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Semiconductor devices - Mechanical and climatic test methods -- Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat (IEC 60749 -20:2008 (EQV))

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60749-20

November 2009

ICS 31.080.01

Supersedes EN 60749-20:2003

English version

Semiconductor devices - Mechanical and climatic test methods - Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat

(IEC 60749-20:2008)

Dispositifs à semiconducteurs - Méthodes d'essais mécaniques et climatiques - Partie 20: Résistance des CMS à boîtiers plastique à l'effet combiné de l'humidité et de la chaleur de brasage (CEI 60749-20:2008)

Halbleiterbauelemente - Mechanische und klimatische Prüfverfahren - Teil 20: Beständigkeit kunststoffverkappter oberflächenmontierbarer Bauelemente (SMD) gegenüber der kombinierten Beanspruchung von Feuchte und Lötwärme (IEC 60749-20:2008)

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CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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Foreword

The text of document 47/1989/FDIS, future edition 2 of IEC 60749-20, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-20 on 2009-09-01.

This European Standard supersedes EN 60749-20:2003.

The main changes are as follows:

– to reconcile certain classifications of EN 60749-20 and those of IPC/JEDEC J-STD-020C;

– reference EN 60749-35 instead of Annex A of EN 60749-20:2003;

– update for lead-free solder;

– correct certain errors in EN 60749-20:2003.

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)	2010-06-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-09-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60749-20:2008 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

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.

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 60068-2-20	2008	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	2008
IEC 60749-3	- [1]	Semiconductor devices - Mechanical and climatic test methods - Part 3: External visual examination	EN 60749-3	2002 [2]
IEC 60749-35	- [1]	Semiconductor devices - Mechanical and climatic test methods - Part 35: Acoustic microscopy for plastic encapsulated electronic components	EN 60749-35	2006 [2]

[1] Undated reference.

[2] Valid edition at date of issue.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat

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 60749-20 has been prepared by IEC technical committee 47: Semiconductor devices.

This second edition cancels and replaces the first edition published in 2002 and constitutes a technical revision. The main changes are as follows:

- to reconcile certain classifications of IEC 60749-20 and those of IPC/JEDEC J-STD-020C;
- reference IEC 60749-35 instead of Annex A of IEC 60749-20, Edition 1;
- update for lead-free solder;
- correct certain errors in the original Edition 1.

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

FDIS	Report on voting
47/1989/FDIS	47/2003/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.

A list of all the parts in the IEC 60749 series, 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 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.

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SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat

1 Scope

This part of IEC 60749 provides a means of assessing the resistance to soldering heat of semiconductors packaged as plastic encapsulated surface mount devices (SMDs). This test is destructive.

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 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60749-3, *Semiconductor devices – Mechanical and climatic test methods – Part 3: External visual inspection*

IEC 60749-35, *Semiconductor devices – Mechanical and climatic test methods – Part 35: Acoustic microscopy for plastic encapsulated electronic components*

3 General description

Package cracking and electrical failure in plastic encapsulated SMDs can result when soldering heat raises the vapour pressure of moisture which has been absorbed into SMDs during storage. These problems are assessed. In this test method, SMDs are evaluated for heat resistance after being soaked in an environment which simulates moisture being absorbed while under storage in a warehouse or dry pack.

4 Test apparatus and materials

4.1 Humidity chamber

The humidity chamber shall provide an environment complying with the temperature and relative humidity defined in 5.3.

4.2 Reflow soldering apparatus

The infrared convection, the convection and the vapour-phase reflow soldering apparatus shall provide temperature profiles complying with the conditions of soldering heat defined in 5.4.2 and 5.4.3. The settings of the reflow soldering apparatus shall be adjusted by temperature profiling of the top surface of the specimen while it is undergoing the soldering heat process, measured as shown in Figure 1.

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