

P14 4051 FW Thermo Rapid 2

**Capacitive Humidity Sensor
with on-chip heater & temperature sensor**
Optimal for weather balloons
/radio sondes

Benefits & characteristics

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

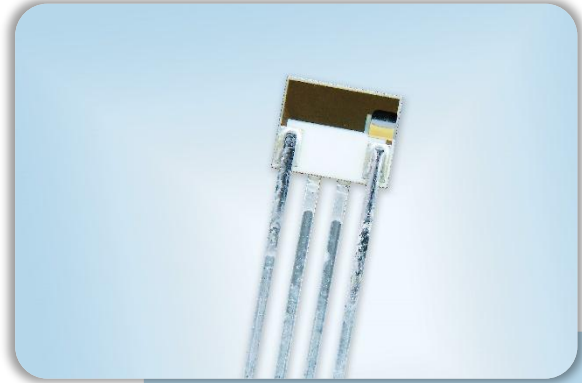


Illustration ¹⁾



Front side: humidity sensor












Back side:
heater/temperature sensor



Side view

¹⁾ for actual size see dimensions in order information

Technical data

	Dimensions (L x W x H/H2 in mm):	40 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%: $\pm(2.59 + 0.05 \times T)$ °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) after one-point calibration
	Response time t ₆₃ : ²⁾	0.3 s ± 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 thus measures response times always for decreasing humidity values, since this is the worst case

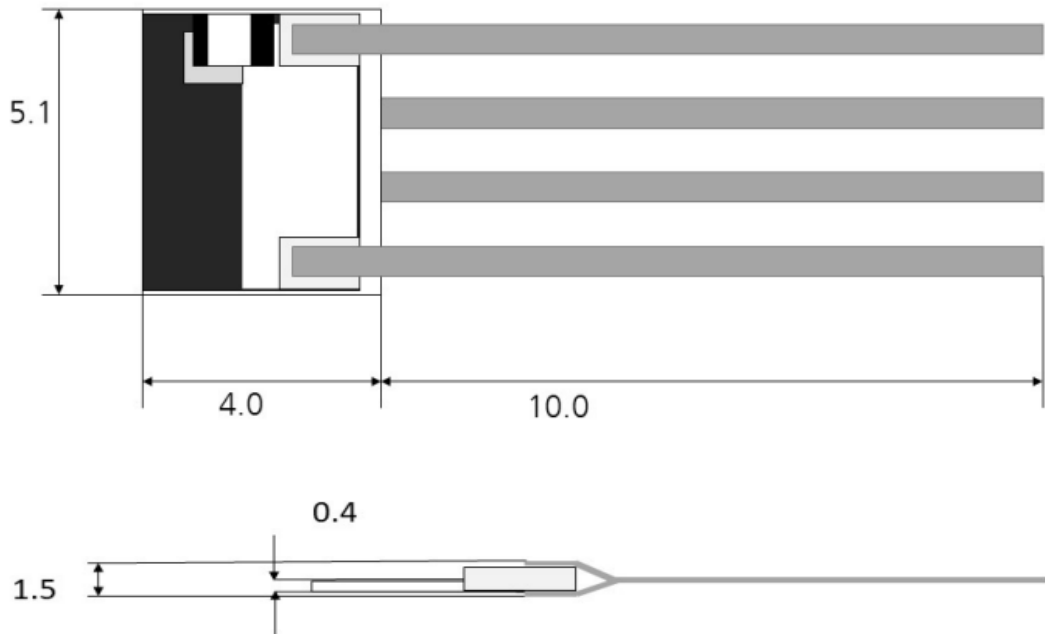
Temperature dependence (nominal):	$\Delta \% \text{ RH} = (B1 \times \% \text{ RH} + B2) \times T [^\circ\text{C}] + (B3 \times \% \text{ RH} + B4)$	
	B1 = 0.0014 [1/°C]	B2 = 0.1325 [% RH/°C]
	B3 = -0.0317	B4 = -3.0876 [% RH]
Measurement frequency range:	1 kHz to 100 kHz (recommended 10 kHz)	
Maximal 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

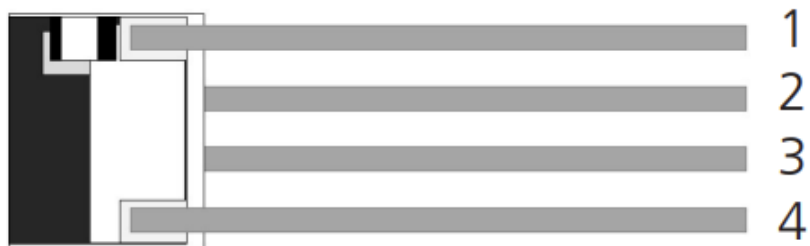
The calibration of the sensor must be done 5 days after soldering at the earliest



Mechanical Dimensions



Pin Assignment



1

2

3

4

Humidity Sensor

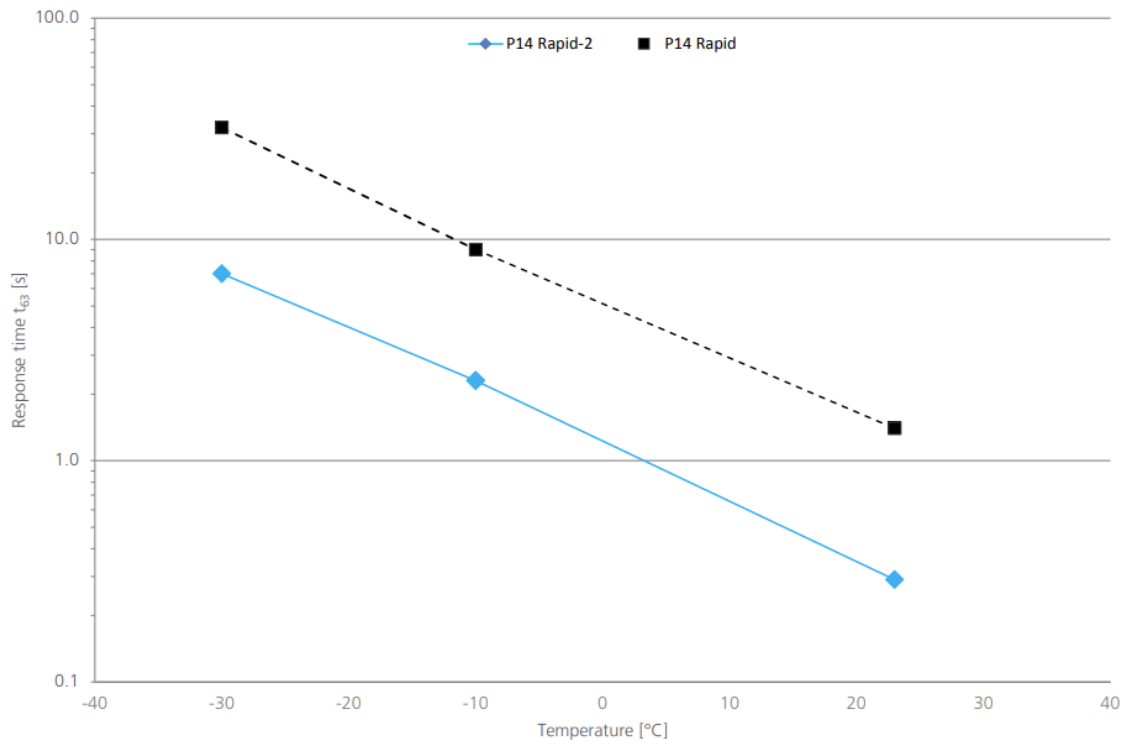
Heater/Temperature
Sensor

Heater/Temperature
Sensor

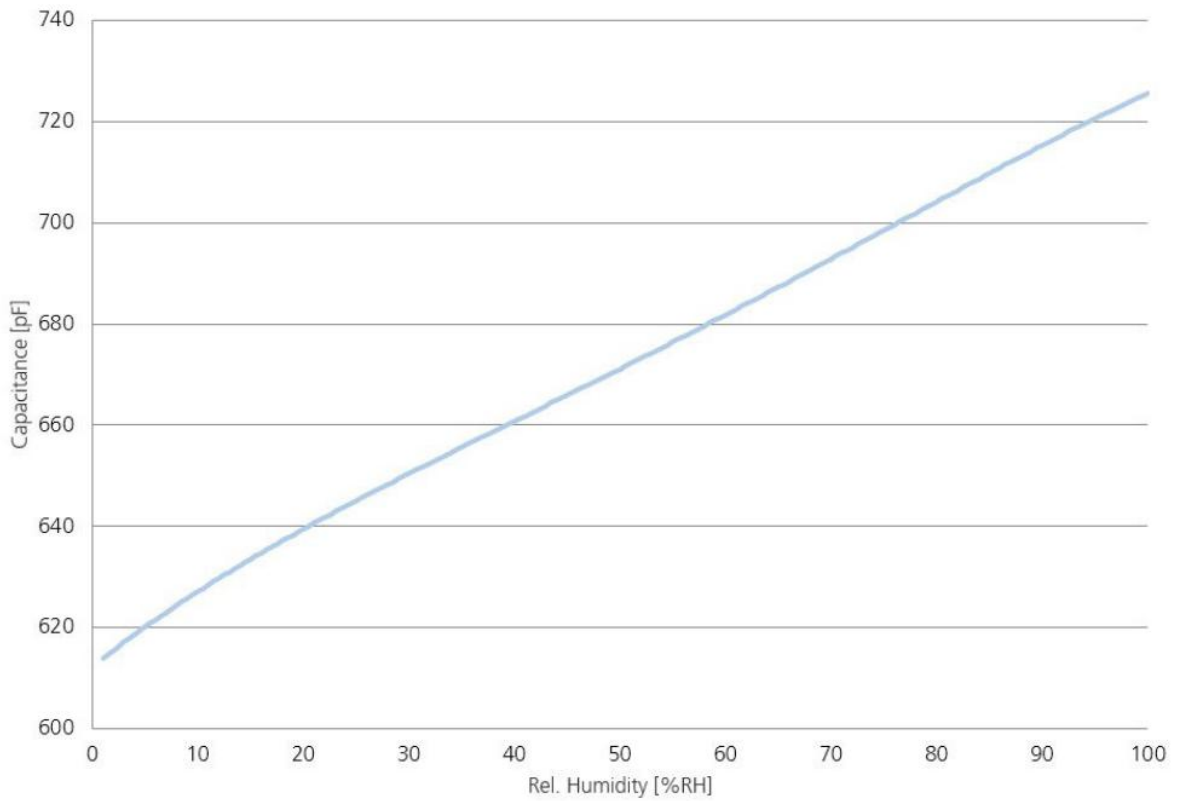
Humidity Sensor



Response Time



Characteristic Curve (typical)





Order Information

Product Title	P14 4051 FW Thermo Rapid 2
Order code	154150



Additional Documents

Document name:

Application Note:	AH_E
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Innovative Sensor Technology IST AG • Stegrütistrasse 14 • 9642 Ebnat-Kappel • Switzerland
+41 71 992 01 00 • info@ist-ag.com • www.ist-ag.com

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