

EIAJ ED-7303B

JEITA

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EIAJ ED – 7303B

Name and code for integrated circuits package

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CONTENTS

1. Scope of application	1
2. Terms	1
3. History	1
4. Basic thinking for the standardization of package naming and coding method	1
5. Package Code	3
5.1 Construction of package code	3
5.2 Material code of package body	5
5.3 Package specific feature code	5
5.4 Basic package name code	7
5.5 Package terminal number code	11
5.6 Code of package nominal dimension	11
5.7 Terminal in-line interval code	15
5.8 Example of package code	15
5.9 Coding of package code	17
6. Derivative package name code and common name	17
6.1 Derivative package name code	17
6.2 Common name	17
6.3 Relation between each code	17
7. Outer view and characteristics of basic package	21

EXPLANATORY NOTES

1. OBJECTIVES OF THE ESTABLISHMENT	27
2. HISTORY OF REVIEW	27
3. KEY POINTS OF REVIEW AND EXPLANATORY NOTES	27
4. RELATED STANDARDS	29
5. COMMITTEE MEMBERS	29

FIGURES AND TABLES

Figure 1	Package code	3
Figure 2	Relation between each code	21
Table 1	Material code of package body	5
Table 2	Package specific feature code	7
Table 3	Basic package name code	9
Table 4	Example of package terminal number code	11
Table 5	Exception code of package nominal dimension	13
Table 6	Terminal in-line interval code	15
Table 7	Example of package code	15
Table 8	Example of derivative package name code	17
Table 9	Example of common name	19
Table 10	List of name and code	21
Table 11	Outer view and characteristics of typical basic package	23

Name and code for integrated circuits package

1. Scope of application

This standard prescribes the name and code for semiconductor packages (hereinafter referred to as packages) in the **EIAJ ED-7300** (Recommended practice on standard for the preparation of outline drawings of semiconductor packages).

2. Terms

The terms used in this standard shall conform to those defined in the **EIAJ ED-7300**. The new terms not included therein shall be defined in the text of this standard.

3. History

The EIAJ standards related with the name and code for integrated circuits package established and revised as follows:

EIAJ ED-7411 [General Rules for the Preparation of Outline Drawings of Integrated Circuits Package Name and Code, established in February 1989]

EIAJ ED-7401-2 [Packages name and code for semiconductor device package (Integrated Circuits), revised in June 1994]

EIAJ ED-7303 [Name and code for integrated circuits package, established in June 1998]

EIAJ ED-7303A [Name and code for integrated circuits package, revised in March 2001]

First, **EIAJ ED-7411** specified the name and code of an integrated circuits package as one of the outline general rules (the present outline standard). Then, the revised edition of **EIAJ ED-7411** was published as **EIAJ ED-7401-2** according to the principle that integrated circuits are subordinate to **EIAJ ED-7401** and discrete devices are subordinate to **EIAJ ED-7501**.

Next, **EIAJ ED-7303** needed re-organization, revision and addition larger than before. That is, for the purpose of respect to International standard IEC, standards of JEITA (former EIAJ) for integrated circuits and discrete devices were integrated and re-organized. The standards of general rules were re-constructed to six-volume organization, ranging from **EIAJ ED-7300** to **EIAJ ED-7305**. As one of six-volume organization, name and code for package were unified with the common rule to **EIAJ ED-7303**. Furthermore, considering examination result of JWG2 which is the joint meeting of JEITA (former EIAJ) and JEDEC, organization of package code were changed. Continuously **EIAJ ED-7303A** was revised to the more common standard by standardization of Japanese name for various codes and names.

Then, for the needs of new codes addition such as seated height examined and approved by IEC for diversified package and for preparing for packages developed in future, it is newly revised as **EIAJ ED-7303B**.

4. Basic thinking for the standardization of package naming and coding method

This standard is based upon the following basic idea.

EIAJ ED-7303B

(1) Definition of package name and code as follows:

Package name (or Japanese name) : described package in English or Japanese

Package code (or Package name code) : described only by alphabet, number and sign(- , x)

(2) Package name and code shall be defined for enough to cover new developed packages.

(3) Package code shall be specified to connect the each codes means material, specific feature, package name, terminal number, terminal in-line interval and nominal dimension to discriminate each packages.

(4) A package name is classified into three names, basic package name, derivative package name and common name, and shall be used properly suitably. Furthermore, each code which omitted the package code exists to each package name.

5. Package Code

5.1 Construction of package code

Package Code is constructed by 6 items below, and maximum of 30 letters shall be specified.

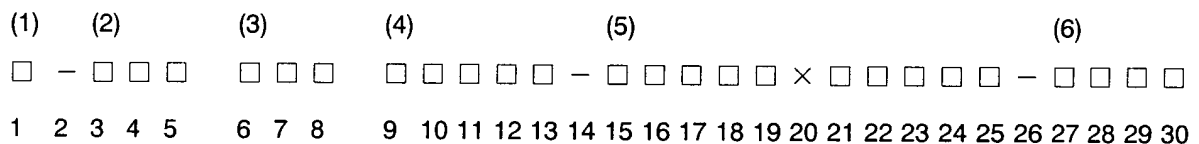


Figure 1 Package code

(1) **Material code of package body** (see Table 1)

1 letter shall be specified.

(2) **Package specific feature code** (see Table 2)

Maximum of 3 letters shall be specified.(Maximum of 3 features)

(3) **Basic package name code** (see Table 3)

3 letters shall be specified in principle (exception exists).

(4) **Package terminal number code** (see Table 4)

Maximum of 5 letters shall be specified.

(5) **Package nominal dimension code** (see Table 5)

Maximum of 11 letters shall be specified.

(6) **Terminal in-line interval code** (see Table 6)

4 letters shall be specified.

EIAJ ED-7303B

5.2 Material code of package body

According to **Table 1**, material code of package body shall be specified 1 letter.

Table 1 Material code of package body

Code	Material	Applicable to
C	Ceramic	Multi-layer ceramic package
G	Ceramic	Glass sealed ceramic package
M	Metal	Package consisting of metallic materials
P	Plastic	Package molded with plastic
T	Tape	Package consisting of tape, For BGA and LGA, tape used for interposer.

5.3 Package specific feature code

According to **Table 2**, Package specific feature code shall be specified maximum of 3 letters (maximum of 3 features).

5.3.1 Coding rule for package specific feature

- (1) Present "Design guideline of integrated circuit" are given a priority.
- (2) For new package, decide to apply this rule or not at making "Design guideline of integrated circuit".
- (3) If "Design guideline of integrated circuit" is not exist, decide to apply this rule or not at making "Standard of integrated circuit package".
- (4) In the case of adding 2 or more specific feature codes to, according to the order of specific feature, first letter is code of highest order. Maximum of 3 letters (maximum of 3 features) shall be specified.

Example: TSSOP, HTSSOP, LSSOP, DSDIP, LBQFP, DLSOI and so on.

Table 2 Package specific feature code

Order	Functional classification	Code	Meaning	Specific feature
-	-	nothing	-	Basic package
1	Outline addition	H	Heat Sink	Heat sink
		D	Window	Window
		P	Piggyback	Piggyback
2	Seated height	L	Low profile	Maximum seated height, 1.20mm < L ≤ 1.70mm
		T	Thin	Maximum seated height, 1.00mm < T ≤ 1.20mm
		V	Very thin	Maximum seated height, 0.80mm < V ≤ 1.00mm
		W	Very-Very thin	Maximum seated height, 0.65mm < W ≤ 0.80mm
		U	Ultra thin	Maximum seated height, 0.50mm < U ≤ 0.65mm
		X	Extremely thin	Maximum seated height, X ≤ 0.50mm
3	Terminal pitch or terminal position	S	Shrink	Shrink pitch of basic package (only used for SOP, DIP, ZIP, PGA)
		F	Fine pitch	Terminal pitch is 0.8mm or less. (only used for BGA, LGA) Terminal pitch is 0.5mm or less. (only used for QFP)
		I	Interstitial	Package with terminal other than grid array (only used for PGA, BGA, LGA)
4	Lead protection	B	Bumper	with bumper
		G	Guard Ring	with Guard Ring
		R	Retain	with Retain

5.4 Basic package name code

According to **Table 3**, basic package name code shall be specified 3 letters in principle. To classify package form in **Table 3**, refer to **EIAJ ED-7300**.

As an exception, derivative package name TSOP(1), TSOP(2), DTP(1) and DTP(2) corresponding to basic package name code SOP and DTP shall be managed as basic package name code and allowed 7 or 6 letters. In this case, conventional TSOP(I) and TSOP(II) shall not be allowed to use for TSOP(1) and TSOP(2).

EIAJ ED-7303B

Furthermore, in the case of TSOP(1), TSOP(2), DTP(1) and DTP(2), if package code letters shall be over 30 letters, missing terminals code is omitted like the example below.

For example

```

P - H T S O P ( 2 ) 5 0 / 4 4 - 1 0 . 1 6 × 1 3 . 2 5 - 0 . 5 0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
                                     ↓
P - H T S O P ( 2 ) 5 0           - 1 0 . 1 6 × 1 3 . 2 5 - 0 . 5 0
1 2 3 4 5 6 7 8 9 10 11 12       13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
    
```

Table 3 Basic package name code

Form ⁽⁴⁾	Code	Basic package name
A	QFP	Quad Flat Package
	QFI	Quad Flat I-Leaded Package
	QFJ	Quad Flat J-Leaded Package
	QFF	Quad Flat F-Leaded Package
	QFN	Quad Flat No Lead Package
B	SOP	Small Outline Package
	SOI	Small Outline I-Leaded Package
	SOJ	Small Outline J-Leaded Package
	SOF	Small Outline F-Leaded Package
	SON	Small Outline No Lead Package
	DIP	Dual Inline Package
C	SIP	Single Inline Package
	ZIP	Zigzag Inline Package
	SVP	Surface Vertical Package
D	PGA	Pin Grid Array Package
	LGA	Land Grid Array Package
	BGA	Ball Grid Array Package
G	DTP	Dual Tape Carrier Package
	QTP	Quad Tape Carrier Package

EIAJ ED-7303B

5.5 Package terminal number code

According to **Table 4**, Package terminal number code shall be specified maximum of 5 letters. In addition, terminal shall be a generic term for lead, pin, land, bump, ball and so on. Which formed for different connection method to outside.

For missing terminals in **Table 4**, 5 letters shall be accepted for 100 pins or less. For example, in the case of 28 terminals package with 2 terminals missing, giving a code of 28/26.

Table 4 Example of package terminal number code

Code	Terminal number
8	8
14	14
64	64
144	144
1000	1000
28/26	28 (missing 2 terminals)

5.6 Code of package nominal dimension

Code of package nominal dimension is constructed by "package body width (mm)"x"package body length (mm)" and shall be specified maximum of 11 letters.

When the figure below the decimal point is "x0" or "00", delete the "0" or "00" from the code.

For example: 39.62 x 39.62, 11.50 x 14.50, 14.00 x 14.00 etc.

New code : 39.62 x 39.62, 11.5 x 14.5, 14 x 14 etc.

If package nominal dimension specified on existing "Design guideline of integrated circuit" and "Standard of integrated circuit package" is not same as new definition of "package body height (mm)"x"package body length (mm)", it is allowed to use existing code for exception, but must be specified both new and existing codes (see **Table 5**).

At the proposal to IEC, must be used only the new definition of "package body height (mm)"x"package body length (mm)". If nominal value was not specified on existing "Design guideline of integrated circuit" and "Standard of integrated circuit package", the maximum value must be used.

Table 5 Exception code of package nominal dimension

Basic and derivative package name code	Nominal dimension	Example ⁽⁵⁾
QFP	Body size	1010, 1420, etc.
QFI	terminal in-line interval	0325, 0400, etc.
QFJ	Body size (square/rectangle)	S115, R400 etc.
QFN	Body size (square/rectangle)	S350, R285, etc.
SIP	maximum seated height	0240, 0440, etc.
ZIP	maximum seated height	0325, 0400, etc.
DIP	terminal in-line interval	0300, 0400, etc.
PGA	matrix size (cavity up/down)	S10U, R11D, etc.
SOP	distance between mount pad centers	0225, 0300, etc.
TSOP (1)	Outermost side dimension	1014, 0820, etc.
TSOP (2)	Body width	0300, 0400, etc.
SOI	terminal in-line interval	0300, 0400, etc.
SOJ	Body width	0300, 0400, etc.
SSOP	Body width	0300, 0044, etc.
SVP	Body size	0516, 1336, etc.
DTP	Body width	0300, 0450, etc.
BGA	Body size	1010, 2727, etc.
FBGA	Body size	1010, 2121, etc.

English letters in code examples in **Table 5** indicate the following contents

- S: Square
- R: Rectangle
- U: Cavity Up
- D: Cavity Down

EIAJ ED-7303

5.7 Terminal in-line interval code

According to **Table 6**, terminal in-line interval code shall be specified 4 letters.

Inch size terminal in-line interval expressed in millimeters shall be written on round form.

(see **ISO-370**)

Table 6 Terminal in-line interval code

Code	Terminal in-line interval
2.54	2.54mm
1.78	1.778mm
1.50	1.50mm
1.27	1.27mm
1.25	1.25mm
1.00	1.00mm
0.80	0.80mm
0.75	0.75mm
0.65	0.65mm
0.50	0.50mm
0.40	0.40mm
0.30	0.30mm

5.8 Example of package code

Table 7 shows example of package code. () is allowed for exception, but not be used for IEC proposal.

Table 7 Example of package code

Package code ⁽⁶⁾
P- ZIP20 -9.4 x 26.67 -1.27 (P- ZIP20 -0400 -1.27)
C -SDIP64 -18.8 x 83.82 -1.78 (C -SDIP64 -0750 -1.78)
C-PGA144 -39.62 x 39.62 -2.54 (C-PGA144 -S15U -2.54)
P -SOP28 -10.03 x 19.05 -1.27 (P -SOP28 -0450 -1.27)
P -SOJ26 -7.74 x 17.57 -1.27 (P -SOJ26 -0300 -1.27)
P -QFP80 -14 x 20 -0.80 (P -QFP80 -1420 -0.80)
P -TSOP (1) 32 -10 x 12.4 -1.27 (P -TSOP (1) 32 -1014 -1.27)
P -QFJ84 -29.41 x 29.41 -1.27 (P -QFJ84 -S115 -1.27)
P -SSOP40 -11.5 x 17 -0.80 (P -SSOP40 -0450 -0.80)
T -DTP (2) 16 -7.62 x 10.79 -1.27 (T -DTP (2) 16 -0300 -1.27)

EIAJ ED-7303

5.9 Coding of package code

When a new integrated circuits package design guideline or a new standard of integrated circuits package are established by the Technical Standardization Committee on Semiconductor Device Package, new package code shall be assigned. In the case of new package name or new code excepted number of terminals will be necessity, this standard shall be revised.

6. Derivative package name code and common name

6.1 Derivative package name code

Derivative package is constructed by package specific feature code (see **Table 2**) and package name code (see **Table 3**). **Table 8** shows some examples.

6.2 Common name

Common name is constructed by material code of package body (see **Table 1**) and derivative package name code, and shows the form of package directly. **Table 9** shows some examples.

When new common name is necessary to be established, it must be reviewed by the Technical Standardization Committee on Semiconductor Device Package according with **EIAJ ED-7300** and this standard.

6.3 Relation between each code

Figure 2 shows the relation between package code, basic package name code, derivative package name code and common name.

Table 10 shows list of name and code.

Table 8 Example of derivative package name code

Basic package name code	Derivative package name code	Derivative package name
QFP	LQFP	Low Profile QFP
	TQFP	Thin QFP
	GQFP	Guard Ring QFP
	BQFP	Bumper QFP
	HQFP	Heat Sink QFP
	RQFP	Retain QFP
SOP	SSOP	Shrink SOP
	HSOP	Heat Sink SOP
	TSOP (1)	Thin SOP Type1
	TSOP (2)	Thin SOP Type2
	LSSOP	Low Profile Shrink SOP
	TSSOP	Thin Shrink SOP
	WSOP	Window SOP
DIP	SDIP	Shrink DIP
	WDIP	Window DIP
	WSDIP	Window Shrink DIP
ZIP	SZIP	Shrink ZIP
PGA	IPGA	Interstitial PGA
	SPGA	Shrink PGA
BGA	FBGA	Fine Pitch BGA
DTP	DTP (1)	DTP Type1
	DTP (2)	DTP Type2

Table 9 Example of common name

Basic and derivative package name code	Common name	Basic and derivative package name
LQFP	P-LQFP	Plastic LQFP
	C-LQFP	Ceramic LQFP
	G-LQFP	Glass sealed ceramic LQFP
TQFP	P-TQFP	Plastic thin QFP
	C-TQFP	Ceramic thin QFP
FQFP	P-FQFP	Plastic fine pitch QFP
	C-FQFP	Ceramic fine pitch QFP
TSOP	P-TSOP	Plastic TSOP
SSOP	P-SSOP	Plastic SSOP
TSSOP	P-TSSOP	Plastic TSSOP
SOJ	P-SOJ	Plastic SOJ
VQFN	P-VQFN	Plastic very thin QFN
DIP	P-DIP	Plastic DIP
	C-DIP	Ceramic DIP
	G-DIP	Glass sealed ceramic DIP
PGA	C-PGA	Ceramic PGA
	P-PGA	Plastic PGA
BGA	P-BGA	Plastic BGA
	T-BGA	Tape BGA
	C-BGA	Ceramic BGA
LBGA	P-LBGA	Plastic LBGA
FBGA	P-FBGA	Plastic FBGA
	T-FBGA	Tape FBGA
	C-FBGA	Ceramic FBGA

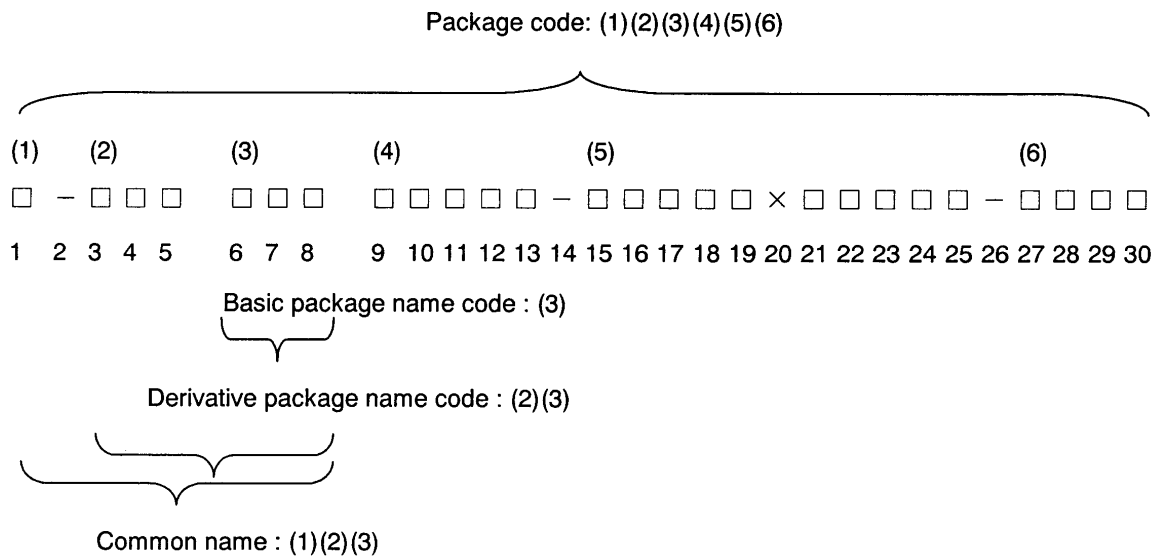


Figure 2 Relation between each code

Table 10 List of name and code

	Name	Code
Package code	-	Figure 1, Table 7
Basic package name and code	Table 3 (Third and fourth column), Table 10	Table 3 (Second column)
Derivative package name and code	Table 8 (Third and fourth column)	Table 8 (Second column)
Common name	Table 9 (Third and fourth column)	Table 9 (Second column)

7. Outer view and characteristics of basic package

Table 11 shows outer view and characteristics of typical basic packages shown in **Table 3**. As specified in **EIAJ ED-7300**, packages are classified by shapes of the package body and terminals. External shapes are classified into eight forms ranging from A to H and terminal shapes are also classified into eight types.

Table 11 Outer view and characteristic of typical basic package

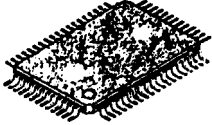
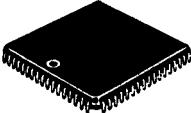

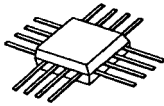
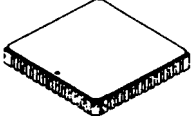

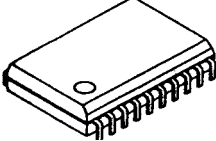

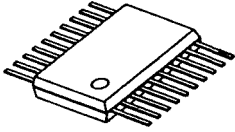
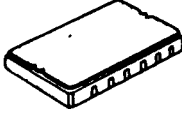



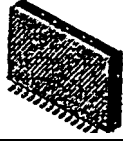
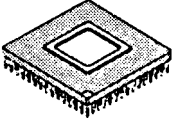
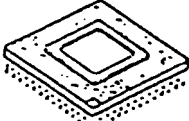

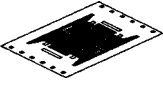
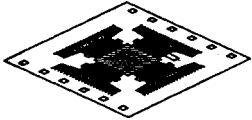
Package	Appearance	Characteristics
QFP		Terminal leads are on four sides of package and are formed in gull wing-shape (L-shape)
QFI		Terminal leads are on four sides of package and are formed in I-shape.
QFJ		Terminal leads are on four sides of package and are formed in J-shape.
QFF		Terminal leads are on four sides of package and are non-formed.
QFN		Terminals are in a single line on each side and exist on four sides and bottom or only on bottom of package.
SOP		Terminal leads are on two sides of package and are formed in gull wing-shape (L-shape).
SOI		Terminal leads are on two sides of package and are formed in I-shape.
SOJ		Terminal leads are on two sides of package and are formed in J-shape.
SOF		Terminal leads are on two sides of package and are non-formed.
SON		Terminals are in a single line on each side and exist on two sides and bottom or only on bottom of package.

Table 11 Outer view and characteristic of typical basic package (continued)

Package	Appearance	Characteristics
DIP		Terminal leads are on two opposite sides of package for through hole mount.
SIP		Terminal leads are on one side of the package and are arranged in a row.
ZIP		Terminal leads are on one side of the package and are bent alternately within the package thickness.
SVP		Terminal leads are on one side of the package and are formed in L-shape.
PGA		Terminal pins are on top or bottom surface of the package and are arranged in two or more lines or grid array.
LGA		Terminal lands are on top or bottom surface of the package and are arranged in two or more lines or grid array.
BGA		Terminal balls or bumps are on top or bottom surface of the package and are arranged in two or more lines or grid array.
DTP		Terminal leads are on two sides of package and package body is constructed by tape.
QTP		Terminal leads are on four sides of package and package body is constructed by tape.

EXPLANATORY NOTES

1. OBJECTIVES OF THE ESTABLISHMENT

EIAJ ED-7303 "Name and code for integrated circuits package" was established in June 1988, revised in March 2001 as **EIAJ ED-7303A** and has been recognized and used in the semiconductor package industry. However the coordination with IEC as international standards has been needed since IEC reviewed and approved new codes such as seated height.

This revise is aimed for addition of some new codes such as seated height and reorganizations of code and being applied by many package users and vendors.

Electronic Industries Association of Japan (EIAJ) and the Japan Electronic Development Association (JEIDA) have merged effective November 1, 2000, the Japan Electronics and Information Technology Industries Association (JEITA).

2. HISTORY OF REVIEW

Following the suggestion from the Technical Standardization Committee on Semiconductor Device Package, this standard was firstly discussed by the Semiconductor Common Standard Sub-Committee in September 2001, and the draft thus prepared was reviewed and approved by the Technical Standardization Committee on Semiconductor Device Package in May 2002.

3. KEY POINTS OF REVIEW AND EXPLANATORY NOTES

3.1 Package specific feature code (Table 2)

- (1) Package specific feature code "W" was changed into "D" for package with window. In order to add "W" to seated height, package specific feature code of package with window was changed because it is rare to be used.
- (2) Package specific feature code "A" was changed into "P" for package assembled in piggyback.
- (3) "W", "U" and "X" were added to seated height.
- (4) Seated height L (T, V, W, U and X) was newly defined. In former standard, "L" was specified as low profile, "T" as thin and "V" as very thin. However, new definition was needed because of difficulty to adopt proper Japanese to "W", "U" and "X".
- (5) Specific feature of terminal position code "I" was changed. PGA, BGA and LGA packages with terminals other than in a grid array were unified into "I".

3.2 Example of common names

- (1) TQFP, FQFP, TSOP, SSOP, TSSOP, SOJ, VQFN and LBGA were added to basic and derivative package name code

3.3 Outer view and characteristic of typical basic package (Table 11)

- (1) The characteristics of QFN and SON were added. Especially in order to avoid the confusion with LGA, the terminals of QFN and SON were in a single line on each side.

EIAJ ED-7303B

(2) The characteristics of PGA, BGA and LGA were added. Especially in order to avoid the confusion with QFN and SON, terminals of LGA were in two or more line or in a grid array. That is, when terminals exist only in bottom, terminals of QFN and SON are only in a single line on each side and terminals of LGA is in two or more line or in a grid array.

3.4 "Contents" and "Figures and Tables" were added.

4. RELATED STANDARDS

(1) EIAJ ED-7300 "Recommended practice on standard for the preparation of outline drawings of semiconductor packages", August 1997.

(2) EIAJ ED-7301 "Manual for the standard of integrated circuits package", December 1996.

(3) EIAJ ED-7302 "Manual for integrated circuits package design guideline", April 1997.

(4) IEC 60191-4 (Second edition) "Coding system and classification into forms of package outlines for semiconductor device packages", October 1999.

(5) JEDEC JESD30-B "Descriptive Designation System for Semiconductor-Device Packages", April 1995.

5. COMMITTEE MEMBERS

This standard was discussed and prepared mainly by Sub-Committee on General Rules and Common Matters of Technical Standardization Committee on Semiconductor Device Package. The members are as shown below.

<Technical Standardization Committee on Semiconductor Device Package>

Chairman	Sony Corporation	Kazuo Nishiyama
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<Sub-committee on General Rules and Common Matters>

Chief	Hitachi, Ltd.	Munehiro Yamada
Sub-Chief	Matsushita Electric Industrial Co., Ltd.	Hiroyoshi Yoshida
Member	Sony Corporation	Satoshi Uchikoba
	TOSHIBA CORPORATION	Hideo Aoki
	TOSHIBA CORPORATION	Jun-ichi Ohno
	NEC Corporation	Shuichi Matsuda
	MITSUBISHI ELECTRIC CORPORATION	Kazushi Hatauchi
	UNITECHNO INC.	Shinichi Nakamura
	TOSHIBA CORPORATION	Masahiko Sakurai
	Matsushita Electric Industrial Co., Ltd.	Tomohiro Tamaki
	Yamaichi Electronics Co., Ltd.	Shunji Abe