TGS 6812-D00 for the detection of Hydrogen, Methane, and LP Gas

**Features:**
- Linear output
- Long life
- Small sensitivity to organic vapors
- Sensitive to hydrogen, methane, and LP gas

The TGS6812-D00 catalytic type gas sensor can detect levels of hydrogen up to 100% LEL. This sensor features high accuracy, good durability, stability, quick response, and linear output. This sensor can detect not only hydrogen, but also methane and LP gas, thus making it an excellent solution for monitoring gas leakage from stationary fuel cell systems which transform combustible gases into hydrogen.

As the sensor possesses an adsorbent inside its sensor cap, its cross sensitivity to organic vapors is small. In addition, TGS6812-D00 is durable against silicone compounds in harsh environments.

**Applications:**
- Hydrogen and combustible gas leak detectors for fuel cells

**Sensitivity Characteristics:**

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 output sensitivity -- \( \Delta V_{out} \) (mV):
\[
\Delta V_{out} = V_{out} \text{ in gas} - V_{out} \text{ in air}
\]

**Temperature Dependency:**

The figure below represents typical temperature dependency characteristics at 65% RH. Again, Y-axis is indicated as sensor output sensitivity -- \( \Delta V_{out} \) (mV):
\[
\Delta V_{out} = V_{out} \text{ in gas} - V_{out} \text{ in air at 20°C}
\]
**Basic Measuring Circuit:**
The TGS6812 is comprised of two elements: 1) element (D) which is sensitive to combustible gases and 2) a reference element (C) which is not sensitive to combustible gases. These elements are installed into a “Wheatstone Bridge”. A variable resistor should be adjusted so that the bridge will produce a stable baseline signal when in an environment free of combustible gases. When combustible gases are present, they will be combusted on the detecting element, causing its temperature to rise. Accordingly the resistance of this element will increase. This results in an “out-of-balance” signal across the bridge and a corresponding change in output voltage which can be measured.

**Specifications**

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<th>Model number</th>
<th>TGS 6812-D00</th>
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<tr>
<td>Sensing element type</td>
<td>Catalytic</td>
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<tr>
<td>Target gases</td>
<td>Hydrogen, methane, iso-butane</td>
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<tr>
<td>Typical detection range</td>
<td>0~100%LEL of each gas</td>
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<td>Standard circuit conditions</td>
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</tr>
<tr>
<td>Operating voltage</td>
<td>3.0±0.1V AC/DC</td>
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<tr>
<td>Heater current</td>
<td>175mA (typical)</td>
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<tr>
<td>Heater power consumption</td>
<td>525mW (typical)</td>
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<tr>
<td>Zero offset</td>
<td>-15 ~ +55mV</td>
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<tr>
<td>Output sensitivity (ΔVout)</td>
<td></td>
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<tr>
<td>hydrogen</td>
<td>8~16mV in 4000ppm</td>
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<tr>
<td>methane</td>
<td>10~18mV in 5000ppm</td>
</tr>
<tr>
<td>iso-butane</td>
<td>5~11mV in 1800ppm</td>
</tr>
<tr>
<td>Standard test conditions</td>
<td></td>
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<tr>
<td>Test gas conditions</td>
<td>Hydrogen/methane/iso-butane in air at 20±2˚C, 65±5%RH</td>
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<tr>
<td>Circuit conditions</td>
<td>3.0±0.05V AC/DC</td>
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<td>Conditioning period before test</td>
<td>≤30 sec.</td>
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<td>Operating conditions</td>
<td>-10˚C~+70˚C, ≤95%RH (w/o dew condensation)</td>
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<td>Storage conditions</td>
<td>-10˚C~+80˚C, ≤95%RH (w/o dew condensation)</td>
</tr>
</tbody>
</table>

**Structure and Dimensions:**

- **Top view**: Ø12.0±0.2 mm
- **Side view**: Cap (Nylon 66) Ø4.6±0.1 mm, Lead pin 4.6±0.1 mm, Base (Reinforced PBT) 3.6±0.1 mm
- **Bottom view**: Detector side 3.8±0.1 mm, Compensator side 3.8±0.1 mm

**Model number**: TGS 6812-D00
**Sensing element type**: Catalytic
**Target gases**: Hydrogen, methane, iso-butane
**Typical detection range**: 0~100%LEL of each gas

**Standard circuit conditions**
- **Operating voltage**: 3.0±0.1V AC/DC
- **Heater current**: 175mA (typical)
- **Heater power consumption**: 525mW (typical)
- **Zero offset**: -15 ~ +55mV
- **Output sensitivity (ΔVout)**
  - Hydrogen: 8~16mV in 4000ppm
  - Methane: 10~18mV in 5000ppm
  - Iso-butane: 5~11mV in 1800ppm

**Test gas conditions**
- Hydrogen/methane/iso-butane in air at 20±2˚C, 65±5%RH

**Circuit conditions**
- 3.0±0.05V AC/DC

**Conditioning period before test**
- ≤30 sec.

**Operating conditions**
- -10˚C~+70˚C, ≤95%RH (w/o dew condensation)

**Storage conditions**
- -10˚C~+80˚C, ≤95%RH (w/o dew condensation)