

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Mechanical standardization of semiconductor devices –
Part 6-3: General rules for the preparation of outline drawings of surface
mounted semiconductor device packages – Measuring methods for package
dimensions of quad flat packs (QFP)**

[IEC 60191-6-3:2000](https://standards.iteh.ai/catalog/standards/sist/9cea39da-4c62-4393-9f78-3b1010000000/iec-60191-6-3-2000)

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**Normalisation mécanique des dispositifs à semiconducteurs –
Partie 6-3: Règles générales pour la préparation des dessins d'encombrement
des dispositifs à semiconducteurs à montage en surface – Méthodes de mesure
pour les boîtiers plats quadrangulaires (QFP)**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES –

**Part 6-3: General rules for the preparation of outline drawings
of surface mounted semiconductor device packages –
Measuring methods for package dimensions of quad flat packs (QFP)**

FOREWORD

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International Standard IEC 60191-6-3 has been prepared by subcommittee 47D: Mechanical standardization of semiconductor devices, of IEC technical committee 47: Semiconductor devices.

This bilingual version (2013-01) corresponds to the monolingual English version, published in 2000-09.

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

FDIS	Report on voting
47D/370/FDIS	47D/388/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 3.

The committee has decided that the contents of this publication will remain unchanged until 2003. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES –

Part 6-3: General rules for the preparation of outline drawings of surface mounted semiconductor device packages – Measuring methods for package dimensions of quad flat packs (QFP)

1 Scope

This part of IEC 60191 stipulates a method for quad flat packs (QFP) measuring dimensions which are classified into Form E.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60191. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60191 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60191-6:1990, *Mechanical standardization of semiconductor devices – Part 6: General rules for the preparation of outline drawings of surface mounted semiconductor device packages*

[IEC 60191-6-3:2000](https://standards.iteh.ai/catalog/standards/sist/9cea39da-4c62-4393-9f78-770b89bc7e18/iec-60191-6-3-2000)

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3 Definitions

For the purpose of this part of IEC 60191, the definitions of IEC 60191-6 apply.

4 Measuring methods

4.1 The measuring methods described in this standard are for dimension values guaranteed to users on the basis of the following items.

- a) In general, measuring the dimensions shall be made with the semiconductor packages mounted on printed circuit-board as the guarantee is made to user.
- b) In general, measurement may be made either by hand or automatically.
- c) If a specified dimension is difficult to measure, the best alternative measuring method is defined as the formal measuring method.
- d) The dimensions that cannot be measured unless the package is destroyed may be calculated from other dimensions or replaced by representative values.

4.2 Reference characters and drawing

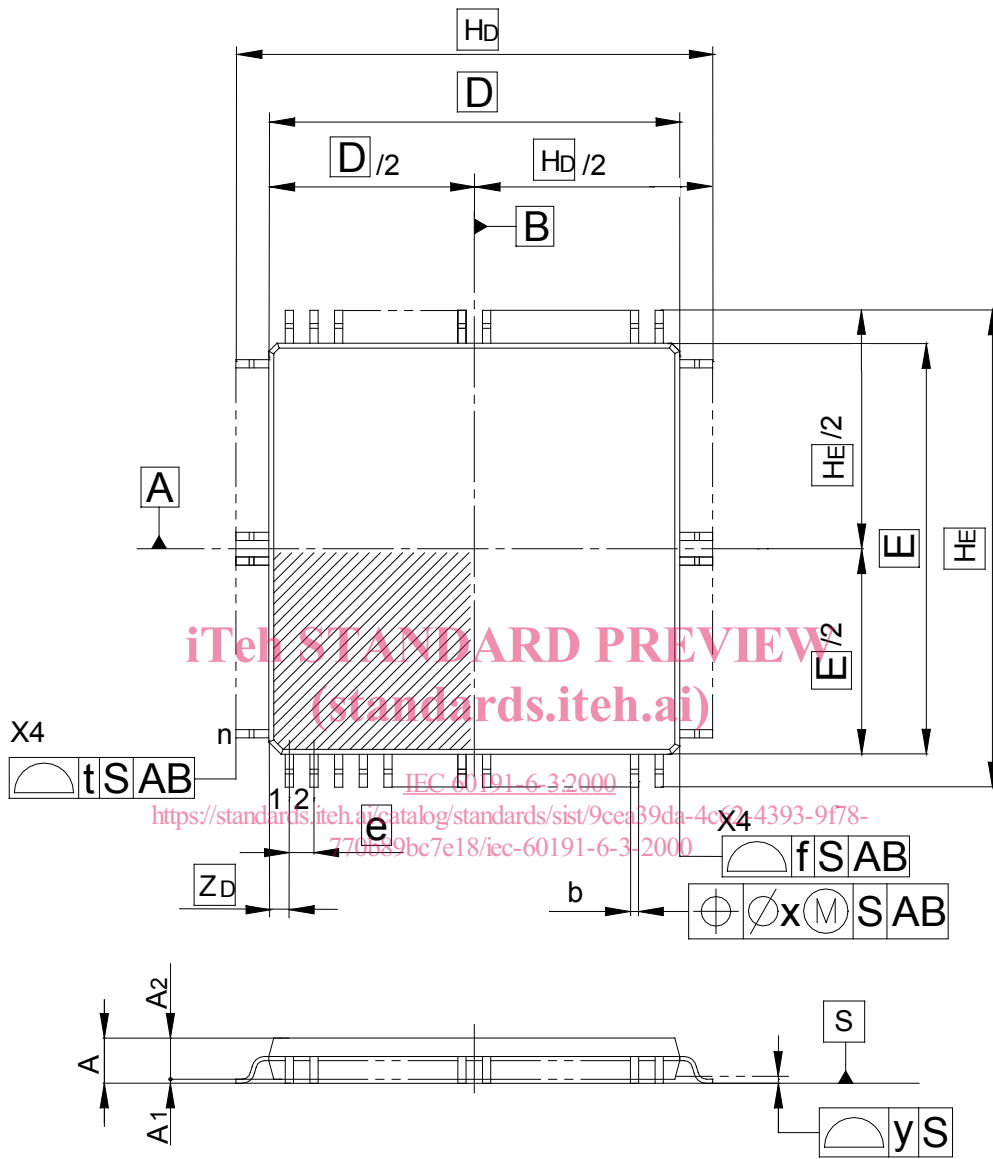
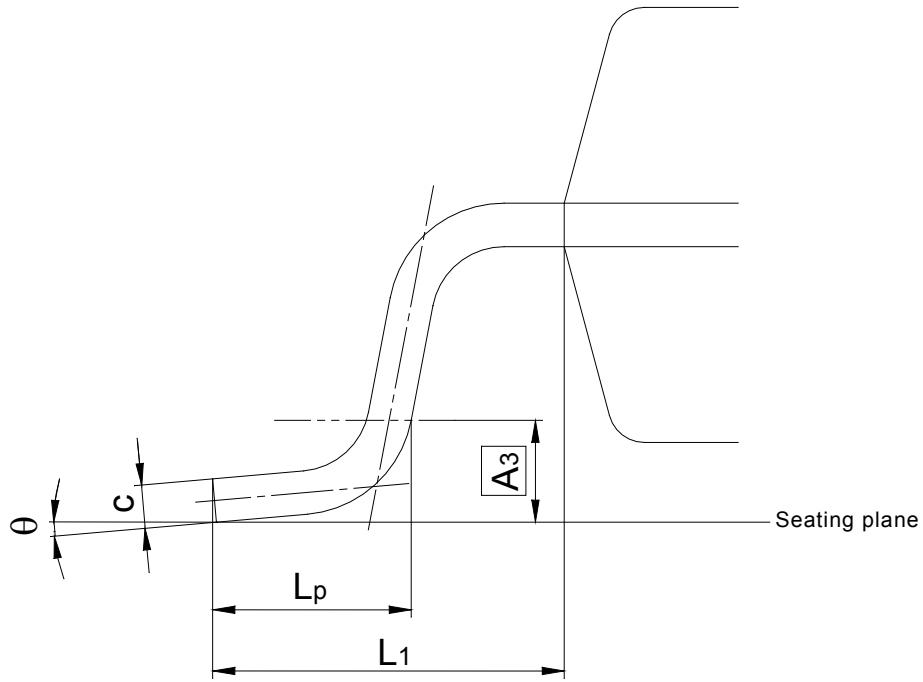
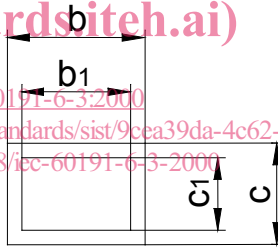


Figure 1



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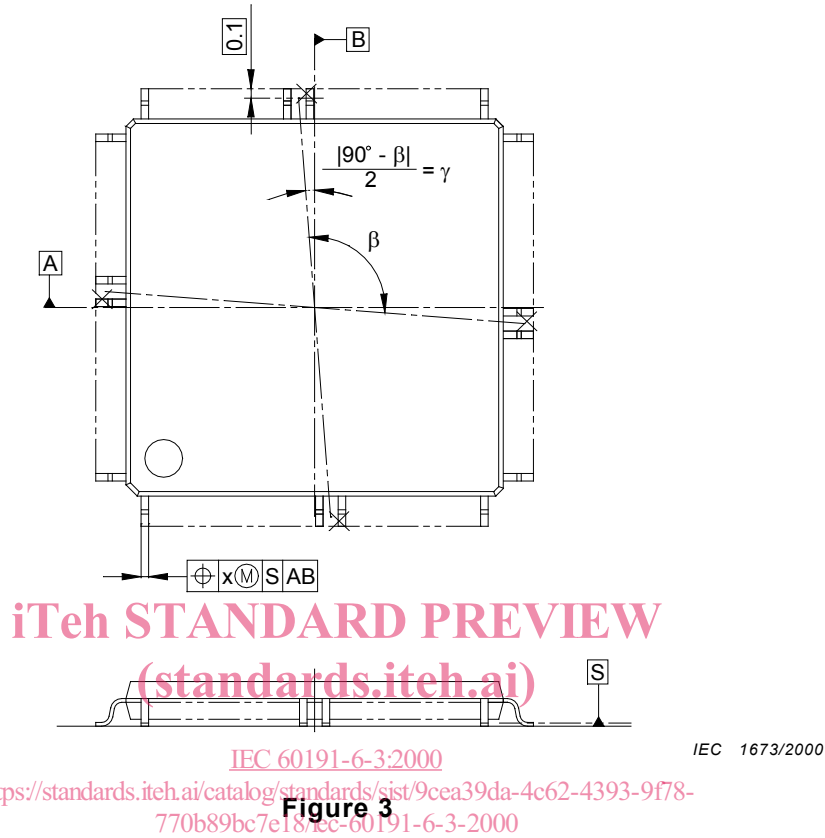


IEC 1672/2000

Figure 2

4.3 Datum

The datum shall be defined as follows.

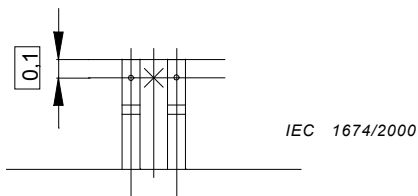


Centres of opposite sides of a package, which are defined below, shall be connected together. An angle β subtended by the two crossing lines shall be obtained.

A difference $|90^\circ - \beta|$ of the angle β from 90° shall be equally distributed to the sides to obtain rectangular axes. The rectangular axes are depicted as datum lines A and B of the package.

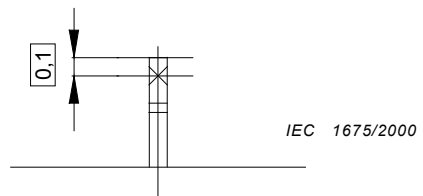
Description of the centres of sides

Even number of leads on a package side



A centre of facing sides of adjacent leads at a position 0,1 mm inside the top of the leads

Odd number of leads on a package side



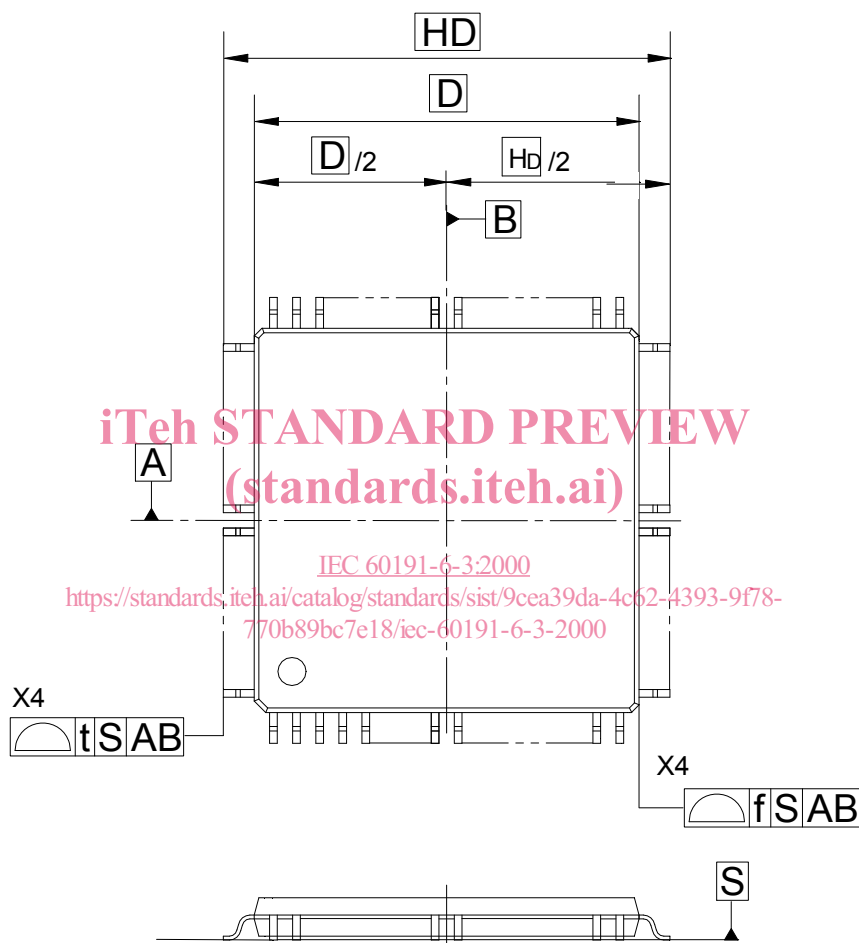
The centre of leads at a position 0,1 mm inside the top of the leads

Figure 4

4.4 Overall width \overline{HE} / overall length \overline{HD} / Package width D / package length E

4.4.1 Description

- a) As to the overall width and overall length, all lead tops should be located within the range t centring on the position which is at a theoretically correct distance of $\overline{HE}/2$ or $\overline{HD}/2$ from the datum A or B.
- b) As to the package width and length, the package end-face should be located within the range f centring on the position which is at a theoretically correct distance of $\overline{E}/2$ or $\overline{D}/2$ from the datum A or B.



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Figure 5

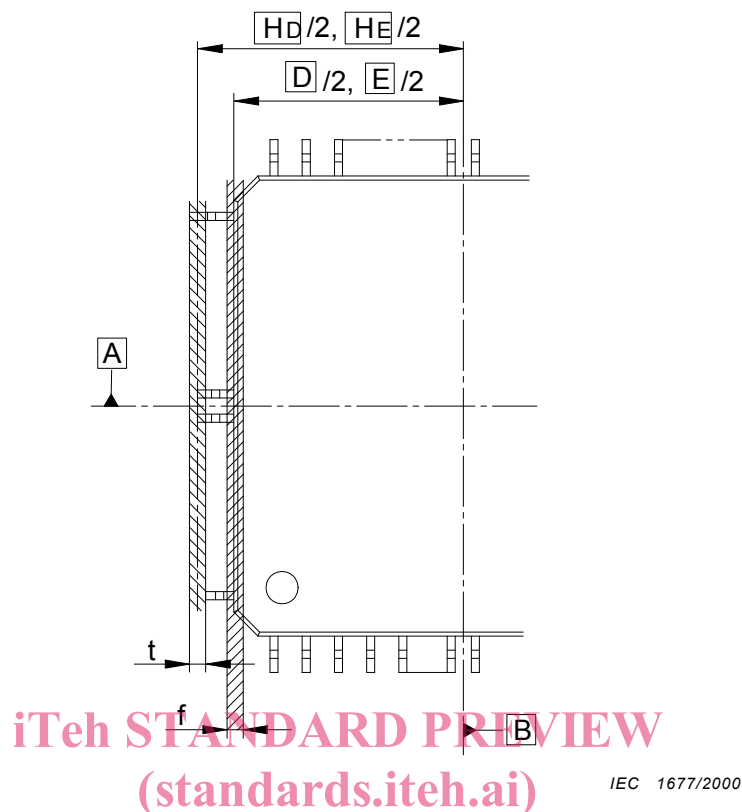


Figure 6

IEC 60191-6-3:2000

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4.4.2 Measuring method

a) HE/HD

- 1) Put the package on the surface plate to establish the datum reference S.
- 2) Make the datum A and B coincide with the measuring reference.
- 3) Find the logically precise distances HD/2 and HE/2 from the datum A and B.

Then check if the tip of every lead on each package side is within the tolerance t (range) specified as the centre.

b) E/D

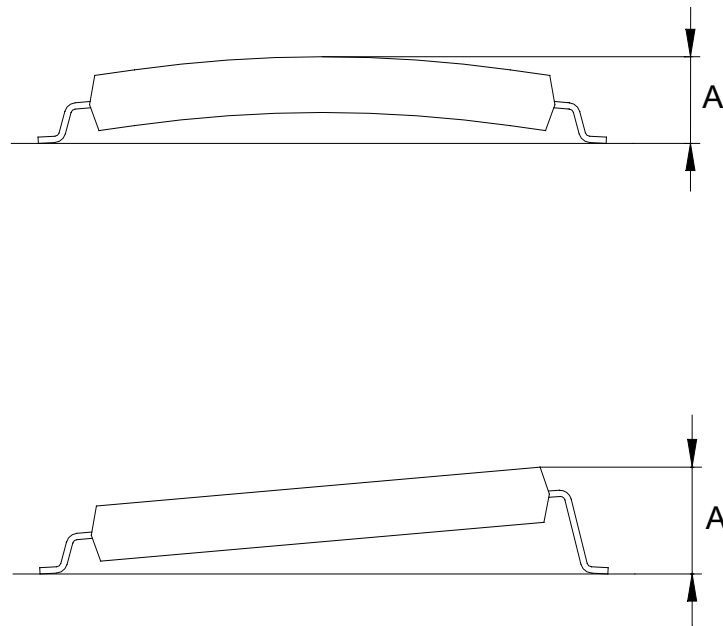
- 1) Put the package on the surface plate to establish the datum reference S.
- 2) Make the datum A and B coincide with the measuring reference.
- 3) Find the theoretically precise distances D/2 and E/2 from the datum A and B.

Then check if the package edge on each package side is within the tolerance f (range) specified as the centre.

4.5 Mounting height A

4.5.1 Description

Let the height of a package from the seating plane to the top of the package be denoted as the mounting height. The mounting height therefore includes inclination and warping of the package.



IEC 1678/2000

Figure 7

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4.5.2 Measuring method

a) Put the package on the surface plate to establish the seating plane.
From the side or the top, measure the distance to a highest point.

b) Let the distance be denoted as the mounting height.