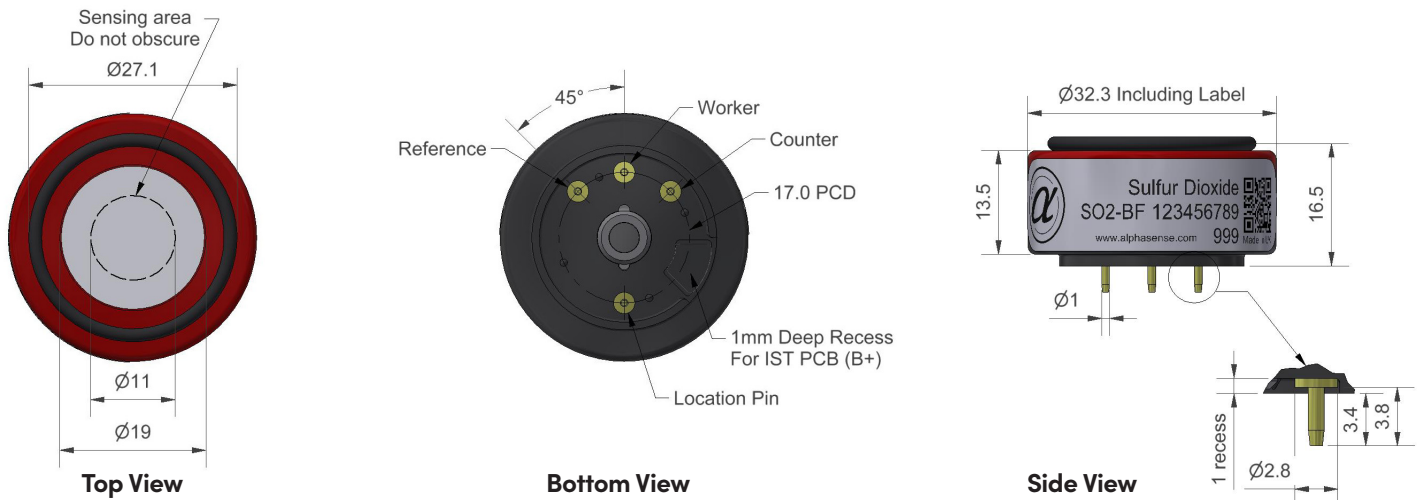


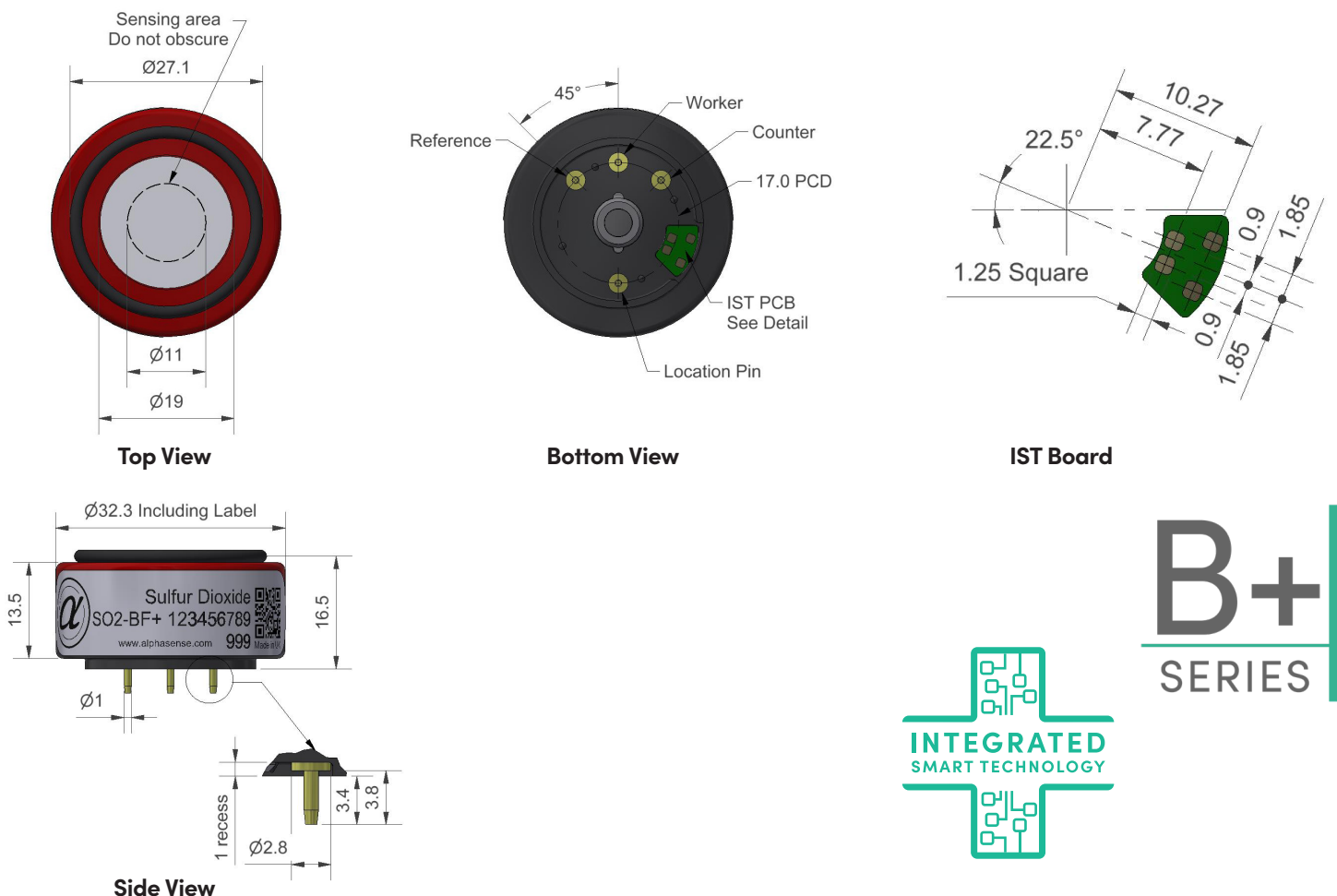
SO2-BF/SO2-BF+ Sulfur Dioxide Sensor

The SO2-BF sensor is a PPM sensor that is designed for a broad variety of applications and instrumentation including portable gas detectors and fixed gas detection systems for industrial safety, environmental air quality and process control. This product is available in our standard format (SO2-BF) and with our patented Integrated Smart Technology (SO2-BF+) 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.

SO2-BF Sulfur Dioxide Sensor – 3-Electrode



SO2-BF+ Sulfur Dioxide Sensor – 3-Electrode (with Integrated Smart Technology)



Dimensions are in millimetres (± 0.15 mm).

Sensor Data

Performance	Sensitivity	nA/ppm in 20ppm SO ₂	300 to 480
	Response time	t ₉₀ (s) from zero to 20ppm SO ₂	< 40
	Zero current	ppm equivalent in zero air	< ±0.5
	Resolution	RMS noise (ppm equivalent)	< 0.1
	Range	ppm limit of performance warranty	100
	Linearity	ppm error at full scale, linear at zero and 20ppm SO ₂	< ±2
	Overgas limit	maximum ppm for stable response to gas pulse	1000
Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.1
	Sensitivity drift	% change/year in lab air, monthly test	< 4
	Operating life	months until 80% original signal (24 month warranted)	> 24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 20ppm	78 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 10ppm	100 to 120
	Zero @ -20°C	ppm equivalent change from 20°C	< 0 to 1
	Zero @ 50°C	ppm equivalent change from 20°C	< 0 to 2
Cross sensitivity	Filter capacity	ppm-hrs H ₂ S	450
	H ₂ S sensitivity	% measured gas @ 20ppm H ₂ S	< 2
	NO ₂ sensitivity	% measured gas @ 10ppm NO ₂	< -120
	Cl ₂ sensitivity	% measured gas @ 10ppm Cl ₂	< -50
	NO sensitivity	% measured gas @ 50ppm NO	< -10
	CO sensitivity	% measured gas @ 400ppm CO	< 1.5
	H ₂ sensitivity	% measured gas @ 400ppm H ₂	< 0.5
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm C ₂ H ₄	< 50
Key specifications	NH ₃ sensitivity	% measured gas @ 20ppm NH ₃	< 0.1
	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 (recommended)	10 to 47
	Weight	g	< 13

Figure 1 Sensitivity Temperature Dependence

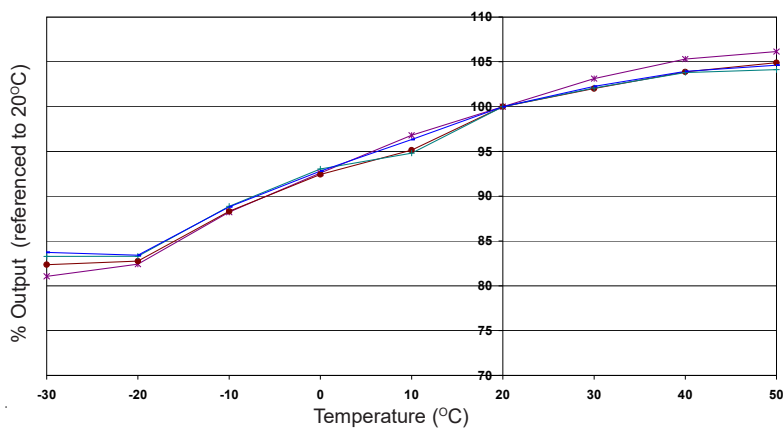


Figure 1 shows the variation in sensitivity caused by changes in temperature.

This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

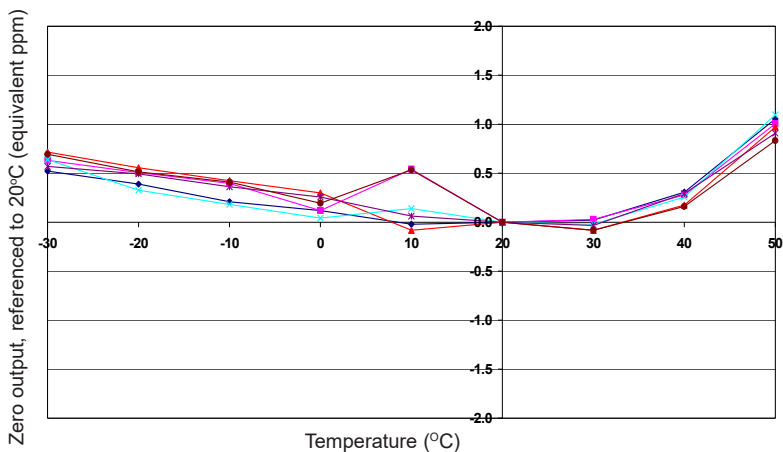


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 Response to 1000 ppm SO₂

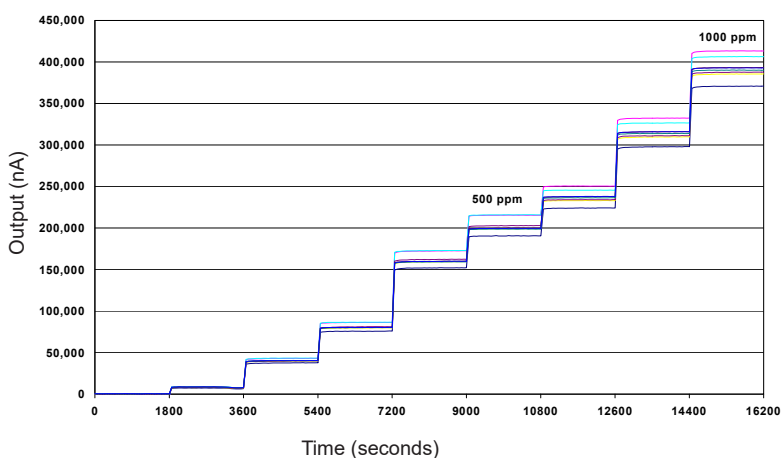


Figure 4 shows the response of the SO₂-BF up to 1000ppm SO₂.

This data is taken from a typical batch of sensors.

The output remains linear and stable up to 1000ppm SO₂. Sensors recover from overgas without change to their performance.

IST Board Data

Interface	Communication Bus Max. Bus Speed Input Logic Levels Absolute Max. Input Signal	Compatible with the 400 kHz I ² C protocol Up to 1 MHz High (Recessive) < 2.3 V Low (Dominant) < 0.2 V 3.6 V
Electrical	Supply Voltage Range Supply current – Stand-By Supply current – Operating Power Supply Conditioning ESD Protection Bus Pins Input Capacitance	1.7 V to 3.6 V < 5 µA < 0.15 mA (temperature reading only) < 2.15 mA (temperature reading + memory reading/writing) Built-In 100 nF decoupling capacitor 4 kV (human body model) – Enhanced ESD / Latch-Up protection 15 pF max.
Performance	Operational Temperature Temperature Sensor Accuracy Memory Data Retention Memory Write Cycles	–40 °C to +85 °C ±1°C (–0°C to +70°C) > 200 years > 4,000,000
Data & Communication	Memory IC & I2C Address Temperature IC & I2C Address Product Data Start Address Calibration Data Start Address User Data Area CRC Polynomial Digital Signature Algorithm	M24128X-FCU Device Address: R – 0xA0 / W – 0xA1 MAX31875R0TZS+T Device Address: R – 0x90 / W – 0x91 0x0900 0x0B00 0x0D00 – 0x18FF (3,072 Bytes) 0x 01 04C1 1DB7 SHA-256

Factory-populated data

15,000+ locations

Product Data 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	Calibration Calibration Data Units Zero (clean dry air) Output Calibration Span Calibration Output Sensitivity Calibration Date Calibration Data Checksum Calibration Data Signature	Sensor Specification 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
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Customer Specific Custom Parameters Re-Calibration Due Date Operational Limits: Low High STEL TWA Next Bump Test Due Date User Data Area

*Note: Above 85% rh and 40oC a maximum continuous exposure period of 10 days is warranted. Where such exposure occurs the sensor will recover normal electrolyte volumes when allowed to rest at lower % rh and temperature levels for several days.

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, 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.

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. SO2-BF/FEB24