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Circuit boards and circuit board assemblies - Design and use - Part 6-3: Land pattern design - Description of land pattern for through hole components (THT)

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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See Eesti standard EVS-EN IEC 61188-6-3:2025 sisaldab Euroopa standardi EN IEC 61188-6-3:2025 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 61188-6-3:2025 consists of the English text of the European standard EN IEC 61188-6-3:2025.
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ICS 31.180, 31.190

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61188-6-3

January 2025

ICS 31.180; 31.190

Supersedes EN 61188-5-2:2003 (partially);
EN 61188-5-3:2007 (partially);
EN 61188-5-4:2007 (partially);
EN 61188-5-5:2007 (partially);
EN 61188-5-6:2003 (partially);
EN 61188-5-8:2008 (partially)

English Version

Circuit boards and circuit board assemblies - Design and use - Part 6-3: Land pattern design - Description of land pattern for through hole components (THT) (IEC 61188-6-3:2024)

Cartes imprimées et cartes imprimées équipées - Conception et utilisation - Partie 6-3: Conception de la zone de report - Description de la zone de report pour les composants à trous traversants (THT) (IEC 61188-6-3:2024)

Leiterplatten und Flachbaugruppen - Konstruktion und Anwendung - Teil 6-3: Anschlussflächengestaltung - Beschreibung von Anschlussflächen für Komponenten der Steckmontage (THT) (IEC 61188-6-3:2024)

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European foreword

The text of document 91/1982/FDIS, future edition 1 of IEC 61188-6-3, prepared by TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61188-6-3:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2026-01-31
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2028-01-31

This document partially supersedes EN 61188-5-2:2003, EN 61188-5-3:2007, EN 61188-5-4:2007, EN 61188-5-5:2007, EN 61188-5-6:2003 and EN 61188-5-8:2008 and all of their amendments and corrigenda (if any).

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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 61188-6-2	NOTE	Approved as EN IEC 61188-6-2
IEC 61191-1	NOTE	Approved as EN IEC 61191-1
IEC 61191-2	NOTE	Approved as EN 61191-2
IEC 61191-3	NOTE	Approved as EN 61191-3
IEC 61191-4	NOTE	Approved as EN 61191-4

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IEC 61188-6-3

Edition 1.0 2024-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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Cartes imprimées et cartes imprimées équipées – Conception et utilisation – Partie 6-3: Conception de la zone de report – Description de la zone de report pour les composants à trous traversants (THT)

IEC 61188-6-3:2024-12(en-fr)

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IEC 61188-6-3

Edition 1.0 2024-12

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NORME INTERNATIONALE

colour inside

Circuit boards and circuit board assemblies – Design and use – Part 6-3: Land pattern design – Description of land pattern for through hole components (THT)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

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CIRCUIT BOARDS AND CIRCUIT BOARD ASSEMBLIES – DESIGN AND USE –

Part 6-3: Land pattern design – Description of land pattern for through hole components (THT)

FOREWORD

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IEC 61188-6-3 has been prepared by IEC technical committee 91: Electronics assembly technology. It is an International Standard.

This first edition partially cancels and replaces the IEC 61188-5 series of International Standards.

The significant technical changes with respect to the previous edition are listed in the Introduction and further detailed information and calculations can be found in Annex A.

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The text of this International Standard is based on the following documents:

Draft	Report on voting
91/1982/FDIS	91/1997/RVD

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 International Standard 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/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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- withdrawn, or
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INTRODUCTION

The new series IEC 61188-6-xx replaces the below listed documents:

IEC 61188-5-1:2002, *Printed boards and printed board assemblies – Design and use – Part 5-1: Attachment (land/joint) considerations – Generic requirements*

IEC 61188-5-2:2003, *Printed boards and printed board assemblies – Design and use – Part 5-2: Attachment (land/joint) considerations – Discrete components*

IEC 61188-5-3:2007, *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 61188-5-4:2007, *Printed boards and printed board assemblies – Design and use – Part 5-4: Attachment (land/joint) considerations – Components with J leads on two sides*

IEC 61188-5-5:2007, *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 61188-5-6:2003, *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 61188-5-8:2007, *Printed boards and printed board assemblies – Design and use – Part 5-8: Attachment (land/joint) considerations – Area array components (BGA, FBGA, CGA, LGA)*

The content of the above documents is based on IPC-SM-782 Rev. A with Amendments 1 and 2, which was replaced in 2002 by IPC-7351. The component spectrum and pitch levels have dramatically changed since publication of the 61188-5-xx series and its dimensioning concept no longer fulfils state of the art mounting and soldering requirements.

This document provides guidelines and focus on land pattern for through hole terminals (THT).

Within the previous standards, primarily the pin diameter of the component and the assembly tolerances were considered.

The new approach is that a sufficiently available (proportional) land pattern is related to:

- size and shape of the component terminal
- the requirements of the assembly process and its used tools
- technology, structure, thickness and manufacturing process of the circuit board

in order to achieve the best possible solder joint due to manufacturability, the assembly result and the reliability of an assembled circuit board.

The variety and the possibility of building printed circuit boards has grown considerably over the years. The technologies can become very complex. The proportion of copper in the circuit board is determined by the number of layers or copper thickness per layer. This could lead to higher thermal capacity of the circuit board.

The general use of soldered THT components has declined dramatically. The requirements for current carrying capacity (e.g. wire thickness of inductors) have increased for the through-hole components used. At the same time, the use of wave soldering has declined in favour of selective wave soldering or other technologies.

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A balance between heat source (soldering process) and heat sink (component or component pin and circuit board) must be found for required assembly results. The landing surface must be defined according to these requirements.

Detailed information and calculations can be found in Annex A.

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CIRCUIT BOARDS AND CIRCUIT BOARD ASSEMBLIES – DESIGN AND USE –

Part 6-3: Land pattern design – Description of land pattern for through hole components (THT)

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1 Scope

This part of IEC 61188 specifies the requirements for lands and land pattern on circuit boards for the mounting of components with leads by soldering based on the solder joint requirements of IEC 61191-1 and IEC 61191-3.

This part of IEC 61188 specifies the requirements for soldering surfaces on circuit boards. This includes lands and land pattern for surface mounted components and also solderable hole configurations for through hole mounted components. These requirements are based on the solder joint requirements of IEC 61191-1, IEC 61191-2, IEC 61191-3 and IEC 61191-4.

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 60194-2, *Printed boards design, manufacture and assembly – Vocabulary – Part 2: Common usage in electronic technologies as well as printed board and electronic assembly technologies*

IEC 60352-5:2020, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60194-2 and the following apply.

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

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

3.1
annular ring
amount of land that remains after a hole is drilled in the defined Padstack

3.2
finished hole size (FSH)
diameter after all metallization processes (galvanic processing) and additional surface finishing processes (final finish) have been completed