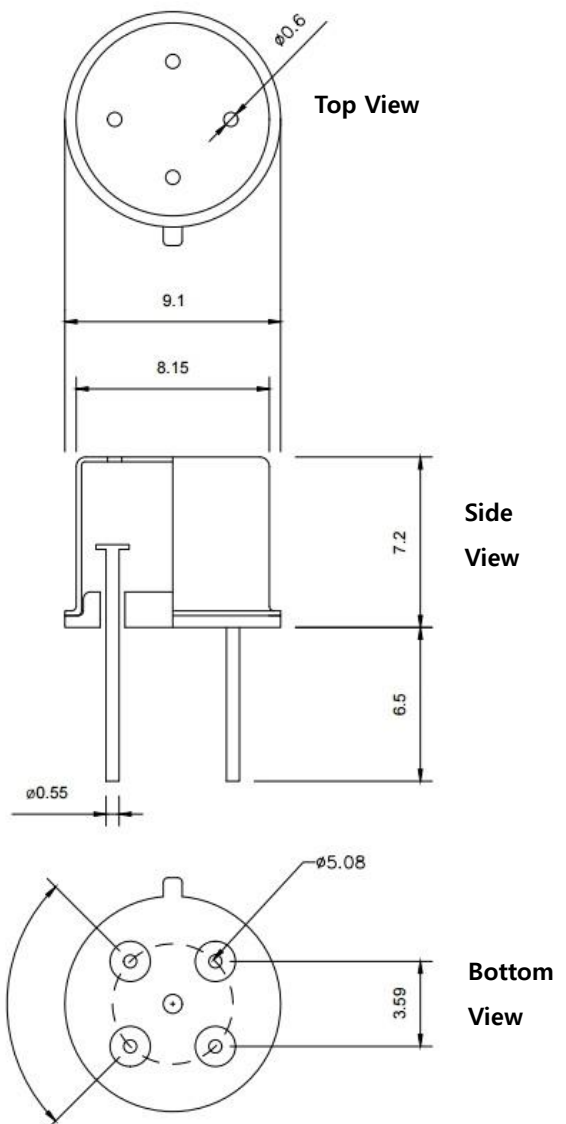
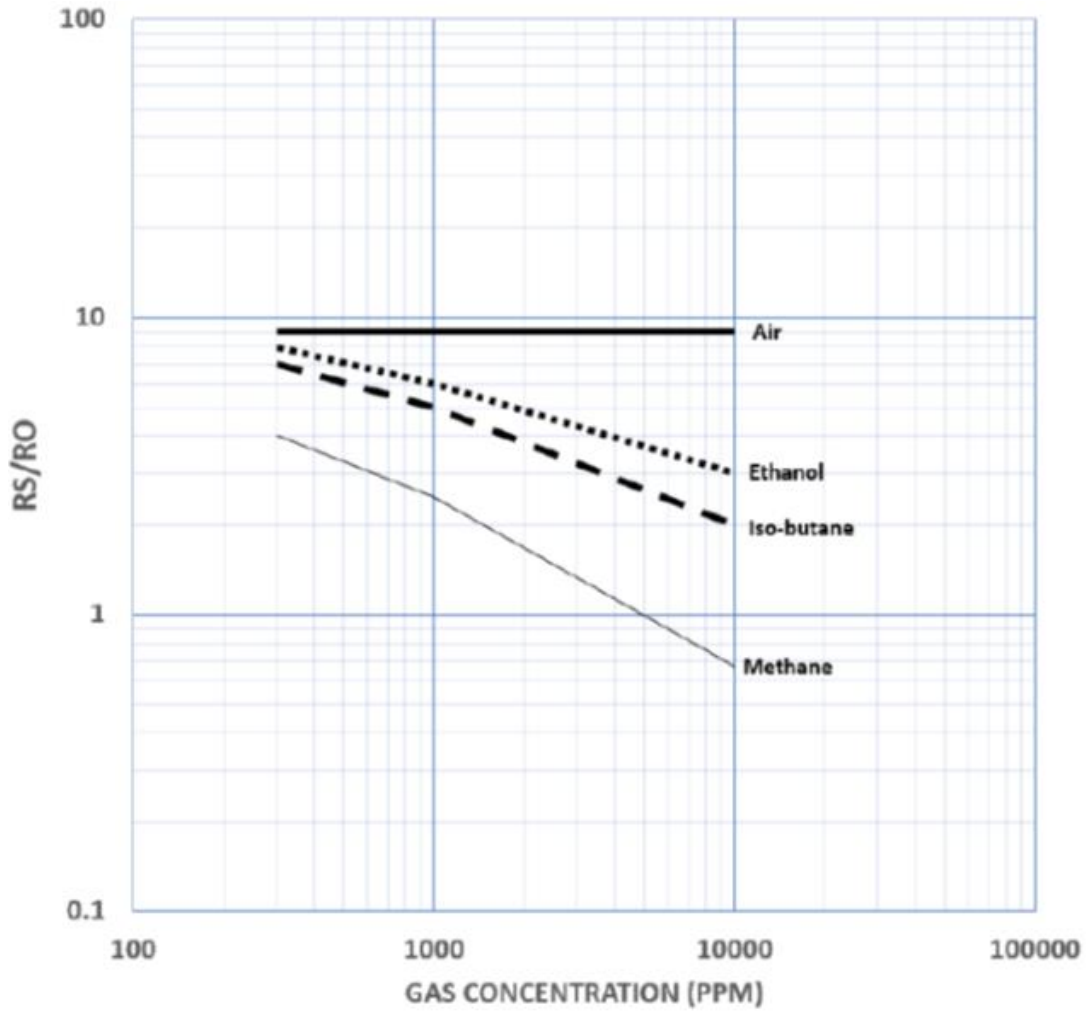


FIGURE 4. PACKAGE DIMENSION

## 7. TYPICAL CHARACTERISTICS



- $R_s$  = Sensor resistance in displayed gases at various concentrations
- $R_o$  = Sensor resistance in fresh air

## 8. REVISION HISTORY

| Rev. No | Chapter | Description of modification | Date        |
|---------|---------|-----------------------------|-------------|
| 0.1     |         | Initial release             | April. 2021 |
|         |         |                             |             |
|         |         |                             |             |
|         |         |                             |             |
|         |         |                             |             |
|         |         |                             |             |
|         |         |                             |             |
|         |         |                             |             |

For inquiries about Gas Sensor products, please contact us below.



#1001, 823, Dongtansunhwan-daero,  
Hwaseong-si, Gyeonggi-do, Korea. 18471

[www.RNSLab.com](http://www.RNSLab.com)

e-mail. [admin@rnslab.com](mailto:admin@rnslab.com)

Tel. +82-31-5183-5131

Copyright © 2021, RNSLab Co., Ltd.