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Directly heated negative temperature coefficient thermistors - Part 1: Generic specification

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

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EN 60539-1:2016/AC:2017-09

English Version

**Directly heated negative temperature coefficient thermistors -  
Part 1: Generic specification  
(IEC 60539-1:2022)**Thermistances à coefficient de température négatif à  
chauffage direct - Partie 1: Spécification générique  
(IEC 60539-1:2022)Direkt geheizte temperaturabhängige Widerstände mit  
negativem Temperaturkoeffizienten - Teil 1:  
Fachgrundspezifikation  
(IEC 60539-1:2022)

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**EN IEC 60539-1:2023 (E)****European foreword**

The text of document 40/2975/FDIS, future edition 4 of IEC 60539-1, prepared by IEC/TC 40 "Capacitors and resistors for electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60539-1:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-10-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-01-19

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IEC 60027-1 NOTE Approved as EN 60027-1

ISO 80000-1 NOTE Approved as EN ISO 80000-1

## Annex A (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60062	-	Marking codes for resistors and capacitors	EN 60062	-
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-11	-	Environmental testing - Part 2-11: Tests - Test Ka: Salt mist	EN IEC 60068-2-11	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-17	-	Basic environmental testing procedures - Part 2-17: Tests - Test Q: Sealing	EN 60068-2-17	-
IEC 60068-2-20	-	Environmental testing - Part 2-20: Tests - Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads	EN IEC 60068-2-20	-
IEC 60068-2-21	2021	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN IEC 60068-2-21	2021
IEC 60068-2-27	2008	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	2009
IEC 60068-2-31	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-38	-	Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test	EN IEC 60068-2-38	-

**EN IEC 60539-1:2023 (E)**

IEC 60068-2-45	1980	Basic environmental testing procedures - Part 2-45: Tests - Test XA and guidance: Immersion in cleaning solvents	EN 60068-2-45	1992
+ A1	1993		+ A1	1993
IEC 60068-2-52	-	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN IEC 60068-2-52	-
IEC 60068-2-58	-	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)	EN 60068-2-58	-
IEC 60068-2-69	-	Environmental testing - Part 2-69: Tests - Test Te/Tc: Solderability testing of electronic components and printed boards by the wetting balance (force measurement) method	EN 60068-2-69	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60294	-	Measurement of the dimensions of a cylindrical component with axial terminations	EN 60294	-
IEC 60717	-	Method for the determination of the space required by capacitors and resistors with unidirectional terminations	EN 60717	-
IEC 61193-2	-	Quality assessment systems - Part 2: Selection and use of sampling plans for inspection of electronic components and packages	EN 61193-2	-
IEC 61249-2-7	-	Materials for printed boards and other interconnecting structures - Part 2-7: Reinforced base materials clad and unclad - Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad	EN 61249-2-7	-





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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Directly heated negative temperature coefficient thermistors –  
Part 1: Generic specification**

**Thermistances à coefficient de température négatif à chauffage direct –  
Partie 1: Spécification générique**







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Part 1: Generic specification**

**Thermistances à coefficient de température négatif à chauffage direct –  
Partie 1: Spécification générique**

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ELECTROTECHNICAL  
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## CONTENTS

FOREWORD.....	8
1 Scope.....	10
2 Normative references .....	10
3 Terms and definitions .....	11
4 General items .....	21
4.1 Units and symbols.....	21
4.2 Preferred values and appropriate category.....	21
4.2.1 General .....	21
4.2.2 Appropriate category .....	21
4.3 Marking.....	21
4.3.1 General .....	21
4.3.2 Marking for small size types such as surface mount NTC thermistors .....	22
4.3.3 Coding.....	22
4.4 Quality assessment procedures .....	22
5 General provisions for measurements and test methods .....	22
5.1 General.....	22
5.2 Standard atmospheric conditions for testing.....	22
5.3 Drying and recovery.....	23
5.3.1 Drying.....	23
5.3.2 Recovery .....	23
5.4 Mounting (for surface mount thermistors only) .....	23
5.4.1 General .....	23
5.4.2 Printed wiring board and land pattern .....	23
5.4.3 Mounting on board.....	23
6 Electrical tests and measurements .....	25
6.1 Zero-power resistance .....	25
6.1.1 General .....	25
6.1.2 Measurement procedures .....	25
6.1.3 Requirements .....	25
6.2 <i>B</i> -value or resistance ratio .....	25
6.2.1 General .....	25
6.2.2 Requirements .....	25
6.3 Insulation resistance (for insulated types only).....	26
6.3.1 General .....	26
6.3.2 Test methods.....	26
6.3.3 Applied voltage.....	29
6.3.4 Requirements .....	29
6.4 Voltage proof (for insulated types only).....	29
6.4.1 General .....	29
6.4.2 Test voltage.....	29
6.4.3 Requirements .....	29
6.5 Resistance/temperature characteristic .....	29
6.5.1 General .....	29
6.5.2 Test methods.....	29
6.5.3 Requirements .....	29
6.6 Dissipation factor ( $\delta$ ).....	30

6.6.1	General .....	30
6.6.2	Initial measurements .....	30
6.6.3	Test methods.....	30
6.6.4	Requirements .....	31
6.7	Thermal time constant by ambient temperature change ( $\tau_a$ ).....	31
6.7.1	The hot to cold thermal time constant for ambient temperature change.....	31
6.7.2	The cold to hot thermal time constant for ambient temperature change.....	32
6.7.3	Final measurements and requirements .....	32
6.7.4	Requirements .....	33
6.8	Thermal time constant by cooling after self-heating ( $\tau_c$ ) .....	33
6.8.1	General .....	33
6.8.2	Initial measurements .....	33
6.8.3	Preconditioning.....	33
6.8.4	Test method .....	34
6.8.5	Final measurements and requirements .....	34
7	Mechanical test and measurements .....	34
7.1	Visual examination and check of dimensions .....	34
7.1.1	Visual examination .....	34
7.1.2	Dimensions.....	35
7.2	Robustness of terminations (not applicable to surface mount thermistors) .....	35
7.2.1	General .....	35
7.2.2	Initial measurements .....	35
7.2.3	Test methods.....	35
7.2.4	Test Ua <sub>1</sub> – Tensile .....	35
7.2.5	Test Ub – Bending (half the number of terminations) .....	36
7.2.6	Test Uc – Torsion (remaining terminations).....	36
7.2.7	Final measurements and requirements .....	36
7.3	Vibration .....	36
7.3.1	General .....	36
7.3.2	Initial measurements .....	36
7.3.3	Test procedures.....	36
7.3.4	Final inspection, measurements and requirements.....	37
7.4	Shock .....	37
7.4.1	General .....	37
7.4.2	Initial measurements .....	37
7.4.3	Mounting .....	37
7.4.4	Test procedures.....	37
7.4.5	Final inspection, measurements and requirements.....	37
7.5	Free fall .....	37
7.5.1	General .....	37
7.5.2	Initial measurements .....	37
7.5.3	Test procedures.....	38
7.5.4	Final inspection, measurements and requirements.....	38
7.6	Shear (adhesion) test (for surface mount NTC thermistors only) .....	38
7.6.1	General .....	38
7.6.2	Initial measurements .....	38
7.6.3	Test conditions .....	38
7.6.4	Final inspection, measurements and requirements.....	38

7.7	Substrate bending test (for surface mount NTC thermistors only).....	38
7.7.1	General .....	38
7.7.2	Initial measurements .....	38
7.7.3	Test procedures.....	38
7.7.4	Final inspection, measurements and requirements.....	39
8	Environmental and climatic tests .....	39
8.1	Rapid change of temperature .....	39
8.1.1	General .....	39
8.1.2	Initial measurements .....	39
8.1.3	Test procedures.....	39
8.1.4	Final inspection, measurements and requirements.....	39
8.2	Thermal shock .....	40
8.2.1	General .....	40
8.2.2	Initial measurements .....	40
8.2.3	Test procedures.....	40
8.2.4	Final inspection, measurements and requirements.....	40
8.3	Cold.....	40
8.3.1	General .....	40
8.3.2	Initial measurements .....	40
8.3.3	Test procedures.....	40
8.3.4	Final inspection, measurements and requirements.....	41
8.4	Dry heat.....	41
8.4.1	General .....	41
8.4.2	Initial measurements .....	41
8.4.3	Test procedures.....	41
8.4.4	Final inspection, measurements and requirements.....	41
8.5	Damp heat, steady state .....	42
8.5.1	General .....	42
8.5.2	Initial measurements .....	42
8.5.3	Test procedures.....	42
8.5.4	Recovery .....	42
8.5.5	Final inspection, measurements and requirements.....	42
8.6	Endurance .....	42
8.6.1	General .....	42
8.6.2	Endurance at room temperature with applied continuous maximum current ( $I_{\max 25}$ ) (for inrush current-limiting thermistors only).....	43
8.6.3	Endurance at room temperature with applied cyclic maximum current ( $I_{\max 25}$ ) (for inrush current-limiting thermistors only).....	44
8.6.4	Endurance at $T_3$ and $P_{\max}$ (for other than inrush current-limiting thermistors only).....	45
8.6.5	Endurance at upper category temperature .....	46
8.6.6	Maximum permissible capacitance (for inrush current-limiting thermistors only).....	47
8.7	Salt mist .....	49
8.7.1	General .....	49
8.7.2	Initial measurements .....	49
8.7.3	Test conditions .....	49
8.7.4	Final inspection, measurements and requirements.....	49
8.8	Sealing .....	49

8.9	Composite temperature/humidity cycle .....	49
8.9.1	General .....	49
8.9.2	Initial measurements .....	49
8.9.3	Test conditions .....	50
8.9.4	Final inspection, measurements and requirements.....	50
9	Tests related to component assembly .....	50
9.1	Resistance to soldering heat .....	50
9.1.1	General .....	50
9.1.2	Preconditioning.....	50
9.1.3	Initial measurements .....	50
9.1.4	Test procedure .....	50
9.1.5	Recovery .....	50
9.1.6	Final inspection, measurement and requirements .....	51
9.2	Solderability .....	51
9.2.1	General .....	51
9.2.2	Initial measurements .....	51
9.2.3	Test procedure .....	51
9.2.4	Final inspection, measurements and requirements.....	51
9.3	Component solvent resistance .....	52
9.3.1	General .....	52
9.3.2	Initial measurements .....	52
9.3.3	Test conditions .....	52
9.3.4	Requirements .....	52
9.4	Solvent resistance of marking .....	52
9.4.1	General .....	52
9.4.2	Initial measurements .....	52
9.4.3	Test conditions .....	52
9.4.4	Requirements .....	52
Annex A (normative) Rules for the preparation of detail specifications for directly heated NTC thermistors for electronic equipment for use within quality assessment systems .....		53
A.1	Drafting.....	53
A.2	Reference standard .....	53
A.3	Circulation .....	53
Annex B (informative) Typical examples of mountings for measurements of directly heated thermistors .....		54
Annex Q (informative) Quality assessment procedures .....		56
Q.1	General.....	56
Q.1.1	Scope of this annex .....	56
Q.1.2	Quality assessment definitions .....	57
Q.1.3	Rework .....	57
Q.1.4	Alternative test methods .....	57
Q.1.5	Certified test records of released lots .....	58
Q.1.6	Unchecked parameters .....	58
Q.1.7	Delayed delivery .....	58
Q.1.8	Repair .....	58
Q.1.9	Registration of approvals .....	58
Q.1.10	Manufacture outside the geographical limits .....	59
Q.2	Qualification approval (QA) procedures.....	59

Q.2.1	Eligibility for qualification approval.....	59
Q.2.2	Application for qualification approval .....	59
Q.2.3	Subcontracting .....	59
Q.2.4	Test procedure for the initial product qualification approval.....	59
Q.2.5	Granting of qualification approval .....	59
Q.2.6	Maintenance of qualification approval .....	59
Q.2.7	Quality conformance inspection .....	60
Q.3	Capability approval (CA) procedures.....	60
Q.3.1	General .....	60
Q.3.2	Eligibility for capability approval.....	60
Q.3.3	Application for capability approval .....	60
Q.3.4	Subcontracting .....	61
Q.3.5	Description of the capability.....	61
Q.3.6	Demonstration and verification of capability .....	61
Q.3.7	Granting of capability approval .....	61
Q.3.8	Maintenance of capability approval .....	61
Q.3.9	Quality conformance inspection .....	61
Q.4	Technology approval (TA) procedure .....	62
Q.4.1	General .....	62
Q.4.2	Eligibility for technology approval .....	62
Q.4.3	Application of technology approval .....	62
Q.4.4	Subcontracting .....	62
Q.4.5	Description of technology .....	62
Q.4.6	Demonstration and verification of the technology .....	62
Q.4.7	Granting of technology approval .....	62
Q.4.8	Maintenance of technology approval.....	62
Q.4.9	Quality conformance inspection .....	63
Q.5	Interpretation of sampling plans and procedures as described in IEC 60410 for use within quality assessment systems .....	63
Q.6	Rules for the preparation of detail specifications for NTC thermistors for electronic equipment for use within quality assessment systems .....	63
Q.6.1	Drafting .....	63
Q.6.2	Reference standard .....	63
Q.7	Layout of the first page of a PCP/CQC specification .....	64
Q.8	Requirements for capability approval test report .....	65
Q.8.1	General .....	65
Q.8.2	Requirements .....	65
Q.8.3	Summary of test information (for each CQC).....	65
Q.8.4	Measurement record.....	65
Q.9	Guidance for the extension of endurance tests on fixed thermistor .....	65
Q.9.1	Overview .....	65
Q.9.2	Guidelines .....	66
Annex X (informative)	Cross-references to IEC 60539-1:2016.....	67
Bibliography.....		69
Figure 1	– Typical resistance-temperature characteristic for NTC thermistors .....	14
Figure 2	– Decreased power dissipation curve .....	16
Figure 3	– Maximum current derating.....	18
Figure 4	– Basic circuit for zero-power resistance measurement.....	25

Figure 5 – Example of Method 1 for testing the insulation resistance .....	26
Figure 6 – Example of Method 2 for testing the insulation resistance (1).....	27
Figure 7 – Example of Method 2 for testing the insulation resistance (2).....	27
Figure 8 – Example of Method 3 for testing the insulation resistance .....	28
Figure 9 – Example of Method 4 for testing the insulation resistance .....	28
Figure 10 – Example of test chamber .....	30
Figure 11 – Dissipation factor measuring circuit .....	31
Figure 12 – Thermal time constant measuring circuit .....	34
Figure 13 – Endurance at room temperature with $I_{\max 25}$ evaluating circuit .....	43
Figure 14 – Endurance at room temperature with $I_{\max 25}$ evaluating circuit .....	44
Figure 15 – Maximum permissible capacitance test circuit (Method 1) .....	48
Figure 16 – Maximum permissible capacitance test circuit (Method 2) .....	48
Figure B.1 – Mounting for measurements of surface mount thermistors .....	55
Table 1 – Lower and upper category temperatures and duration of the damp heat, steady state test .....	21
Table 2 – Tensile force .....	36
Table B.1 – Recommended land dimensions.....	54



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECTLY HEATED NEGATIVE TEMPERATURE  
COEFFICIENT THERMISTORS –****Part 1: Generic specification**

## FOREWORD

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IEC 60539-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Restructured completely to comply to ISO/IEC directives; categorization and reorganization of test methods into these categories;
- b) Annex X added for comparison to the previous edition;
- c) Some wordings, figures and references have been revised.

The text of this International Standard is based on the following documents:

Draft	Report on voting
40/2975/FDIS	40/3016/RVD

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

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60539-1 series, published under the general title *Directly heated negative temperature coefficient thermistors*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

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

# DIRECTLY HEATED NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS –

## Part 1: Generic specification

### 1 Scope

This part of IEC 60539 is applicable to directly heated negative temperature coefficient thermistors, typically made from transition metal oxide materials with semiconducting properties.

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60062, *Marking codes for resistors and capacitors*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Tests A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-11, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-17, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests – Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21:2021, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*

IEC 60068-2-45:1980, *Basis Environmental testing procedures – Part 2-45: Tests – Test XA and guidance: Immersion in cleaning solvents*  
IEC 60068-2-45:1980/AMD1:1993

IEC 60068-2-52, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60068-2-58, *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 60068-2-69, *Environmental testing – Part 2-69: Tests – Test Te/Tc: Solderability testing of electronic components and printed boards by the wetting balance (force measurement) method*

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

IEC 60294, *Measurement of the dimensions of a cylindrical component with axial terminations*

IEC 61193-2, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

IEC 60717, *Method for the determination of the space required by capacitors and resistors with unidirectional terminations*

IEC 61249-2-7, *Materials for printed boards and other interconnecting structures – Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**