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Irish Standard  
I.S. EN 62047-15:2015

# Semiconductor devices - Micro- electromechanical devices - Part 15: Test method of bonding strength between PDMS and glass

**I.S. EN 62047-15:2015**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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EUROPEAN STANDARD

**EN 62047-15**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2015

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English Version

**Semiconductor devices - Micro-electromechanical devices - Part  
15: Test method of bonding strength between PDMS and glass  
(IEC 62047-15:2015)**

Dispositifs à semiconducteurs - Dispositifs  
microélectromécaniques - Partie 15: Méthode d'essai de la  
résistance de collage entre PDMS et verre  
(IEC 62047-15:2015)

Halbleiterbauelemente - Bauelemente der  
Mikrosystemtechnik - Teil 15: Prüfverfahren zur  
Bondqualität zwischen PDMS und Glas  
(IEC 62047-15:2015)

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Comité Européen de Normalisation Electrotechnique  
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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 62047-15:2015**

**European foreword**

The text of document 47F/208/FDIS, future edition 1 of IEC 62047-15, 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 62047-15:2015.

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
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## Annex ZA (normative)

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| <u>Publication</u> | <u>Year</u> | <u>Title</u>  | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| IEC 62047-9        | -           | Semiconductor devices - Micro-electromechanical devices -- Part 9: Wafer to wafer bonding strength measurement for MEMS | EN 62047-9   | -           |

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**IEC 62047-15**

Edition 1.0 2015-03

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**



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**Semiconductor devices – Micro-electromechanical devices –  
Part 15: Test method of bonding strength between PDMS and glass**

**Dispositifs à semiconducteurs – Dispositifs microélectromécaniques –  
Partie 15: Méthode d'essai de la résistance de collage entre PDMS et verre**





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**IEC 62047-15**

Edition 1.0 2015-03

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**



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**Semiconductor devices – Micro-electromechanical devices –  
Part 15: Test method of bonding strength between PDMS and glass**

**Dispositifs à semiconducteurs – Dispositifs microélectromécaniques –  
Partie 15: Méthode d'essai de la résistance de collage entre PDMS et verre**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SEMICONDUCTOR DEVICES –  
MICRO-ELECTROMECHANICAL DEVICES –**
**Part 15: Test method of bonding  
strength between PDMS and glass**

## FOREWORD

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International Standard IEC 62047-15 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/208/FDIS | 47F/213/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.

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A list of all parts in the IEC 62047 series, published under the general title *Semiconductor devices – Micro-electromechanical devices*, can be found on the IEC website.

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## SEMICONDUCTOR DEVICES – MICRO-ELECTROMECHANICAL DEVICES –

### Part 15: Test method of bonding strength between PDMS and glass

#### 1 Scope

This part of IEC 62047 describes test method for bonding strength between poly dimethyl siloxane (PDMS) and glass. Silicone-based rubber, PDMS, is used for building of chip-based microfluidic devices fabricated using lithography and replica moulding processes. The problem of bonding strength is mainly for high pressure applications as in the case of certain peristaltic pump designs where an off chip compressed air supply is used to drive the fluids in micro channels created by a twin layer, one formed by bondage between glass with replica moulded PDMS and another between PDMS and PDMS. Also, in case of systems having pneumatic microvalves, a relatively high level of bonding particularly between two replica moulded layers of PDMS becomes quite necessary. Usually there is a leakage and debonding phenomena between interface of bonded areas, which causes instability and shortage of lifetime for MEMS devices. This standard specifies general procedures on bonding test of PDMS and glass chip.

#### 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 62047-9, *Semiconductor devices – Micro-electromechanical devices – Part 9: Wafer to wafer bonding strength measurement for MEMS*

#### 3 Terms and definitions

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

##### 3.1

##### **complete bonded area**

bonded wafer without void areas

##### 3.2

##### **hydrophilic**

physical property of a molecule that can bond with water (H<sub>2</sub>O) through hydrogen bonding

Note 1 to entry: A definition of the term "molecule" can be found on this page:  
<http://en.wikipedia.org/wiki/Molecule>.

Note 2 to entry: A definition of "hydrogen bond" can be found on this page:  
[http://en.wikipedia.org/wiki/Hydrogen\\_bonding](http://en.wikipedia.org/wiki/Hydrogen_bonding).

##### 3.3

##### **hydrophobic**

property that tend to be non-polar molecules which form aggregates of like molecules in water and analogous intramolecular interactions

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