PTF- FAMILY

Platinum Temperature Sensors

- **Platinum Temperature Sensor**
- **Conformal to DIN EN 60751**
- **Global interchangeability**
- **Wide temperature range**
- **Fast response time**
- **Different tolerances**
- **Different outline dimensions**
- **Low drift over lifetime**
- **Blister box packing**

Product Description

The PTF-sensor family combines a group of resistance temperature detectors (RTD) using a Platinum resistor in thin film technology as sensing element.

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

A platinum RTD consists of a structured platinum film on a ceramics substrate, passivated by glass coating. The connection wires are protected with glass on the welding area.

The connection wires are gold coated nickel wire or silver wire. Gold coated Ni-wire is preferred for welding applications with need of higher application temperature but can be soldered as well, whereas silver wires preferably used for solder applications with lower temperatures.

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.

Sensors are packed as bulk goods in blister box.

Features

- R_0: 100 Ω, 1000 Ω values available
- TCR 3850ppm/K
- Application temperature up to -50…600°C (Class B)
- Various resistance tolerances ±0.24%, ±0.12%, ±0.06%, ±0.04% available
- Size 2 x 2.3 x 1.1 mm³ (width/length/height) FC-geometry
- Size 2 x 5.0 x 1.1 mm³ (width/length/height) FD-geometry
- Size 2 x 4.0 x 1.1 mm³ (width/length/height) FF-geometry
- Size 1.2 x 4.0 x 1.1 mm³ (width/length/height) FM-geometry
- Gold coated nickel lead wire or silver lead wire

Applications

- Specific temperature feedback control
- Medical
- HVAC
- White goods
- Automotive
- Industrial applications
- Sensing element for plug-in probes

Sensor properties

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Nominal Resistance at 0 °C	R_0	Class B (F0.3)	99.88 999.81	100.00 1000.0	100.12 1001.2	Ω
Tolerance at 25°C		Room temperature calibration	-0.43	0	0.43	°C
Temperature Coefficient of Resistance	TCR	0 °C, 100 °C		3850		ppm/°C
Temperature Range **for Au-coated Ni-wire** **Ag wire limited to 300°C**		Class C (F0.6) Class B (F 0.3) Class A (F 0.15) Class T (F 0.1)	-50 -50 -30 -30		600 600 300 200	°C
Selfheating Coefficient in air, flow: 1 m/s		PTFC outline PTFD outline PTFF outline PTFM outline		0.5 0.33 0.5 0.5		°C/mW
Response Time Water Flow: 0.4 m/s	$\tau_{W,0.9}$	PTFC outline PTFD outline PTFF outline PTFM outline		0.2 0.35 0.2 0.2		s
Response Time Air Flow: 1 m/s	$\tau_{A,0.9}$	PTFC outline PTFD outline PTFF outline PTFM outline		10 17 10 10		s
Measuring Current R0: 100 Ω Class B (F0.3)		PTFC outline PTFD outline PTFF outline PTFM outline			1.4 1.7 1.4 1.4	mA
Measuring Current R0: 1000 Ω Class B (F0.3)		PTFC outline PTFD outline PTFF outline PTFM outline			0.4 0.5 0.4 0.4	mA
Lead wire Au- coated Ni-wire		Diameter PTFC outline Diameter PTFD outline Diameter PTFF outline Diameter PTFM outline length		0.25 0.25 0.25 0.2 10		mm
Lead wire Ag-wire		Diameter PTFC outline Diameter PTFD outline Diameter PTFF outline Diameter PTFM outline length		0.3 0.3 0.3 0.25 10		mm

Calculation Formulas

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

For T ≥ 0 °C: $R_{(T)} = R_{(0)} * (1+a * T + b * T^2)$

For T < 0 °C: $R_{(T)} = R_{(0)} * [1+a * T + b * T^2 + c * (T-100°C) * T^3]$

Coefficients: a = 3.9083E-03 b = -5.775E-07 c = -4.183E-12

Tolerances: class F0.1 (T=AA):	± (0.1+0.0017*|T/°C|) °C	(-30 … +200 °C)
Tolerances: class F0.15 (A):	± (0.15+0.002*|T/°C|) °C	(-30 … +300 °C)
Tolerances: class F0.3 (B):	± (0.3+0.005*|T/°C|) °C	(-50 … +600 °C)
Tolerances: class F0.6 (C=2B):	± (0.6+0.007*|T/°C|) °C	(-50 … +600 °C)