SLOVENSKI STANDARD

SIST EN 60749-10:2004

julij 2004

Semiconductor devices - Mechanical and climatic test methods - Part 10: Mechanical shock (IEC 60749-10:2002)

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ICS 31.080.01

Referenčna številka
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60749-10

August 2002

ICS 31.080.01

Partly supersedes EN 60749:1999 + A1:2000 + A2:2001

English version

Semiconductor devices - Mechanical and climatic test methods Part 10: Mechanical shock (IEC 60749-10:2002)

Dispositifs à semiconducteurs -
Méthodes d'essais mécaniques
et climatiques
Partie 10: Chocs mécaniques
(CEI 60749-10:2002)

Halbleiterbauelemente -
Mechanische und klimatische
Prüfverfahren
Teil 10: Mechanisches Schocken
(IEC 60749-10:2002)

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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.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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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Ref. No. EN 60749-10:2002 E

Foreword

The text of document 47/1598/FDIS, future edition 1 of IEC 60749-10, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-10 on 2002-07-02.

This mechanical and climatic test method, as it relates to mechanical shock, is a complete rewrite of the test contained in clause 4, chapter 2 of EN 60749:1999.

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)	2003-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-07-01

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 60749-10:2002 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

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 60068-2-27	1987	Basic environmental testing procedures Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993

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NORME INTERNATIONALE
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CEI
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Première édition
First edition
2002-04

Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques –

Partie 10: Chocs mécaniques

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Part 10: Mechanical shock

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 10: Mechanical shock

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
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4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
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6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60749-10 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
47/1598/FDIS	47/1613/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 mechanical and climatic test method, as it relates to mechanical shock, is a complete rewrite of the test contained in clause 4, chapter 2 of IEC 60749.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

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.

The contents of the corrigendum of August 2003 have been included in this copy.

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 10: Mechanical shock

1 Scope

This part of IEC 60749 describes a shock test intended to determine the suitability of component parts for use in electronic equipment which may be subjected to moderately severe shocks as a result of suddenly applied forces or abrupt changes in motion produced by rough handling, transportation, or field operation. Shock of this type may disturb operating characteristics, particularly if the shock pulses are repetitive. This is a destructive test. It is normally applicable to cavity-type packages.

In general, this mechanical shock test is in conformity with IEC 60068-2-27 but, due to specific requirements of semiconductors, the clauses of this standard apply.

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.

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IEC 60068-2-27:1987, *Environmental testing. Part 2: Tests – Test Ea and guidance: Shock*

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3 Test apparatus

The shock testing apparatus shall be capable of providing shock pulses of 5 000 m/s^2 and 15 000 m/s^2 (peak) with a pulse duration between 0,5 ms and 1,0 ms to the body of the device. The acceleration pulse as determined from the unfiltered output of a transducer with natural frequency greater than or equal to five times the frequency of the shock pulse being established shall be a half-sine waveform with an allowable distortion not greater than ±20 % of the specified peak acceleration. The pulse duration shall be measured between the points at 10 % of the peak acceleration during rise time and 10 % of the peak acceleration during decay time. Absolute tolerances of the pulse duration shall be ±30 % of the specified duration.

4 Procedure

The shock testing apparatus shall be mounted on a sturdy laboratory table or equivalent base and levelled before use. The device shall be rigidly mounted or restrained by its case with suitable protection for the leads. Means may be provided to prevent the shock from being repeated due to "bounce" in the apparatus. Unless otherwise specified, the device shall be subject to five shock pulses of the peak level (g) specified in the selected test condition and for the pulse duration specified in each of the orientations X_1, X_2, Y_1, Y_2, Z_1, and Z_2. One required orientation (Y_1) shall be defined as that one in which the internal element(s) tends to be removed from its mount. Unless otherwise specified, test condition B shall apply.