

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Dispositifs à semiconducteurs – Méthodes d'essais mécaniques et climatiques –
Partie 20: Résistance des CMS à boîtier plastique à l'effet combiné de l'humidité
et de la chaleur de brasage**



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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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**

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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.

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- withdrawn,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.

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.