

TGS 832-F01 - for the detection of Chlorofluorocarbons

Features:

- * High sensitivity to refrigerant gases
- * Improved selectivity
- * Long term stability
- * Uses simple electrical circuit

Applications:

- * Stationary refrigerant leak detectors

The sensing element of Figaro gas sensors is a tin dioxide (SnO₂) 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.

TGS 832-F01 has high sensitivity to commonly used refrigerant gases in air conditioning systems and refrigerators such as R-134a, R-404a, R-407c, and R-410. TGS832-F01 uses filter material in its housing to eliminate the influence of interference gases such as alcohol, resulting in highly selective response to CFC's. This feature makes the sensor ideal for stationary type leakage detectors which require durability and resistance against interference gas.



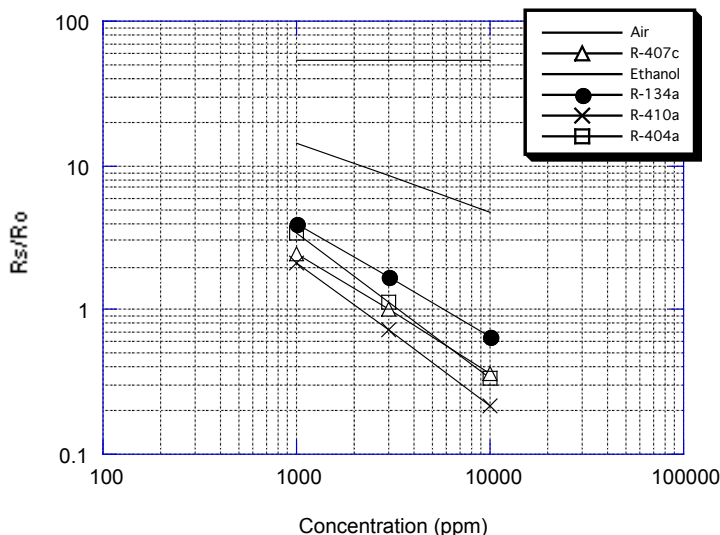
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

- Rs = Sensor resistance of displayed gases at various concentrations
- Ro = Sensor resistance at 3000ppm of R-407c

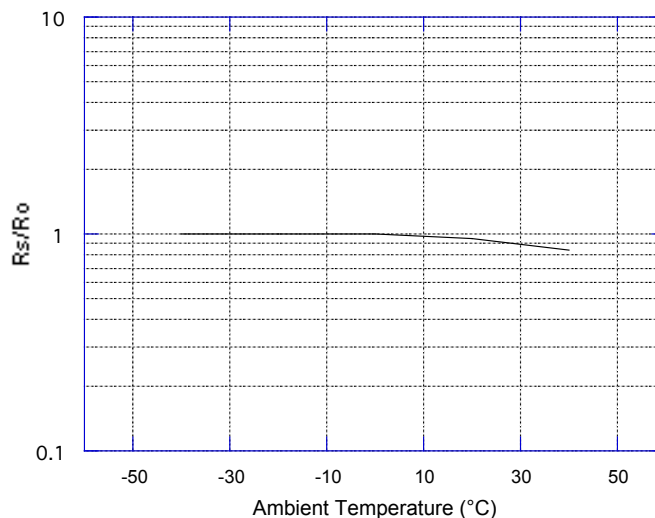
The figure below represents typical temperature dependency characteristics. Again, the Y-axis is indicated as sensor resistance ratio (Rs/Ro), defined as follows:

- Rs = Sensor resistance at 3000ppm of R-407c at various temperatures
- Ro = Sensor resistance at 3000ppm of R-407c at 20°C and 65% R.H.

Sensitivity Characteristics:

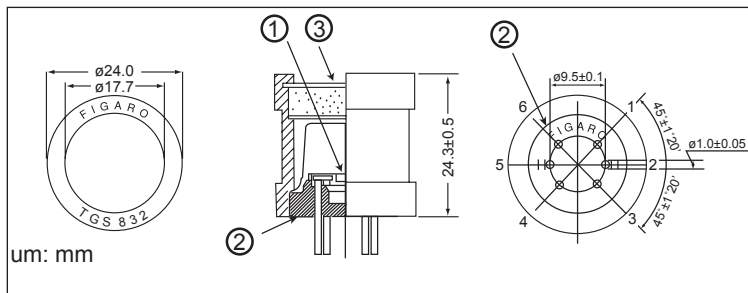


Temperature Dependency:



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:

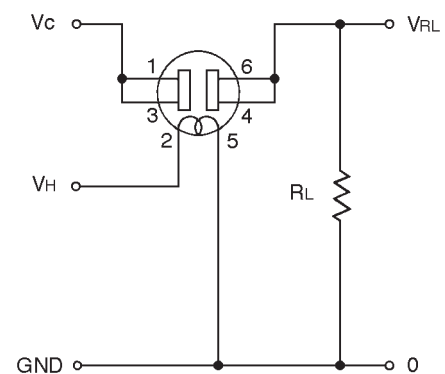


- ① Sensing Element:
SnO₂ is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.
- ② Sensor Base:
Glass fiber reinforced polyamide resin
- ③ Flame Arrester:
100 mesh SUS316 double gauze

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 (R_s) decreases, depending on gas concentration.

Basic Measuring Circuit:



Standard Circuit Conditions:

Item	Symbol	Rated Value	Remarks
Heater voltage	V_H	5.0 ± 0.2V	AC or DC
Circuit voltage	V_C	max. 24V	DC only $P_s \leq 15\text{mW}$
Load Resistance	R_L	variable	0.45kΩ min.

Electrical Characteristics:

Item	Symbol	Condition	Specification
Sensor resistance	R_s	R-407c at 3000ppm/air	0.4kΩ ~ 4kΩ
Change ratio of sensor resistance	R_s/R_o	$\frac{R_s \text{ (R-407c at 3000ppm/air)}}{R_s \text{ (R-407c at 1000ppm/air)}}$	0.3 ~ 0.6
Heater resistance	R_H	Room temperature	30.0 ± 3.0Ω
Heater power consumption	P_H	$V_H=5.0\text{V}$	835mW (typical)

Standard Test Conditions:

TGS 832 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: $V_C = 10.0 \pm 0.1\text{V}$ (AC or DC),
 $V_H = 5.0 \pm 0.05\text{V}$ (AC or DC),
 $R_L = 10.0\text{k}\Omega \pm 1\%$

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:

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

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