

Harmonized system of quality assessment for electronic components — Semiconductor devices — Integrated circuits — Sectional specification for film integrated circuits and hybrid film integrated circuits on the basis of the qualification approval procedures

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National foreword

This British Standard reproduces verbatim IEC 60748-21:1997 and implements it as the UK national standard. It supersedes BS QC 760100:1991 which is withdrawn. This standard is a harmonized specification within the IEC system of quality assessment for electronic components (IECQ).

The UK participation in its preparation was entrusted by Technical Committee EPL/47, Semiconductors, to Subcommittee EPL/47/1, Film and hybrid integrated circuits, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

The British Standard which implements the IECQ Rules of Procedure is BS 9000 *General Requirements for a system for electronic components of assessed quality — Part 3:1996 Specification for the national implementation of the IECQ system*.

From 1 January 1997, all IEC publications have the number 60000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 600027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the IEC title page, page ii, pages 1 to 16 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 August 1997

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**Dispositifs à semiconducteurs –
Circuits intégrés –**

**Partie 21:
Spécification intermédiaire pour les circuits intégrés
à couches et les circuits intégrés hybrides à couches
sur la base des procédures d'homologation**

**Semiconductor devices –
Integrated circuits –**

**Part 21:
Sectional specification for film integrated circuits
and hybrid film integrated circuits on the basis
of the qualification approval procedures**



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1 Scope and object

This sectional specification applies to film integrated circuits and hybrid film integrated circuits, manufactured as catalogue circuits or as custom-built circuits whose quality is assessed on the basis of qualification approval.

The object of this specification is to present preferred values for ratings and characteristics, to select from the generic specification the appropriate tests and measuring methods and to give general performance requirements to be used in detail specifications for film integrated circuits and hybrid film integrated circuits derived from this specification.

The concept of preferred values is directly applicable to catalogue circuits but does not necessarily apply to custom-built circuits.

Test severities and requirements prescribed in detail specifications referring to this sectional specification are of equal or higher performance level, because lower performance levels are not permitted.

Associated with this specification are one or more blank detail specifications, each referenced by an IEC number. A blank detail specification which has been completed as specified in 2.3 of this specification forms a detail specification. Such detail specifications are used for the granting of qualification approval of film integrated circuits and hybrid film integrated circuits and quality conformance inspection in accordance with the IECQ system.

NOTE For test procedures two alternatives are available: method A or method B. However, it is not permitted to change the methods between tests of method A, respectively B. In general, method A is more suitable for passive-component based film integrated circuits, whereas method B is more applicable to semiconductor integrated circuit technology based film integrated circuits.

2 General, preferred characteristics, ratings and severities for environmental tests

2.1 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60748. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60748 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60063:1963, *Preferred number series for resistors and capacitors*.

IEC 60748-20:1988, *Semiconductor devices — Integrated circuits — Part 20: Generic specification for film integrated circuits and hybrid film integrated circuits*.

IEC 60748-20-1:1994, *Semiconductor devices — Integrated circuits — Part 20: Generic specification for film integrated circuits and hybrid film integrated circuits — Section 1: Requirements for internal visual examination*.

2.2 Preferred ratings and characteristics

Preferred values of voltages and currents are given in IEC 60747-1; for resistors and capacitors, preferred values are given in IEC 60063; for custom-built circuits, any values and tolerances may be chosen.

2.3 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specifications.

Detail specifications shall not specify severities inferior to those of the generic or sectional specification. When more severe requirements are included, they shall be listed in the detail specification and indicated in the test schedules, for example by an asterisk.

NOTE The information given on dimensions, characteristics and ratings may, for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

Each detail specification shall prescribe all the tests and measurements required for lot-by-lot inspection and periodic testing. This shall, as a minimum, include the relevant tests given in this specification with methods and severities.

2.3.1 Outline drawing and dimensions

There shall be an illustration of the circuit as an aid to easy recognition and for comparison of the circuit with others. Dimensions and their associated tolerances, which affect interchange ability and mounting, shall be prescribed in the detail specifications. All dimensions shall be stated in millimetres.

Normally, numerical values shall be given for length, width and height of the body, and the termination spacing or, for cylindrical types, the body diameter and length and diameter of the terminations.

When necessary, for example when in a detail specification more than one package is covered, the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than that described above, the detail specification shall state such dimensional information so as to adequately describe the circuit.

2.3.2 Mounting

The detail specification shall prescribe the method of mounting to be applied for normal use and for the application of the vibration, and the bump or shock tests. The design of the circuit may be such that special mounting fixtures are required in its use. In this case, the detail specification shall prescribe the mounting fixtures and they shall be used in the application of the vibration, and bump or shock tests.

2.3.3 Severities for environmental tests

The detail specification shall prescribe the appropriate method of testing and the appropriate severities selected from section 4 of the generic specification.

2.3.4 Marking

The detail specification shall prescribe the content of the marking on the circuit and on the primary package. Deviations from 2.6 of the generic specification shall be specifically stated.

2.3.5 Ordering information

The detail specification shall prescribe that the following information is required when ordering circuits:

- a) circuit type (for example, hybrid thick film integrated circuit);
- b) number and issue of the detail specification with style reference and assessment level (if appropriate);
- c) function of the circuit (if appropriate);
- d) basic functional characteristics with tolerance (if appropriate).

2.3.6 Additional information (not for inspection purposes)

The detail specification may include information which is not normally required to be verified by the inspection procedure, such as circuit diagrams, curves, drawings and notes needed for clarification.

3 Qualification approval procedures

See 3.5 of the generic specification with the following details

3.1 Structural similarity

For the purpose of assessment testing, structural similarity can be used if the testing of one representative type of circuit gives at least the same quality for the rest of the types which are grouped together.

The chief inspector shall declare, to the satisfaction of the NSI, the method of operating the structural similarity plan within the manufacturing facilities and shall agree to the representative type(s) from each structurally similar group.

For the qualification approval procedure, two or more circuits can be considered structurally similar, and thus the required numbers of specimens for a test shall be selected from the combined production, when they have the same function type, use the same design rules, materials, processes and methods (for example, a range of T-cell thick-film attenuators using the same line of inks; or thin-film D/A convertors using the same film material and same added components from the same supplier).

For visual examination the only requirements are: marking, dimensions, sealing, solderability, robustness of terminations, and identical envelopes. Empty packages and/or electrical rejects may be used.