



SLOVENSKI STANDARD
oSIST prEN IEC 61188-6-3:2023
01-oktober-2023

**Plošče tiskanih vezij in sestavi plošč tiskanih vezij - Zasnova in uporaba - 6-3. del:
Razmestitev priključkov - Opis razmestitve priključkov skozi luknje komponent**

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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Ta slovenski standard je istoveten z: prEN IEC 61188-6-3:2023

ICS:

31.180	Tiskana vezja (TIV) in tiskane plošče	Printed circuits and boards
31.190	Sestavljeni elektronski elementi	Electronic component assemblies

oSIST prEN IEC 61188-6-3:2023 **en**



91/1878/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

IEC 61188-6-3 ED1

DATE OF CIRCULATION:

2023-08-25

CLOSING DATE FOR VOTING:

2023-11-17

SUPERSEDES DOCUMENTS:

91/1700/CD, 91/1748/CC

IEC TC 91 : ELECTRONICS ASSEMBLY TECHNOLOGY	
SECRETARIAT: Japan	SECRETARY: Mr Osamu IKEDA
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

The revised CDV draft was approved at the TC91 WG12 meeting in June 2023.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

106

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

108

109 Full information on the voting for the approval of this International Standard can be found in the report
110 on voting indicated in the above table.

111 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

- 115 • reconfirmed,
-
- 116 • withdrawn,
-
- 117 • replaced by a revised edition, or
-
- 118 • amended.

119

120 The National Committees are requested to note that for this document the stability date is 20XX..

121 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE
122 PUBLICATION STAGE.

123

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124 INTRODUCTION

125

126 The new series IEC 6188-6-xx replaces the below listed documents:

127 IEC 61188-5-1 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-1:
128 Attachment (land/joint) considerations - Generic requirements129 IEC 61188-5-2 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-2:
130 Attachment (land/joint) considerations - Discrete components131 IEC 61188-5-3 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-3:
132 Attachment (land/joint) considerations - Components with gull-wing leads on two sides133 IEC 61188-5-4 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-4:
134 Attachment (land/joint) considerations - Components with J leads on two sides135 IEC 61188-5-5 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-5:
136 Attachment (land/joint) considerations - Components with gull-wing leads on four sides137 IEC 61188-5-6 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-6:
138 Attachment (land/joint) considerations - Chip carriers with J-leads on four sides139 IEC 61188-5-8 Ed. 1.0 Printed boards and printed board assemblies - Design and use - Part 5-8:
140 Attachment (land/joint) considerations - Area array components (BGA, FBGA, CGA, LGA)141 The content of above documents is based on IPC-782 Rev. A with Amendment 1 & 2, which was replaced
142 in 2002 by IPC-7351. The component spectrum and pitch levels have dramatically changed since
143 publication of the 61188-5-xx series and its dimensioning concept does not longer fulfil state of the art
144 mounting and soldering requirements.

145

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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)****1 Scope**

This International Standard 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 the IEC 61191-1, and IEC 61191-3.

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 61191-1, *Printed board assemblies – Part 1: Generic specification – Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies*

IEC 61191-3, *Printed board assemblies – Part 3: Sectional specification – Requirements for through-hole mount soldered assemblies*

IEC 60194, *Printed board design, manufacture and assembly – Terms and definitions*

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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 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>

3.1 Annular ring

It is defined as the amount of land that remains after a hole is drilled in the defined padstack

3.2 Finished hole size (FSH)

The diameter after all metallization processes (galvanic processing) and additional surface finishing processes (final finish)

3.3 Solder source side

The side which is in contact with solder material (e.g. soldering wave, solder tip), It is usually the opposite side of the assembled THT component

3.4 Solder target side

The side where the component is usually placed. The solder material will fill the THT from the opposite side (solder source side)

4 Description of a through hole Component**4.1 Component body**

Leaded components consist of a so called body with electrical functional elements and leads which enable the connection to the circuitry of the circuit board by soldering (see Figure 1).

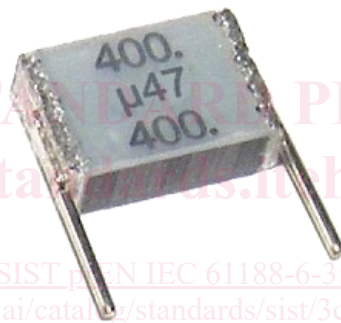


Figure 1 – Leaded component

4.2 Component leads

Leads of components for through hole mounting usually have a round, square or rectangular profile. For the padstack design the maximum diameter of the lead is the determining parameter. The diameter of the through hole depends on the shape of the lead (Typical variations of leads see Figure 2, Figure 3 and Figure 4).

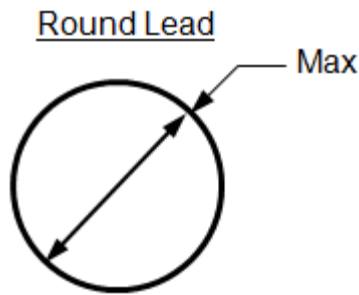


Figure 2 – Round lead

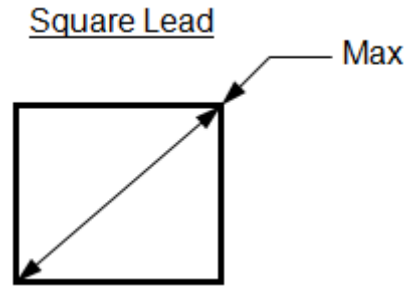


Figure 3 – Square lead

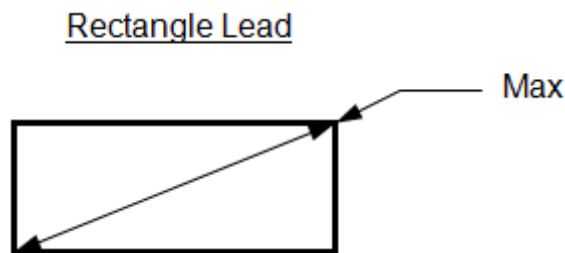


Figure 4 – Rectangle lead

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5 Padstack

5.1 Description

A **Padstack** is the **definition** of the size and shape of the **pads** on each of the layers of a circuit board plus the definition of the hole size and type. Form and size of the pad depends on the lead form and size and the component body.

5.2 Pad types

Depending on the layer function in the circuit board layer stack the pad function also will be different. Table 1 gives an overview about the relation between layer functionality and associated pad type.

Table 1 – Layer function and pad types

Layer function	Pad type	display
Solder mask	Top and Bottom Solder Mask	negative data
Outer layer	Top and Bottom Pad (Land)	positive data
Inner signal layer	Inner Layer Pad	positive data
Inner power layer	Plane Thermal or Plane Anti-Pad	negative data

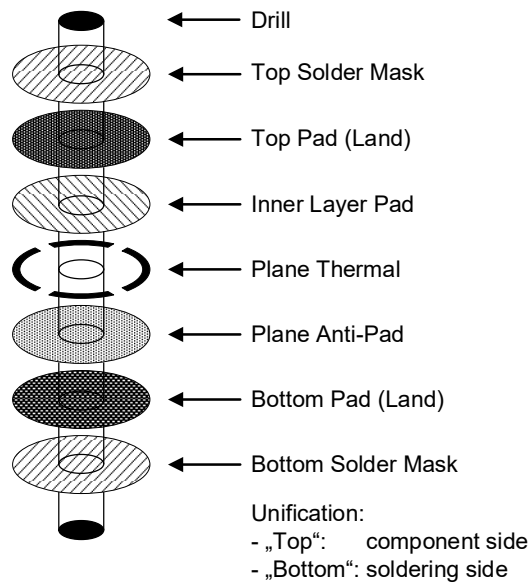


Figure 5 – Padstack

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227 5.2.1 Solder mask pads

228 The solder mask pads define the metallic surface of the solder joint. Within the CAD tool the solder
 229 mask is displayed inverse

230 5.2.2 Outer layer pads

231 Outer layer pads describe the copper area which fixe the soldered device with the outer layer.
 232 Sometimes it can be helpful to distinguish between the component and the solder side.

233 5.2.3 Thermal pads

234 The feature of a thermal pad is used to prohibit heat dissipation during the soldering process to get a
 235 reliable solder joint without degrading the circuit board base material.

236 5.2.4 Anti pads

237 The so called anti pad are used to ensure insulation between the inner layer copper pads and the copper
 238 area of power planes. Usually the minimum size of the anti-pad is the minimum isolation distance of
 239 copper elements with different nets and the size of the inner layer pad.

240 5.3 Pad shapes

241 The basic elements of the Padstacks are polygons on each layer which represent the copper structures
 242 of the circuit board. These polygons can be circular, square or rectangular with rounded or chamfered
 243 corners or even variations of this shapes.

244 Sometimes a special pad shape like a square pad on the component layer of the circuit board is used
 245 as pin 1 indicator.

246 5.4 Holes

247 5.4.1 Considerations for plated through hole dimensioning

248 The used assembly technique has a influences on the hole diameter, additionally the number of pins
 249 per device and their alignment. Different assembly techniques shall have different hole calculations:

- 250 • The way of creating the hole (drilling, milling, punching, additive manufacturing, others)