

TGS2602 Gas Sensor for Air Pollutant Detection

characteristic :

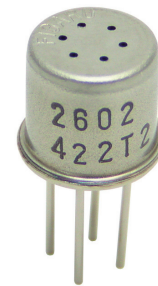
- * High sensitivity to VOC and odor
- * low power consumption
- * High sensitivity to polluted air
- * Long service life
- * Simple application circuit
- * small volume

apply :

- Control of air freshener
- :: Ventilation control
- * air quality monitoring
- *VOC monitor
- :: Odor monitors

The sensor element consists of an integrated heater and a metal oxide semiconductor on an alumina substrate. When object detection gas is present in the air, its concentration increases, thereby raising the sensor's conductivity. A simple circuitry can convert these conductivity changes into corresponding signal outputs that directly reflect the gas concentration.

The TGS2602 sensor demonstrates exceptional sensitivity to low-concentration odorous gases, enabling detection of ammonia and hydrogen sulfide emissions from waste materials in office and household environments. It also shows high sensitivity to volatile organic compounds (VOCs) such as toluene in wood processing and building materials. The compact design features a heater current of only 56mA and employs a standard TO-5 metal housing.



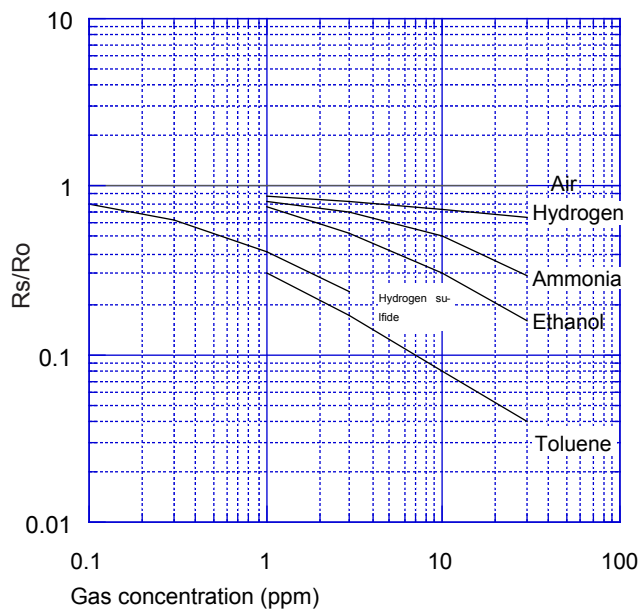
Sensitivity characteristics:

The following figure shows a typical sensitivity characteristic curve, which was measured under our company's standard test conditions (see back).

The vertical axis shows the sensor resistance ratio R_s / R_o , where R_s and R_o are defined as follows:

R_s = Sensor resistance in various gas concentrations

R_o = Sensor resistance in clean air



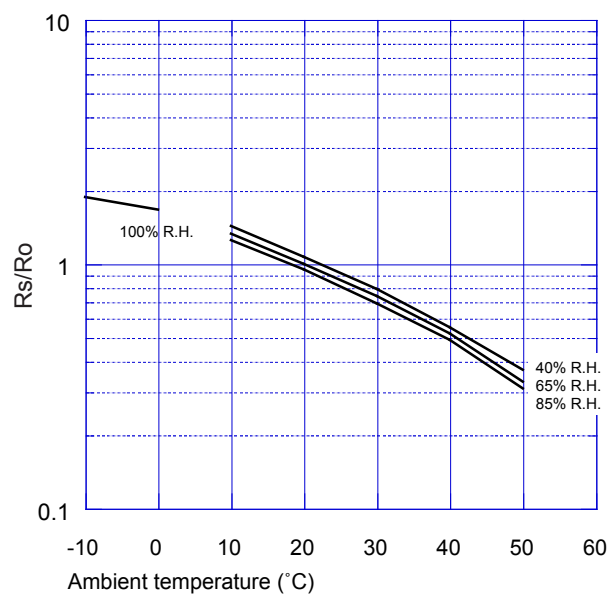
Temperature and humidity characteristics:

The figure below shows the typical characteristic curve affected by temperature and humidity.

The vertical axis shows the sensor resistance ratio R_s / R_o , where R_s and R_o are defined as follows:

R_s = Resistance of the sensor in clean air at various temperature/humidity values
 R_o = Resistance of the sensor in clean air at temperature/humidity of 20°C / 65%

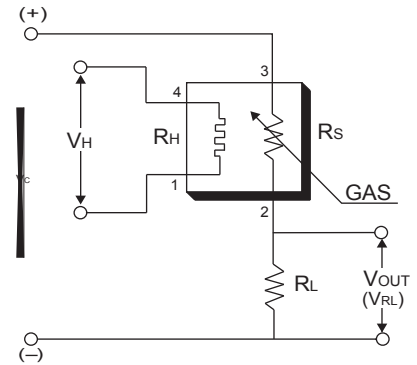
Resistance at R.H.



Important Notice: The application conditions for Feigaro sensors may vary depending on specific customer requirements. Feigaro strongly recommends consulting our technical team prior to use, particularly when the detected gas is not listed. Feigaro assumes no liability for any usage that has not undergone professional testing by Feigaro.

Basic test circuit:

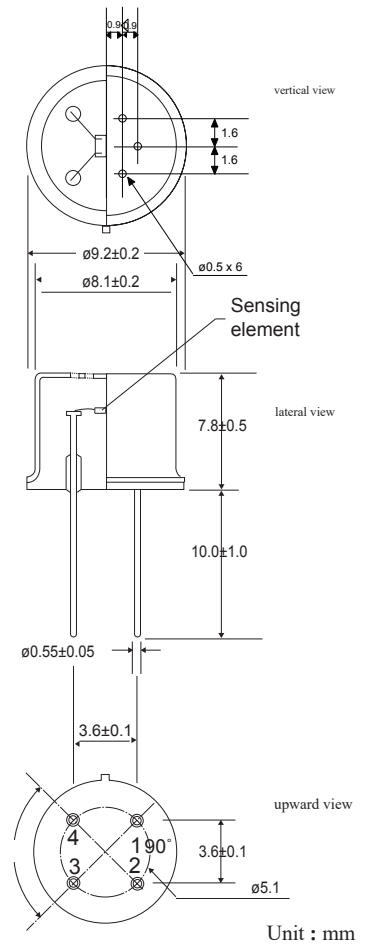
This sensor requires two applied voltages: the Heater Voltage(V_H) and Loop Voltage(V_C). When the built-in heater is energized, the sensing element reaches its optimal operating temperature required for detecting the target gas. The Loop Voltage is applied to measure the voltage across the load resistor(R_L) connected in series with the sensor(V_{RL}). Due to the sensor's polarity requirement, the Loop Voltage must be supplied as direct current. Provided the electrical characteristics meet specifications, V_C and V_H may share a common power circuit. For load resistor selection, R_L 's value should be determined to optimize alarm threshold levels while keeping the sensing element's maximum power consumption(P_S) below the limit of 15mW. When R_L is exposed to the gas, its resistance equals R_S , resulting in maximum power consumption value P_S .



specifications :

model		TGS2602-B00	
Detection principles		Oxidized semiconductor type	
Standard encapsulation		TO-5 Metals	
Object gas		Air pollution (VOC, ammonia, hydrogen sulfide, etc.)	
Scope of detection		Ethanol 1 ~ 30ppm	
Standard loop conditions	heater voltage	V_H	$5.0 \pm 0.2V$ AC/DC
	loop voltage	V_C	$5.0 \pm 0.2V$ DC $P_S \leq 15mW$
	load resistance	R_L	variable $0.45k\Omega$ min.
Electrical characteristics under standard test conditions	Heating element resistance	R_H	Room temperature about 59Ω (typical state)
	Heater current	I_H	$56 \pm 5mA$
	Heater power consumption	P_H	280mW (typical state)
	Sensor resistor	R_S	10 ~ 100k Ω air
	Sensitivity (rate of change of R_S)		$0.15 \sim 0.5$ $\frac{R_S(\text{ethanol } 10 \text{ ppm})}{R_S(\text{air})}$
standard test conditions	Test gas conditions	Normal air 20 ± 2 . C, $65 \pm 5\%$ R.H.	
	Loop conditions	$V_C = 5.0 \pm 0.01V$ DC $V_H = 5.0 \pm 0.05V$ DC	
	preheating time	7 sky	

Structure and size:



pin connection :

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

The power consumption value (P_S) can be calculated by the following formula: The sensor resistor (R_S) depends on V_{OUT} (V_{RL})
The measured value is calculated by the following formula:

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

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

The typical characteristics of the sensor are shown in this product specification. The actual characteristics of the sensor vary from product to product. Please refer to the specifications for each sensor.

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