

# Like a sniffer dog:

## A gas sensor for air quality

### BME690 – 4-in-1 environmental sensor with AI

A dog's nose has up to 220 million olfactory cells. Sniffer dogs have an incredible nose and can even sniff out forbidden substances. Inspired by the animal's super-sensitive organ, the BME690 detects spoiled fruit or bad breath, for example. The BME690 is further developed on BME688, with increased robustness for use in environments with high condensation levels. It can measure gas, humidity, temperature and air pressure simultaneously and is the world's smallest 4-in-1 air quality sensor (3.0 x 3.0 x 0.93 mm<sup>3</sup>).



### Target applications



Wearables



Mobile & care devices



Smart home devices



**Indoor air quality detection**

### Benefits



#### Standardizability

Alignment to WELL/RESET standards for indoor air quality



#### Robustness

Usage in high condensation use cases



#### Power-efficient

Reduced power consumption - optimal for battery operated devices



**Breath analysis**



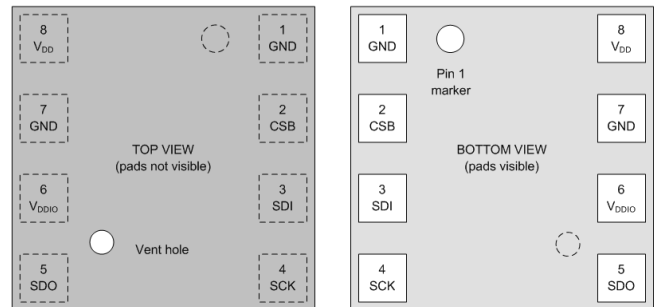
**Food freshness detection**

# Technical features (preliminary data)

## BME690 technical data

Package dimensions (typ.)	3.0 x 3.0 x 0.93 mm <sup>3</sup> 8-Pin LGA with metal
Operating range	Pressure: 300...1100 hPa Humidity 0...100% Temperature: -40...85°C
Supply voltage VDDIO	1.2 ... 3.6 V
Supply voltage VDD	1.71 ... 3.6 V
Interface	I <sup>2</sup> C (up to 3.4 MHz) and SPI (3 and 4 wire, up to 10 MHz)
Average typical current consumption	2.1 µA at 1 Hz for h/T 3.1 µA at 1 Hz for p/T 3.7 µA at 1 Hz for h/p/T 50 µA at ULP mode for p/h/T/air quality 0.9 mA at LP mode for p/h/T/air quality 3.9 mA in standard gas scan mode
Gas sensor	
Sensor-to-sensor deviation (IAQ)	± 15% ± 15 IAQ
IAQ Operating modes	3 sec (LP) and 300 sec (ULP)
Major sensor outputs	Index for Air Quality (IAQ), bVOC- & CO <sub>2</sub> -equivalents (ppm)
Humidity sensor	
Response time	1 s (τ0-63%)
Accuracy tolerance	± 3 % relative humidity
Hysteresis	≤ 1.5 % relative humidity
Pressure sensor	
RMS Noise	0.12 Pa (equiv. to 1.7 cm)
Sensitivity Error	± 0.25 %
Temperature coefficient offset	±1.3 Pa/K (equiv. to ±10.9 cm at 1°C temperature change)
Temperature sensor	
Absolute accuracy	±0.5 °C (0-65°C)

## Pin configuration



Pin	Name	Description
1	GND	Ground
2	CSB	Chip select
3	SDI	Serial data input
4	SCK	Serial clock input
5	SDO	Serial data output
6	VDDIO	Digital interface supply
7	GND	Ground
8	V <sub>DD</sub>	Analog supply



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