INCH-POUND
MIL-PRF-23648/3E
w/ Amendment 2
11 December 2012
SUPERSEDING
MIL-PRF-23648/3E
w/ Amendment 1
15 November 2006

PERFORMANCE SPECIFICATION SHEET

RESISTOR, THERMAL (THERMISTOR), INSULATED NEGATIVE TEMPERATURE COEFFICIENT STYLE RTH10

INACTIVE FOR NEW DESIGN AFTER
15 NOVEMBER 2006

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-23648.

1. SCOPE

1.1 Scope. This specification covers the requirements for style RTH10 thermistor. This style is available in resistance ratios A, B, and C. The only terminal lead available is S type. Resistance tolerance versus temperature characteristics F, G, J, and K are applicable through the maximum temperature of 125°C.

1.2 Part or Identifying Number (PIN). Thermistors covered by this specification are identified by a PIN which consists of a basis style and a coded number. The PIN is in the following form:

RTH10	AS102G
Style	Coded number (see MIL-PRF-23648)

2. APPLICABLE DOCUMENTS

* 2.1 General. The documents listed in this section are specified in sections 3, 4 or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4 or 5 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990, or emailed to Resistor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A FSC 5905

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-23648 - Resistors, Thermal (Thermistor), Insulated, General Specification for.

* (Copies of these documents are available online at https://assist.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

* 2.3 Order of precedence. Unless otherwise noted herein or in the contract or in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Requirements. Requirements shall be in accordance with MIL-PRF-23648, and as specified herein.

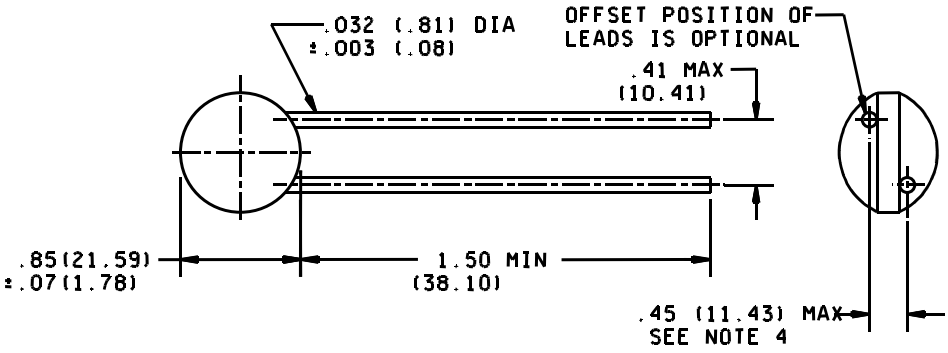
3.2 Interface and physical dimensions. The thermistors shall meet the interface and physical dimensions as specified on figure 1 and herein.

* 3.2.1 Pure tin. The use of pure tin, as an underplate or final finish is prohibited both internally and externally. Tin content of resistor components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.3).

3.3 Thermal time constant. The thermal time constant shall be 80 seconds maximum.

3.4 Dissipation constant. The dissipation constant shall be 5 milliwatts per degrees Celsius minimum.

3.5 Power rating. The thermistor shall be capable of dissipating a maximum power of 1.5 watts at 25°C. Thermistors shall be derated in accordance with figure 2.



NOTES:

1. Dimensions are inches.
2. Millimeters are in parentheses.
3. Metric equivalents are given for general information only.
4. This dimension is lead separation only (measured across solder joints) and will vary with resistance.

FIGURE 1. Style RTH10 thermistors.

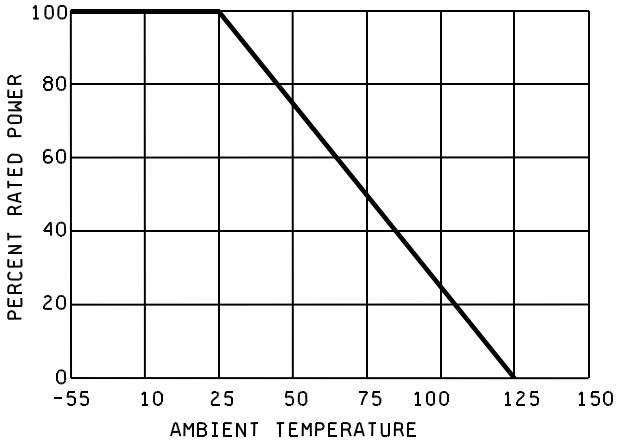


FIGURE 2. Derating curve for high ambient temperatures.

3.6 Resistance.

3.6.1 Resistance at 25°C. Standard values shall be as specified in MIL-PRF-23648 except that the 5 percent decade values shall also be used for resistance tolerances F and G. Minimum and maximum resistance values shall be in accordance with table I.

TABLE I. Minimum and maximum resistance values (at 25°C) for each available resistance ratio.

Ratio 19.8 (A)	Ratio 29.4 (B)	Ratio 48.7 (C)
ohms	ohms	ohms
10 min	68 min	1k min
82 max	330 max	6.8k max

3.6.2 Resistance at temperatures other than 25°C. Factors for determining resistance at temperatures other than 25°C are determined by multiplying the zero power resistance at 25°C by the factors shown in table II for the applicable resistance ratio.

TABLE II. Resistance temperature characteristic factors.

Temperature	Ratio 19.8 (A)	Ratio 29.4 (B)	Ratio 48.7 (C)
°C	ohms	ohms	ohms
-55	54.9	100	
-15	5.77	7.38	8.80
0	2.85	3.27	3.66
25	1.00	1.00	1.00
50	.405	.360	.320
75	.184	.148	.116
100	.0923	.0675	.047
125	.0503	.0340	.0205

3.7 Short time overload. The maximum allowable change in zero power resistance as the result of the short time load test shall be ±2 percent.

3.8 Low temperature storage. The maximum allowable change in zero power resistance as the result of the low temperature storage test shall be ±2 percent.

3.9 High temperature storage. The maximum allowable change in zero power resistance as the result of the high temperature storage shall be ±1 percent.

3.10 Terminal strength. When tested in accordance with 4.2, the maximum allowable change in zero power resistance shall be ±1 percent.

3.11 Thermal shock. The maximum allowable change in zero power resistance as the result of the thermal shock test shall be ±2 percent.

3.12 Resistance to soldering heat. The maximum allowable change in zero power resistance as the result of the resistance to soldering heat test shall be ±1 percent.

3.13 Moisture resistance. The maximum allowable change in zero power resistance as the result of the moisture resistance test shall be ±5 percent.

3.14 Life. The maximum allowable change in zero power resistance as the result of the life test shall be ±5 percent.

3.15 High temperature exposure. The maximum allowable change in zero-power resistance as the result of the high temperature exposure test shall be ±1 percent after 100 hours, and ±2 percent after 1,000 hours.

3.16 Vibration, high frequency. The maximum allowable change in zero-power resistance as the result of the vibration test shall be ±2 percent.

3.17 Shock, specified pulse. The maximum allowable change in zero power resistance as the result of the shock test shall be ±2 percent.

3.18 Immersion. The maximum allowable change in zero power resistance as the result of the immersion test shall be ±3 percent.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-PRF-23648.

4.2 Terminal strength.

4.2.1 Direct load. Direct load shall be applied gradually until the load reaches 4.5 pounds.

4.3 Solderability. The solderability test is applicable to this specification except the steam aging requirement shall be 60 minutes +5 minutes, -0 minutes.

4.4 Resistance to soldering heat. The resistance to solder heat is applicable to this specification.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military services system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The notes specified in MIL-PRF-23648 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of the specification.

b. Unless otherwise specified (see 2.1), the versions of the individual documents referenced will be those in effect on the date of release of the solicitation.

c. Packaging requirements (see 5.1).

* 6.3 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Amendment notations. The margins of this specification are marked with asterisks to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Custodians:
Army – CR
Navy – EC
Air Force – 85
DLA – CC
NASA – NA

Review activities:
Army – AT, AV
Navy – AS, CG, MC, OS
Air Force – 19

Preparing activity:
DLA – CC

(Project 5905-2012-041)

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