SLOVENSKI STANDARD
oSIST prEN IEC 60384-23:2022

01-maj-2022

Nespremenljivi kondenzatorji za uporabo v elektronski opremi - 23. del: Področna specifikacija - Nespremenljivi kondenzatorji za enosmerni tok za površinsko montažo z dielektrikom iz metaliziranega polietilen-naftalatnega filma

Fixed capacitors for use in electronic equipment - Part 23: Sectional specification - Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

Ta slovenski standard je istoveten z: prEN IEC 60384-23:2022

ICS:

31.060.10 Fiksni kondenzatorji Fixed capacitors

oSIST prEN IEC 60384-23:2022 **en**

40/2923/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60384-23 ED3	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2022-03-11	**2022-06-03**
SUPERSEDES DOCUMENTS:	
40/2841/CD, 40/2879/CC	

IEC TC 40 : CAPACITORS AND RESISTORS FOR ELECTRONIC EQUIPMENT

SECRETARIAT:	SECRETARY:
Netherlands	Mr Ronald Drenthen
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

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.

The CENELEC members are invited to vote through the CENELEC online voting system.

☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Fixed capacitors for use in electronic equipment - Part 23: Sectional specification - Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 23: Sectional specification: Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

FOREWORD

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International Standard IEC 60384-23 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 2015 and constitutes a technical revision.

a) This edition includes the following significant technical changes with respect to the previous edition: revision of all parts of the document based on the ISO/IEC Directives, Part 2:2021, and harmonization with other similar kinds of documents;
b) The document structure has been organized to follow new sectional specification structure decided in TC 40;
c) Revised tables and Clause 5 so as to prevent duplications and contradictions.
d) Tangent of loss angle measurement has been added to resistance to soldering heat test.

e) Lot-by-lot and periodical inspection tables including requirements are moved to Annex A

f) Revised Inspection Level (IL) of A1 subgroup.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/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 2:2021.

The list of all parts of the IEC 60384 series, under the (new) general title *Fixed capacitors for use in electronic equipment*, can be found on the IEC web site.

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

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

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 23: Sectional specification: Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

1 Scope

This part of IEC 60384 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyethylene naphthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto printed boards or onto substrates for hybrid circuits. These capacitors can have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the AC component is small with respect to the rated voltage.

This part of IEC 60384 specifies preferred ratings and characteristics, selects from IEC 60384-1:2021 the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor. Test severities and requirements specified in detail specifications referring to this sectional specification are of an equal or higher performance level. Lower performance levels are not permitted.

Capacitors for electromagnetic interference suppression are not included, but are covered by IEC 60384-14.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60063, *Preferred number series for resistors and capacitors*

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

IEC 60384-1:2021, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60417, *Graphical symbols for use on equipment*
(available at http://www.graphicalsymbols.info/equipment)

IEC 61193-2:2007, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

ISO 3, *Preferred numbers – Series of preferred numbers*

3 Terms and definition

For the purposes of this document, the terms and definitions of IEC 60384-1:2021,and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
grade 1 capacitors
<long-life> capacitors for long-life applications with stringent requirements for the electrical parameters

3.2
grade 2 capacitors
<general purpose> capacitors for general applications where the stringent requirements for grade 1 capacitors are not necessary

3.3
grade 3 capacitors
<low temperature, miniature type> miniature type capacitors having a rated temperature of 85° C and for which less stringent requirements than for grade 2 capacitors are acceptable

4 Preferred ratings and characteristics

4.1 Preferred climatic categories

The values given in detail specifications should be selected from the following.

The surface mount capacitors covered by this document are classified into climatic categories according to the general rules given in IEC 60068-1:2013, Annex A.

The lower and upper category temperature and the duration of the damp heat, steady-state test shall be chosen from the following:

Lower category temperature: –55 °C, –40 °C and –25 °C.

Upper category temperature: +85 °C (only grade 3), +100 °C, +125 °C and +155 °C.

Duration of the damp heat, steady state test: 21 days and 56 days.

At continuous operation at 155 °C beyond the endurance test time, accelerated ageing shall be carried out (see detail specification).

The severities for the cold and dry heat tests are the lower and upper category temperatures, respectively.

4.2 Preferred values of ratings

4.2.1 Nominal capacitance (C_N)

Preferred values of nominal capacitance shall be taken from the E6 series of IEC 60063:

1,0 – 1,5 – 2,2 – 3,3 – 4,7 and 6,8 and their decimal multiples ($\times 10^n$, n = integer).

If other values are required they should be chosen from the E12 series.

4.2.2 Tolerance on nominal capacitance

The preferred tolerances on the nominal capacitance are ±5 %, ±10 % and ±20 %.

4.2.3 Rated voltage (U_R)

The preferred values of rated voltage taken from R 10 series of ISO 3 are:

1,0 – 1,6 – 2,5 – 4,0 – 5,0 – 6,3 and their decimal multiples ($\times 10^n$, n: integer).

The sum of the DC voltage and the peak AC voltage applied to the capacitor shall not exceed the rated voltage.

The value of the peak AC voltage shall not exceed the percentages of the rated voltage at the frequencies stated in Table 1 and should not be greater than 280 V, unless otherwise specified in the detail specification.

Table 1 – Percentage limit of the rated voltage at AC voltage frequency

AC voltage frequency Hz	Percentage limit of the rated voltage %
50	20
100	15
1 000	3
10 000	1

4.2.4 Category voltage (U_C)

The category voltage for Grade 1 and Grade 2 capacitors is:

– for upper category temperature 125 °C: 0,8 U_R;
– for upper category temperature 155 °C: 0,5 U_R;

The category voltage for Grade 3 capacitors is:

– for upper category temperature 100 °C: 0,8 U_R;
– for upper category temperature 125 °C: 0,5 U_R.

4.2.5 Rated temperature

Grade 1 and Grade 2 capacitors

The standard value of rated temperature is 100 °C.

Grade 3 capacitors

The standard value of rated temperature is 85 °C.

5 Test and measurement procedures

5.1 General

This Clause 5 supplements the information given in the relevant clauses of IEC 60384-1:2021.

5.2 Mounting

5.2.1 Initial inspections

The capacitance shall be measured in accordance with 5.4.2

The tangent of loss angle shall be measured in accordance with 5.4.3.

5.2.2 Mounting method

See IEC 60384-1:2021, 5.5.

5.2.3 Inspections after mounting

After recovery, the capacitors shall be visually examined and measured and shall meet the requirements given in Table 9.

5.3 Visual examination and check of dimensions

5.3.1 General

See IEC 60384-1:2021, 7.1 with the details of 5.3.2 and 5.3.3.

5.3.2 Visual examination and check of dimensions

Visual examination shall be carried out with equipment with suitable approximately 10× magnification and lighting appropriate to the specimen under test and the quality level required.

The operator should have available facilities for incident or transmitted illumination as well as an appropriate measuring facility.

5.3.3 Requirements

The capacitors shall be examined to verify that the materials, design, construction, physical dimensions and workmanship are in accordance with the applicable requirements given in the detail specification.

5.4 Electrical tests

5.4.1 Voltage proof

5.4.1.1 General

See IEC 60384-1:2021, 6.2 with the details of 5.4.1.2, 5.4.1.3 and 5.4.1.4.

5.4.1.2 Test circuit

Delete the capacitor C_1.

The product of R_1 and the nominal capacitance of the capacitor under test (C_X) shall be smaller than or equal to 1 s and greater than 0,01 s.