Natural Gas Sensor

AS-MLK

Whether for air quality, safety or control, sensor applications have one common requirement: a reliable sensor component. AppliedSensor's ability to micro-machine sensor chips using standard silicon wafer technology allows to produce consistently reliable sensors in high volumes for mass market applications.

Unique micro machined, low power sensor design

AppliedSensor's high-performance ML sensor components offer reduced power consumption and increased packaging flexibility. The sensors are produced by combining the benefits of thick film, thin film and patents pending technologies on silicon substrate. Heater and interdigital electrode structures are positioned on a 1 µm-thin membrane on top of which is deposited a tin dioxide sensitive layer that creates gas concentration-dependent conductivity.

The sensor component has high sensitivity and selectivity to natural gas and is packaged in a standard TO-39 (solid TO-5), 4-pin header. For further cost efficiency, the low heat-generating micro-machined chip may be adhered directly to a printed circuit board (Chip on Board packaging).

In addition to sensor design, AppliedSensor offers complete CH_4 application development including full electronics integration.

Key Benefits

- High sensitivity to CH_4 (0.01 to 4%)
- Low power consumption
- Long lifetime
- Low cross sensitivity
- Long term stability

Typical Applications

- Natural gas monitoring and leakage detection

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Features

Dimensions:

Chip size:	2x2 mm
Including header:	Ø: 10 mm, height: 11 mm

Operational Conditions:

Operation temperature range:	300°C - 350°C
Typical operation temperature:	320°C

Environmental Conditions:

Ambient temperature range:	-40°C - 120°C (lower than op. temp.)
Ambient humidity:	0 - 95% RH

Electrical Characteristics:

Power consumption:	45 mW at 350°C
Typical sensor resistance during operation in air (50% RH):	1 MΩ range
Typical sensor resistance during operation in 0,5% CH_4 (50% RH):	100 kΩ range
Signal output component:	Resistance

Heater:

Typical heater voltage:	~2.7 V for 320°C
Temperature coefficient:	TC≈1700 ppm/K
Typical heater resistance at RT:	95 Ω

Sensing Properties:

Concentration range:	Can withstand 10% CH_4 in air (explosion proof version)
Sensitivity range:	0.01 to 4%
Typical response / recovery time:	Seconds
Expected lifetime:	Years
Cross sensitivity:	Limited cross sensitivity to water

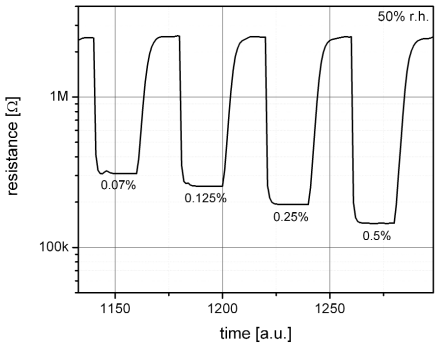
Packaging Options:

Standard TO-39 (solid TO-5) package with protection membrane.
Pre-mould packages.
Chip on board solutions.

Restrictions:

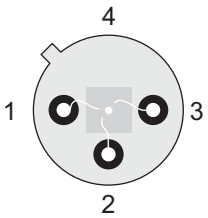
Contact of the sensitive layer with liquids shall be avoided.

Sensor Response



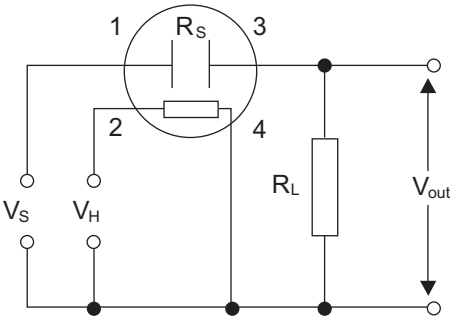
Pin Layout

Top view



pins	function
1	sensor electrode 1
2	heater power
3	sensor electrode 2
4	heater ground

Basic Measuring Circuit



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