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Irish Standard  
I.S. EN 60749-40:2011

# Semiconductor devices - Mechanical and climatic test methods -- Part 40: Board level drop test method using a strain gauge (IEC 60749-40:2011 (EQV))

## I.S. EN 60749-40:2011

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60749-40**

September 2011

ICS 31.080.01

English version

**Semiconductor devices -  
Mechanical and climatic test methods -  
Part 40: Board level drop test method using a strain gauge  
(IEC 60749-40:2011)**

Dispositifs à semiconducteurs -  
Méthodes d'essais mécaniques et  
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jauge de contrainte  
(CEI 60749-40:2011)

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Prüfverfahren -  
Teil 40: Prüfverfahren zum Fall einer  
Leiterplatte unter Verwendung von  
Dehnungsmessstreifen  
(IEC 60749-40:2011)

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## **Foreword**

The text of document 47/2094/FDIS, future edition 1 of IEC 60749-40, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-40 on 2011-08-17.

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The following dates were fixed:

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|--|-------|------------|
| – latest date by which the EN has to be implemented<br>at national level by publication of an identical<br>national standard or by endorsement | (dop) | 2012-05-17 |
| – latest date by which the national standards conflicting<br>with the EN have to be withdrawn  | (dow) | 2014-08-17 |

Annex ZA has been added by CENELEC.

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## **Endorsement notice**

The text of the International Standard IEC 60749-40:2011 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60749-37	-	Semiconductor devices - Mechanical and climatic test methods - Part 37: Board level drop test method using an accelerometer	EN 60749-37	-

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## CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references .....	5
3 Terms and definitions .....	5
4 Test equipment.....	6
5 Test procedure .....	6
5.1 Test specimen.....	6
5.2 Test substrate .....	6
5.3 Solder paste.....	6
5.4 Mounting method.....	7
5.5 Pre-conditionings .....	7
5.6 Initial measurements .....	7
5.7 Intermediate measurement .....	7
5.8 Final measurement.....	7
6 Test method .....	7
6.1 Purpose of test method .....	7
6.2 Example of drop test equipment .....	7
6.3 Example of substrate-securing jig.....	8
6.4 Example of distance between supporting points .....	8
6.5 Example of impacting surface.....	8
6.6 Strain gauge.....	8
6.7 Strain gauge attachment .....	8
6.8 Strain measurement instrument.....	9
6.9 Test condition.....	10
6.9.1 Drop test conditions.....	10
6.9.2 Test procedure .....	10
6.9.3 Drop height.....	11
6.9.4 Pre-test characterization.....	11
6.9.5 Direction.....	13
6.9.6 Number of drops.....	13
7 Summary.....	13
Annex A (normative) Drop impact test method using test rod .....	15
Annex B (informative) An example of strain gauge attachment procedure .....	18
Figure 1 – Example of drop test equipment and substrate securing jig .....	9
Figure 2 – Position of strain gauge attachment .....	10
Figure 3 – Strain measurement instrument.....	11
Figure 4 – Waveform of strain and electrical conductivity of daisy chain .....	11
Figure 5a – Number of times of drop to failure .....	13
Figure 5b – Pulse duration .....	13
Figure 5 – Correlation strain and number of failures and strain and pulse duration.....	13
Figure 6 – Correlation between pulse duration and distance between supporting points.....	13
Figure 7 – Correlation between the number of times of failure and the maximum strain.....	14
Figure 8 – Direction of dropping.....	14

**I.S. EN 60749-40:2011**

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– 3 –

Figure A.1 – Outline of test apparatus.....	16
Figure A.2 – Waveform of strain and electrical conductivity of a daisy chain .....	18
Figure B.1 – Equipment and materials .....	19
Figure B.2 – Example of Attaching Strain Gauge and Guide Mark Dimensions .....	20
Figure B.3 – Strain gauge attachment procedure, part 1 .....	21
Figure B.4 – Strain gauge attachment procedure, part 2 .....	22



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES –  
MECHANICAL AND CLIMATIC TEST METHODS –****Part 40: Board level drop test method using a strain gauge**

## FOREWORD

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International Standard IEC 60749-40 has been prepared by IEC technical committee 47: Semiconductor devices.

The text of this standard is based on the following documents:

FDIS	Report on voting
47/2094/FDIS	47/2100/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60749 series, under the general title *Semiconductor devices – Mechanical and climatic test methods*, can be found in the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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
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## SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

### Part 40: Board level drop test method using a strain gauge

#### 1 Scope

This part of IEC 60749 is intended to evaluate and compare drop performance of a surface mount semiconductor device for handheld electronic product applications in an accelerated test environment, where excessive flexure of a circuit board causes product failure. The purpose is to standardize test methodology to provide a reproducible assessment of the drop test performance of a surface mounted semiconductor devices while duplicating the failure modes normally observed during product level test.

This international standard uses a strain gauge to measure the strain and strain rate of a board in the vicinity of a component. Test method IEC 60749-37 uses an accelerometer to measure the mechanical shock duration and magnitude applied which is proportional to the stress on a given component mounted on a standard board. The detailed specification shall state which test method is to be used.

NOTE 1 Although this test can evaluate a structure where the mounting method and its conditions, the design of a printed wired board, solder material, the mounting capability of a semiconductor device, etc. are combined, it does not solely evaluate the mounting capability of a semiconductor device.

NOTE 2 The result of this test is strongly influenced by the differences between soldering conditions, the design of the land pattern of a printed wired board, solder material, etc. Therefore, in carrying out this test, it is necessary to recognize that this test cannot intrinsically guarantee the reliability of the solder joint of the semiconductor devices.

NOTE 3 When the mechanical stress which is generated by this test does not occur in the actual application of the device, implementation of this test is unnecessary.

#### 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 60749-37, *Semiconductor devices – Mechanical and climatic test methods – Part 37: Board level drop test method using an accelerometer*

#### 3 Terms and definitions

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

##### 3.1

##### **device**

single electronic component to be surface mounted

##### 3.2

##### **drop impact strength**

strength of the test substrate held by a jig that is dropped from a defined height, as represented by the number of cyclic drops that finally cause fracture on the joint between a device and a PWB copper land

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