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

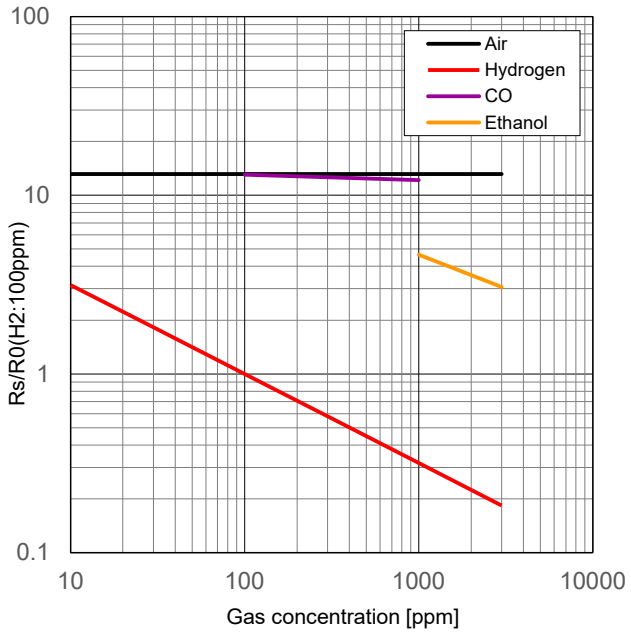
The sensing element is comprised of a metal oxide semiconductor layer formed on an alumina substrate of a sensing chip together with an integrated heater, and it is housed in a standard TO-5 package. In the presence of a detectable gas, the sensor's conductivity increases
depending on the gas concentration 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

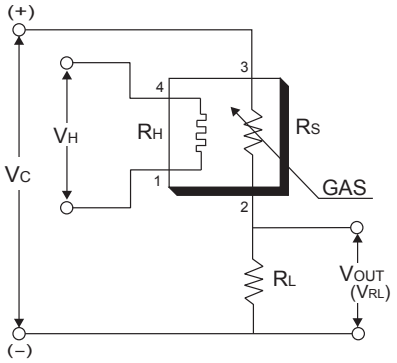


iSweek www.isweek.com
Add: 16/F, Bldg. #3, Zhongke Mansion, No.1 Hi-Tech S. Rd, Hi-Tech Park South, Shenzhen, Guangdong, 518067 P.R.China
Tel: + 86-755-83289036 Fax: + 86-755-83289052 E-mail: sales@isweek.com

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	$\frac{Rs\ (300ppm)}{Rs\ (30ppm)}$
Standard test conditions	Test gas conditions		Hydrogen in air at 20±2°C, 65±5%RH	
	Circuit conditions		V_C = 5.0±0.01V DC V_H = 5.0±0.05V DC	
	Preheating period before test		7 days	

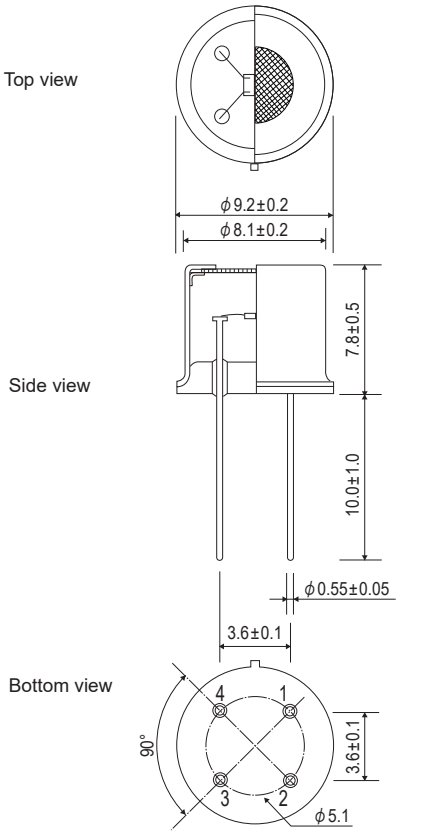
The value of power dissipation (P_S) can be calculated by utilizing the following formula:

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

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

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

Structure and Dimensions:



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Pin connection:

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

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