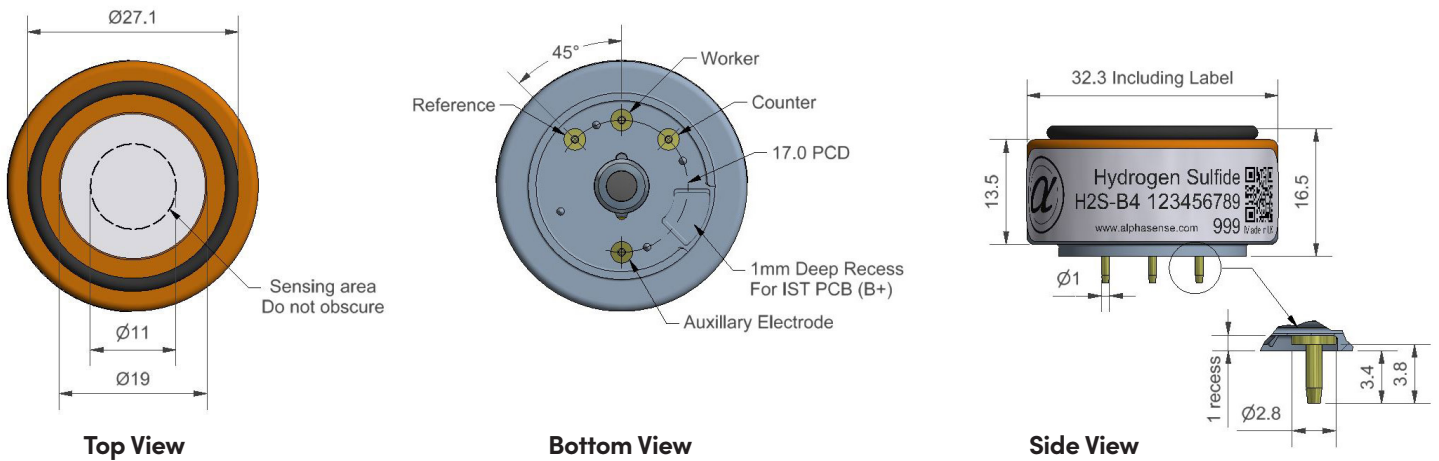


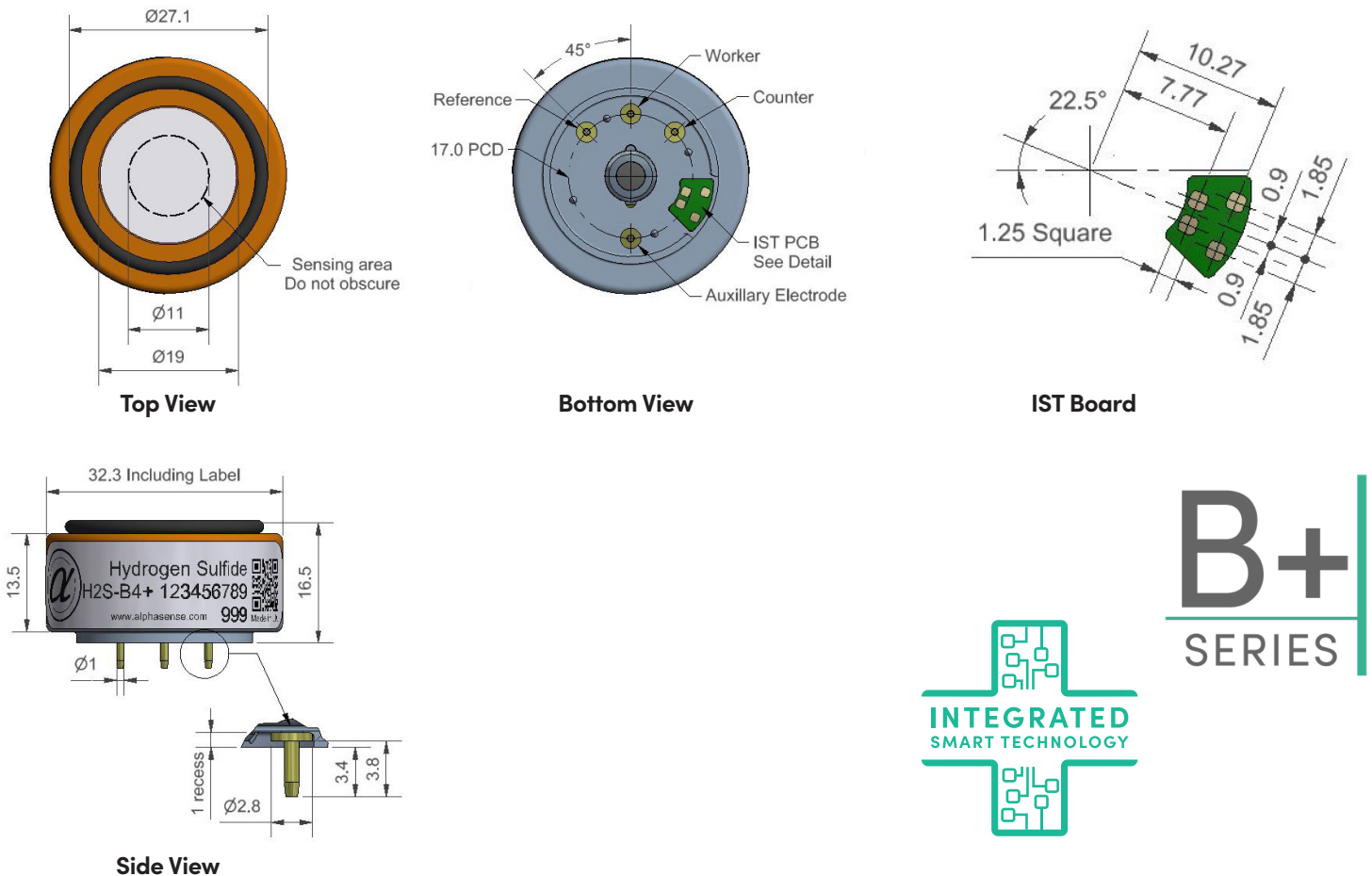
## H2S-B4/H2S-B4+ Hydrogen Sulfide Sensor

The H2S-B4 sensor is a PPB sensor that is designed for environmental air quality applications with best-in-class baseline stability. This product is available in our standard format (H2S-B4) and with our patented Integrated Smart Technology (H2S-B4+) that has an IST board with a memory chip and temperature sensor integrated in the sensor. The + sensors store specific calibration, specification, and identification data on every sensor allowing plug and play operation. The on-board temperature sensor improves the accuracy and simplicity of temperature compensation algorithms.

### H2S-B4 Hydrogen Sulfide Sensor – 4-Electrode



### H2S-B4+ Hydrogen Sulfide Sensor – 4-Electrode (with Integrated Smart Technology)



Dimensions are in millimetres (± 0.15 mm).

## Sensor Data

<b>Performance</b>	Sensitivity	nA/ppm at 2ppm H <sub>2</sub> S	1450 to 2600
	Response time	t90 (s) from zero to 2ppm H <sub>2</sub> S	< 60
	Zero current	nA in zero air at 20°C	-250 to 200
	Noise*	±2 standard deviations (ppb equivalent)	1
	Range	ppm H <sub>2</sub> S limit of performance warranty	100
	Linearity	ppb error at full scale, linear at zero and 40ppm H <sub>2</sub> S	< ± 4
	Overgas limit	maximum ppm for stable response to gas pulse	200
	<b>*Tested with Alphasense ISB low noise circuit</b>		
<b>Lifetime</b>	Zero drift	ppm equivalent change/year in lab air	< ± 100
	Sensitivity drift	% change/year in lab air, monthly test	< 20
	Operating life	months until 50% original signal (24-month warranted)	> 24
<b>Environmental</b>	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 2ppm H <sub>2</sub> S	77 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 2ppm H <sub>2</sub> S	100 to 110
	Zero @ -20°C	nA change from 20°C	50 to 60
	Zero @ 50°C	nA change from 20°C	-120 to -160
<b>Cross Sensitivity</b>	NO <sub>2</sub> sensitivity	% measured gas @ 5ppm	NO <sub>2</sub> < -10
	Cl <sub>2</sub> sensitivity	% measured gas @ 5ppm	Cl <sub>2</sub> < -12
	NO sensitivity	% measured gas @ 5ppm	NO < 12
	SO <sub>2</sub> sensitivity	% measured gas @ 5ppm	SO <sub>2</sub> < 20
	CO sensitivity	% measured gas @ 5ppm	CO < 3
	H <sub>2</sub> sensitivity	% measured gas @ 100ppm	H <sub>2</sub> < 0.5
	C <sub>2</sub> H <sub>4</sub> sensitivity	% measured gas @ 100ppm	C <sub>2</sub> H <sub>4</sub> < 0.1
	NH <sub>3</sub> sensitivity	% measured gas @ 20ppm	NH <sub>3</sub> < 0.1
CO <sub>2</sub> sensitivity	% measured gas @ 5%	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 (ISB circuit is recommended)	33 to 100
	Weight	g	< 13

Figure 1 Sensitivity Temperature Dependence

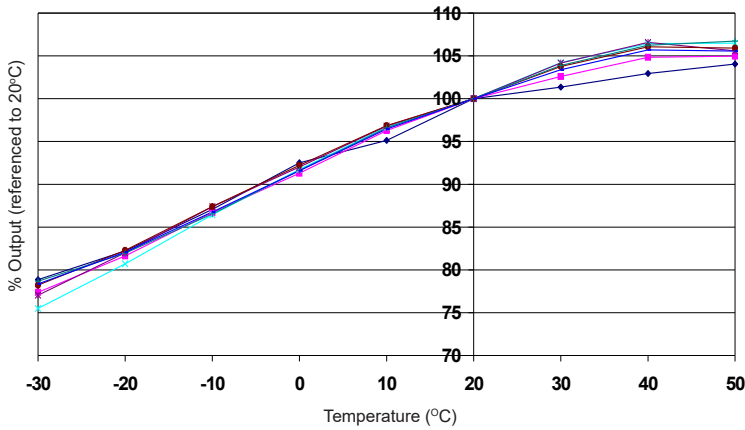


Figure 1 shows the temperature dependence of sensitivity at 2ppm H<sub>2</sub>S.  
This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

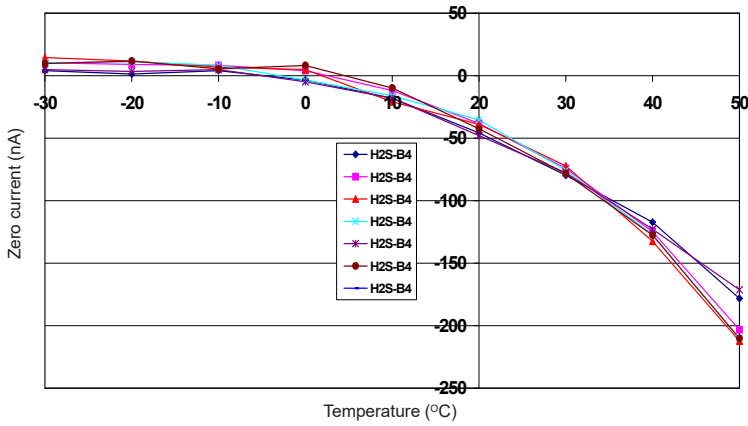


Figure 2 shows the variation in zero output of the working electrode caused by changes in temperature, expressed as nA.  
This data is taken from a typical batch of sensors.  
Contact Alphasense for further information on zero current correction.

Figure 3 Linearity to 200 ppb H<sub>2</sub>S

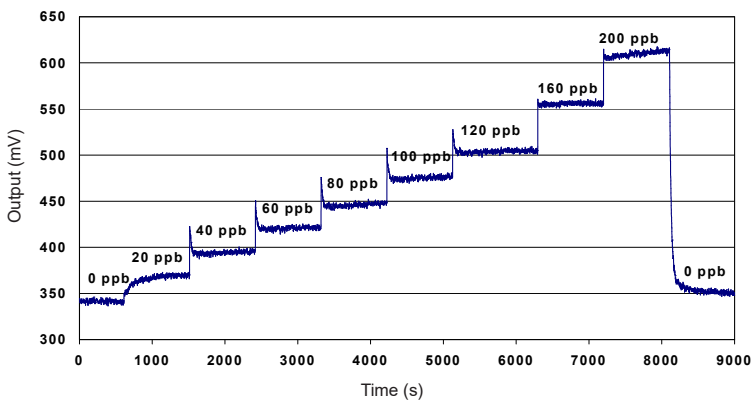


Figure 3 shows response to 200ppb H<sub>2</sub>S.  
Use of Alphasense ISB circuit reduces noise to 1ppb, with the opportunity of digital smoothing to reduce noise even further.

## IST Board Data

<b>Interface</b>	Communication Bus	Compatible with the 400 kHz I <sup>2</sup> C protocol
	Max. Bus Speed	Up to 1 MHz
	Input Logic Levels	High (Recessive) < 2.3 V   Low (Dominant) < 0.2 V
	Absolute Max. Input Signal	3.6 V

<b>Electrical</b>	Supply Voltage Range	1.7 V to 3.6 V
	Supply current – Stand-By	< 5 µA
	Supply current – Operating	< 0.15 mA (temperature reading only) < 2.15 mA (temperature reading + memory reading/writing)
	Power Supply Conditioning	Built-In 100 nF decoupling capacitor
	ESD Protection	4 kV (human body model) – Enhanced ESD / Latch-Up protection
	Bus Pins Input Capacitance	15 pF max.

<b>Performance</b>	Operational Temperature	-40 °C to +85 °C
	Temperature Sensor Accuracy	±1°C (-0°C to +70°C)
	Memory Data Retention	> 200 years
	Memory Write Cycles	> 4,000,000

<b>Data &amp; Communication</b>	Memory IC & I2C Address	M24128X-FCU   Device Address: R – 0xA0 / W – 0xA1
	Temperature IC & I2C Address	MAX31875R0TZS+T   Device Address: R – 0x90 / W – 0x91
	Product Data Start Address	0x0900
	Calibration Data Start Address	0x0B00
	User Data Area	0x0D00 – 0x18FF (3,072 Bytes)
	CRC Polynomial	0x 01 04C1 1DB7
	Digital Signature Algorithm	SHA-256

### Factory-populated data

<b>Product Data</b>
Data Format Version
Customer (OEM) ID
Product ID
Type of Sensor / Target Gas
Sensor Serial Number
End of Storage Period Date
Sensor Replacement Date
Product Data Checksum
Alphasense Digital Signature
Customer Digital Signature

<b>Calibration</b>
Calibration Data Units
Zero (clean dry air) Output
Calibration Span
Calibration Output
Sensitivity
Calibration Date
Calibration Data Checksum
Calibration Data Signature

<b>Sensor Specification</b>
Over-gas limit
Concentration Range
Temperature Range Low
Temperature Range High
Humidity Range Low
Humidity Range High
Pressure Range Low
Pressure Range High
Specification Checksum

### 15,000+ locations

<b>Customer Specific</b>
Custom Parameters
Re-Calibration Due Date
Operational Limits:
Low   High   STEL   TWA
Next Bump Test Due Date
User Data Area

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. NOTE: all sensors are tested at ambient environmental conditions 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.

In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Alphasense Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within. (©ALPHASENSE LTD) Doc. Ref. H2S-B4/FEB24