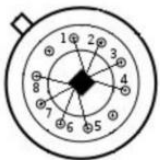
Technical Data: Gas Sensor based on nanoparticles of trioxide of Tungsten (WO_3)

Features:	**Description:**
▪ Stable and long life ▪ Easy to use ▪ Low cost ▪ Low consummation ▪ Compact **Application:** ▪ Gaz detection: NO_2, CO, H_2, CH_4 ect ▪ Heating resister integrated ▪ Heater sensor integrated	Developed of the student of INSA Toulouse in the PTP ISS (Innovative Smart System) at the AIME (Atelier Interuniversitaire de micro-nano Electronique). The sensor is based on the last new technology: on a base of Silicon (Si) and its nanoparticles of WO_3. This sensor has two gas sensor and a heating resistor.

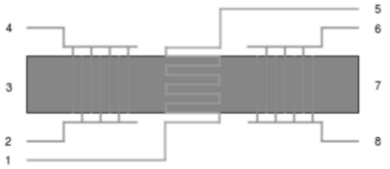
Specification:

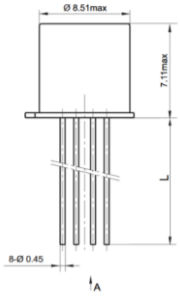
Model		N°D
Type		Semi-conductor
Composition		◈ Silicon ◈ Doped Polysilicon ◈ Aluminum ◈ Trioxide of Tungsten nanoparticles
Box		TO-5 with 10 pins
Montage type		
Gaz detected		◉ NO_2 ◉ CO ◉ H_2 ◉ CH_4
Measure precision		>1ppm
VCircuit	Gaz sensor Voltage	-20 to 20V
	Heating sensor Voltage	-15 to 15V
	Heating resistor Voltage	-10 to 10 V
Characteristics	Gaz sensor resistance	1 to 20 Ω
	Heating sensor resistance	NC
	Heating resistor	130 Ω
Test conditions	Air quality	Normal atmosphere
	Heater	19 ± 2 ℃
	Humidity	65 ± 5 %

Structure and Configuration:

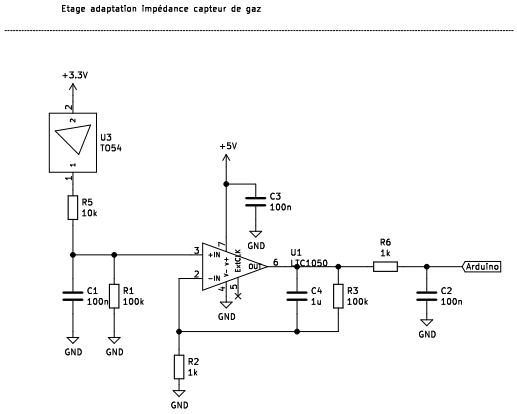


PIN	Connection
1-5	Heating sensor (Aluminum resistor)
2-4	Gas sensor 1 (WO_3 nanoparticules)
3-7	Heating resistor
6-8	Gas sensor 2 (not working on this model)





Typical application:



Here is an example of an utilization of this sensor with an Arduino.
Between the sensor and the Arduino there is an amplification stage which amplificated the current and transform it to a voltage. This voltage is proportional to resistance of gas sensor (U3 TO54) and will be read by the Arduino.

Electrical characteristics

FIGURE 1: CHARACTERISTIC OF THE CURRENT/VOLTAGE OF THE GAS SENSOR

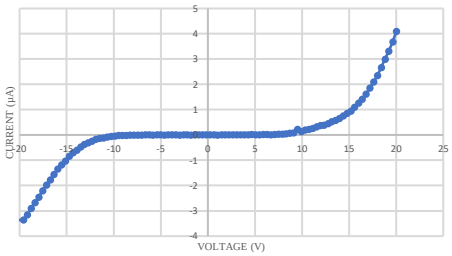


FIGURE 2: NOISE OF THE GAS SENSOR

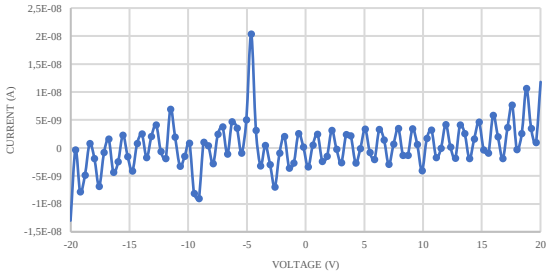


FIGURE 3: EVOLUTION OF THE GAS SENSOR RESISTOR WITH CH4 AT 220°C

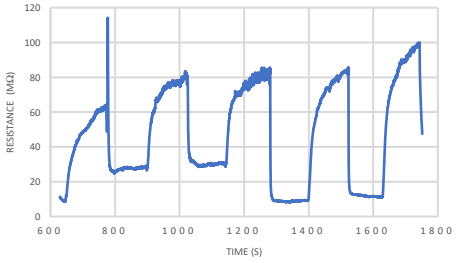


FIGURE 4: EVOLUTION OF THE GAS SENSOR RESISTOR WITH IC2 AT 180 °C

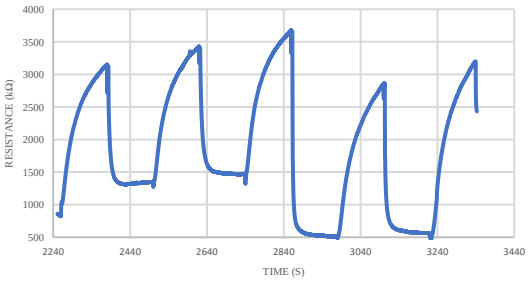
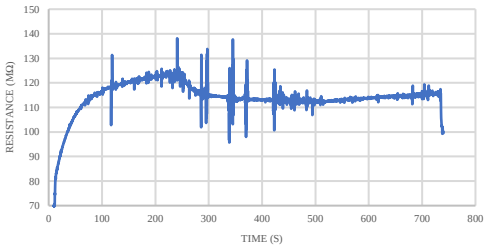


FIGURE 5: EVOLUTION OF THE GAS SENSOR RESISTOR WITH Ic2 AT 5V-5V



All these curves show the influence of a gas on the gas sensor resistivity due to the reaction of the nanoparticles. Moreover, the temperature has an impact on the way the sensor will react to a gas/ We recommend you to wait at least 10 minutes of heating before realizing your experiment.