IEC 60749-5

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Semiconductor devices – Mechanical and climatic test methods – Part 5: Steady-state temperature humidity bias life test

Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques – Partie 5: Essai continu de durée de vie sous température et humidité avec polarisation

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SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 5: Steady-state temperature humidity bias life test

FOREWORD

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IEC 60749-5 has been prepared by IEC technical committee 47: Semiconductor devices. It is an International Standard.

This third edition, based on JEDEC document JESD22-A101D.01, cancels and replaces the second edition published in 2017. It is used with permission of the copyright holder, JEDEC Solid State Technology Association. This edition constitutes a technical revision.

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

a) the specification of the test equipment is changed to require the need to minimize relative humidity gradients and maximize air flow between semiconductor devices under test;

b) the specification of the test equipment fixtures is changed to require the avoidance of condensation on devices under test and on electrical fixtures connecting the devices to the test equipment;

c) replacement of references to “virtual junction” with “die”.

The text of this International Standard is based on the following documents:

Draft	Report on voting
47/2820/FDIS	47/2827/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 60749 series, under the general title *Semiconductor devices – Mechanical and climatic test methods*, can be found in 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 5: Steady-state temperature humidity bias life test

1 Scope

This part of IEC 60749 provides a steady-state temperature and humidity bias life test to evaluate the reliability of non-hermetic packaged semiconductor devices in humid environments.

This test method is considered destructive.

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

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

4 General

Temperature, humidity and bias conditions are applied to 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.

Where both this steady-state, humidity bias test and the damp heat, highly accelerated stress test (HAST) of IEC 60749-4 are performed, the results of this 85 °C/85 % RH steady-state test will take priority over the results of the HAST test, which is an accelerated test designed to activate the same failure mechanisms.

5 Equipment

5.1 Equipment summary

The test requires a temperature-humidity test chamber capable of maintaining a specified temperature and relative humidity continuously, while providing electrical connections to the devices under test in a specified biasing configuration.