

## TGS822 for Organic Solvent Vapor Detection

### characteristic :

- High sensitivity to organic solvents such as ethanol
- Excellent long-term stability
- Long life, low cost
- It can be used in simple circuits

The gas sensor element of Figaro Gas Sensor utilizes tin dioxide ( $\text{SnO}_2$ ), a low-conductivity material found in clean air. When detecting target gases, the sensor's conductivity increases proportionally with rising gas concentrations. A simple circuitry converts these conductivity changes into corresponding output signals that directly reflect the gas concentration levels.

TGS822 sensor has high sensitivity to alcohol and organic solvent, and has been widely used in alcohol detector.

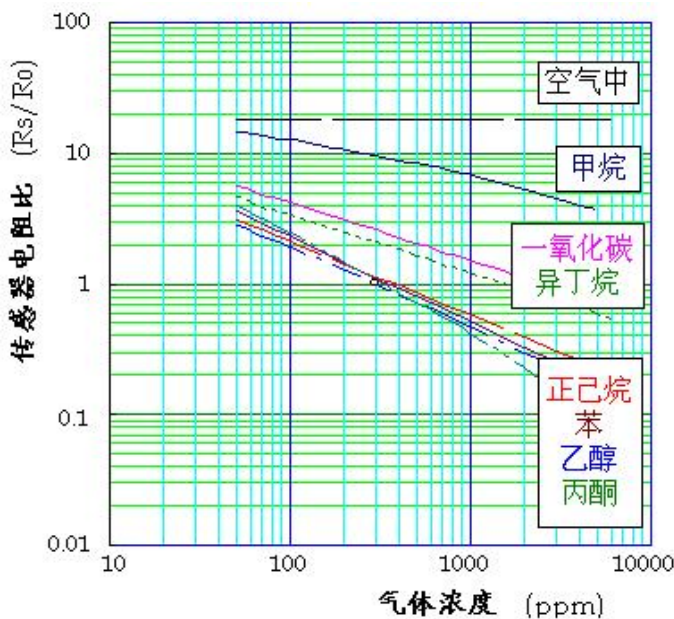
The TGS823 with the same characteristics uses a ceramic base and can be used in high temperature atmospheres of  $200^\circ\text{C}$ .

The following figure shows typical sensitivity characteristics, all obtained under standard test conditions. (See back)

The vertical coordinate is expressed as the sensor resistance ratio ( $R_s/R_0$ ), where  $R_s$  and  $R_0$  are defined as follows:

$R_s$  = resistance value in different concentrations of gas  
 Resistance values in  $R_0 = 300\text{ppm}$  ethanol

### Sensitivity characteristics:



### apply :

- Alcohol detector
- Organic solvent detection in factories, dry cleaners and semiconductor industries

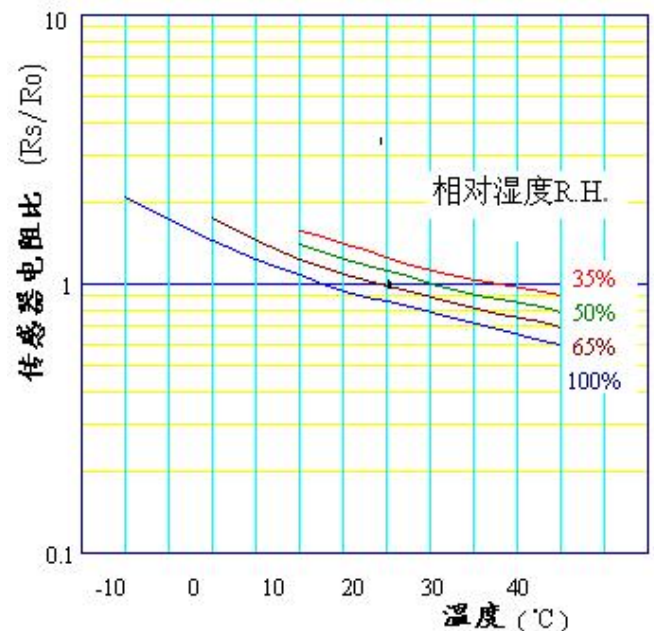


The following figure shows the typical curve affected by temperature and humidity.

The vertical axis of the figure is also expressed as the sensor resistance ratio ( $R_s/R_0$ ), where  $R_s$  and  $R_0$  are defined as follows:

$R_s$  = contains 300ppm ethanol, resistance values at various temperature/humidity conditions  
 $R_0$  = contains 300ppm ethanol, resistance values under  $20^\circ\text{C}65\%\text{R.H.}$

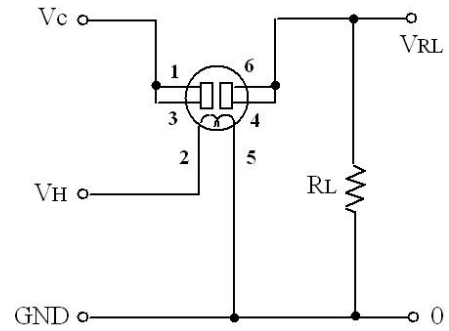
### Temperature and humidity effects:



### Basic test loop:

This sensor requires two voltage inputs: Heater Voltage ( $V_H$ ) and Circuit Voltage ( $V_C$ ). The  $V_H$  is applied to the integrated heater to maintain a specific temperature in the sensing element that corresponds to the target gas. The  $V_C$  is used for measuring the transmission...

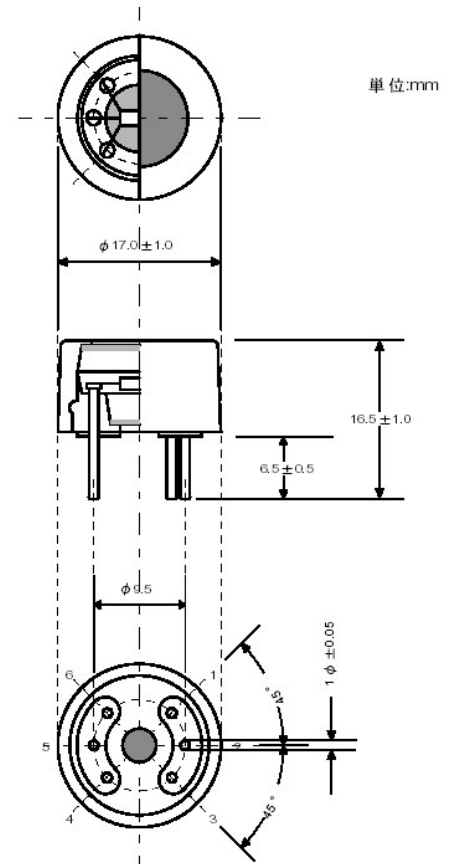
The voltage across the load resistor ( $R_L$ ) in series with the sensor ( $V_{RL}$ ). As this sensor has polarity, a DC power supply is required for  $V_C$ . Provided the electrical requirements are met,  $V_C$  and  $V_H$  can share the same power circuit. To optimize the threshold value and keep the sensing element's power consumption ( $P_S$ ) below the 15mW limit, the resistance value of  $R_L$  must be carefully selected.



### specifications :

### Structure and size:

model		<b>TGS822</b>	
Subtype		8 series	
Standard encapsulation		Plastic, SUS double heavy metal mesh	
Object gas		Alcohol, organic solvents	
Scope of detection		50~5,000 ppm	
Standard loop conditions	heater voltage	VH	5.0±0.2V DC/AC
	loop voltage	VC	MAX 24V Ps ≤ 15mW
	load resistance	RL	variable Ps ≤ 15mW
Electrical characteristics under standard test conditions	Heating element resistance	RH	38±3.0 Ω (room temperature)
	Heater power consumption	PH	660±55mW VH = 5.0V
	Sensor resistance	Rs	1-10 KΩ in 300ppm ethanol
	Sensitivity (Rs rate of change)		0.4±0.1 $\frac{Rs(EtOH:300ppm)}{Rs(EtOH:50ppm)}$
standard test conditions	Test gas conditions	20±2°C, 65±5%RH	
	Loop conditions	VC = 10.0±0.1V DC/AC VH = 5.0±0.05V DC/AC RL=10.0 KΩ ±1%	
	preheating time	7 Above the sky	



The power consumption ( $P_s$ ) value can be calculated by the following formula:  $P_s = \frac{V_C^2 \times R_s}{(R_s + R_L)^2}$  Sensor resistance ( $R_s$ ) can be calculated by the following formula:  $R_s = \left( \frac{V_C}{V_{RL}} - 1 \right) \times R_L$

$$P_s = \frac{V_C^2 \times R_s}{(R_s + R_L)^2}$$

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

Pin 1 or 3: Sensor  
4 or 6: Sensors  
2 : calorifier  
5 : calorifier

This specification may be changed without prior notice to improve performance.

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