

# 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 steel plant safety
- \* 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.

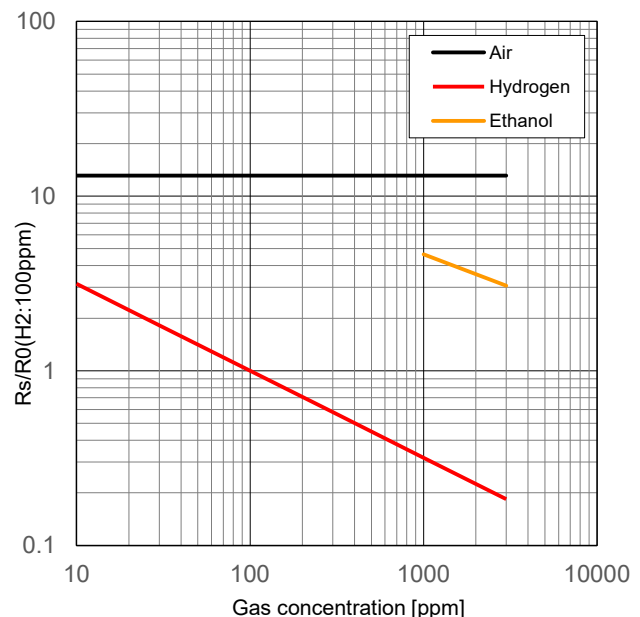


### Sensitivity Characteristics:

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 indicates sensor resistance ratio  $R_s/R_0$ , where  $R_s$  and  $R_0$  are defined as below:

$R_s$  = Sensor resistance in various gases and concentrations

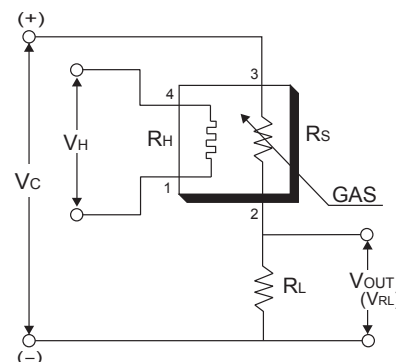
$R_0$  = Sensor resistance in 100 ppm of hydrogen



### 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  $R_S$  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		30~3000ppm	
Standard circuit conditions	Heater voltage	$V_H$	5.0±0.2V DC
	Circuit voltage	$V_C$	5.0±0.2V DC $P_S \leq 15mW$
	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	$R_S$	0.30kΩ ~ 30kΩ in 100ppm hydrogen
Sensitivity (change ratio of $R_S$ )			0.25~0.60 in hydrogen $R_S(1000ppm)$ / $R_S(100ppm)$
Standard test conditions	Test gas conditions	Hydrogen in air at 20±2°C, 65±5%RH	
	Circuit conditions	$V_C = 5.0 \pm 0.01V$ DC $V_H = 5.0 \pm 0.05V$ DC	
	Preheating period before test	2 days	

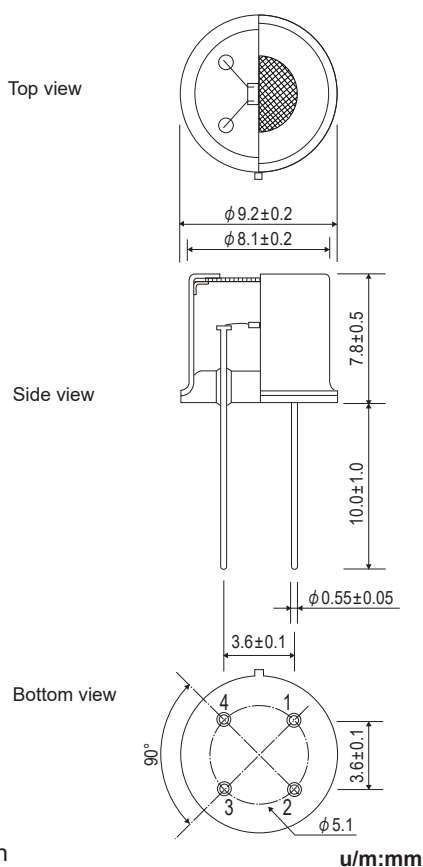
The value of power dissipation ( $P_S$ ) can be calculated by utilizing the following formula:

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

Sensor resistance ( $R_S$ ) 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:



u/m:mm

#### Pin connection:

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

For information on warranty, please refer to Standard Terms and Conditions of Sale of Figaro USA Inc. 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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Before purchasing this product, please read the Warranty Statements shown in our webpage by scanning this QR code.



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