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TECHNICAL REPORT

colour inside

Circuit boards and circuit board assemblies – Design and use –
Part 8: 3D shape data for CAD component library

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CIRCUIT BOARDS AND CIRCUIT BOARD ASSEMBLIES – DESIGN AND USE –

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FOREWORD

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IEC 61188-8 has been prepared by IEC technical committee 91: Electronics assembly technology. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
91/1640/DTR	91/1682/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 61188 series, published under the general title *Circuit boards and circuit board assemblies – Design and use*, can be found on the IEC website.

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

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- withdrawn,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

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CIRCUIT BOARDS AND CIRCUIT BOARD ASSEMBLIES – DESIGN AND USE –

Part 8: 3D shape data for CAD component library

1 Scope

This part of IEC 61188 describes the configuration of part shape data of semiconductor devices and electrical components registered in the CAD library.

This document mainly describes the configuration of 2D and 3D parts shape data.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.2 Abbreviated terms

The abbreviations used in this document are shown in Table 1.

Table 1 – Abbreviated terms

Abbreviation	Full word	Note
STEP	Standard for the Exchange of Product Model Data,	The document for the Exchange of Product Model Data is a comprehensive ISO standard (ISO 10303 [all parts]) that describes how to represent and exchange digital product information.
DXF	Drawing Exchange Format	The Drawing Exchange Format is a CAD data file format developed by Autodesk for enabling data interoperability between AutoCAD and other programs.
IGES	Initial Graphics Exchange Specification	The Initial Graphics Exchange Specification is a vendor-neutral file format that allows the digital exchange of information among CAD systems

4 Classification of component shape data

4.1 Classification by technical drawing

The classifications by technical drawing are the following four patterns. The drawing should be managed by agreement between parts manufacturer and equipment manufacturer.

a) 2D drawing;
b) 2D drawing + 3D shape models;
c) 3D models + simplified 2D drawings;
d) 3D annotated models.

4.2 Classification by the kind of component shape data

4.2.1 General

Component shape data distribution are the following three classes. The usage should be managed by an agreement between parts manufacturer and equipment manufacturer.

a) master data;
b) design-use data;
c) complement data.

4.2.2 Master data

The data which are positioned original when there was a difference between plural data.

4.2.3 Design-use data

The design-use data are directly measured and are treated as a nominal value.

4.2.4 Complement data

The complement data are needed as a reference when the design-use data are insufficient for CAD data design.

4.3 Relation between technical drawing and component shape data

The relation between technical drawing and component shape data are shown in Table 2.

Table 2 – Relation between technical drawing and component shape data

Classification		Master data	Design-use data	Complement data
1A	2D drawing	Data sheet	2D drawing	nothing
1B		2D drawing	Same as left	nothing
2A	2D drawing + 3D shape models	Data sheet	2D drawing	3D shape models
2B		Data sheet	3D shape models	2D drawing
2C		2D drawing	2D drawing	3D shape models
3	3D models + simplified 2D drawings	Data sheet	3D models	Simplified 2D drawings
4A	3D annotated models	Data sheet	3D annotated models	nothing
4B		3D annotated models	Same as left	nothing

5 Configuration data of shape data

5.1 General

The configuration data of shape data used in components consists of the factors as listed below. The decision of factors should be managed based on agreement between parts manufacturer and equipment manufacturer.

a) dimensions (see 5.2);
b) material distinction (see 5.3);
c) marking (see 5.4);
d) component identification information (see 5.5);
e) reference point and placement angle (see 5.6);
f) scale (see 5.7);
g) CAD format (see 5.8);
h) component shape levels (see 5.9);
i) other attributes (see 5.10).

5.2 Dimensions

5.2.1 Dimensions of 2D drawing

The dimensions of 2D drawing in all dimensions of the prepared data are basically nominal values.

5.2.2 Dimensions of 3D shape models

The dimensions of 3D shape models are as follows:

a) basically, all dimensions in the data to be prepared should be nominal values;
b) The tolerances with 2D drawing are important to clarify;
c) When the description of the dimension is "1.0+0.3/-0.1", "1.0" is taken as a nominal value.

5.3 Material distinction

To check locations with resin surface and those with metal surface, it is desirable to distinguish them with different colours.

5.4 Marking

If the component has polarity or orientation markings, the markings should not be omitted in the component shape data. An example of marking is shown in Figure 1.

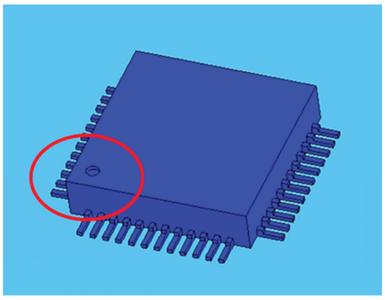

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Figure 1 – Marking

5.5 Component identification information

The shape data should be included with identification information for the purpose of retrieval and storage.

Representative items of identification information are shown in items a) to g) below:

a) part number;

b) manufacturer name;

c) manufacturer model name or manufacturer part number;

d) design use data: file name and version;

e) complement data: file name and version;

f) changes;

g) notes.

As for the constitution information, XML should be used as a searchable description format.

5.6 Reference point and placement angle

5.6.1 Rules for 2D drawings

The rules for 2D drawings are as follows:

a) components and land patterns are drawn in top view;

b) the component point of origin is shown by "+" or "x";

c) A circumscribing rectangle which contains the component body and land patterns (in top view) should be a part of the library component description. This rectangle is the "Courtyard" that provides a minimum electrical and physical clearance for the part and the land pattern. The point of origin of the description should match that of the component and land pattern. The descriptions of the components, land patterns, and circumscribed rectangles, described are the same in the computer library, and each description uses the same origin coordinates. It is recommended that the point of origin is the same as the way the component is positioned on the final design of the board which is normally by the centroid of the component body.

5.6.2 Rules for 3D shape models (component with no moving part)

The rules for 3D shape models (component with no moving part) described are as follows:

a) relation between 2D drawing and 3D shape model;

It is desirable to design the reference point and placement angle according to the same rules.

b) reference point;

The center of the outline of the largest rectangle containing the electrodes described are the reference point.

The sitting plane is considered to have a Z value of 0, and the direction moving below the seating plane is considered the minus direction of the Z-axis.

c) placement angle

Indicate the polarity so that it is in the minus direction in the X-axis or in the minus directions of both X- and Y-axes. The example of placement angle is shown in Figure 2.