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:**
Structure and Dimensions:

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.

Standard Circuit Conditions:

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Rated Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater voltage</td>
<td>$V_H$</td>
<td>5.0±0.2V</td>
<td>AC or DC</td>
</tr>
<tr>
<td>Circuit voltage</td>
<td>$V_C$</td>
<td>max. 24V</td>
<td>DC only $P_s$≤15mW</td>
</tr>
<tr>
<td>Load Resistance</td>
<td>$R_L$</td>
<td>variable</td>
<td>0.45kΩ min.</td>
</tr>
</tbody>
</table>

Electrical Characteristics:

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor resistance</td>
<td>$Rs$</td>
<td>$R$-407c at 3000ppm/air</td>
<td>0.4kΩ ~ 4kΩ</td>
</tr>
<tr>
<td>Change ratio of sensor resistance</td>
<td>$Rs/Ro$</td>
<td>$Rs$ ($R$-407c at 3000ppm/air)</td>
<td>0.3 ~ 0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$Rs$ ($R$-407c at 1000ppm/air)</td>
<td></td>
</tr>
<tr>
<td>Heater resistance</td>
<td>$R_H$</td>
<td>Room temperature</td>
<td>30.0 ± 3.0Ω</td>
</tr>
<tr>
<td>Heater power consumption</td>
<td>$P_H$</td>
<td>$V_H$=5.0V</td>
<td>835mW (typical)</td>
</tr>
</tbody>
</table>

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%RH.
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 ($P_s$) is calculated by the following formula:

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

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