

Harmonized system of quality
assessment for electronic components

Fixed capacitors for use in electronic equipment — Sectional specification for fixed tantalum chip capacitors

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Electronic Components Standards Policy Committee (ECL/-) to Technical Committee ECL/4, upon which the following bodies were represented:

- British Telecommunications plc
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- Electronic Components Industry Federation
- Ministry of Defence
- National Supervising Inspectorate
- Society of British Aerospace Companies Limited

This British Standard, having been prepared under the direction of the Electronic Components Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 20 December 1991

© BSI 12-1999

The following BSI references relate to the work on this standard:
Committee reference ECL/4
Special announcement in *BSI News*, October 1991

ISBN 0 580 20330 1

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Section 1. General	
1.1 Scope	1
1.2 Object	1
1.3 Related documents	1
1.4 Information to be given in a detail specification	1
1.5 Terminology	2
1.6 Marking	2
Section 2. Preferred ratings and characteristics	
2.1 Preferred characteristics	3
2.2 Preferred values of ratings	3
Section 3. Quality assessment procedures	
3.1 Primary Stage of Manufacture	4
3.2 Structurally Similar Components	4
3.3 Certified Records of Released Lots	4
3.4 Qualification Approval	4
3.5 Quality Conformance Inspection	12
Section 4. Test and measurement procedures	
4.1 Preliminary drying	14
4.2 Measuring conditions	14
4.3 Mounting	14
4.4 Visual examination and check of dimensions	14
4.5 Electrical tests	14
4.6 Resistance to soldering heat	15
4.7 Solderability	15
4.8 Adhesion	16
4.9 Bond strength of the end face plating	16
4.10 Rapid change of temperature	16
4.11 Climatic sequence	16
4.12 Damp heat, steady state	16
4.13 Characteristics at high and low temperature	17
4.14 Surge	17
4.15 Endurance	17
4.16 Reverse voltage	18
4.17 Component solvent resistance	18
4.18 Solvent resistance of the marking	18
Table I — Sampling plan together with numbers of permissible defectives for qualification approval tests, Assessment level E	6
Table II — Test schedule for Qualification Approval	7
Table III A	13
Table III B	13
Publication(s) referred to	Inside back cover

National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Policy Committee. It is identical with IEC 384-3:1989 “*Fixed capacitors for use in electronic equipment. Part 3: Sectional specification: Fixed tantalum chip capacitors*” published by the International Electrotechnical Commission (IEC). IEC 384-3, also designated QC 300800, is a harmonized specification in the IECQ system for electronic components of assessed quality.

IEC 384-3 was prepared by IEC Technical Committee No. 40 “Capacitors and resistors for electronic equipment” and the United Kingdom participation in the drafting was provided by Technical Committee ECL/4 “Capacitors and resistors for electronic equipment”.

Cross-references

International Standard	Corresponding British Standard
ISO 3:1973	BS 2045:1965 <i>Preferred numbers</i> (Technically equivalent)
IEC 62:1974	BS 1852:1975 <i>Specification for marking codes for resistors and capacitors</i> (Identical)
IEC 63:1963	BS 2488:1966 <i>Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors for telecommunication equipment</i> (Technically equivalent)
IEC 68-1:1988	BS 2011 <i>Environmental testing</i> Part 1.1:1989 <i>General and guidance</i> (Identical)
IEC 384-1:1982	BS 9930 <i>Harmonized system of quality assessment for electronic components. Fixed capacitors for use in electronic equipment</i> Part 0:1983 <i>Generic specification</i> (Identical)
IEC 384-3-1:1989	BS QC 300801:1992 <i>Harmonized system of quality assessment for electronic components. Fixed capacitors for use in electronic equipment. Blank detail specification for fixed tantalum chip capacitors. Assessment level E</i> (Identical)
IEC 410:1973	BS 6001 <i>Sampling procedures for inspection by attributes</i> Part 1:1991 <i>Specification for sampling plans indexed by acceptable quality levels (AQL) for lot-by-lot inspection</i> (Technically equivalent)
QC 001002:1986	BS QC 001002:1991 <i>Rules of Procedure of the IEC Quality Assessment System for Electronic Components (IECQ)</i> (Identical)

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 3:1991 “*Specification for the national implementation of the IECQ System*”.

The Technical Committee has reviewed the provisions of QC 001001 to which reference is made in the text and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, an inside back cover 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.

Section 1. General

1.1 Scope

This standard is applicable to tantalum solid electrolyte capacitor chips. These capacitors are primarily intended to be mounted directly on to substrates for hybrid circuits or on to printed boards.

Two styles are considered: Style I, protected capacitors and Style II, unprotected capacitors.

1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC Publication 384-1 (1982), the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements prescribed in detail specifications referring to this sectional specification shall be of equal or higher performance level, because lower performance levels are not permitted.

1.3 Related documents

IEC Publications:

Publications 62 (1974):	<i>Marking Codes for Resistors and Capacitors.</i>
Publications 63 (1963):	<i>Preferred Number Series for Resistors and Capacitors.</i>
	Amendment No. 1 (1967)
	Amendment No. 2 (1977)
Publication 68:	<i>Basic Environmental Testing Procedures.</i>
Publication 384-1 (1982):	<i>Fixed Capacitors for Use in Electronic Equipment.</i>
	Amendment No. 2 (1987)
	Amendment No. 3 (1989)
Publication 384-3-1 (1989):	<i>Part 3: Blank Detail Specification.</i>
	<i>Fixed Tantalum Capacitors. Assessment Level E.</i>
Publication 410 (1973):	<i>Sampling Plans and Procedures for Inspection by Attributes.</i>
Publication QC 001001 (1986):	<i>Basic Rules of the IEC Quality Assessment System for Electronic Components (IECQ).</i>
Publication QC 001002 (1986):	<i>Rules of Procedure of the IEC Quality Assessment System for Electronic Components (IECQ).</i>

ISO Publication:

ISO Standard 3 (1973):	<i>Preferred Numbers — Series of Preferred Numbers.</i>
------------------------	---

NOTE The above references apply to the current editions except for IEC Publication 68, for which the referenced edition in the applicable test clauses of the generic specification shall be used.

1.4 Information to be given in a detail specification

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

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in Sub-clause 1.9 of the detail specification and indicated in the test schedules, for example by an asterisk.

NOTE The information given in Sub-clause 1.4.1 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.

1.4.1 Outline drawing and dimensions

There shall be an illustration of the chip capacitor as an aid to easy recognition and for comparison of the chip capacitor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions shall preferably be stated in millimetres, however when the original dimensions are given in inches, the converted metric dimensions in millimetres shall be added.

Normally the numerical values shall be given for the length, width and height of the body. When necessary, for example when a number of case sizes are covered by a detail specification, the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the chip capacitor.

1.4.2 Mounting

The detail specification shall give guidance on methods of mounting for normal use. The capacitors shall be mounted by their normal means. Mounting for test and measurement purposes (when required) shall be in accordance with Sub-clause 4.3 of this sectional specification.

1.4.3 Ratings and characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of this specification, together with the following:

1.4.3.1 Rated capacitance range

See Sub-clause 2.2.1.

NOTE When products approved to the detail specification have different ranges, the following statement should be added: "The range of values available in each voltage range is given in the qualified products list".

1.4.3.2 Particular characteristics

Additional characteristics may be listed, when they are considered necessary to specify adequately the component for design and application purposes.

1.4.3.3 Soldering

The detail specification shall prescribe the test methods, severities and requirements applicable for the solderability test and the resistance to soldering heat test.

1.4.4 Marking

The detail specification shall specify the content of the marking on the capacitor and on the package. Deviations from Sub-clause 1.6 of this sectional specification shall be specifically stated.

1.5 Terminology

In addition to the applicable terms and definitions in IEC Publication 384-1 the following definition applies:

1.5.1

chip capacitor

a capacitor whose small dimensions and nature or shape of terminations make it suitable for surface mounting in hybrid circuits and on printed boards

1.6 Marking

Sub-clause 2.4 of IEC Publication 384-1, with the following details:

1.6.1 The information given in the marking is normally selected from the following list; the relative importance of each item is indicated by its position in the list:

- a) polarity of the terminations (unless identified by the construction);
- b) rated capacitance;
- c) rated voltage (d.c voltage may be indicated by the symbol --- or ---);
- d) tolerance on rated capacitance;
- e) style (in accordance with Sub-clause 1.1);
- f) year and month (or week) of manufacture;