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

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CONTENTS

FOREWORD 7
INTRODUCTION 9

1 Scope 10
2 Normative references...10
3 Definitions 11
4 Apparatus 18
5 Procedure..18
5.1 General 18
5.2 Sequence of inspection...19
5.3 Inspection control 19
5.4 Re-inspection 19
5.5 Exclusions 19
5.6 Magnification 19
5.7 Format and conventions 19
5.8 Interpretations 20
6 Thin film element inspection 20
6.1 Operating metallization non-conformances – "high magnification"..........................20
6.2 Passivation non-conformances "high magnification"..26
6.3 Glassivation non-conformances, "high magnification" 27
6.4 Substrate non-conformances "high magnification" 28
6.5 Foreign material non-conformances "low magnification"..30
6.6 Thin film resistor non-conformances, "high magnification"......................................31
6.7 Laser trimmed thin film resistor non-conformances, "high magnification" 36
6.8 Multilevel thin film non-conformances, "high magnification" 45
6.9 Coupling (air) bridge non-conformances "high magnification"................................45
7 Planar thick film element inspection 47
7.1 Operating metallization non-conformances "low magnification" 47
7.2 Substrate non-conformances, "low magnification" 51
7.3 Thick film resistor non-conformances, "low magnification" 54
7.4 Trimmed thick film resistor non-conformances, "low magnification"........................56
7.5 Multilevel thick film non-conformances, "low magnification" 58
7.6 All thin film capacitors and overlay capacitors used in GaAs microwave devices, "low magnification"...59
8 Active and passive elements...59
9 Element attachment (assembly), "magnification 10× to 60×"....................................59
9.1 Solder connections (general appearance)..59
9.2 Element attachment requirements...60
9.3 Leaded and leadless element attachment 64
9.4 Dual-in-line integrated circuit attachment (butt joints) 64
9.5 Axial and radial leaded components (lap joints) 67
9.6 Components with feet (combined butt and lap joints) 68
9.7 Leadless chip carriers...70
10 Element orientation...71
11 Separation 71

currently in preview, click buy full versi

12 Bond inspection, magnification 30× to 60× 72
12.1 Ball bonds 72
12.2 Wire wedge bonds 72
12.3 Tailless bonds (crescent) 73
12.4 Compound bond 73
12.5 Beam lead 74
12.6 Mesh bonding 76
12.7 Ribbon bonds 76
12.8 General 77
13 Internal leads (e.g. wires, ribbons, beams, wire loops, ribbon loops, beams, etc.), "magnification 10× to 60×" 77
14 Screw tabs and through-hole mounting, magnification 3× to 10× 78
15 Connector and feedthrough centre contact soldering, magnification 10× to 30× 78
16 Package conditions, solder assemblies, lead frame attachments, conformal coating, "magnification 10× to 60×" 81
16.1 Package conditions 81
16.2 Lead frame attachment 81
16.3 Conformal coating 84
17 Non-planar element inspection 84
17.1 General non-planar element non-conformances, "low magnification" 84
17.2 Foreign material non-conformances "low magnification" 85
17.3 Ceramic chip capacitor non-conformances "low magnification" 85
17.4 Tantalum chip capacitor non-conformances, "low magnification" 88
17.5 Parallel plate chip capacitor non-conformances, "low magnification" 88
17.6 Inductor and transformer non-conformances, "low magnification" 89
17.7 Chip resistor non-conformances "low magnification" 90
18 Surface acoustic wave (SAW) element inspection 92
18.1 Operating metallization non-conformances "low magnification" 92
18.2 Substrate material non-conformances "low magnification" 92
18.3 Foreign material non-conformances "low magnification" 92
19 Summary 93
20 Radiographic inspection 93
20.1 Requirements 93
21 Particle impact noise detection (PIND) test 95
21.1 General 95
21.2 Equipment 95
21.3 Test procedure 96
21.4 Failure criteria 96
21.5 Lot acceptance 96
21.6 The detail specification 97

Figure 1 – Class H – Metallization scratch criteria 14
Figure 2 – Class H – Metallization scratch criterion 21
Figure 3 – Class H – Metallization width reduction at bonding pad criterion 21
Figure 4 – Class K – Metallization width pad reduction at bonding pad criterion 21
Figure 5 – Class H – Metallization void criterion 22
Figure 6 – Class H – Interdigitated capacitor metallization void criterion 23

urrently in preview, click buy full vers

Figure 7 – Class K – Interdigitated capacitor metallization void criterion....................................23
Figure 8 – Class H – Operating metallization protrusion criterion 24
Figure 9 – Class H – Interdigitated capacitor metallization protrusion criterion 24
Figure 10 – Class H – Metallization alignment criterion 25
Figure 11 – Class K – Metallization alignment criterion 25
Figure 12 – Class H – Wrap-around connection unmetallized area criterion 26
Figure 13 – Class H – Passivation non-conformance criteria 26
Figure 14 – Class H – Laser trimmed glassivation non-conformance criteria 27
Figure 15 – Class H – Separation and chipout criteria 29
Figure 16 – Class H – Crack criteria...29
Figure 17 – Class K – Semicircular crack criterion...30
Figure 18 – Class H – Film resistor width reduction at terminal by voids criterion 31
Figure 19 – Class H – Film resistor width reduction at terminal by necking criterion 32
Figure 20 – Class H – Resistor width reduction by voids and scratches criteria 32
Figure 21 – Class H – Metal/resistor overlap criterion 33
Figure 22 – Class H – Contact overlap criterion 33
Figure 23 – Class H – Resistor separation criteria...34
Figure 24 – Class H – Substrate irregularity criterion 34
Figure 25 – Class H – Resistor width increase criterion 35
Figure 26 – Class H – Protrusion of resistor material criterion 35
Figure 27 – Class H – Bridging of resistor material criteria 36
Figure 28 – Class H – Kerf width criteria 37
Figure 29 – Class H – Detritus criterion for self-passivating resistor materials........................37
Figure 30 – Class H – Resistor loop element detritus criterion for self-passivating resistor materials 38
Figure 31 – Bridging of detritus between rungs in the active area of a resistor ladder structure criterion 38
Figure 32 – Class H – Resistor ladder structure nicking and scorching criteria exceptions 39
Figure 33 – Class H – Resistor loop nicking and scorching criteria exceptions 40
Figure 34 – Class H – Laser nicking criteria exception for the last rung of a resistor ladder 40
Figure 35 – Class H – Resistor ladder sidebar trim criterion 41
Figure 36 – Class H – Laser trim misalignment criteria..41
Figure 37 – Class H – Laser trim kerf extension into metallization criteria 42
Figure 38 – Class H – Resistor width reduction at metallization interface criteria...................42
Figure 39 – Class H – Resistor width reduction by trimming criteria 43
Figure 40 – Class H – Resistor width reduction and untrimmed resistor material criteria 44
Figure 41 – Class H – Laser trim pitting criterion...44
Figure 42 – Class H – Insulating material extension criteria 45
Figure 43 – Class H and Class K – Coupling (air) bridge criteria 46
Figure 44 – Class H – Metallization scratch criteria 47
Figure 45 – Class H – Metallization width reduction at bonding pad criteria...........................48
Figure 46 – Class K – Metallization width reduction at bonding pad criteria...........................48

currently in preview, click buy full version

Figure 47 – Class H – Metallization void criteria 48
Figure 48 – Class H – Metallization protrusion criterion 50
Figure 49 – Class H – Metallization overlap criterion 50
Figure 50 – Class H – Wrap-around connection unmetallized area criterion 51
Figure 51 – Class H – Separation and chipout criteria 52
Figure 52 – Class H – Additional crack criteria 52
Figure 53 – Class K – Semicircular crack criterion 53
Figure 54 – Class H – Resistor width reduction at terminal caused by voids criterion 54
Figure 55 – Class H – Resistor width reduction at terminal by neck-down criterion 54
Figure 56 – Class H – Resistor width reduction criteria 55
Figure 57 – Class H – Resistor overlap criterion 55
Figure 58 – Class K – Resistor overlap criterion 55
Figure 59 – Resistor overlap criterion 56
Figure 60 – Class H – Kerf width criteria 57
Figure 61 – Class H – Laser trim kerf extension into metallization criteria 57
Figure 62 – Class H – Resistor width reduction and untrimmed resistor material criteria 58
Figure 63 – Class H – Dielectric extension criteria 59
Figure 64 – Solder wetting criteria 60
Figure 65 – Solder wetting contact angle 60
Figure 66 – Element attachments 61
Figure 67 – Balling of die attach material 62
Figure 68 – Adhesive irregularities and cracks 63
Figure 69 – Adhesive string criterion 63
Figure 70 – Package post criteria 64
Figure 71 – Dual-in-line package leads solder wetting 65
Figure 72 – Lead to pad registration 66
Figure 73 – Lap joint solder wetting 67
Figure 74 – Combined butt and lap joints solder wetting – Reject 68
Figure 75 – Combined butt and lap joints solder wetting – Accept 69
Figure 76 – Solder fillet coverage criteria 69
Figure 77 – Acceptable symmetrical element orientation 71
Figure 78 – Bond dimensions 72
Figure 79 – Bond dimensions 73
Figure 80 – One bond used to secure two common wires 73
Figure 81 a) – Beam lead area and location 74
Figure 81 b) – Beam lead area and location 75
Figure 82 – Acceptable/rejectable tears or voids in ribbon weld area 75
Figure 83 – Criterion for strands along the mesh 76
Figure 84 – Criterion for continuous conducting paths 76
Figure 85 – Centre contact orientations to substrate 79
Figure 86 – Centre contact overlap to substrate 79
Figure 87 a) – Void criterion 80
Figure 87 b) – Crack/adhesion criteria 80

currently in preview, click buy full version

Figure 87 c) – Excess solder criterion 80
Figure 87 d) – Insufficient solder criterion 80
Figure 87 e) – Solder criteria....80
Figure 88 – Lead frame registration....81
Figure 89 – Dual-in-line lead frame registration....82
Figure 90 – Solder bridging 82
Figure 91 – Lead frame solder fillets 83
Figure 92 – Single finger solder fillet....83
Figure 93 – Substrate to lead frame fork gap....84
Figure 94 – Class H – Metallization protrusion criterion....84
Figure 95 – Class H – Metal plate exposure criteria 86
Figure 96 – Class H – Crack criteria....86
Figure 97 – Class H – Delamination criteria....86
Figure 98 – Class H – Termination non-conformance criteria....87
Figure 99 – Class H – Metallized edge non-conformance criteria....87
Figure 100 – Class H – Metallization extension criterion....88
Figure 101 – Class H – Crack in dielectric criterion 89
Figure 102 – Class H – Resistor width reduction criterion....90
Figure 103 – Class H – Termination width criterion 90
Figure 104 – Class H – Substrate non-conformance criteria....91
Figure 105 – Class H – Termination material build-up criteria....91
Figure 106 – Class H – Termination material splatter criteria....92

Table 1 – Shaker frequencies....97

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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).

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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.

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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.

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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

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 microcircuit 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*