



SLOVENSKI STANDARD

SIST EN 62047-16:2015

01-september-2015

Polprevodniški elementi - Mikroelektromehanski elementi - 16. del: Preskusne metode za ugotavljanje preostalih mehanskih napetosti v tankih plasteh (filmih) MEMS - Metode z odklanjanjem merilne konzole za merjenje ukrivljenosti rezine

Semiconductor devices - Micro-electromechanical devices - Part 16: Test methods for determining residual stresses of MEMS films - wafer curvature and cantilever beam deflection methods

Halbleiterbauelemente - Bauelemente der Mikrosystemtechnik - Teil 16: Messverfahren zur Ermittlung der Eigenspannungen in Dünnschichten von MEMS-Bauteilen - Substratkrümmungs- und Biegebalken-Verfahren

[SIST EN 62047-16:2015](https://standards.iteh.ai/catalog/standards/sist/7e865e53-df8e-45da-8505-)

Dispositifs à semiconducteurs - Dispositifs microélectromécaniques - Partie 16: Méthodes d'essai pour déterminer les contraintes résiduelles des films de MEMS - Méthodes de la courbure de la plaquette et de déviation de poutre en porte-à-faux

Ta slovenski standard je istoveten z: EN 62047-16:2015

ICS:

31.080.01	Polprevodniški elementi (naprave) na splošno	Semiconductor devices in general
-----------	--	----------------------------------

SIST EN 62047-16:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62047-16:2015](#)

<https://standards.iteh.ai/catalog/standards/sist/7e865e53-dfbc-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015>

EUROPEAN STANDARD

EN 62047-16

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2015

ICS 31.080.99

English Version

Semiconductor devices - Micro-electromechanical devices - Part
16: Test methods for determining residual stresses of MEMS
films - Wafer curvature and cantilever beam deflection methods
(IEC 62047-16:2015)

Dispositifs à semiconducteurs - Dispositifs
microélectromécaniques - Partie 16: Méthodes d'essai pour
déterminer les contraintes résiduelles des films de MEMS -
Méthodes de la courbure de la plaquette et de déviation de
poutre en porte-à-faux
(IEC 62047-16:2015)

Halbleiterbauelemente - Bauelemente der
Mikrosystemtechnik - Teil 16: Messverfahren zur Ermittlung
der Eigenspannungen in Dünnschichten von MEMS-
Bauteilen - Substratkrümmungs- und Biegebalken-
Verfahren
(IEC 62047-16:2015)

This European Standard was approved by CENELEC on 2015-04-09. 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

EN 62047-16:2015**European foreword**

The text of document 47F/209/FDIS, future edition 1 of IEC 62047-16, prepared by SC 47F "Microelectromechanical systems" of IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62047-16:2015.

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) 2016-01-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-04-09

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 62047-16:2015 was approved by CENELEC as a European Standard without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62047-16:2015](https://standards.iteh.ai/catalog/standards/sist/7e865e53-dfbc-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015)

<https://standards.iteh.ai/catalog/standards/sist/7e865e53-dfbc-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015>

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 62047-21	-	Semiconductor devices -- Micro-electromechanical devices -- Part 21: Test method for Poisson's ratio of thin film MEMS materials	EN 62047-21	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 62047-16:2015](https://standards.iteh.ai/catalog/standards/sist/7e865e53-df8e-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015)

<https://standards.iteh.ai/catalog/standards/sist/7e865e53-df8e-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62047-16:2015](#)

<https://standards.iteh.ai/catalog/standards/sist/7e865e53-dfbc-45da-8505-a6eddf8a3fcd/sist-en-62047-16-2015>



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Semiconductor devices – Micro-electromechanical devices –
Part 16: Test methods for determining residual stresses of MEMS films – Wafer
curvature and cantilever beam deflection methods**

**Dispositifs à semiconducteurs – Dispositifs microélectromécaniques –
Partie 16: Méthodes d'essai pour déterminer les contraintes résiduelles des
films de MEMS – Méthodes de la courbure de la plaquette et de déviation de
poutre en porte-à-faux**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.080.99

ISBN 978-2-8322-2294-2

**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	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Testing methods	6
4.1 General	6
4.2 Wafer curvature method	6
4.2.1 General	6
4.2.2 Test apparatus	7
4.2.3 Measurement procedures	7
4.2.4 Reports	7
4.3 Cantilever beam deflection method	8
4.3.1 General	8
4.3.2 Test apparatus	9
4.3.3 Measurement procedures	9
4.3.4 Reports	9
Bibliography	11
iTeh STANDARD PREVIEW (standards.iteh.ai)	
Figure 1 – Schematic drawing of compressive residual stress induced curvature after depositing thin film on substrate	6
Figure 2 – Scheme for comprehensive residual stress induced curvature	9
https://standards.iteh.ai/catalog/standards/sist/7e865e53-dfbc-45da-8505-a6edd18a3fd/sist-en-62047-16-2015	
Table 1 – Mandatory details for the test of wafer curvature method	8
Table 2 – Mandatory details for the report of beam deflection method	10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –
MICRO-ELECTROMECHANICAL DEVICES –

**Part 16: Test methods for determining residual stresses of MEMS films –
Wafer curvature and cantilever beam deflection methods**

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 62047-16 has been prepared by subcommittee 47F: Micro-electromechanical systems, of IEC technical committee 47: Semiconductor devices.

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

FDIS	Report on voting
47F/209/FDIS	47F/214/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.