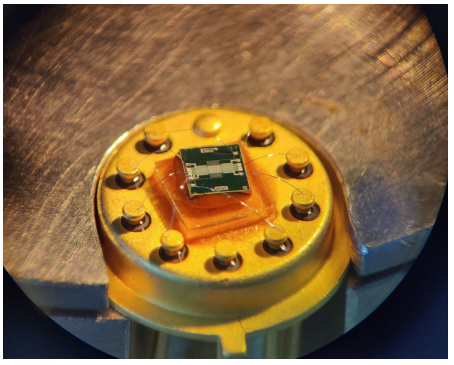
Low Power Gas Sensor based on tungsten trioxide nanoparticles

Features:

- Small in size
- Detection of C2H6O
- Detection of NH3
- Low cost
- Low power consumption
- Short response time



Description

This gas sensor was developed at the multi-university laboratory of micro-nano electronics (AIME). The sensor is based on nanoparticles of tungsten trioxide, which is a metal oxide semiconductor. Two identical sensing elements composed of interdigitated combs of silicon substrate allow accurate gas measurement. A thin layer of tungsten trioxide deposited on the sensing elements form the active component of the sensor. Foreign gases react with the tungsten trioxide, altering the resistivity of the interdigitated combs.

Specifications

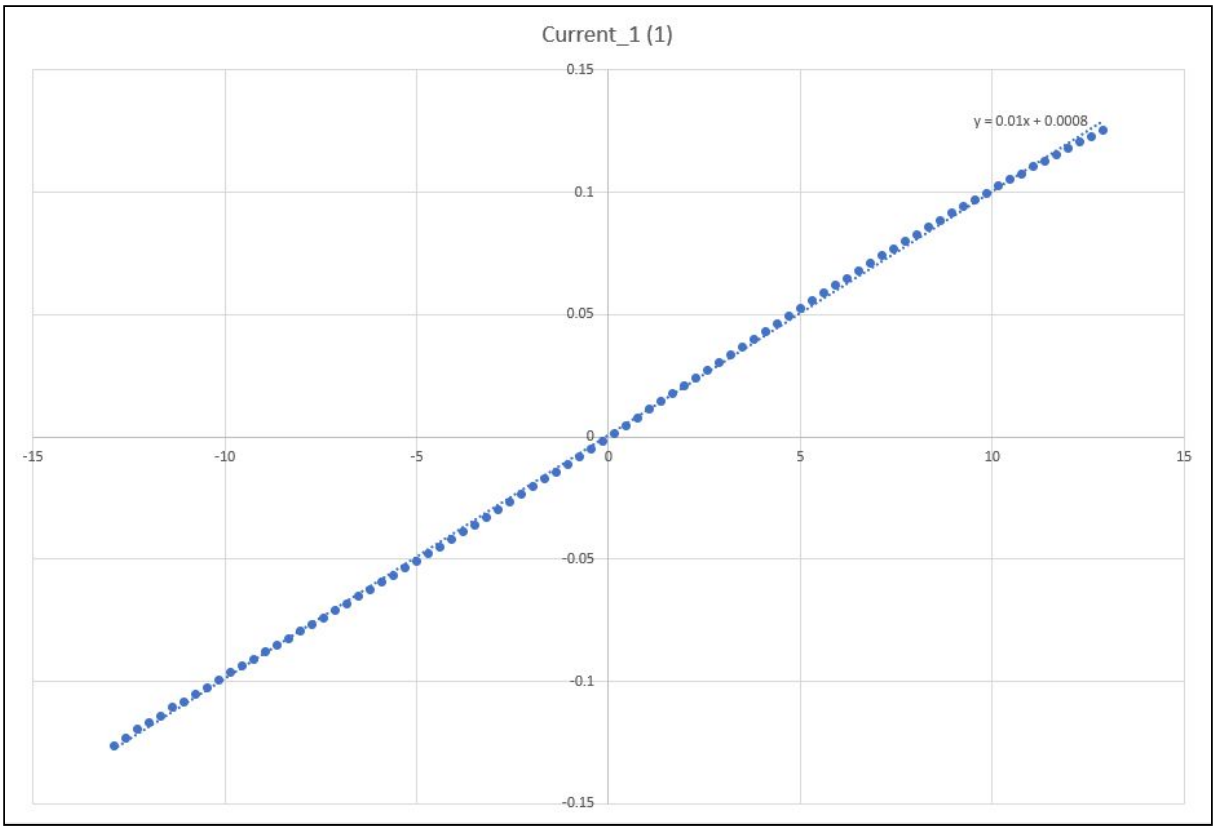
Type	Nanoparticle-based sensor
Materials	• N-doped poly-silicon (heater) • Aluminium (for temperature measurement) • Silicon • Tungsten trioxide nanoparticles
Sensor type	Active (power supply required)
Temperature measurement	Resistive measure
Gas measurement	Resistive measure
Detectable gas	• NH3 • C2H6O
Diameter	9.5mm
Mounting	Through fixed hole
Time response	• Ethanol < 30s • Ammonia < 15s
Package	10-Lead TO-5 metal

Standard use conditions

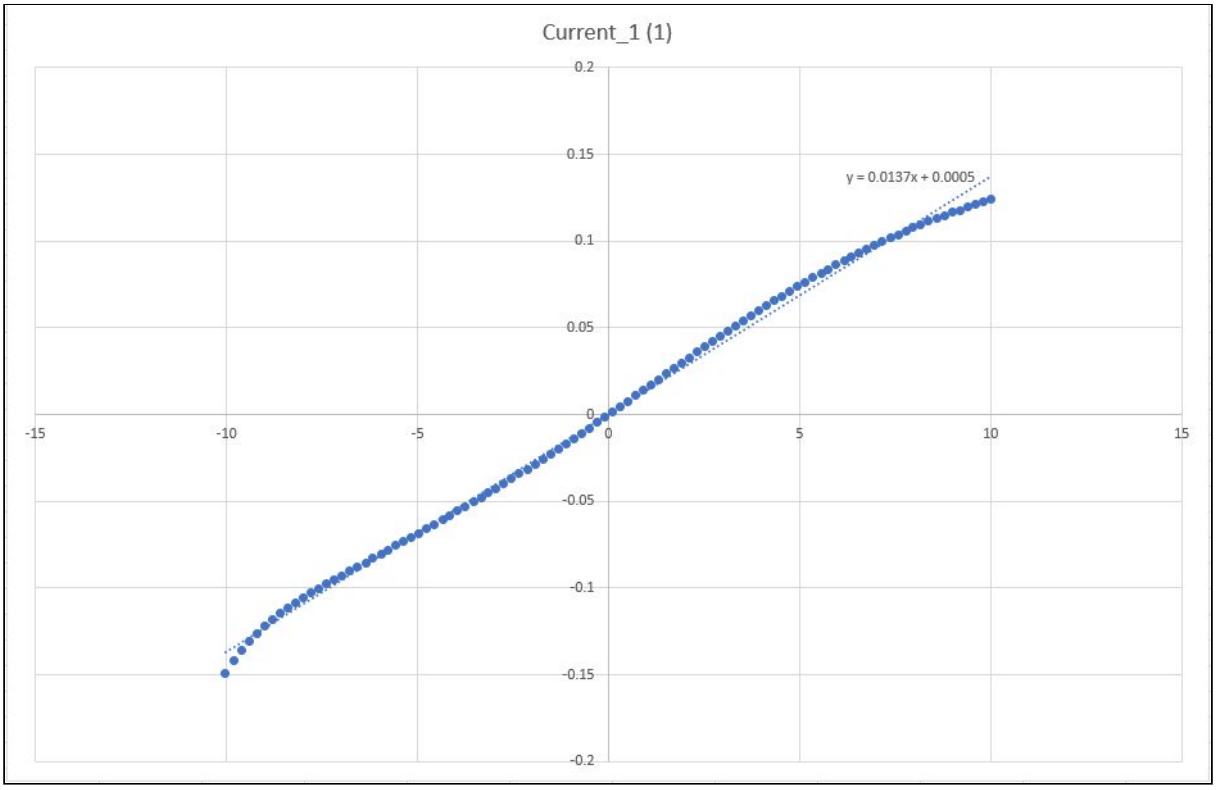
	Unit	Typical value
Temperature	˚C	20±5
Humidity	%	60±5
Air quality	%N2/O2	80/20

Electrical characteristics

	Unit	Value		
		Min	Typical	Max
Gas sensor resistance	MΩ	0,01	1	100
Temperature sensor resistance	Ω	150	151	350
Heater resistance	Ω	67	86	105
Gas sensor voltage	V	-	3,3	-
Temperature sensor	V	3,3	5	-
Heater	V	10	15	20



Current(y) in relation to voltage(x) to determine standard-conditions resistance(slope) in the polymer bar



Current(y) in relation to voltage(x) to determine standard-conditions resistance(slope) in the akuminium resistance

Temperature sensor characteristics
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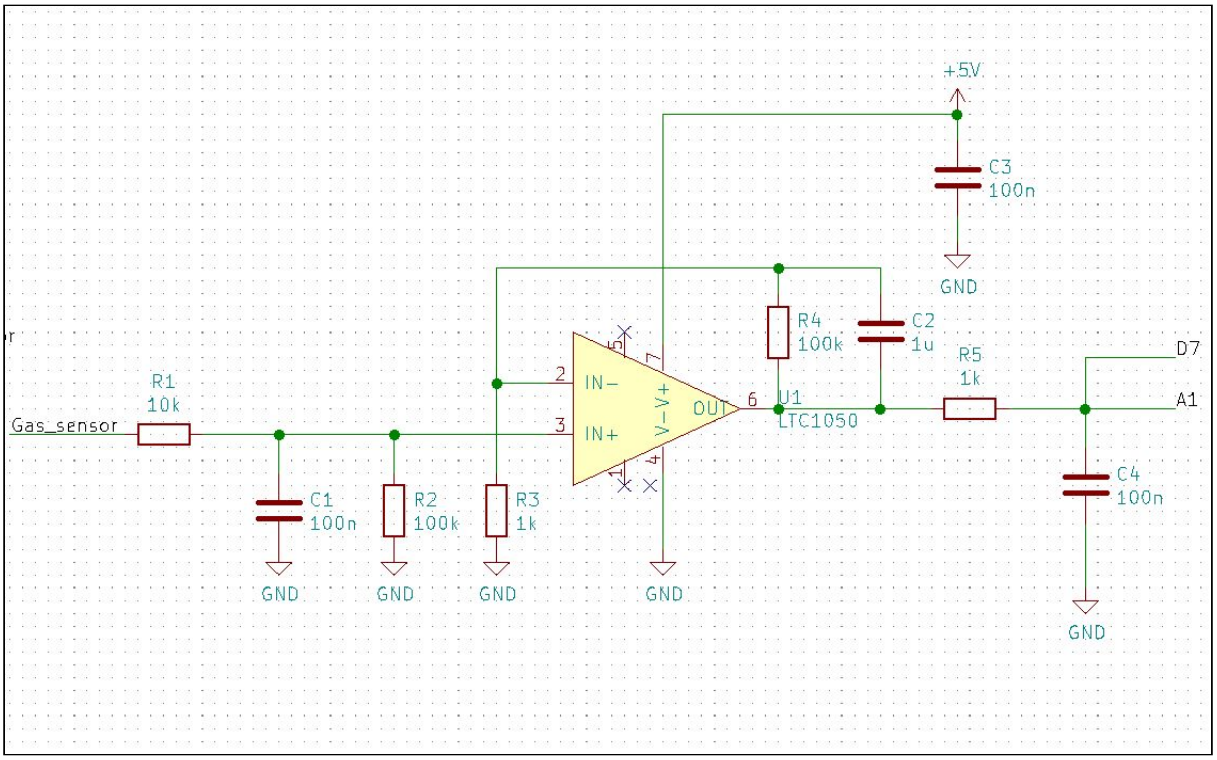
Temperature(°C)	Resistance(Ω)
20	151
150	270
180	283
250	334

Typical Applications



Above is typical application of the sensor in an analogic circuit.