



PTOD102BR00

Platinum Temperature Sensor

Product Description

This sensor is a resistance temperature detector (RTD) using a platinum resistor as sensing element. This platinum resistor consists of a structured platinum film on a ceramic substrate, passivated by glass coating. The contact areas are solderable AgPd (Silver Palladium).

This SMD - Sensor can be mounted face down to a PCB

The characteristic curve of this Platinum RTD complies with DIN EN 60751. The usage of Platinum as resistive material guarantees high long term stability.

The tolerance class is determined at 25°C (room temperature calibration)

Due to small outline and low mass this RTD has a low time constant; therefore it is a suitable solution for fast and precise feedback control systems.

Features

- ◆ R_0 : 1000 Ω
- ◆ TCR 3850ppm/K
- ◆ Application temperature -50...150°C
- ◆ resistance tolerance $\pm 0.12\%$
- ◆ Size 1.6 x 3.25 x 0.9 mm³ (width/length/height)
- ◆ SMD size 1206
- ◆ AgPd-solderable contacts for face down mounting to PCB's

Applications

- ◆ Specific temperature feedback control
- ◆ Medical
- ◆ HVC
- ◆ White goods
- ◆ Automotive
- ◆ Industrial applications

- ◆ **Platinum Temperature Sensor**
- ◆ **Conformal to DIN EN 60751**
- ◆ **Global interchangeability**
- ◆ **Wide temperature range**
- ◆ **Fast response time**
- ◆ **Class B (F0.3) tolerance**
- ◆ **Small outline dimensions**
- ◆ **SMD size 1206**

Sensor properties

Parameter	Symbol	Condition	Min	Typical	Max	Unit
Nominal Resistance at 0 °C	R ₀	Class B (F0.3)	998.8	1000.0	1001.2	Ω
Nominal Resistance at 25 °C	R ₂₅	Class B (F0.3)	1095.7	1097.3	1099.0	Ω
Temperature tolerance at 25 °C		Class B (F0.3)	-0.43		+0.43	°C
Temperature Coefficient of Resistance	TCR	0 °C, 100 °C		3850		ppm/°C
Temperature Range		Class B (F0.3)	-50		150	°C
Selfheating Coefficient in air, flow: 1 m/s				0.4		°C/mW
Response Time Water Flow: 0.4 m/s	τ _{W,0.9}			0.3		s
Response Time Air Flow: 1 m/s	τ _{A,0.9}			15		s
Measuring Current		Class B (F0.3)			0.5	mA

Calculation Formulas

The calculation formulas of this Pt-RTD are defined in DIN EN 60751 as following:

For T ≥ 0 °C:

$$R_{(T)} = R_{(0)} \cdot (1 + a \cdot T + b \cdot T^2)$$

For T < 0 °C:

$$R_{(T)} = R_{(0)} \cdot [1 + a \cdot T + b \cdot T^2 + c \cdot (T - 100^\circ\text{C}) \cdot T^3]$$

Polynomial coefficients:

$$a = 3.9083\text{E-}03 \quad b = -5.775\text{E-}07 \quad c = -4.183\text{E-}12$$

Tolerances: class F0.3 (B):

$$\pm (0.3 + 0.005 \cdot |T/^\circ\text{C}|) \text{ } ^\circ\text{C} \quad (-50 \dots +150 \text{ } ^\circ\text{C})$$

Mechanical Dimensions

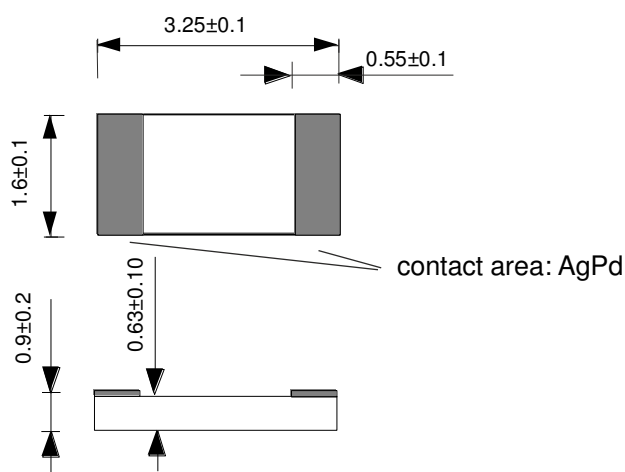


Figure 1: Mechanical dimensions of Platinum Temperature Sensor

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Proposed Solder Profile

The PTOD sensor elements can be soldered using reflow soldering process. The following combination of soldering paste and temperature profile was tested and verified, other soldering pastes and profiles should be tested before using for series production.

Soldering paste: AIM NC254 SAC305 (Sn96.5, Ag0.3, Cu0.5)

Reflow profile: Rate of temperature rise: 2°C / sec max.

Ramp up to 150°C	Progress through 175°C	To peak temp 235±5°C	Time above 217°C	Cooldown ≤ 4°C / sec	Profile length ambient to start of cooldown
120±15 sec	120±15 sec	75±15 sec	75±15 sec	120±15 sec	ca. 6min

