TGS 822 - for the detection of Organic Solvent Vapors

Features:

* High sensitivity to organic solvent vapors such as ethanol
* High stability and reliability over a long period
* Long life and low cost
* Uses simple electrical circuit

Applications:

* Breath alcohol detectors
* Gas leak detectors/alarms
* Solvent detectors for factories, dry cleaners, and semiconductor industries

The sensing element of Figaro gas sensors is a tin dioxide (SnO_2) semiconductor which has low conductivity in clean air. In the presence of a detectable gas, the sensor's conductivity increases depending on the 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 822** has high sensitivity to the vapors of organic solvents as well as other volatile vapors. It also has sensitivity to a variety of combustible gases such as carbon monoxide, making it a good general purpose sensor. Also available with a ceramic base which is highly resistant to severe environments as high as 200°C (model# TGS 823).

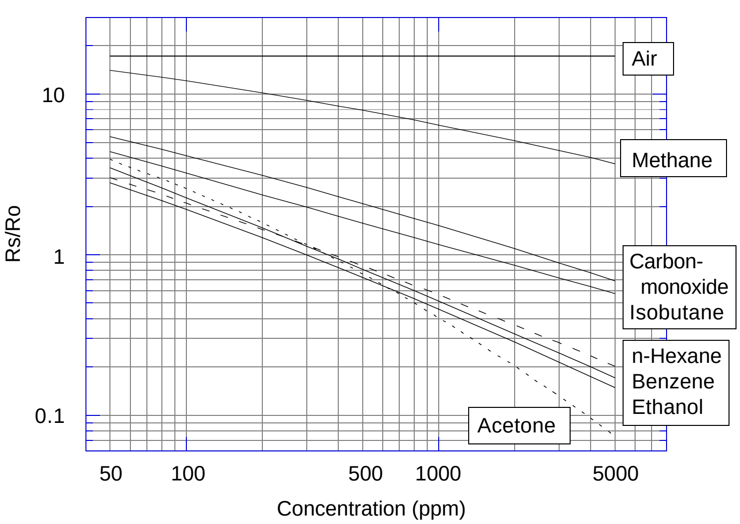
The figure below represents typical sensitivity char-acteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as *sensor resistance ratio* (Rs/Ro) which is defined as follows:

Rs = Sensor resistance of displayed gases at various concentrations
Ro = Sensor resistance in 300ppm ethanol

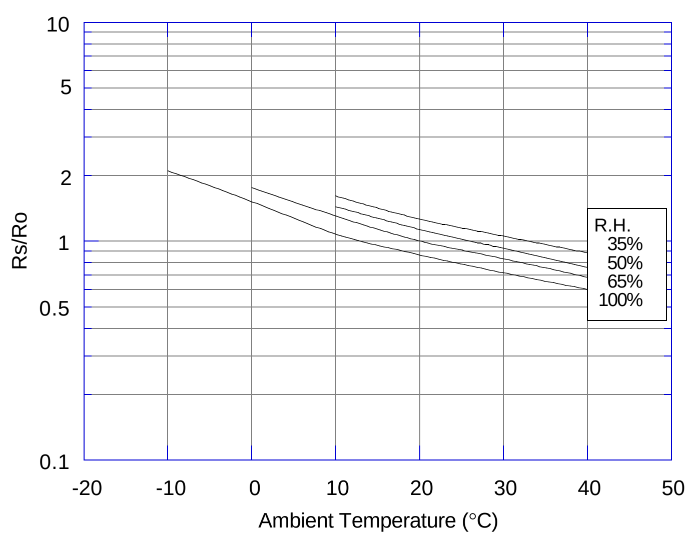
The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as *sensor resistance ratio* (Rs/Ro), defined as follows:

Rs = Sensor resistance at 300ppm of ethanol at various temperatures/humidities
Ro = Sensor resistance at 300ppm of ethanol at 20°C and 65% R.H.

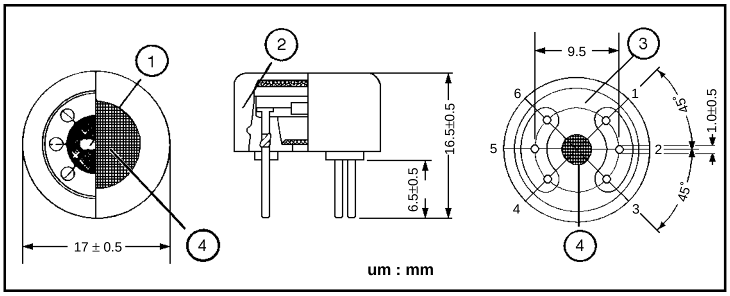
Sensitivity Characteristics:



Temperature/Humidity Dependency:



Structure and Dimensions:

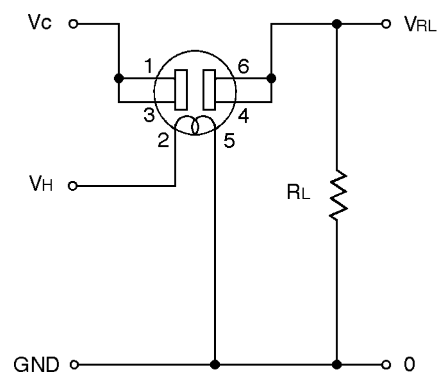


1. Sensing Element:
   SnO_2 is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.
2. Cap:
   Nylon 66
3. Sensor Base:
   Nylon 66
4. Flame Arrestor:
   100 mesh SUS 316 double gauze

Pin Connection and Basic Measuring Circuit:

The numbers shown around the sensor symbol in the circuit diagram at the right correspond with the pin numbers shown in the sensor's structure drawing (*above*). When the sensor is connected as shown in the basic circuit, output across the Load Resistor (V_{RL}) increases as the sensor's resistance (Rs) decreases, depending on gas concentration.

Basic Measuring Circuit:



Standard Circuit Conditions:

Item	Symbol	Rated Values	Remarks
Heater Voltage	V_H	5.0±0.2V	AC or DC
Circuit Voltage	V_C	Max. 24V	AC or DC *PS≤15mW
Load Resistance	R_L	Variable	*PS≤15mW

Electrical Characteristics:

Item	Symbol	Condition	Specification
Sensor Resistance	Rs	Ethanol at 300ppm/Air	1kΩ ~ 10kΩ
Change Ratio of Sensor Resistance	Rs/Ro	$\frac{\text{Rs (Ethanol at 300ppm/Air)}}{\text{Rs (Ethanol at 50ppm/Air)}}$	0.40 ± 0.1
Heater Resistance	R_H	Room temperature	38.0 ± 3.0Ω
Heater Power Consumption	P_H	VH=5.0V	660mW ± 55mW

Standard Test Conditions:

TGS 822 complies with the above electrical characteristics when the sensor is tested in standard conditions as specified below:

Test Gas Conditions: 20°±2°C, 65±5%R.H.
Circuit Conditions: V_C = 10.0±0.1V (AC or DC),
V_H = 5.0±0.05V (AC or DC),
R_L = 10.0kΩ±1%
Preheating period before testing: More than 7 days

Sensor Resistance (Rs) is calculated by the following formula:

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

Power dissipation across sensor electrodes (Ps) is calculated by the following formula:

$$Ps = \frac{V_C^2 \times Rs}{(Rs + R_L)^2}$$