PT TEMPERATURE SENSOR – PTF FAMILY

SPECIFICATIONS

- **Conformal to standard platinum temperature sensors according DIN EN 60751**
- **R0: 100 and 1000 Ω**
- **Class F 0.1 (T = AA), F 0.15 (A), F 0.3 (B) and F 0.6 (C) accuracy**
- **Wide temperature range**
- **Different outline dimensions**
- **Global interchangeability**

The PTF-sensor family combines a group of resistance temperature detectors (RTD) using a Platinum resistor in thin film technology as sensing element. It 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 characteristic curve of this Platinum RTD complies with DIN EN 60751. The usage of Platinum as resistive material guarantees high long term stability.
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

- Conformal to DIN EN 60751
- Wide temperature range: -50 … +600 °C (Ni/Au wire and Class F 0.3, Ag-Wire versions are limited to 300 °C)
- Standard nominal resistances values:
  R_0: 100 and 1000 Ω (other on request)
- Class F 0.1 (T = AA), F 0.15 (A), F 0.3 (B) and F 0.6 (C) accuracy
- Low drift over lifetime
- Fast response time because of low thermal mass
- Different outline dimensions available to fit a wide range of space requirements
- Global interchangeability

APPLICATIONS

- Temperature feedback control
- White goods
- Industrial applications
- Automotive
- Medical
- Sensing element for plug-in probes

PERFORMANCE SPECS

Parameter	Symbol	Condition	Min.	Typical	Max.	Unit
Nominal Resistance at 0 °C	R_0	Class B	99.88 998.8	100.00 1000.0	100.12 1001.2	Ω
Tolerance at 25 °C	Class B	Room temperature calibration	-0.43	0	0.43	°C
Temperature Coefficient of Resistance	TCR	0 °C, 100 °C		3850		ppm/°C
Temperature Range		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
Self Heating 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 R_0: 100 Ω		PTFC outline PTFD outline PTFF outline PTFM outline			1.4 1.7 1.4 1.4	mA
Measuring Current R_0: 1000 Ω		PTFC outline PTFD outline PTFF outline PTFM outline			0.4 0.5 0.4 0.4	mA

CALCULATION FORMULAS

The calculation formulas of Pt-RTDs 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 F 0.1 (T = AA):	± (0.10+0.0017*|T/°C|) °C	(-30…+200 °C)
Class F 0.15 (A)	± (0.15+0.002*|T/°C|) °C	(-30…+300 °C)
Class F 0.3 (B):	± (0.30+0.005*|T/°C|) °C	(-50…+600 °C)
Class F 0.6 (C):	± (0.60+0.01*|T/°C|) °C	(-50…+600 °C)

TYPICAL PERFORMANCE CURVES

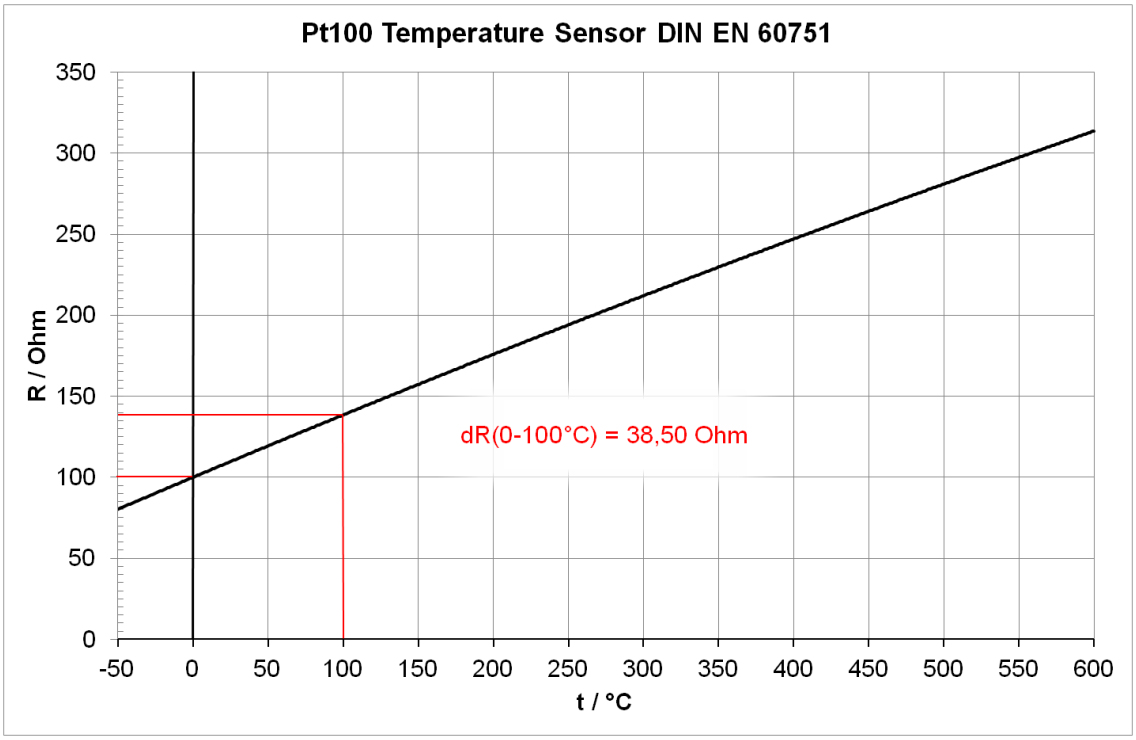

Figure 1: Resistance characteristics

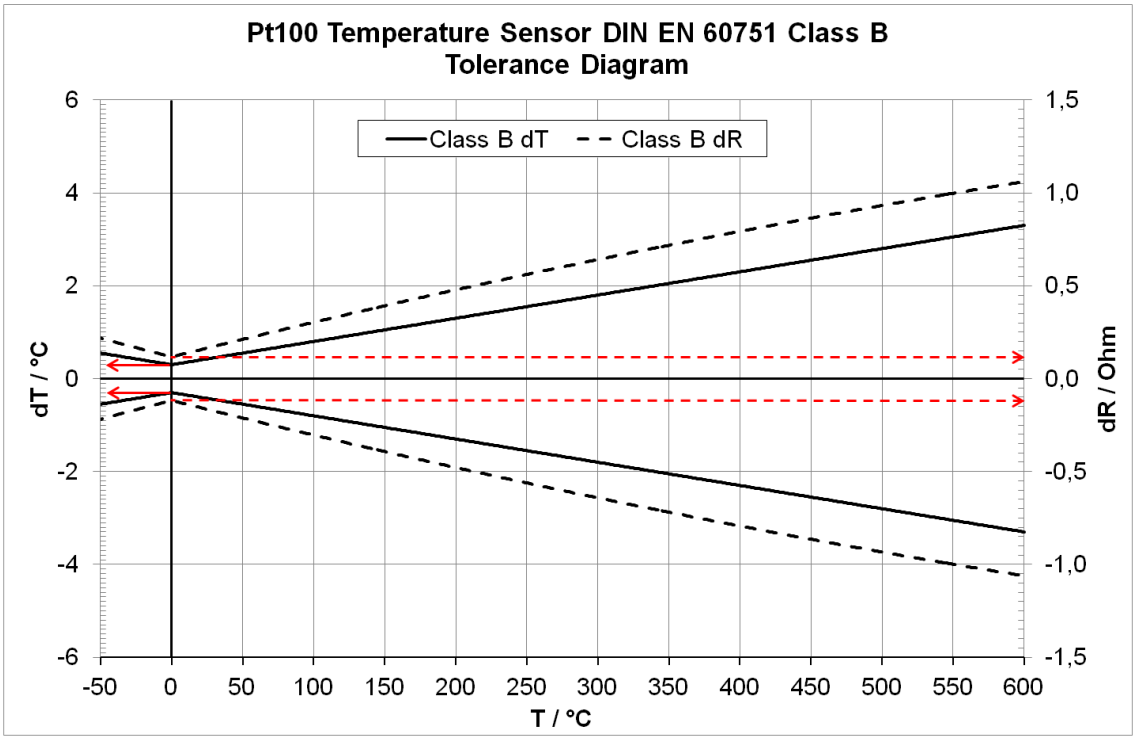

Figure 2: Tolerance chart

DIMENSIONAL DRAWING - PTFC OUTLINE

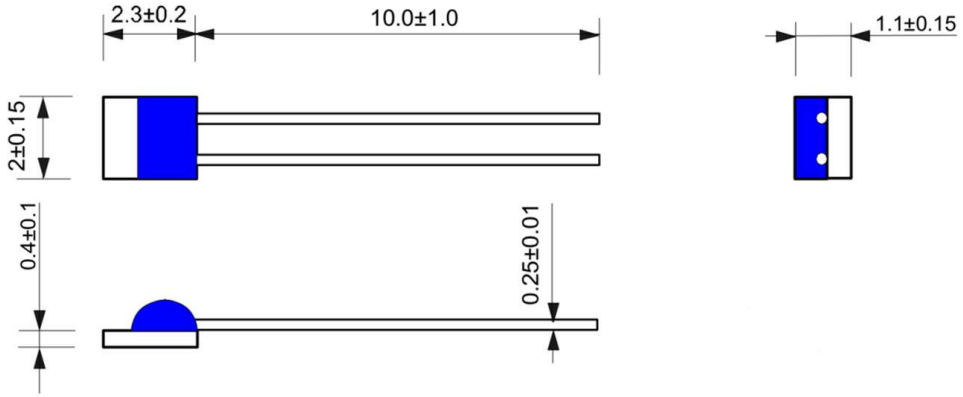

Figure 3: PTFC outline dimensions (mm)

DIMENSIONAL DRAWING - PTFD OUTLINE

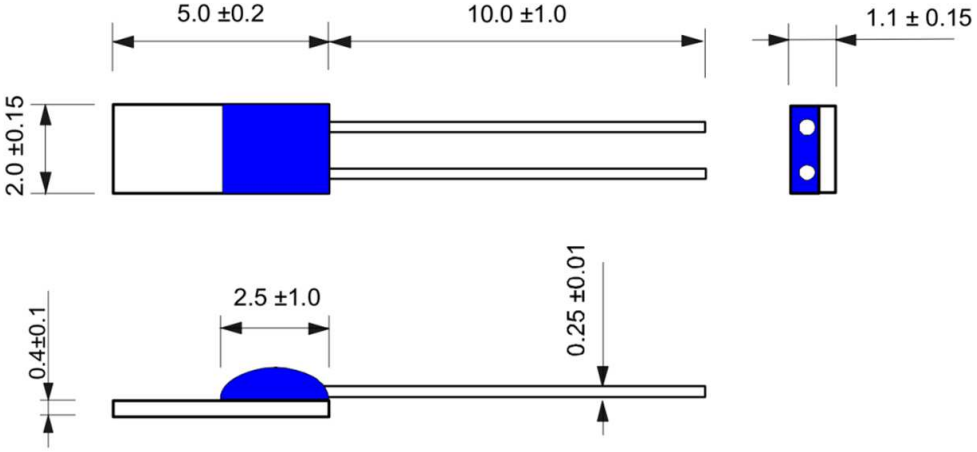

Figure 4: PTFD outline dimensions (mm)

DIMENSIONAL DRAWING - PTFF OUTLINE

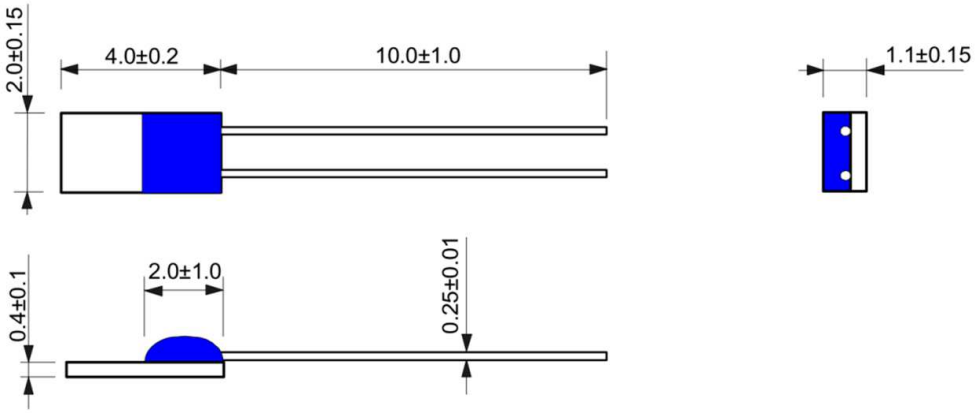

Figure 5: PTFF outline dimensions (mm)

DIMENSIONAL DRAWING - PTFM OUTLINE

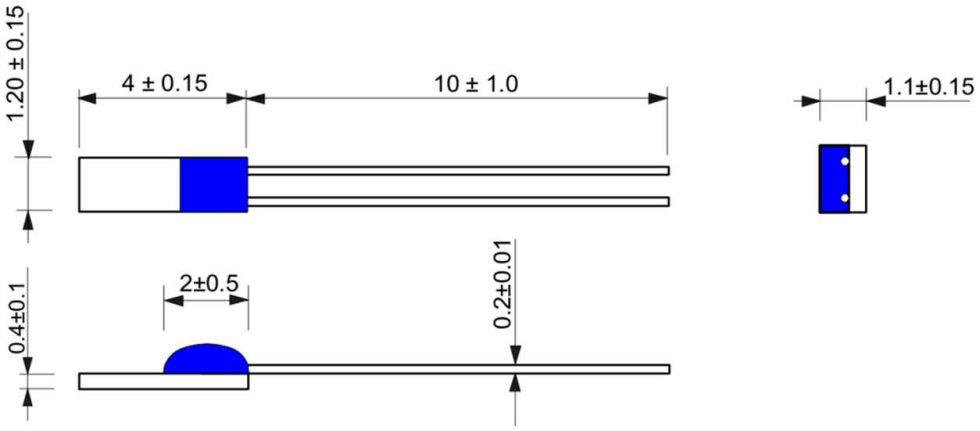

Figure 6: PTFM outline dimensions (mm)

TYPE CONFIGURATION MATRIX

Sensor family	Type	Outline dimensions	Nominal resistance		Tolerance class DIN EN 60751				Connection wire	
			100 Ω	1000 Ω					Ag wire	Ni/Au wire
PTF	C	2.0 x 2.3	101	102	T	A	B	C	1A0	1G0
PTF	D	2.0 x 5.0	101	102	T	A	B	C	1A0	1G0
PTF	F	2.0 x 4.0	101	102	T	A	B	C	1A0	1G0
PTF	M	1.2 x 4.0	101	102	T	A	B	C	1A0	1G0

PACKING AND MINIMUM ORDER QUANTITY

Packing	PCS per Packing unit	MOQ
Transparent Blister Box 80(120)mm x 50(60)mm x 20mm	500 (bulk)	500 per Type

ORDERING INFORMATION I

Product Number	Type	Description
Platinum Thin Film Sensors PTFC-Type (2 mm x 2.3 mm)		
NB-PTCO-005	PTFC101C1G0	100 Ohms, 2.0 mm x 2.3 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-002	PTFC101B1G0	100 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-011	PTFC101A1G0	100 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-058	PTFC101T1G0	100 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-159	PTFC101C1A0	100 Ohms, 2.0 mm x 2.3 mm, F 0.6 (C), Ag-wire
NB-PTCO-160	PTFC101B1A0	100 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Ag-wire
NB-PTCO-161	PTFC101A1A0	100 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Ag-wire
NB-PTCO-162	PTFC101T1A0	100 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Ag-wire
NB-PTCO-046	PTFC102C1G0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-006	PTFC102B1G0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-029	PTFC102A1G0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-154	PTFC102T1G0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-163	PTFC102C1A0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.6 (C), Ag-wire
NB-PTCO-157	PTFC102B1A0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Ag-wire
NB-PTCO-164	PTFC102A1A0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Ag-wire
NB-PTCO-165	PTFC102T1A0	1000 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Ag-wire
Platinum Thin Film Sensors PTFD-Type (2 mm x 5 mm)		
NB-PTCO-013	PTFD101C1G0	100 Ohms, 2.0 mm x 5.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-024	PTFD101B1G0	100 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-037	PTFD101A1G0	100 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-155	PTFD101T1G0	100 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-166	PTFD101C1A0	100 Ohms, 2.0 mm x 5.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-053	PTFD101B1A0	100 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-158	PTFD101A1A0	100 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-152	PTFD101T1A0	100 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Ag-wire
NB-PTCO-167	PTFD102C1G0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-126	PTFD102B1G0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-168	PTFD102A1G0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-150	PTFD102T1G0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-169	PTFD102C1A0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-035	PTFD102B1A0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-170	PTFD102A1A0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-151	PTFD102T1A0	1000 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Ag-wire

Ordering INFORMATION II

Product Number	Type	Description
Platinum Thin Film Sensors PTFF-Type (2 mm x 4 mm)		
NB-PTCO-171	PTFF101C1G0	100 Ohms, 2.0 mm x 4.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-172	PTFF101B1G0	100 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-173	PTFF101A1G0	100 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-174	PTFF101T1G0	100 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-175	PTFF101C1A0	100 Ohms, 2.0 mm x 4.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-176	PTFF101B1A0	100 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-177	PTFF101A1A0	100 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-178	PTFF101T1A0	100 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Ag-wire
NB-PTCO-149	PTFF102C1G0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-101	PTFF102B1G0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-179	PTFF102A1G0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-180	PTFF102T1G0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-181	PTFF102C1A0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-182	PTFF102B1A0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-183	PTFF102A1A0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-184	PTFF102T1A0	1000 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Ag-wire
Platinum Thin Film Sensors PTFM-Type (1.2 mm x 4 mm)		
NB-PTCO-148	PTFM101C1G0	100 Ohms, 1.2 mm x 4.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-032	PTFM101B1G0	100 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-142	PTFM101A1G0	100 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-156	PTFM101T1G0	100 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-185	PTFM101C1A0	100 Ohms, 1.2 mm x 4.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-186	PTFM101B1A0	100 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-187	PTFM101A1A0	100 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-188	PTFM101T1A0	100 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Ag-wire
NB-PTCO-189	PTFM102C1G0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.6 (C), Ni/Au-wire
NB-PTCO-012	PTFM102B1G0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Ni/Au-wire
NB-PTCO-050	PTFM102A1G0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Ni/Au-wire
NB-PTCO-153	PTFM102T1G0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Ni/Au-wire
NB-PTCO-190	PTFM102C1A0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.6 (C), Ag-wire
NB-PTCO-191	PTFM102B1A0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Ag-wire
NB-PTCO-192	PTFM102A1A0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Ag-wire
NB-PTCO-193	PTFM102T1A0	1000 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Ag-wire

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