

STN	Nepremenné kondenzátory na použitie v elektronických zariadeniach. Časť 20: Rámcová špecifikácia. Nepremenné kondenzátory na jednosmerný prúd s dielektrikom z pokovovanej polyfenylénsulfidovej fólie na povrchovú montáž.	STN EN 60384-20
		35 8291

Fixed capacitors for use in electronic equipment - Part 20: Sectional specification - Fixed metallized polyphenylene sulfide film dielectric surface mount d.c. capacitors

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. 04/16

Obsahuje: EN 60384-20:2015, IEC 60384-20:2015

Oznámením tejto normy sa od 26.08.2018 ruší
STN EN 60384-20 (35 8291) z októbra 2008

122684

Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, 2016
Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

EUROPEAN STANDARD

EN 60384-20

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2015

ICS 31.060.10

Supersedes EN 60384-20:2008

English Version

**Fixed capacitors for use in electronic equipment - Part 20:
Sectional specification - Fixed metallized polyphenylene sulfide
film dielectric surface mount d.c. capacitors
(IEC 60384-20:2015)**

Condensateurs fixes utilisés dans les équipements
électroniques - Partie 20: Spécification intermédiaire -
Condensateurs fixes pour montage en surface pour courant
continu à diélectrique en film de sulfure de polyphénylène
métallisé
(IEC 60384-20:2015)

Festkondensatoren zur Verwendung in Geräten der
Elektronik - Teil 20: Rahmenspezifikation -
Oberflächenmontierbare Festkondensatoren für
Gleichspannung mit metallisierter Polyphenyl-Sulfid-Folie
als Dielektrikum
(IEC 60384-20:2015)

This European Standard was approved by CENELEC on 2015-08-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European Foreword

The text of document 40/2381/FDIS, future edition 3 of IEC 60384-20, prepared by IEC TC 40, "Capacitors and resistors for electronic equipment" was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60384-20:2015.

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) 2016-05-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-08-26

This document supersedes EN 60384-20:2008.

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

Endorsement notice

The text of the International Standard IEC 60384-20:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60384-14

NOTE Harmonized as EN 60384-14.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60062	2004	Marking codes for resistors and capacitors	EN 60062	2005
-	-		+ corrigendum Jan.	2007
IEC 60063	-	Preferred number series for resistors and capacitors	EN 60063	-
IEC 60068-1	2013	Environmental testing -- Part 1: General and guidance	EN 60068-1	2014
IEC 60384-1	2008	Fixed capacitors for use in electronic equipment -- Part 1: Generic specification	EN 60384-1	2009
IEC 61193-2	2007	Quality assessment systems -- Part 2: Selection and use of sampling plans for inspection of electronic components and packages	EN 61193-2	2007
ISO 3	-	Preferred numbers; Series of preferred numbers	-	-



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fixed capacitors for use in electronic equipment –
Part 20: Sectional specification – Fixed metallized polyphenylene sulfide film
dielectric surface mount d.c. capacitors**

**Condensateurs fixes utilisés dans les équipements électroniques –
Partie 20: Spécification intermédiaire – Condensateurs fixes pour montage en
surface pour courant continu à diélectrique en film de sulfure de polyphénylène
métallisé**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fixed capacitors for use in electronic equipment –
Part 20: Sectional specification – Fixed metallized polyphenylene sulfide film
dielectric surface mount d.c. capacitors**

**Condensateurs fixes utilisés dans les équipements électroniques –
Partie 20: Spécification intermédiaire – Condensateurs fixes pour montage en
surface pour courant continu à diélectrique en film de sulfure de polyphénylène
métallisé**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.060.10

ISBN 978-2-8322-2792-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
1 General	7
1.1 Scope	7
1.2 Object	7
1.3 Normative references	7
1.4 Information to be given in a detail specification	8
1.4.1 General	8
1.4.2 Outline drawing and dimensions	8
1.4.3 Mounting	8
1.4.4 Ratings and characteristics	8
1.4.5 Marking	9
1.5 Terms and definitions	9
1.6 Marking	9
1.6.1 General	9
1.6.2 Information for marking	9
1.6.3 Marking on capacitors	9
1.6.4 Marking on packaging	10
2 Preferred ratings and characteristics	10
2.1 Preferred characteristics	10
2.2 Preferred values of ratings	10
2.2.1 Nominal capacitance (C_N)	10
2.2.2 Tolerance on nominal capacitance	10
2.2.3 Rated voltage (U_R)	10
2.2.4 Category voltage (U_C)	11
2.2.5 Rated temperature	11
3 Quality assessment procedures	11
3.1 Primary stage of manufacture	11
3.2 Structurally similar components	11
3.3 Certified test records of released lots	11
3.4 Qualification approval procedures	12
3.4.1 General	12
3.4.2 Qualification approval on the basis of the fixed sample size procedure	12
3.4.3 Tests	12
3.5 Quality conformance inspections	18
3.5.1 Formation of inspection lots	18
3.5.2 Test schedule	19
3.5.3 Delayed delivery	19
3.5.4 Assessment levels	19
4 Test and measurement procedures	20
4.1 Mounting	20
4.2 Visual examination and check of dimensions	20
4.2.1 General	20
4.2.2 Visual examination and check of dimensions	20
4.2.3 Requirements	20
4.3 Electrical tests	20
4.3.1 Voltage proof	20

4.3.2	Capacitance	21
4.3.3	Tangent of loss angle ($\tan \delta$)	21
4.3.4	Insulation resistance	22
4.4	Shear test	23
4.4.1	General	23
4.5	Substrate bending test	23
4.5.1	General	23
4.5.2	Initial inspections	23
4.5.3	Final inspections and requirements	23
4.6	Resistance to soldering heat	24
4.6.1	General	24
4.6.2	Initial inspections	24
4.6.3	Test conditions	24
4.6.4	Recovery	24
4.6.5	Final inspections and requirements	24
4.7	Solderability	24
4.7.1	General	24
4.7.2	Test conditions	24
4.7.3	Final inspections and requirements	24
4.8	Rapid change of temperature	24
4.8.1	General	24
4.8.2	Initial inspections	24
4.8.3	Test conditions	24
4.8.4	Final inspections and requirements	25
4.9	Climatic sequence	25
4.9.1	General	25
4.9.2	Initial inspections	25
4.9.3	Dry heat	25
4.9.4	Damp heat, cyclic, test Db, first cycle	25
4.9.5	Cold	25
4.9.6	Damp heat, cyclic, test Db, remaining cycles	25
4.9.7	Recovery	25
4.9.8	Final inspections and requirements	25
4.10	Damp heat, steady state	25
4.10.1	General	25
4.10.2	Initial inspections	25
4.10.3	Test conditions	26
4.10.4	Recovery	26
4.10.5	Final inspections and requirements	26
4.11	Endurance	26
4.11.1	General	26
4.11.2	Initial inspections	26
4.11.3	Test conditions	26
4.11.4	Final inspections and requirements	26
4.12	Charge and discharge	27
4.12.1	General	27
4.12.2	Initial inspections	27
4.12.3	Test conditions	27
4.12.4	Recovery	27

4.12.5	Final inspections and requirements.....	27
4.13	Component solvent resistance (if required)	27
4.13.1	General	27
4.14	Solvent resistance of the marking (if required)	27
4.14.1	General	27
	Bibliography.....	28
	Table 1 – Percentage limit of the rated voltage at a.c. voltage frequency	11
	Table 2 – Category voltages for upper category temperature 125 °C.....	11
	Table 3 – Category voltages for upper category temperature 155 °C.....	11
	Table 4 – Sampling plan for qualification approval – Assessment level EZ	13
	Table 5 – Test schedule for qualification approval (<i>1 of 5</i>)	14
	Table 6 – Lot-by-lot inspection	19
	Table 7 – Periodic tests	20
	Table 8 – Test voltages.....	21
	Table 9 – Tangent of loss angle limits	22
	Table 10 – Requirements insulation resistance	23
	Table 11 – Correction factor dependent on test temperature	23
	Table 12 – Endurance test for Grade 1, 2 and 3 capacitors	26

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –**Part 20: Sectional specification – Fixed metallized polyphenylene sulfide film dielectric surface mount d.c. capacitors**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60384-20 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 2008, and constitutes a technical revision.

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

- a) Revision of the structure in accordance with ISO/IEC Directives, Part 2:2011 (sixth edition) to the extent practicable, and harmonization between other similar kinds of documents.
- b) In addition, Clause 4 and all the tables have been reviewed in order to prevent duplications and contradictions.

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

FDIS	Report on voting
40/2381/FDIS	40/2394/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.

A list of all parts in the IEC 60384 series, published under the general title *Fixed capacitors for use in electronic equipment*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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 20: Sectional specification – Fixed metallized polyphenylene sulfide film dielectric surface mount d.c. capacitors

1 General

1.1 Scope

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

These capacitors are divided to 3 grades. Performance grade 1 for long life, performance grade 2 for general purpose and performance grade 3 for miniature type.

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

Capacitors used for motor or fluorescent lamp are outside the scope of this standard.

1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC 60384-1, the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements prescribed in detail specifications referring to this standard shall be of equal or higher performance level, lower performance levels are not permitted.

1.3 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 60062:2004, *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 60384-1:2008, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

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*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN