

# Platinum Temperature Sensor 2 x Pt100, Ø 4,5 x 13

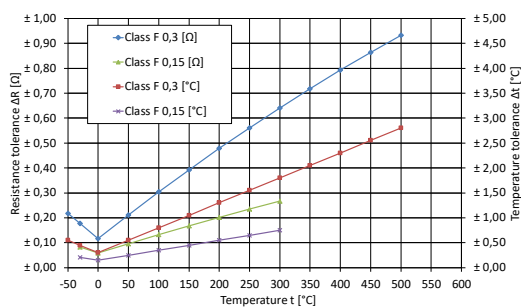
## Technical Data

|   |   |
|---|---|
| Resistance at 0°C (R <sub>0</sub> )                     | 100 Ω   |
| Temperature coefficient (0 °C up to +100 °C)            | 3.85 · 10 <sup>-3</sup> K <sup>-1</sup>   |
| Tolerance classes according to DIN EN 60751             | <ul style="list-style-type: none"> <li>• F 0,15 (-30°C - +300°C)</li> <li>• F 0,3 (-50°C - +500°C)</li> </ul> |
| Operating temperature range depending on lead material: |   |
| AgPd5   | -50 °C up to +400 °C  |
| Pt  | -50 °C up to +600 °C  |
| Measurement current (DC) at 25 °C                       | 1.0 mA  |
| Maximal permissible peak current (DC) at 25 °C          | 3.0 mA  |
| Insulation resistance                                   | > 10 MΩ   |
| Self-heating at 0 °C                                    | < 0.2 K/mW  |
| Thermal response time                                   |   |
| Flowing water (v = 0.2 m/s)                             | T <sub>0,5</sub> ≤ 1.3 s, T <sub>0,9</sub> ≤ 5.0 s  |
| Flowing air (v = 1 m/s)                                 | T <sub>0,5</sub> ≤ 15 s, T <sub>0,9</sub> ≤ 50 s  |
| Resistance value [Ω] at                                 |   |
| Temperature   | Tolerance class   |
|   | F 0,15 [Ω]   F 0,3 [Ω]  |
| 0 °C  | 100 ± 0.06   100 ± 0.12   |
| +100 °C   | 138.51 ± 0.13   138.51 ± 0.30   |
| R <sub>t</sub> measuring point                          | 2 mm from wire end  |
| Maximal Resistance Change at UCT 250 h                  | < 0.1 %   |

| Specification  | DIN EN 60751   |       |       |    |        |        |       |        |      |     |
|--|--|-------|-------|----|--------|--------|-------|--------|------|-----|
| Type   | Film sensor  |       |       |    |        |        |       |        |      |     |
| <b>Technology:</b> Chip - advanced thin-film-technology (ceramic carrier with a structured platinum layer, covered with a passivating layer), assembled in a sealed ceramic protective tube  |  |       |       |    |        |        |       |        |      |     |
| <b>Remark:</b> For high temperature applications the sensor element has to be protected applicable against contaminations of substances (heavy metals, Si, P, Cl, Na, Ka etc.) which could destroy for example the pattern structure caused by chemical or electro-chemical reactions. |  |       |       |    |        |        |       |        |      |     |
| <b>Operating conditions:</b> Unprotected application only in dry environments without any contamination. Any compressive and tensile stresses of the leads have to be avoided.   |  |       |       |    |        |        |       |        |      |     |
| <b>Conformity:</b> 2011/65/EU Restriction of the use of Hazardous Substances Directive (RoHS)  |  |       |       |    |        |        |       |        |      |     |
| Dimensions [mm]  |  |       |       |    |        |        |       |        |      |     |
|  |  |       |       |    |        |        |       |        |      |     |
|  | Leads Ø d  |       |       |    |        |        |       |        |      |     |
|  | Ceramics tube (sealed)   |       |       |    |        |        |       |        |      |     |
|  | <table border="1"> <thead> <tr> <th>Leads</th> <th>AgPd5</th> <th>Pt</th> </tr> </thead> <tbody> <tr> <td>l [mm]</td> <td>15 ± 1</td> <td>7 ± 1</td> </tr> <tr> <td>d [mm]</td> <td>0,25</td> <td>0,2</td> </tr> </tbody> </table> | Leads | AgPd5 | Pt | l [mm] | 15 ± 1 | 7 ± 1 | d [mm] | 0,25 | 0,2 |
| Leads  | AgPd5  | Pt    |       |    |        |        |       |        |      |     |
| l [mm]   | 15 ± 1   | 7 ± 1 |       |    |        |        |       |        |      |     |
| d [mm]   | 0,25   | 0,2   |       |    |        |        |       |        |      |     |

## Functional performance

according to DIN EN 60751



Picture 1: Resistance and temperature tolerances of Pt100 (Please note - the operating temperature range depends on lead material!)

Temperature range from -50 °C up to 0 °C:

$$R_t = R_0 \cdot (1 + A \cdot t + B \cdot t^2 + C \cdot (t - 100 \text{ °C}) \cdot t^3)$$

Temperature range from 0°C up to +600°C:

$$R_t = R_0 \cdot (1 + A \cdot t + B \cdot t^2)$$

Tolerance classes according to DIN EN 60751:

Class F 0,15 (-30°C - +300°C):  $\Delta t = \pm (0.15 + 0.002 \cdot |t|)$

Class F 0,3 (-50°C - +500°C):  $\Delta t = \pm (0.3 + 0.005 \cdot |t|)$

Whereby:

R<sub>t</sub> ... Resistance [Ω] at temperature t

R<sub>0</sub> ... Resistance [Ω] at 0 °C

t ... Temperature [°C]

Δt ... Permissible temperature deviation at t [°C]

$$A = 3.9083 \cdot 10^{-3} \text{ °C}^{-1}$$

$$B = -5.775 \cdot 10^{-7} \text{ °C}^{-2}$$

$$C = -4.183 \cdot 10^{-12} \text{ °C}^{-4}$$

## Fields of application

- Industrial electronics
- Building automation
- Automotive electronics
- Energy and environmental engineering
- Safety and medical engineering

## Ordering example

| Construction   | Class of accuracy | Leads (ø d x l [mm] lead material) | Operating temperature range [°C] |
|--|-------------------|------------------------------------|----------------------------------|
| Temperature sensor 2 x Pt100, Ceramics tube Ø 4,5 x 13 mm sealed | F 0,3             | 0.2x7 Pt                           | -50/+600                         |

Other classes of accuracy and wire lengths are available on request.