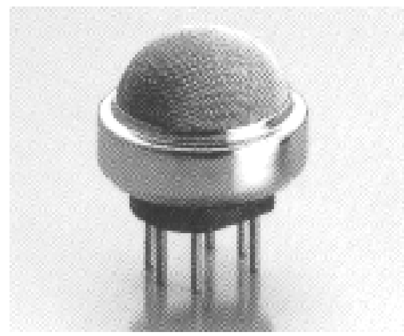
TGS 825 - Special Sensor for Hydrogen Sulfide

Features:

* High sensitivity to low concentration of hydrogen sulfide
* Good repeatability in measurement
* Uses simple electrical circuit
* Ceramic base resistant to severe environment

Applications:

* Hydrogen sulfide detectors/ alarms



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 825** has high sensitivity to hydrogen sulfide. The sensor can detect concentrations of hydrogen sulfide as low as 5ppm, making it ideal for application in gas leak detection.

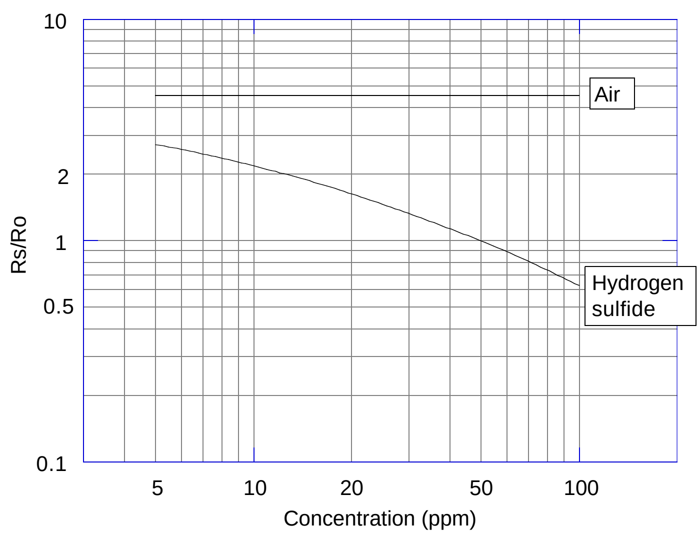
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

Rs = Sensor resistance of displayed gases at various concentrations
Ro = Sensor resistance at 50ppm of hydrogen

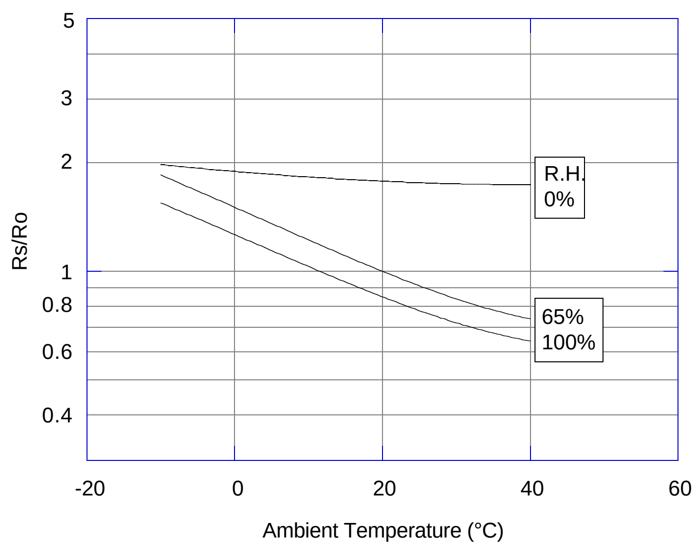
The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as sensor resistance ratio (Rs/Ro), defined as follows:

Rs = Sensor resistance at 50ppm of hydrogen sulfide at various temp./humidities
Ro = Sensor resistance at 50ppm of hydrogen sulfide at 20°C and 65% R.H.

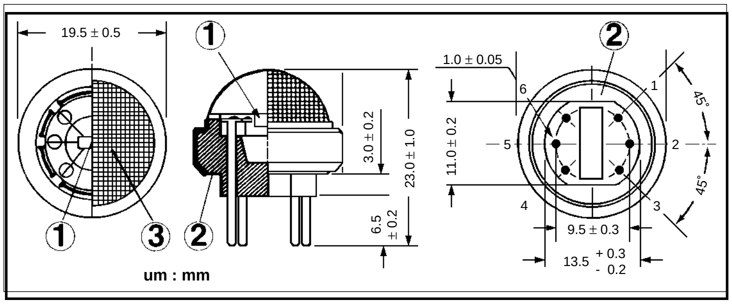
Sensitivity Characteristics:



Temperature/Humidity Dependency:



Structure and Dimensions:

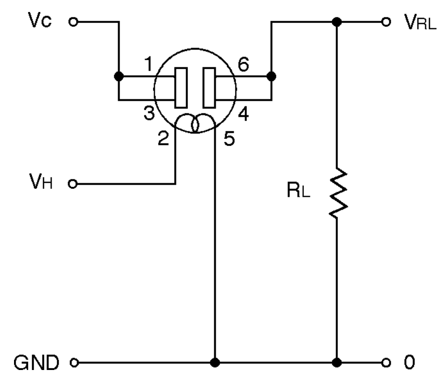


1. Sensing Element:
   SnO_2 is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.
2. Sensor Base:
   Alumina ceramic
3. Flame Arrestor:
   100 mesh SUS 316 double gauze

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	Hydrogen sulfide at 50ppm/Air	3k ~ 30k
Change Ratio of Sensor Resistance	Rs/Ro	Rs (Hydrogen sulfide at 50ppm/Air) / Rs (Hydrogen sulfide at 10ppm/Air)	0.45 ± .15
Heater Resistance	R_H	Room temperature	38.0 ± 3.0
Heater Power Consumption	P_H	VH=5.0V	660 ± 55mW

Standard Test Conditions:

TGS 825 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:

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