

# INTERNATIONAL STANDARD

**IEC**  
**60384-25**

First edition  
2006-06

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**Fixed capacitors for use in electronic equipment –**

**Part 25:**

**Sectional specification –**

**Surface mount fixed aluminium electrolytic  
capacitors with conductive polymer solid  
electrolyte**

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Reference number  
IEC 60384-25:2006(E)

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## Fixed capacitors for use in electronic equipment –

### Part 25: Sectional specification – Surface mount fixed aluminium electrolytic capacitors with conductive polymer solid electrolyte

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –****Part 25: Sectional specification – Surface mount fixed aluminium electrolytic capacitors with conductive polymer solid electrolyte**

## FOREWORD

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International Standard IEC 60384-25 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

The text of this standard is based on the following documents:

| FDIS         | Report on voting |
|--------------|------------------|
| 40/1733/FDIS | 40/1756/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.

IEC 60384 consists of the following parts, under the general title *Fixed capacitors for use in electronic equipment*:

- Part 1: Generic specification
- Part 2: Sectional specification: Fixed metallized polyethylene-terephthalate film dielectric d.c. capacitors
- Part 3: Sectional specification: Fixed tantalum chip capacitors
- Part 4: Sectional specification: Aluminium electrolytic capacitors with solid and non-solid electrolyte
- Part 5: Sectional specification: Fixed mica dielectric d.c. capacitors with a rated voltage not exceeding 3 000 V – Selection of methods of test and general requirements
- Part 6: Sectional specification: Fixed metallized polycarbonate film dielectric d.c. capacitors
- Part 7: Sectional specification: Fixed polystyrene film dielectric metal foil d.c. capacitors
- Part 8: Sectional specification: Fixed capacitors of ceramic dielectric, Class 1
- Part 9: Sectional specification: Fixed capacitors of ceramic dielectric, Class 2
- Part 11: Sectional specification: Fixed polyethylene-terephthalate film dielectric metal foil d.c. capacitors
- Part 12: Sectional specification: Fixed polycarbonate film dielectric metal foil d.c. capacitors
- Part 13: Sectional specification: Fixed polypropylene film dielectric metal foil d.c. capacitors
- Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains
- Part 15: Sectional specification: Fixed tantalum capacitors with non-solid or solid electrolyte
- Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d.c. capacitors
- Part 17: Sectional specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors
- Part 18: Sectional specification: Fixed aluminium electrolytic chip capacitors with solid and non-solid electrolyte
- Part 19: Sectional specification: Fixed metallized polyethylene-terephthalate film dielectric chip d.c. capacitors
- Part 20: Sectional specification: Fixed metallized polyphenylene sulphide film dielectric chip d.c. capacitors
- Part 21: Sectional specification: Fixed surface mount multilayer capacitors of ceramic dielectric, Class 1
- Part 22: Sectional specification: Fixed surface mount multilayer capacitors of ceramic dielectric, Class 2
- Part 23: Sectional specification: Fixed surface mount metallized polyethylene naphthalate film dielectric d.c. capacitors
- Part 24: Sectional specification: Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte
- Part 25: Sectional specification: Surface mount fixed aluminium electrolyte capacitors with conductive polymer solid electrolyte

All sectional specifications mentioned above do have one or more blank detail specifications being a supplementary document, containing requirements for style, layout and minimum content of detail specifications.

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.

A bilingual version of this publication may be issued at a later date.

The contents of the corrigendum of October 2006 have been included in this copy.

Withdawn

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## FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

### Part 25: Sectional specification – Surface mount fixed aluminium electrolytic capacitors with conductive polymer solid electrolyte

#### 1 General

##### 1.1 Scope

This part of IEC 60384 is applicable to aluminium electrolytic capacitors with conductive polymer solid electrolyte. These capacitors are primarily intended to be mounted direct on substrates for hybrid circuits or to printed boards.

Fixed aluminium electrolytic chip capacitors with solid ( $\text{MnO}_2$ ) are not included but are covered by IEC 60384-18.

##### 1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC 60384-1:1999, 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, lower performance levels are not permitted.

##### 1.3 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 60063:1963, *Preferred number series for resistors and capacitors*  
Amendment 1 (1967)  
Amendment 2 (1977)

IEC 60068-1: *Environmental testing – Part 1: General and guidance*

IEC 60068-2-58:2004, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60384-1:1999, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60410: *Sampling plans and procedures for inspection by attributes*

ISO 3:1973, *Preferred numbers – Series of preferred numbers*



## 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 1.9 of the detail specification and indicated in the test schedules, for example, by an asterisk.

NOTE The information given in 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 surface mount capacitors as an aid to easy recognition and for comparison of the surface mount capacitors 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 surface mount capacitors.

### 1.4.2 Mounting

The detail specification shall give guidance on methods of mounting for normal use. Mounting for test and measurement purposes (when required) shall be in accordance with 4.3 of this sectional specification.

### 1.4.3 Rating 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 2.2.1.

#### 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 and the resistance to soldering heat tests.

### 1.4.4 Marking

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

## 1.5 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 60384-1, as well as the following, apply.

### 1.5.1

#### **surface mount capacitor**

capacitor whose small dimensions and nature or shape of terminations make it suitable for surface mounting

## 1.6 Marking

See 2.4 of IEC 60384-1 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  $\text{---}$  or  $\text{—}$ );
- d) tolerance on rated capacitance;
- e) year and month (or week) of manufacture;
- f) manufacturer's name or trade mark;
- g) climatic category;
- h) manufacturer's type designation;
- i) reference to the detail specification.

**1.6.2** Surface mount capacitors are generally not marked on the body. If some marking can be applied, they shall be clearly marked with as many as possible of the above items as is considered useful. Any duplication of information in the marking on the capacitor should be avoided.

**1.6.3** Any marking shall be legible and not easily smeared or removed by rubbing with the finger.

**1.6.4** The package containing the capacitor(s) shall be clearly marked with all the information listed in 1.6.1, except polarity, unless this is applicable to the method of packaging.

**1.6.5** Any additional marking shall be so applied that no confusion can arise.

## 2 Preferred rating and characteristics

### 2.1 Preferred characteristics

The values given in the detail specification shall preferably be selected from the following:

#### 2.1.1 Preferred climatic categories

The surface mount capacitors covered by this specification are classified into climatic categories according to the general rules given in IEC 60068-1.

The lower and upper category temperatures and the duration of the damp-heat, steady-state test shall be chosen from the following:

|   |                    |
|---|--------------------|
| Lower category temperature:                   | –55 °C             |
| Upper category temperature:                   | +105 °C and 125 °C |
| Duration of the damp heat, steady state test: | 21 days            |

The severities for the cold and dry heat tests are the lower and upper category temperatures respectively.

## 2.2 Preferred values of ratings

### 2.2.1 Rated capacitance ( $C_R$ )

The rated capacitance shall be expressed in microfarads ( $\mu\text{F}$ ).

Preferred values of rated capacitance are the values from the E6 and E12 series of IEC 60063 and their decimal multiples ( $10^n$ ,  $n$ : integer).

### 2.2.2 Tolerance on rated capacitance

Preferred values of tolerance on rated capacitance are:  $\pm 10\%$  and  $\pm 20\%$ .

### 2.2.3 Rated voltage ( $U_R$ )

The preferred values of the rated voltage are the values of the R10 series of ISO 3: 1,0 - 1,25 - 1,6 - 2,0 - 2,5 - 3,15 - 4,0 - 5,0 - 6,3 - 8,0 and their decimal multiples ( $\times 10^n$ ,  $n$ : integer).

### 2.2.4 Surge voltage

The surge voltage shall be 1,15 times the rated voltage rounded off to the nearest volt (see Table 1).

**Table 1 – Surge voltage**

|                    |     |     |     |     |     |     |    |      |    |    |    |
|--------------------|-----|-----|-----|-----|-----|-----|----|------|----|----|----|
| Rated voltage<br>V | 2,0 | 2,5 | 4,0 | 5,0 | 6,3 | 8,0 | 10 | 12,5 | 16 | 20 | 25 |
| Surge voltage<br>V | 2,3 | 2,9 | 4,6 | 5,8 | 7,2 | 9,2 | 12 | 14   | 18 | 23 | 29 |

### 2.2.5 Rated temperature

The value of the rated temperature is +105 °C and +125 °C.

## 3 Quality assessment procedures

### 3.1 Primary stage of manufacture

The primary stage of manufacture is the capacitor manufacturer's evaluation of the formed anode foil.

### 3.2 Structurally similar components

Capacitors considered as being structurally similar are capacitors produced with similar processes and materials, though they may be of different case sizes and values.