Semiconductor devices - Micro-electromechanical devices -- Part 6: Axial fatigue testing methods of thin film materials

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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 62047-6:2010 sisaldab Euroopa standardi EN 62047-6:2010 ingliskeelset teksti.	This Estonian standard EVS-EN 62047-6:2010 consists of the English text of the European standard EN 62047-6:2010.
Standard on kinnitatud Eesti Standardikeskuse 30.04.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.04.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 05.03.2010.	Date of Availability of the European standard text 05.03.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 31.080

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62047-6

March 2010

ICS 31.080.99

English version

Semiconductor devices - Micro-electromechanical devices - Part 6: Axial fatigue testing methods of thin film materials

(IEC 62047-6:2009)

Dispositifs à semiconducteurs - Dispositifs microélectromécaniques - Partie 6: Méthodes d'essais de fatigue axiale des matériaux en couche mince (CEI 62047-6:2009)

Halbleiterbauelemente - Bauelemente der Mikrosystemtechnik - Teil 6: Prüfverfahren zur uniaxialen Dauerschwingfestigkeit von Dünnschicht-Werkstoffen (IEC 62047-6:2009)

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62047-6:2010 E

Foreword

The text of document 47F/15/FDIS, future edition 1 of IEC 62047-6, prepared by SC 47F, Micro-electromechanical systems, of IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62047-6 on 2010-03-01.

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

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2010-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-03-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 62047-6:2009 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 62047-2	2006	Semiconductor devices - Micro-electromechanical devices - Part 2: Tensile testing methods of thin film materials	EN 62047-2	2006

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SEMICONDUCTOR DEVICES – MICRO-ELECTROMECHANICAL DEVICES –

Part 6: Axial fatigue testing methods of thin film materials

1 Scope

This International Standard specifies the method for axial tensile–tensile force fatigue testing of thin film materials with a length and width under 1 mm and a thickness in the range between 0,1 μm and 10 μm under constant force range or constant displacement range. Thin films are used as main structural materials for MEMS and micromachines.

The main structural materials for MEMS, micromachines, etc., have special features, such as typical dimensions of a few microns, material fabrication by deposition, and test piece fabrication by means of non-mechanical machining, including photolithography. This International Standard specifies the axial force fatigue testing methods for micro-sized smooth specimens, which enables a guarantee of accuracy corresponding to the special features. The tests are carried out at room temperatures, in air, with loading applied to the test piece along the longitudinal axis.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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 and definitions

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

3.1
maximum force
P_{max}
highest algebraic value of applied force in a cycle

NOTE Adapted from ASTM E 1823-05a [1][1].

3.2
minimum force
P_{min}
lowest algebraic value of applied force in a cycle

NOTE Adapted from ASTM E 1823-05a [1].

3.3
mean force
P_{mean}
algebraic average of the maximum and minimum forces in constant amplitude loading, or of individual cycles

NOTE Adapted from ASTM E 1823-05a [1].

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1 The figures between brackets refer to the Bibliography.