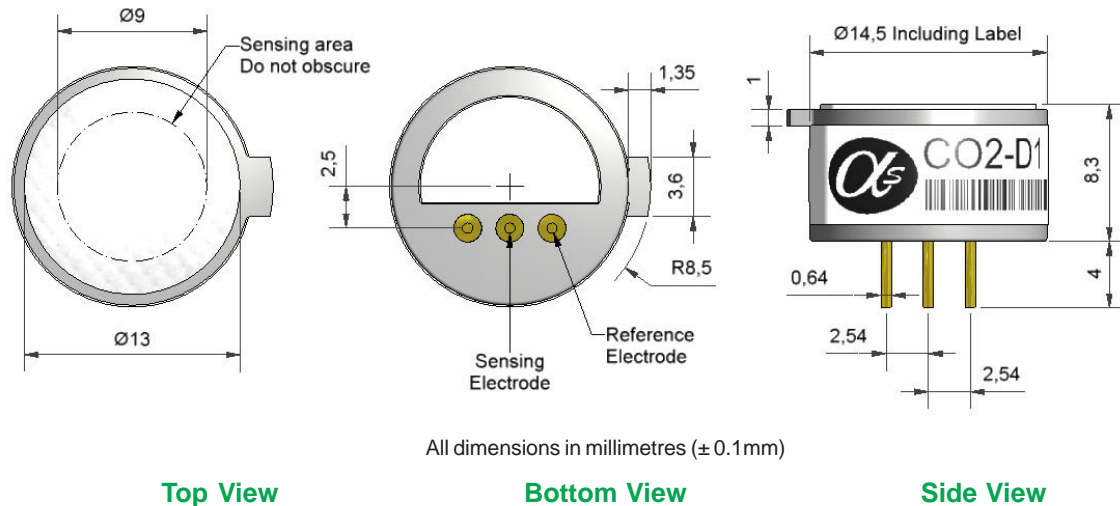


## CO2-D1 Carbon Dioxide Sensor Solid State



PATENTED

Figure 1 CO2-D1 Schematic Diagram



Technical Specification

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

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



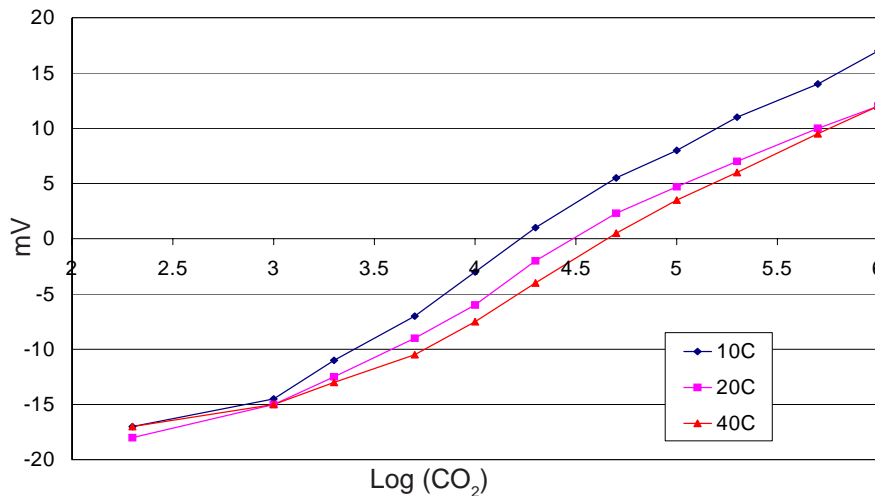
**NOTE:** all sensors are tested at ambient environmental conditions, with 10 ohm load resistor, unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the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

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# CO2-D1 Performance Data

Technical Specification

Figure 2 Mastercurve



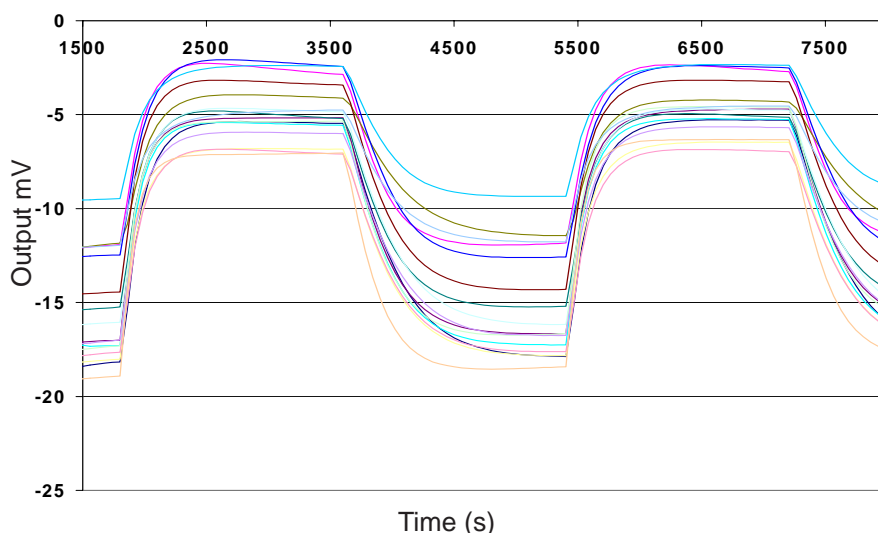
The CO2-D1 is a potentiometric sensor and responds over four decades of CO<sub>2</sub> concentration.

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.

## 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

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