

# 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 à 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**

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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 second edition cancels and replaces the first edition published in 1994. 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:

FDIS	Report on voting
49/995/FDIS	49/1000/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.

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## INTRODUCTION

The enclosures of quartz crystal resonators and oscillators are unified in this second edition of IEC 61240 “Preparation of outline drawings of surface-mounted devices (SMD) for frequency control and selection – General rules”.

Regarding the current situation of many quartz crystal device suppliers, many suppliers 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.

In the previous edition of IEC 61240, layout rules of outline drawings of SMD devices were based on IEC 60191-6 and applied to semi-conductive devices. However, there are several specific rules for quartz devices. In this edition, the general rules for outline drawings of SMD enclosures for quartz crystal devices are included, taking account of the ISO layout rules (ISO 1101, ISO 5456-2, and ISO 128-30).

The newly proposed general rules of outline drawings for three types of surface-mounted devices are shown in sheets included as examples. The difference from the previous version of outline drawings is that one set of drawings consists of four views, which are the view from above, the front view, the view from the right, and the view from below.

Furthermore, the definition of the drawings has been changed. Firstly, ceramic enclosure is specifically defined. Secondly, the reference line of the package is defined as shown in the sheets. Thirdly, geometrical dimensions of the package have been further simplified compared to the previous edition. These corrections are shown in Annexes A and B of this standard.

Detailed information concerning the new outline drawings will be provided in a future publication.

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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 standard 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60191-6:2009 *Mechanical standardization of semiconductor devices – Part 6: General rules for the preparation of outline drawings of surface mounted semiconductor device packages*

ISO 1101:2004, *Geometrical Product Specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

ISO 5456-2:1996, *Technical drawings – Projection methods – Part 2: Orthographic representations*

ISO 128-30:2001, *Technical drawings – General principles of presentation – Part 30: Basic conventions for views*

#### 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 3<sup>1</sup>.

## 5 Composition of the outline drawing

### 5.1 Elements of outline drawings

The outline drawing of an SMD shall be composed of five elements which are drawings from four views in the third-angle projection, table of detailed dimensions, actual size sketch, drawing of terminal land areas and 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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<sup>1</sup> Examples 1, 2 and 3 refer to the sheets provided after Clause 10 of this standard.

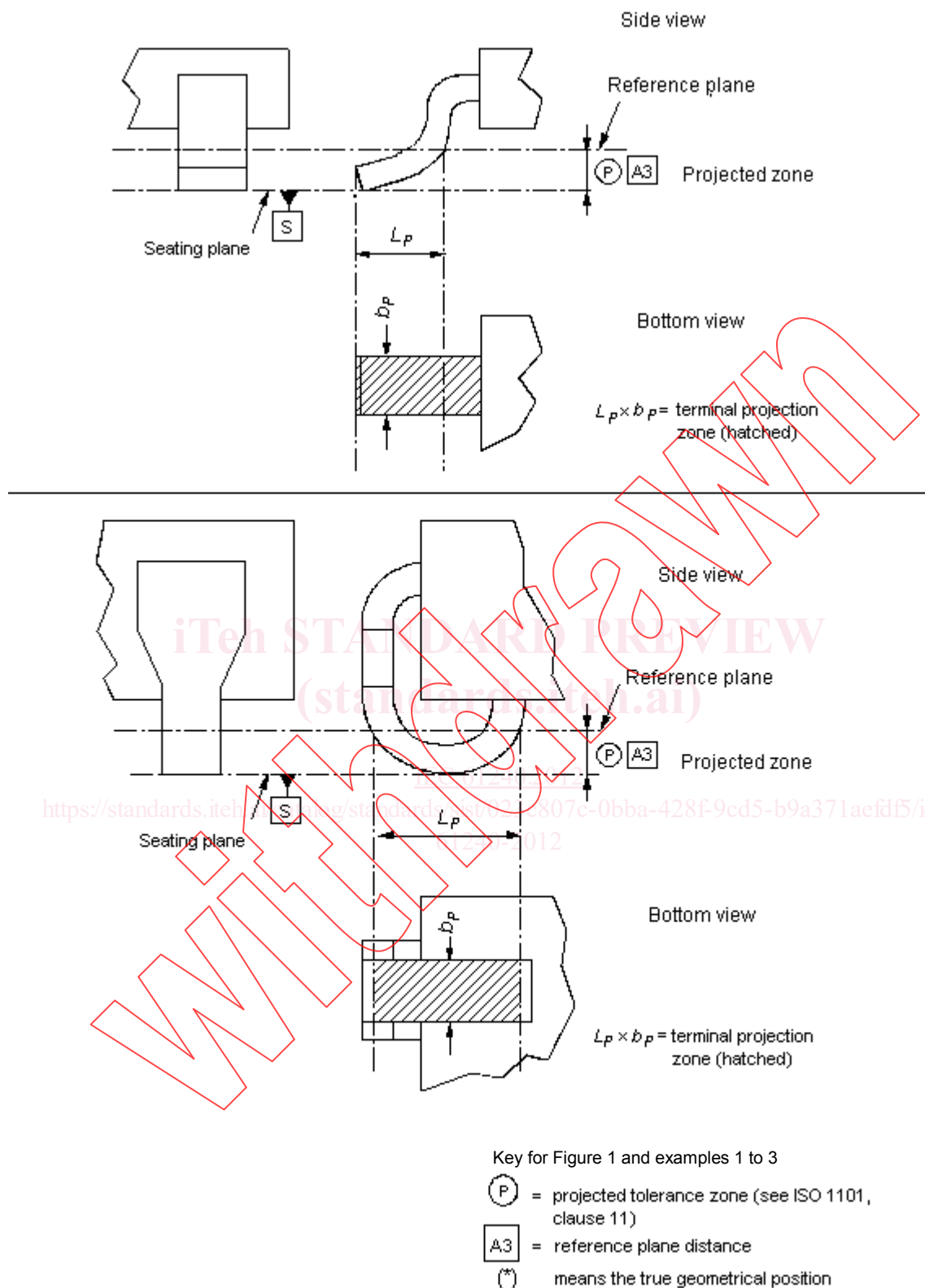


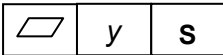
Figure 1 – Illustration of terminal projection zone

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

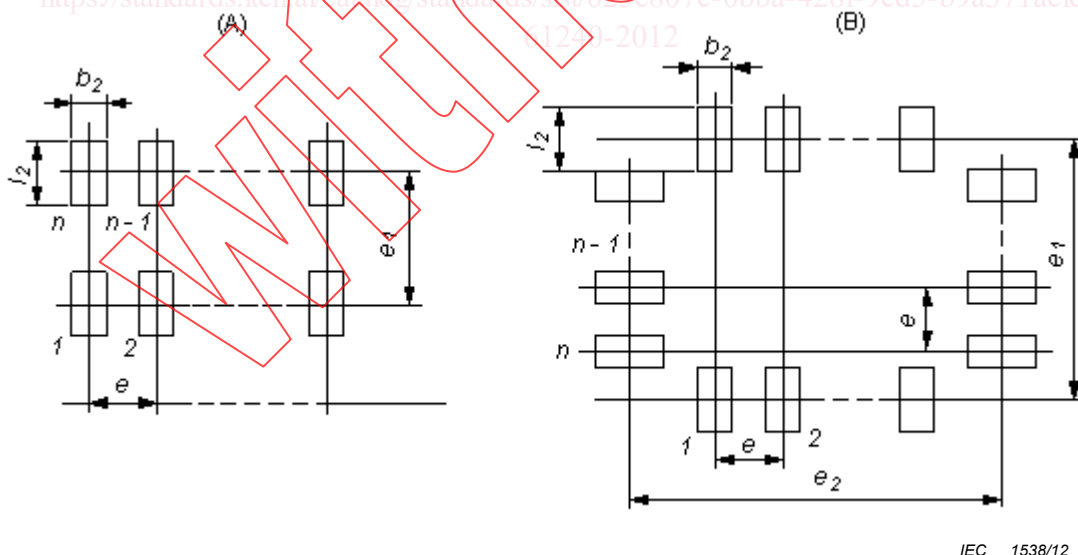
**6.4**  means in this drawing that the distance from the seating plane to the nearest point of each terminal shall not exceed  $y$  mm.

## 7 Requirements for the terminal land area<sup>2</sup>

**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.



IEC 1538/12

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.

<sup>2</sup> See Figure 2.

## 9 Descriptive notes

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

## 10 References

The references to IEC 60191-6, ISO 1101, ISO 5456-2, and ISO 128-30 shall be given.

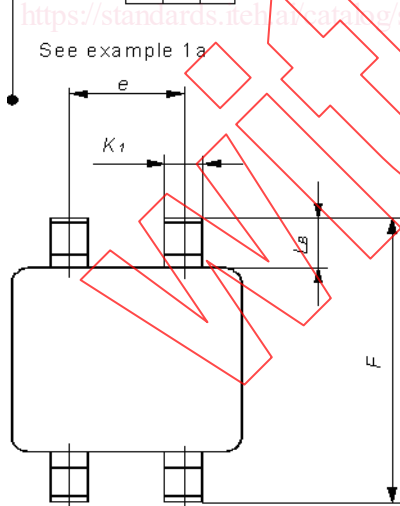
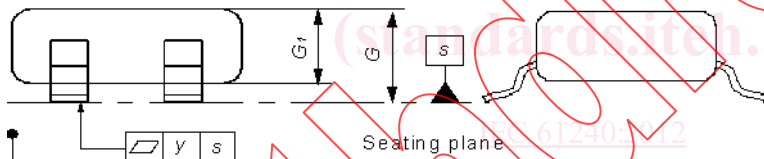
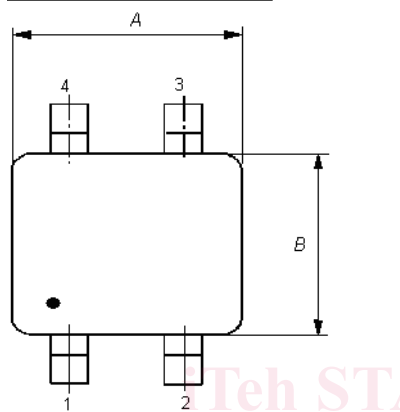
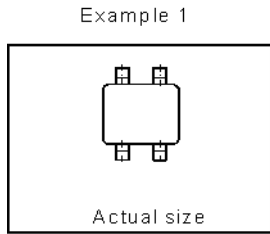


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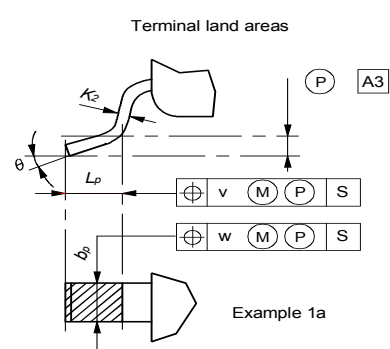
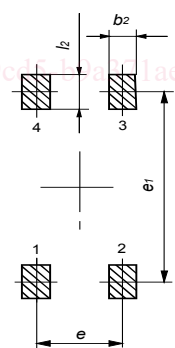
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<https://standards.iteh.ai/catalog/standards/sist/623c807c-0bba-428f-9cd5-b9a371aefd5/iec-61240-2012>

Outline drawing



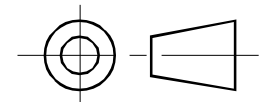
Ref.	Dimensions (mm)			Notes
	Min.	Nom.	Max.	
A	-	-	x	
B	-	-	x	
G	-	-	x	
G1	-	-	x	
K1	x	-	x	
K2	x	-	x	
F	x	-	x	
LB	x	-	x	
e	-	x	-	
e1	-	x	-	
b2	-	-	x	
l2	-	-	x	
y	-	-	x	
A3	-	x (*)	-	
bp	x	-	x	
Lp	x	-	x	
e	x	-	x	Deg.



IEC 1539/12

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

Scale 3: 1



Sheet - number