SLOVENSKI STANDARD

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Semiconductor devices - Mechanical and climatic test methods - Part 14: Robustness of terminations (lead integrity) (IEC 60749-14:2003)

ICS 31.080.01

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EUROPEAN STANDARD **EN 60749-14**

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English version

Semiconductor devices - Mechanical and climatic test methods Part 14: Robustness of terminations (lead integrity)

(IEC 60749-14:2003)

Dispositifs à semiconducteurs - Méthodes d'essais mécaniques et climatiques Partie 14: Robustesse des sorties (intégrité des connexions) (CEI 60749-14:2003)

Halbleiterbauelemente - Mechanische und klimatische Prüfverfahren Teil 14: Festigkeit der Bauelementeanschlüsse (Unversehrtheit der Anschlüsse) (IEC 60749-14:2003)

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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.

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

The text of document 47/1701/FDIS, future edition 1 of IEC 60749-14, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-14 on 2003-10-01.

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)	2004-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2006-10-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60749-14:2003 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

Publication	Year	Title	EN/HD	Year
IEC 60749-8	- [1)]	Semiconductor devices - Mechanical and climatic test methods Part 8: Sealing	EN 60749-8	2003 [2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

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Semiconductor devices – Mechanical and climatic test methods –

Part 14: Robustness of terminations (lead integrity)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 14: Robustness of terminations (lead integrity)

FOREWORD

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International Standard IEC 60749-14 has been prepared by IEC technical committee 47: Semiconductor devices.

This standard cancels and replaces IEC/PAS 62184 published in 2000. This first edition constitutes a technical revision.

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

FDIS	Report on voting
47/1701/FDIS	47/1707/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.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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

SEMICONDUCTOR DEVICES –
MECHANICAL AND CLIMATIC TEST METHODS –

Part 14: Robustness of terminations (lead integrity)

1 Scope

This part of IEC 60749 provides various tests for determining the integrity between the lead/package interface and the lead itself when the lead(s) are bent due to faulty board assembly followed by rework of the part for re-assembly. For hermetic packages, it is recommended that this test be followed by hermeticity tests in accordance with IEC 60749-8 to determine if there are any adverse effects from the stresses applied to the seals as well as to the leads.

This test, including each of the test conditions, is considered destructive and is only recommended for qualification testing.

This standard is applicable to all through-hole devices and surface-mount devices requiring lead forming by the user.

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 60749-8, *Semiconductor devices – Mechanical and climatic test methods – Part 8: Sealing*

3 General

3.1 Apparatus

The appropriate apparatus is described under each particular test condition.

3.2 General procedure applicable to all test conditions

The device shall be subjected to the stress described in the specified test condition and the specified end point measurements and inspections shall be made except for initial conditioning unless otherwise specified. When possible, the stress shall be applied to randomly selected leads from each device. The same leads shall not be used for more than one test condition.

3.3 General summary

The following details, and those required by the specific test condition, shall be specified in the relevant specification:

a) Test condition letter.

b) Sample size (combinations of number of leads per device and number of devices) and quality level.

4 Test condition A – Tension

4.1 Purpose

This test condition provides for the application of straight tensile loading. It is designed to check the capabilities of the device, leads, welds, and seals to withstand a straight pull.

4.2 Apparatus

The tension test requires suitable clamps and fixtures for securing the device and attaching the specified weight without lead restriction. Equivalent linear pull test equipment may be used.

4.3 Procedure

A tension of 2,2 N ± 0,1 N (220 g ± 10 g) shall be applied without shock to each lead to be tested in a direction parallel to the axis of the lead or terminal and the tension shall be maintained for 30 s minimum. For leads with a diameter of less than 0,25 mm (or cross sectional area of less than 0,05 mm^2) a tension of 1 N ± 0,1 N (100 g ± 10 g) shall be applied. The tension shall be applied as close to the end of the lead as practicable.

4.3.1 Measurements

Hermeticity test on hermetically sealed packages, visual examination and electrical measurements that consist of parametric and functional tests shall be taken, as specified in the relevant specification.

4.3.2 Failure criteria

After the removal of the stress, examine the device using a magnification between 10× and 20×. Any evidence of breakage, loosening, or relative motion between the lead and the device body shall be considered a device failure. When hermeticity tests are conducted (in accordance IEC 60749-8) as a post measurement, meniscus cracks shall not be a cause for rejection of the devices which have passed the tests. Failure to meet the requirements of any specified post electrical measurement shall be considered a cause for failure.

4.4 Summary

The following details shall be specified in the relevant specification:

a) Weight to be attached to lead, if other than 2,2 N ± 0,1 N (220 g ± 10 g).

b) Length of time weight is to be attached, if other than 30 s.

c) Failure criteria, if other than specified in 4.3.2.

5 Test condition B – Bending stress

5.1 Purpose

This test condition provides for the application of bending stresses to determine the integrity of leads, seals and lead plating. It is designed to check the capability of the leads, lead finish, lead welds and seals of the devices to withstand stresses to the leads and seals which might reasonably be expected to occur from actual handling and assembly of the devices in application.