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**Polprevodniški elementi - Mehanske in klimatske preskusne metode - 39. del:  
Meritve prepuščanja vlage organskih materialov in njihove vodotopnosti za  
polprevodniške komponente (IEC 60749-39:2006)**

**(istoveten EN 60749-39:2006)**

Semiconductor devices - Mechanical and climatic test methods - Part 39:  
Measurement of moisture diffusivity and water solubility in organic materials used  
for semiconductor components (IEC 60749-39:2006)

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**Semiconductor devices -  
Mechanical and climatic test methods  
Part 39: Measurement of moisture diffusivity and water solubility  
in organic materials used for semiconductor components  
(IEC 60749-39:2006)**

Dispositifs à semiconducteurs -  
Méthodes d'essais mécaniques  
et climatiques  
Partie 39: Mesure de la diffusion  
d'humidité et de l'hydrosolubilité  
dans les matériaux organiques utilisés  
dans les composants à semiconducteurs  
(CEI 60749-39:2006)

Halbleiterbauelemente -  
Mechanische und klimatische  
Prüfverfahren  
Teil 39: Messung des  
Feuchtediffusionskoeffizienten  
und der Wasserlöslichkeit  
in organischen Werkstoffen,  
welche bei Halbleiter-Komponenten  
verwendet werden  
(IEC 60749-39:2006)

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## CENELEC

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 47/1860/FDIS, future edition 1 of IEC 60749-39, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-39 on 2006-08-01.

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) 2007-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-08-01

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## Endorsement notice

The text of the International Standard IEC 60749-39:2006 was approved by CENELEC as a European Standard without any modification.

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First edition  
2006-07

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

**Partie 39:**

**Mesure de la diffusion d'humidité et de  
l'hydrosolubilité dans les matériaux organiques  
utilisés dans les composants à semiconducteurs**

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

**Part 39:**

**Measurement of moisture diffusivity and  
water solubility in organic materials used  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –  
MECHANICAL AND CLIMATIC TEST METHODS –

**Part 39: Measurement of moisture diffusivity and water solubility in  
organic materials used for semiconductor components**

## FOREWORD

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International Standard IEC 60749-39 has been prepared by IEC technical committee 47: Semiconductor devices.

This standard cancels and replaces IEC/PAS 62307 published in 2002. This first edition constitutes a technical revision.

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

FDIS	Report on voting
47/1860/FDIS	47/1872/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 of 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 39: Measurement of moisture diffusivity and water solubility in organic materials used for semiconductor components

#### 1 Scope

This part of IEC 60749 details the procedures for the measurement of the characteristic properties of moisture diffusivity and water solubility in organic materials used in the packaging of semiconductor components.

These two material properties are important parameters for the effective reliability performance of plastic packaged semiconductors after exposure to moisture and being subjected to high-temperature solder reflow.

NOTE It is recommended that the moisture absorption parameters used in this standard be obtained from the material suppliers (such as the resin supplier).

#### 2 Apparatus

2.1 Analytical balance capable of a resolution of either 0,000 01 g or 0,001 % of sample mass.

2.2 High-temperature oven capable of maintaining uniform temperatures from 100 °C to 250 °C ± 2 °C.

2.3 Temperature/humidity chamber(s) capable of maintaining temperatures in a range from 30 °C to 85 °C and relative humidities ( $H_R$ ) in a range from 60 %  $H_R$  to 85 %  $H_R$ . Within the chamber working area, temperature tolerance shall be ±2 °C and the  $H_R$  tolerance shall be ±3 %  $H_R$ .

2.4 Perforated stainless steel trays or stainless steel wire mesh baskets used for holding samples and for placement into ovens.

2.5 Large aluminium plate or disk used for heat sink capability.

2.6 Desiccator for holding dry samples.

#### 3 Samples

Samples must be flat parallel-sided discs or coupons. The linear dimensions shall be accurately measured to within ±0,02 mm.

To approximate one-dimensional diffusion behaviour with edge effects limited to less than 5 % of the total diffusional moisture mass uptake, the free surface area in the thickness dimension must be less than 5 % of the flat-sided free surface area of the sample. For a disc of radius,  $r$ , and thickness,  $h$ , the following relation shall be met:

$$h < 0,05r \quad (1)$$