Printed boards and printed board assemblies - Design and use - Part 7: Electronic component zero orientation for CAD library construction

EESTI STANDARDIKESKUS EVS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61188-7:2009 sisaldab Euroopa standardi EN 61188-7:2009 ingliskeelset teksti.	This Estonian standard EVS-EN 61188-7:2009 consists of the English text of the European standard EN 61188-7:2009.
Standard on kinnitatud Eesti Standardikeskuse 31.08.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 31.08.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 09.07.2009.	Date of Availability of the European standard text 09.07.2009.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 31.180

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61188-7

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ICS 31.180

English version

Printed boards and printed board assemblies - Design and use - Part 7: Electronic component zero orientation for CAD library construction
(IEC 61188-7:2009)

Cartes imprimées
et cartes imprimées équipées -
Conception et utilisation -
Partie 7: Orientation nulle des composants
électroniques pour l'élaboration
de la bibliothèque CAO
(CEI 61188-7:2009)

Leiterplatten und Flachbaugruppen -
Konstruktion und Anwendung -
Teil 7: Nullorientierung elektronischer
Bauelemente für CAD-Bibliotheksaufbau
(IEC 61188-7:2009)

This European Standard was approved by CENELEC on 2009-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61188-7:2009 E

Foreword

The text of document 91/854/FDIS, future edition 1 of IEC 61188-7, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61188-7 on 2009-06-01.

The following dates were fixed:

– latest date by which the EN has to be implemented
  at national level by publication of an identical
  national standard or by endorsement   (dop)   2010-03-01

– latest date by which the national standards conflicting
  with the EN have to be withdrawn   (dow)   2012-06-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 61188-7:2009 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications
with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE   When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61182-2	[1]	Printed board assembly products - Manufacturing description data and transfer methodology - Part 2: Generic requirements	-	-
IEC 61188-5-1	[1]	Printed boards and printed board assemblies - Design and use - Part 5-1: Attachment (land/joint) considerations - Generic requirements	EN 61188-5-1	2002[2]
IEC 61188-5-2	[1]	Printed boards and printed board assemblies - Design and use - Part 5-2: Attachment (land/joint) considerations - Discrete components	EN 61188-5-2	2003[2]
IEC 61188-5-3	[1]	Printed boards and printed board assemblies - Design and use - Part 5-3: Attachment (land/joint) considerations - Components with gull-wing leads on two sides	EN 61188-5-3	2007[2]
IEC 61188-5-4	[1]	Printed boards and printed board assemblies - Design and use - Part 5-4: Attachment (land/joint) consideration - Components with J-leads on two sides	EN 61188-5-4	2007[2]
IEC 61188-5-5	[1]	Printed boards and printed board assemblies - Design and use - Part 5-5: Attachment (land/joint) considerations - Components with gull-wing leads on four sides	EN 61188-5-5	2007[2]
IEC 61188-5-6	[1]	Printed boards and printed board assemblies - Design and use - Part 5-6: Attachment (land/joint) considerations - Chip carriers with J-leads on four sides	EN 61188-5-6	2003[2]
IEC 61188-5-8	[1]	Printed boards and printed board assemblies - Design and use - Part 5-8: Attachment (land/joint) considerations - Area array components (BGA, FBGA, CGA, LGA)	EN 61188-5-8	2008[2]

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[1] Undated reference.

[2] Valid edition at date of issue.

CONTENTS

INTRODUCTION

One of the factors of establishing a CAD library component description and land pattern standard is to adopt a fixed zero component orientation so that all CAD images are built with the same rotation for the purpose of assembly machine automation.

The land pattern standards clearly define all the properties necessary for standardization and acceptability of a one world CAD library. The main objective in defining a one world CAD library is to achieve the highest level of electronic product development automation. This encompasses all the processes involved from engineering to PCB layout to fabrication, assembly and test. The data format standards need this type of consistency in order to meet the efficiency that electronic data transfer can bring to the industry.

Many large firms have spent millions of dollars creating and implementing their own unique standards for their own electronic product development automation. These standards are proprietary to each firm and are not openly shared with the rest of the industry. This has resulted in massive duplication of effort costing the industry millions of man hours in waste and creating industry chaos and global non-standardization.

The industry associations responsible for component descriptions and tape and reel orientation have tried valiantly to influence the industry by making good standards that describe the component outlines and how they should be positioned in the delivery system to the equipment on the manufacturing floor. Suppliers of parts have either not adhered to the recommendations or have misunderstood the intent and provided their products in different orientations.

The Land pattern standards (IEC 61188-5-1, IEC 61188-5-2, IEC 61188-5-3, IEC 61188-5-4, IEC 61188-5-5, IEC 61188-5-6 and IEC 61188-5-8) put an end to the proprietary intellectual property and introduce a world standard so every electronics firm can benefit from electronic product development automation. The data format standards (IPC-2581 and IEC 61182-2) are an open database XML software code that is neutral to all the various CAD ASCII formats. For true machine automation to exist, the world desperately needs a neutral CAD database format that all PCB manufacturing machines can read.

The main purpose of creating the land pattern standards is to achieve reliable solder joint formation platforms; the reason for developing the data transfer structure is to improve the efficiency with which engineering intelligence is converted to manufacturing reality. Even if the neutral CAD format can drive all the manufacturing machines, it would be meaningless unless the component description standard for CAD land patterns was implemented with some consistency. Zero component orientation has a key role in machine automation.

The obvious choice for global standardization for EE hardware engineering, PCB design layout, manufacturing, assembly and testing processes is to incorporate the standard land pattern conventions. Any other option continues the confusion and additional manual hours of intervention in order to achieve the goals of automation. In addition, the ease of having one system export a file so that another system can accomplish the work may require unnecessary manipulation of the neutral format in order to meet the object of clear, unambiguous software code.

The design of any assembly will continue to permit arrangement and orientation of components at any orientation consistent with design standards. Starting from a commonly understood data capture concept will benefit the entire supply chain.

This standard defines angle and origin point of land-pattern for land-pattern designing.

PRINTED BOARDS AND PRINTED BOARD ASSEMBLIES – DESIGN AND USE –

Part 7: Electronic component zero orientation for CAD library construction

1 Scope

This part of IEC 61188 establishes a consistent technique for the description of electronic component orientation, and their land pattern geometries. This facilitates and encourages a common data capture and transfer methodology amongst and between global trading partners.

2 Normative references

The following referenced documents are indispensable for the application 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 61182-2, *Printed board assembly products – Manufacturing description data and transfer methodology – Part 2: Generic requirements*

IEC 61188-5-1, *Printed boards and printed board assemblies – Design and use – Part 5-1: Attachment (land/joint) considerations – Generic requirements*

IEC 61188-5-2, *Printed boards and printed board assemblies – Design and use – Part 5-2: Attachment (land/joint) considerations – Discrete components*

IEC 61188-5-3, *Printed boards and printed board assemblies – Design and use – Part 5-3: Attachment (land/joint) considerations – Components with gull-wing leads on two sides*

IEC 61188-5-4, *Printed boards and printed board assemblies – Design and use – Part 5-4: Attachment (land/joint) considerations – Components with J-leads on two sides*

IEC 61188-5-5, *Printed boards and printed board assemblies – Design and use – Part 5-5: Attachment (land/joint) considerations – Components with gull-wing leads on four sides*

IEC 61188-5-6, *Printed boards and printed board assemblies – Design and use – Part 5-6: Attachment (land/joint) considerations – Chip carriers with J-leads on four sides*

IEC 61188-5-8, *Printed boards and printed board assemblies – Design and use – Part 5-8: Attachment (land/joint) considerations – Area array components (BGA, FBGA, CGA, LGA)*

3 Basic rules

3.1 Common rules

Common rules are divided into two groups; level A and level B. The main difference between the rules is the original orientation within the CAD system library. This orientation may be any version that the designers finds useful including his own version, however when the information is transferred to an assembler the orientation shall be properly defined without ambiguity or shall be corrected in order that any variation between the different systems are