IEC 61191-6

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Printed board assemblies –
Part 6: Evaluation criteria for voids in soldered joints of BGA and LGA and measurement method

Ensembles de cartes imprimées –
Partie 6: Critères d'évaluation des vides dans les joints brasés des boîtiers BGA et LGA et méthode de mesure

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FOREWORD

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

FDIS	Report on voting
91/897/FDIS	91/909/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.

A list of all parts of the IEC 61191 series, under the general title *Printed board assemblies*, can be found on the IEC website.

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

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- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

The necessity for the evaluation of voids in soldered joints increases in the industry because the voids may affect the reliability of joints as the devices get smaller. As the number of interconnections increases the reliability per joint must also increase.

This subject has been discussed in some countries and trade organizations, and specific proposals have been made for classification or evaluation of voids to develop process guidelines. The same subject is also studied in academia to find correlation between voids and reliability of a joint. Appreciable findings are now available from the reliability study including relation between shapes of voids and degradation of life due to voids in a joint in thermal cycle stress.

Based on the information available, we developed evaluation criteria of voids in soldered joints for BGA (Ball Grid Array) and LGA (Land Grid Array) and a measurement method.

PRINTED BOARD ASSEMBLIES –

Part 6: Evaluation criteria for voids in soldered joints of BGA and LGA and measurement method

1 Scope

This part of IEC 61191 specifies the evaluation criteria for voids on the scale of the thermal cycle life, and the measurement method of voids using X-ray observation. This part of IEC 61191 is applicable to the voids generated in the solder joints of BGA and LGA soldered on a board. This part of IEC 61191 is not applicable to the BGA package itself before it is assembled on a board.

This standard is applicable also to devices having joints made by melt and re-solidification, such as flip chip devices and multi-chip modules, in addition to BGA and LGA. This standard is not applicable to joints with under-fill between a device and a board, or to solder joints within a device package.

This standard is applicable to macrovoids of the sizes of from 10 µm to several hundred micrometres generated in a soldered joint, but is not applicable to smaller voids (typically, planar microvoids) with a size of smaller than 10 µm in diameter.

This standard is intended for evaluation purposes and is applicable to

– research studies,
– off-line production process control and
– reliability assessment of assembly

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 60068-1:1998, *Environmental testing – Part 1: General and guidance*
Amendment 1:1992

IEC 60194:2006, *Printed board design, manufacture and assembly – Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60194 and the following apply. The terms and definitions for BGA and LGA have been added for the benefit of the reader, see also IEC 60194.

3.1
ball grid array
BGA
surface mount package wherein the bumps for terminations are formed in a grid on the bottom of a package

[IEC 60194, definition 34.1096]