

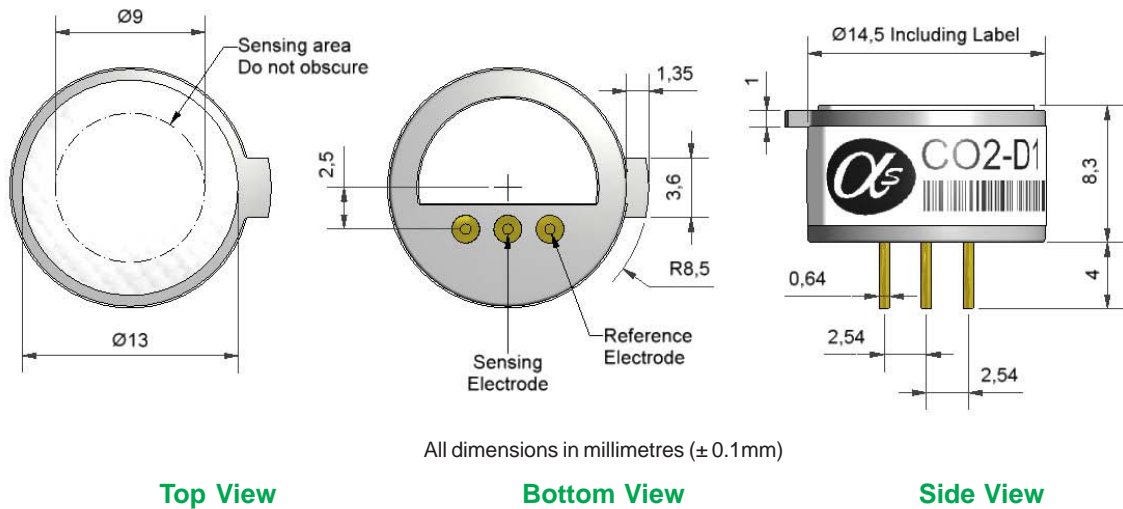


# CO2-D1 Carbon Dioxide Sensor Solid State



PATENTED

Figure 1 CO2-D1 Schematic Diagram



Technical Specification

PERFORMANCE	Parameter	Specification	Value
	Sensitivity	mV/decade concentration change (0.5% to 5% CO <sub>2</sub> )	6 to 10
	Response time	t <sub>90</sub> (s) for mV change (20°C)(0.5% to 5% CO <sub>2</sub> )	2-4 mins
	Zero	E <sub>0</sub> @ 5000ppm CO <sub>2</sub>	-30 to +30mV
	Resolution	RMS noise (ppm equivalent) @ 5,000ppm CO <sub>2</sub>	100
	Range	CO <sub>2</sub> concentration	0.2% to 95%
	Linearity	see Figure 3	Logarithmic

LIFETIME	Parameter	Specification	Value
	Zero drift	(mV)E <sub>0</sub> change/day in lab air	$\pm 3$
	Sensitivity drift	mV/decade/month change in lab air, monthly test	<1
	Operating life	months until 80% original signal (24 month warranted)	>24

ENVIRONMENTAL	Parameter	Specification	Value
	Temperature range	°C	10 to 35°C
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 95

KEY SPECIFICATIONS	Parameter	Specification	Value
	Storage period	months @ 0 to 20°C (stored in original container)	6
	Input	Impedance of op amp input	>10 <sup>8</sup> Ω



At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste, but contact the instrument manufacturer, Alphasense or its distributor for disposal instructions.

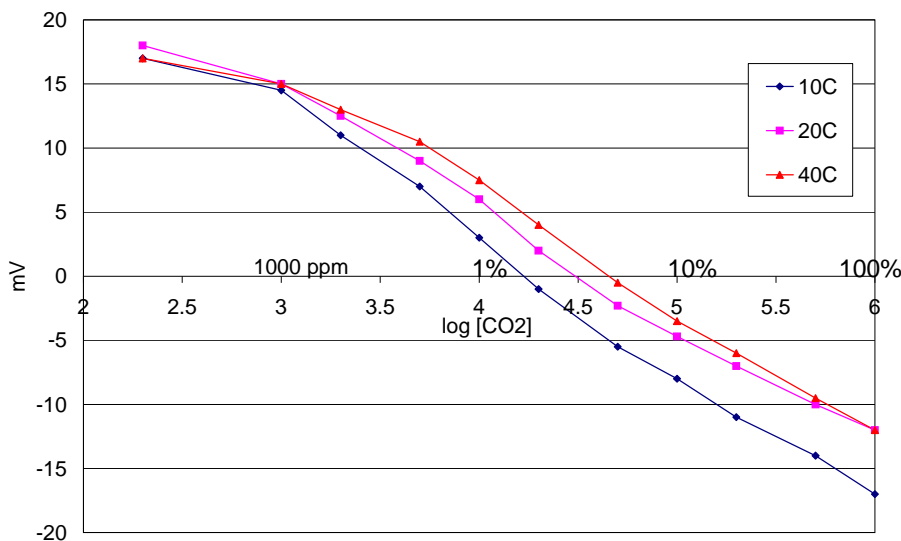
**NOTE:** all sensors are tested at ambient environmental conditions, with 10 ohm load resistor, unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their own requirements.



# CO2-D1 Performance Data

Technical Specification

Figure 2 Mastercurve



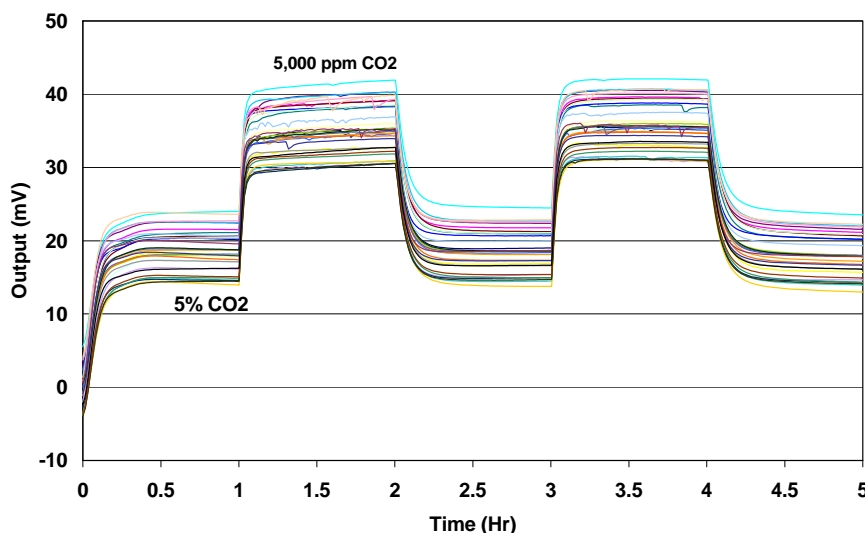
The CO2-D1 is a potentiometric sensor and responds over four decades of CO<sub>2</sub> concentration.

Sensitivity (mV/decade concentration) is not constant, it changes with concentration: sensitivity increases at higher concentrations.

Sensitivity remains stable with time, but the offset voltage ( $E_0$ ) will shift, so regular zeroing is advised.

Temperature affects  $E_0$  but not the sensitivity from 10° to 40°C.

Figure 3 Hysteresis



Sensors were exposed first to 5000 ppm CO<sub>2</sub> then 5% CO<sub>2</sub> for 30 minutes.

Sensors return to the initial voltage with a fast initial response, followed by a slower stabilisation to the final voltage.

The absolute mV shifts with time and environment, so sensor should be calibrated regularly in fresh air (typically 400 ppm CO<sub>2</sub>).

## CO2-D1 Sensor Conditioning PCB

The CO2-D1 is a potentiometric electrochemical gas sensor which responds to carbon dioxide as a gas ion selective electrode. The potential that is generated must not be measured using low impedance circuitry. Alphasense has developed a simple buffering circuit that conditions the potential to protect the CO2-D1 from damage.

This conditioning board allows customers during validation and single users (research groups) to use a simple datalogger or DVM to monitor the sensor without causing damage to the sensor.



**Power:** CR2032 Li coin cell (3V) (20mm dia, 3.2mm ht. 165mA) located under the board

**Power consumption:** Approx. 30uA giving between 6 and 12 months continuous use

**Output socket:** 2-way screw terminal  
Marked + and -. Suitable for feeding directly into a datalogger or DVM

For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. For Application Notes visit "[www.alphasense.com](http://www.alphasense.com)".

In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Alphasense Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within. (©ALPHASENSE LTD) Doc. Ref. CO2D1/DEC10