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## Low Power Gas Sensor

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### DATASHEET

#### *Sensor Description :*

The sensor is based on tungsten trioxide nanoparticles, and is composed of two interdigitated combs of silicon substrate with a thin tungsten trioxide nanoparticles deposit.

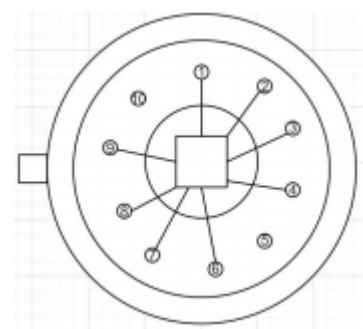
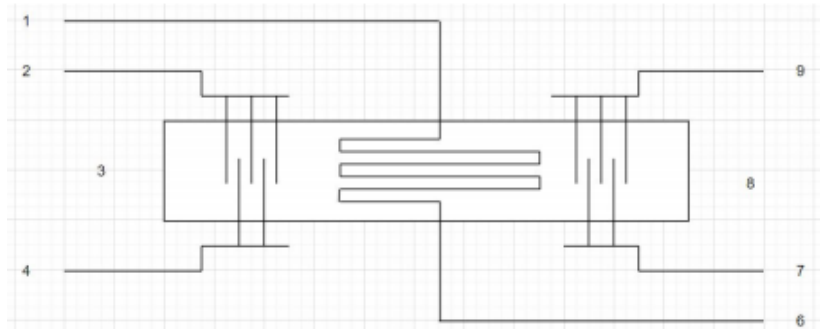
The resistance evolution of the two pins connected to the combs with deposits of WO<sub>3</sub> depends on the nature of the gas and includes a temperature sensor made of an aluminum band. The resistance of the aluminium varies with the temperature of the sensor to capture temperature.

We can mention the heater resistor, which is integrated to heat the sensor. The energy consumption of this sensor depends on how much you want to heat the gas sensor with these two pins. The hotter the sensor is, the lower the noise is and the faster the reaction is, but the power consumption increases.

#### *General Features :*

- . Low Power Consumption,
- . Small Volume,
- . Low Cost,
- . Short to moderate Response Time,
- . NH<sub>3</sub> Detection,
- . C<sub>2</sub>H<sub>6</sub>O Detection,
- . Temperature Sensor and Heater integrated.

### Some Pins Information :



PIN	FUNCTION
Pin N° : 1 and 6	Temperature Sensor
Pin N° : 2 and 4	Gas Sensor
Pin N° : 3 and 8	Heater Resistor
Pin N° : 7 and 9	Gas Sensor
Pin N° : 5	NC
Pin N° : 10	NC

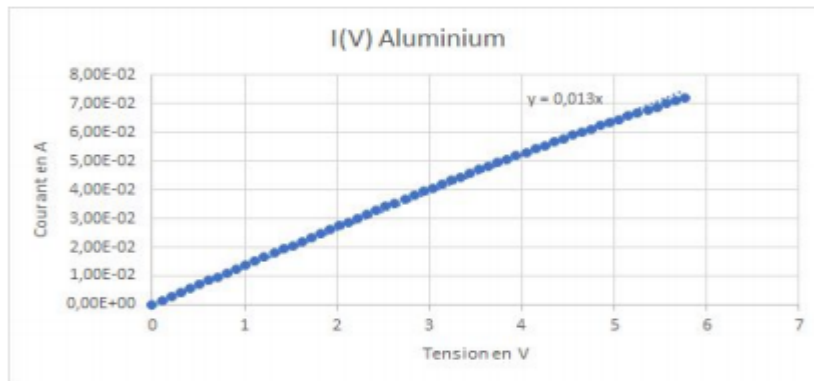
### Specifications :

Type	Active nanoparticle based sensor, external power needed.
Package	10-Lead TO-5 metal
Diameter	9.5mm
Mounting	Through hole fixed.
Measurement Type	Resistive measure for : Gas & Temperature.
Detectable Gaz	Ethanol (C <sub>2</sub> H <sub>6</sub> O).
Time response	Ethanol < 40 s
Standard Use Condition	Temperature : 20+-5 (°C) Humidity : 60+-5 (%) Air Quality : 80/20 (%N <sub>2</sub> /O <sub>2</sub> )

### Electrical Characteristics :

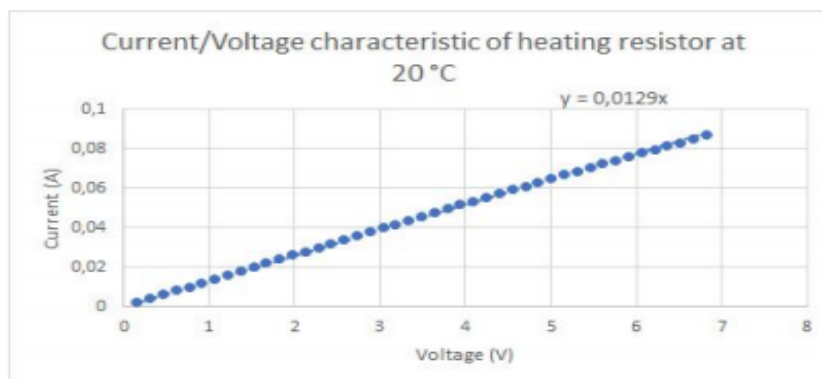
Gas Sensor Voltage	-20 to +20	V
Temperature Sensor Voltage	-15 to +15	V
Heater Voltage	-10 to +10	V

### Temperature Sensor Characteristic :



We can see on this graph that when the current/voltage characteristic of the temperature sensor (aluminium) is at 20 °C, the resistance is 77  $\Omega$ .

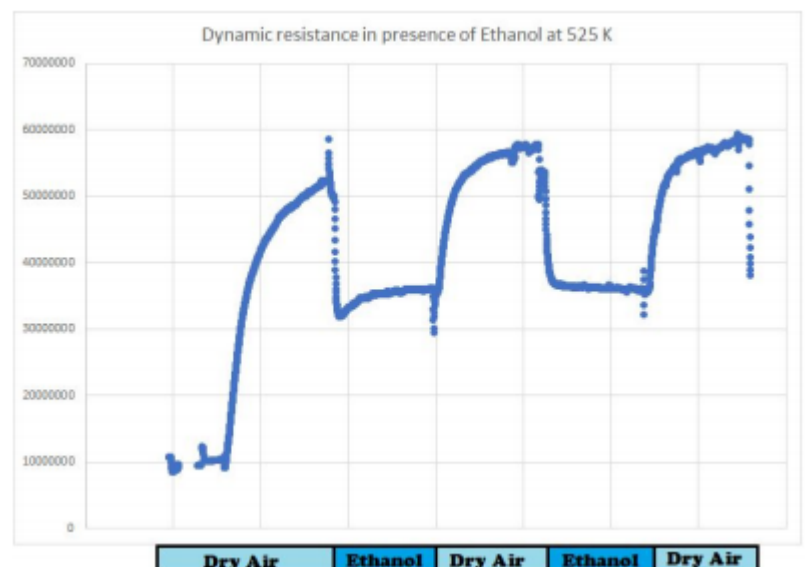
### Heating Resistor Characteristic :



We can see on this graph that when the current/voltage characteristic of the heating resistor (polysilicon) is at 20 °C, the resistance is 77  $\Omega$ .

### Gas Sensor Characteristics :

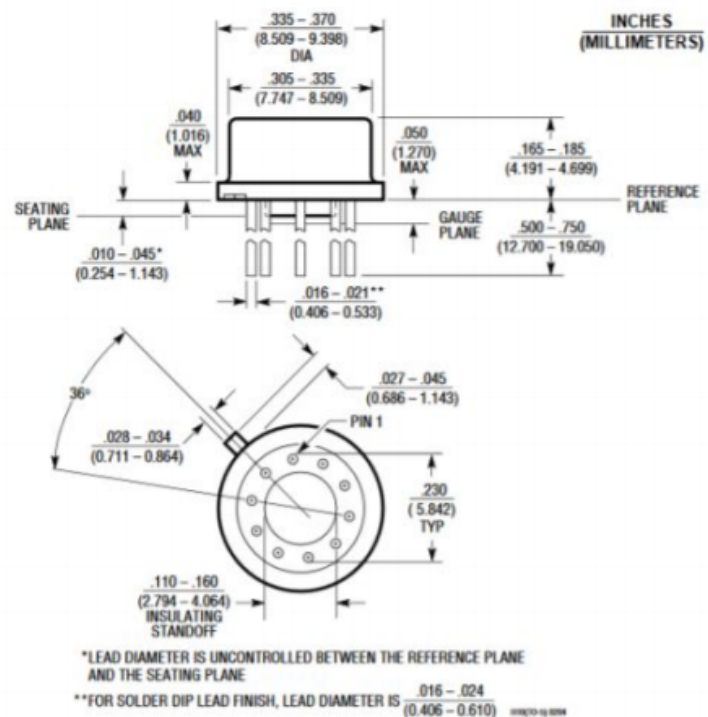
In order to determine the gas sensor characteristic, the resistance evolution is measured in presence of different gases. In the case of a resistance drop, that reveals gas presence and the gap observed is proportional to the concentration. The time response is the parameter



used to determine the nature of the gas.

#### *Dimensions :*

Our package is a 10-Lead TO-5 metal, with the following dimensions.



#### *Typical Applications :*

Above is the typical application of the sensor we built, with an analogical circuit. in order to be able to read the gas value we have to amplify the sensor's output. For the amplification we recommend using the LTC1050 with the analogical system described above. The tension from the ADC\_gas label can be connected to a 5V ADC, like an Arduino. The tension to heat the sensor should be up to 10V during the measurement.

