TGS 2616-C01 - for the detection of Hydrogen

Features:

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

Applications:

* Hydrogen detection for transformer oil maintenance

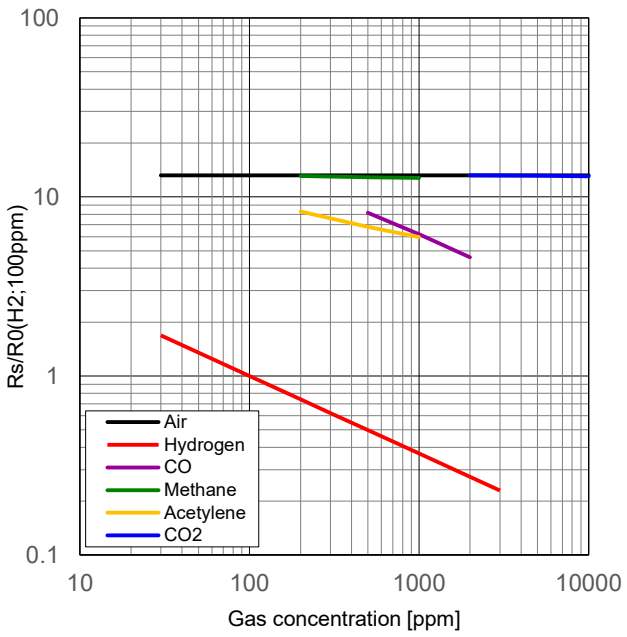
The sensing element is comprised of a metal oxide semiconductor layer formed on an alumina substrate of a sensing chip together with an integrated heater, and it is housed in a standard TO-5 package. In the presence of a detectable gas, the sensor's conductivity increases
depending on the gas concentration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

TGS2616-C01 has a newly developed sensing element which reduces the influence of interference gases such as acetylene, 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 Rs/Ro, where Rs and Ro are defined as below:

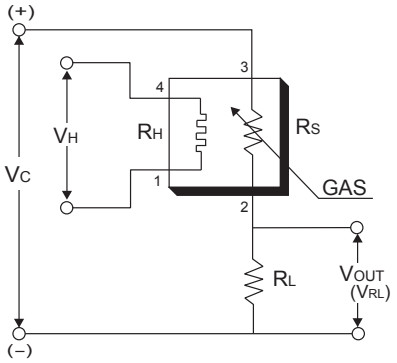
Rs = Sensor resistance in various gases and concentrations
Ro = Sensor resistance in 100 ppm of hydrogen



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.

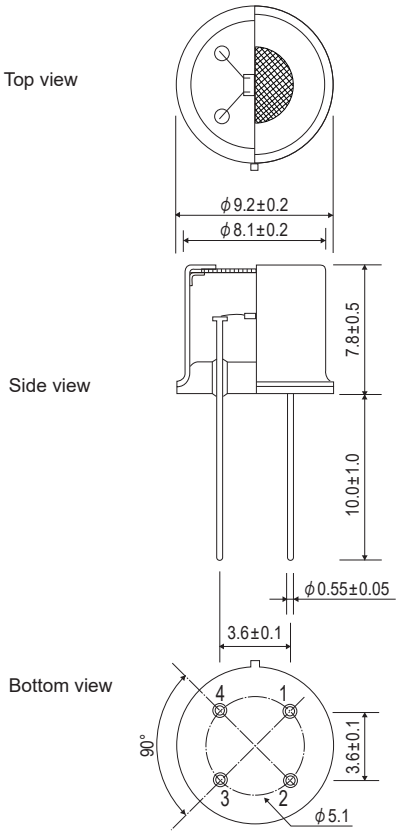
A common power supply circuit can be used for both V_C and V_H to fulfill the sensor's electrical requirements. The value of the load resistor (R_L) should be chosen to optimize the alarm threshold value, keeping power dissipation (P_S) of the semiconductor below a limit of 15mW. Power dissipation (P_S)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



Specifications:

Model number			TGS2616-C01	
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	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	0.30kΩ ~ 30kΩ in 100ppm hydrogen	
	Sensitivity (change ratio of Rs)		0.25~0.60 in hydrogen	$\frac{Rs\ (1000ppm)}{Rs\ (100ppm)}$
	Selectivity		>1	$\frac{Rs\ (500ppm\ of\ C_2H_2)}{Rs\ (3ppm\ of\ H_2)}$
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		2 days	

Structure and Dimensions:



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Pin connection:

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

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:

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

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.

Before purchasing this product, please read the Warranty Statements shown in our webpage by scanning this QR code.

https://www.figaro.co.jp/en/pdf/Limited_Warranty_en.pdf

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