

# TGS 1820 - for the detection of Acetone

## Features:

- \* High sensitivity and selectivity to acetone
- \* Low interference from ethanol and hydrogen
- \* Quick response
- \* Compact
- \* Low power consumption

## Applications:

- \* Acetone detectors
- \* Breath acetone testers

**TGS1820** is a hot wire semiconductor type gas sensor. The sensing element consists of a noble metal coil embedded in a small bead of sintered metal oxide semiconductor material. Electrical conductivity change caused by gas adsorption on the MOS material surface can be measured between both ends of the noble metal coil as a change in the combined resistance of the MOS material and the noble metal coil.

TGS1820 has high sensitivity to acetone with small interference from ethanol and hydrogen. This feature makes the sensor ideal for breath acetone analysis.



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 voltage (bridge output) difference  $\Delta V$ , which is defined as follows:

$$\Delta V = V_b (\text{Gas}) - V_b (\text{Air})$$

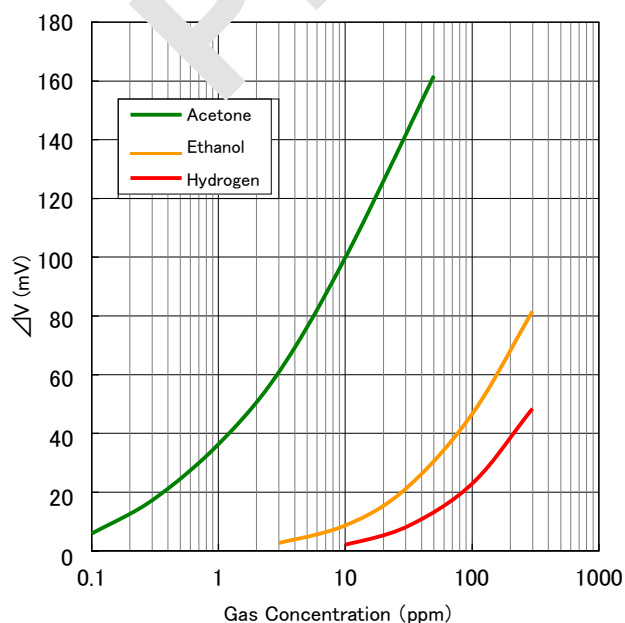
$V_b$  = Sensor output voltage (bridge output)

The figure below represents typical gas response curves. Again, the Y-axis is indicated as sensor output voltage (bridge output) difference  $\Delta V$ , which is defined as follows:

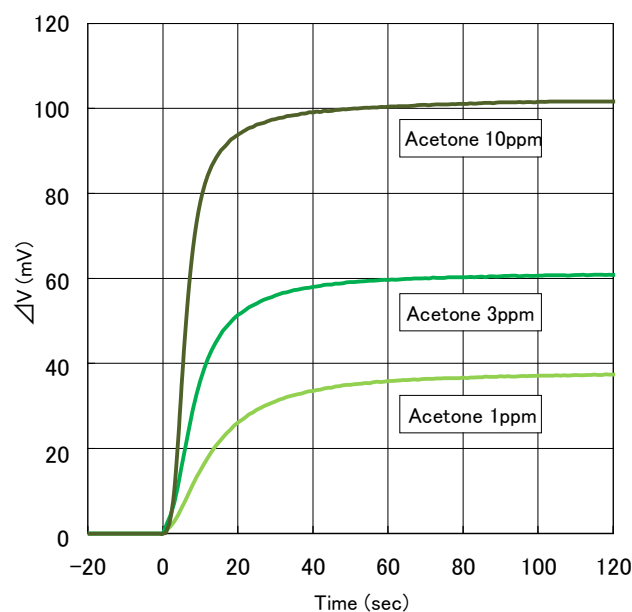
$$\Delta V = V_b (\text{Gas}) - V_b (\text{Air})$$

$V_b$  = Sensor output voltage (bridge output)

## Sensitivity Characteristics:



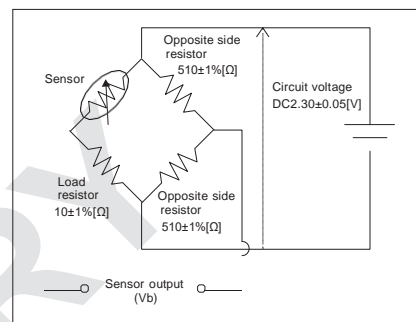
## Gas Response:



**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:

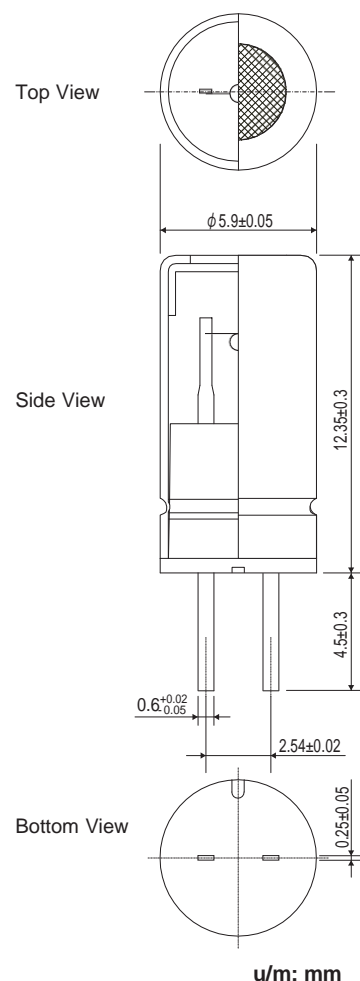
Basic measuring circuit for TGS1820 The bridge output or sensor output is shown in figure on the right. Circuit measured from a Wheatstone bridge voltage is applied between both ends consisting of the sensor, a load resistor of the sensor and a load resistor, which and two opposite side resistors as are connected in series. Appropriate shown in the basic measuring circuit. circuit voltage, which also works as By using a high-resolution voltmeter, heater voltage, and a load resistor of sensor response can also be monitored appropriate value should be determined by measuring voltage changes across in order to maintain the sensing element the load resistor without a Wheatstone at a specific temperature which is optimal bridge circuit. for gas sensing.



### Specifications:

Model number		TGS1820
Sensing principle		Hot wire semiconductor type
Standard package		Plastic base and metal can
Target gases		Acetone
Typical detection range		1 ~ 20ppm
Operating temperature and humidity		0 ~ 40°C, 10 ~ 80%RH
Standard circuit conditions	Circuit voltage	2.30±0.05V DC
	Load resistance	10Ω ±1%
	Opposite side resistance	510Ω ±1% (variable)
Electrical characteristics under standard test conditions	Power consumption	125mW
	Sensor current	≤ 85mA
	Sensor output Vb (Air)	-370 ~ -290mV
	ΔV (1ppm Acetone)	20 ~ 60mV
	Sensitivity to Acetone	1.4 ~ 2.5 $\frac{\Delta V(3\text{ppm Acetone})}{\Delta V(1\text{ppm Acetone})}$
	Ethanol interference	≤ 1.0 $\frac{\Delta V(10\text{ppm Ethanol})}{\Delta V(1\text{ppm Acetone})}$
	Hydrogen interference	≤ 1.0 $\frac{\Delta V(10\text{ppm H}_2)}{\Delta V(1\text{ppm Acetone})}$
Standard test conditions	Test gas conditions	20±5°C/60±5%RH
	Circuit conditions	Circuit voltage: 2.30±0.05V DC Load resistance: 10Ω ±1% Opposite side resistance: 510Ω±1%
	Preheating period before test	≥ 1 hour
Life expectancy at 20°C/60%RH in normal air		> 2 years

### Structure and Dimensions:



All sensor characteristics shown in this brochure represent typical characteristics. Actual characteristics vary from sensor to sensor. The only characteristics warranted are those in the Specification table above.

REV: 02/21

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