

TGS816 A Sensor Used to Detect Flammable Gases

characteristic : _____

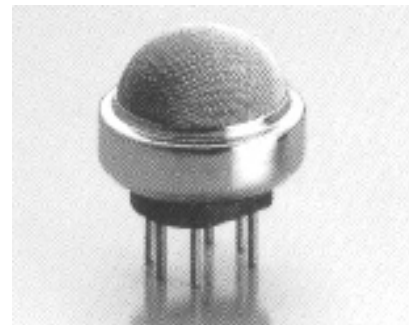
- * Sensitive to a wide range of flammable gases
- High sensitivity to methane, propane and butane
- :: Long service life and low cost
- * Ceramic base can be used in harsh environment

apply : _____

- * Industrial gas leakage and alarm
- Portable gas detector

The Faguo sensor's sensitive element is constructed from tin dioxide (SnO_2) semiconductor. In clean air, it exhibits low conductivity. When the detection gas is present in the air, the gas concentration increases proportionally with the sensor's conductivity. A simple circuitry converts these conductivity changes into corresponding signal outputs that directly indicate the gas concentration.

The TGS816 gas sensor not only detects multiple combustible gases but also features a ceramic base designed to withstand 200°C temperatures. With exceptional sensitivity for methane, propane, and butane, it stands as the ideal solution for monitoring liquefied natural gas (LNG) and liquefied petroleum gas (LPG). Its versatility across various applications, combined with outstanding sensitivity to multiple gases, makes this sensor both cost-effective and a high-performance choice for diverse industrial scenarios.

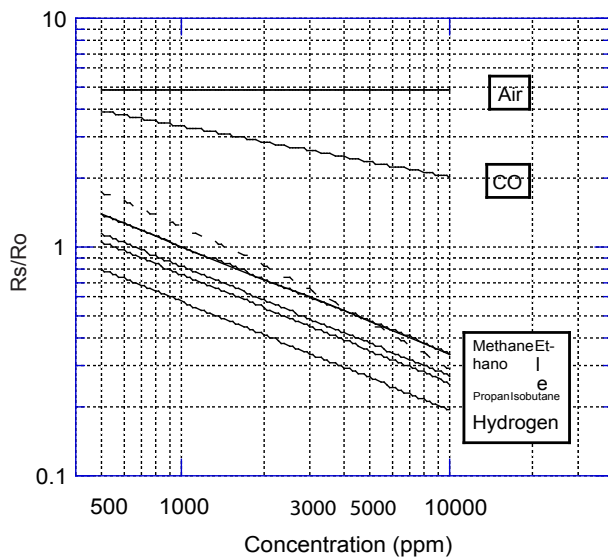


Sensitivity characteristics: _____

The representative sensitivity characteristic curve is shown in the figure below under standard test conditions (see back).

The vertical axis indicates the ratio of sensor resistance R_s / R_o , where R_s and R_o are defined as follows: R_s = the resistance value of the sensor in various concentrations of gas

R_o = Sensor resistance value in 1000ppm methane



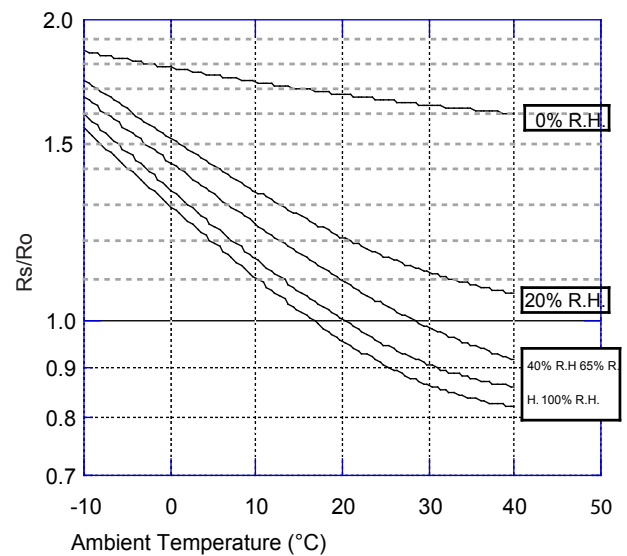
Temperature and humidity characteristics: _____

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

The vertical axis shows the sensor resistance ratio R_s / R_o , where R_s and R_o are defined as follows:

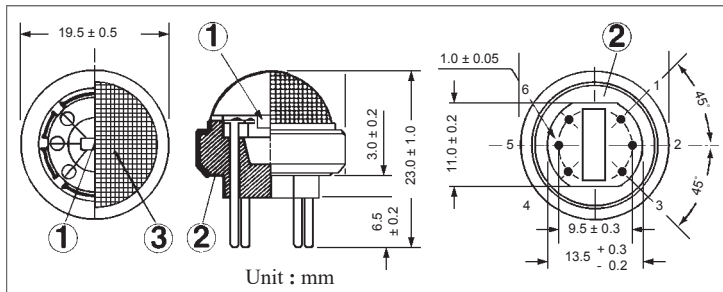
R_s = Resistance value of the sensor at various temperature and humidity containing 1000ppm methane gas

R_o = Resistance of the sensor at 1000ppm methane gas, temperature and humidity 20°C, 65% R.H



Important Notice: The application conditions for Feigaro sensors may vary depending on specific customer requirements. Feigaro strongly recommends consulting our technical team before use, particularly when the detected gas is not listed. Feigaro assumes no liability for any usage that has not undergone professional testing by Feigaro.

Structure and size:



The circuit diagram on the right shows the sensor's symbol code, and the structure above and the size diagram show the sensor's pin numbers.

As shown in the figure, when the sensor is connected to the base circuit, the rise of the load output voltage (V_{RL}) and the fall of the sensor resistance (R_s) will depend on the detection concentration of the object gas.

Standard circuit conditions:

| project | symbol | rating | remarks |
|-----------------|--------|----------------|-------------------------|
| loop voltage | V_H | $5.0 \pm 0.2V$ | AC perhaps DC |
| circuit voltage | V_C | Max 24V | Only DC P s $\leq 15mW$ |
| load resistance | R_L | variable | $0.45k\Omega$ min. |

electrical character :

| project | symbol | condition | specifications |
|---|-----------|---|---------------------------|
| Sensor resistor | R_s | Methane 1000ppm | $5k\Omega \sim 15k\Omega$ |
| The rate of change of the sensor resistance | R_s/R_0 | $\frac{R_s(\text{methane } 3000\text{ppm/air})}{R_s(\text{methane } 1000\text{ppm/air})}$ | 0.60 ± 0.05 |
| Heating element resistance | R_H | room temperature | $30.0 \pm 3.0\Omega$ |
| Heater power consumption | P_H | $V_H=5.0V$ | 835mW (typical) |

standard test conditions :

When tested under the standard conditions specified below, TGS816 must comply with the electrical characteristics in the table above.

Test conditions: $20^\circ C \pm 2^\circ C, 65 \pm 5\% R.H$

Circuit condition: $V_C = 10.0 \pm 0.1V$ (AC or DC)

$V_H = 5.0 \pm 0.05V$ (AC or DC)

$R_L = 4.0k\Omega \pm 1\%$ Circuit

condition: more than 7 days

The typical characteristics of the sensor are shown in this product specification. The actual characteristics of the sensor vary depending on the product. Please refer to the specifications for each sensor.

① Detection element:

An oxidation aluminum ceramic tube with a built-in heating wire and a sintered surface

A thick layer of SnO_2 film

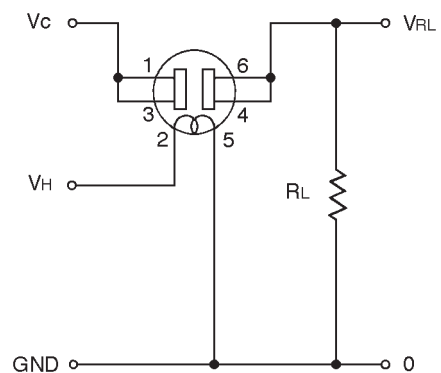
② Sensor substrate:

alumina ceramics

③ back-fire relief valve :

SUS 316 100 mesh double layer wire mesh

Pin and basic test circuit:



The power consumption value (P_s) can be calculated by the following formula:

$$P_s = \frac{(V_C - V_{RL})^2}{R_s}$$

The sensor resistance (R_s) can be calculated from the following formula according to the measured value of V_{OUT} (V_{RL}):

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

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