

INTERNATIONAL STANDARD

NORME INTERNATIONALE

QC 300801

**Fixed capacitors for use in electronic equipment –
Part 3-1: Blank detail specification: Surface mount fixed tantalum electrolytic
capacitors with manganese dioxide solid electrolyte – Assessment level EZ**

**Condensateurs fixes utilisés dans les équipements électroniques –
Partie 3-1: Spécification particulière cadre: Condensateurs fixes électrolytiques
au tantale pour montage en surface, à électrolyte solide au dioxyde de
manganèse – Niveau d'assurance EZ**



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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Email: csc@iec.ch

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

**Part 3-1: Blank detail specification:
Surface mount fixed tantalum electrolytic capacitors
with manganese dioxide solid electrolyte –
Assessment level EZ**

FOREWORD

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International Standard IEC 60384-3-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This second edition cancels and replaces the first edition published in 1989 and constitutes a minor revision related to tables, figures and references.

This bilingual version, published in 2008-06, corresponds to the English version.

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

FDIS	Report on voting
40/1772/FDIS	40/1790/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.

The QC numbers that appear on the front cover of this publication are the specification numbers in the IEC Quality Assessment System for Electronic Components (IECQ).

A list of all the parts of the IEC 60384 series, under the general title *Fixed capacitors for use in electronic equipment*, can be found on the IEC website.

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
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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 3: Blank detail specification: Surface mount fixed tantalum electrolytic capacitors with manganese dioxide solid electrolyte – Assessment level EZ

INTRODUCTION

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style, 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” (IEC) 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).

NOTE When the capacitor is not designed for use in printed circuit board applications, this is clearly stated in the detail specification in this position.

- [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]	IEC 60384-3-1-XXX QC 300801-XXX	[2]
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH: IEC 60384-1 IEC 60384-3	IEC 60384-3-1 QC 300801	[4]
	SURFACE MOUNT FIXED TANTALUM ELECTROLYTIC CAPACITORS WITH MANGANESE DIOXIDE SOLID ELECTROLYTE	[5]
OUTLINE DRAWING: (see Table 1) (first angle projection)		[6]
	ASSESSMENT LEVEL(S): EZ	[8]
[7] (Other shapes are permitted within the dimensions given.)		
NOTE For [1] to [9]: see previous page. IEC 60384-3-1:2006		

<https://standards.iteh.ai/catalog/standards/sist/ea807b87-06e4-4861-8a28-8b024ffe76b5/iec-60384-3-1-2006> [9]

Information on the availability of components qualified to this detail specification is given in the Qualified Products List.

1 General data

1.1 Recommended method of mounting (to be inserted)

The capacitors are mounted by their terminations (see 1.3.2 and 4.3 of IEC 60384-3).

1.2 Dimensions

Table 1 – Case-size reference and dimensions

Case-size reference	Dimensions					
	mm or inches and mm					
	\varnothing	l	h	d	...	

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

The dimensions shall be given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Capacitance range	(see Table 2)
Tolerance on rated capacitance	
Rated voltage	(see Table 2)
Category voltage (if applicable)	(see Table 2)
Climatic category	
Rated temperature	
Variation of capacitance with temperature	(see Table 3)
Tangent of loss angle	
Leakage current	(see Table 3)
Impedance (if applicable)	(see Table 4)
Equivalent series resistance (ESR) (if required)	(see Table 5)
Surge voltage	

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

Rated voltage				
Category voltage^a				
	Case size	Case size	Case size	Case size
Rated capacitance (in µF)				
^a If different from the rated voltage.				

Table 3 – Characteristics at high and low temperature

U_R V	C_R μF	Capacitance change %			Maximum values						
					Tangent of loss angle %				Leakage current μA		
		T_A	T_R	T_B	T_A	20 °C	T_R	T_B	20 °C	T_R	T_B^a

T_A is the lower category temperature.
 T_B is the upper category temperature.
 T_R is the rated temperature.
^a Measured with the category voltage.

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Table 4 – Impedance at 100 kHz (if required)

IEC 60384-3-1:2006

<https://standards.iteh.ai/catalog/standards/sist/ea807b87-06e4-4861-8a28-8b024ff76b5/iec-60384-3-1-2006>

Case size	Impedance Ω

Table 5 – Equivalent series resistance (ESR) at 100 kHz (if required)

Rated voltage U_R V			
Rated capacitance μF	Maximum ESR m Ω		

1.4 Normative references

IEC 60286-3, *Packaging of components for automatic handling – Part 3: Packaging of surface mount components on continuous tapes* (only available in English)

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

IEC 60384-3:2007, *Fixed capacitors for use in electronic equipment – Part 3: Sectional specification: Surface mount fixed tantalum electrolytic capacitors with manganese dioxide solid electrolyte*

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

1.5 Marking

The marking of the capacitor (if applied) and the package shall be in accordance with the requirements of IEC 60384-3, 1.6.

The details of the marking of the component and package shall 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) packing (bulk or taped; if taped, according to IEC 60286-3).

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 6 – Other characteristics

<p>This table is to be used for defining characteristics which are additional to, or more severe than, those given in the sectional specification.</p>
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2 Inspection requirements

2.1 Procedures

2.1.1 For qualification approval, the procedures shall be in accordance with 3.4 of IEC 60384-3.

2.1.2 For quality conformance inspection, the test schedule (Table 7) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of IEC 60384-3.

Table 7 – Test schedule for conformance (lot-by-lot) inspection (Groups A and B) – Assessment level EZ

Subclause number and test ^a	D or ND	Conditions of test ^a	Number of specimens and number of non-conforming items ^b			Performance requirements ^a	
			IL	n ^d	c		
Group A inspection (lot-by-lot) Subgroup A0 4.21 High surge current (if required by the detail specification) 4.5.1 Leakage current 4.5.2 Capacitance 4.5.3 Tangent of loss angle (tan δ) 4.5.4 Impedance ^e 4.5.5 Equivalent series resistance (ESR) ^e	ND	Protective resistance: 1 000 Ω Frequency: ... Hz Bias: V Frequency: Hz Bias: V Frequency: 100 kHz Frequency: 100 kHz	100 %			0,02 C _R U _R μA/μF × V or 1 μA, whichever is the greater. See Table 3 for details Within specified tolerance Class 1 ≤ 0,08 Class 2 ≤ 0,12 Class 3 ≤ 0,24 See Table 3 for details As in Table 4 As in Table 5	
Subgroup A1 4.4 Visual examination 4.4 Dimension (detail)	ND	IEC 60384-3-1:2006 https://standards.iteh.ai/catalog/standards/sist/ea807b87-06e4-4861-8a28-8b024ffe76b5/iec-60384-3-1-2006			S-3	0	As in 4.4.2 Marking legible and as specified in 4.5 of this specification See Table 1 of this specification
Group B inspection (lot-by-lot) 4.7 Solderability ^d 4.7.2 Final measurement	D	Method:.... Temperature and duration:.. or Temperature profile:... Visual examination	S-3	^d	0	As in 4.7.2	
4.18 Solvent resistance of the marking (if applicable)		Solvent: ... Solvent temperature: ... Method 1 Rubbing material: cotton wool Recovery time: ...				Legible marking	
The explanation of footnotes to tables is given at the end of Table 7.							

Table 7 (continued)

Subclause number and test ^a	D or ND	Conditions of test ^a	Sample size and criterion of acceptability ^b			Performance requirements ^a
			<i>p</i>	<i>n</i>	<i>c</i>	
GROUP C INSPECTION (inspection)						
Subgroup C1	D		3	12	0	
4.6.1 Initial measurements		Capacitance Tangent of loss angle				
4.6 Resistance to soldering heat		Attitude: ... ^d				
4.6.3 Final measurements		Capacitance Tangent of loss angle (tan δ)				$ \Delta C/C \leq \dots\%d$ ^d
4.17 Component solvent resistance ^c (if applicable)		Solvent: ... ^d Solvent temperature: ... ^d Method: 2 Recovery: ... ^d Visual examination				To be specified in the detail specification As in 4.6.3
Subgroup C2	D		3	12	0	
4.9 Substrate bending test ^e		Capacitance (with printed board in bent position) Deflection: ...mm ^d Number of bends: ... ^d				$ \Delta C/C \leq \dots\%d$
4.9.6 Final measurement		Visual examination				No visible damage
Subgroup C3	D					
4.3 Mounting		Visual examination Leakage current Capacitance Tangent of loss angle (tan δ) Impedance ^c or Equivalent series resistance (ESR) ^c				No visible damage $\leq 0,02 C_R \times U_R \mu A/\mu F \times V$ or $\leq 1 \mu A$, whichever is the greater To be specified in the detail specification To be specified in the detail specification As in Table 4 As in Table 5