SLOVENSKI STANDARD
SIST EN 61188-5-2:2004

01-marec-2004

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

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

Leiterplatten und Flachbaugruppen - Konstruktion und Anwendung -- Teil 5-2: Betrachtungen zur Montage (Anschlussfläche/Verbindung) - Einzelbauelemente

Cartes imprimées et cartes imprimées équipées - Conception et utilisation -- Partie 5-2: Considérations sur les liaisons pistes-soudures - Composants discrets

Ta slovenski standard je istoveten z: **EN 61188-5-2:2003**

ICS:

31.180	Tiskana vezja (TIV) in tiskane plošče	Printed circuits and boards

SIST EN 61188-5-2:2004 **en**

EUROPEAN STANDARD **EN 61188-5-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM September 2003

ICS 31.180; 31.190

English version

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

(IEC 61188-5-2:2003)

Cartes imprimées et cartes imprimées équipées -
Conception et utilisation
Partie 5-2: Considérations sur les liaisons pistes-soudures - Composants discrets
(CEI 61188-5-2:2003)

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(IEC 61188-5-2:2003)

This European Standard was approved by CENELEC on 2003-09-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61188-5-2:2003 E

Foreword

The text of document 91/382/FDIS, future edition 1 of IEC 61188-5-2, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61188-5-2 on 2003-09-01.

This European Standard is to be read in conjunction with EN 61188-5-1:2002.

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)	2004-06-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2006-09-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61188-5-2:2003 was approved by CENELEC as a European Standard without any modification.

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

IEC 60051	NOTE	Harmonized as EN 60051 series (not modified).
IEC 61191-1	NOTE	Harmonized as EN 61191-1:1998 (not modified).
IEC 61191-2	NOTE	Harmonized as EN 61191-2:1998 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 60068-2-58	- [1)]	Environmental testing Part 2-58: Tests - Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)	EN 60068-2-58	1999 [2)]
IEC 60115-1 (mod)	- [1)]	Fixed resistors for use in electronic equipment Part 1: Generic specification	EN 60115-1	2001 [2)]
IEC 60286-3	- [1)]	Packaging of components for automatic handling Part 3: Packaging of surface mount components on continuous tapes	EN 60286-3	1998 [2)]
IEC 60286-4	- [1)]	Part 4: Stick magazines for electronic components encapsulated in packages of form E and G	EN 60286-4	1998 [2)]
IEC 60286-5 (mod)	- [1)]	Part 5: Matrix trays	EN 60286-5	1997 [2)]
IEC 60286-6	- [1)]	Part 6: Bulk case packaging for surface mounting components	EN 60286-6	1998 [2)]
IEC 60384-3	- [1)]	Fixed capacitors for use in electronic equipment. Part 3: Sectional specification: Fixed tantalum chip capacitors	-	-
IEC 60384-18	- [1)]	Part 18: Sectional specification: Fixed aluminium electrolytic chip capacitors with solid and non-solid electrolyte	-	-

[1)] Undated reference.

[2)] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 60384-20	- [1)]	Part 20: Sectional specification: Fixed metallized polyphenylene sulfide film dielectric surface mount d.c. capacitors	EN 60384-20	1999 [2)]
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 61605	- [1)]	Fixed inductors for use in electronic and telecommunication equipment - Marking codes	EN 61605	1997 [2)]

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Cartes imprimées et cartes imprimées équipées – Conception et utilisation –

Partie 5-2: Considérations sur les liaisons pistes-soudures – Composants discrets

Printed boards and printed board assemblies – Design and use –

Part 5-2: Attachment (land/joint) considerations – Discrete components

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International Electrotechnical Commission
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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRINTED BOARDS AND PRINTED BOARD ASSEMBLIES – DESIGN AND USE –

Part 5-2: Attachment (land/joint) considerations – Discrete components

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61188-5-2 has been prepared by IEC technical committee 91: Electronics assembly technology.

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

FDIS	Report on voting
91/382/FDIS	91/397/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.

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

This International Standard is to be read in conjunction with IEC 61188-5-1:2002.

This standard forms Part 5-2 of IEC 61188 which is published under the general title *Printed boards and printed board assemblies – Design and use* [1]:

Part 5-1: Attachment (land/joint) considerations – Generic requirements

Part 5-2: Attachment (land/joint) considerations – Discrete components

Part 5-3: Attachment (land/joint) considerations – Gull-wing leads, two sides

Part 5-4: Attachment (land/joint) considerations – J leads, two sides

Part 5-5: Attachment (land/joint) considerations – Components with gull-wing leads, four sides

Part 5-6: Attachment (land/joint) considerations – J leads, four sides

Part 5-7: Attachment (land/joint) considerations – Post (DIP) leads, two sides

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

1 At the time of writing, some of these parts are still under consideration.

INTRODUCTION

This part of IEC 61188 covers land patterns for discrete components such as chip resistors, chip capacitors, and various diode and transistor types.

The proposed land pattern dimensions are based upon the fundamental tolerance calculation combined with the given land protrusions and courtyard excesses (see IEC 61188-5-1, Generic requirements). The courtyard includes all issues relating to normal manufacturing requirements.

The land pattern dimensions given in this standard are generally applicable for reflowed solder paste processes. For immersion soldering processes (e.g. wave, jet, drag soldering), lands may have to be modified to prevent shadowing and shorting (e.g. by extending land length parallel to the direction of motion of the board and/or provision of solder thieves).

This standard offers a threefold land pattern dimensioning (levels 1, 2 and 3) on the basis of a threefold set of land protrusions and courtyard excesses: maximum (max.), median (mdn) and minimum (min.). Each land pattern has been assigned an identification number to indicate the characteristics of the specific robustness of the land patterns. Users also have the opportunity to organize the information so that it is most useful for their particular design.

This standard assumes that land dimensions are always larger than component termination or lead outlines. If a user has good reason to use solder resist to limit wetting on a land, or to use lands smaller than component terminations, or to apply a concept different from that of IEC 61188-5-1, then this standard may not apply.

It is the responsibility of the user to verify the SMD land patterns used for achieving an undisturbed mounting process, including testing, and an ensured reliability for the product stress conditions in use.

Dimensions of the components listed in this standard are those available on the market and are for reference only.

PRINTED BOARDS AND PRINTED BOARD ASSEMBLIES – DESIGN AND USE –

Part 5-2: Attachment (land/joint) considerations – Discrete components

1 Scope

This part of IEC 61188 provides information on land pattern geometries used for the surface attachment of discrete electronic components.

The purpose of this standard is to provide the appropriate size, shape and tolerances of surface mount land patterns to ensure sufficient area for the appropriate solder fillet, and also allow for inspection, testing and rework of resulting solder joints.

Each clause contains a specific set of clearly presented criteria providing information on the component, the component dimensions, the solder joint design and the land pattern dimensions.

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 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60115-1, *Fixed resistors for use in electronic equipment – Part 1: General specification*

IEC 60286-3, *Packaging of components for automatic handling – Part 3: Packaging of leadless components on continuous tapes*

IEC 60286-4, *Packaging of components for automatic handling – Part 4: Stick magazines for electric components encapsulated in packages of form E and G*

IEC 60286-5, *Packaging of components for automatic handling – Part 5: Matrix trays*

IEC 60286-6, *Packaging of components for automatic handling – Part 6: Bulk case packaging for surface mounting compounds*

IEC 60384-3, *Fixed capacitors for use in electronic equipment – Part 3: Sectional specification: Fixed Tantalum chip capacitors*

IEC 60384-18, *Fixed capacitors for use in electronic equipment – Part 18: Sectional specification – Fixed aluminium electrolytic chip capacitors with solid and non-solid electrolyte*

IEC 60384-20, *Fixed capacitors for use in electronic equipment – Part 20: Sectional specification – Fixed metallized polyphenylene sulfide film dielectric chip d.c. capacitors*

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

IEC 61605, *Fixed inductors for use in electronic and telecommunication equipment – Marking codes*

3 Packaging

The following IEC standards shall be referred to:

- IEC 60286-3 (see figure 1);
- IEC 60286-4;
- IEC 60286-5;
- IEC 60286-6.

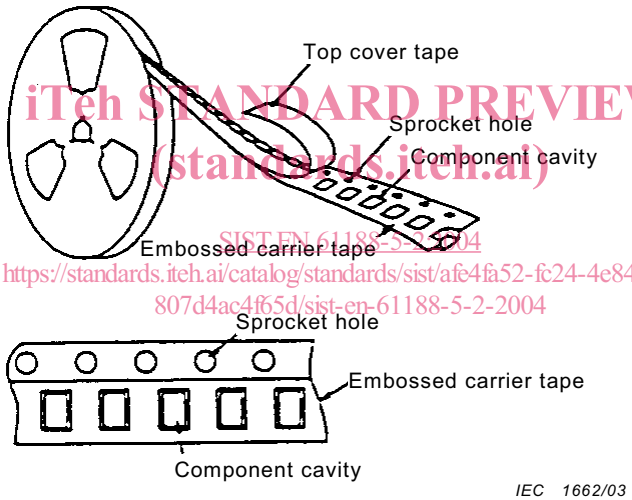

Figure 1 – Packaging

4 Fixed rectangular chip resistors

4.1 Introductory remark

This clause specifies the dimensions of components and land patterns for fixed rectangular chip resistors, together with an analysis of tolerance and solder joint assumptions for the land pattern dimensions.

4.2 Component description

A variety of values exist for the dimensions of resistors. The following subclauses describe the most common types.