

# Solid Polymer Sensor ES1-AG1-1000 - All Gas

## **Technical Specification**

### Performance

T CHOIManoc	
Sensitivity	55 <b>± 15 nA / ppm</b>
Zero current	± 100 nA
Response time	
-T <sub>50</sub>	< 10 s
-T <sub>90</sub>	< 30 s
Range	1000 ppm
Repeatability	1 %
Lower Detectable Limit (LDL)	<1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	1000 ppm

### Environment

	Temperature Range	-40 to 50 °C
ge.	Humidity Range (non condensing)	10 to 95 % R.H
	Pressure Range	800 to 1200 hPa

### **Operation**

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100
Warm up time	< 90 / 60 s

#### Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month
Housing	
Housing material	ABS
Weight	< 0.7 g



**Part Number:** 01-ES1-AG1-1000-01

Features

```
High sensitivity
Low cost alternative
to PID
No electrolyte leakage
Low cost at large
volumes
Individual
ly calibrated
including test
report
Detect to most VOC
Gases
Strong signal to noise
Sensor in the world
Fast Response time
```

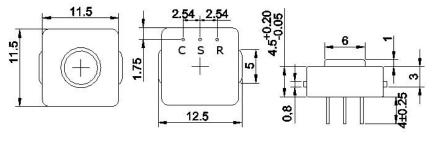
### Typical applications

Consumer Market General Gas Detection VOC Gas Detection Low Power Nose Mobile Phone Nose Indoor Air Quality Outdoor Air Quality Breath Alcohol

Detector

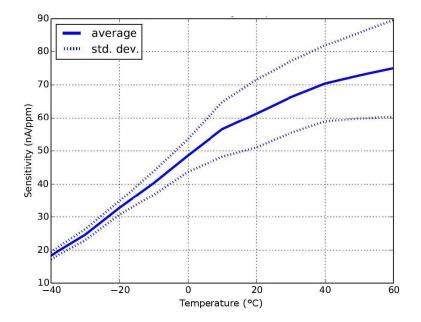


# **Dimensions**



All dimensions in mm

# Temperature curve





# **Cross sensitivity**

AmmoniaNH,500Carbon DioxideCO210000Carbon MonoxideCO100100ChlorineCl21.00Dichlor methaneCH2,Cl2300EthanolC2,H2,Cl2104100Ethylene oxideC2,H2,OH14<2EthyleneC2,H2,OH10020HydrogenH210020Hydrogen SulphideH210400Hydrogen CyanideHCN109IsopropanolC3,H2,OHyesMethanCH4300000MethanalHCHOYesNitric OxideNO21518Nitric OxideNO210-5OzoneO30.50Sulphur DioxideSO2yesTolueneC,H8No25AyleneC2,H2yesMethyl MarcaptanCH2yesMethyl MarcaptanCH3yes		Formula	Test concentration (ppm)	Sensor reading (ppm)
Carbon MonoxideCO100100ChlorineCl21.00Dichlor methaneCH2Cl2300EthanolC2H3Cl2104100EthanolC2H3Cl2104100Ethylene oxideC2H3Cl414<2Ethylene oxideC2H310020HydrogenH210020Hydrogen SulphideH21009IsopropanolC3H,OH109IsopropanolC4GH300000MethanCH4300000MethanolCH4OYesMethanolCH3OH1518Nitric OxideNO25n.e.Nitric OxideNO210-5OzoneO30.50Sulphur DioxideSO2yesTolueneC3H30YesTolueneC3H30yesAcetyleneC3H30yes		NH <sub>3</sub>	50	0
$\begin{array}{c c c c c } Chlorine & Cl_2 & 1.0 & 0 \\ \hline Dichlor methane & CH_2Cl_2 & 30 & 0 \\ \hline Ethanol & C_2H_5Cl_2 & 104 & 100 \\ \hline Ethylene oxide & C_2H_5OH & 14 & <2 \\ \hline Ethylene oxide & C_2H_4 & Yes \\ \hline Hydrogen & H_2 & 100 & 20 \\ \hline Hydrogen Sulphide & H_2S & 10 & 400 \\ \hline Hydrogen Cyanide & HCN & 10 & 9 \\ \hline Isopropanol & C_3H,OH & yes \\ \hline Methan & CH_4 & 30000 & 0 \\ \hline Methanol & CH_5OH & Yes \\ \hline Methanol & CH_5OH & Yes \\ \hline Methanol & CH_4 & 15 & 18 \\ \hline Nitric Oxide & NO & 25 & n.e. \\ \hline Nitrogen Dioxide & NO_2 & 10 & -5 \\ \hline Ozone & O_3 & 0.5 & 0 \\ \hline Sulphur Dioxide & SO_2 & yes \\ \hline Toluene & C_3H_0 & & No \\ \hline Xylene & C_8H_0 & & No \\ \hline Sylene & C_8H_0 & & yes \\ \hline Acetylene & C_2H_2 & yes \\ \hline \end{array}$	Э	CO <sub>2</sub>	1000	0
Dichlor methane $CH_2Ol_2$ 30         0           Ethanol $C_gH_gOl_2$ 104         100           Ethylene oxide $C_2H_5OH$ 14         <2	ide	СО	100	100
Ethanol $C_2H_4Cl_2$ 104         100           Ethylene oxide $C_2H_4CH$ 14         <2		Cl <sub>2</sub>	1.0	0
Ethylene oxide $C_2H_sOH$ 14 $<2$ Ethylene $C_2H_a$ YesEthylene $C_2H_a$ 10020Hydrogen $H_2$ 100400Hydrogen Sulphide $H_2S$ 10400Hydrogen CyanideHCN109Isopropanol $C_3H_7OH$ yesMethanCH $_a$ 300000MethanalHCHOYesMethanolCH $_3OH$ YesMethanolCA $_4B_a$ 1518Nitric OxideNO25n.e.Nitrogen DioxideSO $_2$ yesToluene $C_2H_a$ 0.50Sulphur DioxideSO $_2$ yesAcetylene $C_2H_a$ NoAcetylene $C_2H_a$ yes	ie	$CH_2CI_2$	30	0
Ethylene $C_2H_4$ YesHydrogen $H_2$ 10020Hydrogen Sulphide $H_2$ S10400Hydrogen CyanideHCN109Isopropanol $C_3H_2OH$ yesMethanCH4300000MethanalHCHOYesMethanolCH_3OHYesMethanolCH_3OHYesMethylpropeneC_4H_81518Nitric OxideNO25n.e.Nitrogen DioxideSO210-5OzoneO30.50Sulphur DioxideSO2yesTolueneCrH8NoXyleneQasolineC_2H2yesAcetyleneC2H2yes		$C_2H_5CI_2$	104	100
Hydrogen $H_2$ 10020Hydrogen Sulphide $H_2$ S10400Hydrogen CyanideHCN109Isopropanol $C_3H_2OH$ yesMethanCH4300000MethanalHCHOYesMethanolCH3OHYesMethylpropeneC4H81518Nitric OxideNO25n.e.Nitric OxideSO210-5OzoneO30.50Sulphur DioxideSO2yesTolueneCrH8NONOXyleneCsH10NoGasolineC2H2yesAcetyleneC2H2yes		$C_2H_5OH$	14	<2
Hydrogen Sulphide $H_2S$ 10400Hydrogen CyanideHCN109Isopropanol $C_3H_2OH$ yesMethanCH_4300000MethanalHCHOYesMethanolCH_3OHYesMethanolCH_4OHYesMethanolCH_4D15Nitric OxideNO25Nitric OxideNO210Nitrogen DioxideO30.5OzoneO30.50Sulphur DioxideSO2yesTolueneCr4H8NoXyleneCgH10YesAcetyleneC2H2yes		$C_2H_4$		Yes
Hydrogen CyanideHCN109Isopropanol $C_3H_7OH$ yesMethan $CH_4$ 300000MethanalHCHOYesMethanol $CH_3OH$ YesMethanol $CH_3OH$ YesMethylpropene $C_4H_8$ 1518Nitric OxideNO25n.e.Nitrogen Dioxide $O_3$ 0.50Sulphur DioxideSO2yesyesToluene $C_2H_8$ YesNoXylene $C_2H_2$ yesyes		H <sub>2</sub>	100	20
Isopropanol $C_3H_2OH$ yesMethan $CH_4$ 300000MethanalHCHOYesMethanol $CH_3OH$ YesMethylpropene $C_4H_8$ 1518Nitric OxideNO25n.e.Nitrogen Dioxide $O_3$ 0.50Sulphur DioxideSO2yesyesToluene $C_7H_8$ YesNoXylene $C_9H_{10}$ YesyesAcetylene $C_2H_2$ yesyes	hide	H <sub>2</sub> S	10	400
MethanCH4300000MethanalHCHOYesMethanolCH3OHYesMethylpropeneC4H81518Nitric OxideNO25n.e.Nitrogen DioxideNO210-5OzoneO30.50Sulphur DioxideSO2yesTolueneC7H8NoXyleneC2H10YesGasolineC2H2yesAcetyleneC2H2yes	nide	HCN	10	9
MethanalHCHOYesMethanol $CH_3OH$ YesMethylpropene $C_4H_8$ 1518Nitric OxideNO25n.e.Nitrogen Dioxide $NO_2$ 10-5Ozone $O_3$ 0.50Sulphur Dioxide $SO_2$ yesToluene $C_rH_8$ NoXylene $C_sH_{10}$ NoGasoline $yes$ Acetylene $C_2H_2$ yes		C <sub>3</sub> H <sub>7</sub> OH		yes
Methanol $CH_3OH$ YesMethylpropene $C_4H_8$ 1518Nitric OxideNO25n.e.Nitrogen DioxideNO210-5Ozone $O_3$ 0.50Sulphur DioxideSO2yesToluene $C_7H_8$ NoXylene $C_5H_{10}$ NoGasoline $C_2H_2$ yes		CH <sub>4</sub>	30000	0
Methylpropene $C_4 H_8$ 15         18           Nitric Oxide         NO         25         n.e.           Nitrogen Dioxide         NO2         10         -5           Ozone         O3         0.5         0           Sulphur Dioxide         SO2         yes         10           Yene         C7H8         No         10           Acetylene         C2H2         yes         10		НСНО		Yes
Nitric Oxide         NO         25         n.e.           Nitrogen Dioxide         NO2         10         -5           Ozone         O3         0.5         0           Sulphur Dioxide         SO2         yes         yes           Toluene         C7H8         NO         NO           Xylene         C5H10         No         yes           Gasoline         Yes         yes         yes		CH₃OH		Yes
Nitrogen Dioxide $NO_2$ 10-5Ozone $O_3$ 0.50Sulphur Dioxide $SO_2$ yesToluene $C_7H_8$ NoXylene $C_6H_{10}$ NoGasolineyesAcetylene $C_2H_2$ yes		$C_4H_8$	15	18
Ozone $O_3$ 0.5         0           Sulphur Dioxide         SO_2         yes           Toluene $C_7H_8$ No           Xylene $C_5H_{10}$ No           Gasoline         yes         yes           Acetylene $C_2H_2$ yes		NO	25	n.e.
Sulphur DioxideSO2yesTolueneC7H8NoXyleneC5H10NoGasolineyesyesAcetyleneC2H2yes	le	NO <sub>2</sub>	10	-5
Toluene $C_7H_8$ NoXylene $C_5H_{10}$ NoGasolineyesAcetylene $C_2H_2$ yes		O <sub>3</sub>	0.5	0
XyleneC_5H_10NoGasolineyesAcetyleneC_2H_2yes	e	SO <sub>2</sub>		yes
Gasoline     yes       Acetylene     C2H2     yes		C <sub>7</sub> H <sub>8</sub>		No
Acetylene C <sub>2</sub> H <sub>2</sub> yes		C <sub>5</sub> H <sub>10</sub>		No
				•
Methyl Mercaptan CH <sub>4</sub> S yes				
	tan	·		
Phosphine PH <sub>3</sub> yes				
Tetrahydrothiophene THT 10 <1	hene		10	<1
Vinyl Chloride C2H3Cl yes				yes
Formaldehyde HCHO yes				yes
Ozone O <sub>3</sub> yes				yes
Hydrazine N2H4 yes				yes
Arsine AsH <sub>3</sub> yes		AsH <sub>3</sub>		yes



Fluorine	F <sub>2</sub>	yes
Chlorine Dioxide		No
Bromine	Br <sub>2</sub>	No
Hydrogen Chloride	HCI	No
Hydrogen Bromide	HBr <sub>2</sub>	No
Acrylonitrile	CH2CHCN	No
Acetone	СНЗСОСНЗ	No

Above sensor reading in ppm after calibration to CO.

 $\ensuremath{\mathsf{Cross}}$  sensitivities indicated withyes showed a signal response under a bump test.

We will continue to do more cross gas testing.

DISCLAIMER:Sensor performance is temperature dependent. Performance data stated is based on test conditions with new sensors at 23°C, 50%/H and 1 atm, flow rate>150qcm/min using EC-Sense recommended circuitry. Cross sensitivity gases are not target gases. Relations and performance can change, also with ageing of the sensor. In the interest of continued product improvement, EC-Sense reserves the right to change design features and specifications without prior notification. We do not accept any legal responsibility for customer applications of our sensors. EC-Sense accepts no liability for any consequential losses, injury or damage resulting from the use of this document, the information contained within or from any omissions or errors herein. This document does not constitute an offer for sale and the data contained is for guidance only and may not be taken as warranty. Any use of the given data must be assessed and determined by the user thereof to be in accordance with federal, state and local laws and regulations. All specifications outlined are subject to change without notice.

WARNING:EC-Sense sensors are designed to operate in a wide range of harsh conditions. It is nevertheless essential to prevent exposure to high concentrations of solvent vapours during storage, assembly and operation. When using sensors on printed circuit boards (PCB's), degreasing agents should be used prior to the sensor being fitted. Please note that gluing or soldering direct to the pins of EC-Sense gas sensors will void any warranty. Please use PCB sockets when connecting EC-Sense sensors. Any electrochemical EC-Sense gas sensor can potentially fail to meet specification without warning. Despite the high reliability of our products, we recommend checking all sensors and instruments for response to gas before use, especially where life safety is a performance requirement of the product. At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste but contact EC-Sense or their distributor for disposal instructions. Customers should test under their own conditions to ensure that the sensors are suitable for their specific requirements.