SLOVENSKI STANDARD

SIST EN 60749-21:2005

december 2005

Polprevodniški elementi – Mehanske in klimatske preskusne metode – 21. del: Spajkljivost (IEC 60749-21:2004)

Semiconductor devices – Mechanical and climatic test methods – Part 21: Solderability (IEC 60749-21:2004)

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EUROPEAN STANDARD **EN 60749-21**

NORME EUROPÉENNE

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English version

Semiconductor devices – Mechanical and climatic test methods Part 21: Solderability

(IEC 60749-21:2004)

Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques Partie 21: Brasabilité (CEI 60749-21:2004)

Halbleiterbauelemente – Mechanische und klimatische Prüfverfahren Teil 21: Lötbarkeit (IEC 60749-21:2004)

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

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Foreword

The text of document 47/1741/FDIS, future edition 1 of IEC 60749-21, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-21 on 2004-12-07.

This mechanical and climatic test method, as it relates to solderability, is a complete rewrite of the test contained in Subclause 2.1, 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) 2005-09-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-01-01

Endorsement notice

The text of the International Standard IEC 60749-21:2004 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068	NOTE	Harmonized in the EN 60068 series (not modified).
IEC 60749	NOTE	Harmonized in the EN 60749 series (not modified).
IEC 60749-15	NOTE	Harmonized as EN 60749-15:2003 (not modified).
IEC 60749-20	NOTE	Harmonized as EN 60749-20:2003 (not modified).

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

**Partie 21:
Brasabilité**

**Semiconductor devices –
Mechanical and climatic test methods –**

**Part 21:
Solderability**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 21: Solderability

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 60749-21 has been prepared by IEC technical committee 47: Semiconductor devices.

This standard cancels and replaces IEC/PAS 62173 published in 2000. This first edition constitutes a technical revision.

This part of the IEC 60749 series completes the full revision of IEC 60749 (1996).

This bilingual version (2005-10) replaces the English version.

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

FDIS	Report on voting
47/1741/FDIS	47/1749/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.

The French version of this standard has not been voted upon.

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

IEC 60749 consists of the following parts, under the general title *Semiconductor devices – Mechanical and climatic test methods:*

Part 1: General
Part 2: Low air pressure
Part 3: External visual inspection
Part 4: Damp heat, steady state, highly accelerated stress test (HAST)
Part 5: Steady-state temperature humidity bias life test
Part 6: Storage at high temperature
Part 7: Internal moisture content measurement and the analysis of other residual gases
Part 8: Sealing
Part 9: Permanence of marking
Part 10: Mechanical shock
Part 11: Rapid change of temperature – Two-fluid-bath method
Part 12: Vibration, variable frequency
Part 13: Salt atmosphere
Part 14: Robustness of terminations (lead integrity)
Part 15: Resistance to soldering temperature for through-hole mounted devices
Part 16: Particle impact noise detection (PIND)
Part 17: Neutron irradiation
Part 18: Ionizing radiation (total dose)
Part 19: Die shear strength
Part 20: Resistance of plastic-encapsulated SMDs to the combined effect of moisture and soldering heat
Part 21: Solderability
Part 22: Bond strength
Part 23: High temperature operating life
Part 24: Accelerated moisture resistance – Unbiased HAST
Part 25: Temperature cycling
Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)
Part 27: Electrostatic discharge (ESD) sensitivity testing – Machine model (MM)
Part 28: Electrostatic discharge (ESD) sensitivity testing – Charged device model (CDM)[1]

[1] To be published

Part 29: Latch-up test

Part 30: Preconditioning of non-hermetic surface mount devices prior to reliability testing

Part 31: Flammability of plastic-encapsulated devices (internally induced)

Part 32: Flammability of plastic-encapsulated devices (externally induced)

Part 33: Accelerated moisture resistance – Unbiased autoclave

Part 34: Power cycling

Part 35: Acoustic microscopy for plastic encapsulated electronic components [2]

Part 36: Acceleration, steady state

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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
- amended.

[2] To be published

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 21: Solderability

1 Scope

This part of IEC 60749 establishes a standard procedure for determining the solderability of device package terminations that are intended to be joined to another surface using tin-lead (SnPb) or lead-free (Pb-free) solder for the attachment.

This test method provides a procedure for 'dip and look' solderability testing of through hole, axial and surface mount devices (SMDs) as well as an optional procedure for a board mounting solderability test for SMDs for the purpose of allowing simulation of the soldering process to be used in the device application. The test method also provides optional conditions for ageing.

This test is considered destructive unless otherwise detailed in the relevant specification.

NOTE 1 This test method is in general accord with IEC 60068, but due to specific requirements of semiconductors, the following text is applied.

NOTE 2 This test method does not assess the effect of thermal stresses which may occur during the soldering process. Reference should be made IEC 60749-15 or IEC 60749-20.

NOTE 3 This mechanical and climatic test method as it relates to solderability, is a complete rewrite of the test contained in Subclause 2.1 of Chapter 2 of IEC 60749 (1996).

2 Test apparatus

This test method requires the following equipment.

2.1 Solder bath

The solder bath shall be not less than 40 mm in depth and not less than 300 ml in volume such that it can contain at least 1 kg of solder. The apparatus shall be capable of maintaining the solder at the specified temperature within ±5 °C.

2.2 Dipping device

A mechanical dipping device capable of controlling the rates of immersion and emersion of the terminations and providing a dwell time (time of total immersion to the required depth) in the solder bath as specified shall be used.

2.3 Optical equipment

An optical microscope capable of providing magnification inspection from 10× to 20× shall be used.