

INTERNATIONAL STANDARD

IEC
60539-2

First edition
2003-11

**Directly heated negative temperature
coefficient thermistors –**

**Part 2:
Sectional specification –
Surface mount negative temperature
coefficient thermistors**

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IEC 60539-2:2003

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Reference number
IEC 60539-2:2003(E)

Publication numbering

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

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CONTENTS

FOREWORD	4
1 General	6
1.1 Scope	6
1.2 Normative references	6
1.3 Information to be given in a detail specification	6
1.3.1 Outline drawing and dimensions	7
1.3.2 Mounting	7
1.3.3 Ratings and characteristics	7
1.4 Terminology	7
2 Preferred ratings and characteristics	7
2.1 Tolerances on rated zero-power resistance	7
2.2 Climatic categories	7
3 Quality assessment procedures	8
3.1 Primary stage of manufacture	8
3.2 Structurally similar components	8
3.3 Qualification approval procedures	8
3.3.1 The manufacturer shall comply with 3.4 of IEC 60539-1	8
3.4 Quality conformance inspection	8
3.4.1 Qualification approval on the basis of the fixed sample size procedure	8
3.5 Quality conformance inspection	10
3.5.1 Formation of inspection lots	10
3.5.2 Test schedule	11
3.5.3 Delayed delivery	11
3.5.4 Assessment level	11
4 Test and measurement procedures	12
4.1 Mounting	12
4.2 Drying and recovery	12
4.2.1 Drying	12
4.2.2 Recovery	12
4.3 Visual examination and check of dimensions	12
4.3.1 Visual examination	12
4.3.2 Requirements	12
4.3.3 Marking	14
4.3.4 Dimensions	14
4.4 Electrical tests	14
4.4.1 Zero-power resistance	14
4.4.2 B-value or resistance ratio	14
4.4.3 Resistance/temperature characteristic	15
4.5 Thermal tests	15
4.5.1 Dissipation factor (δ)	15
4.5.2 Thermal time constant by cooling after self-heating (τ_c)	15

4.6	Resistance to soldering heat	15
4.6.1	Initial measurement	15
4.6.2	Test conditions	15
4.6.3	Recovery	16
4.6.4	Final inspection, measurements and requirements	16
4.7	Solderability	16
4.7.1	Test conditions	16
4.7.2	Recovery	17
4.7.3	Final inspection, measurements and requirements	17
4.8	Rapid change of temperature	17
4.9	Thermal shock	17
4.10	Climatic sequence	18
4.10.1	Initial measurements	18
4.10.2	Dry heat	18
4.10.3	Damp heat (cyclic), first cycle	18
4.10.4	Cold	18
4.10.5	Damp heat (cyclic), remaining cycles	18
4.10.6	Final measurements	19
4.11	Damp heat, steady state	19
4.12	Endurance	19
4.12.1	Endurance at θ_3 and P_{max}	19
4.12.2	Endurance at upper category temperature	19
4.13	Shear (adhesion) test	20
4.14	Substrate bending test	20
4.15	Component solvent resistance	20
4.16	Solvent resistance of marking	20

Annex A (normative)	Guide for the specification and coding of dimensions of surface mount negative temperature coefficient thermistors	21
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Table 1	– Upper and lower category temperatures and duration of the damp heat test	8
Table 2	– Fixed sample size test schedule for qualification approval of surface mount negative temperature coefficient thermistors Assessment level EZ	10
Table 3	– Lot-by-lot inspection	11
Table 4	– Periodic test	12
Table 5	– Number of cycles	18
Table A.1	– Dimensions	21
Figure 1	– Fault: fissure or defect	13
Figure 2	– Fault: crack	13
Figure 3	– Separation or delamination	13
Figure 4	– Exposed electrodes	13
Figure 5	– Principal faces	14
Figure A.1	– Dimensioning of surface mount thermistors	21

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECTLY HEATED NEGATIVE TEMPERATURE
COEFFICIENT THERMISTORS –**

**Part 2: Sectional specification –
Surface mount negative temperature coefficient thermistors**

FOREWORD

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International Standard IEC 60539-2 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
40/1346/FDIS	40/1368/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual edition of this document may be issued at a later date.

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DIRECTLY HEATED NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS –

Part 2: Sectional specification – Surface mount negative temperature coefficient thermistors

1 General

1.1 Scope

This part of IEC 60539 is applicable to surface mount directly heated negative temperature coefficient thermistors, typically made from transition metal oxide materials with semiconducting properties. These thermistors have metallized connecting pads or soldering strips and are intended to be mounted directly on to substrates for hybrid circuits or on to printed boards.

1.2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-2:1974, *Environmental testing – Part 2: Tests – Tests B: Dry heat*
Amendment 1 (1993)
Amendment 2 (1994)

IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*
Amendment 1 (1986)

IEC 60068-2-30:1980, *Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*
Amendment 1 (1985)

IEC 60068-2-58:1999, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60068-2-78: *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60539-1:2002, *Directly heated negative temperature coefficient thermistors – Part 1: Generic specification*

1.3 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specification.

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in 1.9 of the detail specification and indicated in the test schedules, for example, by an asterisk.

NOTE The information given in 1.3.1 may for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.3.1 Outline drawing and dimensions

There shall be an illustration of the thermistor as an aid to easy recognition and for comparison with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions shall preferably be stated in millimetres; however, when the original dimensions are given in inches, the converted metric dimensions in millimetres shall be added.

Normally, the numerical values shall be given for the length, width and height of the body. When necessary, for example when a number of items are covered by a detail specification, the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the thermistor.

1.3.2 Mounting

The detail specification shall give guidance on methods of mounting for normal use. Mounting for test and measurement purposes (when required) shall be in accordance with 4.27 of IEC 60539-1.

1.3.3 Ratings and characteristics

1.3.3.1 Particular characteristics

Additional characteristics may be listed when they are considered necessary to specify the component adequately for design and application purposes.

1.3.3.2 Marking

See 2.4 of IEC 60539-1.

1.4 Terminology

See 2.2 of IEC 60539-1.

2 Preferred ratings and characteristics

2.1 Tolerances on rated zero-power resistance

Preferred values of tolerances on zero-power resistance are:

±1 %, ±2 %, ±3 %, ±5 %, ±10 %.

2.2 Climatic categories

The upper and lower category temperatures and the duration of the damp-heat steady-state test shall be selected from Table 1.

Table 1 – Upper and lower category temperatures and duration of the damp heat test

Lower category temperature °C	-55, -40, -25, -10, -5, +5
Upper category temperature °C	70, 85, 100, 105, 125, 150, 155
Damp heat, steady state days	21, 42, 56

The detail specification shall prescribe the appropriate category.

3 Quality assessment procedures

3.1 Primary stage of manufacture

The primary stage of manufacture is defined as the initial mixing process of ingredients.

3.2 Structurally similar components

Surface mount thermistors may be grouped as structurally similar for the purpose of forming inspection lots provided that the requirements of 3.1 of IEC 60539-1 are met, with the following addition.

For the shear test and the substrate bending test, devices may be grouped if they have been made on the same production line, have the same dimensions, internal structure and external finish.

3.3 Qualification approval procedures

3.3.1 The manufacturer shall comply with 3.4 of IEC 60539-1.

3.4 Quality conformance inspection

Blank detail specifications associated with this specification shall prescribe the test schedule for quality conformance inspection.

This schedule shall also specify the grouping, sampling and periodicity for the lot-by-lot and periodic inspection.

Inspection levels and sampling plans shall be selected from those given in IEC 60410.

If required, more than one test schedule may be specified.

3.4.1 Qualification approval on the basis of the fixed sample size procedure

a) Sampling

The sample shall be representative of the range of thermistors for which approval is sought. This may or may not be the complete range covered by the detail specification.

The sample shall consist of specimens having the lowest, highest and middle-rated zero-power resistance of each case size.