IEC 60384-24-1

Edition 1.0 2006-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fixed capacitors for use in electronic equipment – Part 24-1: Blank detail specification – Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte – Assessment level EZ

Condensateurs fixes utilisés dans les équipements électroniques – Partie 24-1: Spécification particulière cadre – Condensateurs fixes électrolytiques au tantale pour montage en surface à électrolyte solide en polymère conducteur – Niveau d'assurance EZ

IEC 60384-24-1:2006

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 24-1: Blank detail specification – Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte – Assessment level EZ

FOREWORD

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International Standard IEC 60384-24-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This bilingual version (2013-05) corresponds to the monolingual English version, published in 2006-06.

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

FDIS	Report on voting
40/1732/FDIS	40/1755/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.

The French version of this standard has not been voted upon.

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 delectric 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.

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 24-1: Blank detail specification – Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte – Assessment level EZ

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style and layout and minimum content of detail specifications. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specifications nor shall they so be described.

In the preparation of detail specifications the content of 1.4 of the sectional specification shall be taken into account.

The numbers between square brackets on the first page of the detail specification correspond to the following information, which shall be inserted in the position indicated.

Identification of the detail specification

[1] The “International Electrotechnical Commission” or the National Standards Organization under whose authority the detail specification is drafted.

[2] The IEC or National Standards number of the detail specification, date of issue and any further information required by the national system.

[3] The number and issue number of the IEC or national generic specification.

[4] The IEC number of the blank detail specification.

Identification of the capacitor

[5] A short description of the type of capacitor.

[6] Information on typical construction (when applicable).

[7] Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the national or international documents for outlines. Alternatively, this drawing may be given in an annex to the detail specification.

[8] Application or group of applications covered and/or assessment level.

[9] Reference data on the most important properties, to allow comparison between the various capacitor types.

[1]	[2]
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH : [3]	IEC 60384-24-1 [4]
	Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte [5]
Outline drawing : (see Table 1) [7] (…angle projection)	[6]
	Assessment level(s): EZ [8]

Information on the availability of components qualified to this detail specification is given in IEC QC 001005.

(9)

1 General data

1.1 Recommended method(s) of mounting (to be inserted)

(See 1.4.2 of IEC 60384-24).

1.2 Dimensions

Table 1 – Case size reference and dimensions

Case size reference	**Dimension** mm						
	L	***W***	***H***				

NOTE 1 When there is no case size reference, Table 1 may be omitted and the dimensions should be given in Table 2, which then becomes Table 1.

NOTE 2 The dimensions should be given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Rated capacitance range (see Table 2)
Tolerance on rated capacitance
Rated voltage (see Table 2)
Category voltage (see Table 2)
Climatic category
Rated temperature
Variation of capacitance with temperature (see Table 3)
Tangent of loss angle (see Table 3)
Leakage current (see Table 3)
Equivalent series resistance (see Table 3)
Surge voltage (see Table 2)

Table 2 – Values of capacitance and of voltage related to case sizes

Rated voltage V					
Category voltage V					
Surge voltage V	**Rated temperature**				
	Upper category temperature				
		Case sizes	**Case sizes**	**Case sizes**	**Case sizes**
Rated capacitance µF					

Table 3 – Characteristics

Case size	U_R V	C_R µF	**Capacitance change %**			**Maximum values**							
						Tangent of loss angle tan δ at 120 Hz				**Leakage current** µA			**Equivalent series resistance at 100 kHz** mΩ
			-55 °C	**Rated temperature**	**Upper category temperature**	**-55 °C**	**20 °C**	**Rated temperature**	**Upper category temperature**	**20 °C**	**Rated temperature**	**Upper category temperature**	**20 °C**

1.4 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 60384-1:1999, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60384-24:2006, *Fixed capacitors for use in electronic equipment – Part 24: Sectional specification – Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte*

1.5 Marking

The marking of the capacitor and the package shall be in accordance with the requirements of 1.6 of IEC 60384-24.

NOTE The details of the marking of the component and package should be given in full in the detail specification.

1.6 Ordering information

Orders for capacitors covered by this specification shall contain, in clear or in coded form, the following minimum information:

a) rated capacitance;

b) tolerance on rated capacitance;

c) rated d.c. voltage;

d) number and issue reference of the detail specification and style reference;

e) packaging instructions.

1.7 Certified records of released lots

Required/not required.

1.8 **Additional information** (not for inspection purposes)

1.9 Additional or increased severities or requirements to those specified in the generic and/or sectional specification

NOTE Additions or increased requirements should be specified only when essential.

Table 4 – Other characteristics

This table is to be used for defining characteristics which are additional to, or more severe than, those given in the sectional specification.

2 Inspection requirements

2.1 Procedures

2.1.1 For qualification approval, the procedures shall be in accordance with 3.4 of IEC 60384-24.

2.1.2 For quality conformance inspection, the test schedule (Table 5) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of IEC 60384-24.

Table 5 – Test schedule for quality conformance inspection

Subclause number and test[a]	D or ND[b]	Conditions of test[a]	Number of specimens and number of non-conforming items[b]			Performance requirements[a]
			IL	*n*	*c*	
Group A inspection (lot-by-lot)						
Subgroup A0	ND		100 %[c]			
4.18 High surge current (if applicable)						
4.5.1 Leakage current		Protective resistor: 1 000 Ω				As in Table 3
4.5.2 Capacitance		Frequency: 120 Hz				Within specified tolerance
4.5.3 Tangent of loss angle (tan δ)		Frequency: 120 Hz				As in Table 3
4.5.4 Equivalent series resistance (ESR) (if applicable)		Frequency: 100 kHz				As in Table 3
Subgroup A1	ND		S-3	[d]	0	
4.4 Visual examination						As in 4.4.2 Legible marking (if required) and as specified in the detail specification
Subgroup A2	ND		S-3	[d]	0	
4.4 Dimension (detail)[e]						As specified in Table 1 of this specification
Group B inspection (lot-by-lot)			S-3	[d]	0	
4.7 Solderability	D					
4.7.1 Test		See detail specification for the method				
4.7.2 Final measurement		Visual examination				As in 4.7.2

Table 5 *(continued)*

Subclause number and test[a]	D or ND[b]	Conditions of test[a]	Number of specimens and number of non-conforming items[b]			Performance requirements[a]
			p	*n*	*c*	
Group C inspection (Periodic)						
Subgroup C1	D		3	12	0 [f]	
4.6 Resistance to soldering heat						
4.6.1 Initial measurement		Capacitance				For use as reference value
4.6.2 Test		Method: ...				
		Deflection: ...s				
		Reflow profile: ...				
		Recovery: 24 h ± 2 h				
4.6.3 Final measurement		Visual examination				As in 4.6.3
		Leakage current				As in Table 3
		Capacitance				See detail specification
		Tangent of loss angle (tan δ)				As in Table 3
		Equivalent series resistance (ESR)				See detail specification
Sub group C2	D		3	12	0 [f]	
4.9 Substrate bending test						
4.9.1 Initial measurement		Capacitance				For use as reference value
4.9.3 Final inspection		Capacitance (with printed board in bent position)				See detail specification
Sub group C3						
4.3 Mounting	D	Substrate material: ...	[g]			
4.3.1 Initial measurement		Capacitance (the value obtained in 4.5.2 may be used)				
4.3.3 Final inspection		Visual examination				No visible damage
		Leakage current				As in Table 3
		Capacitance				$\Delta C/C \leq 8$ %
		Tangent of loss angle (tan δ)				As in Table 3
		Equivalent series resistance (ESR)				See detail specification