
Termistorji - Neposredno ogrevani s pozitivnim temperaturnim koeficientom - 1.
del: Splošna specifikacija

Thermistors - Directly heated positive temperature coefficient - Part 1: Generic specification

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Thermistances - Coefficient de température positif à chauffage direct - Partie 1:
Spécification générique

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SECRETARIAT: Netherlands	SECRETARY: Mr Ronald Drenthen
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
<p>Attention IEC-CENELEC parallel voting</p> <p>The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

Thermistors - Directly heated positive temperature coefficient - Part 1: Generic specification

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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International Standard IEC 60738-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

The French version of this standard has not been voted upon.

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

IEC 60738 consists of the following parts, under the general title *Thermistors – Directly heated positive step-function coefficient*:

- | | |
|-----------|---|
| Part 1: | Generic specification |
| Part 1-1: | Blank detail specification – Current limiting application – Assessment level EZ |
| Part 1-2: | Blank detail specification – Heating element application – Assessment level EZ |
| Part 1-3: | Blank detail specification – Inrush current application – Assessment level EZ |
| Part 1-4: | Blank detail specification – Sensing application – Assessment level EZ |

266 The committee has decided that the contents of the base publication and its amendment will
267 remain unchanged until the stability date indicated on the IEC web site under
268 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
269 publication will be

- 270 • reconfirmed;
- 271 • withdrawn;
- 272 • replaced by a revised edition, or
- 273 • amended.

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275

INTRODUCTION

276 The International Electrotechnical Commission (IEC) draws attention to the fact that it is
277 claimed that compliance with this document may involve the use of a patent. IEC takes no
278 position concerning the evidence, validity, and scope of this patent right.

279 The holder of this patent right has assured IEC that s/he is willing to negotiate licences under
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THERMISTORS – DIRECTLY HEATED POSITIVE TEMPERATURE COEFFICIENT –

Part 1: Generic specification

1 Scope

This part of IEC 60738 describes terms and methods of test for positive step-function temperature coefficient thermistors, insulated and non-insulated types typically made from ferro-electric semi-conductor materials.

It establishes standard terms, inspection procedures and methods of test for use in detail specifications for Qualification Approval and for Quality Assessment Systems for electronic components.

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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)*

IEC 60062, *Marking codes for resistors and capacitors*

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

IEC 60068-2-1:1990, *Environmental testing – Part 2: Tests – Tests A: Cold*
Amendment 1 (1993)
Amendment 2 (1994)

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

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

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

IEC 60068-2-13, *Environmental testing – Part 2: Tests – Test M: Low air pressure*

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

IEC 60068-2-20:1979, *Environmental testing – Part 2: Tests – Test T: Soldering*
Amendment 2 (1987)

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

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

- 323 IEC 60068-2-30:2005, *Environmental testing – Part 2: Tests – Test Db: Damp heat, cyclic*
 324 *(12 h + 12-hour cycle)*
- 325 IEC 60068-2-45:1980, *Environmental testing – Part 2: Tests – Test XA and guidance –*
 326 *Immersion in cleaning solvents*
- 327 IEC 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for*
 328 *solderability, resistance to dissolution of metallization and to soldering heat of surface*
 329 *mounting devices (SMD)*
- 330 IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady*
 331 *state*
- 332 IEC 60294, *Measurement of the dimensions of a cylindrical component having two axial*
 333 *terminations*
- 334 IEC 61193-2, *Sampling plans and procedures for inspection by attributes*
- 335 IEC 60617 (all parts) [DB]¹: *Graphical symbols for diagrams*
- 336 IEC 60717, *Method for determination of the space required by capacitors and resistors with*
 337 *unidirectional terminations*
- 338 IEC 61249-2-7, *Materials for printed boards and other interconnecting structures – Part 2-7:*
 339 *Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of*
 340 *defined flammability (vertical burning test), copper-clad*
- 341 IEC 61760-1, *Surface mounting technology – Part 1: Standard method for the specification of*
 342 *surface mounting components (SMDs)*
- 343 IEC QC 001002-3, *Rules of Procedure of the IEC Quality Assessment System for Electronic*
 344 *Components (IECQ) – Part 3: Approval procedures*
- 345 ISO 80000-1, *Quantities and units -- Part 1: General*

346 **3 Terms and definitions**

347 For the purposes of this document, the following terms and definitions apply.

348 **3.1**

349 **type**

350 group of components having similar design features and the similarity of whose manufacturing
 351 techniques enables them to be grouped together either for qualification approval or for quality
 352 conformance inspection

353 They are generally covered by a single detail specification

354 NOTE Components described in several detail specifications, may, in some cases, be considered as belonging to
 355 the same type but they are generally covered by a single detail specification.

356 **3.2**

357 **style**

358 variation within a type having specific nominal dimensions and characteristics

¹ "DB" refers to the IEC on-line database.

3.3**thermistor**

thermally sensitive semiconducting resistor which exhibits a significant change in electrical resistance with a change in body temperature

3.4**positive temperature coefficient thermistor**

thermistor, the resistance of which increases with its increasing temperature throughout the useful part of its characteristic

3.5**positive step-function temperature coefficient thermistor****PTC**

thermistor which shows a step-like increase in its resistance when the increasing temperature reaches a specific value

A PTC thermistor will show secondary effects which are to be considered

3.6**zero-power resistance** **R_T**

value of the resistance of a PTC thermistor, at a given temperature, under conditions such that the change in resistance due to the internal generation of heat is negligible with respect to the total error of measurement

Note 1 to entry: Any resistance value of a PTC thermistor is dependent on the value and the mode of the applied voltage (AC or DC) and, when an AC source is used, on the frequency (see 3.8 and 3.9).

3.7**nominal zero-power resistance** **R_n**

DC resistance value of a thermistor measured at a specified temperature, preferably at 25 °C, with a power dissipation low enough that any further decrease in power will result only in a negligible change in resistance. Zero-power resistance may also be measured using AC if required by the detail specification

3.8**voltage dependency**

secondary effect, exhibiting a decreasing resistance with increasing voltage across the thermistor when measured at a constant body temperature

3.9**frequency dependency**

secondary effect exhibiting a substantial decrease of the positive temperature coefficient of the thermistor with increasing frequency

3.10**resistance/temperature characteristics**

relationship between the zero-power resistance of a thermistor and the temperature of the thermo-sensitive element when measured under specified reference conditions (see Figure 1)

Note 1 to entry: PTC thermistors may have more than one resistance/temperature characteristic specified. The zero-power resistance of the resistance/temperature characteristics can be measured using a pulse voltage (Upulse) higher than 1,5 V, which is specified in the detail specification. The right curve in Figure 1 shows the typical resistance/temperature characteristic when using the pulse voltage (Upulse).

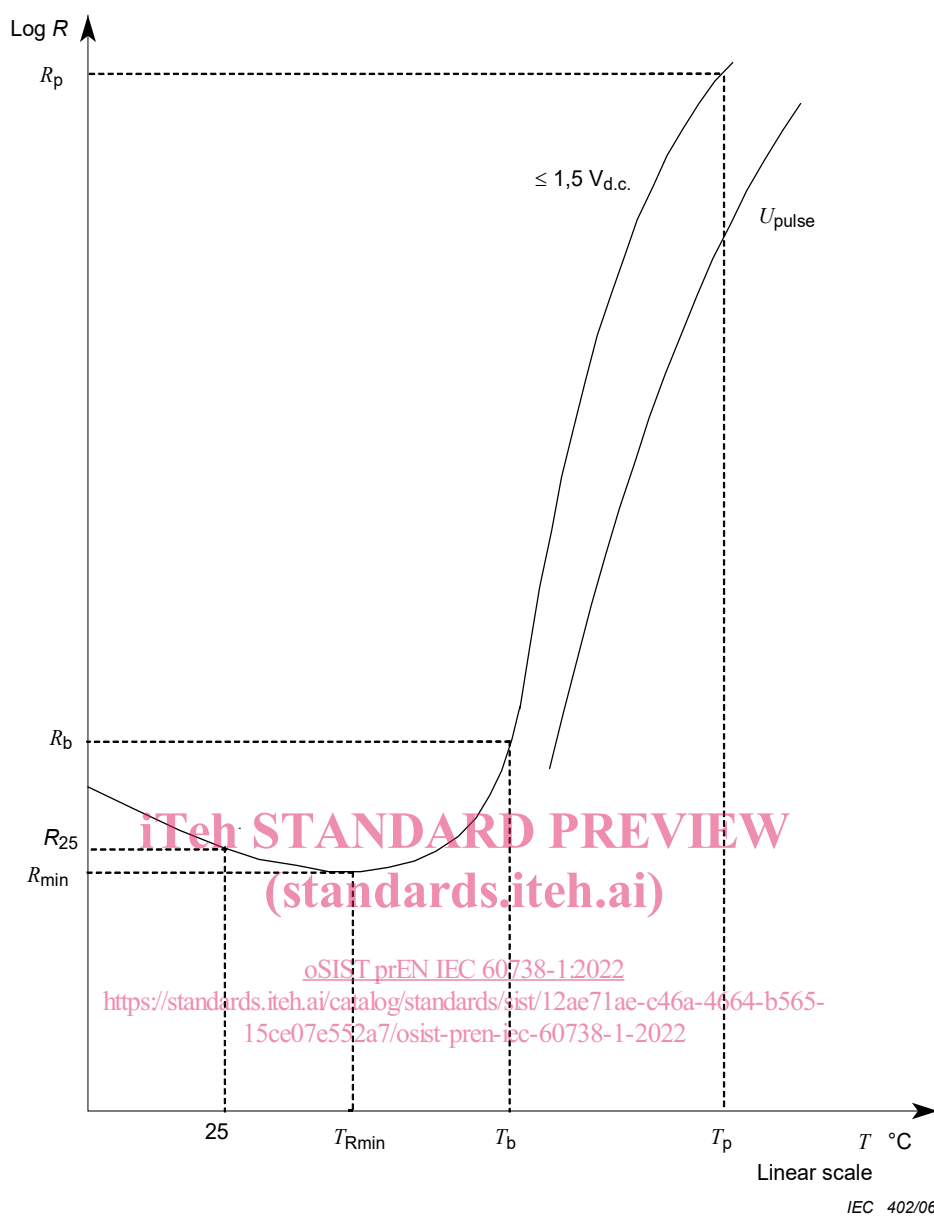


Figure 1 – Typical resistance-temperature characteristic and definitions for PTC thermistors (at zero power)