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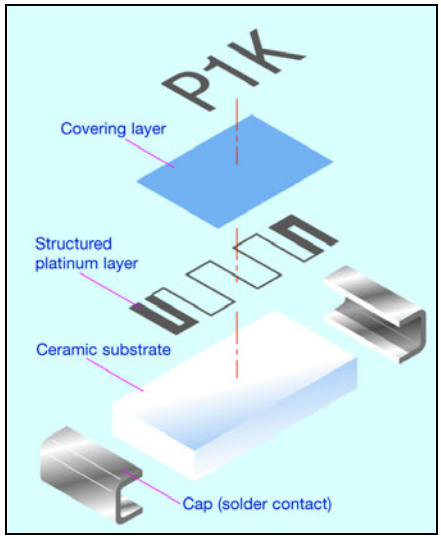
Platinum-chip temperature sensors in SMD style to EN 60 751

- **for temperatures from -50 to +150 °C**
- **standardized nominal values and tolerances**
- **galvanic wrap-around contact**
- **for insertion in automatic large-scale production**
- **blister belt packaging to IEC 286-3**

PCS style



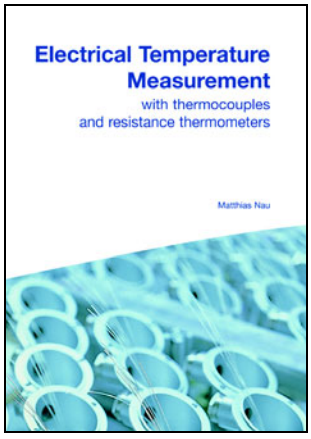
Introduction

Platinum-chip temperature sensors belong to the category of thin-film sensors. During production of these temperature sensors, a platinum layer, which constitutes the active layer, is formed into a serpentine structure and applied to a ceramic substrate. In the case of the SMD temperature sensors, the platinum serpentine is provided with two solder contacts at the opposing lengthwise ends of the temperature sensor, to make the electrical connection. The glass layer that is applied after the adjustment additionally protects the platinum serpentine against external effects.

These temperature sensors are based on a temperature-dependent resistance whose development and permissible tolerance is defined in the international standard EN 60 751. High measurement accuracy and good long-term stability are further positive characteristics of these temperature sensors. The thin-film technology used enables the production of small and rugged styles, which, in addition, can have high-resistance nominal values.

The application temperature of JUMO SMD temperature sensors spans -50 to +150 °C. The sensors are used for surface and ambient temperature measurements on circuit boards. They are frequently applied in temperature monitoring/compensation circuits. One must also not overlook the numerous applications in temperature probes, whereby an assembled board serves as the measuring insert, enabling easy installation.

Technical publication



This revised edition takes account of altered standards and recent developments. The new chapter “Measurement uncertainty” incorporates the basic concept of the internationally recognized ISO guideline “Guide to the expression of uncertainty in measurement” (abbreviated: GUM).
In addition, the chapter on explosion protection for thermometers has been updated in view of the European Directive 94/9/EC, which has been in force since 1st July 2003.

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JUMO platinum temperature sensors

Construction and application of platinum temperature sensors	Data Sheet 90.6000
Platinum-glass temperature sensors	Data Sheet 90.6021
Platinum-ceramic temperature sensors	Data Sheet 90.6022
Platinum-foil temperature sensors	Data Sheet 90.6023
Platinum-glass temperature sensors with glass extension	Data Sheet 90.6024
Platinum-chip temperature sensors with connecting wires	Data Sheet 90.6121
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Platinum-chip temperature sensors with terminal clamps	Data Sheet 90.6123
Platinum-chip temperature sensors in cylindrical style	Data Sheet 90.6124
Platinum-chip temperature sensors in SMD style	Data Sheet 90.6125

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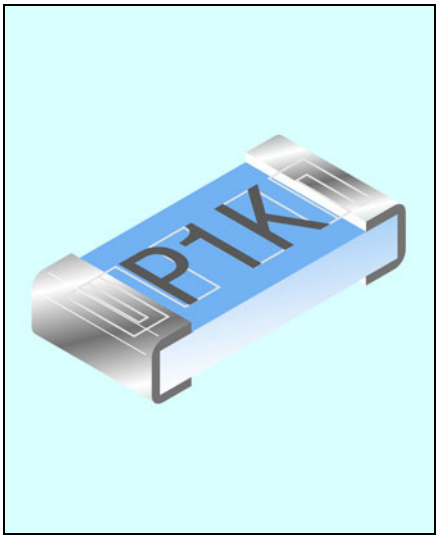
PCS style



Brief description

Platinum-chip temperature sensors in SMD style are mainly used for automatic placing on electronic circuit boards in large-scale production. The JUMO range offers a choice of the two SMD sizes 1206 and 0805. Thanks to their small size, SMD temperature sensors allow a very high component density.

They are available with the nominal values 100, 500 and 1000Ω to EN 60 751. All JUMO SMD temperature sensors have electro-tinned wrap-around contacts with a diffusion barrier, and have been designed with future lead-free soldering in mind. In addition, this high-quality type of contact ensures user-friendly placing and high reliability of the temperature sensor in operation.

The favorable linear characteristic, wide temperature measurement range and high precision, together with an outstandingly good long-term stability, make these standardized platinum temperature sensors quite clearly the first choice.

They are delivered in belt packaging. If necessary, they can also be stored for many months without any problem.

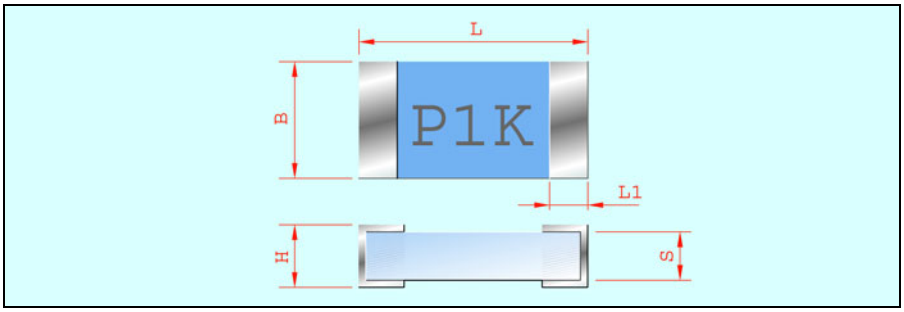
Temperature sensors in cardboard belt packaging*

Temperature sensor						Solder connection		Sales No. for tolerance class		
Type	R_0/Ω	B	L	H	S	Material	L1	1/3 DIN B	A	B
PCS 1.1302.1	1x100	1.3	2.0	0.5	0.38	Sn + (Ni barrier)	0.4	-	-	90/00427145
PCS 1.1302.5	1x500	1.3	2.0	0.5	0.38	Sn + (Ni barrier)	0.4	-	-	90/00427146
PCS 1.1302.10	1x1000	1.3	2.0	0.5	0.38	Sn + (Ni barrier)	0.4	-	-	90/00427147
PCS 1.1503.1	1x100	1.5	3.1	0.8	0.64	Sn + (Ni barrier)	0.5	-	-	90/00309087
PCS 1.1503.5	1x500	1.5	3.1	0.8	0.64	Sn + (Ni barrier)	0.5	-	-	90/00358356
PCS 1.1503.10	1x1000	1.5	3.1	0.8	0.64	Sn + (Ni barrier)	0.5	-	-	90/00374853

Dim. tolerances: ΔB = ±0.2 / ΔL = ±0.2 / ΔH = ±0.2 / ΔS = ±0.06 / L1 = approx. dimensions
Dimensions in mm.
* small quantities can also be supplied loose in bags

For a definition of the tolerance classes, see Data Sheet 90.6000

Dimensional drawing



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Technical data

Standard	EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °C^{-1} (between 0 and 100 °C)
Temperature range	-50 to +150 °C
Tolerance	Temperature validity range Class B: -50 to +150 °C
Measuring current	Pt100 recommended: 1.0 mA Pt500 recommended: 0.7 mA Pt1000 recommended: 0.1 mA
Maximum current	Pt100 7.0 mA Pt500 3.0 mA Pt1000 1.0 mA
SMD size	Types PCS 1.1503.x (size 1206) and PCS 1.1302.x (size 0805) meet the requirements of CECC 40401-004/DIN 45 921.
Processing	- Reflow soldering (soldering temperature/time ≤240 °C/8 sec) - Wave soldering (soldering temperature/time ≤260 °C/10 sec)
Solder connections	Electro-tinned wrap-around contact with diffusion barrier, solderability, see IEC 68 Part 2
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. The user may have to carry out some checks before operation. **Please also refer to the Installation Instructions B 90.6121.4 "Notes on the application of platinum-chip temperature sensors."**
Long-term stability	max. R_0 drift ≤0.05 %/year (see Data Sheet 90.6000 for definitions)
Insulation resistance	>10 MΩ at room temperature
Self-heating	$\Delta t = I^2 \times R \times E$ (see Data Sheet 90.6000 for definitions)
Packaging	* cardboard belt, small quantities can also be supplied loose in bags
Storage	In the standard packaging, JUMO temperature sensors, PCS style, can be stored for at least 12 months under normal ambient conditions. It is not permissible to store the sensors in aggressive atmospheres, corrosive media, or in high humidity.

Self-heating coefficients and response times

Type	Self-heating coefficient E in °C/mW		Response times in seconds			
	in water (v = 0.2 m/sec)	in air (v = 2 m/sec)	in water (v = 0.4 m/sec)		in air (v = 1 m/sec)	
			$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
PCS 1.1302.1	0.02	0.15	0.1	0.3	2.6	7.9
PCS 1.1302.5	0.02	0.15	0.1	0.3	2.6	7.9
PCS 1.1302.10	0.02	0.15	0.1	0.3	2.6	7.9
PCS 1.1503.1	0.02	0.20	0.1	0.3	3.3	9.5
PCS 1.1503.5	0.02	0.20	0.1	0.3	3.3	9.5
PCS 1.1503.10	0.02	0.20	0.1	0.3	3.3	9.5