

INTERNATIONAL STANDARD

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





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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES –
MECHANICAL AND CLIMATIC TEST METHODS –****Part 3: External visual examination**

FOREWORD

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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- withdrawn,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 reference 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