



SLOVENSKI STANDARD

SIST EN 62047-17:2015

01-september-2015

Polprevodniški elementi - Mikroelektromehanski elementi - 17. del: Izboklinska preskusna metoda za merjenje mehanskih lastnosti tankih plasti

Semiconductor devices - Micro-electromechanical devices - Part 17: Bulge test method for measuring mechanical properties of thin films

Halbleiterbauelemente - Bauelemente der Mikrosystemtechnik - Teil 17: Wölbungs-Prüfverfahren zur Bestimmung mechanischer Eigenschaften dünner Schichten

Dispositifs à semiconducteurs - Dispositifs microélectromécaniques - Partie 17: Méthode d'essai de renflement pour la mesure des propriétés mécaniques des couches minces

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Ta slovenski standard je istoveten z: EN 62047-17:2015

ICS:

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

EN 62047-17

NORME EUROPÉENNE

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July 2015

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English Version

Semiconductor devices - Micro-electromechanical devices - Part
17: Bulge test method for measuring mechanical properties of
thin films
(IEC 62047-17:2015)

Dispositifs à semiconducteurs - Dispositifs
microélectromécaniques - Partie 17: Méthode d'essai de
renflement pour la mesure des propriétés mécaniques des
couches minces
(IEC 62047-17:2015)

Halbleiterbauelemente - Bauelemente der
Mikrosystemtechnik - Teil 17: Wölbungs-Prüfverfahren zur
Bestimmung mechanischer Eigenschaften dünner
Schichten
(IEC 62047-17:2015)

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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 62047-17:2015**European foreword**

The text of document 47F/210/FDIS, future edition 1 of IEC 62047-17, 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 62047-17:2015.

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-04-09

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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 62047-2	2006	Semiconductor devices - Micro-electromechanical devices -- Part 2: Tensile testing method of thin film materials	EN 62047-2	2006

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Semiconductor devices – Micro-electromechanical devices –
Part 17: Bulge test method for measuring mechanical properties of thin films**

**Dispositifs à semiconducteurs – Dispositifs microélectromécaniques –
Partie 17: Méthode d'essai de renflement pour la mesure des propriétés
mécaniques des couches minces**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –
MICRO-ELECTROMECHANICAL DEVICES –

**Part 17: Bulge test method for measuring
mechanical properties of thin films**

FOREWORD

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International Standard IEC 62047-17 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/210/FDIS	47F/215/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 62047 series, published under the general title *Semiconductor devices – Micro-electromechanical devices*, can be found in the IEC website.

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
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SEMICONDUCTOR DEVICES – MICRO-ELECTROMECHANICAL DEVICES –

Part 17: Bulge test method for measuring mechanical properties of thin films

1 Scope

This part of IEC 62047 specifies the method for performing bulge tests on the free-standing film that is bulged within a window. The specimen is fabricated with micro/nano structural film materials, including metal, ceramic and polymer films, for MEMS, micromachines and others. The thickness of the film is in the range of 0,1 μm to 10 μm , and the width of the rectangular and square membrane window and the diameter of the circular membrane range from 0,5 mm to 4 mm.

The tests are carried out at ambient temperature, by applying a uniformly-distributed pressure to the testing film specimen with bulging window.

Elastic modulus and residual stress for the film materials can be determined with this method.

2 Normative references

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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 62047-2:2006, *Semiconductor devices – Micro-electromechanical devices – Part 2: Tensile testing method of thin film materials*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.1.1

residual stress

σ_0

stress which exists in a specimen in the absence of an external load

3.1.2

biaxial modulus

M

elastic modulus in plane strain condition

3.1.3

membrane window

testing area, contacted directly with the pressure media and surrounded by a frame, in the free standing film specimen

Note 1 to entry: See Figure 1.