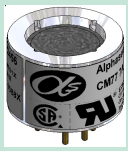
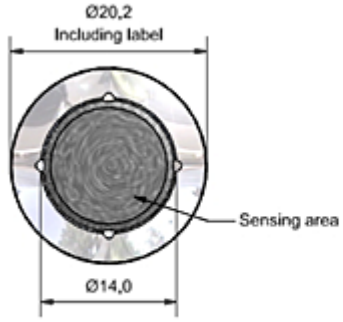
# Hydrogen Sulfide Sensor

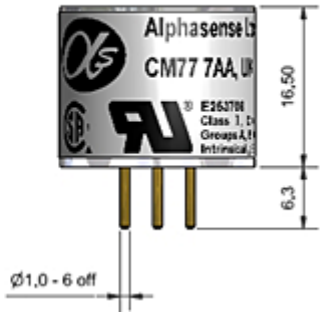
## Metal Oxide Technology

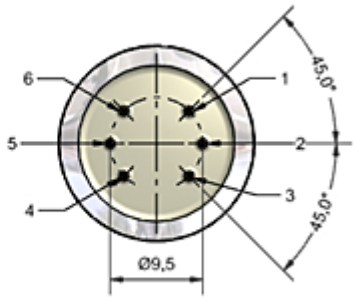


Technical Specification

### H2S-AFF* Figure 1 Schematic Diagram



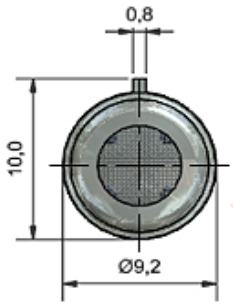



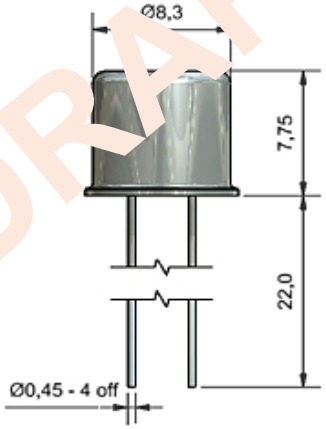

| | |
|---|---|
| Pins 1 & 6 | Detector |
| Pins 2 & 5 | Heater |
| Pins 3 & 4 | Detector |

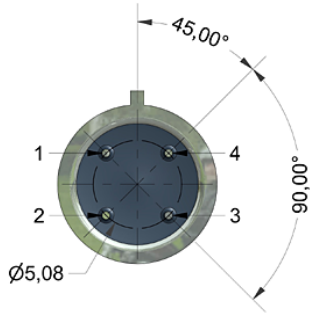
All dimensions in millimetres (± 0.1mm)

Top View | Side View | Bottom View

### H2S-MFF* Figure 2 Schematic Diagram



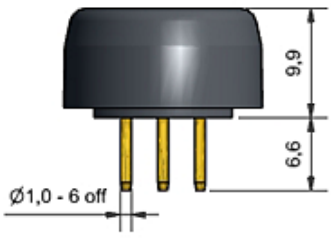

| | |
|---|---|
| Pins 1 & 3 | Heater |
| Pins 2 & 4 | Detector |

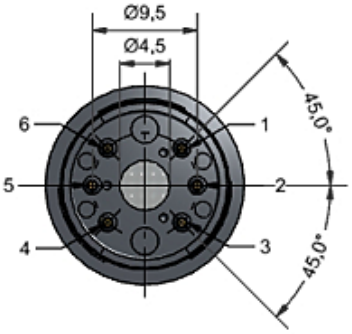
All dimensions in millimetres (± 0.1mm)

Top View | Side View | Bottom View



### H2S-PFF* Figure 3 Schematic Diagram


| | |
|---|---|
| Pins 1 & 6 | Detector |
| Pins 2 & 5 | Heater |
| Pins 3 & 4 | Detector |

All dimensions in millimetres (± 0.1mm)

Top View | Side View | Bottom View

* also available as H2S-*x*F1 (without external filter; dimensions as above)

Alphasense Ltd, Sensor Technology House, 300 Avenue West, Skyline 120, Great Notley. CM77 7AA. UK
Telephone: +44 (0) 1376 556 700 Fax: +44 (0) 1376 335 899 E-mail: sensors@alphasense.com Website: www.alphasense.com

# H2S Performance Data

Technical Specification

## GENERAL DESCRIPTION

The p-type metal oxide gas sensor is equipped with integrated filters to be selective to $H_2S$. The sensor is thermally cycled* to provide improved sensitivity with a large dynamic range and repeatable time-independent responses. The sensor also has low humidity response. The measured resistance of the sensing material increases in the presence of $H_2S$. This change in conductivity can be converted to an output voltage via a simple electrical circuit.

*The sensor is operated to alternate repeatedly between 400°C (the sensing temperature) and 525°C (the reset temperature). In this way, the exposure time in $H_2S$ is fixed at the dwell time at 400°C . The dwell time is determined by the detection range required by the end user. For further advice, please contact Technical Support.

## PERFORMANCE

| | | |
|---|---|---|
| Range | ppm $H_2S$ limit of performance warranty | 1 to 100 |
| Sensor resistance ($R_o$) | kΩ (humid air) | 250 ±50 |
| Sensor resistance ($R_g$) | kΩ; $H_2S$ @ 24ppm in air | 2300 ±500 |
| Sensor resistance ratio ($R_g/R_o$ x 100%) | %; $H_2S$ @ 24ppm in air | 900 ±100 |
| Gas response relationship ($R_g/R_o$ - 1 = k.Conc$^n$) (5 - 20ppm) | k is ppm$^{-1}$ ; power n is dimensionless ; Conc. is ppm | 0.34 +/- 0.04 (k); 1.0 (n) |
| Gas response relationship ($R_g/R_o$ - 1 = k.Conc$^n$) (20 - 100ppm) | k is ppm$^{-1}$ ; power n is dimensionless ; Conc. is ppm | 0.27 +/- 0.03 (k); 1.0 (n) |
| Heater resistance ($R_H$ at RT) | Ω (23 ±1°C) | 10 ±1.5 |
| Heater resistance ($R_H$ at sensing temp.) | Ω (400 ±10°C) | 22 ±3 |
| Heater resistance ($R_H$ at reset temp.) | Ω (525 ±10°C) | 26 ±3 |
| Heater power consumption (mW) typical for 5:1 | $V_H$ = 2.7 ±0.2V (400°C) | 340 ±30 |
| | 3.7 ±0.3V (525°C) | 530 ±50 |
| Operating Temperature Range | °C | -20 to 120 |

## CROSS SENSITIVITY - TBA following tests with filtered sensors

| | | |
|---|---|---|
| $H_2$ sensitivity | % measured gas @ 100 ppm $H_2$ | TBA |
| EtOH sensitivity | % measured gas @ 50 ppm EtOH | TBA |
| $C_3H_8$ sensitivity | % measured gas @ 500 ppm $C_3H_8$ | TBA |
| $NH_3$ sensitivity | % measured gas @ 25 ppm $NH_3$ | TBA |



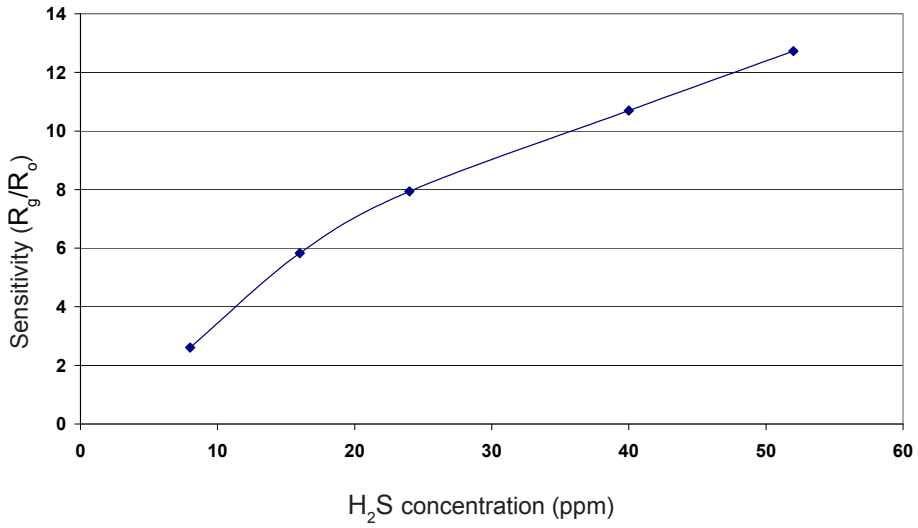
At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste, but contact the instrument manufacturer, Alphasense or its distributor for disposal instructions.

For further information on the performance of this sensor, on other sensors in our range. please contact Alphasense Ltd.

# H2S Performance Data

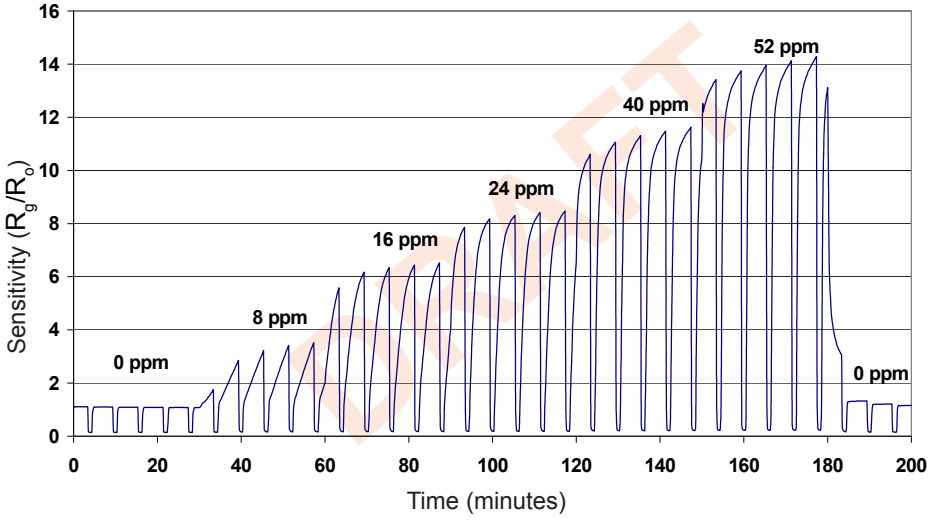
Technical Specification

## Figure 4 Sensitivity as a function of Concentration




Sensitivity over range 8 - 52 ppm $H_2S$ in 50% rh air. Operating in 2-temperature mode with a 5:1 cycle ratio of sensing (400°C) and resetting (525°C).

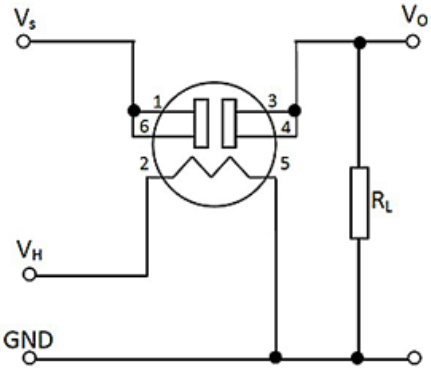
## Figure 5 Real-time sensitivity as a function of Concentration






Real time sensitivity data for 8-52ppm $H_2S$ in 50% rh air. Sensor operating in 2-temperature mode, pulsing between 400°C for 5 minutes and 525°C for 1 minute.

## Figure 6 Basic Measuring Circuit for H2S-AFF or H2S-PFF package




Pins on the measuring circuit, shown in Figure 6, correspond with the pin numbers in Figure 1, 2 & 3 above.

When the sensor is connected in this half Wheatstone bridge configuration, $V_O$ decreases as the sensing material resistance increases.

| | | |
|---|---|---|
| Heater Voltage | ($V_H$) | 2.7 ± 0.2 V (AC or DC) |
| Circuit Voltage | ($V_S$) | Max. 24 VDC |
| Load Resistance | ($R_L$) | > 1kΩ |

# H2S Performance Data

Technical Specification

## H2S-AFF EXPLOSION PROOF CERTIFICATION

This certification does not apply to H2S-MFF or H2S-PFF

### CERTIFICATION

| | | | |
|---|---|---|---|
| Sira 07ATEX 1088X | II 2 G<br>Ex d IIC T4<br>-40°C to 50°C<br>5V, 1.25 W | IECEx SIR07.0031X | Ex d IIC T4<br>5VRc, 1.25 W, $T_a$ -40° to 50°C |
| UL913 091007-E253708 | Class I, II and III, Division 1<br>10 V, 1.5 W, 10 µH | CSA 22.2 1906313 | Class 4828 31 |

SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

The non-metallic parts of the Flameproof Sensor Housings shall only be installed in enclosures that offer protection from mechanical impact damage and shall not be exposed to ultraviolet radiation.

The final installation of the Flameproof Sensor Housings shall ensure that any likely damage from dropping the complete device has been considered.

The Flameproof Sensor Housings shall only be connected to an electrical supply that is certified as compliant with IEC 60079-11 and limited to the following: Type D - 5 Vdc, 1.25 W