



# HYGROCHIP

## DIGITAL HUMIDITY SENSOR HYT-221

1/3



### Characteristic Features

- ▶ Measuring range 0 ... 100% rH, -40 ... 125°C
- ▶ Low drift
- ▶ Stable at high humidity
- ▶ Splash water proof with protection filter
- ▶ I<sup>2</sup>C protocol for humidity and temperature (address 0x28 or alternative address)
- ▶ Accuracy  $\pm 1.8\%$  rH,  $\pm 0.2^\circ\text{C}$
- ▶ Temperature compensated

### Typical Areas of Application

- ▶ Meteorology
- ▶ Industrial drying systems
- ▶ Medical devices
- ▶ Agriculture

### Features

#### The HYT 221 – for critical application areas

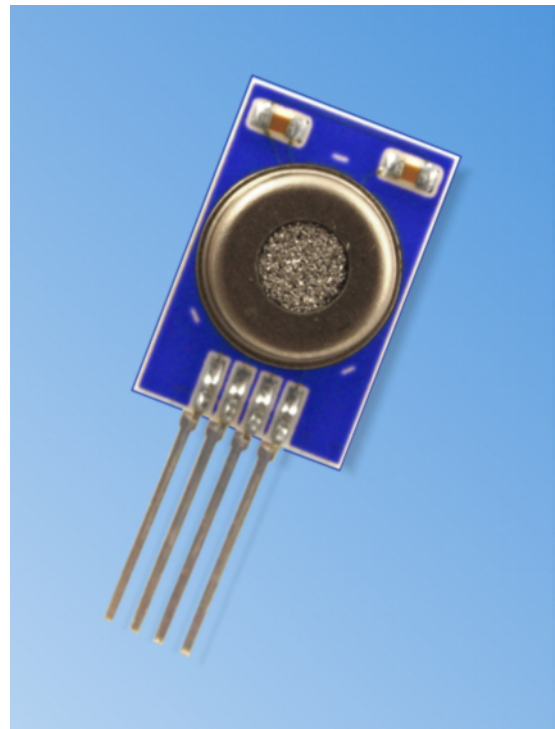
The round stainless steel casing can be easily fitted into housing openings and can be sealed against the wall with the use of an O-ring. Combined with the waterproof metal filter, it results into an assembly that is splash water proof and enables a sealed housing construction while providing a high dynamic responsiveness.

Precisely calibrated, the HYT 221 delivers an accuracy of  $\pm 1.8\%$  rH and  $\pm 0.2^\circ\text{C}$ . Like all representatives of the HYGROCHIP family, the sensor combines the advantages of a precise, capacitive polymer humidity sensor with the high integration density and functionality of an ASIC. The signal processing integrated in the sensor completely processes the measured data and directly delivers the physical parameters of relative humidity and temperature over the I<sup>2</sup>C compatible interface as digital values. The module is precisely calibrated by the manufacturer and is therefore fully interchangeable without adjustment.

Both the linearity error as well as the temperature drift are corrected "OnChip" through computation resulting in an outstanding accuracy over a wide range of applications. Due to mechanical robustness, high chemical stability, dew formation resistance as well as excellent long term stability, the typical areas of application are humidity measurement in saunas, applications in outdoor areas or industrial applications in the field of drying systems.

Further variants and the full spectrum of the HYGROCHIP product series can be found at:

<http://www.hygrochip.com>



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# HYGROCHIP

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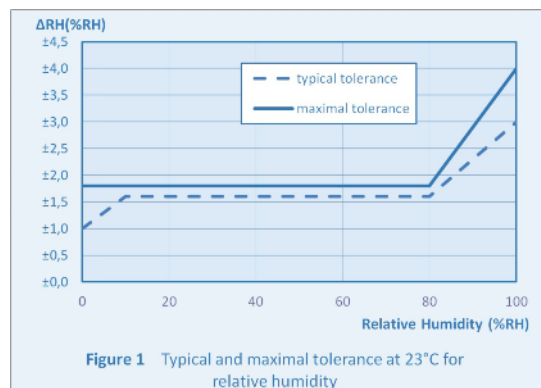
2/3

### Technical Data

| Humidity Measurement                                    |                                                       |
|---------------------------------------------------------|-------------------------------------------------------|
| Humidity measuring range <sup>(1)</sup>                 | 0 ... 100% rH<br>see Figure 3                         |
| Humidity accuracy <sup>(2)</sup><br>(Maximum tolerance) | $\pm 1.8\% \text{ rH}$ (0 ... 80% rH)<br>see Figure 1 |
| Accuracy humidity 0 ... 10% RH (0 ... 50 °C)            | $\pm (1\% \text{ rF} + 8\% \text{ a}_w)$              |
| (Typical tolerance)                                     | $\text{a}_w = \text{rF} / 100\%$                      |
| Reproducibility <sup>(3)</sup>                          | $\pm 0.2\% \text{ rH}$                                |
| Hysteresis                                              | $< \pm 1\% \text{ rH}$                                |
| Humidity resolution                                     | 0.02% rH                                              |
| Linearity error                                         | $< \pm 1\% \text{ rH}$                                |
| Response time $t_{63}$                                  | $< 12 \text{ sec}$ with membrane filter               |
| Tk Residual error                                       | 0.05% rH / K (0 ... 60°C)                             |
| Long term drift                                         | $< 0.5\% \text{ rH} / \text{a}$                       |
| Measuring principle                                     | Capacitive polymer humidity sensor                    |

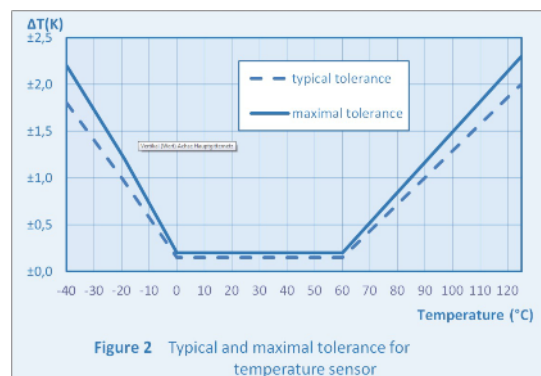
| Temperature Measurement     |                                                |
|-----------------------------|------------------------------------------------|
| Temperature measuring range | - 40 ... +125°C                                |
| Temperature accuracy        | $\pm 0.2\text{K}$ (0 ... 60°C)<br>see Figure 2 |
| Reproducibility             | $\pm 0.1\text{K}$                              |
| Temperature resolution      | 0.015°C                                        |
| Response time $t_{63}$      | $< 12 \text{ sec}$ with filter                 |
| Long term drift             | $< 0.05\text{K} / \text{a}$                    |
| Measuring principle         | PTAT (integrated)                              |

### Relative Humidity Accuracy



- (1) The maximum dew point is limited to 80°C.
- (2) The accuracy is tested at 23°C and 3.3V operating voltage in the direction of rising humidity. The accuracy does not include Tk-Residual error, residual linearity error or hysteresis effect.
- (3) The repeatability is measured in the same direction and does not consider the hysteresis effect.

### Temperature Measurement Accuracy



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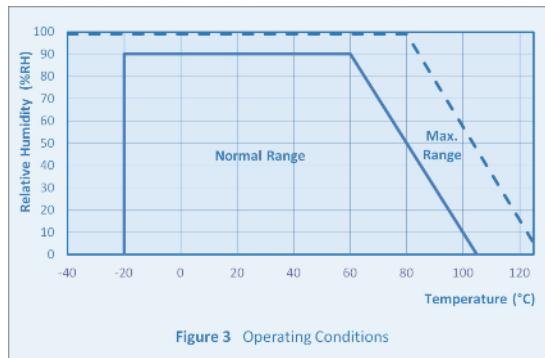


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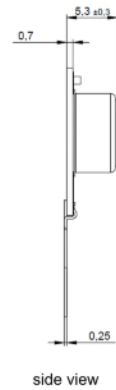
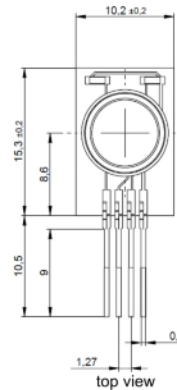
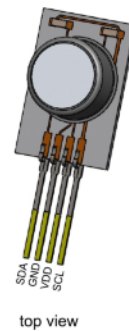
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3/3

### Humidity Application Range



### Mechanical Dimensions



| Operating Data                |                                                       |
|-------------------------------|-------------------------------------------------------|
| Operating voltage             | 2.7 ... 5.5V                                          |
| Current consumption (Nominal) | < 22µA at 1Hz measuring rate<br>850µA maximum         |
| Current consumption (Sleep)   | < 1µA                                                 |
| Application temperature       | -40°C ... 125°C                                       |
| Humidity application range    | 0 ... 100% rH                                         |
| Digital interface             | I <sup>2</sup> C, address 0x28 or alternative address |

| Limits              |                |
|---------------------|----------------|
| Operating voltage   | -0.3 ... 6.0V  |
| Storage temperature | -20°C ... 80°C |



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All mechanical dimensions are valid at 25°C ambient temperature, if not differently indicated. ■ All data except the mechanical dimensions only have information purposes and are not to be understood as assured characteristics. ■ Technical changes without previous announcement as well as mistakes reserve. ■ The information on this data sheet was examined carefully and will be accepted as correct. No liability in case of mistakes. ■ Load with extreme values during a longer period can affect the reliability.

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