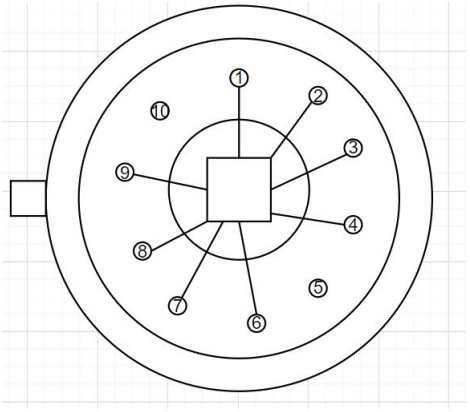
Low Power gas Sensor based on tungsten trioxide nanoparticles

General features

- Low power consumption
- small volume
- low cost
- short to moderate response time
- NH3 detection
- C2H6O detection
- temperature sensor and heater (resistor) included

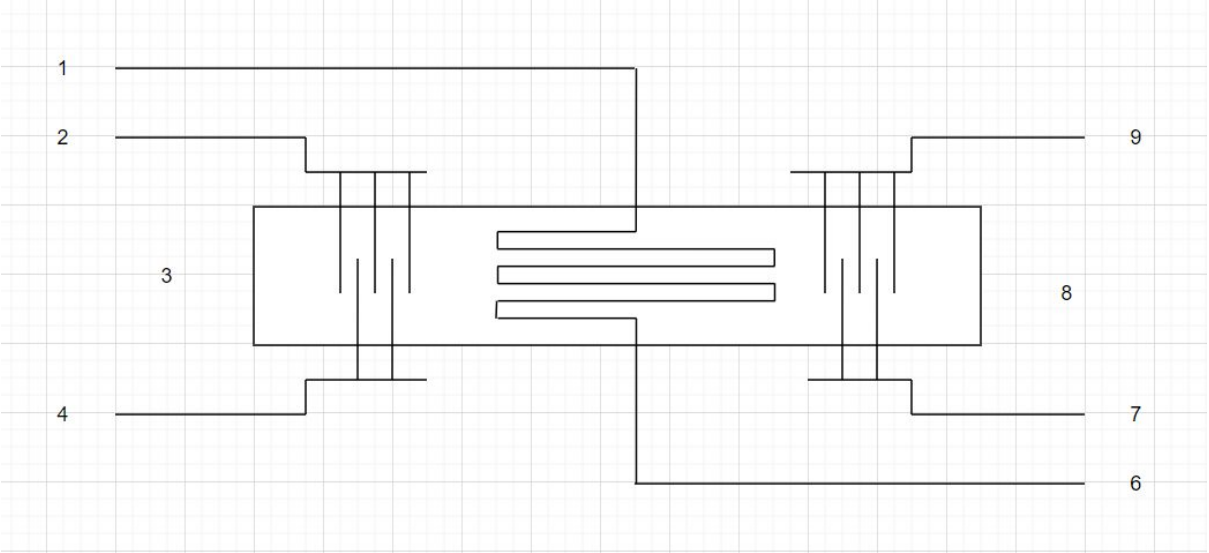
Description

This sensor is based on tungsten trioxide nanoparticles. It is composed of two interdigitated combs of silicon substrate with a thin tungsten trioxide nanoparticles (WO3) deposit. The resistance evolution of the two pins connected to the combs with deposits of WO3 depends on the nature of the gaz. There is also a temperature sensor made of an aluminum band : the resistance of the aluminium depends on the temperature of the sensor so it is possible to determine the temperature of the sensor. Eventually, there is a heater resistor to heater the sensor, get rid of un. 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, the lower the noise and the faster the reaction, but the higher the power consumption.

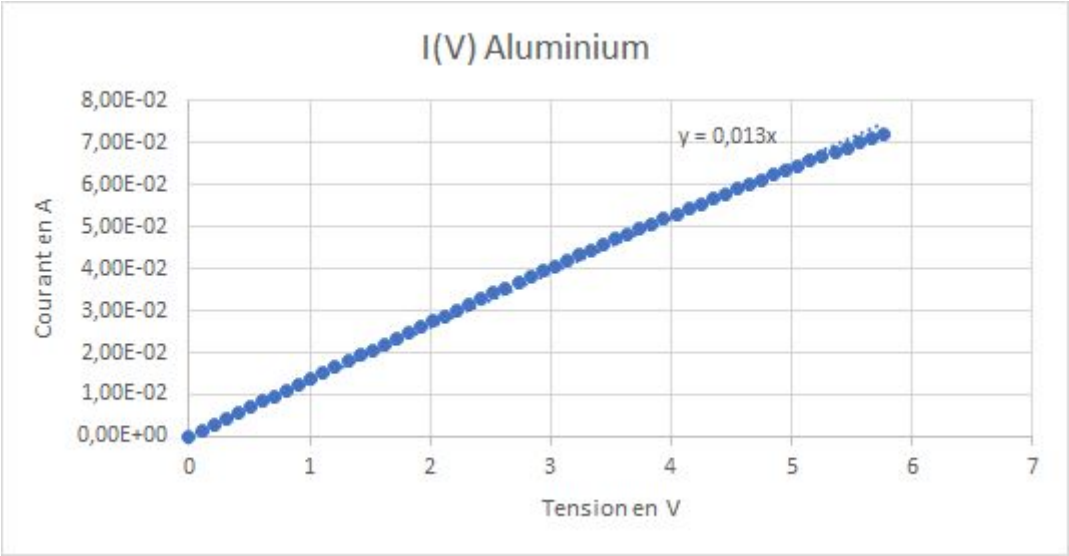


Pin number	Usage
1 & 6	Temperature sensor (aluminium resistor)
2 & 4	Gas sensor
3 & 8	Heater resistor (polysilicon resistor)

7 & 9	Gas sensor
5	X
10	X



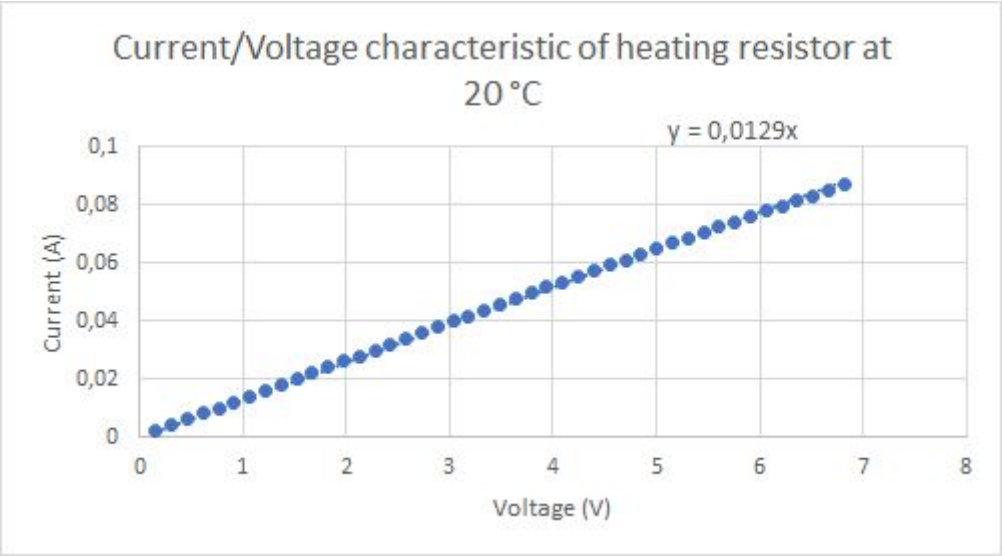
Temperature sensor characteristic



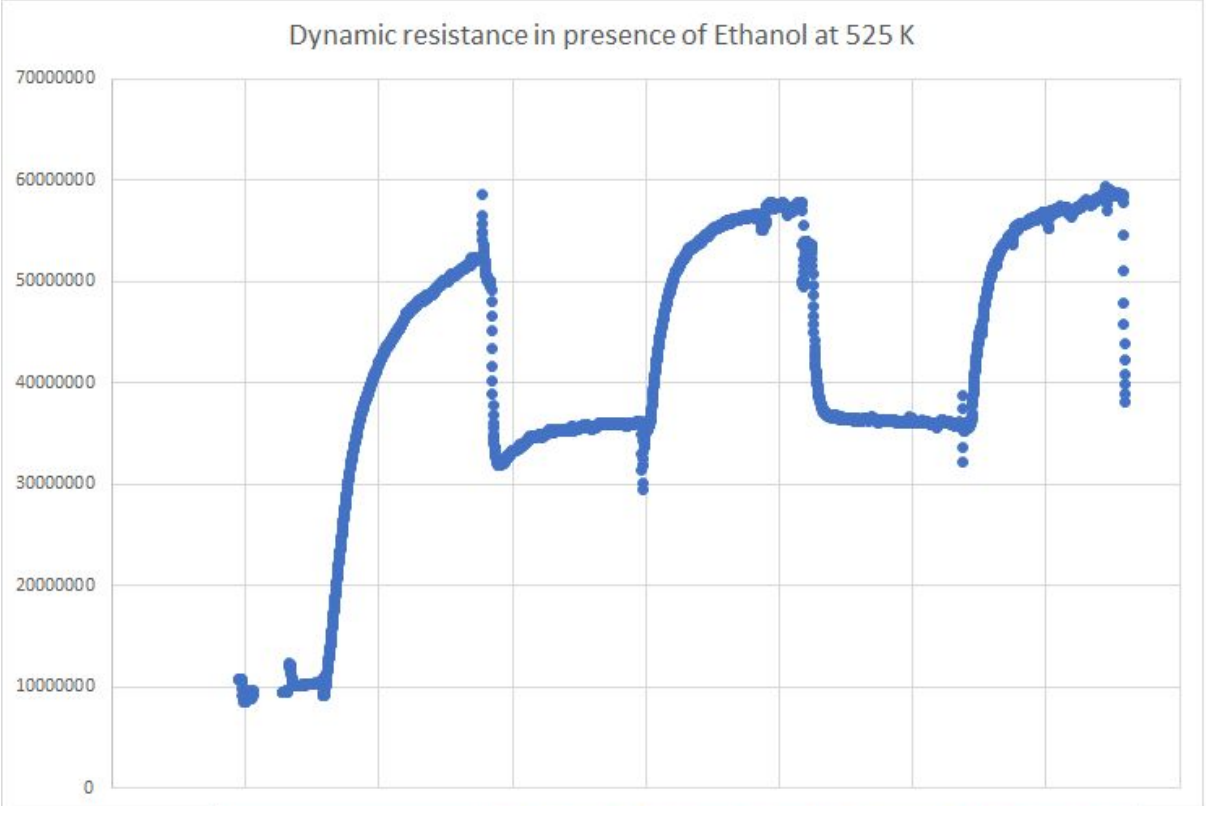
Details

Electrical characteristics

Heating resistor characteristics



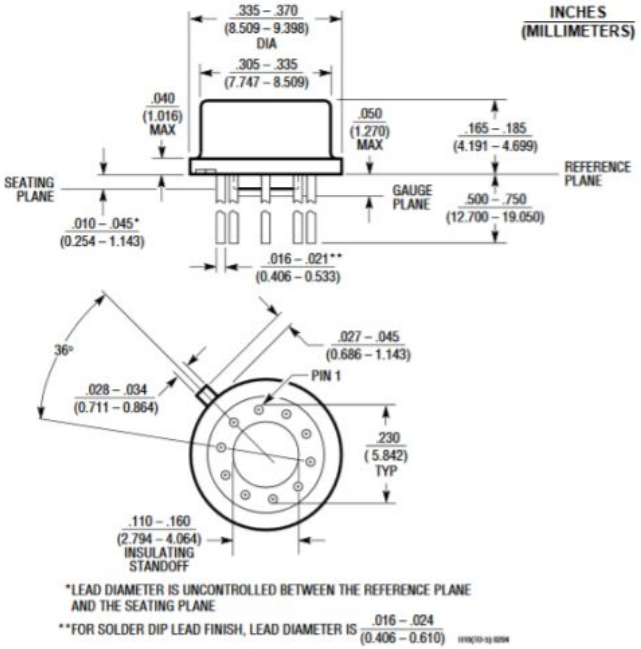
Gas sensor characteristics



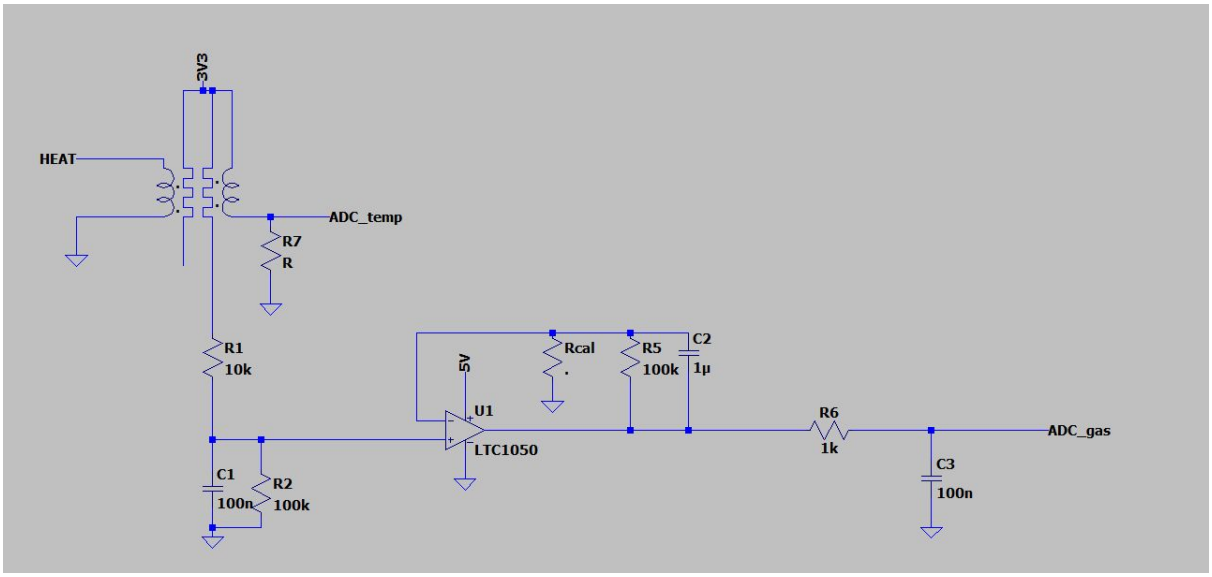
In order to determine the gas sensor characteristic, the resistance evolution is measured in presence of different gases. In the case of a resistance drop, that reveals gas presence and the gap observed is proportional to the concentration. The time response is the parameter used to determine the nature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