



**NSAI**  
Standards

Irish Standard  
I.S. EN 62047-4:2010

Semiconductor devices - Micro-  
electromechanical devices -- Part 4:  
Generic specification for MEMS (IEC  
62047-4:2008 (EQV))

## I.S. EN 62047-4:2010

*Incorporating amendments/corrigenda issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

|   |  |   |
|---|--|---|
| <i>This document replaces:</i>  | <i>This document is based on:</i><br>EN 62047-4:2010                           | <i>Published:</i><br>15 October, 2010                                     |
| This document was published under the authority of the NSAI and comes into effect on:<br>27 October, 2010 |  | ICS number:<br>31.080.99  |
| <b>NSAI</b><br>1 Swift Square,<br>Northwood, Santry<br>Dublin 9   | T +353 1 807 3800<br>F +353 1 807 3838<br>E standards@nsai.ie<br><br>W NSAI.ie | <b>Sales:</b><br>T +353 1 857 6730<br>F +353 1 857 6729<br>W standards.ie |
| Údarás um Chaighdeáin Náisiúnta na hÉireann   |  |   |

EUROPEAN STANDARD

**EN 62047-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2010

ICS 31.080.99

English version

**Semiconductor devices -  
Micro-electromechanical devices -  
Part 4: Generic specification for MEMS  
(IEC 62047-4:2008)**

Dispositifs à semiconducteurs -  
Dispositifs microélectromécaniques -  
Partie 4: Spécification générique pour les  
MEMS  
(CEI 62047-4:2008)

Halbleiterbauelemente -  
Bauteile der Mikrosystemtechnik -  
Teil 4: Fachgrundspezifikation für  
Mikrosystemtechnik  
(IEC 62047-4:2008)

This European Standard was approved by CENELEC on 2010-10-01. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 47/1975/FDIS, future edition 1 of IEC 62047-4, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62047-4 on 2010-10-01.

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) 2011-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-10-01

Annex ZA has been added by CENELEC.

---

## Endorsement notice

The text of the International Standard IEC 62047-4:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- IEC 60721-3-0 NOTE Harmonized as EN 60721-3-0.
  - IEC 60721-3-1 NOTE Harmonized as EN 60721-3-1.
-

## 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.

| <u>Publication</u> | <u>Year</u> | <u>Title</u>  | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| IEC 60027          | Series      | Letter symbols to be used in electrical technology  | EN 60027     | Series      |
| IEC 60068-2        | Series      | Environmental testing - Part 2: Tests   | EN 60068-2   | Series      |
| IEC 60617          | -           | Graphical symbols for diagrams  | -            | -           |
| IEC 60747-1        | 2006        | Semiconductor devices - Part 1: General   | -            | -           |
| IEC 60749          | Series      | Semiconductor devices - Mechanical and climatic test methods  | EN 60749     | Series      |
| IEC 61193-2        | -           | Quality assessment systems - Part 2: Selection and use of sampling plans for inspection of electronic components and packages                   | EN 61193-2   | -           |
| IEC 62047-1        | -           | Semiconductor devices - Micro-electromechanical devices - Part 1: Terms and definitions   | EN 62047-1   | -           |
| IEC QC 001002-3    | 2005        | IEC Quality Assessment System for Electronic Components (IECQ) - Rules of Procedure - Part 3: Approval procedures                               | -            | -           |
| ISO 1000           | -           | SI units and recommendations for the use of their multiples and of certain other units  | -            | -           |
| ISO 2859-1         | -           | Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection | -            | -           |

*This page is intentionally left BLANK.*

## CONTENTS

|  |    |
|--|----|
| FOREWORD.....  | 3  |
| 1 Scope.....   | 5  |
| 2 Normative references .....   | 5  |
| 3 Terms, definitions, units and symbols .....                                | 6  |
| 4 Standard environmental conditions .....                                    | 7  |
| 5 Marking .....  | 7  |
| 5.1 Device identification .....  | 7  |
| 5.2 Device traceability .....  | 7  |
| 5.3 Packing .....  | 7  |
| 6 Quality assessment procedures .....  | 7  |
| 6.1 General.....   | 7  |
| 6.1.1 Eligibility for qualification and/or capability approval .....         | 7  |
| 6.1.2 Primary stage of manufacture .....                                     | 7  |
| 6.1.3 Formation of inspection lots .....                                     | 7  |
| 6.1.4 Structurally similar device.....                                       | 7  |
| 6.1.5 Subcontracting .....   | 8  |
| 6.1.6 Incorporated components .....  | 8  |
| 6.1.7 Validity of release .....  | 8  |
| 6.2 Qualification approval procedure .....                                   | 8  |
| 6.2.1 Qualification approval testing.....                                    | 8  |
| 6.2.2 Environmental and climatic tests .....                                 | 8  |
| 6.2.3 Granting of qualification approval .....                               | 8  |
| 6.2.4 Statistical sampling procedures .....                                  | 11 |
| 6.2.5 Endurance tests .....  | 11 |
| 6.2.6 Endurance tests where the failure rate is specified .....              | 11 |
| 6.2.7 Accelerated test procedures .....                                      | 12 |
| 7 Test and measurement procedures.....                                       | 12 |
| 7.1 Standard conditions and general precautions .....                        | 12 |
| 7.1.1 Standard conditions.....   | 12 |
| 7.1.2 General precautions .....  | 13 |
| 7.1.3 Precision of measurements .....  | 13 |
| 7.2 Physical examination.....  | 13 |
| 7.2.1 Visual examination .....   | 13 |
| 7.2.2 Dimensions .....   | 13 |
| 7.3 Climatic and mechanical tests .....                                      | 13 |
| 7.4 Alternative test methods .....   | 13 |
| Annex A (normative) Sampling procedures .....                                | 14 |
| Annex B (informative) Classification for MEMS technologies and devices ..... | 15 |
| Bibliography.....  | 19 |
| Table 1 – MEMS categories and terms.....                                     | 6  |
| Table 2 – Subgrouping for Group B and Group C .....                          | 10 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES –  
MICRO-ELECTROMECHANICAL DEVICES –****Part 4: Generic specification for MEMS**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62047-4 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 |
| 47/1975/FDIS | 47/1985/RVD      |

Full information on the voting for the approval on 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 the parts in the IEC 62047 series, under the general title *Semiconductor devices – Micro-electromechanical devices*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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
- amended.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-