INTERNATIONAL STANDARD

IEC 60748-23-2

QC165000-2

First edition
2002-05

Semiconductor devices –
Integrated circuits –

Part 23-2:
Hybrid integrated circuits and film structures –
Manufacturing line certification –
Internal visual inspection and special tests

Dispositifs à semiconducteurs –
Circuits intégrés –

Partie 23-2:
Circuits intégrés hybrides et structures par films –
Certification de la ligne de fabrication –
Contrôle visuel interne et essais spéciaux

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PRICE CODE XD

For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SEMICONDUCTOR DEVICES – INTEGRATED CIRCUITS –

Part 23-2: Hybrid integrated circuits and film structures – Manufacturing line certification – Internal visual inspection and special tests

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 60748-23-2 has been prepared by subcommittee 47A: Integrated circuits, of IEC technical committee 47: Semiconductor devices.

The text of this standard is based on the European standard EN 165000-2 and the following documents:

FDIS	Report on voting
47A/639/FDIS	47A/650/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.

IEC 60748-23-2 should be read in conjunction with Parts 23-1, 23-3 and 23-4.

The QC number that appears on the front cover of this publication is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ).

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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- withdrawn;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

INTRODUCTION

This set of specifications prescribes a set of procedures to be used by users and manufacturers for the production and delivery of high-quality, special requirement hybrid integrated circuits and film structures with a specified level of quality and reliability.

This set of specifications prescribes reference criteria for the establishment, control, maintenance and development of a certified manufacturing line and represents a manufacturing line certification methodology.

The targeted level of quality and reliability is to be achieved by using best design and manufacturing practices. Examples of quality and reliability best practices for elimination of potential failure mechanisms and achievement of a targeted quality and reliability level include: material characterization for derivation of process design rules, in-process control, continuous improvement, etc.

Assessment (estimation) of the targeted quality and reliability level may be accomplished by:

a) using data obtained from the material characterization, design and process control and improvement activities; or

b) through the use of product assessment level schedule (PALS) tests.

Part 23-1 of this set of specifications provides general information.

Part 23-3 of this set of specifications provides a framework for use as an assessment/audit tool to assist the suppliers, customers or an independent organization to carry out an assessment of a certified manufacturing line of a hybrid manufacturing company.

Part 23-4 of this set of specifications provides a blank detail specification, which provides guidance to 'users' of hybrids for procurement purposes.

Part 23-5 of this set of specifications provides a means of quality assessment on the basis of qualification approval.

SEMICONDUCTOR DEVICES – INTEGRATED CIRCUITS –

Part 23-2: Hybrid integrated circuits and film structures – Manufacturing line certification – Internal visual inspection and special tests

1 Scope

This part of IEC 60748 applies to high quality approval systems for hybrid integrated circuits and film structures.

The purpose of the tests is to perform visual inspections on the internal materials, construction and workmanship of hybrid, multichip and multichip module microcircuits and passive elements used for microelectronic applications including r.f./microwave.

These tests are for both Class H and Class K quality levels, SAW and film hybrid/multichip/ multichip module microcircuits using substrates such as ceramic and silicon. Class K is applicable to all microcircuits released to product assessment level schedule 11 (e.g. for space applications – see IEC 60748-23-1). Class H is applicable to all other microcircuits released to this standard. The following types of microcircuits may be inspected:

a) passive thin and thick film networks;

b) active thin and thick film circuits;

c) multiple circuits, including combinations, stacking or other interconnections of 1 a) and 1 b).

Where the deposited film has geometric features larger than 25 μm, the inspection criteria defined in clause 5 apply. In cases where deposited features are smaller than this (e.g. deposited integrated circuits) the inspection requirements of IEC 60747 shall be applied.

These tests will normally be used on microelectronic devices prior to capping or encapsulation to detect and eliminate devices with internal non-conformances that could lead to device failure in normal application. They may also be employed on a sampling basis to determine the effectiveness of the manufacturers' quality control and handling procedures.

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 60050 (all parts), *International Electrotechnical Vocabulary*

IEC 60747-1:1983, *Semiconductor devices – Discrete devices – Part 1: General* [1]

Amendment 3 (1996)

IEC 60748-1, *Semiconductor devices – Integrated circuits – Part 1: General* [1]

IEC 60748-23-1:2002, *Semiconductor devices – Integrated circuits – Part 23-1: Hybrid integrated circuits and film structures – Manufacturing line certification – Generic specification*

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[1] Together with any other part of IEC 60747 or IEC 60748 relevant to the specific hybrid application, including terminology.

IEC 60748-23-3:2002, *Semiconductor devices – Integrated circuits – Part 23-3: Hybrid integrated circuits and film structures – Manufacturing line certification – Manufacturers' self-audit checklist and report*

IEC 60748-23-4:2002, *Semiconductor devices – Integrated circuits – Part 23-4: Hybrid integrated circuits and film structures – Manufacturing line certification – Blank detail specification*

IEC 61191-2:1998, *Printed board assemblies – Part 2: Sectional specification – Requirements for surface mount soldered assemblies*

IEC 61340-5-1:1998, *Electrostatics – Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements*

EN 100012:1995, *Basic Specification: X-ray inspection of electronic components*