

# Solid Polymer Sensor

## ES1-AG1-1000 - All Gas

### Technical Specification



#### Part Number:

01-ES1-AG1-1000-01

#### Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individual calibration including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC 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

#### Performance

|                              |                  |
|------------------------------|------------------|
| Sensitivity                  | 55 ± 15 nA / ppm |
| 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    |
| 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               |

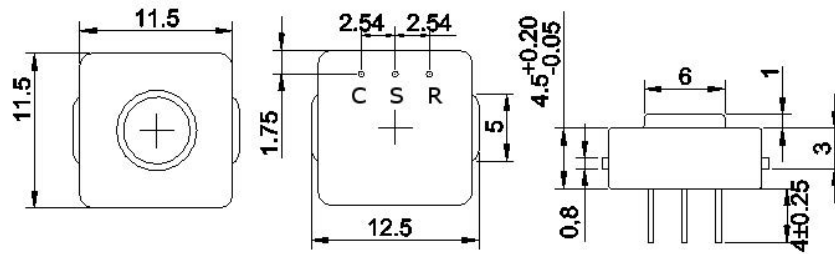
#### Lifetime

|                             |             |
|-----------------------------|-------------|
| 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

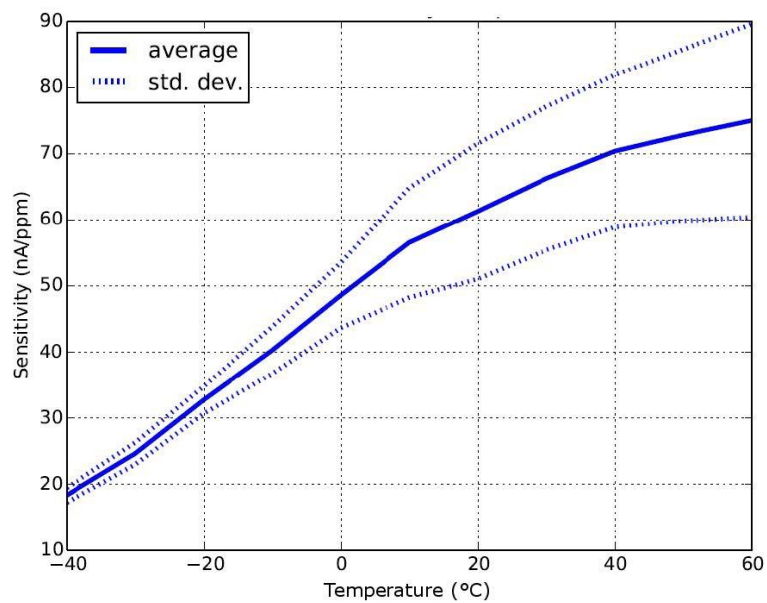
|                  |         |
|------------------|---------|
| Housing material | ABS     |
| Weight           | < 0.7 g |

## Dimensions



All dimensions in mm

## Temperature curve



## Cross sensitivity

| Gas                 | Formula                                       | Test concentration (ppm) | Sensor reading (ppm) |
|---------------------|---|--------------------------|----------------------|
| Ammonia             | NH <sub>3</sub>                               | 50                       | 0                    |
| Carbon Dioxide      | CO <sub>2</sub>                               | 1000                     | 0                    |
| Carbon Monoxide     | CO  | 100                      | 100                  |
| Chlorine            | Cl <sub>2</sub>                               | 1.0                      | 0                    |
| Dichlor methane     | CH <sub>2</sub> Cl <sub>2</sub>               | 30                       | 0                    |
| Ethanol             | C <sub>2</sub> H <sub>5</sub> Cl <sub>2</sub> | 104                      | 100                  |
| Ethylene oxide      | C <sub>2</sub> H <sub>5</sub> OH              | 14                       | <2                   |
| Ethylene            | C <sub>2</sub> H <sub>4</sub>                 |                          | Yes                  |
| Hydrogen            | H <sub>2</sub>                                | 100                      | 20                   |
| Hydrogen Sulphide   | H <sub>2</sub> S                              | 10                       | 400                  |
| Hydrogen Cyanide    | HCN   | 10                       | 9                    |
| Isopropanol         | C <sub>3</sub> H <sub>7</sub> OH              |                          | yes                  |
| Methan              | CH <sub>4</sub>                               | 30000                    | 0                    |
| Methanal            | HCHO  |                          | Yes                  |
| Methanol            | CH <sub>3</sub> OH                            |                          | Yes                  |
| Methylpropene       | C <sub>4</sub> H <sub>8</sub>                 | 15                       | 18                   |
| Nitric Oxide        | NO  | 25                       | n.e.                 |
| Nitrogen Dioxide    | NO <sub>2</sub>                               | 10                       | -5                   |
| Ozone               | O <sub>3</sub>                                | 0.5                      | 0                    |
| Sulphur Dioxide     | SO <sub>2</sub>                               |                          | yes                  |
| Toluene             | C <sub>7</sub> H <sub>8</sub>                 |                          | No                   |
| Xylene              | C <sub>5</sub> H <sub>10</sub>                |                          | No                   |
| Gasoline            |   |                          | yes                  |
| Acetylene           | C <sub>2</sub> H <sub>2</sub>                 |                          | yes                  |
| Methyl Mercaptan    | CH <sub>4</sub> S                             |                          | yes                  |
| Phosphine           | PH <sub>3</sub>                               |                          | yes                  |
| Tetrahydrothiophene | THT   | 10                       | <1                   |
| Vinyl Chloride      | C <sub>2</sub> H <sub>3</sub> Cl              |                          | yes                  |
| Formaldehyde        | HCHO  |                          | yes                  |
| Ozone               | O <sub>3</sub>                                |                          | yes                  |
| Hydrazine           | N <sub>2</sub> H <sub>4</sub>                 |                          | yes                  |
| Arsine              | AsH <sub>3</sub>                              |                          | yes                  |

|                   |                                   |     |
|-------------------|-----------------------------------|-----|
| Fluorine          | F <sub>2</sub>                    | yes |
| Chlorine Dioxide  | ClO <sub>2</sub>                  | No  |
| Bromine           | Br <sub>2</sub>                   | No  |
| Hydrogen Chloride | HCl                               | No  |
| Hydrogen Bromide  | HBr <sub>2</sub>                  | No  |
| Acrylonitrile     | CH <sub>2</sub> CHCN              | No  |
| Acetone           | CH <sub>3</sub> COCH <sub>3</sub> | No  |

Above sensor reading in ppm after calibration to CO.

Cross sensitivities indicated with yes 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%rH 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.