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Varistors for use in electronic equipment - Part 1: Generic specification

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

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/19

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EN IEC 61051-1

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English Version

Varistors for use in electronic equipment - Part 1: Generic specification (IEC 61051-1:2018)

Varistances utilisées dans les équipements électroniques - Partie 1: Spécification générique (IEC 61051-1:2018)

Varistoren zur Verwendung in Geräten der Elektronik - Teil 1: Fachgrundspezifikation (IEC 61051-1:2018)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 61051-1:2018 E

European foreword

The text of document 40/2621/FDIS, future edition 3 of IEC 61051-1, 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 61051-1:2018.

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) 2019-09-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-12-03

This document supersedes EN 61051-1:2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61051-1:2018 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(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.

Publication	Year	Title	EN/HD	Year
IEC 60027	series	Letter symbols to be used in electrical technology	EN 60027	series
IEC 60050	series	International Electrotechnical Vocabulary	-	-
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	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-6	2007	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-13	1983	Basic environmental testing procedures - Part 2-13: Tests - Test M: Low air pressure	EN 60068-2-13	1999
IEC 60068-2-14	2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-20	2008	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	2008
IEC 60068-2-21	2006	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	2006
IEC 60068-2-21 Corrigendum 1	2012	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices; Corrigendum 1	--	-
IEC 60068-2-27	2008	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	2009

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IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
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		-	-
IEC 60068-2-58	2015	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	2015
IEC 60068-2-69	2017	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	2017
IEC 60068-2-78	2012	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2013
IEC 60294	-	Measurement of the dimensions of a cylindrical component with axial terminations	EN 60294	-
IEC 60617	-	Graphical symbols for diagrams	-	-
IEC 60695-11-5	2016	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2017
IEC 60717	2012	Method for the determination of the space required by capacitors and resistors with unidirectional terminations	EN 60717	2012
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
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	2002	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	2002
-	-		+ corrigendum Sep.	2005
ISO 80000-1	2009	Quantities and units - Part 1: General	EN ISO 80000-1	2013

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Varistors for use in electronic equipment – Part 1: Generic specification

Varistances utilisées dans les équipements électroniques – Partie 1: Spécification générique

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Varistors for use in electronic equipment – Part 1: Generic specification

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

FOREWORD....7
1 Scope....9
2 Normative references....9
3 Terms and definitions....10
4 Technical data....15
4.1 Units, symbols and terminology....15
4.2 Preferred values and characteristics....15
4.3 Marking....15
4.3.1 General....15
4.3.2 Coding....16
5 Quality assessment procedures....16
5.1 General....16
5.1.1 Overview....16
5.1.2 Applicability of qualification approval....16
5.1.3 Applicability of capability approval....16
5.1.4 Applicability of technology approval....17
5.2 Primary stage of manufacture....17
5.3 Subcontracting....17
5.4 Structurally similar components....17
5.5 Qualification approval procedures....18
5.5.1 Eligibility for qualification approval....18
5.5.2 Application for qualification approval....18
5.5.3 Test procedure for qualification approval....18
5.5.4 Granting of qualification approval....18
5.5.5 Maintenance of qualification approval....18
5.5.6 Quality conformance inspection....18
5.6 Capability approval procedures....19
5.6.1 General....19
5.6.2 Eligibility for capability approval....19
5.6.3 Application for capability approval....19
5.6.4 Description of capability....19
5.6.5 Demonstration and verification of capability....20
5.6.6 Programme for capability approval....21
5.6.7 Capability approval test report....21
5.6.8 Abstract of description of capability....21
5.6.9 Modifications likely to affect the capability approval....21
5.6.10 Initial capability approval....21
5.6.11 Granting of capability approval....22
5.6.12 Maintenance of capability approval....23
5.6.13 Extension of capability approval....23
5.6.14 Quality conformance inspection....23
5.7 Rework and repair....23
5.7.1 Rework....23
5.7.2 Repair....24
5.8 Release for delivery....24
5.8.1 General....24

5.8.2 Certified records of released lots 24
5.8.3 Delayed delivery 24
5.8.4 Release for delivery before the completion of Group B tests 24
5.9 Alternative test methods 24
5.10 Unchecked parameters 25
5.11 Characteristics and parameters for application reference 25
5.12 Technology approval procedures 25
5.12.1 General 25
5.12.2 Eligibility for technology approval 25
5.12.3 Application of technology approval 25
5.12.4 Description of technology 25
5.12.5 Demonstration and verification of the technology 25
5.12.6 Granting of technology approval 26
5.12.7 Maintenance of technology approval 26
5.12.8 Quality conformance inspection 26
5.12.9 Failure rate level determination 26
5.12.10 Outgoing quality level 26
6 Test and measurement procedures 26
6.1 General 26
6.2 Standard atmospheric conditions 26
6.2.1 Standard atmospheric conditions for testing 26
6.2.2 Recovery conditions 27
6.2.3 Referee conditions 27
6.2.4 Reference conditions 27
6.3 Drying and recovery 27
6.3.1 General 27
6.3.2 Procedure I 27
6.3.3 Procedure II 27
6.4 Visual examination and check of dimensions 28
6.4.1 Visual examination 28
6.4.2 Marking 28
6.4.3 Dimensions (gauging) 28
6.4.4 Dimensions (detail) 28
6.5 General requirements for electrical tests 28
6.6 Varistor voltage 29
6.7 Leakage current 29
6.8 Capacitance 30
6.9 Voltage proof (for insulated varistors only) 30
6.9.1 General 30
6.9.2 V-block method 30
6.9.3 Metal ball method 30
6.9.4 Foil method 30
6.10 Insulation resistance (for insulated varistors only) 31
6.10.1 Test procedure 31
6.10.2 Measurement and requirements 31
6.11 Clamping voltage 31
6.12 ESD clamping voltage (for surface mount electrostatic protective varistors only) 32
6.13 Maximum peak current 32

6.13.1 Initial measurement 32
6.13.2 Test procedure 32
6.13.3 Final inspection, measurement and requirements 32
6.14 Rated average dissipation power 32
6.14.1 General 32
6.14.2 Initial measurement 33
6.14.3 Test procedure 33
6.14.4 Final inspection, measurement and requirements 33
6.15 Rated energy 33
6.15.1 General 33
6.15.2 Initial measurement 33
6.15.3 Test procedure 34
6.15.4 Final inspection, measurement and requirements 34
6.16 Electrostatic discharge (ESD) (for surface mount electrostatic protective varistors only) 35
6.16.1 Initial measurement 35
6.16.2 Test procedure 35
6.16.3 Final inspection, measurement and requirements 35
6.17 Robustness of terminations 35
6.17.1 General 35
6.17.2 Test Ua_1 – Tensile 35
6.17.3 Test Ub – Bending (half of the number of terminations) 35
6.17.4 Test Uc – Torsion (the other half of the number of terminations) 35
6.17.5 Test Ud – Torque (for terminations with threaded studs or screws and for integralmounting devices) 36
6.17.6 Visual examination 36
6.17.7 Final measurement 36
6.17.8 Robustness of terminations of surface mount varistors 36
6.18 Resistance to soldering heat 37
6.18.1 Preconditioning 37
6.18.2 Test procedure 37
6.18.3 Recovery 38
6.18.4 Final inspection, measurement and requirements 38
6.19 Solderability 38
6.19.1 General 38
6.19.2 Test procedure 38
6.19.3 Final inspection, measurements and requirements 39
6.20 Rapid change of temperature 39
6.20.1 Initial measurement 39
6.20.2 Test procedure 39
6.20.3 Final inspection, measurement and requirements 39
6.21 Shock 39
6.21.1 Initial measurement 39
6.21.2 Test procedure 39
6.21.3 Final inspection, measurement and requirements 39
6.22 Vibration 40
6.22.1 Initial measurement 40
6.22.2 Test procedure 40
6.22.3 Final inspection, measurement and requirements 40

6.23 Climatic sequence 40
6.23.1 General 40
6.23.2 Initial measurement 40
6.23.3 Dry heat 40
6.23.4 Damp heat, cyclic, Test Db, first cycle 40
6.23.5 Cold 40
6.23.6 Low air pressure 40
6.23.7 Damp heat, cyclic, Test Db, remaining cycles 41
6.23.8 Final inspection, measurement and requirements 41
6.24 Damp heat, steady state 41
6.24.1 Initial measurement 41
6.24.2 Test procedure 41
6.24.3 Final inspection, measurement and requirements 41
6.25 Fire hazard 42
6.26 Endurance at upper category temperature 42
6.26.1 Test system 42
6.26.2 Initial measurement 42
6.26.3 Mounting of the samples 42
6.26.4 Test procedure, measurement and requirements 43
6.27 Solvent resistance of marking 43
6.27.1 Test procedure 43
6.27.2 Requirements 43
6.28 Component solvent resistance 43
6.28.1 Initial measurements 43
6.28.2 Test procedure 43
6.28.3 Measurement and requirements 44
6.29 Mounting (for surface mount varistors only) 44
Annex A (informative) Rules for the preparation of detail specifications for capacitors and resistors for electronic equipment 46
Annex B (normative) Test pulses used in this specification 47
B.1 Types of test pulses 47
B.1.1 General 47
B.1.2 Pulse type 1 47
B.1.3 Pulse type 2 (rectangular pulse) 47
B.1.4 Pulse type 3 (ESD discharge pulse) 47
B.2 Pulse parameters 48
B.2.1 Value of the pulse current/voltage 48
B.2.2 Virtual front time T_1 48
B.2.3 Virtual origin O_1 49
B.2.4 Virtual time to half-value T_2 49
B.2.5 Virtual duration of peak of a rectangular pulse current T_D 49
B.2.6 Virtual total duration T_T of a pulse current 49
B.3 Tolerances for the pulses 50
Annex C (informative) Recommended measurement/test methods for characteristics and parameters for application reference 51
C.1 Voltage vs. current characteristic 51
C.2 Maximum peak current derating characteristic 52
C.2.1 Rationale related to this test 52
C.2.2 Failure criteria 52

C.2.3 Pulse life test 52
C.2.4 Graphing of the maximum peak current derating curves 54
C.3 Thermal resistance (for leaded varistors only) 54
C.3.1 Test system 54
C.3.2 Mounting of the sample 55
C.3.3 Test procedure 55
C.4 Abnormal overvoltage withstanding duration 55
C.4.1 Test system 55
C.4.2 Test procedure 56
C.4.3 Requirements 56

Figure 1 – General scheme for capability approval 19
Figure 2 – Mounting method for measurement of surface mount varistors 44
Figure B.1 – Shape of pulse current type 1 47
Figure B.2 – Shape of pulse voltage type 1 48
Figure B.3 – Shape of pulse type 2 48
Figure B.4 – Shape of pulse type 3 49
Figure C.1 – Maximum peak current derating characteristic 54

Table 1 – Standard atmospheric conditions 27
Table 2 – Force for wire terminations 36
Table 3 – Torque 36
Table 4 – Number of cycles 41
Table B.1 – Accepted differences between specified and recorded pulse values 50
Table B.2 – Tolerances for pulse type 3 50

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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VARISTORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 1: Generic specification

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61051-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

a) 10 new terms and definitions – leaded varistors, surface mount varistors(SMV), electrostatic discharge (ESD), ESD clamping voltage, equivalent rectangular pulse duration, maximum peak current derating characteristic, rated average dissipation power, rated energy, abnormal overvoltage withstanding duration and temperature derating curve – have been added (see 3.6, 3.7, 3.14, 3.15, 3.19, 3.20, 3.23, 3.24, 3.25 and 3.29);
b) General requirements for electrical tests and 7 new test items – clamping voltage, ESD clamping voltage, maximum peak current, rated average dissipation power, rated energy, electrostatic discharge (ESD), robustness of terminations of surface mount varistors – have been added (see 6.5, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16 and 6.17.8);
c) In 6.6, 6.7, 6.8, 6.9.3, 6.23.2, 6.23.4 and 6.26, following test items have been revised:

- Varistor voltage, leakage current and capacitance: more detailed requirements and information have been added;
- Voltage proof – foil method: the space between the edge of the foil and each termination has been changed from 1 mm ~ 1,5 mm to 3 mm ~ 3.5 mm for testing varistors not having axial terminations and the minimum space between the foil and the termination has been changed from 1 mm to 3 mm for testing varistors having axial terminations;
- Climatic sequence – dry heat: the method has been changed from Ba to Bb;
- Climatic sequence – cold: the method has been changed from Aa to Ab;
- Endurance at upper category temperature: the method of "applying test voltages in cycles of 1,5 h on and 0,5 h off" has been changed to the method of applying test voltages continuously throughout the test lasting for 1 000 h;

d) The test items of pulse current, voltage under pulse condition and bump have been deleted from the section of test and measurement procedures;

e) Annex A and the contents referring to the test fixture specified in Annex A have been deleted;

f) All contents related to silicon carbide varistors have been deleted;

g) A new normative annex entitled "Test pulses used in this specification" (Annex B) has been added;

h) A new informative annex entitled "Recommended measurement/test methods for characteristics and parameters for application reference" (Annex C) has been added, in which guidelines of measuring/testing characteristics and parameters for application reference including voltage vs. current characteristic, maximum peak current derating characteristic, thermal resistance and abnormal overvoltage withstanding duration have been given.

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

FDIS	Report on voting
40/2621/FDIS	40/2625/RVD

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

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

A list of all parts in the IEC 61051 series, published under the general title *Varistors for use in electronic equipment*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "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.

VARISTORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 1: Generic specification

1 Scope

This part of IEC 61051 is a generic specification and is applicable to varistors with symmetrical voltage-current characteristics for use in electronic equipment.

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

NOTE Detail specifications can be specifications within the IEC system, another specification system linked to IEC, or specified by the manufacturer or user. The drafting of a complete detail specification by IEC technical committee 40, if required, follows the rules described in Annex A.

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

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (Sinusoidal)*

IEC 60068-2-13:1983, *Environmental testing – Part 2-13: Tests – Test M: Low air pressure*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*
IEC 60068-2-21:2006/COR1:2012

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

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12-hour cycle)*

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

IEC 60068-2-58:2015, *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 60068-2-69:2017, *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 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

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

IEC 60617, *Graphical symbols for diagrams*
(available at http://std.iec.ch/iec60617)

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60717:2012, *Method for the determination of the space required by capacitors and resistors with unidirectional terminations*

IEC 61000-4-2:2008, *Electromagnetic Compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

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

IEC 61249-2-7:2002, *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*

ISO 80000-1:2009, *Quantities and units – Part 1: General*