

TGS 3830 - for the detection Chlorofluorocarbons (CFCs)

Features:

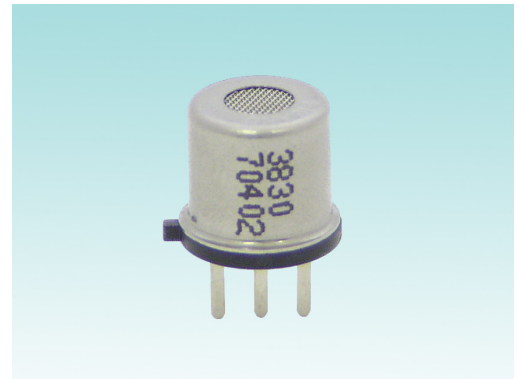
- * Low power consumption
- * High sensitivity to R-134a
- * Quick response to R-134a

Applications:

- * Portable refrigerant leak detector

TGS 3830 is Figaro's new metal oxide semiconductor gas sensor for the detection of Chlorofluorocarbons. The sensing element of the sensor is a tin dioxide (SnO₂) semiconductor which has low 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. Miniaturization of the gas sensing bead results in a heater power consumption of only 120mW.

The TGS3830 has high sensitivity to R-134a, the most promising alternative to R-12, commonly used in air conditioning systems and refrigerators. With its quick response speed, TGS3830 is an excellent, low-cost sensor for portable refrigerant leak detector.



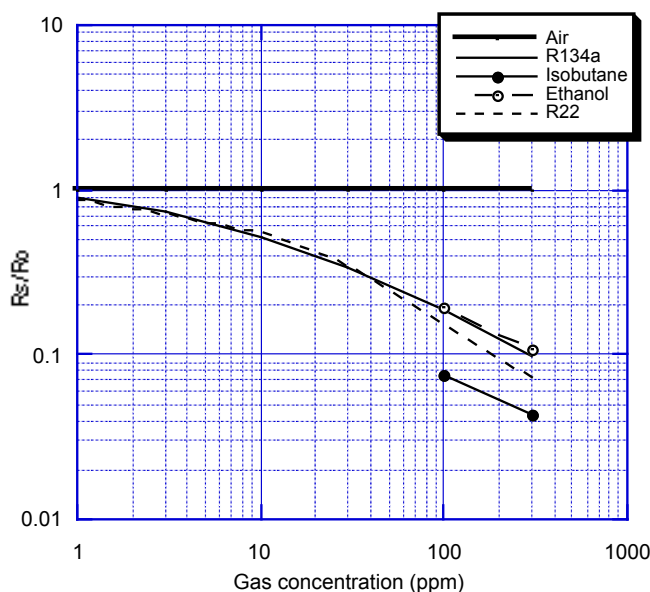
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

- Rs = Sensor resistance in displayed gases at various concentrations
- Ro = Sensor resistance in fresh air

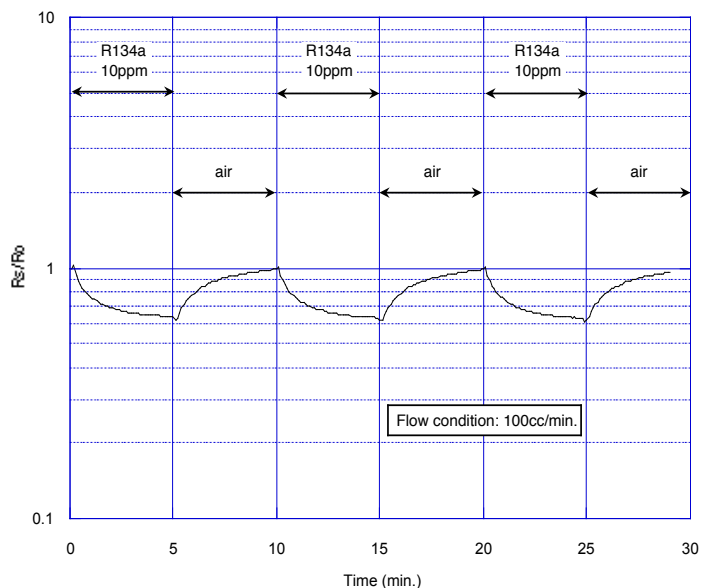
The figure below represents typical gas response and repeatability in flow conditions of 100cc/min.. The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

- Rs = Sensor resistance in displayed gases at various concentrations
- Ro = Sensor resistance in fresh air

Sensitivity Characteristics:



Gas Response and Repeatability:



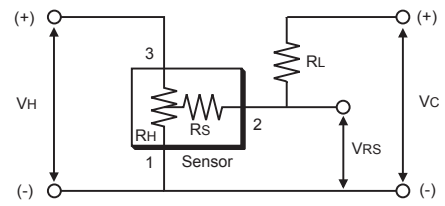
IMPORTANT NOTE: OPERATING CONDITIONS IN WHICH FIGARO SENSORS ARE USED WILL VARY WITH EACH CUSTOMER'S SPECIFIC APPLICATIONS. FIGARO STRONGLY RECOMMENDS CONSULTING OUR TECHNICAL STAFF BEFORE DEPLOYING FIGARO SENSORS IN YOUR APPLICATION AND, IN PARTICULAR, WHEN CUSTOMER'S TARGET GASES ARE NOT LISTED HEREIN. 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.

Basic Measuring Circuit:

The sensor requires two voltage inputs: heater voltage (V_H) and circuit voltage (V_C). The sensor has three pins: Pin #3--heater (+), Pin #2--sensor electrode (+), and Pin #1--common (-). To maintain the sensing element at specific temperatures which are optimal for sensing two different gases, heater

voltage of 0.8V is applied continuously between pins #1 and #3.

Circuit voltage (V_C) is applied between both ends of the sensor (R_S) and a load resistor (R_L), which are connected in series, to allow measurement of voltage (V_{RS}).

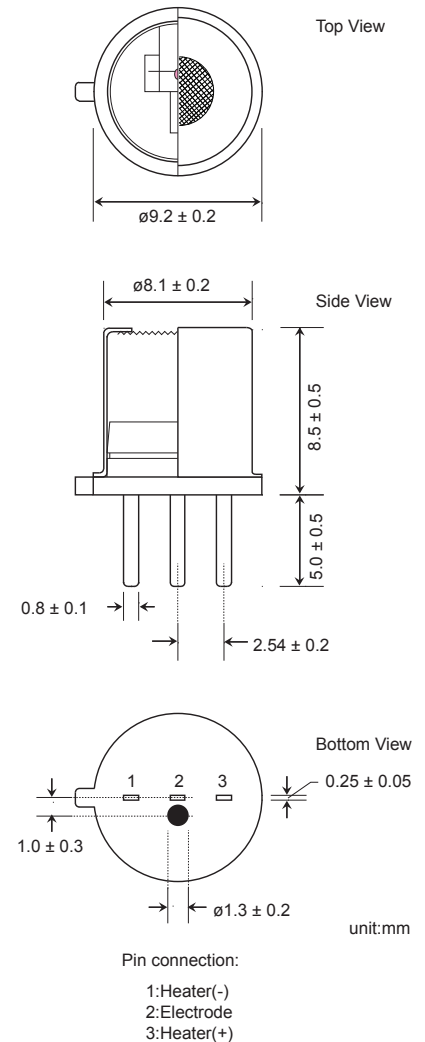


Basic measuring circuit

Specifications:

| | | | |
|---|--------------------------------------|---|---------------------------------------|
| Model number | | TGS3830 | |
| Sensing element type | | Micro-bead | |
| Standard package | | Plastic base and metal can | |
| Target gases | | R-134a | |
| Typical detection range | | 5~100ppm | |
| Standard circuit conditions | Heater voltage | V_H | $V_H = 0.8V \pm 3\%$ |
| | Circuit voltage | V_C | 5.0V DC max. |
| | Load resistance | R_L | variable (10k Ω min.) |
| Electrical characteristics under standard test conditions | Heater resistance | R_H | 3.0 \pm 0.3 Ω at room temp. |
| | Heater power consumption | P_H | approx. 100mW |
| | Sensor resistance | R_S | 10~640k Ω in air |
| | Sensitivity (change ratio of R_S) | ≤ 0.85 | $\frac{R_S (10ppm R134a)}{R_S (air)}$ |
| Standard test conditions | Test gas conditions | Target gas in air at 20 \pm 2 $^{\circ}$ C, 65 \pm 5%RH | |
| | Circuit conditions | $V_H = 0.8V \pm 2\%$ | |
| | Conditioning period before test | 1 hour | |
| Expected lifetime (total operating time) | | 2,000 hours in air | |

Structure and Dimensions:



NOTE: Sensor resistance (R_S) is calculated with a measured value of V_{RS} by using the following formula:

$$R_S = \frac{(V_{RS} - 0.5V_H)}{(V_C - V_{RS})} \times R_L$$

IMPORTANT: This product is not designed and authorized for use as a critical component in life support applications wherein a failure or malfunction of the products may result in injury or threat to life. Figaro Engineering Inc. reserves the right to make changes without notice to this product to improve reliability, functioning or design.

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