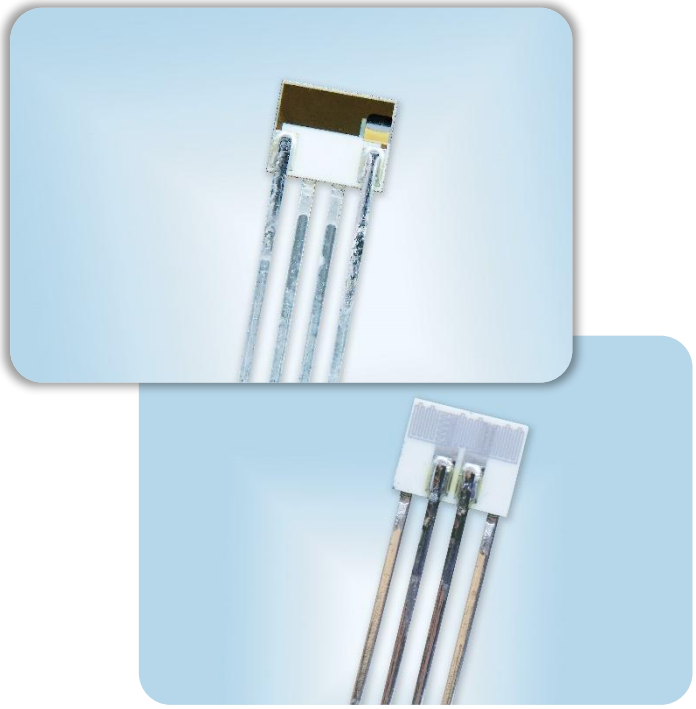
P14 4051 FW Thermo Rapid 2

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%: ±(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) after one-point calibration
Response time t_{63}: [2)]	0.3 s ± 0.2s (50 % RH to 0 % RH at +23 °C)

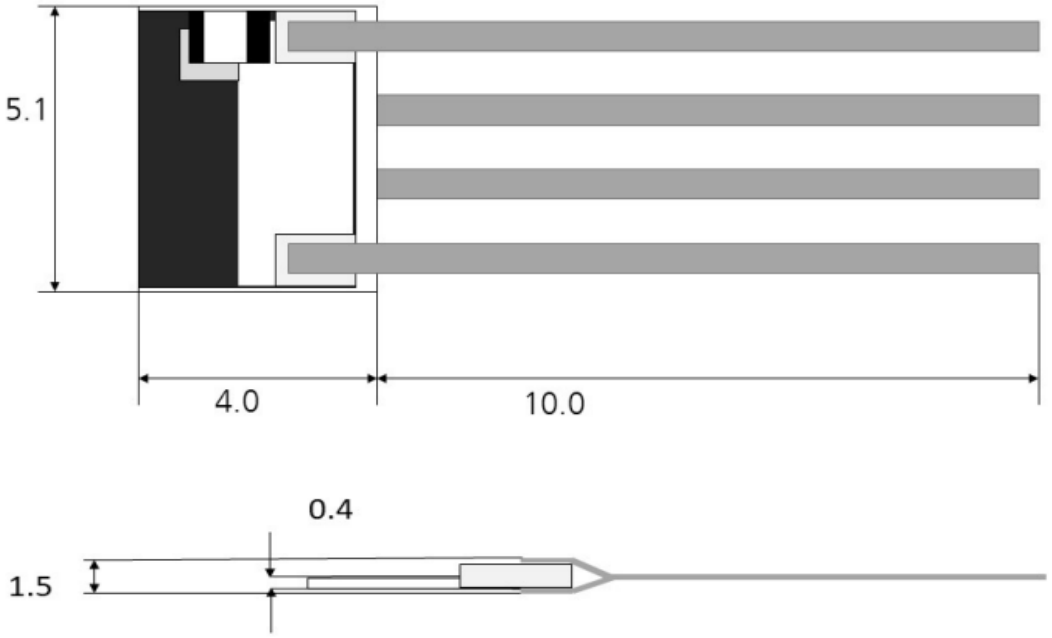
2) The response time is often measured for increasing humidity steps,whereas physics predicts that decreasing humidity leads to generally far longer response times for capacitive humidity sensors. iST thus measures response times always for decreasing humidity values, since this is the worst case

Temperature dependence (nominal):	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 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

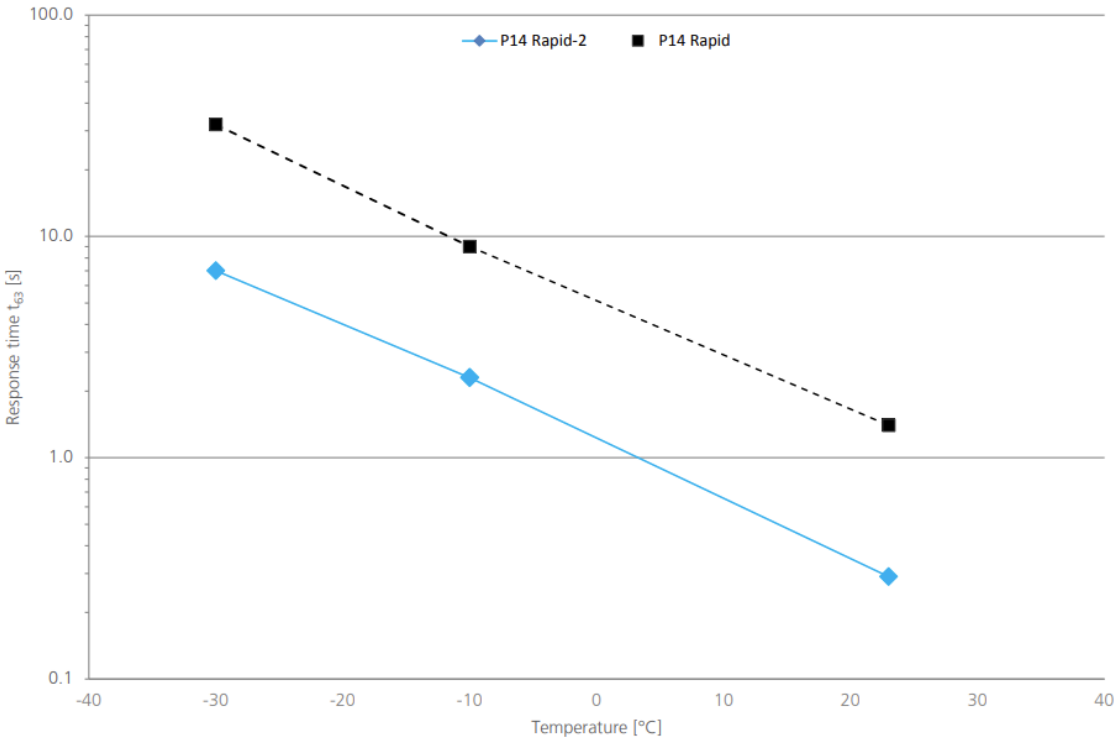
Mechanical Dimensions



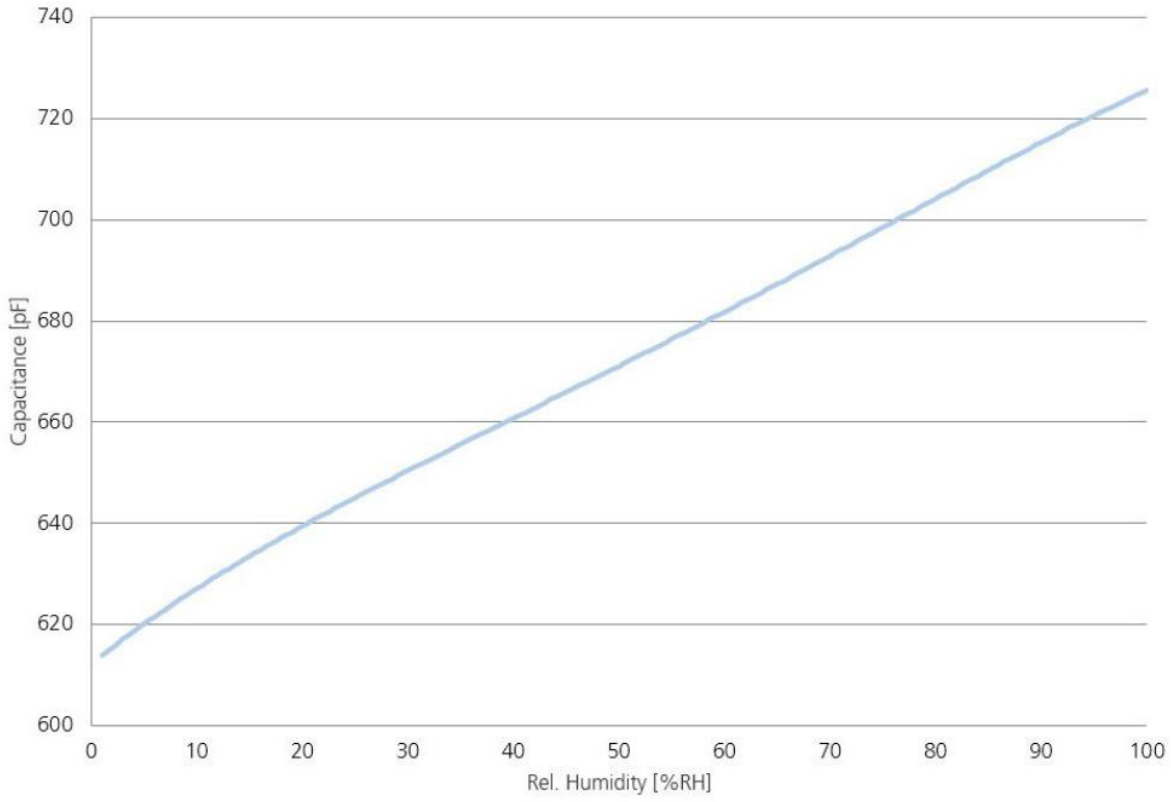
Pin Assignment

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

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