INTERNATIONAL STANDARD

IEC 60191-6-4

First edition 2003-06

Mechanical standardization of semiconductor devices –

Part 6-4:

General rules for the preparation of outline drawings of surface mounted semiconductor device packages – Measuring methods for package dimensions of ball grid array (BGA)

Normalisation mécanique des dispositifs à semiconducteurs –

Partie 6-4:

Règles générales pour la préparation des dessins d'encombrement des dispositifs à semiconducteurs à montage en surface – Méthodes de mesure pour les dimensions des boîtiers matriciels à billes

© IEC 2003 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



CONTENTS

FOI	REWC)RD	. 3	
1	Scop	e	. 4	
2	Norm	ative references	. 4	
3	Terms and definitions			
4	Refer	Reference character and drawings		
	4.1	Ball grid array package (BGA) Type 1 – Ball datum	. 5	
	4.2	Ball grid array package (BGA) Type 2 – Body datum	. 6	
Mea	asurin	g method	. 7	
	5.1	Datum S as pertaining to ball coplanarity		
	5.2	Datum A, B		
	5.3	Definition of specified dimensions and measuring method		
	5.4	Profile of a package edge surface v		
	5.5 5.6	Mounting height AFirst stand-off A1		
	5.7	Second stand-off A4		
	5.8	Ball diameter b		
	5.9	Ball centre position X		
	5.10	Ball coplanarity y	16	
	5.11	Package top flatness y1	16	
Eigi	uro 1	PCA package Type 1 Pell datum	_	
		BGA package Type 1 – Ball datum		
_		– BGA package Type 2 – Body datum – Datum S		
_		– Datum A, B – Type 1		
		- Centre of ball centres (for an even number)		
_		- Centre of ball centres (for an odd number)		
_		- Datum A - Type 2		
•		- Datum B - Type 2		
•		- Tolerance w		
_		— Measuring method of tolerance w		
		- Profile of a package edge surface v		
		2 – Measuring method of package edge surface v		
_		S – Mounting height A		
_		– First stand-off A1		
		- Measuring method of stand-off A1		
_		S – Second stand-off A4		
_		– Measuring method of stand-off A4		
•		B – Ball diameter b		
•		– Ball centre position X		
Fig	ure 20	– Theoretically correct ball centre	15	
Fig	ure 21	- Measuring method of ball centre position X	15	
Fig	ure 22	– Ball coplanarity y	16	
Fia	ure 23	– Package top flatness y1	16	

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES -

Part 6-4: General rules for the preparation of outline drawings of surface mounted semiconductor device packages – Measuring methods for package dimensions of ball grid array (BGA)

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 60191-6-4 has been prepared by subcommittee 47D: Mechanical standardization of semiconductor devices, of IEC technical committee 47: Semiconductor devices.

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

FDIS	Report on voting
47D/531/FDIS	47D/546/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.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

A bilingual version of this publication may be issued at a later date.

MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES -

Part 6-4: General rules for the preparation of outline drawings of surface mounted semiconductor device packages – Measuring methods for package dimensions of ball grid array (BGA)

1 Scope

This part of IEC 60191 covers the requirements for the measuring methods of ball grid array (BGA) 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 60191-6:1990, Mechanical standardization of semiconductor devices – Part 6: General rules for the preparation of outline drawings of surface mounted semiconductor device packages