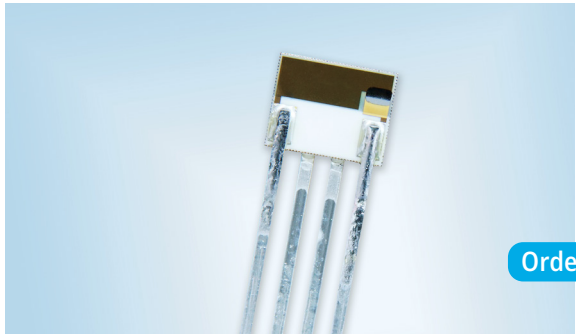


P14 4051 FW Thermo Rapid 2

Capacitive Humidity Sensor

Optimal for weather balloons / radiosondes with on-chip heater and temperature sensor



Order code 154150

Benefits & Characteristics

- Extraordinary fast response time: 3 x faster than P14 Rapid
- Temperature shock resistant
- Robust against icing
- Humidity sensor with on-chip heater / temperature sensor enables fast recovery time after condensation
- Outstanding sensitivity
- Customer-specific sensor available upon request

Illustration¹⁾



Front side: humidity sensor



Back side: Heater / temperature sensor



Side-view

¹⁾ For actual size, see mechanical dimensions

Technical Data

Dimensions (L x W x H / H2 in mm):	4.0 x 5.1 x 0.4 / 1.5
Operating humidity range:	0 % RH to 100 % RH (maximal dew point +85 °C)
Operating temperature range:	-80 °C to +150 °C
Heater / temperature sensor:*	Pt100 (100 Ω at 0 °C)
Heater/temperature sensor accuracy:	IEC60751 ±1%: ±(2.59 + 0.05 x T) °C T = absolute value of temperature in °C
Capacitance (C ₃₀):*	650 pF ±150 pF (at 30 % RH and +23 °C)



Typical sensitivity (at $C_{30} = 650$ pF): 1 pF/% RH (15 % RH to 90 % RH)

Loss factor: < 0.05 (at 23 °C, at 10 kHz, at 15 % RH to 90 % RH)



Linearity error: < 1.5 % RH (15 % RH to 90 % RH at +23 °C)

Hysteresis: < 2.5 % RH



Response time $t_{63}^{-2)}$ 0.3 s \pm 0.2s (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 AG thus measures response times always for decreasing humidity values, since this is the worst case.



Temperature dependence (nominal): $\Delta \% RH = (B1 \times \% RH + B2) \times T [^{\circ}C] + (B3 \times \% RH + B4)$

$$B1 = 0.0014 [1/^{\circ}C] \qquad B2 = 0.1325 [\% RH/^{\circ}C]$$

$$B3 = -0.0317 \qquad B4 = -3.0876 [\% RH]$$



Measurement frequency range: 1 kHz to 100 kHz (recommended 10 kHz)



Maximal supply voltage: < 12 V_{pp} AC

Signal form: alternating signal without DC bias

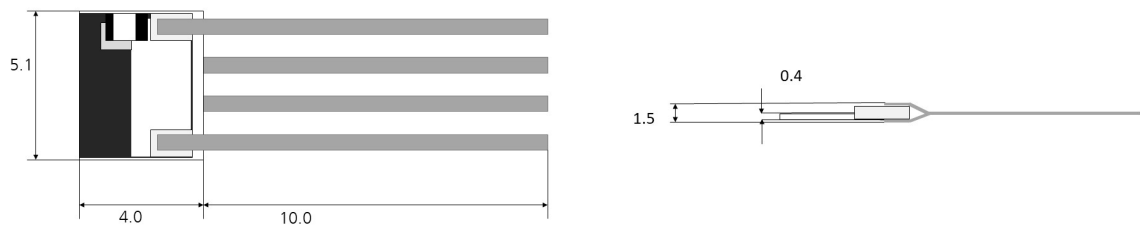


Connection*: CuSn flat wire, 10 mm
W x H: 0.5 x 0.25 mm with 1.27 mm pitch

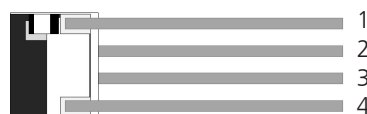
* Customer-specific alternatives available

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

Mechanical Dimensions



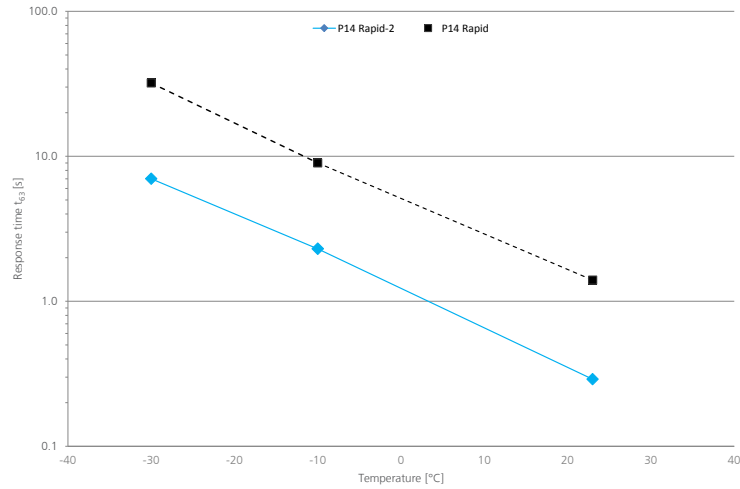
Pin assignment



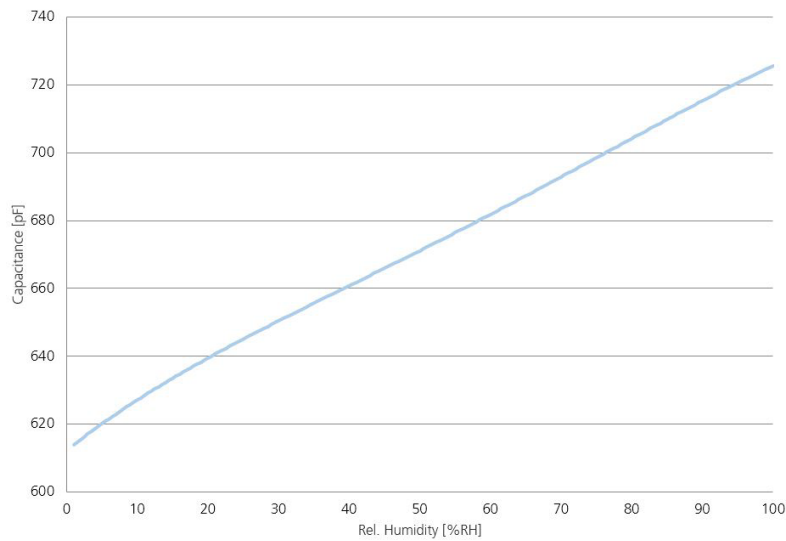
1	2	3	4
humidity sensor	heater/temperature sensor	heater/temperature sensor	humidity sensor



Response time (typical)



Characteristic Curve (typical)



Order Information - CuSn flat wire, 10 mm

Nominal resistance: 100 Ω at 0 °C

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