TGS 2602 - for the detection of Air Contaminants

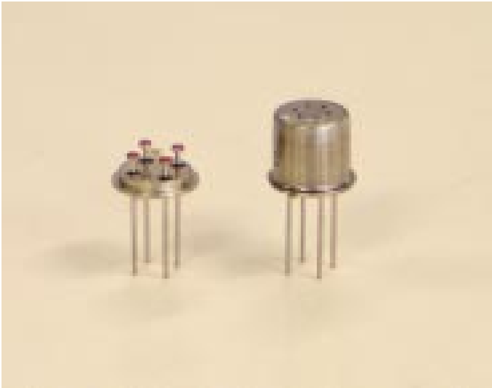
Features:

* High sensitivity to VOCs and odorous gases
* Low power consumption
* High sensitivity to gaseous air contaminants
* Long life
* Uses simple electrical circuit
* Small size

Applications:

* Air cleaners
* Ventilation control
* Air quality monitors
* VOC monitors
* Odor monitors

The sensing element is comprised of a metal oxide semiconductor layer formed on the alumina substrate of a sensing chip together with an integrated heater. In the presence of detectable gas, sensor conductivity increases depending on 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.



The **TGS 2602** has high sensitivity to low concentrations of odorous gases such as ammonia and H_2S generated from waste materials in office and home environments. The sensor also has high sensitivity to low concentrations of VOCs such as toluene emitted from wood finishing and construction products. Figaro also offers a microprocessor (FIC02667) which contains special software for handling the sensor's signal for appliance control applications.

Due to miniaturization of the sensing chip, TGS 2602 requires a heater current of only 42mA and the device is housed in a standard TO-5 package.

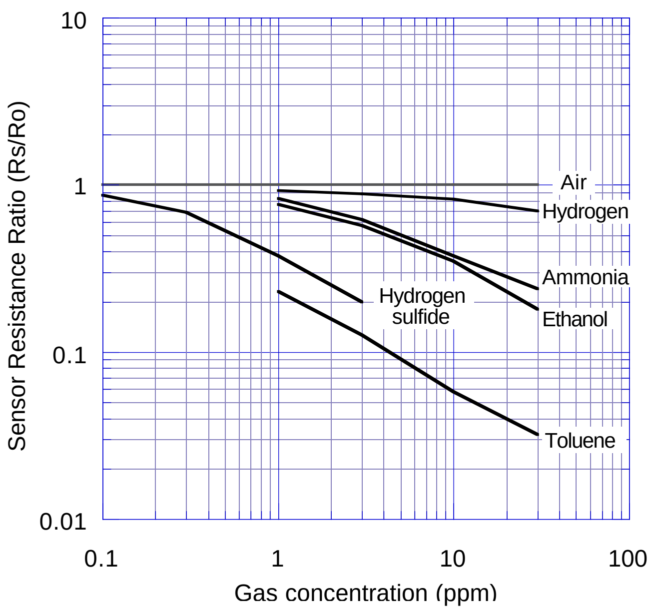
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as *sensor resistance ratio* (Rs/Ro) which is defined as follows:

Rs = Sensor resistance in displayed gases at various concentrations
Ro = Sensor resistance in fresh air

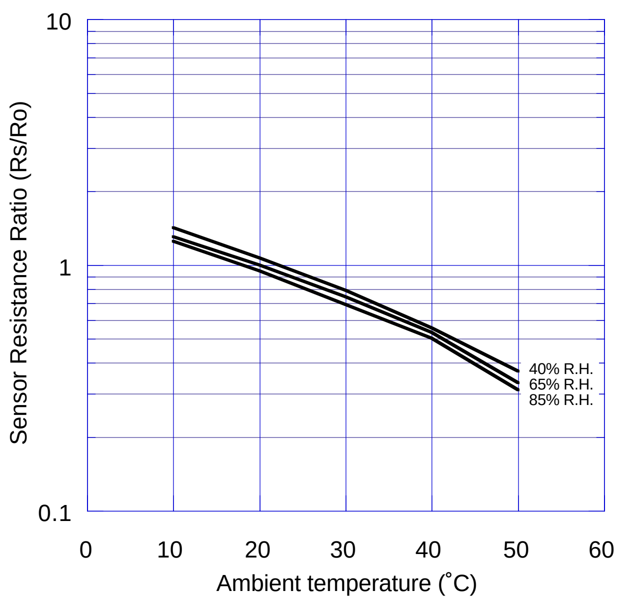
The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as *sensor resistance ratio* (Rs/Ro), defined as follows:

Rs = Sensor resistance in fresh air at various temperatures/humidities
Ro = Sensor resistance in fresh air at 20°C and 65% R.H.

Sensitivity Characteristics:

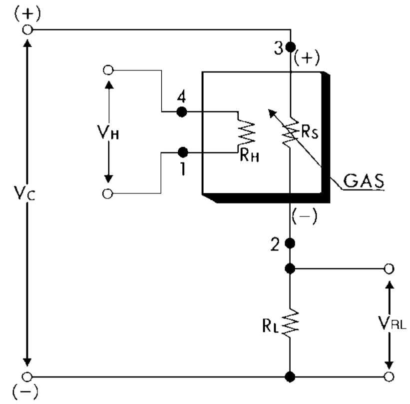


Temperature/Humidity Dependency:



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 (Vout) across a load resistor (R_L) which is connected in series with the sensor. DC voltage is required for the circuit voltage since the sensor has a polarity. 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 consumption (P_S) of the semiconductor below a limit of 15mW. Power consumption (P_S) will be highest when the value of Rs is equal to R_L on exposure to gas.



Specifications:

Model number			TGS 2602-B00	
Sensing element type			D1	
Standard package			TO-5 metal can	
Target gases			Air contaminants	
Typical detection range			1 ~ 30 ppm of EtOH	
Standard circuit conditions	Heater voltage	V_H	5.0±0.2V DC/AC	
	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 (typical)	
	Sensor resistance	Rs	10k~100kΩ in air	
	Sensitivity (change ratio of Rs)		0.15~0.5	$\frac{\text{Rs (10ppm of EtOH)}}{\text{Rs (air)}}$
Standard test conditions	Test gas conditions		normal air at 20±2°C, 65±5%RH	
	Circuit conditions		V_C = 5.0±0.01V DC V_H = 5.0±0.05V DC	
	Conditioning period before test		7 days	

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

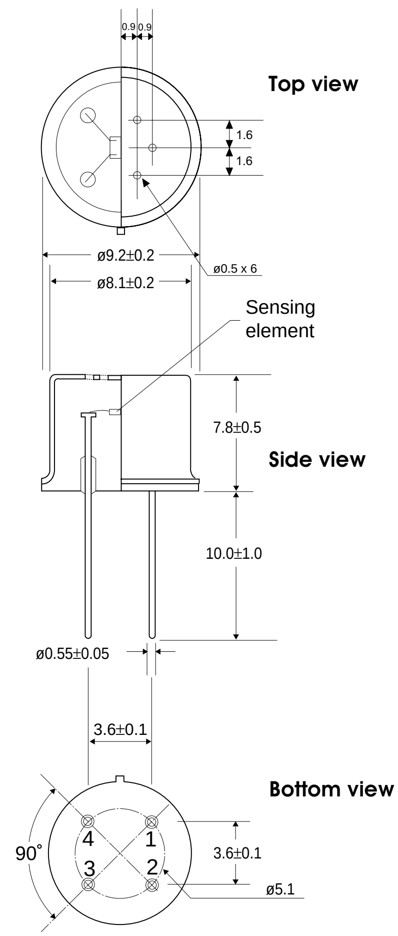
$$P_S = \frac{(V_C - Vout)^2}{R_S}$$

Sensor resistance (Rs) is calculated with a measured value of Vout by using the following formula:

$$R_S = \frac{V_C \times R_L}{Vout} - R_L$$

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.

Structure and Dimensions:



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