Humidity sensors
Accurate monitoring for all industries

SENSIRION

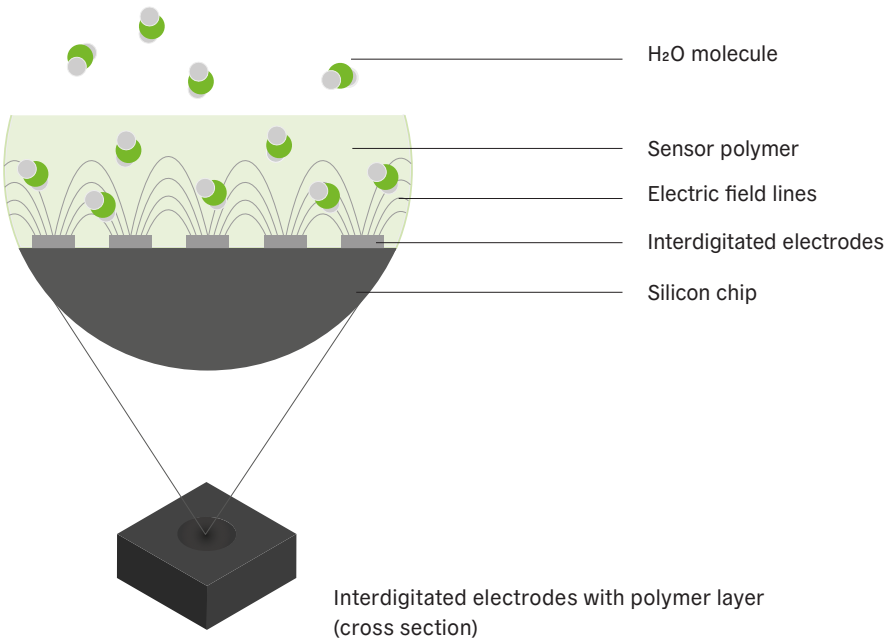
Tested and proven worldwide

Our high-accuracy digital humidity sensors are based on Sensirion's CMOSens® Technology, which combines the strengths of standard CMOS production processes and advanced MEMS technology on a single silicon chip. In-house sensor calibration and testing infrastructure enables efficient processes that comply with established quality standards. Each sensor is individually calibrated and tested for quality and accuracy. The high reliability of our sensors has been proven by more than half a billion sensors in the field over more than ten years. Additionally, it is guaranteed through a rigorous qualification based on the AEC-Q100 automotive standard.

The sensors are certified by ISO17025 and NIST, while also benefiting from the comprehensive data accessibility provided by Libellus, our cloud platform. These certifications affirm our commitment to industry standards and best practices in quality, calibration, and reliability.

Capacitive measurement principle

Our humidity sensors are based on the capacitive measurement principle. The sensing element consists of a dielectric polymer, which absorbs or releases water proportionally to the relative ambient humidity. This change in water concentration alters the dielectric constant of the polymer and is measured through the sensor's integrated circuit. Temperature measurement is implemented by Bipolar Junction Transistors (BJTs).



Interdigitated electrodes with polymer layer (cross section)

SEK-SHTxx evaluation kit
Straightforward sensor evaluation

The SHT4xx Evaluation Kit (SEK) is designed to facilitate seamless sensor evaluation. With plug-and-play hardware and ControlCenter viewer software, the SEK offers a straightforward and efficient testing process. It provides an essential tool for assessing sensor performance. Note that while all SHTxx EKs operate similarly, each kit caters to different sensor variants.

- Quick, easy, cost-efficient sensor evaluation
- Kit content: 3 sensor samples, on FPCB, RJ45 adapter cable (1 meter length)
- ControlCenter: displays and logs signals for multiple sensors on one PC
- SensorBridge required (must be bought separately)

Learn more about the SEK-SHTxx

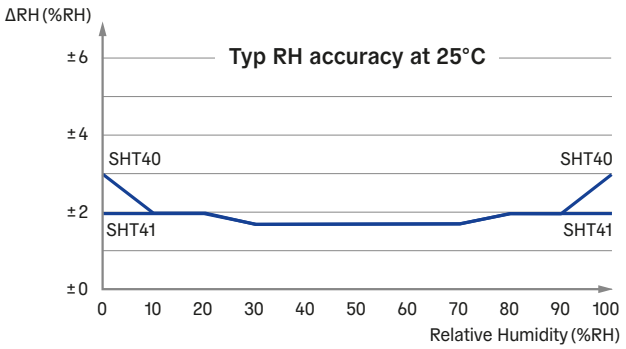
SHT4x

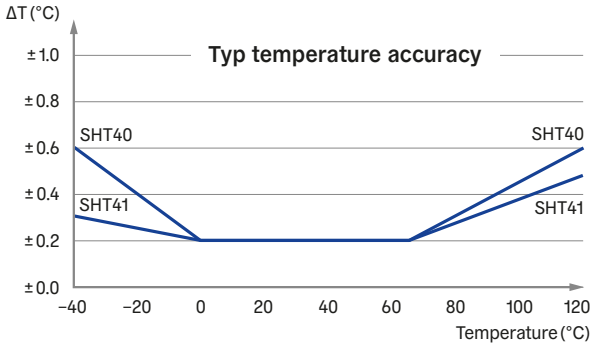
Our SHT4x offers unmatched price-performance with outstanding humidity and temperature sensing and the ideal combination of high accuracy and low power consumption. With a wide supply voltage range (1.08 V to 3.6 V), it is ideal for consumer and battery-driven devices, alongside its compliance with RESET®, WELL Building Standard™ and UL 2905. Additionally, the SHT43 is ISO17205 certified with calibration certificates available for download at libellus.sensirion.com.

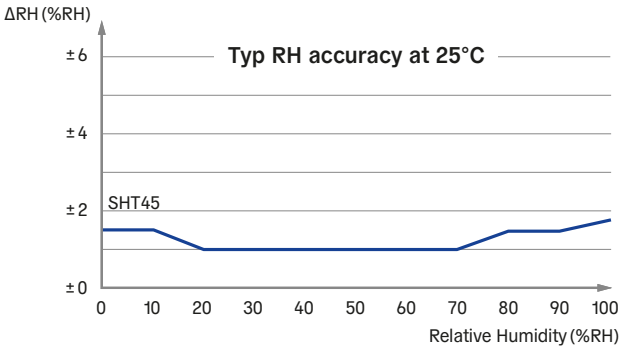
Features	Benefits
Available in multiple accuracy ranges	Adaptability and cost-effectiveness
Four-pin DFN packaging	Suitable for standard SMD assembly processes
Compact footprint of only 1.5 × 1.5 × 0.5 mm³	Ideal for high-volume applications
ISO17025 temperature calibration certificate on-demand	Enables tracking applications (cold chain, pharmaceuticals, and asset tracking)
Available in different I²C addresses	Flexible integration into complex architectures
Up to 0.08 °C temperature accuracy between 32 and 42 °C	Higher accuracy in body temperature range
Optional wettable flanks	Automated optical inspection for high-volume products

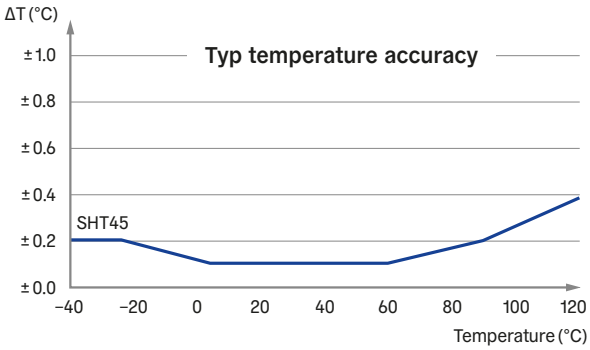
Applications

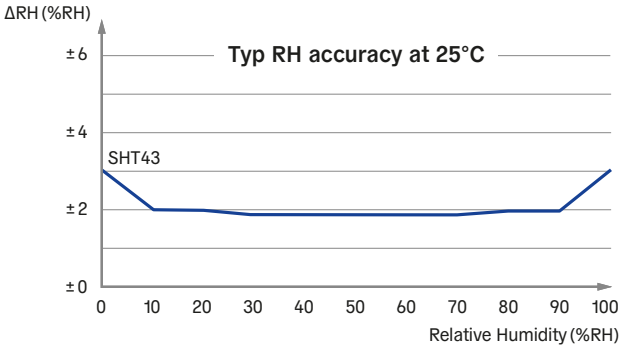
- Wearable fitness and activity monitors
- Weather stations
- Smart home devices
- Mobile phones, laptops, tablets
- Core-body and skin temperature sensing
- Trackers and data loggers

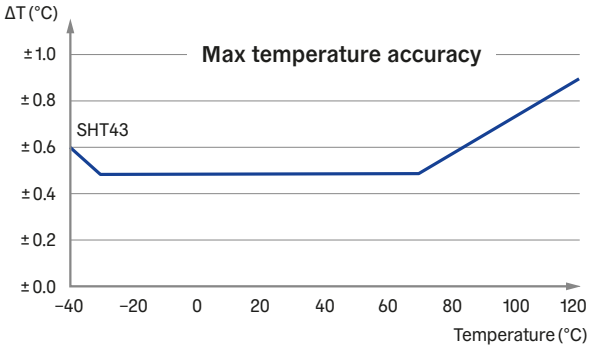








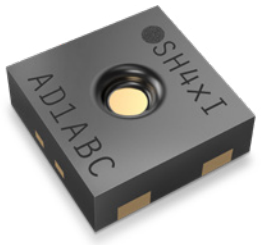




Learn more about the
SHT4x

SHT4xI

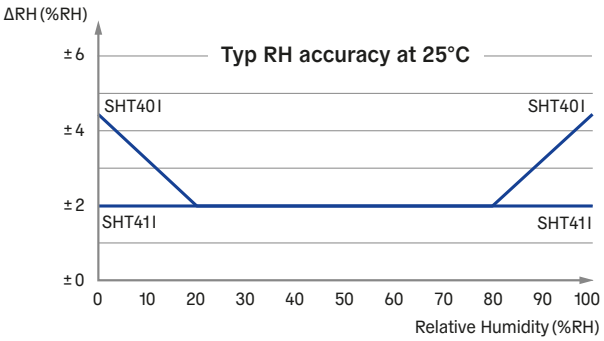
The SHT4xI sensor platform expands our 4th generation humidity sensing series for demanding industrial applications. With precision variants SHT40I and SHT41I featuring 5 V supply voltage, superior robustness, and enhanced ESD protection, it upholds our track record of accuracy and durability. Through CMOSens® Technology, it ensures reliability and seamless integration, perfect for precise and reliable measurements under rough conditions.

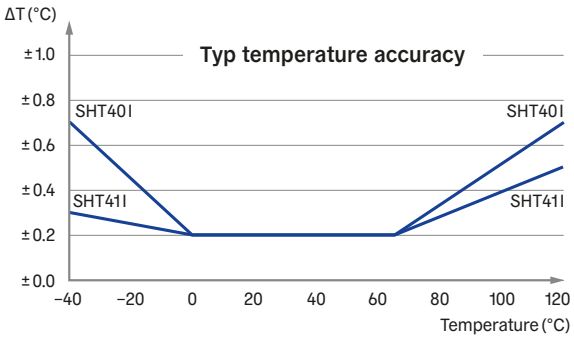


Features	Benefits
Fully functional in condensing environment	Long-term stability and energy efficiency
Customizable analog output	Customer-defined RH/T vs. voltage output
NIST traceability	High accuracy and quality assurance
Water activity measurement in oil	Monitoring of pump and transformer systems
Variable power heater	Decontamination capabilities
Patented protection options	Compatibility and functionality in harsh environments
JEDEC JESD47 qualification	High reliability

Applications

- Refrigerators
- Heat exchangers
- Air conditioners
- Smart thermostats
- Dehumidifiers





Learn more about the
SHT4xI

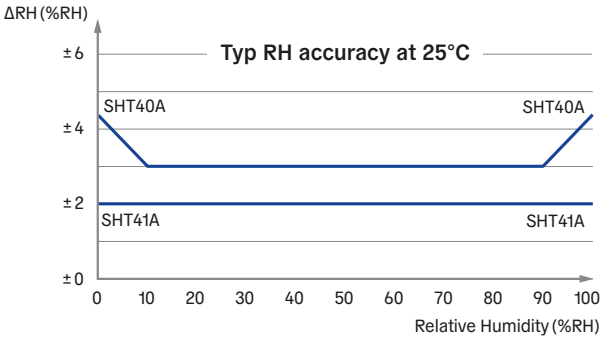
SHT4xA

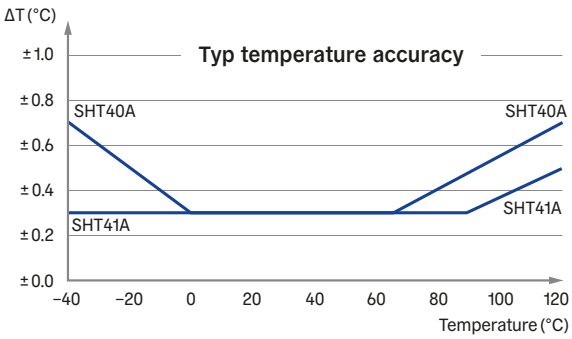
The SHT4xA sensor platform is the latest addition to our 4th-generation humidity series, specifically designed for automotive applications. With diverse accuracy options and interfaces (I²C or PWM), it offers versatility. AEC-Q100 qualification ensures superior reliability, while a power heater enables advanced self-diagnosis. Based on CMOSens® Technology and available with wettable flanks packaging available, the SHT4xA delivers precision and reliability tailored for automotive applications.

Features	Benefits
AEC-Q100 qualified	Guaranteed high reliability through automotive standard
Robust DFN housing with optional wettable flanks	Facilitated integration and inspection
Included power heater	Advanced self-diagnosis capabilities
Fully functional in condensing environments	Best-in-class humidity and temperature accuracy
Available in three I²C-Address versions and PWM	Communication and interfacing flexibility

Applications

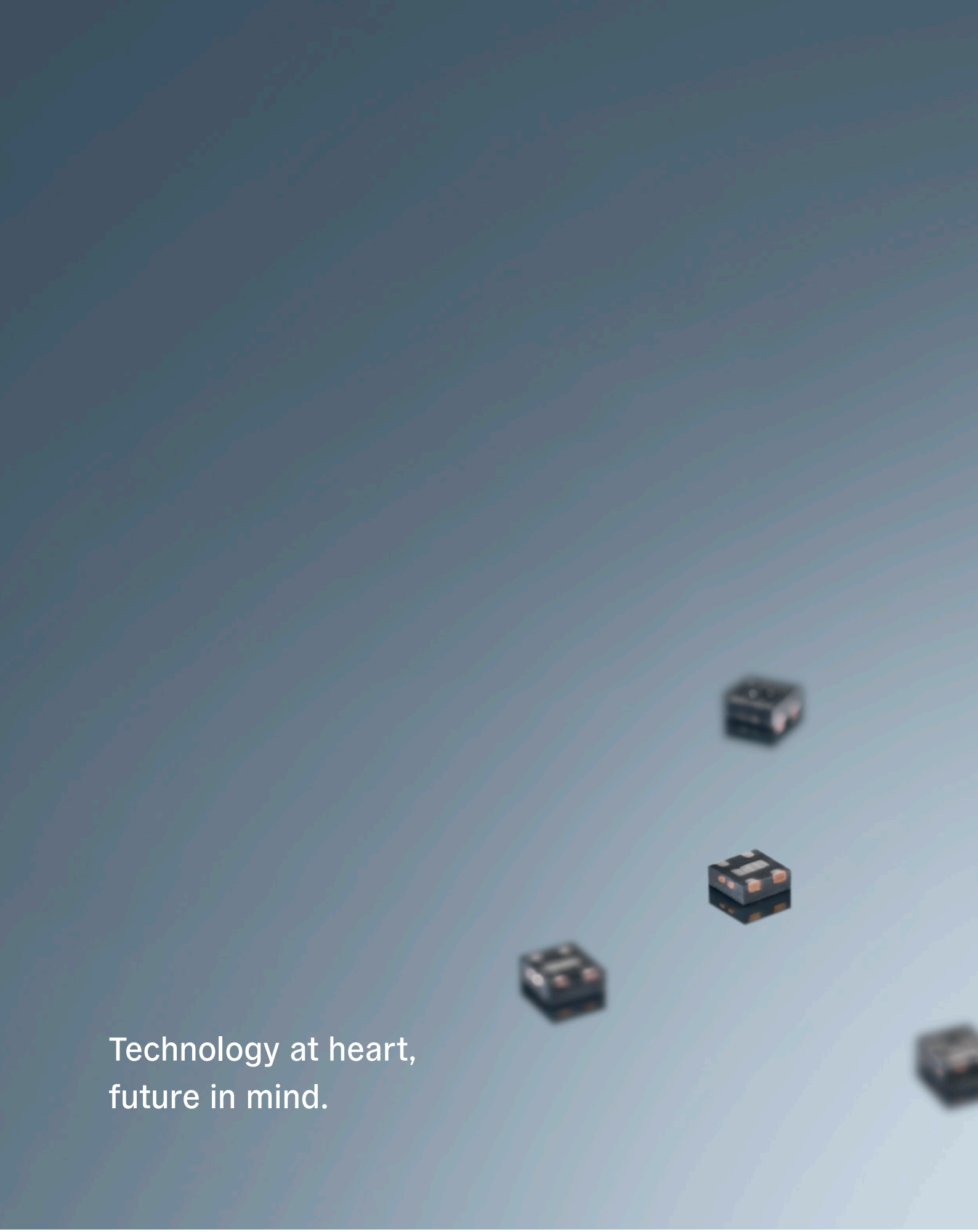
- Anti-fogging detection module
- Thermal runaway monitoring
- Steer-by-Wire and Break-by-Wire
- Onboard HVAC systems





Learn more about the
SHT4xA

Humidity sensor	SHT40	SHT41	SHT43	SHT45	SHT40I		SHT41I	SHT40A	SHT41A
Typical accuracy (% RH)	± 1.8 (30 to 70% RH)		± 1 (20 to 70% RH)		Digital: ± 2 (20 to 80% RH)	Analog: ± 2.5 (20 to 80% RH)	± 2 (0 to 100% RH)	± 3 (10 to 90% RH)	± 2 (0 to 100% RH)
Maximum accuracy (% RH)	± 3.5 (10 to 90% RH)	± 2.5 (0 to 90% RH)	± 3.5 (10 to 90% RH)	± 2 (0 to 90% RH)	± 4 (20 to 80% RH)		± 2.5 (0 to 90% RH)	± 4.5 (10 to 90% RH)	± 2.5 (0 to 90% RH)
Hysteresis (%RH)	±0.8				± 0.8			± 0.8	
Typ long-term drift (&RH/y)	<0.20				< 0.20			< 0.20	
Operating range (&RH)	0 to 100				0 to 100			0 to 100	
Response time (s)	4				4			4	
Temperature sensor									
Typical accuracy (°C)	± 0.2 (0 to 65 °C)		± 0.1 (5 to 60 °C)		Digital: ± 0.2 (0 to 65 °C)	Analog: ± 0.3 (0 to 65 °C)	± 0.2 (0 to 65 °C)	± 0.3 (0 to 65 °C)	± 0.2 (0 to 90 °C)
Maximum accuracy (°C)	± 0.4 (0 to 65 °C)		± 0.48 (0 to 65 °C)	± 0.2 (5 to 60 °C)	± 0.4 (0 to 65 °C)			± 0.4 (0 to 65 °C)	± 0.4 (–40 to 125 °C)
Typ long-term drift (°C/y)	< 0.03		< 0.01	< 0.03	< 0.03			< 0.03	
Operating range (°C)	–40 to 125				–40 to 125			–40 to 125	
Response time (s)	2				2			2	
Electrical									
Interface	I²C, FM+				I²C			I²C, PWM, SDM, MSPPM	
Number of addresses available	3		2	3	Digital: 3	Analog: n/a	3	3	
Supply voltage range (V)	1.08 to 3.6				2.3 to 5.5			1.08 to 5.5	
Measurement duration (ms)	6.9 (high), 1.3 (low)				6.9 (high), 1.3 (low)			6.9 (high), 1.3 (low)	
Avg current consumption (µA)	2.4 (high), 0.4 (low)				21 (high), 18 (low)			20 (high), 18 (low)	
Idle current (µA)	0.08				18			18	
Integrated Heater									
Power (mW)	20 – 110 – 200				Digital: 20 – 110 – 200	Analog: 100 – 150 – 200	20 – 110 – 200	20 – 110 – 200	
Pulse duration (s)	0.1 – 1				Digital: 0.1 – 1	Analog: 0.1, 0.5, 1.2	0.1 – 1	0.1 - 1	
Other									
Size	1.5 × 1.5 × 0.5 mm³				1.5 × 1.5 × 0.5 mm³			1.5 × 1.5 × 0.5 mm³	
Protection option	Filter membrane, protective cover				Filter membrane, protective cover			Protective cover	
ISO17025 certification	no		yes	no	no			no	
Wettable Flanks	no				no			yes	
Compliance with IAQ standards	RESET, WELL, UL 2905				RESET, WELL, UL 2905				



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