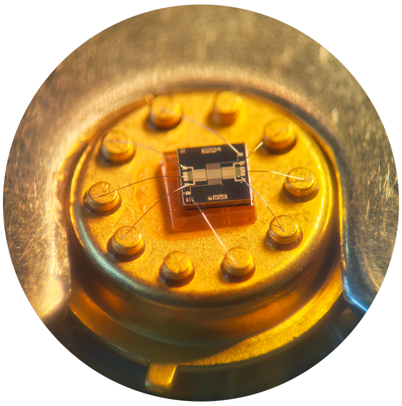
B2MC-FGS-25 Hight sensitivity, multi purposes, smart gas sensor

1 Features

- Nominal input voltage : from 3.3V to 10V
- Sensibility :
- resolution :
- Gas : ethanol, ammonia, CO, etc
- Integrated temperature sensor
- package : TO-5 10



2 Applications

Measuring of dectecting a wide range of gases such as amonia, ethanal, CO, etc. Great sensibility, wide range of detectable gases, cheap hardware to use.

3 Description

The B2MC-FGS-25 is a multi purpose MOx gas sensor based on a tungsten trioxide nanoparticle technology that allow great sensibility to a wide variety of gases including ethanol, water vapor, ammonia and other gas.

It works by measuring the MOx impedance which varies depending on the gas concentration. To work, the MOx element need to be at hight temperature to evaporate water and be more reactive, hence the presence of an polysilicium heating element and a thermistor for feedback. The MOx needs to be regenerated after each measure of a new gas. You can see a proper measuring cycle in the typical characteristics.

4 Technical specification

4.1 Absolute maximum rating

	Min	Max	Unit
$U_{barreau}$ (poly-silicium heating element supply voltage)		10	V
U_{temp} (thermistor voltage)		7	V
T_{MOx} (Metal oxide resistor (Tungsten trioxide) temperature)		300	°C

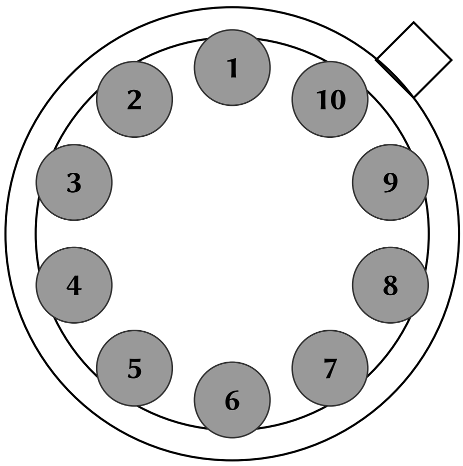
4.2 Electrical Characteristics

All measures have been done in an ambient environment at $T_{ambient} = 21°C$.

Parameter	Test Conditions	Min	Typ.	Max	Unit
Temperature sensor (Aluminium thermistor)					
R_{temp}	$U_{temp} = 10$ V	80	86	94	Ω
S_{temp}	$U_{temp} = 10$ V		1		Ω/°C
Poly-silicium heating element					
R_{poly}	$U_{barreau} = 5$ V	79	87	94	Ω
Tungsten trioxide element (gas sensor)					
R_{gas}	T_{MOx} = 21°C, gas = N2O2 (dry air)	10	16	20	GΩ
$\Delta R/R_0$[1]	T_{MOx} = 277°C, gas = ethanol, $C_{eth} = 1000$ ppm	35	64	237	%
k_{eth}[2]	T_{MOx} = 277°C, gas = ethanol, $C_{eth} = 1000$		0.34		ppm
t_{eth}[3]	T_{MOx} = 277°C, gas = ethanol, $C_{eth} = 1000$ ppm		88		s
S	T_{MOx} = 277°C, gas = ethanol, $C_{eth} = 1000$ ppm		85000		Ω/ppm
S_{lim}[4]	T_{MOx} = 277°C, gas = ethanol, $C_{eth} = 1000$ ppm		38.3		ppm

5 Pinout

Figure 1: TO-5 10 bottom view



[1]Max variation of the MOx resitor over the whole sensor range.
[2]Sensitivity coefficient
[3]Response time to ethanol (10% of the final value)
[4]Sensibility limit, lowest measurable change in gas concentration

Pin	Signal
1	Temp+ (Positive terminal for the internal aluminium termistance)
2	Gas1+ (Positive terminal for the first gas sensor)
3	Barreau+ (Positive terminal for the internal heating element)
4	Gas1- (Negative terminal for the first gas sensor)
5	NC
6	Temp- (Negative terminal for the internal aluminium termistance)
7	Gas2+ (Positive terminal for the second gas sensor)
8	Barreau- (Negative terminal for the internal heating element)
9	Gas2- (Negative terminal for the second gas sensor)
10	NC

6 Typical Characteristics

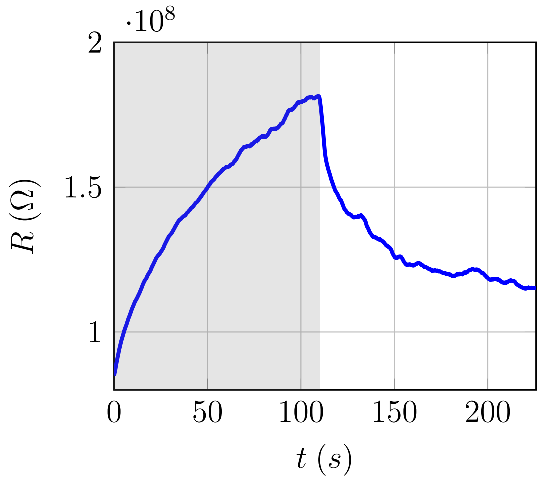


Figure 2: Evolution of the MOx resistance during a regeneration phase (in gray) no gas presence, and a detection phase. ($T_{MOx} = 277$°C, gas = ethanol vapor.)

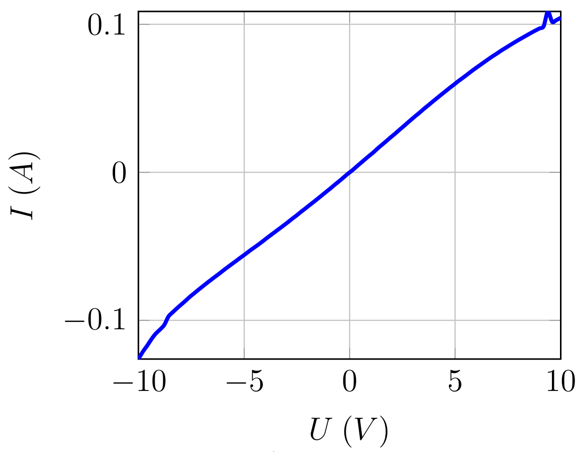


Figure 3: Thermistance caracteristic ($T_{ambient} = 21$°C), non linearities over maximal range.

7 Typical Application

8 Important notes

- Before use, calibrate on target gas for accurate ppm measurement.
- Need to have a regeneration cycle under none oxidizing atmosphere.

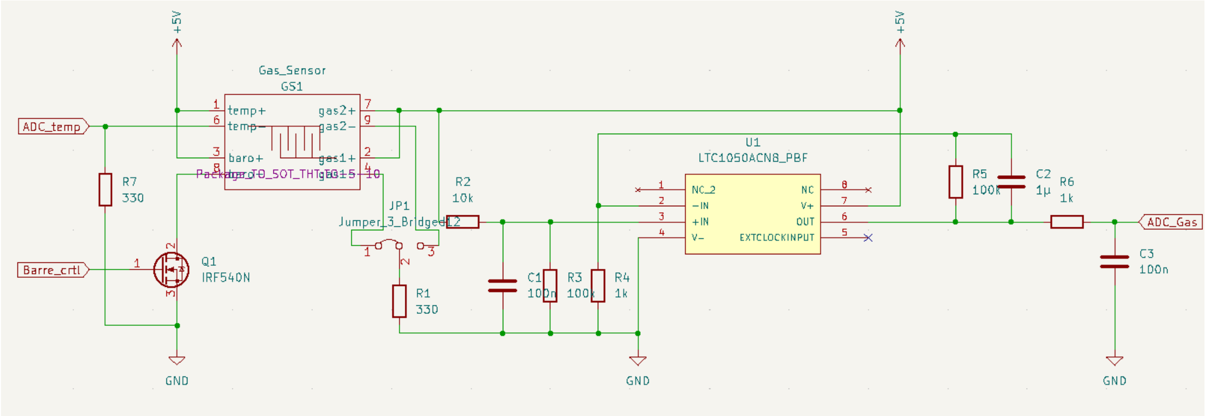


Figure 4: Typical application, electronic circuit schematic for conditionning the MOx resistor, the thermistor, and controlling the heating element.

9 Package Outline

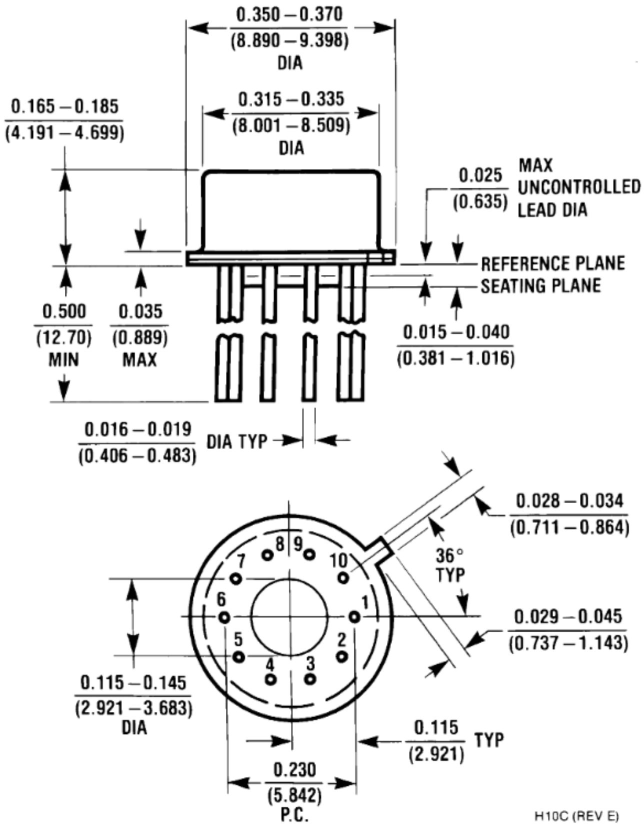


Figure 5: 10 Lead (0.230” Diameter P.C.) TO-5 Metal Can Package NS Package Number H10C