TGS 826 - for the Detection of Amine Compounds

Features:

* High sensitivity to amine compounds
* Quick response to low concentrations of ammonia
* Uses simple electrical circuit
* Ceramic base resistant to severe environment

Applications:

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

The sensing element of TGS-826 is a metal oxide 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-826 has high sensitivity to amine compounds, especially 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.
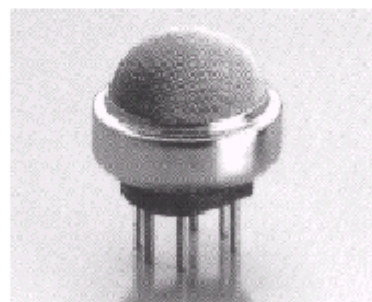
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

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

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.

Sensitivity Characteristics:
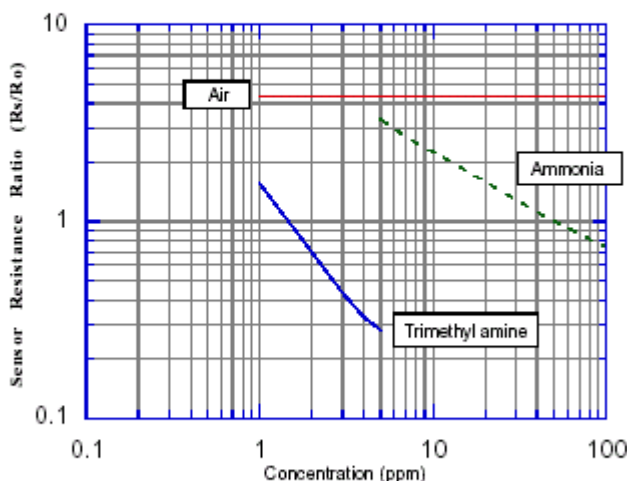
Temperature/Humidity Dependency:
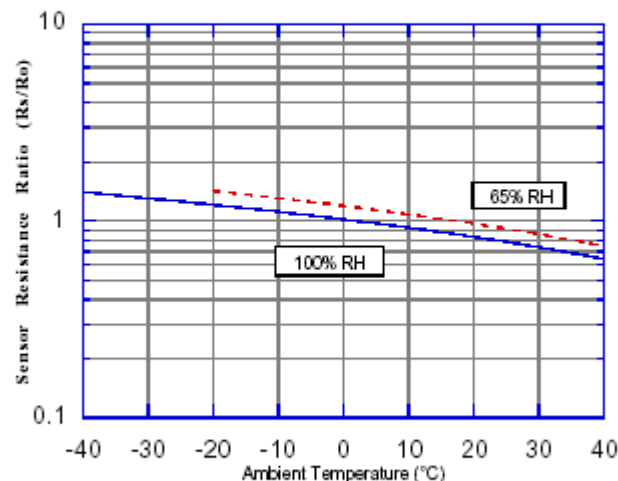
IMPORTANT NOTE: OPERATING CONDITIONS IN WHICH FIGARO SENSORS ARE USED WILL VARY WITH EACH CUSTOMER'S SPECIFIC APPLICATIONS. FIGARO STRONGLY RECOMMENDS CONSULTING OUR TECHNICAL STAFF BEFORE DEPLOYING FIGARO SENSORS IN YOUR APPLICATION AND, IN PARTICULAR, WHEN CUSTOMER'S TARGET GASES ARE NOT LISTED HEREIN. FIGARO CANNOT ASSUME ANY RESPONSIBILITY FOR ANY USE OF ITS SENSORS IN A PRODUCT OR APPLICATION FOR WHICH SENSOR HAS NOT BEEN SPECIFICALLY TESTED BY FIGARO.

Structure and Dimensions:

um : mm
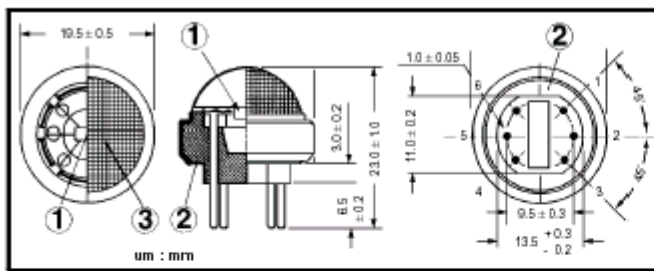
① **Sensing Element:**
Metal oxide is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.

② **Sensor Base:**
Alumina ceramic

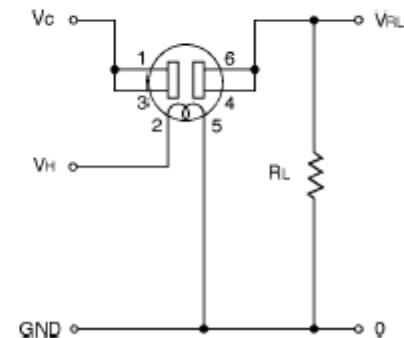③ **Flame Arrestor:**
100 mesh SUS 316 double gauze

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). Since the sensor has a polarity, DC voltage is always required for circuit voltage (a white dot indicates pin 2). When the sensor is connected as shown in the basic circuit, output across the Load Resistor (V_{RL}) increases as the sensor's resistance (R_s) decreases, depending on gas concentration.

Basic Measuring Circuit:

Pin #2 is indicated by a white dot on the sensor's base.

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	DC only *PS≤15mW
Load Resistance	R_L	Variable	*PS≤15mW

Electrical Characteristics:

Item	Symbol	Condition	Specification
Sensor Resistance	R_s	Ammonia at 50ppm/Air	20kΩ ~ 100kΩ
Change Ratio of Sensor Resistance	R_s/R_o	$\dfrac{R_s \text{ (Ammonia at 150ppm/air)}}{R_s \text{ (Ammonia at 50ppm/air)}}$	0.4 ~ 0.70
Heater Resistance	R_H	Room temperature	30.0 ± 3.0Ω
Heater Power Consumption	P_H	V_H=5.0V	833mW
Cross Sensitivity		$\dfrac{R_s \text{ (H}_2 \text{ at 50ppm)}}{R_s \text{ (NH}_3 \text{ at 50ppm)}}$	≥ 1.0

Standard Test Conditions:

TGS 826 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 = 5.0±0.1V (DC),
V_H = 5.0±0.1V (DC),
R_L = 33.0kΩ±1%

Preheating period before testing: More than 7 days

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

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

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

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

Special Note: A more narrowly defined range of Rs or Rs/Ro will be indicated on each production lot. Preselected ranges of Rs or Rs/Ro are not available.