Semiconductor devices - Micro-electromechanical devices - Part 22: Electromechanical tensile test method for conductive thin films on flexible substrates

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62047-22

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English Version

Semiconductor devices - Micro-electromechanical devices - Part 22: Electromechanical tensile test method for conductive thin films on flexible substrates (IEC 62047-22:2014)

Dispositifs à semiconducteurs - Dispositifs microélectromécaniques -
Partie 22: Méthode d'essai de traction électromécanique pour les couches minces conductrices sur des substrats souples
(CEI 62047-22:2014)

Halbleiterbauelemente - Bauelemente der Mikrosystemtechnik -
Teil 22: Elektromechanisches Zug-Prüfverfahren für leitfähige Dünnschichten auf flexiblen Substraten
(IEC 62047-22:2014)

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Foreword

The text of document 47F/186/FDIS, future edition 1 of IEC 62047-22, 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 62047-22:2014.

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)	2015-04-24
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-07-24

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1 Scope

This part of IEC 62047 specifies a tensile test method to measure electromechanical properties of conductive thin micro-electromechanical systems (MEMS) materials bonded on non-conductive flexible substrates. Conductive thin-film structures on flexible substrates are extensively utilized in MEMS, consumer products, and flexible electronics. The electrical behaviours of films on flexible substrates differ from those of freestanding films and substrates due to their interfacial interactions. Different combinations of flexible substrates and thin films often lead to various influences on the test results depending on the test conditions and the interfacial adhesion. The desired thickness of a thin MEMS material is 50 times thinner than that of the flexible substrate, whereas all other dimensions are similar to each other.

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

IEC 62047-3:2006, *Semiconductor devices – Micro-electromechanical devices – Part 3: Thin film standard test piece for tensile testing*

IEC 62047-8:2011, *Semiconductor devices – Micro-electromechanical devices – Part 8: Strip bending test method for tensile property measurement of thin films*

ISO 527-3:1995, *Plastics – Determination of tensile properties – Part 3: Test conditions for films and sheets*

3 Terms, definitions, symbols and designations

3.1 Terms and definitions

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

3.1.1
gauge factor
G_F
ratio of the change in electrical resistance divided by the original resistance (R_O, resistance in the undeformed configuration) to engineering strain (e)

Note 1 to entry: Gauge factor is expressed as $G_F = (R - R_O)/R_O e$, where R is the electrical resistance in the deformed configuration.