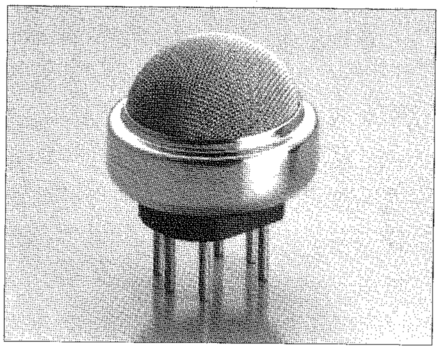
TGS 824 - Special Sensor for Ammonia

Features:

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

Applications:

* Ammonia leak detection in refrigerators
* Ammonia detection for the agricultural and poultry industries



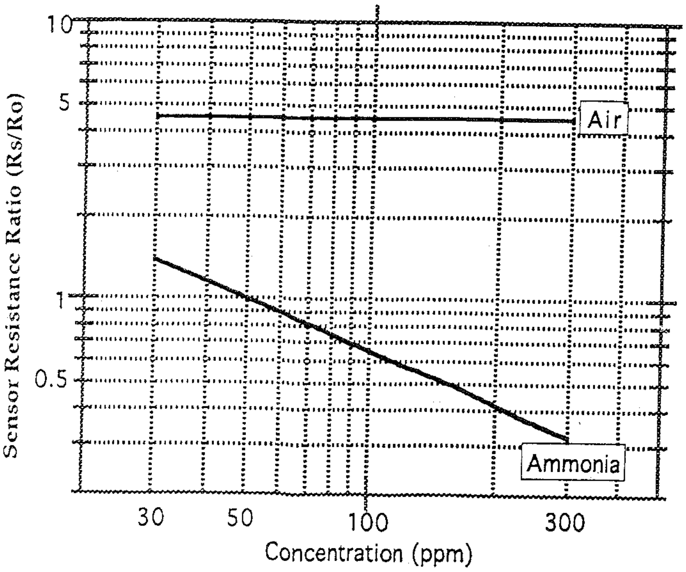
The sensing element of Figaro gas sensors is a tin dioxide (SnO_2) semiconductor which has low conductivity in clean air. In the presence of a detectable gas, the sensor's conductivity increases depending on the gas concentration in the air. A simple electrical circuit can convert the change in conductivity to an output signal which corresponds to the gas concentration.

The **TGS 824** has high sensitivity to ammonia gas. The sensor can detect concentrations as low as 30ppm in the air and is ideally suited to critical safety-related applications such as the detection of ammonia leaks in refrigeration systems and ammonia detection in the agricultural field.

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 ammonia

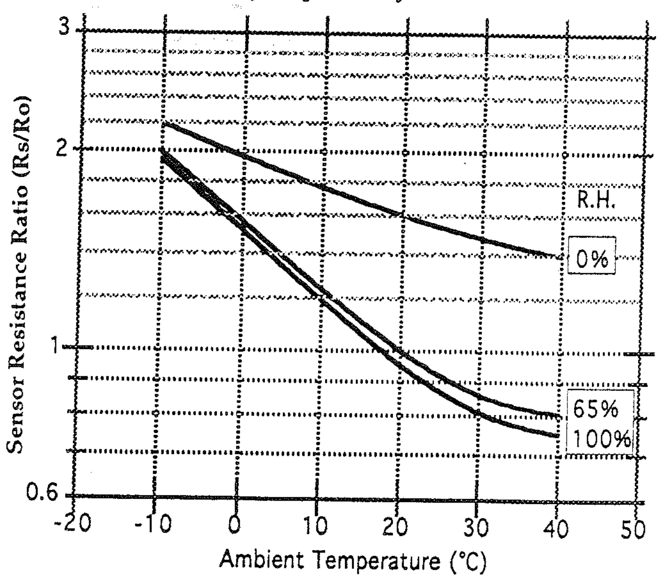
Sensitivity Characteristics:



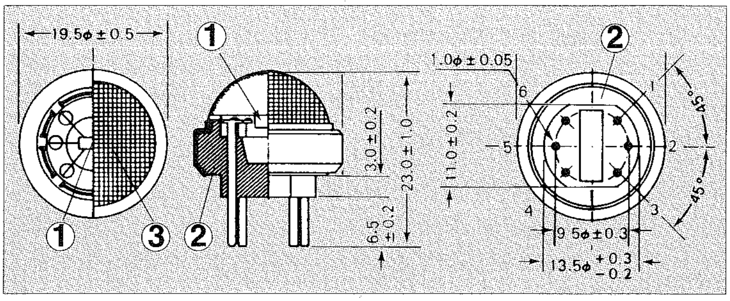
The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as *sensor resistance ratio* (Rs/Ro), defined as follows:

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

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.

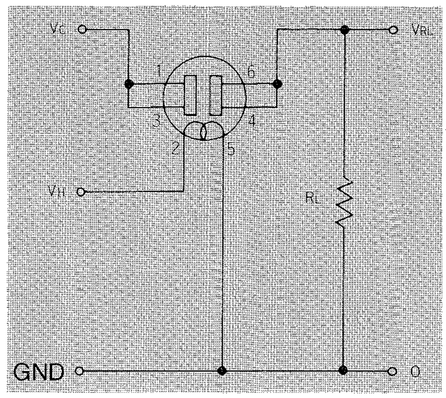
② Sensor Base:
Alumina ceramic

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	Ammonia at 50ppm/Air	5kΩ ~ 20kΩ
Change Ratio of Sensor Resistance	Rs/Ro	Rs (Ammonia at 150ppm/Air) / Rs (Ammonia at 50ppm/Air)	0.50 ± .05
Heater Resistance	R_H	Room temperature	59.0 ± 4.0Ω
Heater Power Consumption	P_H	VH=5.0V	425 ± 30mW

Standard Test Conditions:

TGS 824 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:

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

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