SONDA CO2 Grove

CO_2, humidity, and temperature sensor

- NDIR CO_2 sensor technology
- Integrated temperature and humidity sensor
- Best performance-to-price ratio
- Dual-channel detection for superior stability
- Small form factor: 35 mm x 23 mm x 7 mm
- Measurement range: 400 ppm – 10.000 ppm
- Accuracy: ±(30 ppm + 3%)
- Current consumption: 19 mA @ 1 meas. per 2 s.
- Fully calibrated and linearized
- Digital interface UART or I^2C

Product Summary

CMOSens® Technology for IR detection enables carbon dioxide measurements of the highest accuracy at a competitive price.

Along with the NDIR measurement technology for detecting CO_2 comes a best-in-class Sensirion humidity and temperature sensor integrated on the very same sensor module. Ambient humidity and temperature can be measured by Sensirion's algorithm expertise through modelling and compensating of external heat sources without the need of any additional components. The very small module height allows easy integration into different applications.

Carbon Dioxide is a key indicator for indoor air quality. Thanks to new energy standards and better insulation, houses have become increasingly energy-efficient, but the air quality can deteriorate rapidly. Active ventilation is needed to maintain a comfortable and healthy indoor environment and improve the well-being and productivity of the inhabitants. Sensirion sensor solutions offer an accurate and stable monitoring of CO_2 in the air, as well as temperature and humidity. This enables our customers to develop new solutions that increase energy efficiency and simultaneously support the well-being of everyone.

Content

1 Sensor Specifications[1]

CO_2 Sensor Specifications

Parameter	Conditions	Value
CO_2 measurement range	-	0 – 40'000 ppm
Accuracy[2]	400 ppm – 10'000 ppm	± (30 ppm + 3%MV)
Repeatability[3]	400 ppm – 10'000 ppm	± 10 ppm
Temperature stability[4]	T = 0 … 50°C, 400 ppm – 10'000 ppm	± 2.5 ppm / °C
Response time[5]	$\tau_{63\%}$	20 s
Accuracy drift over lifetime[6]	400 ppm – 10'000 ppm ASC field-calibration algorithm activated and SCD30 in environment allowing for ASC, or FRC field-calibration algorithm applied.	± 50 ppm

Table 1: SCD30 CO_2 sensor specifications

Humidity Sensor Specifications[7]

Parameter	Conditions	Value
Humidity measurement range	-	0 %RH – 100 %RH
Accuracy[8]	25°C, 0 – 100 %RH	± 3 %RH
Repeatability[3]	-	± 0.1 %RH
Response time[5]	$\tau_{63\%}$	8 s
Accuracy drift	-	< 0.25 %RH / year

Table 2: SCD30 humidity sensor specifications

Temperature Sensor Specifications[7]

Parameter	Conditions	Value
Temperature measurement range[9]	-	- 40°C – 70°C
Accuracy[8]	0 – 50°C	± (0.4°C + 0.023 × (T [°C] – 25°C))
Repeatability[3]	-	± 0.1°C
Response time[5]	$\tau_{63\%}$	> 10 s
Accuracy drift	-	< 0.03 °C / year

Table 3: SCD30 temperature sensor specifications

[1] Default conditions of T = 25°C, p = 1013 mbar, V_{DD} = 3.3 V, continuous measurement mode with measurement rate = 2 s apply to values listed in the tables, unless otherwise stated.
[2] Deviation to a high-precision reference. Accuracy is fulfilled by > 90% of the sensors after calibration. Rough handling, shipping and soldering reduces the accuracy of the sensor. Full accuracy is restored with FRC or ASC recalibration features. Accuracy is based on tests with gas mixtures having a tolerance of ± 1.5%.
[3] RMS error of consecutive measurements at constant conditions. Repeatability is fulfilled by > 90% of the sensors.
[4] Average slope of CO_2 accuracy when changing temperature, valid at 400 ppm. Fulfilled by > 90% of the sensors after calibration.
[5] Time for achieving 63% of a respective step function. Response time depends on design-in, heat exchange and environment of the sensor in the final application.
[6] CO_2 concentrations < 400 ppm may result in sensor drifts when ASC is activated. For proper function of ASC field-calibration algorithm SCD30 has to be exposed to air with CO_2 concentration 400 ppm regularly.
[7] Design-in of the SCD30 in final application and the environment impacts the accuracy of the RH/T sensor. Heat sources have to be considered for optimal performance. Please use integrated on-board RH/T compensation algorithm to account for the actual design-in.
[8] Deviation to a high-precision reference. Accuracy is fulfilled by > 90% of the sensors after calibration.
[9] RH/T sensor component is capable of measuring up to T = 120°C. Measuring at T > 70°C might result in permanent damage of the sensor.