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# SMD-L-AuNi

## Platinum-chip temperature sensors in SMD design type

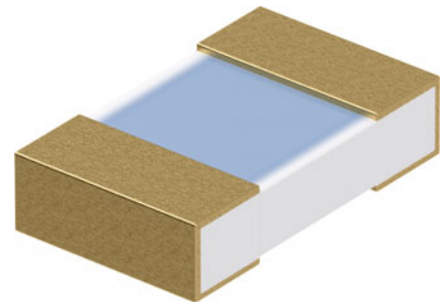
according to DIN EN IEC 60751

### Areas of application

- Heating, air conditioning, and ventilation technology
- Industrial measurement technology
- Medical and laboratory technology
- White goods
- Motor and commercial vehicles
- Mechanical engineering
- Electromobility

### Special features

- Version as SMD with wrap-around contact
- Gold-plated nickel solder contact
- Highly-purified and even contact layer for a better solder connection
- High long-term stability
- High temperature cycle stability
- High measuring accuracy
- Long operating life
- Qualified according to AEC-Q200, Rev. D for selected sensors



Type 906141

### Description

Platinum-chip temperature sensors belong to the category of temperature sensors that are made using thin film technology. Because they are mounted on surfaces (SMT, surface-mount technology), the SMD sensors are suitable for surface or ambient temperature measurements on circuit boards.

They are the preferred option for temperature monitoring or compensation circuits and have numerous applications in temperature probes. The sensors can also be operated as a heated resistor for calorimetric measurements.

JUMO platinum-chip temperature sensors are available in different versions. You can find a summary and further information on our website.

⇒ [Platinum-chip temperature sensors](#)

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## Technical data

|                                                                                                         |                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature range<br>For platinum-chip temperature sensor<br>On circuit board                           | -70 to +250 °C<br>-50 to +150 °C<br>Use circuit board with adapted thermal expansion coefficient.                                                                                                                                                                                                      |
| Temperature coefficient                                                                                 | $\alpha = 3.851 \times 10^{-3} \text{ }^{\circ}\text{C}^{-1}$ (between 0 and 100 °C)                                                                                                                                                                                                                   |
| Temperature range of validity <sup>a</sup><br>Class F 0.1<br>Class F 0.15<br>Class F 0.3<br>Class F 0.6 | 0 to 150 °C<br>-30 to +150 °C<br>-50 to +250 °C<br>-70 to +250 °C                                                                                                                                                                                                                                      |
| Measuring current<br>Pt100<br>Pt500<br>Pt1000                                                           | Recommended 1.0 mA, maximum 7.0 mA<br>Recommended 0.7 mA, maximum 3.0 mA<br>Recommended 0.1 mA, maximum 1.0 mA                                                                                                                                                                                         |
| Operating conditions                                                                                    | Do not use platinum-chip temperature sensors unprotected in a humid environment or in aggressive atmospheres. Direct immersion into liquids is not admissible.<br>Refer to the installation instructions "Application notes for platinum-chip temperature sensors", which can be found on the website. |
| Self-heating                                                                                            | $\Delta t = I^2 \times R \times E$<br>$\Delta t$ : Self-heating or measurement error<br>I: Measuring current<br>E: Self-heating coefficient, see the table "Self-heating and response times" for values                                                                                                |
| Stability at maximum temperature                                                                        | 1000 h at 160 °C in air<br>Drift des Messwerts $\Delta T_0 < 100 \text{ mK}$                                                                                                                                                                                                                           |
| Long-term stability                                                                                     | Max. $R_0$ drift of 0.05 % per year                                                                                                                                                                                                                                                                    |
| Solder connections<br>Nickel layer thickness<br>Gold layer thickness                                    | Gold-plated nickel solder contact<br>$\geq 1 \text{ } \mu\text{m}$<br>$\geq 40 \text{ nm}$                                                                                                                                                                                                             |
| Solderability                                                                                           | According to IEC/DIN EN 60068-2-58<br>Group 3 soldering process "Higher temperatures", solder Sn96.5Ag3.0Cu0.5                                                                                                                                                                                         |
| Resistance to dissolution                                                                               | According to IEC/DIN EN 60068-2-58<br>Group 3 soldering process "Higher temperatures", solder Sn96.5Ag3.0Cu0.5                                                                                                                                                                                         |
| ESD                                                                                                     | According to AEC-Q200-002 Level 2<br>Typically $\geq 2 \text{ kV}$<br>HBM (direct contact)<br>Soldered onto circuit board as a module (see data sheet 906143).                                                                                                                                         |
| Storage                                                                                                 | Can be stored for at least 5 years after delivery in the original packaging.                                                                                                                                                                                                                           |
| Packaging                                                                                               | According to IEC 60286-3 (standard)<br>Sensor surface at top (outside).                                                                                                                                                                                                                                |
| Compliant with RoHS 2011/65/EU and RoHS 2015/863/EU                                                     | Yes                                                                                                                                                                                                                                                                                                    |
| Compliant with REACH 1907/2006                                                                          | Yes                                                                                                                                                                                                                                                                                                    |

<sup>a</sup> Note on accuracy class F 0.1 and F 0.15: Contrary to the standard DIN EN IEC 60751, the routine testing of the limit deviation only takes place at one temperature. The temperature coefficient of the relevant batch is also checked on a random sample basis.

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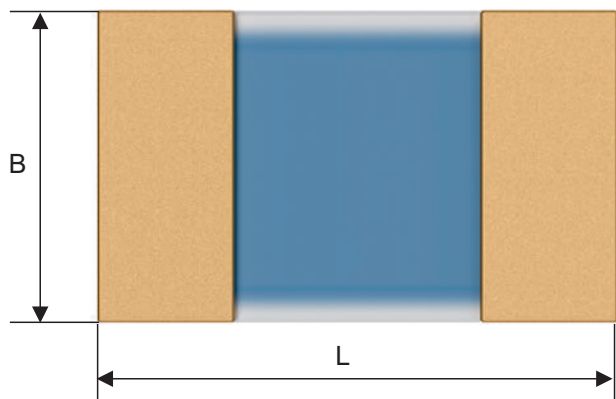


## Self-heating and response times

| Type     | Self-heating coefficient E in °C/mW<br>in air ( $v = 3 \text{ m/s}$ , $t = 22 \text{ °C}$ ) | Response times in s<br>in air ( $v = 3 \text{ m/s}$ ) |           |
|----------|---------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------|
|          |                                                                                             | $t_{0.5}$                                             | $t_{0.9}$ |
| SMD 0805 | 0.3                                                                                         | 8                                                     | 17        |
| SMD 1206 | 0.3                                                                                         | 9                                                     | 20        |

Constructed as JUMO measuring insert PCB-B-Au (see data sheet 906143)

## Dimensions



B Width (tolerance  $+0.2/-0.1 \text{ mm}$ )

H Height (tolerance  $\pm 0.05 \text{ mm}$ )

L Length (tolerance  $+0.2/-0.1 \text{ mm}$ )

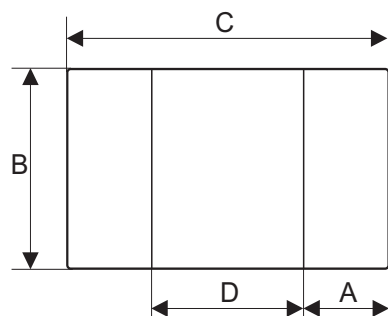
L1 Connection length (tolerance  $\pm 0.2 \text{ mm}$ )



## Processing

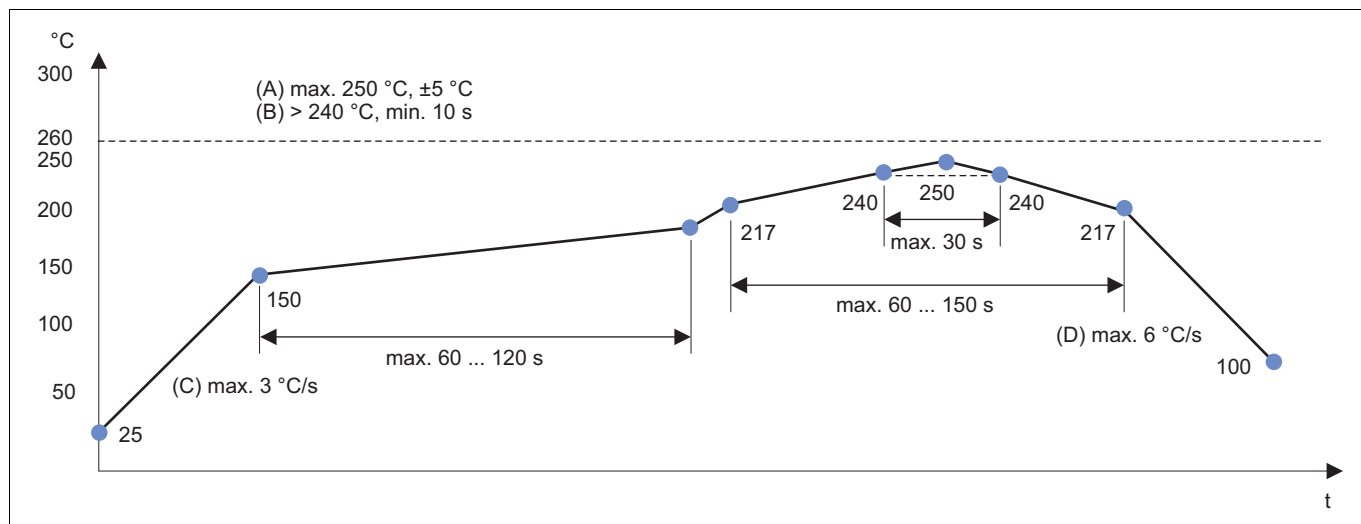
The temperature sensors are optimized for soft-soldering in a reflow method. The temperature sensors could be damaged when soldering with a soldering iron. The soldering temperature may be raised slightly in comparison with tin-plated components.

### Recommended pad dimensions on the circuit board



| SMD size | A<br>in mm | B<br>in mm | C<br>in mm | D<br>in mm |
|----------|------------|------------|------------|------------|
| 0805     | 0.8        | 1.25       | 2.6        | 1.0        |
| 1206     | 0.8        | 1.50       | 3.6        | 2.0        |

### Recommended soldering profile for lead-free solder, type SAC 305/405



(A) Reflow soldering profile  
 (B) Solder point temperature

(C) Heat-up rate  
 (D) Cooling rate

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## Order details

|                                                      |                                                                      |
|------------------------------------------------------|----------------------------------------------------------------------|
| <b>(1) Basic type</b>                                |                                                                      |
| 906141                                               | SMD-L-AuNi – platinum-chip temperature sensors in SMD design type    |
| <b>(2) Version</b>                                   |                                                                      |
| 0                                                    | Standard                                                             |
| <b>(3) SMD size</b>                                  |                                                                      |
| 0805                                                 | 0805 (imperial), 2012 (metric)                                       |
| 1206                                                 | 1206 (imperial), 3216 (metric)                                       |
| <b>(4) Height H</b>                                  |                                                                      |
| 0.4                                                  | 0.4 mm                                                               |
| <b>(5) Nominal value of resistance R<sub>0</sub></b> |                                                                      |
| 100                                                  | 100 Ω (Pt100)                                                        |
| 500                                                  | 500 Ω (Pt500)                                                        |
| 1000                                                 | 1000 Ω (Pt1000)                                                      |
| <b>(6) Packaging unit</b>                            |                                                                      |
| 5000                                                 | 5000 pieces, 8-mm belt on a 7" plastic reel with roll feed line      |
| 20000                                                | 20000 pieces, 8-mm belt on a 330-mm plastic reel with roll feed line |
|                                                      | Small quantities upon request, without roll feed line                |
| <b>(7) Tolerance class</b>                           |                                                                      |
| 010                                                  | F 0.1                                                                |
| 015                                                  | F 0.15                                                               |
| 030                                                  | F 0.3                                                                |
| 060                                                  | F 0.6                                                                |

Order code

Order example

|             |     |             |     |             |     |             |   |             |   |             |   |     |
|-------------|-----|-------------|-----|-------------|-----|-------------|---|-------------|---|-------------|---|-----|
| (1)         | (2) | (3)         | (4) | (5)         | (6) | (7)         |   |             |   |             |   |     |
| <div></div> | /   | <div></div> | -   | <div></div> | -   | <div></div> | - | <div></div> | - | <div></div> |   |     |
| 906141      | /   | 0           | -   | 0805        | -   | 0.4         | - | 1000        | - | 5000        | - | 030 |

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## Stock versions

### SMD size 0805, dimensions 1.25 × 2.0 mm (B × L)

| Order code                                    | Size<br>H<br>in mm | Connection<br>length<br>L1<br>in mm | Nomi-<br>nal<br>value<br>R <sub>0</sub><br>in Ω | Packaging<br>unit<br>in pieces | Tolerance<br>class | Part no. |
|-----------------------------------------------|--------------------|-------------------------------------|-------------------------------------------------|--------------------------------|--------------------|----------|
| 906141/0-0805-0.4-100-5000-030                | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.3              | 00585849 |
| 906141/0-0805-0.4-100-5000-015                | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.15             | 00659407 |
| 906141/0-0805-0.4-100-5000-010                | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.1              | 00647797 |
| 906141/0-0805-0.4-500-5000-030                | 0.4                | 0.4                                 | 500                                             | 5000                           | F 0.3              | 00649601 |
| 906141/0-0805-0.4-500-20000-030               | 0.4                | 0.4                                 | 500                                             | 20000                          | F 0.3              | 00585853 |
| 906141/0-0805-0.4-500-20000-015               | 0.4                | 0.4                                 | 500                                             | 20000                          | F 0.15             | 00628428 |
| 906141/0-0805-0.4-1000-5000-060 <sup>a</sup>  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.6              | 00695344 |
| 906141/0-0805-0.4-1000-5000-030 <sup>a</sup>  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.3              | 00649602 |
| 906141/0-0805-0.4-1000-5000-015 <sup>a</sup>  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.15             | 00647798 |
| 906141/0-0805-0.4-1000-5000-010 <sup>a</sup>  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.1              | 00647795 |
| 906141/0-0805-0.4-1000-20000-030 <sup>a</sup> | 0.4                | 0.4                                 | 1000                                            | 20000                          | F 0.3              | 00585854 |

<sup>a</sup> Qualified according to AEC-Q200, Rev. D

### SMD size 1206, dimensions 1.5 × 3.0 mm (B × L)

| Order code                       | Size<br>H<br>in mm | Connection<br>length<br>L1<br>in mm | Nomi-<br>nal<br>value<br>R <sub>0</sub><br>in Ω | Packaging<br>unit<br>in pieces | Tolerance<br>class | Part no. |
|----------------------------------|--------------------|-------------------------------------|-------------------------------------------------|--------------------------------|--------------------|----------|
| 906141/0-1206-0.4-100-5000-030   | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.3              | 00585846 |
| 906141/0-1206-0.4-100-5000-015   | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.15             | 00700543 |
| 906141/0-1206-0.4-100-5000-010   | 0.4                | 0.4                                 | 100                                             | 5000                           | F 0.1              | 00647835 |
| 906141/0-1206-0.4-500-5000-030   | 0.4                | 0.4                                 | 500                                             | 5000                           | F 0.3              | 00649603 |
| 906141/0-1206-0.4-500-20000-030  | 0.4                | 0.4                                 | 500                                             | 20000                          | F 0.3              | 00585847 |
| 906141/0-1206-0.4-1000-5000-030  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.3              | 00649605 |
| 906141/0-1206-0.4-1000-5000-015  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.15             | 00647834 |
| 906141/0-1206-0.4-1000-5000-010  | 0.4                | 0.4                                 | 1000                                            | 5000                           | F 0.1              | 00686986 |
| 906141/0-1206-0.4-1000-20000-030 | 0.4                | 0.4                                 | 1000                                            | 20000                          | F 0.3              | 00585848 |

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| PCA1.2003.10EG 10 | S01.160.05.0050.0050 | ZCKY11C    |
| PCA1.2005.1S      | CP1.140.05.0100.0100 | ZCKY31     |
| PCA1.2003.1EG 10  | L01.085.05.0050.0050 | ZCKY422460 |
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| PCS1.1302.1M      | S06.150.05.0100.0100 | ZCE10      |
| PCA1.2004.1EG 10  | CK1.060.05.0050.0050 | ZCY46      |
| PCS1.1302.5M      | S05.175.05.0100.0100 | ZCKD31     |
| PCS1.1302.10M     | C01.240.05.0239.0114 | ZCKE09     |
| PCA1.2005.10S     | S01.115.05.0115.0115 | ZCMD21L2   |
| PCA1.2005.10M     | S01.165.05.0050.0050 | .....      |