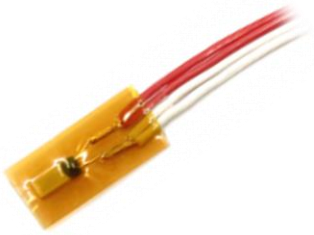
Flexible Surface Mount Temperature Sensors for Space Applications

Platinum PT100 and PT1000 RTD in Polyimide Body



Product Overview

Minco's flexible surface mount temperature sensors provide accurate, fast-response temperature measurements in a lightweight, low-profile design. Built with robust construction and proven materials, these sensors have an extensive history of reliable operation in spaceflight missions where durability and performance under extreme conditions are critical.

Available as commercial off-the-shelf components or fully customized designs, Minco sensors are well suited to meet demanding space application requirements. The S240880/S240881 series incorporates testing based on NASA EEE-INST-002, Section T1, Table 2, Level 2, covering the most common test parameters used for resistance temperature detectors (RTDs) in space flight applications. Section T1 establishes baseline criteria for thermistors, which is the closest applicable category for RTDs.

For over half a century, Minco has engineered rugged temperature sensors and heaters to withstand the harshest environments of space. We partner with mission teams to define and perform screening and qualification testing to meet or exceed reliability requirements. Minco offers tailored products and test plans to align with program-specific needs, including extended qualification testing per EEE-INST-002, Section T1, Table 3.

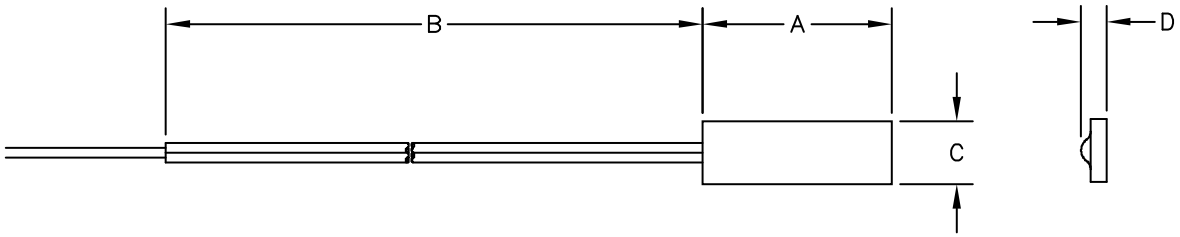
In addition to NASA-defined protocols, Minco provides testing based on ESCC Generic Specification No. 4006 (see ESCC Detail Specification Number 4006/S220185).

Product Features

Characteristic	Details
Temperature Range	-196°C to 200°C
Resistance at 0°C	100 Ω or 1000 Ω (IEC60751 Class B)
Temperature Coefficient of Resistance	0.003851 Ω/Ω/°C from 0°C to 100°C
Excitation Current	1 mA MAX recommended
Screening Testing	Based on NASA EEE-INST-002, Section T1, Table 2
Construction	Flat, flexible polyimide body for easy mounting
Outgassing	Meets NASA low outgassing requirements
Wiring Options	2-, 3-, or 4-wire AWG 26 leads
Lead Customization	Variable lead length and insulation (PTFE or polyimide)
Configurability	Customizable specifications and screening/testing levels

Model Number Options

Model Number	Body Dimensions: *C* (Width) x *A* (Length) x *D* (Thickness)
S240880	0.28" x 0.60" x 0.08" (7 mm x 15 mm x 2 mm)
S240881	0.40" x 0.80" x 0.08" (10 mm x 20 mm x 2 mm)



Specification Options

S240880	Model Number from Table
PD	Sensing element: PD: Platinum 100 Ω +/- 0.12% at 0C IEC 60751 Class B PF: Platinum 1000 Ω +/- 0.12% at 0C IEC 60751 Class B
Z	Number of AWG 26 leads: Y = 2 leads Z = 3 leads X = 4 leads
T	Leadwire insulation: T = PTFE K = Polyimide
40	Lead length *B* in inches
A	Adhesive backing: A = No adhesive B = Pressure-sensitive adhesive (PSA)[1]
S240880PDZT40A = Sample part number	

[1] PSA reduces temperature to 177°C and adds 0.002" (0.05 mm).

Resistance/Temperature Characteristics

Element	R_Z[1]	-196°C[2]	-50°C	0°C	+25°C	+75°C	+100°C	+200°C
PD	Nom. (Ω)	20.25	80.31	100.00	109.73	128.99	138.51	175.86
PF	Nom. (Ω)	202.5	803.1	1000.0	1097.3	1289.9	1385.1	1758.6
PD, PF	Tol. (±%)	5.45	0.27	0.12	0.15	0.20	0.22	0.27
	Tol. (±°C)	2.56	0.55	0.30	0.43	0.68	0.80	1.30

[1] R_Z = Zero Power Resistance. Measured with 1 mA maximum excitation current. The minimal effects of self-heating are included in measurements for RTDs.
[2] IEC 60751 does not define class B (F 0.3) tolerance at temperatures below -50°C for thin-film elements. The stated tolerance at -196°C is based on double the tolerance allowed for wire wound elements per IEC 60751 at the minimum temperature.

Summary of Screening Testing

Inspection/Test	Test Parameters	Acceptance Criteria
Preconditioning	5 cycles 25C +10/-5C; 5 minutes MIN -196C +/- 5C; 30 seconds MIN	N/A
Zero Power Resistance	0°C	Resistance/Temperature Characteristics Table
Resistance Ratio Characteristic	R100°C/R0°C	1.3862 MAX/1.3838 MIN
Thermal Shock	MIL-STD-202, Method 107 10 cycles -65C +0/-5C; 30 minutes MIN 25C +10/-5C; 5 minutes MAX 200C +5/-0C; 30 minutes MIN 25C +10/-5C; 5 minutes MAX	N/A
High Temperature Storage	MIL-STD-202, Method 108 200°C +/- 10°C 100 +10/-0 hours	N/A
Zero Power Resistance	0°C	Resistance/Temperature Characteristics Table
Insulation Resistance	MIL-STD-202, Method 301	10,000 megohms minimum at 500 V DC
Visual	Weld quality, trim border, lamination, foreign material, workmanship, and overall appearance	Minco visual inspection criteria
Dimensional	Measure dimensions	Specification Drawing
Resistance Temperature Characteristic *Optional Testing:* *Must add "-RT" to end of the part number to include this test item*	-196°C, -50°C, 0°C, 100°C, 200°C	Resistance/Temperature Characteristics Table
Percent Defective Allowable	Cumulative defects from testing	10%

Minco's flexible surface mount temperature sensors provide precise, reliable temperature measurements in lightweight, space-qualified designs. With customizable configurations and testing aligned to NASA or ESCC standards, they provide mission-critical performance trusted for demanding spaceflight applications.