FIGARO

product presentation

TGS8100 Gas Sensor for Detecting Air Pollutants

character-
istic：

:: Surface ceramic packaging
:: Low power consumption
High sensitivity to cigarette, kitchen odor and gaseous pollutants
:: Long service life and low cost

apply：

:: Indoor air monitoring
* Air freshener
:: Ventilation fan controls
* Range hood control

The gas-sensitive element consists of a heater integrated on a silicon substrate using MEMS technology and a metal oxide semiconductor formed on the substrate. The housing is made of ceramic material, and the sensing chip is miniaturized to enable surface packaging.
The TGS8100 consumes minimal power at just 15mW, delivering remarkable energy efficiency for low-power devices and battery-powered instruments. When detecting gases in the air, its conductivity increases proportionally with higher gas concentrations. Through a simple circuit design, these conductivity changes are converted into voltage signals that directly reflect the gas concentration levels.

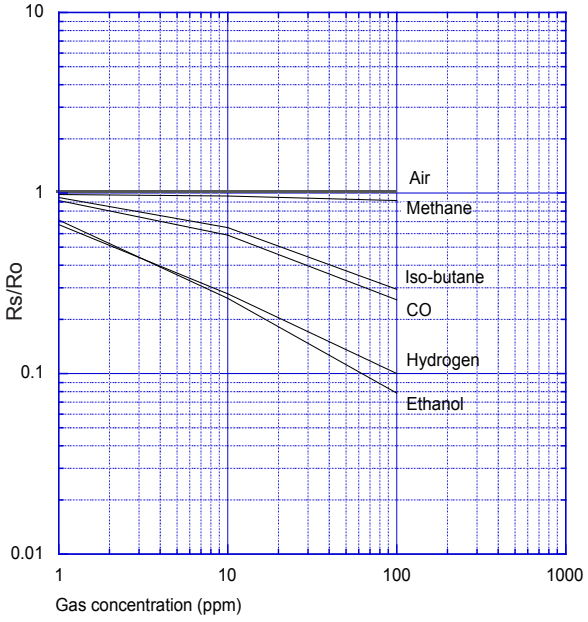
The TGS8100 has high sensitivity to gaseous pollutants such as low-concentration cigarette smoke and kitchen odors. The sensor uses a relative value detection method (measuring air pollution levels based on changes in the sensor's resistance relative to clean air), enabling control that mimics human perception.

Sensitivity characteristics:

The representative sensitivity characteristic curve is shown in the figure below under standard test conditions (see back).

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

Rs = Resistance of the sensor in various concentrations of gas
Ro = Resistance of the sensor in clean air

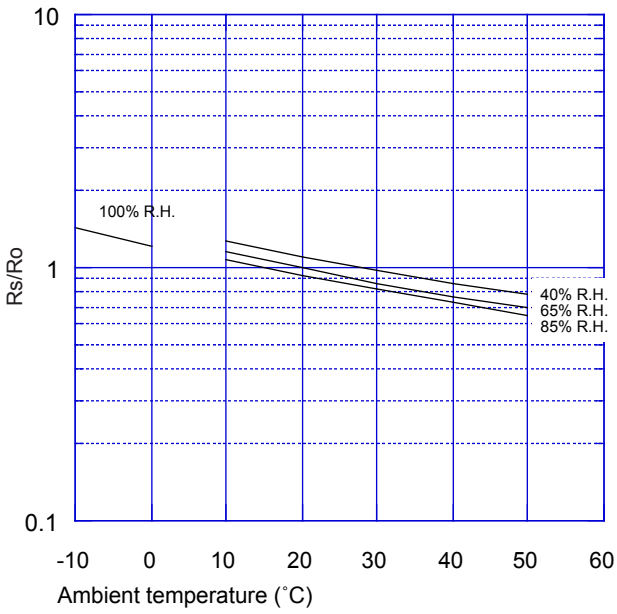


Temperature and humidity characteristics:

The following figure shows the representative 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 value of the sensor in clean air under various temperature and humidity
Ro = Sensor resistance in clean air, temperature/ humidity 20°C / 65% R.H.



FIGARO

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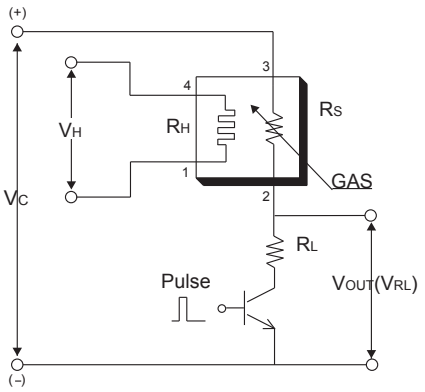
Basic test circuit:

This sensor requires both heater voltage (V H) and loop voltage (V C). The V H is applied to the integrated heater to maintain a temperature in the sensing element that corresponds to the target gas. The V C measures the voltage across the load resistor (R L) connected in series with the sensor, denoted as V OUT.

For the load resistance, select the optimal change threshold for the range of gas concentrations to be detected.

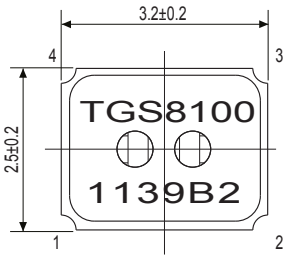


specifications：

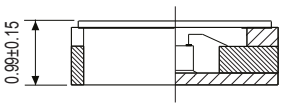
model			TGS8100	
Detection principle			Oxidized semiconductor type	
Standard encapsulation			pottery and porcelain	
Object gas			Air pollution (hydrogen, alcohol, etc.)	
Scope of detection			Hydrogen 1 ~ 30ppm	
Standard loop conditions	heater voltage	VH	1.8V DC ±2%	
	loop voltage	VC	Max 3.0V DC 2msec 0 V ⩾ 998msec	
	load resistance	RL	Variable (10kΩ min)	
Electrical characteristics under standard test conditions	Heating element resistance	RH	Room temperature is about 110 Ω	
	Heater current	IH	8mA (typical)	
	Heater power consumption	PH	15mW (typical)	
	Sensor resistor	RS	10 ~ 300kΩ air	
	Sensitivity (rate of change of Rs)		~0.6	Rs (hydrogen 10ppm) / Rs (air)
standard test conditions	Test gas conditions		Normal air 20±2. C,65 ±5%R.H.	
	Loop conditions		The same as the standard circuit conditions above	
	preheating time		1 Over 1 hour	

Structure and size:

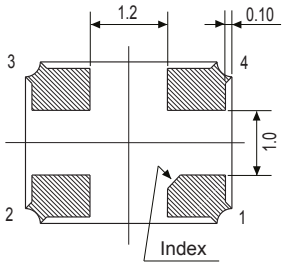
vertical view



lateral view



upward view



Unit：mm

pin connection：

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

The sensor resistance (R s) can be calculated from the following formula according to the measured value of V OUT (V RL):

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

Note: The TGS8100 is a highly sensitive component to static electricity, and Figaro recommends that ESD protection measures be taken during use.

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

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