HUMIDITY

TEMPERATURE

FLOW

CONDUCTIVITY

P14 Rapid

Capacitive Humidity Sensor

For weather balloons and radio sondes

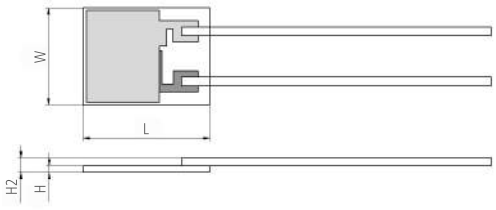
INNOVATIVE SENSOR TECHNOLOGY

Benefits & Characteristics

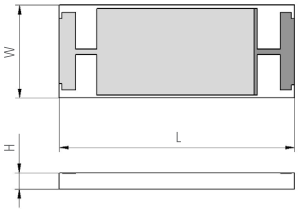
- Ultra fast response time
- Condensation resistant
- High humidity stability
- Wide temperature range
- Temperature shock resistant
- Fast recovery time
- Customer specific sensor available upon request

Illustration[1)]

Wired



SMD



1) For actual size, see dimensions

Technical Data

	Wired	SMD
Dimensions (L x W x H / H2 in mm):	5 x 3.81 x 0.4 / 0.8	6.35 x 2.54 x 0.4
Capacitance at 30 % RH and +23 °C (C_{30}):*	140 pF ±40 pF	180 pF ±50 pF
Sensitivity at C_{30} = 150 pF/ 180 pF (15 % RH to 90 % RH):	0.25 pF/% RH	0.3 pF/% RH
Operating humidity range:	0 % RH to 100 % RH (maximal dew point +85 °C)	
Operating temperature range:	-80 °C to +150 °C	
Loss factor:	< 0.01 (at 23 °C, at 10 kHz, at 90 % RH)	
Linearity error:	< 1.5 % RH (15 % RH to 90 % RH at +23 °C after one point calibration)	
Hysteresis:	< 1.5 % RH	
Response time t_{63}:[2)]	< 1.5 s (50 % RH to 0 % RH at +23 °C)	
2) The response time is often measured for increasing humidity steps, whereas physics predicts that decreasing humidity leads to generally far longer response times for capacitive humidity sensors. IST thus measures response times always for decreasing humidity values, since this is the worst case.		
Temperature dependence (nominal):	Δ % RH = (B1 x % RH + B2) x T [°C] + (B3 x % RH + B4)	
	B1 = 0.0014 [1/ °C]	B2 = 0.1325 [% RH/ °C]
	B3 = -0.0317	B4 = -3.0876 [% RH]
Measurement frequency:	1 kHz to 100 kHz (recommended 10 kHz)	
Maximal supply voltage:	< 12 V_{pp} AC	

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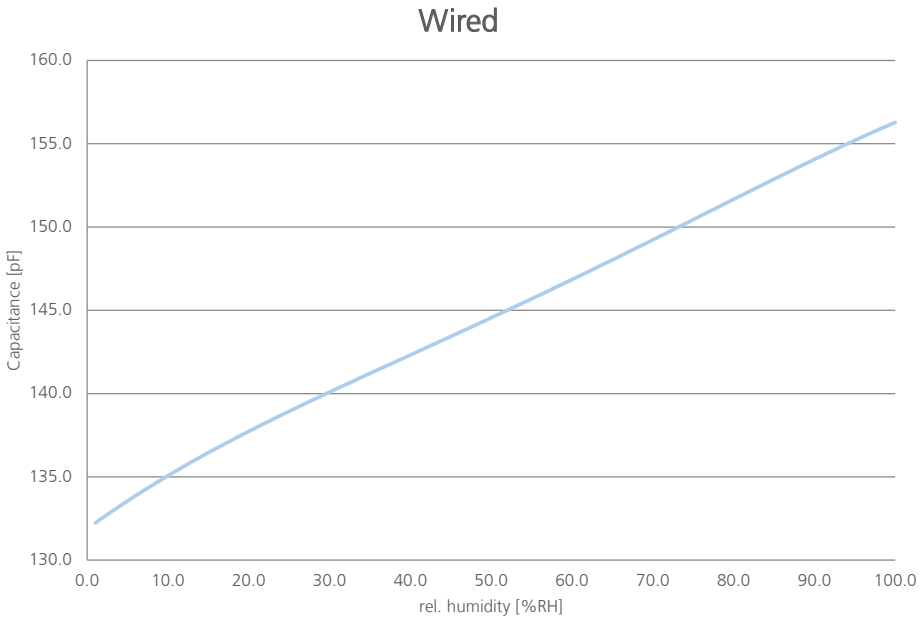
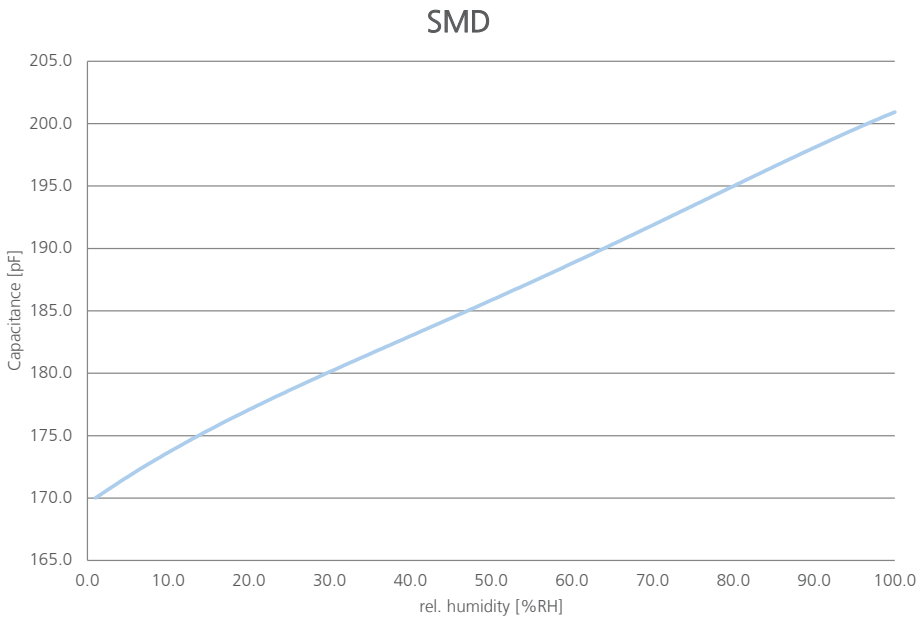
Signal form:	alternating signal without DC bias
Connection:*	CuP-SIL-wire post-plated with Sn, 10 mm or Au/Cu-wire, Ø 0.4 mm or SMD automatic assembly compatible

* Customer specific alternatives available

The calibration of the sensor must be done 5 days after soldering at the earliest.

Characteristic Curve





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Order Information - SIL (CuP-SIL-wire post-plated with Sn, 10 mm)

	P14 Rapid (140 ±40pF)
Order code	040.00119

Order Information - SMD

	P14 SMD Rapid-G (180 ±50pF)
Order code	040.00170

Order Information - Au/Cu-wire, Ø 0.4 mm

	P14 Rapid-W (140 ±40pF)
Order code	040.00177

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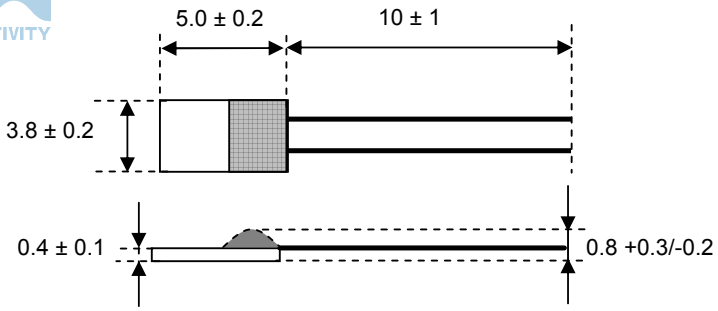
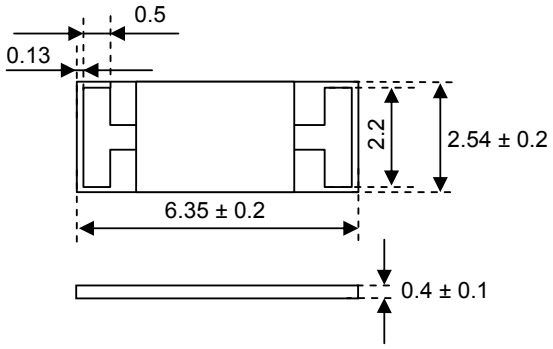
Construction Sizes

Wired (in mm)



SMD (in mm)



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P14 Rapid
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Handling guideline

Packaging

Type:	Delivery packaging:
P14 SMD	Tray (448 pieces)
P14 Femtocap	Tray (400 pieces)

The sensors in the trays are covered with a dummy tray. Therefore, please consider careful handling while opening the trays. The active sensor area is faced down.

Storage

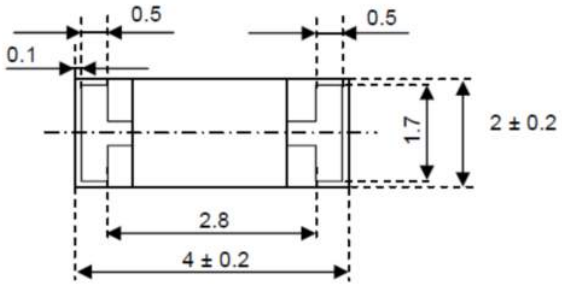
Storage temperature	-20°C...+50°C (-4...122°F)

The sensors must be stored in the original trays only.

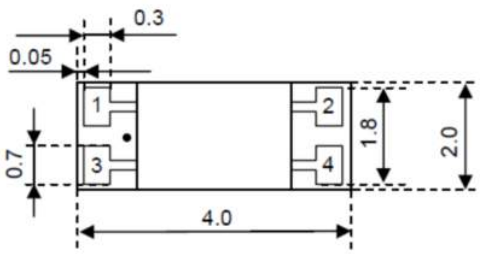
Layout geometry

The following information is all in mm.

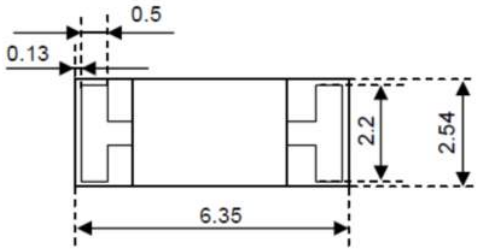
P14 Femtocap



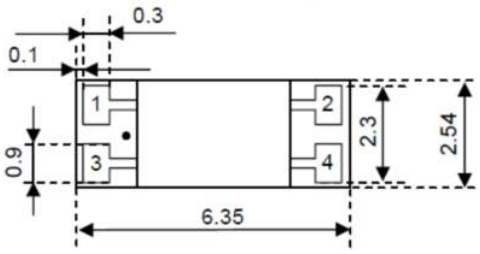
P14 Femto Thermo



P14 SMD



P14 SMD Thermo



Please consider position and size of the SMD soldering pads on the PCB to be similar to the rectangular part outside of the connecting pads on the chip.

P14 Rapid
Capacitive Humidity Sensor
Handling guideline

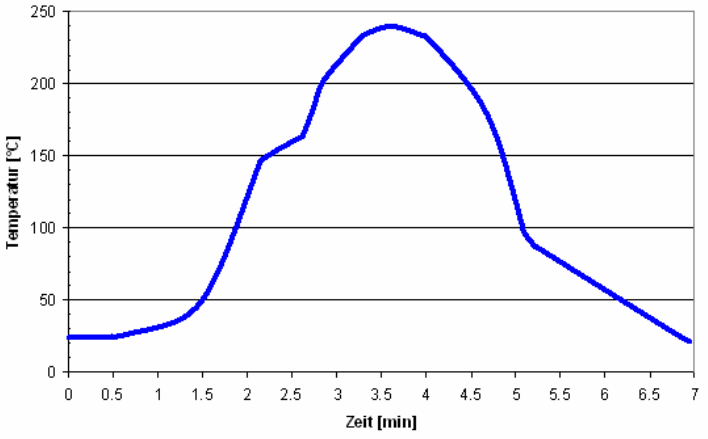
Sensor handling

- The sensitive area must not be touched, damaged or scratched. While soldering, no flux or solder must touch the sensitive area.
- The sensor must not be exposed to mechanical stress, e.g. bending or touching with sharp-edged objects.
- The transport of the sensor is only possible using a suction tool at its backside, at the contact pads or its outer run.

Soldering profile

- The soldering profile depends on the applied soldering paste and the reflow oven. The profiles are to be requested from the solder paste manufacturer.
- Unless otherwise identified in the documents of the manufacturer, it is generally to be considered to not exceed 1 to 2 minutes with a maximum allowed temperature of **240°C**.
- The calibration of the sensors has to been done **5 days after soldering at earliest**. This time is needed to provide a relaxation after the heat induces during the soldering process.
- Recommended solder paste: SAC305 (96.5Sn / 3.0Ag / 0.5Cu)
  Supplier: Indium Corporation

Typical reflow-temperature soldering-profile (lead free):



Soldering by hand

- Up to **320°C** briefly (< 10 s) and only in the soldering pads area.

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Cleaning of the sensor

- The sensor can be cleaned in isopropanol at 23°C only. Followed by drying.
- The sensor cannot be cleaned mechanically with cotton swabs for instance.
- It is possible to clean the sensor with oil free and filtered clean air, e.g. to remove dust particles.

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