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Irish Standard
I.S. EN 60749-20-1:2009

**Semiconductor devices -
Mechanical and climatic test
methods -- Part 20-1: Handling,
packing, labelling and shipping of
surface-mount devices sensitive to
the combined effect of moisture
and soldering heat (IEC 60749-20
-1:2009 (EQV))**

I.S. EN 60749-20-1:2009

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Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 60749-20-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2009

ICS 31.080.01

English version

**Semiconductor devices -
Mechanical and climatic test methods -
Part 20-1: Handling, packing, labelling and shipping
of surface-mount devices sensitive to the combined effect
of moisture and soldering heat
(IEC 60749-20-1:2009)**

Dispositifs à semiconducteurs -
Méthodes d'essais mécaniques
et climatiques -
Partie 20-1: Manipulation, emballage,
étiquetage et transport des composants
pour montage en surface sensibles
à l'effet combiné de l'humidité
et de la chaleur de brasage
(CEI 60749-20-1:2009)

Halbleiterbauelemente -
Mechanische und klimatische
Prüfverfahren -
Teil 20-1: Handhabung, Verpackung,
Kennzeichnung und Transport
oberflächenmontierbarer Bauelemente,
die empfindlich gegen die Kombination
von Feuchte und Lötwärme sind
(IEC 60749-20-1:2009)

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 47/2010/FDIS, future edition 1 of IEC 60749-20-1, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-20-1 on 2009-05-01.

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) 2010-02-01
- latest date by which the national standards conflicting
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Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60749-20-1:2009 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 60749-37 | NOTE Harmonized as EN 60749-37:2008 (not modified). |
| IEC 60749-39 | NOTE Harmonized as EN 60749-39:2006 (not modified). |

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60749-20	- ¹⁾	Semiconductor devices - Mechanical and climatic test methods - Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat	EN 60749-20	200X ²⁾
IEC 60749-30	- ¹⁾	Semiconductor devices - Mechanical and climatic test methods - Part 30: Preconditioning of non-hermetic surface mount devices prior to reliability testing	EN 60749-30	2005 ³⁾

¹⁾ Undated reference.

²⁾ To be ratified.

³⁾ Valid edition at date of issue.

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Semiconductor devices – Mechanical and climatic test methods –
Part 20-1: Handling, packing, labelling and shipping of surface-mount devices
sensitive to the combined effect of moisture and soldering heat**

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Partie 20-1: Manipulation, emballage, étiquetage et transport des composants
pour montage en surface sensibles à l'effet combiné de l'humidité et de la
chaleur de brasage**



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INTERNATIONAL STANDARD

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chaleur de brasage**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 20-1: Handling, packing, labelling and shipping of surface-mount devices sensitive to the combined effect of moisture and soldering heat

FOREWORD

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International Standard IEC 60749-20-1 has been prepared by IEC technical committee 47: Semiconductor devices.

This standard cancels and replaces IEC/PAS 62168 and IEC/PAS 62169 published in 2000. IEC/PAS 62169 was based on a Joint (IPC/JEDEC) Industry Standard. This first edition of IEC 60749-20-1 constitutes a technical revision.

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

FDIS	Report on voting
47/2010/FDIS	47/2013/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.

INTRODUCTION

The advent of surface-mount devices (SMDs) introduced a new class of quality and reliability concerns regarding package damage “cracks and delamination” from the solder reflow process. This document describes the standardized levels of floor life exposure for moisture/reflow-sensitive SMDs along with the handling, packing and shipping requirements necessary to avoid moisture/reflow-related failures. IEC 60749-20 defines the classification procedure and Annex A of this document defines the labelling requirements.

Moisture from atmospheric humidity enters permeable packaging materials by diffusion. Assembly processes used to solder SMDs to printed circuit boards (PCBs) expose the entire package body to temperatures higher than 200 °C. During solder reflow, the combination of rapid moisture expansion, materials mismatch, and material interface degradation can result in package cracking and/or delamination of critical interfaces within the package.

The solder reflow processes of concern are convection, convection/IR, infrared (IR), vapour phase (VPR) and hot air rework tools. The use of assembly processes that immerse the component body in molten solder are not recommended for most SMDs.

This first edition of IEC 60749-20-1 is based principally on IPC/JEDEC J-STD-033 ¹ and the permission to use this standard is gratefully acknowledged. It is also based on contributing documents from various national committees.

¹ Refer to Bibliography.

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 20-1: Handling, packing, labelling and shipping of surface-mount devices sensitive to the combined effect of moisture and soldering heat

1 Scope

This part of IEC 60749 applies to all non-hermetic SMD packages which are subjected to reflow solder processes and which are exposed to the ambient air.

The purpose of this document is to provide SMD manufacturers and users with standardized methods for handling, packing, shipping, and use of moisture/reflow sensitive SMDs which have been classified to the levels defined in IEC 60749-20. These methods are provided to avoid damage from moisture absorption and exposure to solder reflow temperatures that can result in yield and reliability degradation. By using these procedures, safe and damage-free reflow can be achieved, with the dry packing process, providing a minimum shelf life capability in sealed dry-bags from the seal date.

Two test conditions, method A and method B, are specified in the soldering heat test of IEC 60749-20. For method A, moisture soak conditions are specified on the assumption that moisture content inside the moisture barrier bag is less than 30 % RH. For method B, moisture soaking conditions are specified on the assumption that manufacturer's exposure time (MET) does not exceed 24 h and the moisture content inside the moisture barrier bag is less than 10 % RH. In an actual handling environment, SMDs tested by method A are permitted to absorb moisture up to 30 % RH, and SMDs tested by method B are permitted to absorb moisture up to 10 % RH. This standard specifies the handling conditions for SMDs subjected to the above test conditions.

NOTE Hermetic SMD packages are not moisture sensitive and do not require moisture precautionary handling.

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 60749-20, *Semiconductor devices – Mechanical and climatic test methods – Part 20: Resistance of plastic-encapsulated SMDs to the combined effect of moisture and soldering heat*

IEC 60749-30, *Semiconductor devices – Mechanical and climatic test methods – Part 30: Preconditioning of non-hermetic surface mount devices prior to reliability testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

active desiccant

desiccant that is either fresh (new) or has been baked according to the manufacturer's recommendations to renew it to original specifications

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