



**NSAI**  
Standards

Irish Standard  
I.S. EN 60749-3:2017

# Semiconductor devices - Mechanical and climatic test methods - Part 3: External visual examination

**I.S. EN 60749-3:2017**

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

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## National Foreword

I.S. EN 60749-3:2017 is the adopted Irish version of the European Document EN 60749-3:2017,  
Semiconductor devices - Mechanical and climatic test methods - Part 3: External visual examination

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EUROPEAN STANDARD

**EN 60749-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2017

ICS 31.080.01

Supersedes EN 60749-3:2002

English Version

**Semiconductor devices - Mechanical and climatic test methods -  
Part 3: External visual examination  
(IEC 60749-3:2017)**

Dispositifs à semiconducteurs - Méthodes d'essais  
mécaniques et climatiques - Partie 3: Examen visuel  
externe  
(IEC 60749-3:2017)

Halbleiterbauelemente - Mechanische und klimatische  
Prüfverfahren - Teil 3: Äußere Sichtprüfung  
(IEC 60749-3:2017)

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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

## **EN 60749-3:2017**

### **European foreword**

The text of document 47/2345/FDIS, future edition 2 of IEC 60749-3, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60749-3:2017.

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) 2018-01-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-04-07

This document supersedes EN 60749-3:2002.

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

### **Endorsement notice**

The text of the International Standard IEC 60749-3:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60749-9	NOTE	Harmonized as EN 60749-9.
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## Annex ZA

(normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61340-5-1	-	Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements	EN 61340-5-1	-
IEC 62483	-	Environmental acceptance requirements for tin whisker susceptibility of tin and tin alloy surface finishes on semiconductor devices	-	-

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**IEC 60749-3**

Edition 2.0 2017-03

# **INTERNATIONAL STANDARD**

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**Semiconductor devices – Mechanical and climatic test methods –  
Part 3: External visual examination**



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**IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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Edition 2.0 2017-03

# INTERNATIONAL STANDARD

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**Semiconductor devices – Mechanical and climatic test methods –  
Part 3: External visual examination**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 31.080.01

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### **SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –**

#### **Part 3: External visual examination**

#### **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.
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International Standard IEC 60749-3 has been prepared by IEC technical committee 47: Semiconductor devices.

This second edition cancels and replaces the first edition published in 2002. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) reference to the need for ESD protection;
- b) inclusion of information on the phenomenon of tin whiskers;
- c) inclusion of an optional report form/checklist.

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

FDIS	Report on voting
47/2345/FDIS	47/2370/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

## SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

### Part 3: External visual examination

#### 1 Scope

The purpose of this part of IEC 60749 is to verify that the materials, design, construction, markings, and workmanship of a semiconductor device are in accordance with the applicable procurement document. External visual inspection is a non-destructive test and applicable for all package types. The test is useful for qualification, process monitor, or lot acceptance.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61340-5-1, *Electrostatics – Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements*

IEC 62483, *Environmental acceptance requirements for tin whisker susceptibility of tin and tin alloy surface finishes on semiconductor devices*

#### 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 4 Test apparatus

Apparatus used in this test shall be capable of demonstrating device conformance to the applicable requirements, which may include optical equipment capable of magnification to resolve features between > 0,5 mm to 10 mm. A lense magnification between 3× and 10× and a relatively large and accessible field of view with an illuminated ring magnifier is typically used. Where visual observation requires clarification, a higher magnification (up to x30) can be used. Illumination should be in the range between 1,000 to 10,000 lux in an ambient overhead lighting environment of greater than 200 lux.

#### 5 Procedure

The device shall be examined in accordance with the requirements of the relevant specification and the criteria listed in Clause 6. Where adherence of foreign material is in question, devices may be subjected to a clean filtered air stream (suction or expulsion) of

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