

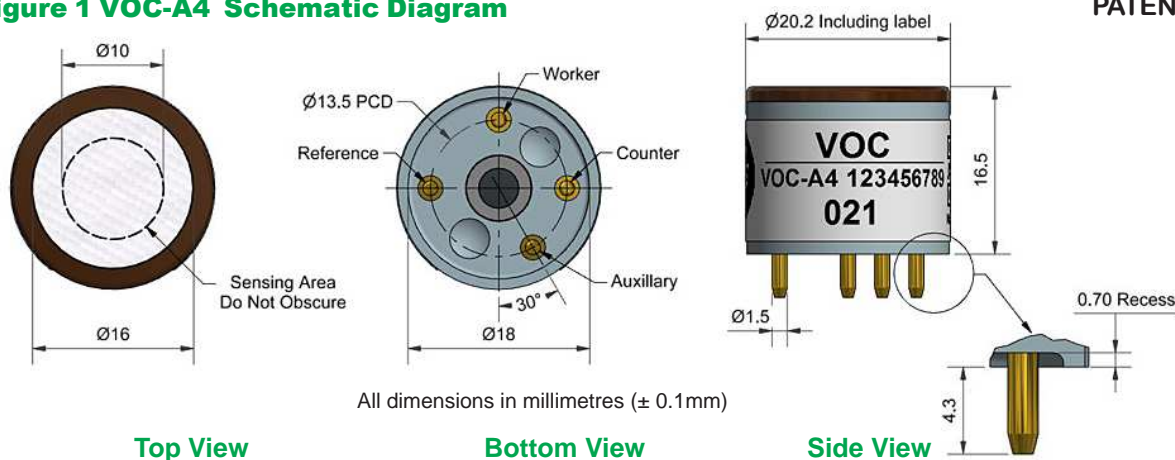


# VOC-A4 4-Electrode Volatile Organic Compound Sensor



PATENTED

Figure 1 VOC-A4 Schematic Diagram



## SPECIFICATION CO SENSING

PERFORMANCE	Sensitivity	nA/ppm in 2ppm CO	230 to 410
	Response time	$t_{90}$ (s) from zero to 2ppm CO	< 30
	Zero current	nA in zero air at 20°C	± 200
	Noise*	±2 standard deviations (ppb equivalent)	20
	Range	ppm limit of performance warranty	190
	Linearity	ppm CO error at full scale, linear at zero, 10ppm CO	± 1.5
	Overgas limit	maximum ppm for stable response to gas pulse	1000

LIFETIME	Zero drift	ppb equivalent change/year in lab air	±500
	Sensitivity drift	% change/year in lab air, monthly test	< 15
	Operating life	months until 50% original signal (24 month warranted)	> 36

ENVIRONMENTAL	Sensitivity @ -20°C (% output @ -20°C/output @ 20°C) @ 2ppm CO	50 to 80
	Sensitivity @ 50°C (% output @ 50°C/output @ 20°C) @ 2ppm CO	100 to 120
	Zero @ -20°C            nA change from 20°C	± 20
	Zero @ 50°C            nA change from 20°C	± 100

## CROSS SENSITIVITY

C <sub>2</sub> H <sub>6</sub> O sensitivity	% measured gas @ <1ppm	C <sub>2</sub> H <sub>6</sub> O	< 125
H <sub>2</sub> S sensitivity	% measured gas @ 5ppm	H <sub>2</sub> S	< 400
NO <sub>2</sub> sensitivity	% measured gas @ 5ppm	NO <sub>2</sub>	< -90
Cl <sub>2</sub> sensitivity	% measured gas @ 5ppm	Cl <sub>2</sub>	< -45
NO sensitivity	% measured gas @ 5ppm	NO	< 35
SO <sub>2</sub> sensitivity	% measured gas @ 5ppm	SO <sub>2</sub>	< 110
H <sub>2</sub> sensitivity	% measured gas @ 100ppm	H <sub>2</sub> at 20°C	< 50
C <sub>2</sub> H <sub>4</sub> sensitivity	% measured gas @ 40ppm	C <sub>2</sub> H <sub>4</sub>	< 115
NH <sub>3</sub> sensitivity	% measured gas @ 20ppm	NH <sub>3</sub>	< -0.1
CO <sub>2</sub> sensitivity	% measured gas @ 5% vol	CO <sub>2</sub>	< 0.1

KEY SPECIFICATIONS	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (AFE circuit is recommended)	33 to 100
	Weight	g	< 6

**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.



## VOC-A4 Performance Data

**Figure 2 Linearity from 0 to 10ppm CO**

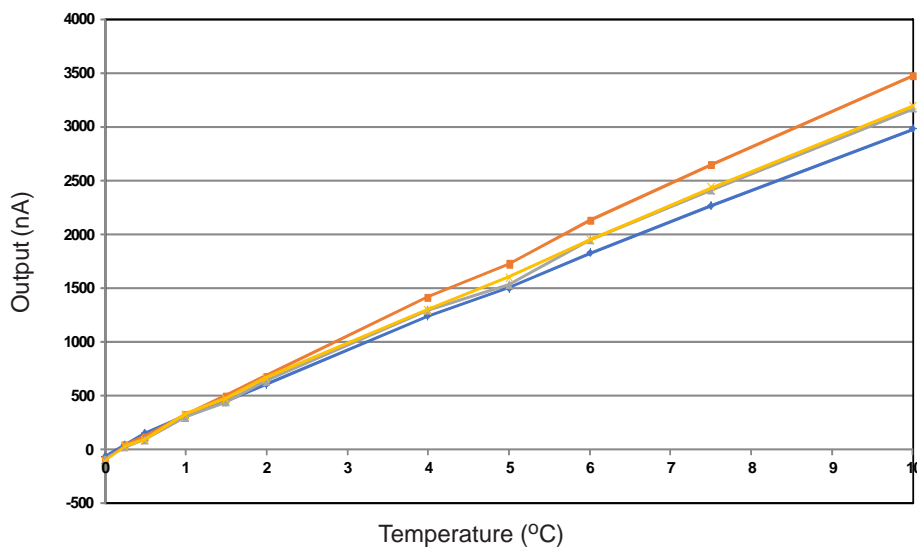


Figure 2 shows example sensor response at concentrations of up to 10ppm CO

**Figure 3 Zero Temperature Dependence**

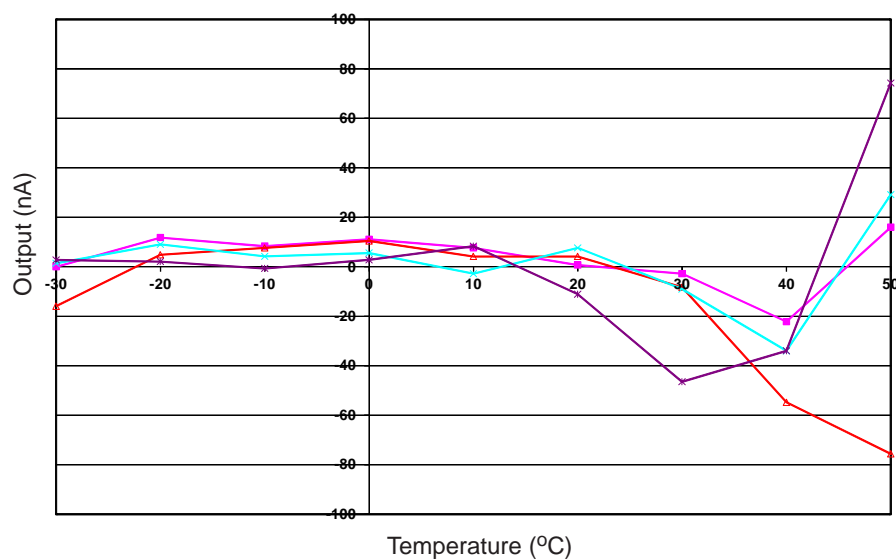


Figure 3 shows example variation in zero output of the working electrode caused by changes in temperature, expressed as nA.



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.

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)".

Technical Specification



# VOC-A4 4-Electrode Volatile Organic Compound Sensor

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The VOC-A4 detects both VOCs and CO gases. Using both a VOC-A4 and a CO-A4 sensor in combination allows the estimation of VOC concentration at 0V bias.

The data given in this TDS refers to the use of the VOC-A4 sensor at 0V bias. Other voltages within the range 0 to 0.3V can also be applied (see application note AAN-805)

In order to calculate the VOC concentration, it is necessary to ensure the signals from the two sensors have been corrected for electronic zero offset, sensor zero offset and temperature dependence, and sensitivity (nA/ppm) calibration and temperature dependence.

## SPECIFICATION ETHANOL (C<sub>2</sub>H<sub>6</sub>O) SENSING

<b>PERFORMANCE</b>	Sensitivity	nA/ppm in <1ppm C <sub>2</sub> H <sub>6</sub> O	200 to 400
	Response time	t <sub>90</sub> (s) from zero to <1ppm C <sub>2</sub> H <sub>6</sub> O	< 30
	Zero current	nA in zero air at 20°C	± 200
	Noise	±2 standard deviations (ppb equivalent)	20
	Range	ppm limit of performance warranty	2
	Linearity	ppm error at full scale, linear at zero, <1 ppm C <sub>2</sub> H <sub>6</sub> O	< 0.13
	Overgas limit	maximum ppm for stable response to gas pulse	5

<b>LIFETIME</b>	Zero drift	ppb equivalent change/year in lab air	± 500
	Sensitivity drift	% change/year in lab air, monthly test	< 15
	Operating life	months until 50% original signal (24 month warranted)	> 36

<b>ENVIRONMENTAL</b>	Sensitivity @ -20°C (% output @ -20°C/output @ 20°C)	ND
	Sensitivity @ 50°C (% output @ 50°C/output @ 20°C)	ND
	Zero @ -20°C	nA change from 20°C
	Zero @ 50°C	nA change from 20°C

## CROSS SENSITIVITY

CO	sensitivity	% measured gas @ 2ppm	CO	< 110
H <sub>2</sub> S	sensitivity	% measured gas @ 5ppm	H <sub>2</sub> S	< 400
NO <sub>2</sub>	sensitivity	% measured gas @ 5ppm	NO <sub>2</sub>	< -80
Cl <sub>2</sub>	sensitivity	% measured gas @ 5ppm	Cl <sub>2</sub>	< -40
NO	sensitivity	% measured gas @ 5ppm	NO	< 40
SO <sub>2</sub>	sensitivity	% measured gas @ 5ppm	SO <sub>2</sub>	< 100
H <sub>2</sub>	sensitivity	% measured gas @ 100ppm	H <sub>2</sub> at 20°C	< 50
C <sub>2</sub> H <sub>4</sub>	sensitivity	% measured gas @ 40ppm	C <sub>2</sub> H <sub>4</sub>	< 110
NH <sub>3</sub>	sensitivity	% measured gas @ 20ppm	NH <sub>3</sub>	< -0.1
CO <sub>2</sub>	sensitivity	% measured gas @ 5% vol	CO <sub>2</sub>	< 0.1

<b>KEY SPECIFICATIONS</b>	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (AFE circuit is recommended)	33 to 100
	Weight	g	< 6

**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.



# VOC-A4 Performance Data

## Technical Specification

**Figure 4 Linearity from 0 to 860ppb (approx) Ethanol**

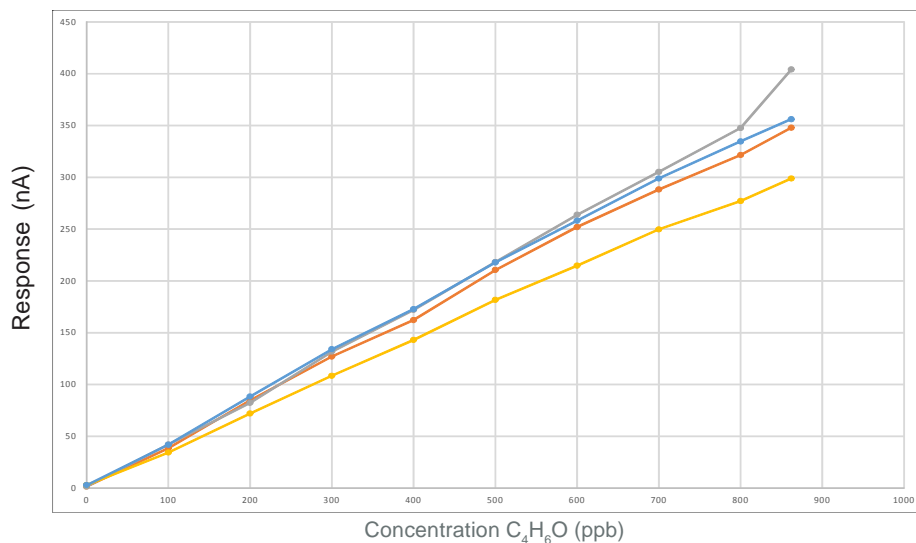


Figure 4 shows example sensor output at concentrations of up to 860ppb Ethanol

**Figure 5 Response to 860ppb (approx) Ethanol**

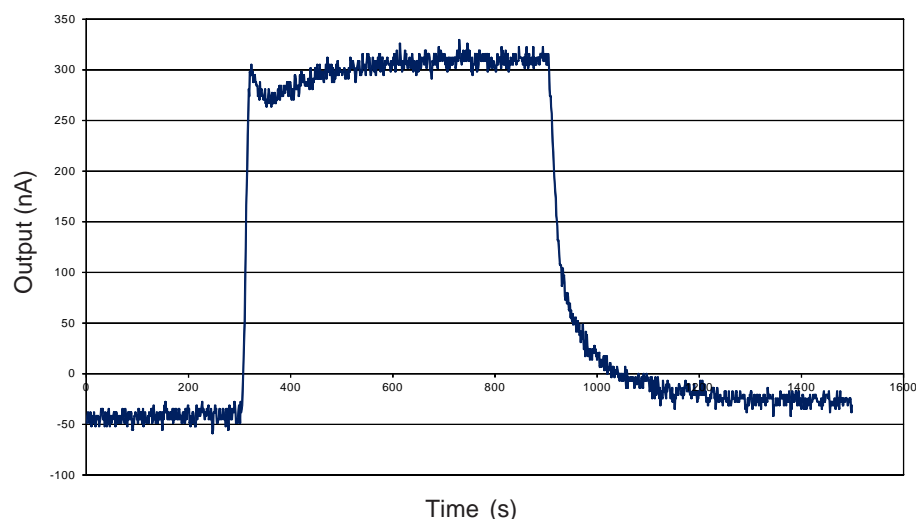


Figure 5 shows example sensor output in response to 860ppb Ethanol

**Figure 6 Response to 2ppm C<sub>4</sub>H<sub>8</sub> with voltage bias**

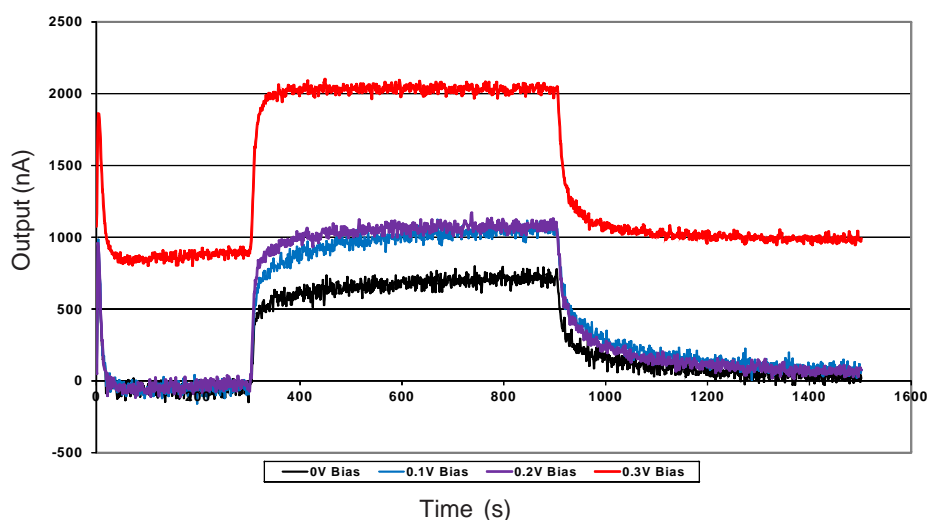


Figure 6 shows example output at different bias voltages in response to 2ppm C<sub>4</sub>H<sub>8</sub>