TGS2603 Gas Sensor for Odor and Air Pollutant Detection

character-istic：

* low power consumption
High sensitivity to amine series and sulfur-containing odors
* Highly sensitive to food odors
* Long service life and low cost
* Simple application circuit

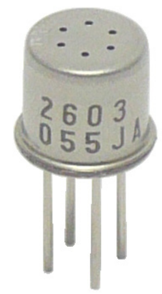
apply：

Control of air freshener
:: Ventilation control
:: Deodorizer control
* air quality monitoring

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 levels.

TGS2603 has high sensitivity to low concentrations of odors, such as hydrogen sulfide gas from amine series and waste, and spoilage of fish food.

The air quality is actually controlled by simulating the human feeling in the polluted air by using the change of circuit resistance and its ratio to the resistance in clean air.



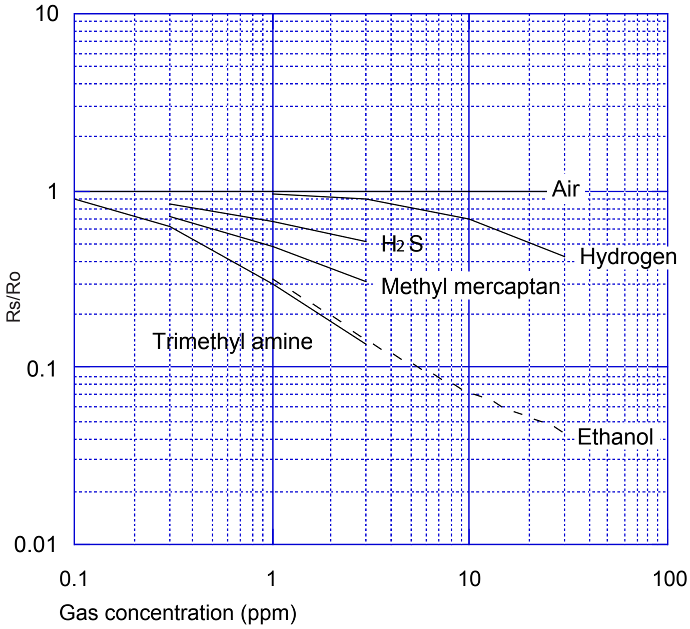
Sensitivity characteristics:

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 Rs / Ro, where Rs and Ro are defined as follows:

Rs = Sensor resistance in various gas concentrations

Ro = Sensor resistance in clean air



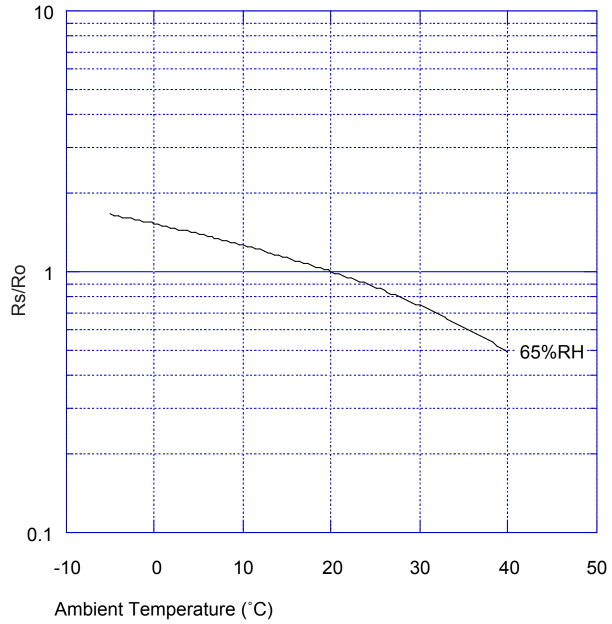
Temperature and humidity characteristics:

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

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

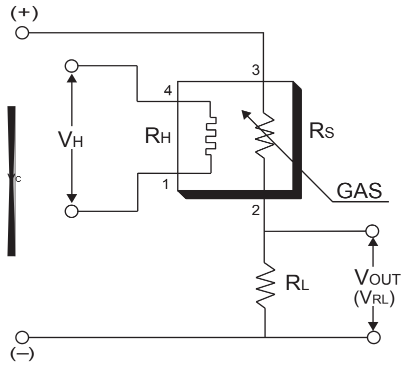
Rs = Resistance of the sensor at various temperatures/humidity in clean air

Ro = Sensor resistance in clean air, temperature/ humidity 20°C / 65% R.H.



Basic test circuit:

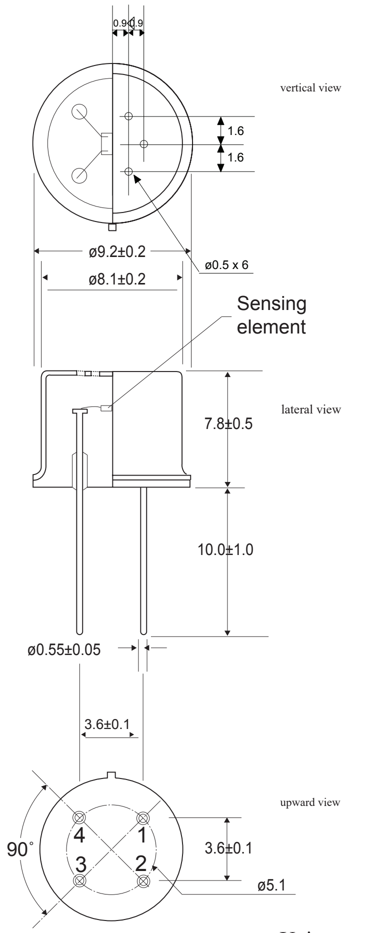
This sensor requires two applied voltages: the Heater Voltage (V_H) and Loop Voltage (V_C). When the built-in heater is energized, the sensing element reaches its optimal operating temperature required for detecting the target gas. The Loop Voltage is applied to measure the voltage across the load resistor(R_L) 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, the Loop Voltage (V_C) and Heater Voltage (V_H) may share the same power circuit. For load resistor selection, R_L values 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 the gas L is present, the resistance value equals R_S, resulting in maximum power consumption value P_S.



specifications：

model			TGS2603-B00	
Detection principle			Oxidized semiconductor type	
Standard encapsulation			TO-5 Metals	
Object gas			Air pollution (trimethylamine, methyl mercaptan, etc.)	
Scope of detection			Ethanol 1 ~ 10ppm	
Standard loop conditions	heater voltage	V_H	5.0±0.2V AC/DC	
	loop voltage	V_C	5.0±0.2V DC	$P_S \leqslant 15mW$
	load resistance	R_L	variable	0.45kΩ min.
Electrical characteristics under standard test conditions	Heating element resistance	R_H	Room temperature about 67Ω (typical state)	
	Heater current	I_H	48mA	
	Heater power consumption	P_H	240mW	V_H=5.0V DC
	Sensor resistor	R_S	20 ~ 200kΩ air	
	Sensitivity (rate of change of Rs)		<0.5	Rs (ethanol 10 ppm) Rs (air)
standard test conditions	Test gas conditions		Normal air 20±2. C,65 ±5%R.H.	
	Loop conditions		Vc = 5.0±0.2V DC VH = 5.0±0.2V AC/DC	
	preheating time		96 Over 1 hour	

Structure and size:



Unit：mm

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:

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

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

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

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 of each sensor for details.

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