# TGS 2616-C00 - for the detection of Hydrogen

## Features:

* High selectivity to hydrogen
* Small size and low power consumption
* Uses simple electrical circuit

## Applications:

* Hydrogen detection for:
  - transformer oil maintenance
  - steel plant safety, etc.
* Portable gas detectors
* Leak detection for gas appliances
* Hydrogen leak detectors for fuel cells

The sensing element is comprised of a metal oxide semiconductor layer formed on an alumina substrate of a sensing chip together with an integrated heater, and it is housed in a standard TO-5 package. In the presence of a detectable gas, the sensor's conductivity increases
depending on the gas concentration in the air. A simple electrical circuit can convert the change in conductivity to an output signal which corresponds to the gas concentration.

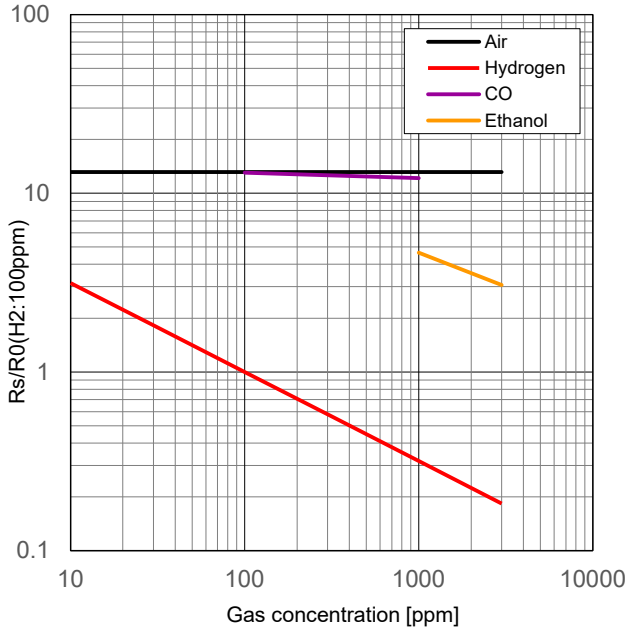

**TGS2616-C00** has a newly developed sensing element which reduces the influence of interference gases such as alcohol, resulting in highly selective response to hydrogen.



### Sensitivity Characteristics:

The figure on the right represents typical sensitivity characteristics that are measured at standard test conditions. (see reverse side of this sheet for more details) The Y-axis is indicated as sensor resistance ratio Rs/Ro, where Rs and Ro are defined as below:

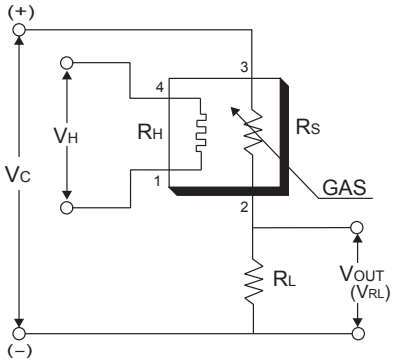
Rs = Sensor resistance in various gases and concentrations
Ro = Sensor resistance in 100 ppm of hydrogen



## Basic Measuring Circuit:

The sensor requires two voltage inputs: heater voltage ($V_H$) and circuit voltage ($V_C$). The heater voltage ($V_H$) is applied to the integrated heater in order to maintain the sensing element at a specific temperature which is optimal for sensing. Circuit voltage ($V_C$) is applied to allow measurement of voltage $V_{OUT}$($V_{RL}$) across a load resistor ($R_L$) which is connected in series with the sensor.

A common power supply circuit can be used for both $V_C$ and $V_H$ to fulfill the sensor's electrical requirements. The value of the load resistor ($R_L$) should be chosen to optimize the alarm threshold value, keeping power dissipation ($P_S$) of the semiconductor below a limit of 15mW. Power dissipation ($P_S$) will be highest when the value of Rs is equal to $R_L$ on exposure to gas.




## Specifications:

| | | | | |
|---|---|---|---|---|
| Model number | | | TGS2616-C00 | |
| Sensing principle | | | MOS type | |
| Standard package | | | TO-5 metal can | |
| Target gases | | | Hydrogen | |
| Typical detection range | | | 10～3000ppm | |
| Standard circuit conditions | Heater voltage | $V_H$ | 5.0±0.2V DC | |
| | Circuit voltage | $V_C$ | 5.0±0.2V DC | Ps≤15mW |
| | Load resistance | $R_L$ | variable | 0.45kΩ min. |
| Electrical characteristics under standard test conditions | Heater resistance | $R_H$ | approx 59Ω at room temp. | |
| | Heater current | $I_H$ | 56±5mA | |
| | Heater power consumption | $P_H$ | 280mW | $V_H$ = 5.0V DC |
| | Sensor resistance | $R_S$ | 0.3kΩ ~ 8.0kΩ in 100ppm hydrogen | |
| | Sensitivity (change ratio of Rs) | | 0.14~0.52 | Rs (300ppm) / Rs (30ppm) |
| Standard test conditions | Test gas conditions | | Hydrogen in air at 20±2˚C, 65±5%RH | |
| | Circuit conditions | | Vc = 5.0±0.01V DC<br>$V_H$ = 5.0±0.05V DC | |
| | Preheating period before test | | 7 days | |

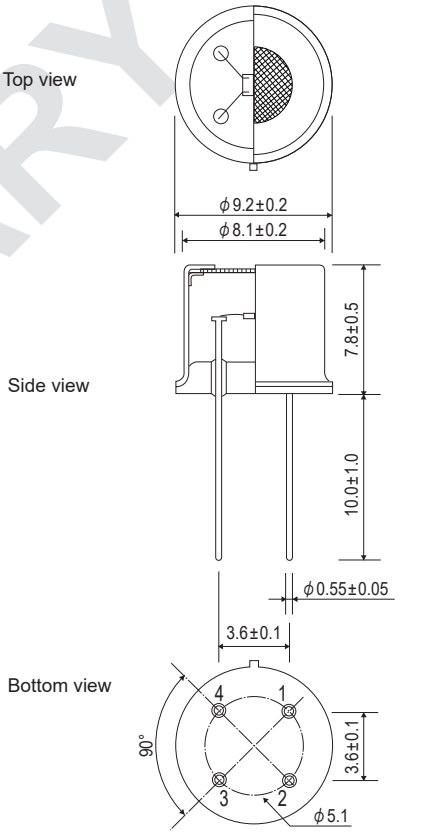
The value of power dissipation ($P_S$) can be calculated by utilizing the following formula:

$$P_S = \frac{(V_C - V_{RL})^2}{R_S}$$

Sensor resistance (Rs) is calculated with a measured value of $V_{OUT}$( $V_{RL}$) by using the following formula:

$$R_S = \left(\frac{V_C}{V_{RL}} - 1\right) \times R_L$$

## Structure and Dimensions:

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**Pin connection:**

1: Heater
2: Sensor electrode (-)
3: Sensor electrode (+)
4: Heater



All sensor characteristics shown in this brochure represent typical characteristics. Actual characteristics vary from sensor to sensor. The only characteristics warranted are those in the Specification table above.

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