

JUMO GmbH & Co. KG

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SMDFC-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 an SMD with one-sided contact (flip chip)
- 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

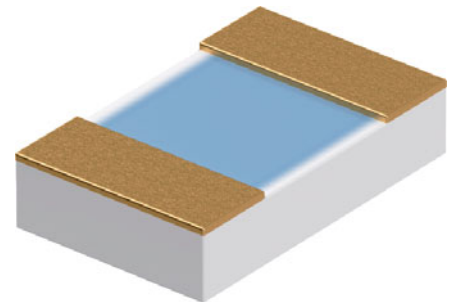
Description

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), 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 SMDFC-L-AuNi design type is a version with single-sided contact surfaces for "face down mounting" (flip chip). Thanks to this style of mounting, the connection contacts and sensor surface are protected by the component's ceramic base body.

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](#)



Type 906142

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Technical data

| | |
|---|--|
| Temperature range For platinum-chip temperature sensor On circuit board | -70 to +250 °C -50 to +150 °C 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 ^a Class F 0.1 Class F 0.15 Class F 0.3 Class F 0.6 | 0 to 150 °C -30 to +150 °C -50 to +250 °C -70 to +250 °C |
| Measuring current Pt100 Pt500 Pt1000 | Recommended 1.0 mA, maximum 7.0 mA Recommended 0.7 mA, maximum 3.0 mA 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. Refer to the installation instructions "Application notes for platinum-chip temperature sensors", which can be found on the website. |
| Self-heating | $\Delta t = I^2 \times R \times E$ Δt : Self-heating or measurement error I: Measuring current 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: Drift des Messwerts $\Delta T_0 < 100 \text{ mK}$ |
| Long-term stability | Max. R_0 drift of 0.05 % per year |
| Solder connections Nickel layer thickness Gold layer thickness | Gold-plated nickel solder contact $\geq 1 \text{ } \mu\text{m}$ $\geq 40 \text{ nm}$ |
| Solderability | According to IEC/DIN EN 60068-2-58 Group 3 soldering process "Higher temperatures", solder Sn96.5Ag3.0Cu0.5 |
| Resistance to dissolution | According to IEC/DIN EN 60068-2-58 Group 3 soldering process "Higher temperatures", solder Sn96.5Ag3.0Cu0.5 |
| ESD | According to AEC-Q200-002 Level 5A Typically $\geq 8 \text{ kV}$ HBM (direct contact) 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) Sensor surface at bottom (inside) |
| Compliant with RoHS 2011/65/EU and RoHS 2015/863/EU | Yes |
| Compliant with REACH 1907/2006 | Yes |

^a 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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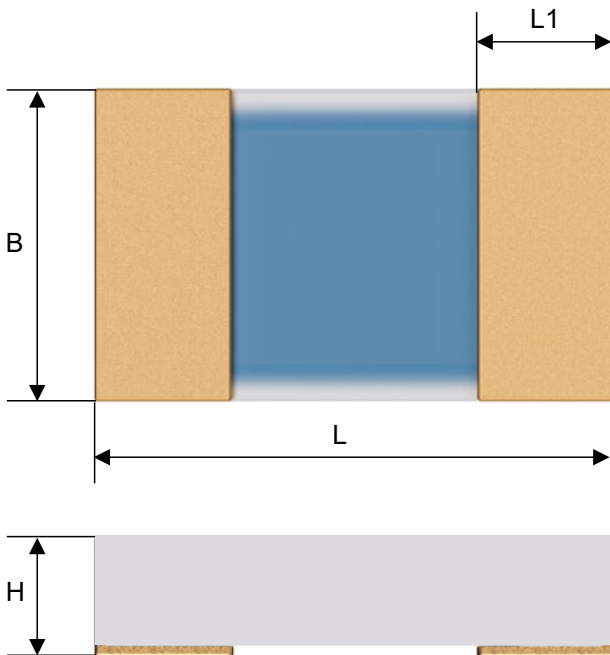


Self-heating and response times

| Type | Self-heating coefficient E in °C/mW in air (v = 3 m/s, t = 22 °C) | Response times in s in air (v = 3 m/s) | |
|----------|--|---|------------------|
| | | t _{0.5} | t _{0.9} |
| SMD 0805 | 0.3 | 4 | 11 |

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

Dimensions



B Width (tolerance +0.2/-0.1 mm)
 H Height (tolerance ±0.05 mm)

L Length (tolerance +0.2/-0.1 mm)
 L1 Connection length (tolerance ±0.2 mm)

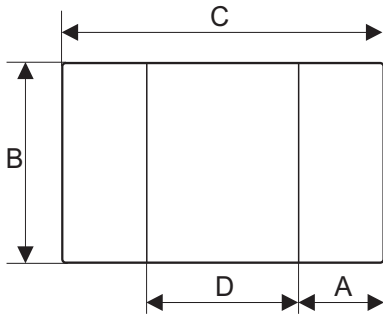


Processing

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.

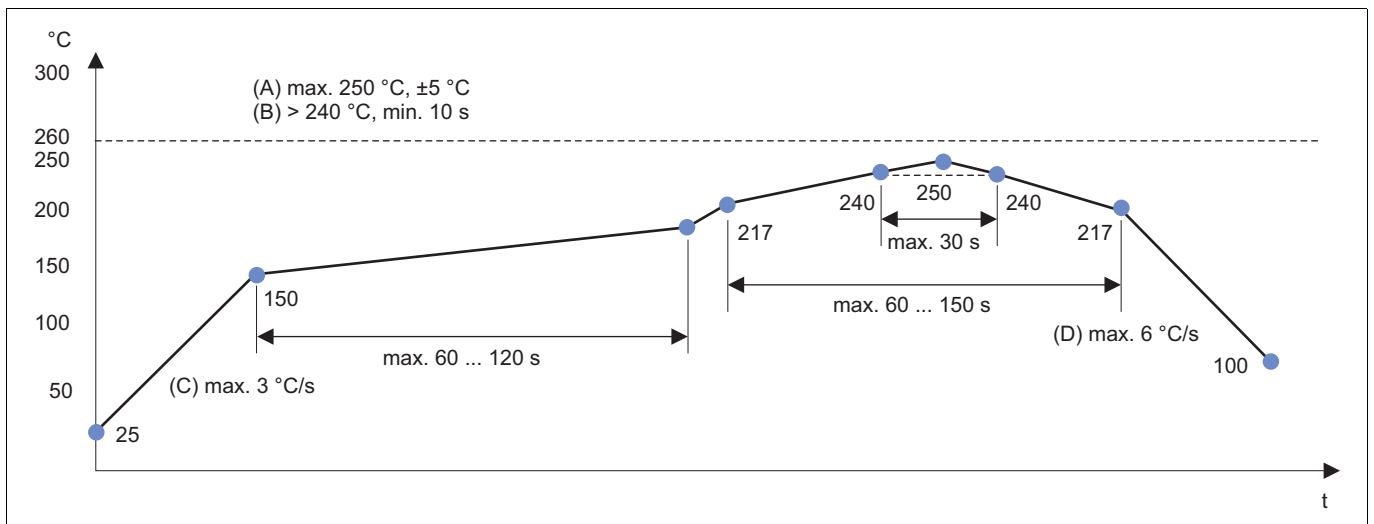
Type PCF (flip chip): Depending on the solder used, it may be necessary to adapt the printed solder quantity compared to a sensor/component with wrap-around contact.

Recommended pad dimensions on the circuit board



| SMD size | A in mm | B in mm | C in mm | D in mm |
|----------|------------|------------|------------|------------|
| 0805 | 0.65 | 1.25 | 2.2 | 0.9 |

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

| | |
|--------|--|
| | (1) Basic type |
| 906142 | SMDFC-L-AuNi – platinum-chip temperature sensors in SMD design type |
| | (2) Version |
| 0 | Standard |
| | (3) SMD size |
| 0805 | 0805 (imperial), 2012 (metric) |
| | (4) Height H |
| 0.4 | 0.4 mm |
| | (5) Nominal value of resistance R₀ |
| 100 | 100 Ω (Pt100) |
| 500 | 500 Ω (Pt500) |
| 1000 | 1000 Ω (Pt1000) |
| | (6) Processing |
| 0 | Soldering |
| 1 | Bonding |
| | (7) Packaging unit |
| 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 |
| | (8) Tolerance class |
| 010 | F 0.1 |
| 015 | F 0.15 |
| 030 | F 0.3 |
| 060 | F 0.6 |

Order code (1) (2) (3) (4) (5) (6) (7) (8)
 Order example 906142 / 0 - 0805 - 0.4 - 1000 - 0 - 5000 - 030

Stock versions

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

| Order code | Size | Connection length | Nomi-nal value | Packaging unit | Tolerance class | Part no. |
|---|---------|-------------------|---------------------|----------------|-----------------|----------|
| | H in mm | L1 in mm | R ₀ in Ω | in pieces | | |
| 906142/0-0805-0.4-100-0-5000-030 | 0.4 | 0.5 | 100 | 5000 | F 0.3 | 00674541 |
| 906142/0-0805-0.4-500-0-5000-030 | 0.4 | 0.5 | 500 | 5000 | F 0.3 | 00667826 |
| 906142/0-0805-0.4-1000-0-5000-030 ^a | 0.4 | 0.5 | 1000 | 5000 | F 0.3 | 00674549 |
| 906142/0-0805-0.4-1000-0-20000-030 ^a | 0.4 | 0.5 | 1000 | 20000 | F 0.3 | 00719062 |

^a Qualified according to AEC-Q200, Rev. D