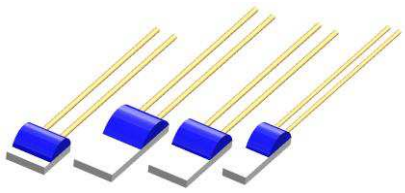
te.com



PTF -FAMILY

Platinum Thinfilm (PTF) Temperature Elements (PT-RTD's)

Product Description

The PTF family combines a group of resistance temperature detectors (RTD) using a Platinum resistor element utilizing the latest in thin film technology. It consists of a structured platinum film on a ceramic substrate, passivated by a 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 the resistive material provides excellent long-term stability.

Due to small size and low mass, this RTD has a fast response time and low time constant; therefore, it is an optimal solution for fast and precise feedback control systems.

Features

- Conforms to DIN EN 60751
- Wide operating temperature range: -200°C to +600°C (Au-coated Nickel wire and Class F 0.3, Ag-Wire versions are limited to +300°C)
- Standard nominal resistances values: R0: 100Ω and 1000Ω (others available upon request)
- Standardized Tolerance Classes: Class F 0.1 (T = AA), F 0.15 (A), F 0.3 (B) and F 0.6 (C) accuracy with defined tolerance temperature ranges
- Excellent long-term stability
- Fast response time due to low thermal mass
- Variety of 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

- Platinum Temperature Sensor (Pt-RTD)
- Conformal to DIN EN 60751
- Global interchangeability
- Wide operating temperature range
- Fast response time
- Other Geometries, Nominal Resistance values and specific Characteristics (TCR) on request
- Unprotected use of the elements in dry and clean environment only
- Resistance drift typically <0.03% after 1000h at 300°C
- Tests according to AEC-Q200 passed

CLICK HERE ›
CONNECT WITH A SPECIALIST

Sensor properties

** Operating temperature range is, -200°C to +600°C for elements with Au-coated Ni wire. Max temperature for elements with Ag wire is 300°C. Accuracy is not guaranteed if the sensor is exposed to temperatures outside the specified tolerance temperature range.*

*** The response times given are for comparison of several element geometries, will change on the later assemblies.*

**** The limitations of measuring current values for narrower tolerance classes is made due to the self-heating effects affecting accuracy.*

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Nominal Resistance at 0 °C	R_0	Class B (F0.3) Pt100 Class A (F0.15) Pt100 Class AA or T (F0.1) Pt100 Class B (F0.3) Pt1000 Class A (F0.15) Pt1000 Class AA or T (F0.1) Pt1000	99.88 99.94 99.96 998.8 999.4 999.6	100.00 100.00 100.00 1000.0 1000.0 1000.0	100.12 100.06 100.04 1001.2 1001.6 1001.4	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
Tolerance Temperature Range (*see remarks above)		Class C (F 0.6) Class B (F 0.3) Class A (F 0.15) Class AA or T (F 0.1) Class B/Cryo (F 0.3)	-50 -50 -30 -30 -200		600(Ag-wire 300) 600(Ag-wire 300) 300 200 200	°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 (**see remarks above)	$\tau_{W,0.9}$	PTFC outline PTFD outline PTFF outline PTFM outline		0.2 0.35 0.2 0.2		s
Response Time Air Flow: 1 m/s (**see remarks above)	$\tau_{A,0.9}$	PTFC outline PTFD outline PTFF outline PTFM outline		10 17 10 10		s
Measuring Current R_0: 100 Ω (***see remarks above)		PTFC outline (Class C/B/A/T) PTFD outline (Class C/B/A/T) PTFF outline (Class C/B/A/T) PTFM outline (Class C/B/A/T))			1.4 / 1.4 / 1.0 / 0.8 1.7 / 1.7 / 1.2 / 1.0 1.4 / 1.4 / 1.0 / 0.8 1.4 / 1.4 / 1.0 / 0.8	mA
Measuring Current R_0: 1000 Ω (***see remarks above)		PTFC outline (Class C/B/A/T) PTFD outline (Class C/B/A/T) PTFF outline (Class C/B/A/T) PTFM outline (Class C/B/A/T)			0.4 / 0.4 / 0.3 / 0.2 0.5 / 0.5 / 0.3 / 0.3 0.4 / 0.4 / 0.3 / 0.2 0.4 / 0.4 / 0.3 / 0.2	mA

Calculation Formulas

The temperature dependencies of resistance of this Pt-RTD's are defined in DIN EN 60751 as:

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

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

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+0.06*|T/°C|) °C	(-50…+600 °C)
	Class F 0.3 B (Cryo)	± (0.30+0.005*|T/°C|) °C	(-200…+200 °C)

Typical Performance Curves

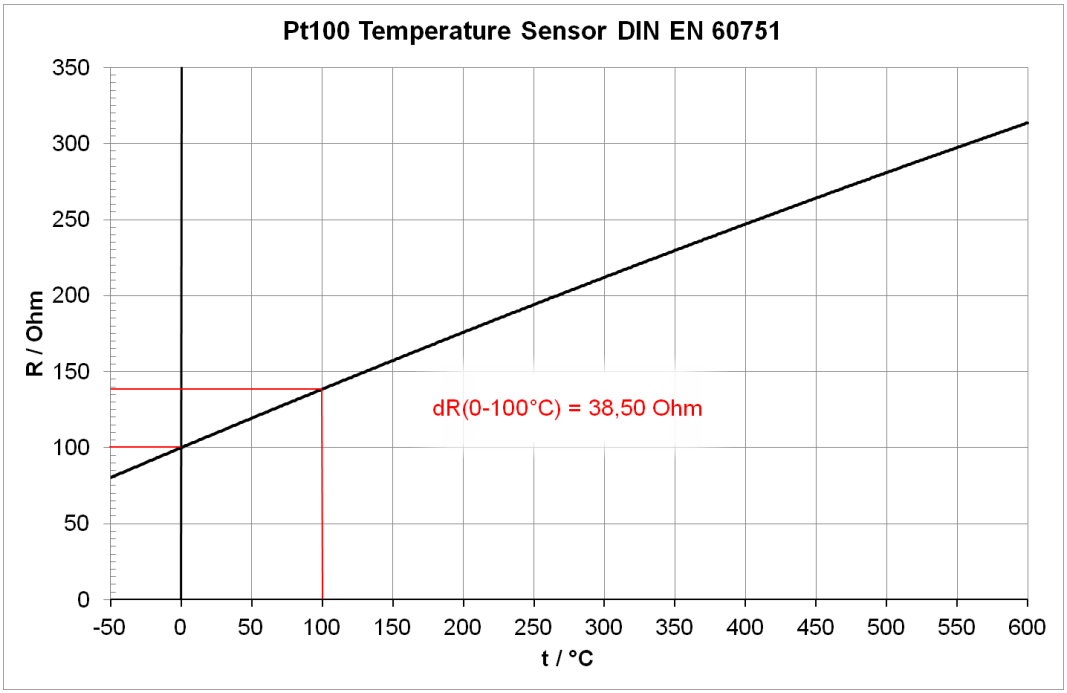


Figure 1: Resistance characteristics
(For Pt1000 use for Resistance Values Scale a Nominal Resistance Factor 10)

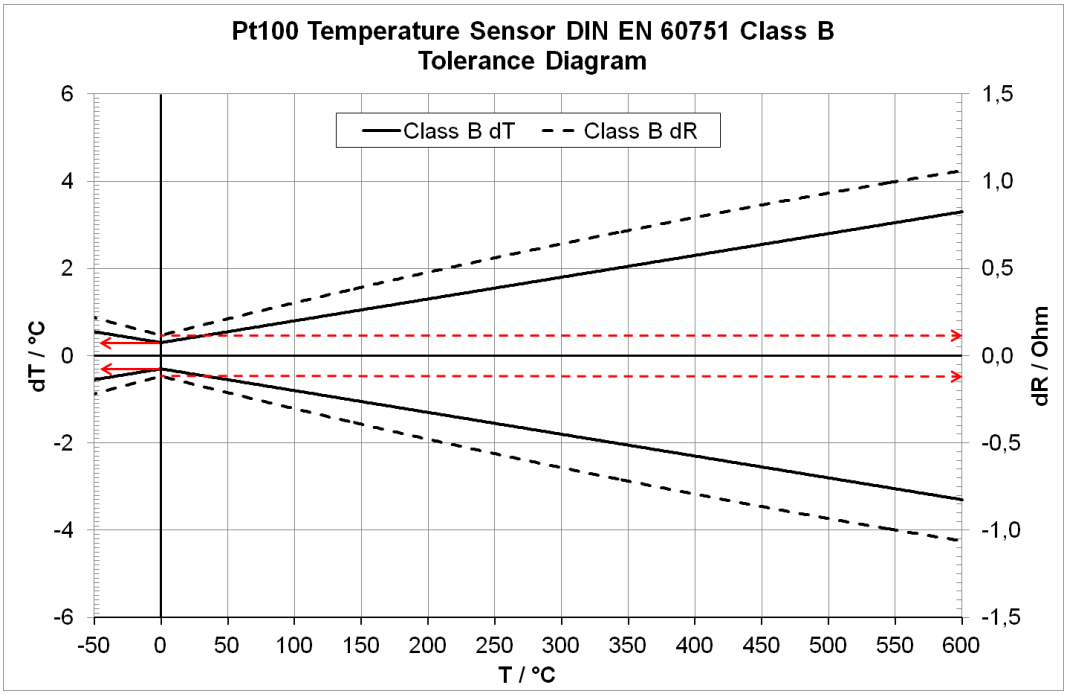


Figure 2: Tolerance chart
(For Pt1000 use for Resistance Values Scale a Nominal Resistance Factor 10, Temperature Tolerance scale is equal to Pt100)

Dimensional Drawing - PTFC Outline

Wire diameter depends on wire material, drawings are for Au-coated Ni-wire (Ø Ag-wire is 0.3mm)

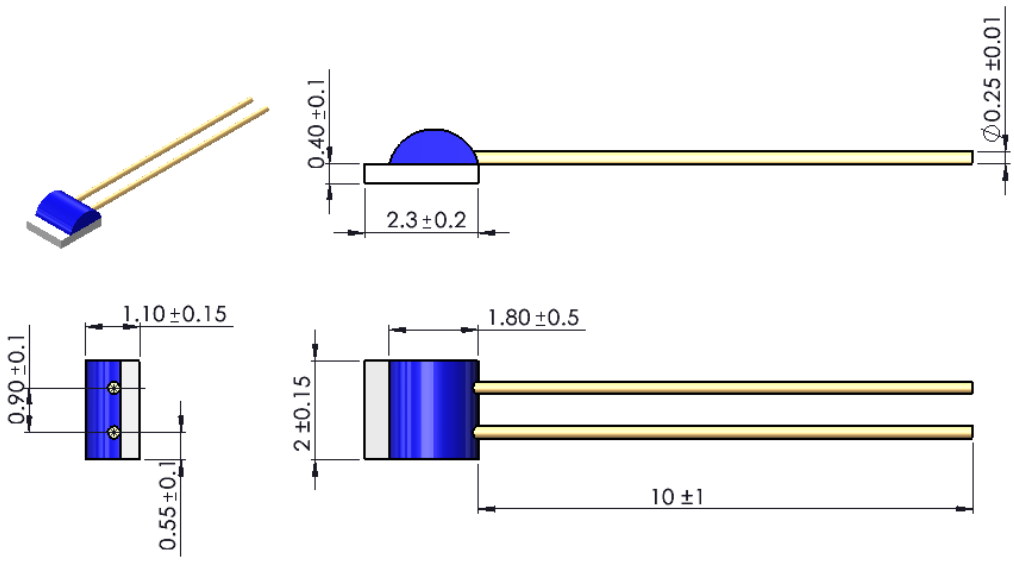


Figure 3: PTFC outline dimensions (mm)

Dimensional Drawing - PTFD Outline

Wire diameter depends on wire material, drawings are for Au-coated Ni-wire (Ø Ag-wire is 0.3mm)

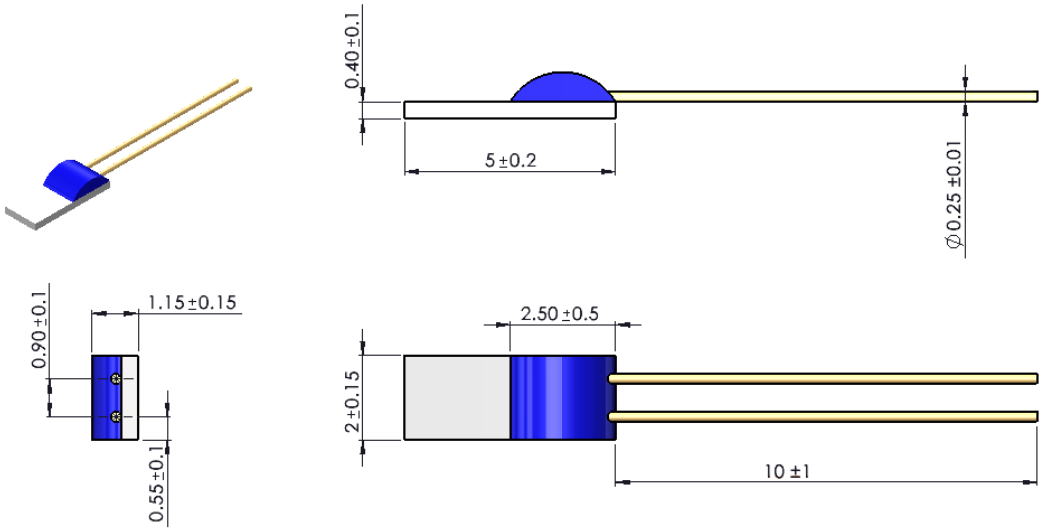


Figure 4: PTFD outline dimensions (mm)

Mechanical Dimensions PTFF Outline

Wire diameter depends on wire material, drawings are for Au-coated Ni-wire (Ø Ag-wire is 0.3mm)

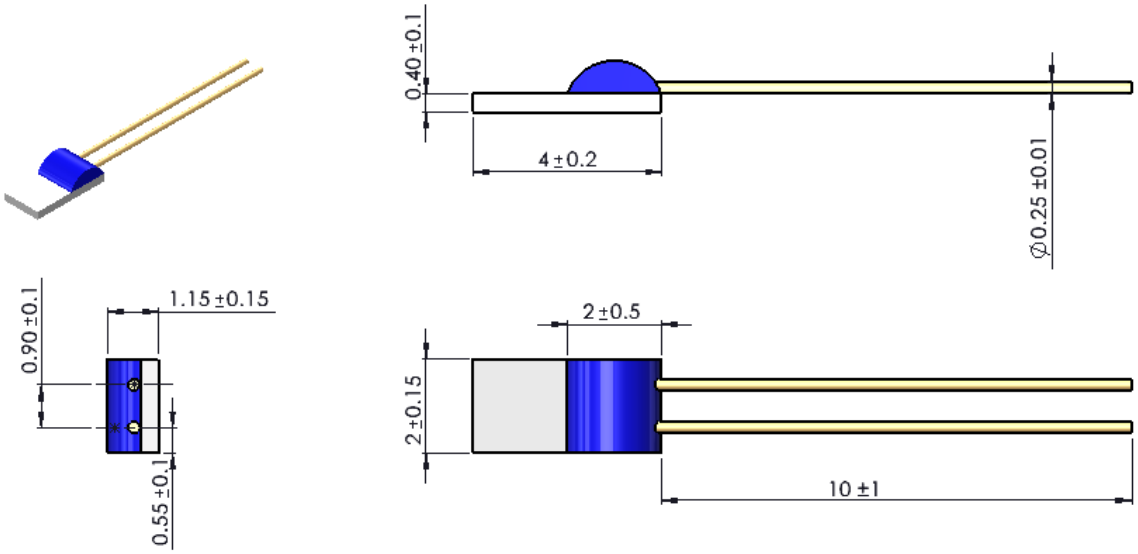


Figure 5: PTFF outline dimensions (mm)

Dimensional Drawing - PTFM Outline

Wire diameter depends on wire material, drawings are for Au-coated Ni-wire (Ø Ag-wire is 0.25mm)

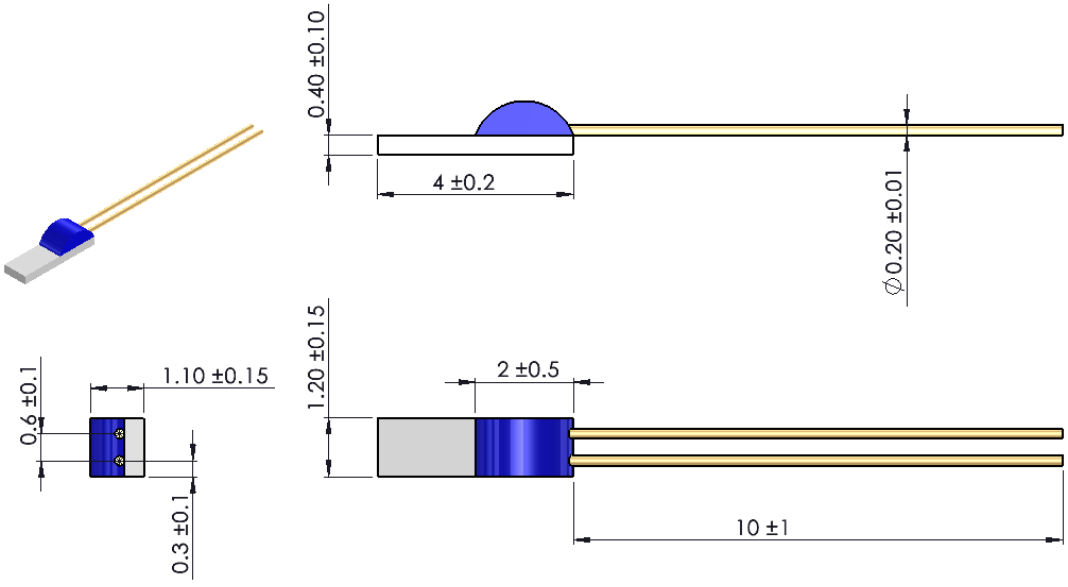


Figure 6: PTFM outline dimensions (mm)

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 PTFC Outline (2.0 mm x 2.3mm)

Part Number	Type	Description
NB-PTCO-005	**PTFC101C1G0**	100 Ohms, 2.0 mm x 2.3 mm, F 0.6 (C), Au-coated Ni-wire
NB-PTCO-002	**PTFC101B1G0**	100 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-011	**PTFC101A1G0**	100 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-058	**PTFC101T1G0**	100 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Au-coated Ni-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), Au-coated Ni-wire
NB-PTCO-006	**PTFC102B1G0**	1000 Ohms, 2.0 mm x 2.3 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-029	**PTFC102A1G0**	1000 Ohms, 2.0 mm x 2.3 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-154	**PTFC102T1G0**	1000 Ohms, 2.0 mm x 2.3 mm, F 0.1 (T = AA), Au-coated Ni-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
NB-PTCO-295	**PTFC101BC1G0**	1000 Ohms, 2.0 mm x 2.3 mm x 1.1 mm, F 0.3 (B) cryo, 10mm Au-coated Ni-wire
10213359-00	**PTFC101BC1G0**	100 Ohms, 2.0 mm x 2.3 mm x 1.1 mm,F 0.3 (B) cryo, 10mm Au-coated Ni-wire

Ordering Information PTFD Outline (2.0 mm x 5.0mm)

Part Number	Type	Description
NB-PTCO-013	**PTFD101C1G0**	100 Ohms, 2.0 mm x 5.0 mm, F 0.6 (C), Au-coated Ni-wire
NB-PTCO-024	**PTFD101B1G0**	100 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-037	**PTFD101A1G0**	100 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-155	**PTFD101T1G0**	100 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Au-coated Ni-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), Au-coated Ni-wire
NB-PTCO-126	**PTFD102B1G0**	1000 Ohms, 2.0 mm x 5.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-168	**PTFD102A1G0**	1000 Ohms, 2.0 mm x 5.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-150	**PTFD102T1G0**	1000 Ohms, 2.0 mm x 5.0 mm, F 0.1 (T = AA), Au-coated Ni-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 PTFF Outline (2.0 mm x 4.0mm)

Part Number	Type	Description
NB-PTCO-171	**PTFF101C1G0**	100 Ohms, 2.0 mm x 4.0 mm, F 0.6 (C), Au-coated Ni-wire
NB-PTCO-172	**PTFF101B1G0**	100 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-173	**PTFF101A1G0**	100 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-174	**PTFF101T1G0**	100 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Au-coated Ni-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), Au-coated Ni-wire
NB-PTCO-101	**PTFF102B1G0**	1000 Ohms, 2.0 mm x 4.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-179	**PTFF102A1G0**	1000 Ohms, 2.0 mm x 4.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-180	**PTFF102T1G0**	1000 Ohms, 2.0 mm x 4.0 mm, F 0.1 (T = AA), Au-coated Ni-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

Ordering Information PTFM Outline (1.2 mm x 4.0mm)

Part Number	Type	Description
NB-PTCO-148	**PTFM101C1G0**	100 Ohms, 1.2 mm x 4.0 mm, F 0.6 (C), Au-coated Ni-wire
NB-PTCO-032	**PTFM101B1G0**	100 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-142	**PTFM101A1G0**	100 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-156	**PTFM101T1G0**	100 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Au-coated Ni-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), Au-coated Ni-wire
NB-PTCO-012	**PTFM102B1G0**	1000 Ohms, 1.2 mm x 4.0 mm, F 0.3 (B), Au-coated Ni-wire
NB-PTCO-050	**PTFM102A1G0**	1000 Ohms, 1.2 mm x 4.0 mm, F 0.15 (A), Au-coated Ni-wire
NB-PTCO-153	**PTFM102T1G0**	1000 Ohms, 1.2 mm x 4.0 mm, F 0.1 (T = AA), Au-coated Ni-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

Version # 02/2024