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

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NATIONAL FOREWORD

See Eesti standard EVS-EN 62047-16:2015 sisaldab Euroopa standardi EN 62047-16:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 62047-16:2015 consists of the English text of the European standard EN 62047-16:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.07.2015.	Date of Availability of the European standard is 10.07.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 31.080.99

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62047-16

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.

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

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Ref. No. EN 62047-16:2015 E

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

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The text of the International Standard IEC 62047-16:2015 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, 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.

Publication	Year	Title	EN/HD	Year
IEC 62047-21	-	Semiconductor devices -- Micro-electromechanical devices -- Part 21: Test method for Poisson's ratio of thin film MEMS materials	EN 62047-21	-

CONTENTS

SEMICONDUCTOR DEVICES – MICRO-ELECTROMECHANICAL DEVICES –

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

1 Scope

This part of IEC 62047 specifies the test methods to measure the residual stresses of films with thickness in the range of 0,01 μm to 10 μm in MEMS structures fabricated by wafer curvature or cantilever beam deflection methods. The films should be deposited onto a substrate of known mechanical properties of Young's modulus and Poisson's ratio. These methods are used to determine the residual stresses within thin films deposited on substrate [1][1].

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

3 Terms and definitions

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

3.1
residual stress
σ_f
stress that remains after the original cause of the stresses (external forces, heat source) has been removed

3.2
curvature
κ
amount by which a geometric object deviates from being flat

Note 1 to entry: In case of a circle, $\kappa = 1/R$ where R is the radius.

3.3
body
object with mass, not only energy, that is three dimensional (extended in 3-dimensions of space), has a trajectory of position and orientation in space, and is lasting for some duration of time

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1 Numbers in square brackets refer to the Bibliography.