

Gas sensor based on WO₃ nanoparticles

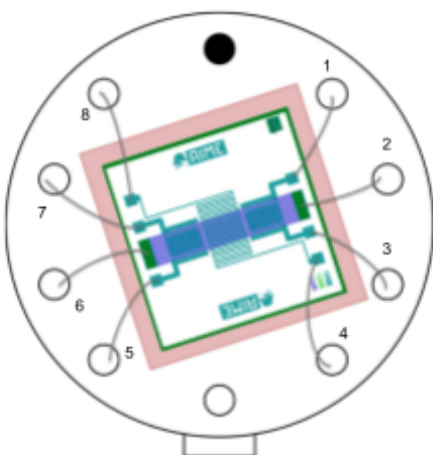
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Developed by INSA Toulouse students during the ISS (Innovative Smart Systems) training in the AIME lab (Atelier Interuniversitaire de Micro-nano Électronique). It allows the detection and monitoring of Ammonia gas, Nitrogen dioxide and Ethanol gas. It is based on tungsten nanoparticles (WO₃), doped polysilicon heater and an aluminium resistor layer. Nanoparticles are deposited on 2 sides of the sensor on an aluminium comb, which conductivity will vary depending on the amount of gas present, allowing a precise measure.

Features

- Detection of Ammonia gas
- Detection of Nitrogen dioxide
- Detection of Ethanol gas
- Low cost
- Low energy consumption
- Temperature sensor (aluminium)
- Heater resistance (polysilicon)
- Double sensors

Pins

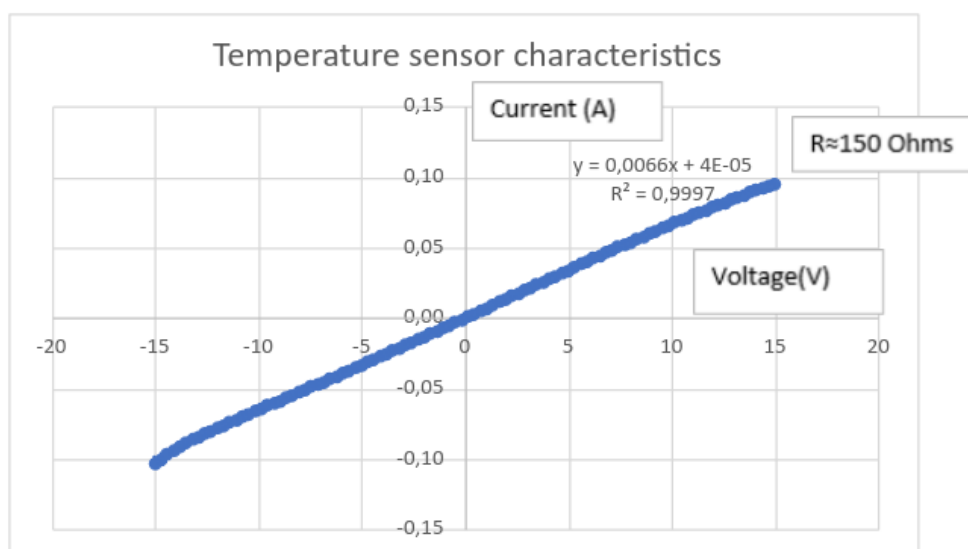


Pin	Usage
1 - 3	Gas sensor 1 (WO ₃ nanoparticles integrated on an aluminium interdigital combs)
5 - 7	Gas sensor 2 (WO ₃ nanoparticles integrated on an aluminium interdigital combs)
2 - 6	Heater resistor (Polysilicon resistor)
4 - 8	Temperature sensor (Aluminium resistor)

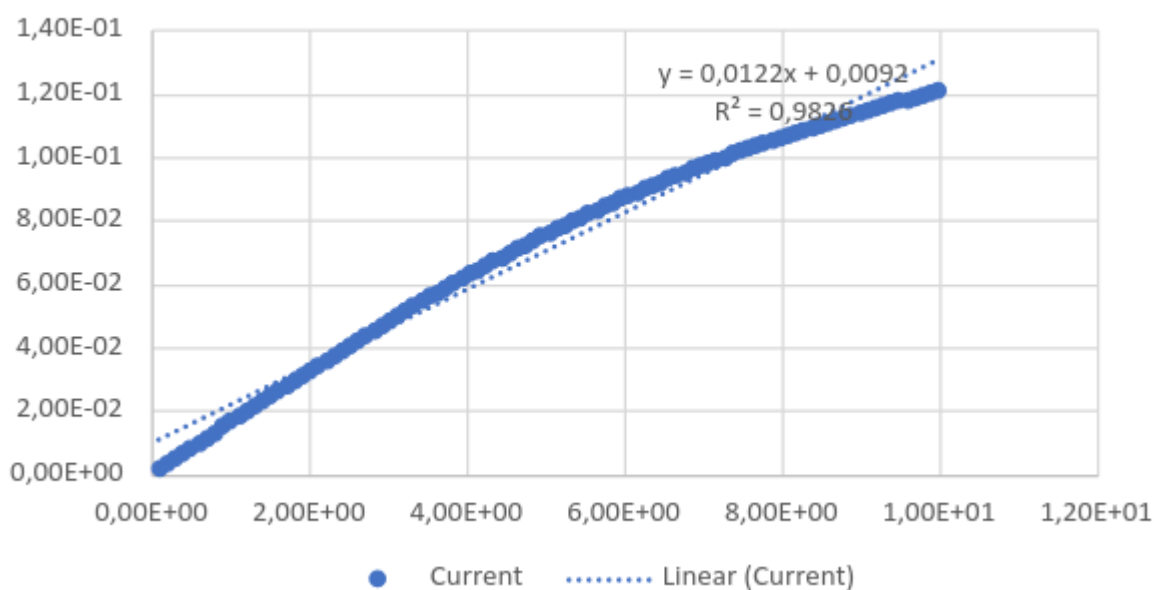
Specifications

Type	Nanoparticles based sensor
Materials	<ul style="list-style-type: none"> • Silicon • Doped polysilicon • Aluminium • WO₃ nanoparticles
Sensor Type	Active
Temperature and gas measurement	Resistive measure
Detectable gases	<ul style="list-style-type: none"> • Ammonia • Nitrogen • Ethanol
Package	10-Lead TO-5 metal
Diameter	9.5mm
Height	25mm
Mounting	Through Holes Fixed
Time response	<ul style="list-style-type: none"> • Ethanol <30s • Ammonia <15s

Electrical Characteristics

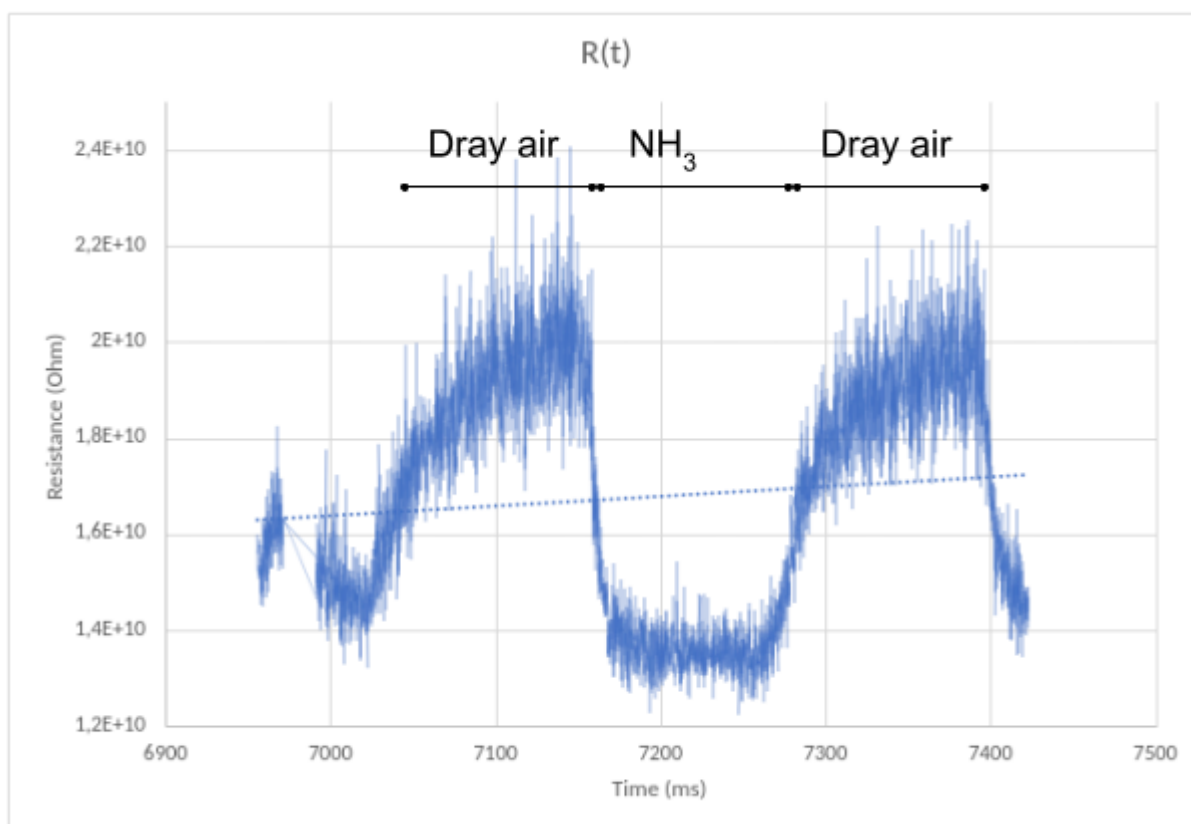


Heater characteristics



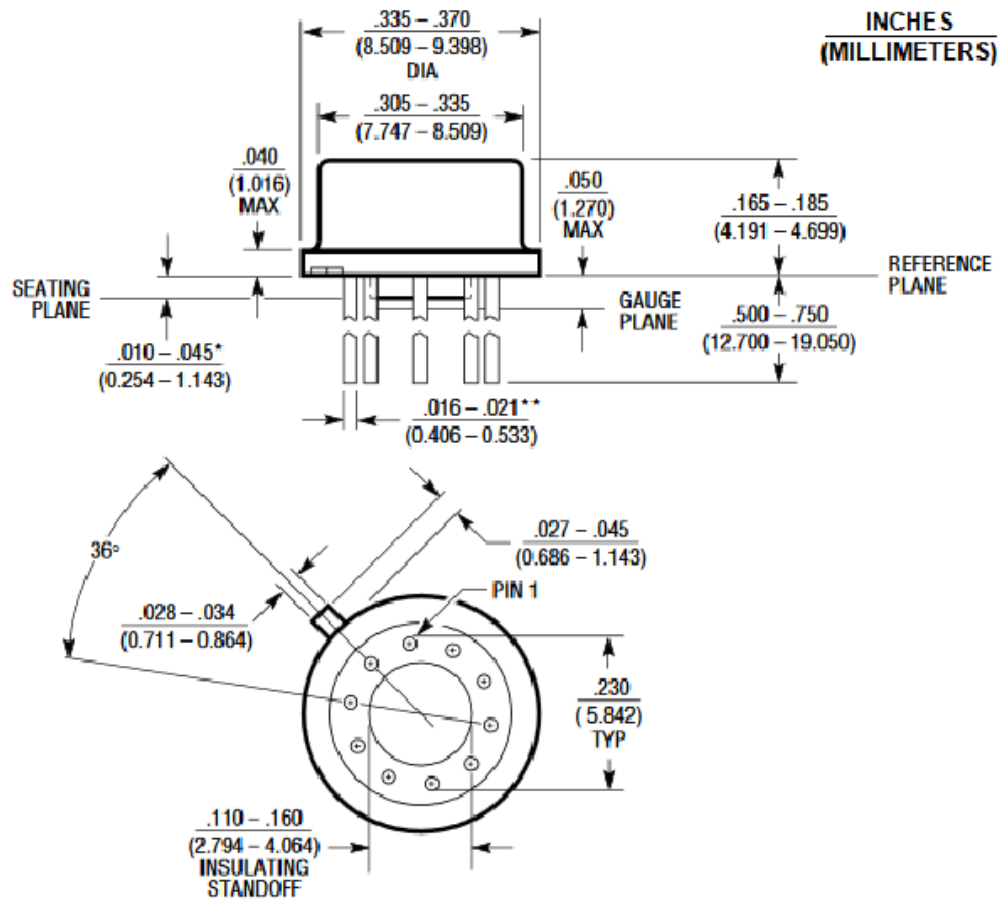
	Unit	Value		
		Min	Typical	Average
Gas sensor resistance	GΩ	0.01	1	100
Temperature sensor resistance	Ω	145	150	-
Heater resistance	Ω	61	70	-
Gas sensor voltage	V	-	3.3	-
Temperature sensor voltage	V	3.3	5	-
Heater voltage	V	10	15	20

Gas Sensor Characteristics



Dimensions

The package is a 10-Lead TO-5 metal:



*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND THE SEATING PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $.016 - .024$ (0.406 - 0.610) 1110(10-5) 0204

Typical Application

