



**NSAI**  
Standards

Irish Standard  
I.S. EN 60749-4:2017

# Semiconductor devices - Mechanical and climatic test methods - Part 4: Damp heat, steady state, highly accelerated stress test (HAST)

**I.S. EN 60749-4:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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*This document is based on:*

EN 60749-4:2017

*Published:*

2017-06-16

*This document was published  
under the authority of the NSAI  
and comes into effect on:*

2017-07-04

ICS number:

31.080.01

NOTE: If blank see CEN/CENELEC cover page

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## National Foreword

I.S. EN 60749-4:2017 is the adopted Irish version of the European Document EN 60749-4:2017, Semiconductor devices - Mechanical and climatic test methods - Part 4: Damp heat, steady state, highly accelerated stress test (HAST)

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EUROPEAN STANDARD

**EN 60749-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2017

ICS 31.080.01

Supersedes EN 60749-4:2002

English Version

**Semiconductor devices - Mechanical and climatic test methods -  
Part 4: Damp heat, steady state, highly accelerated stress test  
(HAST)  
(IEC 60749-4:2017)**

Dispositifs à semiconducteurs - Méthodes d'essais  
mécaniques et climatiques - Partie 4: Essai continu  
fortement accéléré de contrainte de chaleur humide (HAST)  
(IEC 60749-4:2017)

Halbleiterbauelemente - Mechanische und klimatische  
Prüfverfahren - Teil 4: Feuchte Wärme, konstant, Prüfung  
mit hochbeschleunigter Wirkung (HAST)  
(IEC 60749-4:2017)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## **EN 60749-4:2017**

### **European foreword**

The text of document 47/2346/FDIS, future edition 2 of IEC 60749-4, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60749-4:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-01-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-04-07

This document supersedes EN 60749-4:2002.

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### **Endorsement notice**

The text of the International Standard IEC 60749-4:2017 was approved by CENELEC as a European Standard without any modification.

## Annex ZA

(normative)

### Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60749-5	-	Semiconductor devices - Mechanical and climatic test methods - Part 5: Steady-state temperature humidity bias life test	EN 60749-5	- <sup>1)</sup>

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1) To be published.

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**IEC 60749-4**

Edition 2.0 2017-03

# **INTERNATIONAL STANDARD**

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**Semiconductor devices – Mechanical and climatic test methods –  
Part 4: Damp heat, steady state, highly accelerated stress test (HAST)**



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**IEC 60749-4**

Edition 2.0 2017-03

# **INTERNATIONAL STANDARD**

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**Semiconductor devices – Mechanical and climatic test methods –  
Part 4: Damp heat, steady state, highly accelerated stress test (HAST)**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 31.080.01

ISBN 978-2-8322-4002-1

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## CONTENTS

FOREWORD .....	3
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions .....	5
4 HAST test – General remarks .....	5
5 Test apparatus .....	6
5.1 Test apparatus requirements .....	6
5.2 Controlled conditions .....	6
5.3 Temperature profile .....	6
5.4 Devices under stress .....	6
5.5 Minimize release of contamination .....	6
5.6 Ionic contamination .....	6
5.7 De-ionized water .....	6
6 Test conditions .....	6
6.1 Test conditions requirements .....	6
6.2 Biasing guidelines .....	7
6.3 Choosing and reporting .....	8
7 Procedure .....	8
7.1 Test device mounting .....	8
7.2 Ramp-up .....	8
7.3 Ramp-down .....	8
7.4 Test clock .....	8
7.5 Bias .....	8
7.6 Readout .....	9
7.7 Handling .....	9
7.8 Calibration records .....	9
8 Failure criteria .....	9
9 Safety .....	9
10 Summary .....	9
Table 1 – Temperature, relative humidity and duration requirements .....	7
Table 2 – Bias and reporting requirements .....	8

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

#### Part 4: Damp heat, steady state, highly accelerated stress test (HAST)

#### 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 60749-4 has been prepared by IEC technical committee 47: Semiconductor devices.

This second edition cancels and replaces the first edition published in 2002. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) clarification of requirements for temperature, relative humidity and duration detailed in Table 1;
- b) recommendations that current limiting resistor(s) be placed in the test set-up to prevent test board or DUT damage;
- c) allowance of additional time-to-test delay or return-to-stress delay.

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

FDIS	Report on voting
47/2346/FDIS	47/2371/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

A list of all parts in the IEC 60749 series, published 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

A bilingual version of this publication may be issued at a later date.

## **SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –**

### **Part 4: Damp heat, steady state, highly accelerated stress test (HAST)**

#### **1 Scope**

This part of IEC 60749 provides a highly accelerated temperature and humidity stress test (HAST) for the purpose of evaluating the reliability of non-hermetic packaged semiconductor devices in humid environments.

#### **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60749-5, *Semiconductor devices – Mechanical and climatic test methods – Part 5: Steady state temperature humidity bias life test*

#### **3 Terms and definitions**

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### **4 HAST test – General remarks**

The HAST test employs severe conditions of temperature, humidity and bias which accelerate the penetration of moisture through the external protective material (encapsulant or seal) or along the interface between the external protective material and the metallic conductors which pass through it. The stress usually activates the same failure mechanisms as the “85/85” steady-state temperature humidity bias life test, IEC 60749-5. As such the test method may be selected from IEC 60749-5 or from this test method. When both test methods are performed, test results of the 85 °C/85 % RH steady-state temperature humidity bias life test, IEC 60749-5, take priority over HAST.

This test method shall be considered destructive.

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