

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Piezoelectric devices – Preparation of outline drawings of surface-mounted devices (SMD) for frequency control and selection – General rules

Dispositifs piézoélectriques – Préparation des dessins d'encombrement des dispositifs pour montage en surface pour la commande et le choix de la fréquence – Règles générales



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PIEZOELECTRIC DEVICES – PREPARATION OF OUTLINE
DRAWINGS OF SURFACE-MOUNTED DEVICES (SMD) FOR
FREQUENCY CONTROL AND SELECTION – GENERAL RULES**

FOREWORD

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International Standard IEC 61240 has been prepared by IEC technical committee 49: Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection.

This bilingual version (2017-12) corresponds to the monolingual English version, published in 2016-10.

This third edition cancels and replaces the second edition published in 2012. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- outline drawings have been changed from three views (top, front and bottom) to that based on ISO layout in the third-angle projection, in which the view from the right has been added to the top, front and bottom views;
- reference line and geometrical dimensions of the package for enclosures have been changed for practical use;

- information on miniaturized leadless ceramic enclosures of piezoelectric devices (SMD) for frequency control and selection has been included in an annex.

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

CDV	Report on voting
49/1172/CDV	49/1188/RVC

Full information on the voting for the approval of this International 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 document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- replaced by a revised edition, or
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INTRODUCTION

The enclosures of quartz crystal resonators and oscillators are unified in this third edition of IEC 61240.

Regarding the current situation of many quartz crystal device suppliers, many of them use their own enclosure layouts in their catalogues. For the convenience of consumers, general rules of enclosure layout and definition of size need to be unified.

The reasons prompting the revision of IEC 61240:2012 are as follows:

- a) The height of packages should not be included in a drawing. Only the total height of enclosures should be expressed.
- b) In small enclosure types, the size tolerance in smaller enclosures will not meet the conditions defined in Table A.3 (Annex A).

In newly proposed general rules of outline drawings, only the total height of enclosures should be expressed and the size tolerance in smaller enclosures is revised.

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PIEZOELECTRIC DEVICES – PREPARATION OF OUTLINE DRAWINGS OF SURFACE-MOUNTED DEVICES (SMD) FOR FREQUENCY CONTROL AND SELECTION – GENERAL RULES

1 Scope

This International Standard sets out general rules for drawing all dimensional and geometrical characteristics of a surface-mounted piezoelectric device package (referred to in this document as SMD) in order to ensure mechanical inter-changeability of all outline drawings of the SMDs for frequency control and selection.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60191-6, *Mechanical standardization of semiconductor devices – Part 6: General rules for the preparation of outline drawings of surface mounted semiconductor device packages*

3 Classification of SMD

The SMD piezoelectric devices are classified into three types of packages depending on the structure of the terminal leads.

a) Leaded type: the folded ends of the terminal leads are turned away from the body.

NOTE 1 The package of the pin lead type is compatible with the socket. This is defined in the description of the leaded type.

b) Folded-leads type: the folded ends of the terminal lead are turned towards the body.

NOTE 2 The supporter with a board is defined in the description of this folded lead type.

c) Leadless type: terminal pads only are present on the body instead of terminal leads.

A proper combination of these options should be selected.

4 Title of the outline drawing

The title of the outline drawing shall imply the main package material (e.g. metal, plastic, glass, ceramic), the sealing procedure, number of terminals and the type of SMD, as shown in Examples 1, 2 and 3¹.

5 Composition of the outline drawing

5.1 Elements of outline drawings

The outline drawing of an SMD shall be composed of five elements: the drawings from four views in the third-angle projection, the table of detailed dimensions, the actual size sketch, the

¹ Examples 1, 2 and 3 refer to the sheets provided after Clause 9 of this document.

drawing of terminal land areas and the terminal lead details. These sample formats are shown in Examples 1, 2, and 3.

5.2 Outline drawing

The outline drawing with dimensional symbols shall be executed in the third-angle projection. Basically, one set of outline drawings consists of the view from above, the front view, the view from the right, and the view from below. In square type enclosure and cylindrical type enclosure, the view from the right can be omitted.

5.3 Table of detailed dimensions

The dimensions shall be given in millimetres and are required only where the letter X is shown in the table.

5.4 Actual size sketch

The actual size sketch means a drawing of the view from above with the real size outer dimensions.

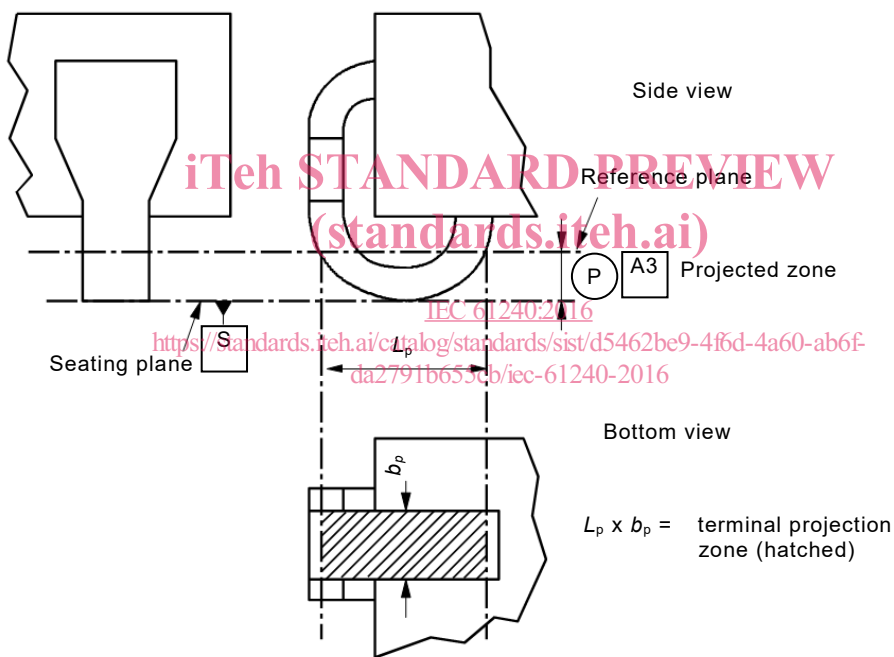
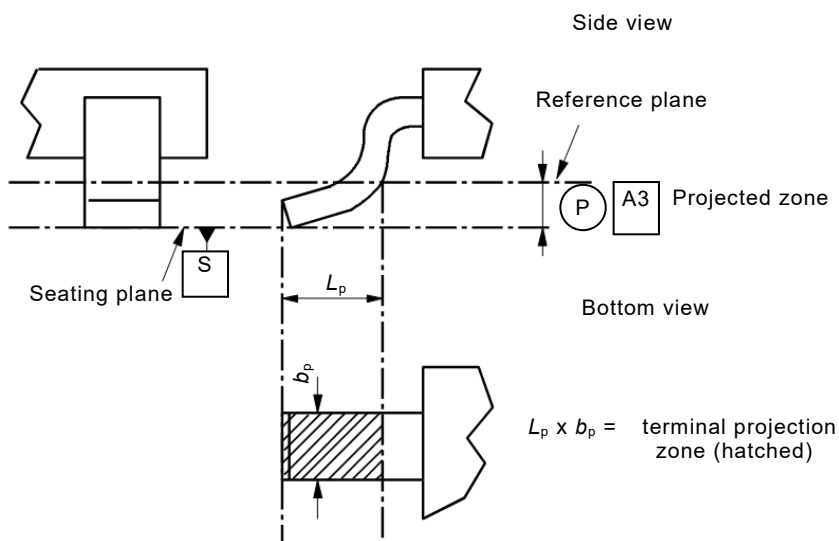
5.5 Drawing of terminal land areas

The drawing of terminal land areas which is defined in Clause 7 shall be adapted to the connecting terminal leads on the printed circuit boards, alumina substrates, etc.

5.6 Terminal lead details

The terminal lead details shall be shown in accordance with IEC 60191-6 (see Figure 1).

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Key for figure 1 and examples 1 to 3

(P) = projected tolerance zone (see ISO 1101, clause 11)

(A3) = reference plane distance

(*) means the true geometrical position

IEC

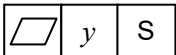
Figure 1 – Illustration of terminal projection zone

6 Requirements for terminal leads

6.1 The dimensions of terminal lead spacing shall be shown by the centre position of the terminal leads and its basic value e is $2,54 \times n$ mm (n is an integer) and $1,27 \times n$ mm for package dimensions smaller than 6 mm.

6.2 In the view from above of SMD, the lower lead from the left end shall be designated as terminal lead number 1. The subsequent lead numbers shall be designated as 2 to n , with the terminals following counter-clockwise.

6.3 The number 1 terminal lead shall be indicated by a corner notch or by a dotted expression on the top side. If there is a requirement to indicate the number 1 terminal on bottom side, the land area of the number 1 terminal can be designed in different size from others.

6.4  means in this drawing that the distance from the seating plane to the nearest point of each terminal shall not exceed y mm.

7 Requirements for the terminal land area²

7.1 The positioning of land areas shall be adapted to the positions of the terminal leads.

The dimensions of the terminal land areas shall be specified with respect to the central line of the contacts of the SMD device.

7.2 The dimensions of terminal land areas shall be indicated as the maximum area which shall be added to the projection zone of the terminals for the parts to be connected to a printed circuit board and to its positional tolerances.

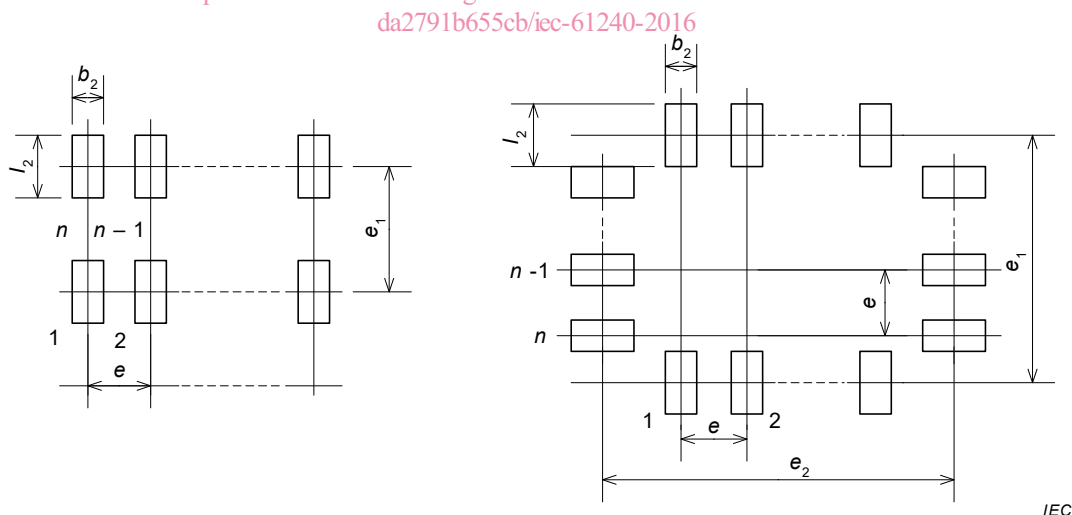


Figure 2 – Example of a terminal land area

8 Connections of terminal leads

The functions of the connections of terminal leads should not be defined on the outline drawing, but if necessary they may be indicated as shown in Annex B.

² See Figure 2.

9 Descriptive notes

Descriptive notes may be used at the bottom of, or adjacent to the outline drawing if necessary.

Outline drawing

Ref.	Dimensions (mm)			Notes
	Min.	Nom.	Max.	
A	-	-	x	
B	-	-	x	
G	-	-	x	
K ₁	x	-	x	
K ₂	x	-	x	
F	x	-	x	
L _B	x	-	x	
e	-	x	-	
e ₁	-	x	-	
b ₂	-	-	x	
l ₂	-	-	x	
Y	-	-	x	
A3	-	x (*)	-	
b _p	x	-	x	
L _p	x	-	x	
θ	x	-	x	Deg.

Example 1

Actual size

Seating plane

Terminal land areas

Example 1a

IEC 61240:2016

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See example 1a

Scale 3: 1

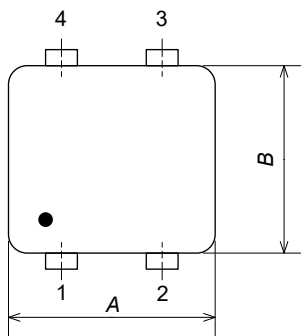
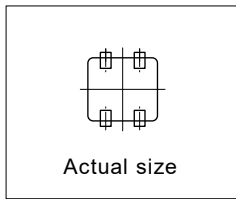
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Glass or ceramic, solder-glass sealed four-leaded SMD outline, type- (example 1)

Sheet - number

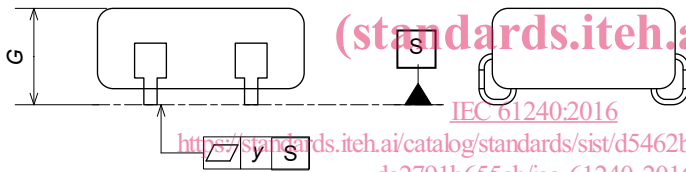
Outline drawing

Example 2

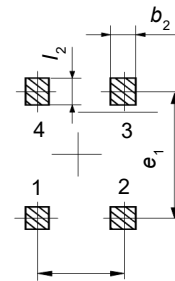
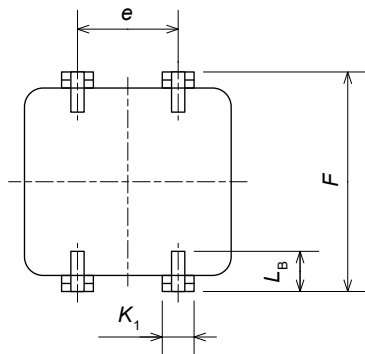


Ref.	Dimensions (mm)			Notes
	Min.	Nom.	Max.	
A	-	-	x	
B	-	-	x	
G	-	-	x	
K ₁	x	-	x	
K ₂	x	-	x	
F	x	-	x	
L _B	x	-	x	
e	-	x	-	
e ₁	-	x	-	
b ₂	-	-	x	
l ₂	-	-	x	
Y	-	-	x	
A3	-	x (*)	-	
b _p	x	-	x	
L _p	x	-	x	

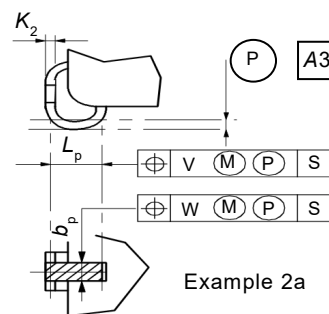
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See example 2a



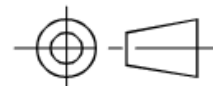
Terminal land areas



IEC

Glass or ceramic, solder-glass sealed four-folded lead SMD outline, type- (example 2)

Scale 3: 1



Sheet - number