



Standard of Japan Electronics and Information Technology Industries Association

EIAJ ED - 7311-16A

Standard of integrated circuits package (C-LGA)

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Prepared by
Technical Standardization Committee on Semiconductor Device Package

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Standard of integrated circuits package (C-LGA)

1. Scope of Application

This standard regulated which among the packages classified as form D in the **EIAJ ED-7300** [Recommended practice on Standard for the preparation of outline drawings of semiconductor packages]. Ceramic Land Grid Array (hereinafter referred to as C-LGA) that the package carrier material is ceramic. C-LGA which terminal pitch is $\square = 1.00\text{mm}$ and Ceramic Fine pitch Land Grid Array (hereinafter referred to as C-FLGA) which terminal pitch is $\square =$ equal to or less than 0.80mm . This standard provides about those outline drawings and dimensions.

Note: This standard is correspond to **EIAJ EDR-7316A** (Design guideline of integrated circuits for Fine-pitch Ball Grid Array and Fine-pitch Land Grid Array (FBGA/FLGA)), established in April 2002.

2. Definition of the Technical Terms

The definition of the technical terms used in this standard is in conformity with **EIAJ ED-7300** and **EIAJ ED-7303B** (Name and Code for Integrated Circuits Package). And the definitions of technical terms appearing a new are given within the text of this standard.

3. Background

In recent years, it corresponds to the multifunction of the electronic equipment, and the demand to the numerous pin package is increasing rapidly. It answers the demand, at first, Pin Grid Array (PGA) appeared and which the pin insertion type to into the printed circuit board through hole. Then, with to do mount area small being possible that Ball Grid Array (hereinafter referred to as BGA) and LGA appeared which surface mount type of the printed circuit board. This standard intended to standardize the outer dimensions of C-LGA and C-FLGA ensure compatibility between products as far as possible for standardization.

4. Definition of LGA, FLGA

At the "Outline classification of shapes of semiconductor package" in **EIAJ ED-7300**, It is package "LGA" which is classified into form D. "LGA" define that package with metal Lands or metal bumps which terminal height is less than or equal to 0.10mm , and positioned in an array on base plane of the package as the external terminals. This packages structure makes it possible to surface mount the packages to the printed circuit board. ("BGA" define that package with metal Balls or metal bumps which terminal height exceeds 0.10mm .)

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(1) Notation in terminal pitch (\square)

It defines Notation in terminal pitch (\square) as follows.

In case of terminal pitch \square = less than or equal to 1.00mm, "LGA" (Land Grid Array)

In case of terminal pitch \square = less than or equal to 0.80mm, "FLGA" (Fine-pitch Land Grid Array)

(2) Definition of material notation

It defines a material notation in the package name and the code as follows.

Ceramic type (C-), It is classified to packages which consist of ceramic substrate as interposer material.

(3) Notation in terminal array

It defines notation in terminal array as follows.

"ILGA" (Interstitial Land Grid Array) Terminal array are staggered.

5. Numbering of Terminals

According to **EIAJ ED-7300** rules, Index is positioned at the lower left corner of the package body when it is viewed from the seating plane. A row that is the closest to the index corner is named, A, and as the row moves further away from the index the rows are named, B, C, AA, AB, Also, a column that is the closest to the index corner is numbered 1, and as the column moves further away to the right, they are numbered 2, 3,.....The numbering of terminals are named by these combinations A1, B1,..... In naming the rows, the letters I, O, Q, S, X, and Z should not be used.

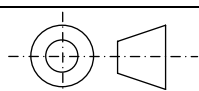
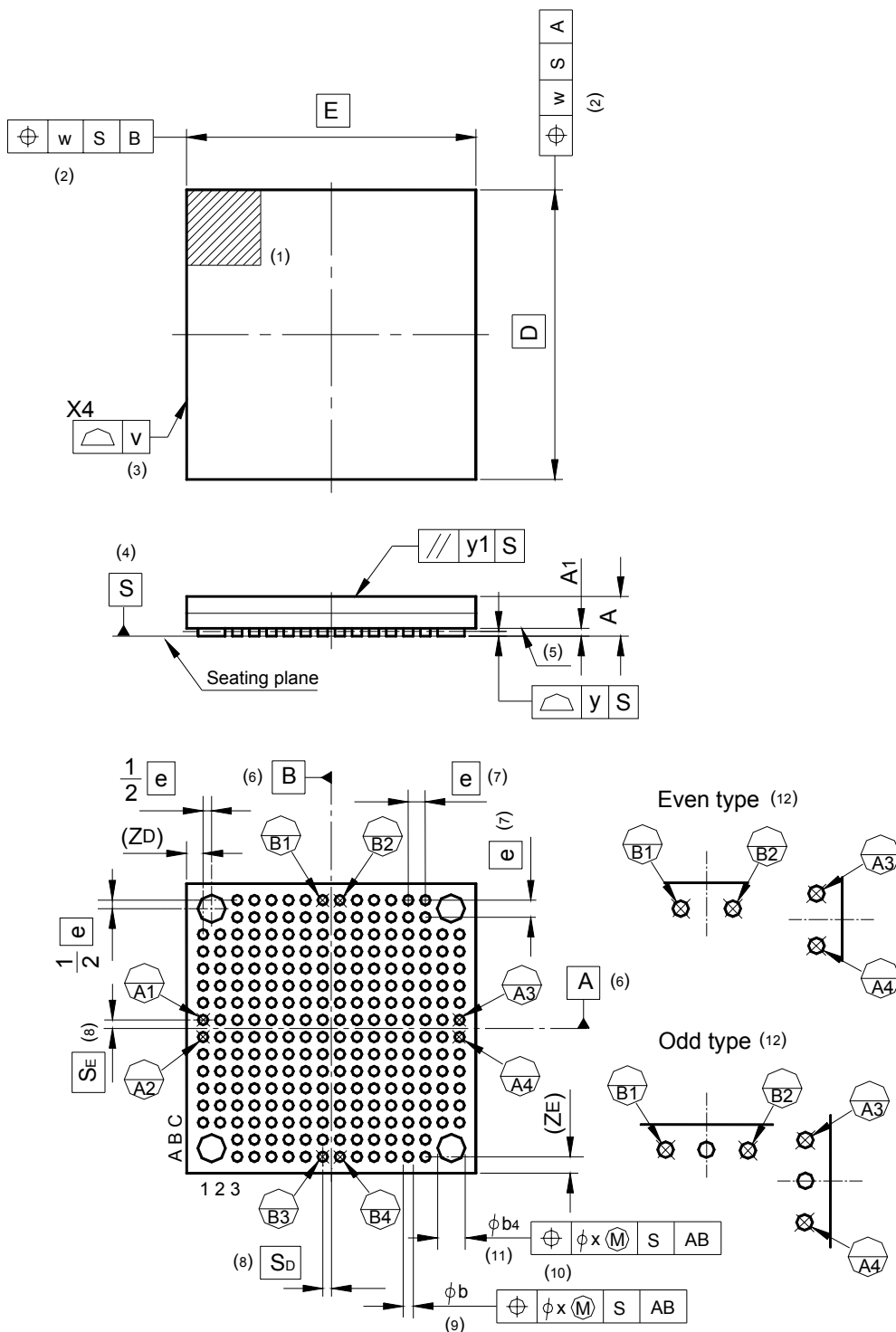
6. Definition of package length (\square), package width (\square)

The index is positioned at the lower left corner of the package body when it is viewed from the seating plane. A vertical direction side is classified as package length (\square) and A horizontal direction side (\square) is package width. It doesn't define size relation between the package length and the package width.

7. Nominal Dimensions

The package body size D×E (package length: D, package width: E) is regarded as Nominal dimensions.

Figure 1



JEITA STANDARD
PACKAGE OUTLINE DRAWINGS

DATE
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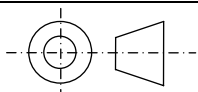
SHEET
1/43

PACKAGE NAME
C-LGA

JEITA REGISTRATION NO.
IC-7316A-001

Notes:

- (¹) Shows the allowable position of the Index mark area, which is basically 1/16 with package body size, however in case of small package body size, it is less than 1/4 with package body size, It must be included in the shaded area entirely.
- (²) Indicates package center offset (w). Package center offset (w) prescribes each of directions package width (E) and length (D) to datum lines A, B in the package center.
- (³) Indicates tolerance of package lateral profile (v). Tolerance of package lateral profile (v) is applied to 4 sides of the package body. Meaning is tolerance zone of package outline.
- (⁴) Indicates seating plane (S). Seating plane is defined by the plane, which package contacts to mount surface.
- (⁵) Indicates base plane, which is in parallel with seating plane (S) and links lowest point of package body. However, it except the stand off (A₁).
- (⁶) Datum lines of package center (A, B) are coordinates axes, which were looked for in the minimum square method for the offset of the terminal position with the geometrical true to become smallest. (Refer to **explanation 4. Definition of datum**)
- (⁷) Terminal pitch (e) specifies the true geometric position of the terminal axis.
- (⁸) Center terminal position in package direction of width and length (S_E, S_D) are stipulated the position of the closest terminal with respect to datum lines A, B.
- (⁹) Terminal diameter (φb) provides at the maximum diameter when regarding as the projection perpendicularly from seating plane (S).
- (¹⁰) Maximum material requirements apply to the positional tolerance of the terminal center (φX), and it is applied to all terminals. (Refer to **ISO 2692/JIS B 0023**)
- (¹¹) Indicates reinforcement land(φb₄), which are situated on the package 4 corner.
- (¹²) (A1, A2), (A3, A4), (B1, B2), (B3, B4) shows the terminals which decides datum line A, B.
- (¹³) Position of terminal matrix and reinforcement land. It is assumed 1/2 e -->0, because it agrees for e =0.50mm.

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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

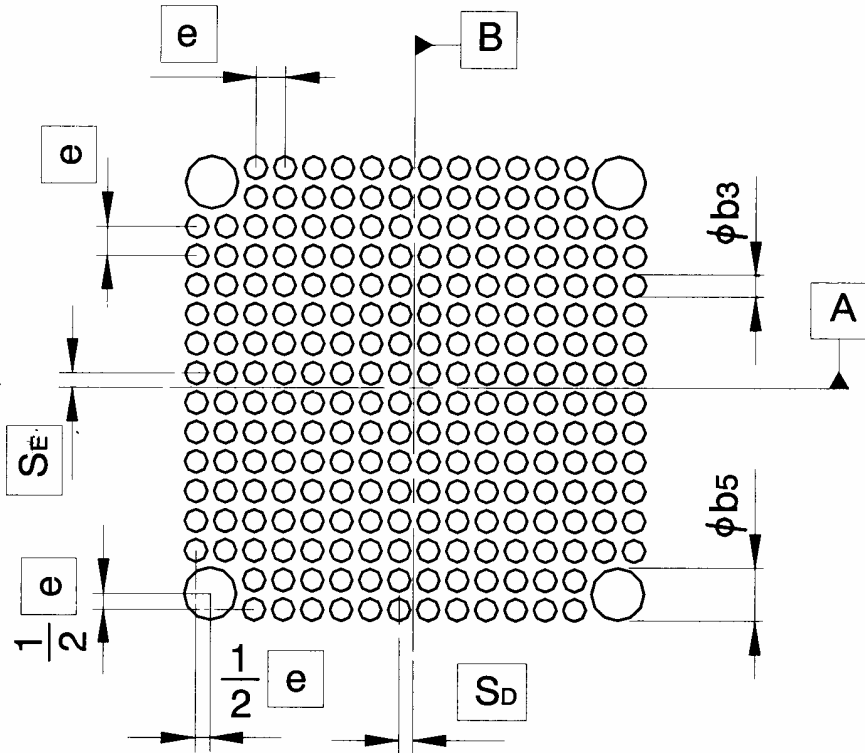
備考：端子存在範囲

Remarks: Range where pattern of terminal position areas exist.

フットパターン設計の参考資料となるよう、端子の存在範囲を図2に示す。

Range where pattern of terminal position areas exist is shown in Figure 2 as reference for foot pattern design.

図2
Figure 2



注(Notes)

- (1) 端子存在範囲における端子径 (ϕb_3) は次式によって算出される。
$$\phi b_3 = \phi b_{\max} + x$$

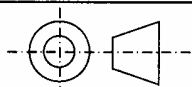
(2) 端子存在範囲における補強ランド径 (ϕb_5) は次式によって算出される。
$$\phi b_5 = \phi b_{4\max} + x$$

(1) Range where pattern of terminal diameter position areas exist (ϕb_3) is calculated by the following formula.

$$\phi b_3 = \phi b_{\max} + x$$

(2) Range where pattern of reinforcement land diameter position areas exist (ϕb_5) is calculated by the following formula.

$$\phi b_5 = \phi b_{4\max} + x$$



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PACKAGE OUTLINE DRAWINGS

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PACKAGE NAME
C-LGA

JEITA REGISTRATION
NO.IC-7316A-001

EIAJ ED-7311-16A**8. Registration table****Package name: LGA, FLGA****8.1 Registration number: IC-7316A-001**

It indicate registration number, [(Number of existing terminals “n”)-001-(serial number, 3 cords)]

serial number table

Registration Numbers in the table indicate, (serial number) of 1st cord and 3rd cord.

CODE		1st		2nd		3rd
symbol	e		D		E	
	1.00	A	3.00	A	3.00	A
	0.80	B	4.00	B	4.00	B
	0.65	C	5.00	C	5.00	C
	0.50	D	6.00	D	6.00	D
	0.40	E	7.00	E	7.00	E
			8.00	F	8.00	F
			9.00	G	9.00	G
			10.00	H	10.00	H
			11.00	J	11.00	J
			12.00	K	12.00	K
			13.00	L	13.00	L
			14.00	M	14.00	M
			15.00	N	15.00	N
			16.00	P	16.00	P
			17.00	Q	17.00	Q
			18.00	R	18.00	R
			19.00	S	19.00	S
			20.00	T	20.00	T
			21.00	U	21.00	U


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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

8.2 登録一覧表リスト(List of Registration table)

登録番号は, [(実端子数 “n”) - 001 - (整理番号 3 桁)] を示す。

It indicate registration number, [(Number of existing terminals “n”)-001-(serial number, 3 cords)]

表 1 C-LGA, C-FLGA 登録一覧表
Table 1 C-LGA,C-FLGA List of Registration table

		Terminal Pitch 			
		1.00	0.80	0.65	0.50
E x D	3x3				
	4x4				
	5x5				
	6x6				
	7x7	32-001-AEE	47-001-BEE	83-001-CEE	132-001-DEE
		45-001-AEE	60-001-BEE	96-001-CEE	165-001-DEE
	8x8	47-001-AFF	83-001-BFF	104-001-CFF	188-001-DFF
		60-001-AFF	96-001-BFF	117-001-CFF	221-001-DFF
	9x9	64-001-AGG	104-001-BGG	152-001-CGG	252-001-DGG
		77-001-AGG	117-001-BGG	165-001-CGG	285-001-DGG
	10x10	83-001-AHH	127-001-BHH	179-001-CHH	324-001-DHH
		96-001-AHH	140-001-BHH	192-001-CHH	357-001-DHH
	11x11	104-001-AJJ	152-001-BJJ	239-001-CJJ	404-001-DJJ
		117-001-AJJ	165-001-BJJ	252-001-CJJ	437-001-DJJ
	12x12				
	13x13	152-001-ALL	239-001-BLL	344-001-CLL	588-001-DLL
		165-001-ALL	252-001-BLL	357-001-CLL	621-001-DLL
	14x14				
	15x15	208-001-ANN	307-001-BNN	467-001-CNN	804-001-DNN
		221-001-ANN	320-001-BNN	480-001-CNN	837-001-DNN
	16x16				
	17x17	272-001-AQQ	424-001-BQQ	608-001-CQQ	1052-001-DQQ
		285-001-AQQ	437-001-BQQ	621-001-CQQ	1085-001-DQQ
	18x18				
	19x19				
	20x20				
	21x21				

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8.3 登録一覧表, Registration table

呼び寸法(Nominal dimension): DXE=07.00X07.00

Unit: mm

整理番号 Serial Number		32-001-AEE			備考 Remark	45-001-AEE			備考 Remark
外形タイプ External Type		C-LGA032-07.00×07.00-1.00				C-LGA045-07.00×07.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	7.00	—		—	7.00	—	
		—	7.00	—		—	7.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	32	—	n _{max} =16-1	—	45	—	n _{max} =4
	M _D	—	7	—		—	7	—	
	M _E	—	7	—		—	7	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.32AEE	フルマトリックス Full matrix			*See Fig.45AEE
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA	—	—	1.20	TLGA
	—	—	1.00	VLGA	—	—	1.00	VLGA
	—	—	0.80	WLGA	—	—	0.80	WLGA
	—	—	0.65	ULGA	—	—	0.65	ULGA
	—	—	0.50	XLGA	—	—	0.50	XLGA

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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=07.00X07.00

Unit: mm



整理番号 Serial Number		47-001-BEE			備考 Remark	60-001-BEE			備考 Remark
外形タイプ External Type		C-FLGA047-07.00×07.00-0.80				C-FLGA060-07.00×07.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	7.00	—		—	7.00	—	
		—	7.00	—		—	7.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	47	—	n _{max} -16-1	—	60	—	n _{max} -4
	M _D	—	8	—		—	8	—	
	M _E	—	8	—		—	8	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.47BEE	フルマトリックス Full matrix			*See Fig.60BEE
Group2		—	0.40	—		—	0.40	—	
		—	0.40	—		—	0.40	—	
	Z _D	—	0.70	—		—	0.70	—	
	Z _E	—	0.70	—		—	0.70	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA	—	—	1.20	TFLGA
	—	—	1.00	VFLGA	—	—	1.00	VFLGA
	—	—	0.80	WFLGA	—	—	0.80	WFLGA
	—	—	0.65	UFLGA	—	—	0.65	UFLGA
	—	—	0.50	XFLGA	—	—	0.50	XFLGA

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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=07.00X07.00

Unit: mm

整理番号 Serial Number		83-001-CEE			備考 Remark	96-001-CEE			備考 Remark
外形タイプ External Type		C-FLGA083-07.00×07.00-0.65				C-FLGA096-07.00×07.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	7.00	—		—	7.00	—	
		—	7.00	—		—	7.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	83	—	n _{max} -16-1	—	96	—	n _{max} -4
	M _D	—	10	—		—	10	—	
	M _E	—	10	—		—	10	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.83CEE	フルマトリックス Full matrix			*See Fig.96CEE
Group2		—	0.325	—		—	0.325	—	
		—	0.325	—		—	0.325	—	
	Z _D	—	0.575	—		—	0.575	—	
	Z _E	—	0.575	—		—	0.575	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA	—	—	1.20	TFLGA
	—	—	1.00	VFLGA	—	—	1.00	VFLGA
	—	—	0.80	WFLGA	—	—	0.80	WFLGA
	—	—	0.65	UFLGA	—	—	0.65	UFLGA
	—	—	0.50	XFLGA	—	—	0.50	XFLGA

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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=07.00X07.00

Unit: mm

整理番号 Serial Number		132-001-DEE			備考 Remark	165-001-DEE			備考 Remark
外形タイプ External Type		C-FLGA132-07.00×07.00-0.50				C-FLGA165-07.00×07.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1	D	—	7.00	—		—	7.00	—	
	E	—	7.00	—		—	7.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
	e	—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	132	—	n _{max} -36-1	—	165	—	n _{max} -4
	M _D	—	13	—		—	13	—	
	M _E	—	13	—		—	13	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.132DEE	フルマトリックス Full matrix			*See Fig.165DEE
Group2	S _D	—	0.00	—		—	0.00	—	
	S _E	—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

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PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=08.00X08.00

Unit: mm

整理番号 Serial Number		47-001-AFF			備考 Remark	60-001-AFF			備考 Remark
外形タイプ External Type		C-LGA047-08.00×08.00-1.00				C-LGA060-08.00×08.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	8.00	—		—	8.00	—	
		—	8.00	—		—	8.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	47	—	n _{max} -16-1	—	60	—	n _{max} -4
	M _D	—	8	—		—	8	—	
	M _E	—	8	—		—	8	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.47AFF	フルマトリックス Full matrix			*See Fig.60AFF
Group2		—	0.50	—		—	0.50	—	
		—	0.50	—		—	0.50	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 10/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=08.00X08.00

Unit: mm

整理番号 Serial Number		83-001-BFF			備考 Remark	96-001-BFF			備考 Remark
外形タイプ External Type		C-FLGA083-08.00×08.00-0.80				C-FLGA096-08.00×08.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	8.00	—		—	8.00	—	
		—	8.00	—		—	8.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	83	—	n _{max} -16-1	—	96	—	n _{max} -4
	M _D	—	10	—		—	10	—	
	M _E	—	10	—		—	10	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.83BFF	フルマトリックス Full matrix			*See Fig.96BFF
Group2		—	0.40	—		—	0.40	—	
		—	0.40	—		—	0.40	—	
	Z _D	—	0.40	—		—	0.40	—	
	Z _E	—	0.40	—		—	0.40	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 11/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=08.00X08.00

Unit: mm

整理番号 Serial Number		104-001-CFF			備考 Remark	117-001-CFF			備考 Remark
外形タイプ External Type		C-FLGA104-08.00×08.00-0.65				C-FLGA117-08.00×08.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1	D	—	8.00	—		—	8.00	—	
	E	—	8.00	—		—	8.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
	e	—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	104	—	n _{max} -16-1	—	117	—	n _{max} -4
	M _D	—	11	—		—	11	—	
	M _E	—	11	—		—	11	—	
	端子配列 Terminal ary	補強ランドタイプ Reinforcement Land type			*See Fig.104CFF	フルマトリックス Full matrix			*See Fig.117CFF
Group2	S _D	—	0.00	—		—	0.00	—	
	S _E	—	0.00	—		—	0.00	—	
	Z _D	—	0.75	—		—	0.75	—	
	Z _E	—	0.75	—		—	0.75	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 12/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=08.00X08.00

Unit: mm

整理番号 Serial Number		188-001-DFF			備考 Remark	221-001-DFF			備考 Remark
外形タイプ External Type		C-FLGA188-08.00×08.00-0.50				C-FLGA221-08.00×08.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	8.00	—		—	8.00	—	
		—	8.00	—		—	8.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	188	—	n _{max} -36-1	—	221	—	n _{max} -4
	M _D	—	15	—		—	15	—	
	M _E	—	15	—		—	15	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.188DFF	フルマトリックス Full matrix			*See Fig.221DFF
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 13/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=09.00X09.00

Unit: mm

整理番号 Serial Number		64-001-AGG			備考 Remark	77-001-AGG			備考 Remark
外形タイプ External Type		C-LGA064-09.00×09.00-1.00				C-LGA077-09.00×09.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	9.00	—		—	9.00	—	
		—	9.00	—		—	9.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	64	—	n _{max} -16-1	—	77	—	n _{max} -4
	M _D	—	9	—		—	9	—	
	M _E	—	9	—		—	9	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.64AGG	フルマトリックス Full matrix			*See Fig.77AGG
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 14/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=09.00X09.00

Unit: mm

整理番号 Serial Number		104-001-BGG			備考 Remark	117-001-BGG			備考 Remark
外形タイプ External Type		C-FLGA104-09.00×09.00-0.80				C-FLGA117-09.00×09.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	9.00	—		—	9.00	—	
		—	9.00	—		—	9.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	104	—	n _{max} -16-1	—	117	—	n _{max} -4
	M _D	—	11	—		—	11	—	
	M _E	—	11	—		—	11	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.104BGG	フルマトリックス Full matrix			*See Fig.117BGG
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 15/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=09.00X09.00

Unit: mm

整理番号 Serial Number		152-001-CGG			備考 Remark
外形タイプ External Type		C-FLGA152-09.00×09.00-0.65			
照合文字 Reference Symbol		min	nom	max	
Group1		—	9.00	—	
		—	9.00	—	
	v	—	—	0.20	
	w	—	—	0.30	
		—	0.65	—	
	A	—	—		*See below
	A ₁	—	—	0.10	
	Φb	0.30	0.40	0.50	
	x	—	—	0.10	
	y	—	—	0.05	
	y ₁	—	—	0.20	
	n	—	152	—	n _{max} -16-1
	M _D	—	13	—	
	M _E	—	13	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.152CGG
Group2		—	0.00	—	
		—	0.00	—	
	Z _D	—	0.60	—	
	Z _E	—	0.60	—	
	Φb ₃	—	0.40	—	
	Φb ₄	0.95	1.05	1.15	

165-001-CGG			備考 Remark
C-FLGA165-09.00×09.00-0.65			
min	nom	max	
—	9.00	—	
—	9.00	—	
—	—	0.20	
—	—	0.30	
—	0.65	—	
—	—		*See below
—	—	0.10	
0.30	0.40	0.50	
—	—	0.10	
—	—	0.05	
—	—	0.20	
—	165	—	n _{max} -4
—	13	—	
—	13	—	
フルマトリックス Full matrix			*See Fig.165CGG
—	0.00	—	
—	0.00	—	
—	0.60	—	
—	0.60	—	
—	0.40	—	
—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 16/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=09.00X09.00

Unit: mm

整理番号 Serial Number		252-001-DGG			備考 Remark	285-001-DGG			備考 Remark
外形タイプ External Type		C-FLGA252-09.00×09.00-0.50				C-FLGA285-09.00×09.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1	D	—	9.00	—		—	9.00	—	
	E	—	9.00	—		—	9.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
	e	—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	252	—	n _{max} -36-1	—	285	—	n _{max} -4
	M _D	—	17	—		—	17	—	
	M _E	—	17	—		—	17	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.252DGG	フルマトリックス Full matrix			*See Fig.285DGG
Group2	S _D	—	0.00	—		—	0.00	—	
	S _E	—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 17/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=10.00X10.00

Unit: mm

整理番号 Serial Number		83-001-AHH			備考 Remark	96-001-AHH			備考 Remark
外形タイプ External Type		C-LGA083-10.00×10.00-1.00				C-LGA096-10.00×10.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	10.00	—		—	10.00	—	
		—	10.00	—		—	10.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	83	—	n _{max} -16-1	—	96	—	n _{max} -4
	M _D	—	10	—		—	10	—	
	M _E	—	10	—		—	10	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.83AHH	フルマトリックス Full matrix			*See Fig.96AHH
Group2		—	0.50	—		—	0.50	—	
		—	0.50	—		—	0.50	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 18/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=10.00X10.00

Unit: mm

整理番号 Serial Number		127-001-BHH			備考 Remark	140-001-BHH			備考 Remark
外形タイプ External Type		C-FLGA127-10.00×10.00-0.80				C-FLGA140-10.00×10.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	10.00	—		—	10.00	—	
		—	10.00	—		—	10.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	127	—	n _{max} -16-1	—	140	—	n _{max} -4
	M _D	—	12	—		—	12	—	
	M _E	—	12	—		—	12	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.127BHH	フルマトリックス Full matrix			*See Fig.140BHH
Group2		—	0.40	—		—	0.40	—	
		—	0.40	—		—	0.40	—	
	Z _D	—	0.60	—		—	0.60	—	
	Z _E	—	0.60	—		—	0.60	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 19/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=10.00X10.00

Unit: mm

整理番号 Serial Number		179-001-CHH			備考 Remark	192-001-CHH			備考 Remark
外形タイプ External Type		C-FLGA179-10.00×10.00-0.65				C-FLGA192-10.00×10.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	10.00	—		—	10.00	—	
		—	10.00	—		—	10.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	179	—	n _{max} -16-1	—	192	—	n _{max} -4
	M _D	—	14	—		—	14	—	
	M _E	—	14	—		—	14	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.179CHH	フルマトリックス Full matrix			*See Fig.192CHH
Group2		—	0.325	—		—	0.325	—	
		—	0.325	—		—	0.325	—	
	Z _D	—	0.775	—		—	0.775	—	
	Z _E	—	0.775	—		—	0.775	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 20/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=10.00X10.00

Unit: mm

整理番号 Serial Number		324-001-DHH			備考 Remark	357-001-DHH			備考 Remark
外形タイプ External Type		C-FLGA324-10.00×10.00-0.50				C-FLGA357-10.00×10.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1	\overline{D}	—	10.00	—		—	10.00	—	
	\overline{E}	—	10.00	—		—	10.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
	\overline{e}	—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	324	—	n _{max} -36-1	—	357	—	n _{max} -4
	M _D	—	19	—		—	19	—	
	M _E	—	19	—		—	19	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.324DHH	フルマトリックス Full matrix			*See Fig.357DHH
Group2	$\overline{S_D}$	—	0.00	—		—	0.00	—	
	$\overline{S_E}$	—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA	—	—	1.20	TFLGA
	—	—	1.00	VFLGA	—	—	1.00	VFLGA
	—	—	0.80	WFLGA	—	—	0.80	WFLGA
	—	—	0.65	UFLGA	—	—	0.65	UFLGA
	—	—	0.50	XFLGA	—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 21/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=11.00X11.00

Unit: mm

整理番号 Serial Number		104-001-AJJ			備考 Remark	117-001-AJJ			備考 Remark
外形タイプ External Type		C-LGA104-11.00×11.00-1.00				C-LGA117-11.00×11.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	11.00	—		—	11.00	—	
		—	11.00	—		—	11.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	104	—	n _{max} -16-1	—	117	—	n _{max} -4
	M _D	—	11	—		—	11	—	
	M _E	—	11	—		—	11	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.104AJJ	フルマトリックス Full matrix			*See Fig.117AJJ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 22/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=11.00X11.00

Unit: mm

整理番号 Serial Number		152-001-BJJ			備考 Remark	165-001-BJJ			備考 Remark
外形タイプ External Type		C-FLGA152-11.00×11.00-0.80				C-FLGA165-11.00×11.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	11.00	—		—	11.00	—	
		—	11.00	—		—	11.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	152	—	n _{max} -16-1	—	165	—	n _{max} -4
	M _D	—	13	—		—	13	—	
	M _E	—	13	—		—	13	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.152BJJ	フルマトリックス Full matrix			*See Fig.165BJJ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.70	—		—	0.70	—	
	Z _E	—	0.70	—		—	0.70	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 23/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=11.00X11.00

Unit: mm

整理番号 Serial Number		239-001-CJJ			備考 Remark	252-001-CJJ			備考 Remark
外形タイプ External Type		C-FLGA239-11.00×11.00-0.65				C-FLGA252-11.00×11.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	11.00	—		—	11.00	—	
		—	11.00	—		—	11.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	239	—	n _{max} -36-1	—	252	—	n _{max} -4
	M _D	—	16	—		—	16	—	
	M _E	—	16	—		—	16	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.239CJJ	フルマトリックス Full matrix			*See Fig.252CJJ
Group2		—	0.325	—		—	0.325	—	
		—	0.325	—		—	0.325	—	
	Z _D	—	0.625	—		—	0.625	—	
	Z _E	—	0.625	—		—	0.625	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 24/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=11.00X11.00

Unit: mm

整理番号 Serial Number		404-001-DJJ			備考 Remark	437-001-DJJ			備考 Remark
外形タイプ External Type		C-FLGA404-11.00×11.00-0.50				C-FLGA437-11.00×11.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	11.00	—		—	11.00	—	
		—	11.00	—		—	11.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	404	—	n _{max} -36-1	—	437	—	n _{max} -4
	M _D	—	21	—		—	21	—	
	M _E	—	21	—		—	21	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.404DJJ	フルマトリックス Full matrix			*See Fig.437DJJ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 25/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=13.00X13.00

Unit: mm

整理番号 Serial Number		152-001-ALL			備考 Remark	165-001-ALL			備考 Remark
外形タイプ External Type		C-LGA152-13.00×13.00-1.00				C-LGA165-13.00×13.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	13.00	—		—	13.00	—	
		—	13.00	—		—	13.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	152	—	n _{max} 16-1	—	165	—	n _{max} 4
	M _D	—	13	—		—	13	—	
	M _E	—	13	—		—	13	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.152ALL	フルマトリックス Full matrix			*See Fig.165ALL
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 26/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=13.00X13.00

Unit: mm

整理番号 Serial Number		239-001-BLL			備考 Remark	252-001-BLL			備考 Remark
外形タイプ External Type		C-FLGA239-13.00×13.00-0.80				C-FLGA252-13.00×13.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	13.00	—		—	13.00	—	
		—	13.00	—		—	13.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	239	—	n _{max} -16-1	—	252	—	n _{max} -4
	M _D	—	16	—		—	16	—	
	M _E	—	16	—		—	16	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.239BLL	フルマトリックス Full matrix			*See Fig.252BLL
Group2		—	0.40	—		—	0.40	—	
		—	0.40	—		—	0.40	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 27/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=13.00X13.00

Unit: mm

整理番号 Serial Number		344-001-CLL			備考 Remark	357-001-CLL			備考 Remark
外形タイプ External Type		C-FLGA344-13.00×13.00-0.65				C-FLGA357-13.00×13.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	13.00	—		—	13.00	—	
		—	13.00	—		—	13.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	344	—	n _{max} -16-1	—	357	—	n _{max} -4
	M _D	—	19	—		—	19	—	
	M _E	—	19	—		—	19	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.344CLL	フルマトリックス Full matrix			*See Fig.357CLL
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.65	—		—	0.65	—	
	Z _E	—	0.65	—		—	0.65	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA	—	—	1.20	TFLGA
	—	—	1.00	VFLGA	—	—	1.00	VFLGA
	—	—	0.80	WFLGA	—	—	0.80	WFLGA
	—	—	0.65	UFLGA	—	—	0.65	UFLGA
	—	—	0.50	XFLGA	—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 28/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=13.00X13.00

Unit: mm

整理番号 Serial Number		588-001-DLL			備考 Remark	621-001-DLL			備考 Remark
外形タイプ External Type		C-FLGA588-13.00×13.00-0.50				C-FLGA621-13.00×13.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	13.00	—		—	13.00	—	
		—	13.00	—		—	13.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	588	—	n _{max} -36-1	—	621	—	n _{max} -4
	M _D	—	25	—		—	25	—	
	M _E	—	25	—		—	25	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.588DLL	フルマトリックス Full matrix			*See Fig.621DLL
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 29/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=15.00X15.00

Unit: mm

整理番号 Serial Number		208-001-ANN			備考 Remark	221-001-ANN			備考 Remark
外形タイプ External Type		C-LGA208-15.00×15.00-1.00				C-LGA221-15.00×15.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	15.00	—		—	15.00	—	
		—	15.00	—		—	15.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	208	—	n _{max} -16-1	—	221	—	n _{max} -4
	M _D	—	15	—		—	15	—	
	M _E	—	15	—		—	15	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.208ANN	フルマトリックス Full matrix			*See Fig.221ANN
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 30/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=15.00X15.00

Unit: mm

整理番号 Serial Number		307-001-BNN			備考 Remark	320-001-BNN			備考 Remark
外形タイプ External Type		C-FLGA307-15.00×15.00-0.80				C-FLGA320-15.00×15.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	15.00	—		—	15.00	—	
		—	15.00	—		—	15.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	307	—	n _{max} -16-1	—	320	—	n _{max} -4
	M _D	—	18	—		—	18	—	
	M _E	—	18	—		—	18	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.307BNN	フルマトリックス Full matrix			*See Fig.320BNN
Group2		—	0.40	—		—	0.40	—	
		—	0.40	—		—	0.40	—	
	Z _D	—	0.70	—		—	0.70	—	
	Z _E	—	0.70	—		—	0.70	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA	—	—	1.20	TFLGA
	—	—	1.00	VFLGA	—	—	1.00	VFLGA
	—	—	0.80	WFLGA	—	—	0.80	WFLGA
	—	—	0.65	UFLGA	—	—	0.65	UFLGA
	—	—	0.50	XFLGA	—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 31/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=15.00X15.00

Unit: mm

整理番号 Serial Number		467-001-CNN			備考 Remark
外形タイプ External Type		C-FLGA467-15.00×15.00-0.65			
照合文字 Reference Symbol		min	nom	max	
Group1		—	15.00	—	
		—	15.00	—	
	v	—	—	0.20	
	w	—	—	0.30	
		—	0.65	—	
	A	—	—		*See below
	A ₁	—	—	0.10	
	Φb	0.30	0.40	0.50	
	x	—	—	0.10	
	y	—	—	0.05	
	y ₁	—	—	0.20	
	n	—	467	—	n _{max} -16-1
	M _D	—	22	—	
	M _E	—	22	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.467CNN
Group2		—	0.325	—	
		—	0.325	—	
	Z _D	—	0.675	—	
	Z _E	—	0.675	—	
	Φb ₃	—	0.40	—	
	Φb ₄	0.95	1.05	1.15	

480-001-CNN			備考 Remark
C-FLGA480-15.00×15.00-0.65			
min	nom	max	
—	15.00	—	
—	15.00	—	
—	—	0.20	
—	—	0.30	
—	0.65	—	
—	—		*See below
—	—	0.10	
0.30	0.40	0.50	
—	—	0.10	
—	—	0.05	
—	—	0.20	
—	480	—	n _{max} -4
—	22	—	
—	22	—	
フルマトリックス Full matrix			*See Fig.480CNN
—	0.325	—	
—	0.325	—	
—	0.675	—	
—	0.675	—	
—	0.40	—	
—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 32/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=15.00X15.00

Unit: mm

整理番号 Serial Number		804-001-DNN			備考 Remark	837-001-DNN			備考 Remark
外形タイプ External Type		C-FLGA804-15.00×15.00-0.50				C-FLGA837-15.00×15.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	15.00	—		—	15.00	—	
		—	15.00	—		—	15.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	804	—	n _{max} -36-1	—	837	—	n _{max} -4
	M _D	—	29	—		—	29	—	
	M _E	—	29	—		—	29	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.804DNN	フルマトリックス Full matrix			*See Fig.837DNN
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 33/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=17.00X17.00

Unit: mm

整理番号 Serial Number		272-001-AQQ			備考 Remark	285-001-AQQ			備考 Remark
外形タイプ External Type		C-LGA272-17.00×17.00-1.00				C-LGA285-17.00×17.00-1.00			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	17.00	—		—	17.00	—	
		—	17.00	—		—	17.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	1.00	—		—	1.00	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.50	0.60	0.70		0.50	0.60	0.70	
	x	—	—	0.15		—	—	0.15	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	272	—	n _{max} -16-1	—	285	—	n _{max} -4
	M _D	—	17	—		—	17	—	
	M _E	—	17	—		—	17	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.272AQQ	フルマトリックス Full matrix			*See Fig.285AQQ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.60	—		—	0.60	—	
	Φb ₄	1.50	1.60	1.70		—	—	—	

A	—	—	1.20	TLGA
	—	—	1.00	VLGA
	—	—	0.80	WLGA
	—	—	0.65	ULGA
	—	—	0.50	XLGA

—	—	1.20	TLGA
—	—	1.00	VLGA
—	—	0.80	WLGA
—	—	0.65	ULGA
—	—	0.50	XLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 34/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=17.00X17.00

Unit: mm

整理番号 Serial Number		424-001-BQQ			備考 Remark	437-001-BQQ			備考 Remark
外形タイプ External Type		C-FLGA424-17.00×17.00-0.80				C-FLGA437-17.00×17.00-0.80			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	17.00	—		—	17.00	—	
		—	17.00	—		—	17.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.80	—		—	0.80	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.40	0.50	0.60		0.40	0.50	0.60	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	424	—	n _{max} -16-1	—	437	—	n _{max} -4
	M _D	—	21	—		—	21	—	
	M _E	—	21	—		—	21	—	
	端子配列 Terminal array	補強ランドタイプ Reinforcement Land type			*See Fig.424BQQ	フルマトリックス Full matrix			*See Fig.437BQQ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.50	—		—	0.50	—	
	Φb ₄	1.20	1.30	1.40		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 35/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=17.00X17.00

Unit: mm

整理番号 Serial Number		608-001-CQQ			備考 Remark	621-001-CQQ			備考 Remark
外形タイプ External Type		C-FLGA608-17.00×17.00-0.65				C-FLGA621-17.00×17.00-0.65			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1		—	17.00	—		—	17.00	—	
		—	17.00	—		—	17.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
		—	0.65	—		—	0.65	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.30	0.40	0.50		0.30	0.40	0.50	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	608	—	n _{max} -16-1	—	621	—	n _{max} -4
	M _D	—	25	—		—	25	—	
	M _E	—	25	—		—	25	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.608CQQ	フルマトリックス Full matrix			*See Fig.621CQQ
Group2		—	0.00	—		—	0.00	—	
		—	0.00	—		—	0.00	—	
	Z _D	—	0.70	—		—	0.70	—	
	Z _E	—	0.70	—		—	0.70	—	
	Φb ₃	—	0.40	—		—	0.40	—	
	Φb ₄	0.95	1.05	1.15		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 36/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

呼び寸法(Nominal dimension): DXE=17.00X17.00

Unit: mm

整理番号 Serial Number		1052-001-DQQ			備考 Remark	1085-001-DQQ			備考 Remark
外形タイプ External Type		C-FLGA1052-17.00×17.00-0.50				C-FLGA1085-17.00×17.00-0.50			
照合文字 Reference Symbol		min	nom	max		min	nom	max	
Group1	D	—	17.00	—		—	17.00	—	
	E	—	17.00	—		—	17.00	—	
	v	—	—	0.20		—	—	0.20	
	w	—	—	0.30		—	—	0.30	
	e	—	0.50	—		—	0.50	—	
	A	—	—		*See below	—	—		*See below
	A ₁	—	—	0.10		—	—	0.10	
	Φb	0.20	0.30	0.40		0.20	0.30	0.40	
	x	—	—	0.10		—	—	0.10	
	y	—	—	0.05		—	—	0.05	
	y ₁	—	—	0.20		—	—	0.20	
	n	—	1052	—	n _{max} -36-1	—	1085	—	n _{max} -4
	M _D	—	33	—		—	33	—	
	M _E	—	33	—		—	33	—	
端子配列 Terminal array		補強ランドタイプ Reinforcement Land type			*See Fig.1052DQQ	フルマトリックス Full matrix			*See Fig.1085DQQ
Group2	S _D	—	0.00	—		—	0.00	—	
	S _E	—	0.00	—		—	0.00	—	
	Z _D	—	0.50	—		—	0.50	—	
	Z _E	—	0.50	—		—	0.50	—	
	Φb ₃	—	0.30	—		—	0.30	—	
	Φb ₄	0.70	0.80	0.90		—	—	—	

A	—	—	1.20	TFLGA
	—	—	1.00	VFLGA
	—	—	0.80	WFLGA
	—	—	0.65	UFLGA
	—	—	0.50	XFLGA

—	—	1.20	TFLGA
—	—	1.00	VFLGA
—	—	0.80	WFLGA
—	—	0.65	UFLGA
—	—	0.50	XFLGA

JEITA STANDARD PACKAGE OUTLINE DRAWINGS		DATE 2004-02-01	SHEET 37/43
PACKAGE NAME C-LGA		JEITA REGISTRATION NO. IC-7316A-001	

9. Terminal layout figure

As assistance in the design and development of new package in the future, **Terminal layout figure** shown below.

Terminal layout figure (1/4)

Note: The figure shows the condition of the full matrix.

DXE=7.00X7.00

DXE=8.00X8.00

e = 1.00

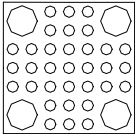


Fig.32AEE

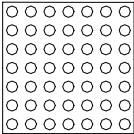


Fig.45AEE

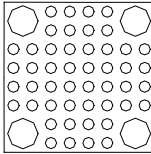


Fig.47AFF

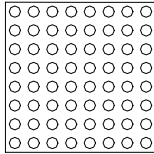


Fig.60AFF

e = 0.80

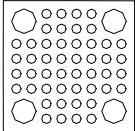


Fig.47BEE

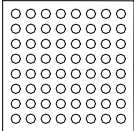


Fig.60BEE

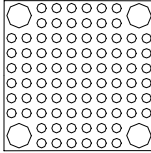


Fig.83BFF

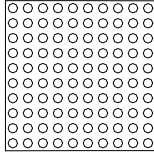


Fig.96BFF

e = 0.65

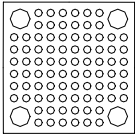


Fig.83CEE

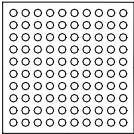


Fig.96CEE

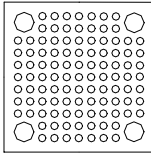


Fig.104CFF

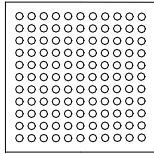


Fig.117CFF

e = 0.50

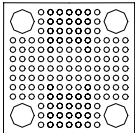


Fig.132DEE

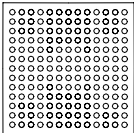


Fig.165DEE

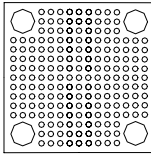


Fig.188DFF

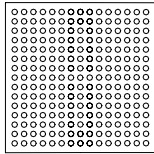
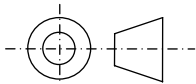


Fig.221DFF



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Terminal layout figure (2/4)

Note: The figure shows the condition of the full matrix.

DXE=9.00X9.00

DXE=10.00X10.00

e = 1.00

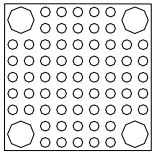


Fig.64AGG

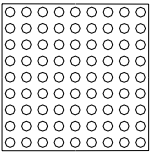


Fig.77AGG

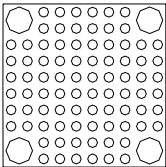


Fig.83AHH

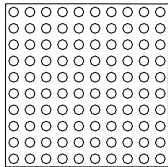


Fig.96AHH

e = 0.80

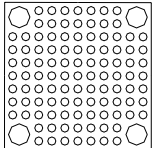


Fig.104BGG

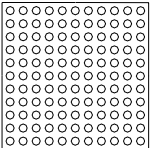


Fig.117BGG

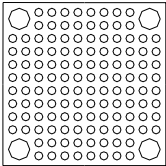


Fig.127BHH

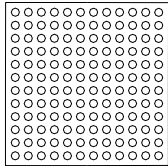


Fig.140BHH

e = 0.65

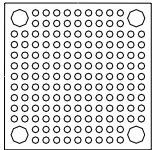


Fig.152CGG

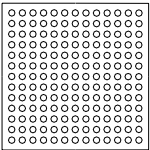


Fig.165CGG

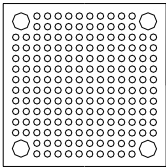


Fig.179CHH

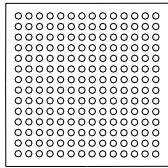


Fig.192CHH

e = 0.50

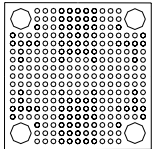


Fig.252DGG

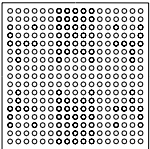


Fig.285DGG

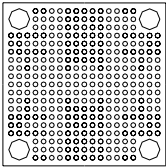


Fig.324DHH

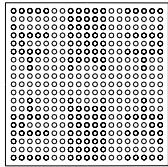
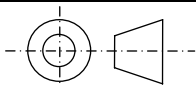


Fig.357DHH



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Terminal layout figure (3/4)

Note: The figure shows the condition of the full matrix.

DXE=11.00X11.00

DXE=13.00X13.00
(1/4 area)

e= 1.00

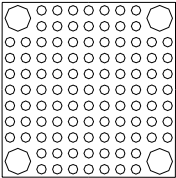


Fig.104AJJ

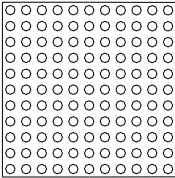


Fig.117AJJ

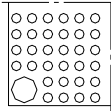


Fig.152ALL

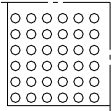


Fig.165ALL

e= 0.80

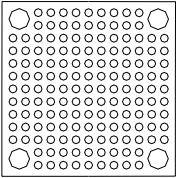


Fig.152BJJ

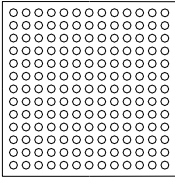


Fig.165BJJ

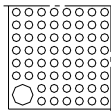


Fig.239BLL

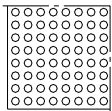


Fig.252BLL

e= 0.65

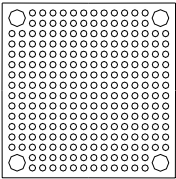


Fig.239CJJ

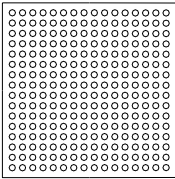


Fig.252CJJ

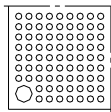


Fig.344CLL

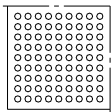


Fig.357CLL

e= 0.50

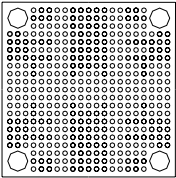


Fig.404DJJ

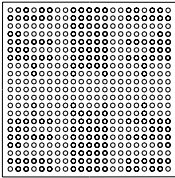


Fig.437DJJ

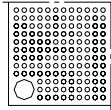


Fig.588DLL

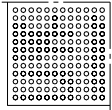
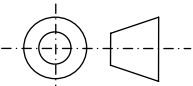


Fig.621DLL



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Terminal layout figure (4/4)

Note: The figure shows the condition of the full matrix.

DXE=15.00X15.00
(1/4 area)

DXE=17.00X17.00
(1/4 area)

$e = 1.00$

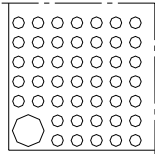


Fig.208ANN

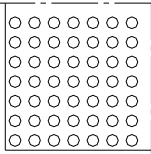


Fig.221ANN

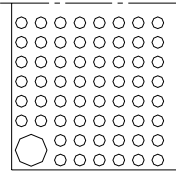


Fig.272AQQ

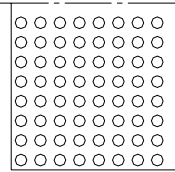


Fig.285AQQ

$e = 0.80$

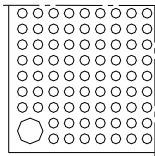


Fig.307BNN

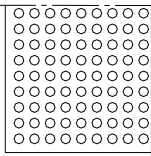


Fig.320BNN

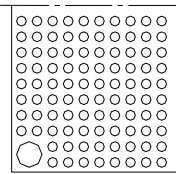


Fig.424BQQ

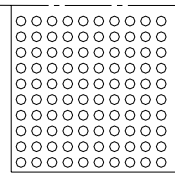


Fig.437BQQ

$e = 0.65$

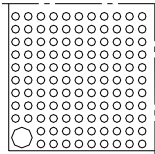


Fig.467CNN

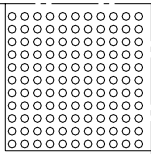


Fig.480CNN

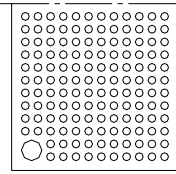


Fig.608CQQ

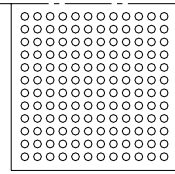


Fig.621CQQ

$e = 0.50$

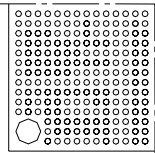


Fig.804DNN

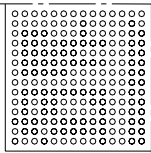


Fig.837DNN

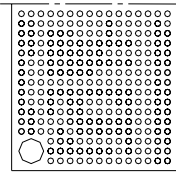


Fig.1052DQQ

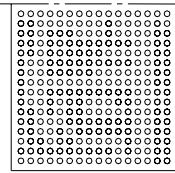
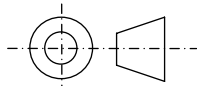


Fig.1085DQQ



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9.1 Terminal layout

As assistance in the design and development of new package in the future, **Terminal layout table** shown below.

Terminal layout table

		pin number							
		Terminal Pitch e							
		1.00		0.80		0.65		0.50	
E x D	7x7	Full M=7	45	Full M=8	60	Full M=10 3row 2row	96 80 60	Full M=13 5row 4row 3row 2row	165 156 140 116 84
	8x8	Full M=8 2row	60 44	Full M=10 3row 2row	96 80 60	Full M=11 4row 3row 2row	117 108 92 68	Full M=15 5row 4row 3row 2row	221 196 172 140 100
	9x9	Full M=9 3row 2row	77 68 52	Full M=11 4row 3row 2row	117 108 92 68	Full M=13 5row 4row 3row 2row	165 156 140 116 84	Full M=17 5row 4row 3row 2row	285 236 204 164 116
	10x10	Full M=10 3row 2row	96 80 60	Full M=12 4row 3row 2row	140 124 104 76	Full M=14 5row 4row 3row 2row	192 176 156 128 92	Full M=19 5row 4row 3row 2row	357 276 236 188 132
	11x11	Full M=11 4row 3row 2row	117 108 92 68	Full M=13 5row 4row 3row 2row	165 156 140 116 84	Full M=16 5row 4row 3row 2row	252 216 188 152 108	Full M=21 5row 4row 3row 2row	437 316 268 212 148
	13x13	Full M=13 5row 4row 3row 2row	165 156 140 116 84	Full M=16 5row 4row 3row 2row	252 216 188 152 108	Full M=19 6row 5row 4row 3row 2row	357 308 276 236 188 132	Full M=25 5row 4row 3row 2row	621 396 332 260 180
	15x15	Full M=15 6row 5row 4row 3row 2row	221 212 196 172 140 100	Full M=18 6row 5row 4row 3row 2row	320 284 256 220 176 124	Full M=22 6row 5row 4row 3row 2row	480 380 336 284 224 156	Full M=29 5row 4row 3row 2row	837 476 396 308 212
	17x17	Full M=17 5row 4row 3row 2row	285 236 204 164 116	Full M=21 5row 4row 3row 2row	437 316 268 212 148	Full M=25 5row 4row 3row 2row	621 396 332 260 180	Full M=33 5row 4row 3row 2row	1085 556 460 356 244

Full M: (Full Matrix) - (4corner not connecting electricity)
row: number of rows from the package periphery

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(1) pin number

②=1.00, 0.80, 0.65mm

Reinforcement Land type, number of the pins = number of the display pins -16-1

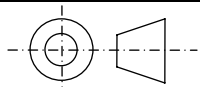
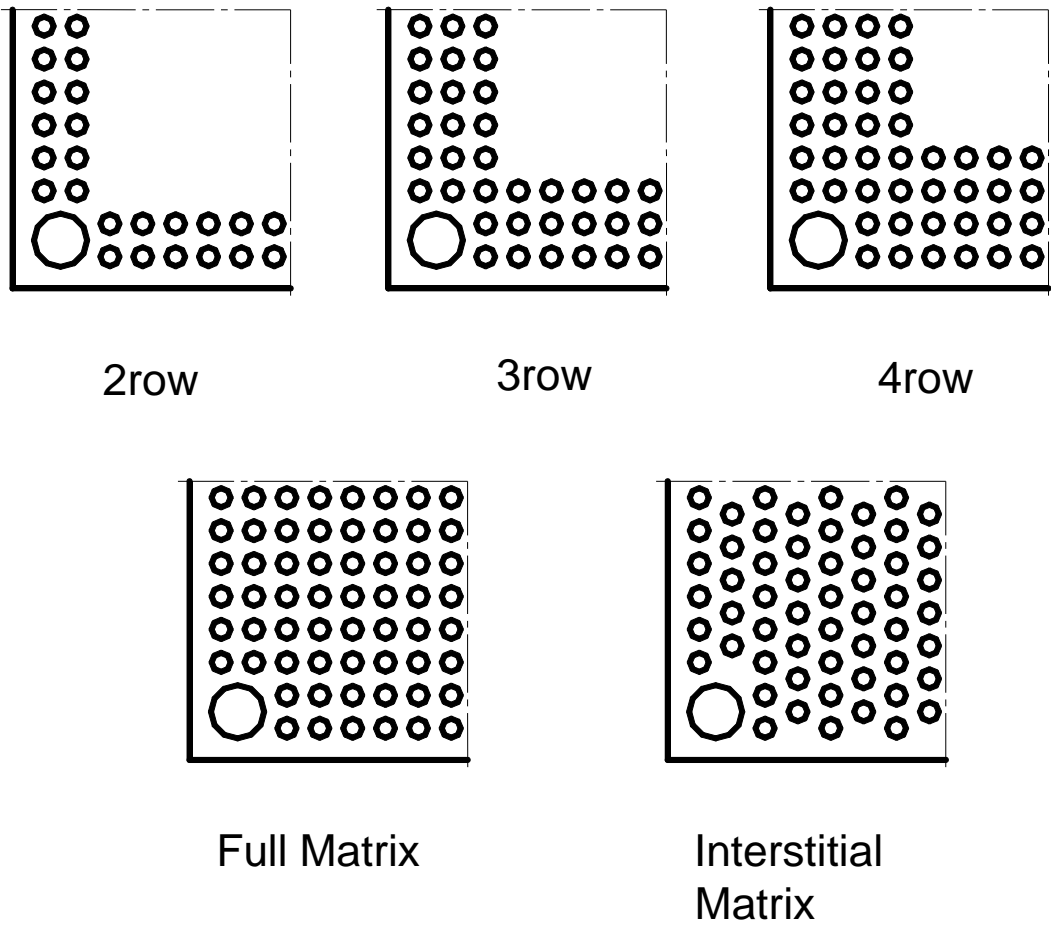
②=0.50mm

Reinforcement Land type, number of the pins = number of the display pins -36-1

(2) Terminal layout

2row, 3row, 4row of the terminal layout are the number of the lines from the package periphery to the starting point. Full Matrix becomes the number of the maximum terminals. Interstitial Matrix becomes stagger layout. (Explanation figure 1)

Explanation figure 1



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EXPLANATORY NOTES

1. Objective of establishment

This standard aims to be standardized by the industry of the package which Ceramic Land Grid Array (hereinafter referred to as C-LGA) and Ceramic Fine pitch Land Grid Array (hereinafter referred to as C-FLGA) that the package carrier material is ceramic. It was established to provide the design guideline when it is made in to product or when Automatic mounting machinery and associated parts are developed.

2. History of review

In early 1995, the Society for the Study of CSP (Chip Scale Package) (its antecedents of the Society for the Study of Next Generational Packages) was established under the Mounting Technical Committee on Semiconductor Device Packages and had investigated CSP, possibility of standardizing their external dimensions, and so on. The standardization of CSP had been proceeded at the Technical Standardization Committee on Semiconductor Device Packages based on the report from the Society for the Study of CSP, and the furthermore investigations for its standardization have been done at Area Array Package Committee (currently, Integrated Circuits Package Subcommittee), since October 1995.

(1) FBGA/FLGA design guide

In the half of 1990's, by the rise of the market needs of rapid FBGA and FLGA, their standard of the package outlines in the market avoids confusion, which is not. Therefore, the deliberation on the square types of Fine pitch BGA and LGA was done and **EIAJ EDR-7316** (hereinafter referred to as "FBGA / FLGA Design guideline") was issued in April 1998, which based on **EIAJ EDR-7315A** (hereinafter referred to as "BGA design guideline"), which the earlier published in half of 1990's. In the 2nd half of 1990's, the market needs of FBGA and FLGA for memory use are raised, and the standardization of package outlines of rectangular type is required. The deliberation on this had started in November 1998. Its deliberation had been proceeded based on the FBGA/FLGA design guideline (**EIAJ EDR-7316**) with its correction and/or addition. The practical activities were completed in May 1999, and Semiconductor Package Standardization Committee approved the final draft of the provisional standard, which was valid by March 2001, and it was issued as **EIAJ EDX-7316**. Related Committee brought forward problems of difference of square type and rectangular type standards (**EIAJ EDR-7316**, **EIAJ EDX-7316**). So these standards had unified and **EIAJ EDR-7316A** published in April 2002.

Rectangular type FBGA/FLGA design guide was proposed to **SC 47D** from Japan, **SC 47D** take charge of the standardization of the semiconductor package outline of **International Electrotechnical Commission** (hereinafter referred to as **IEC**). And 2 standards of the following are established.

IEC 60191-6 -11 General Design guide for FBGA (Rectangular Type), establishment in June, 2002.

IEC 60191-6 -12 General Design guide for FLGA (Rectangular Type), establishment in June, 2002.

EIAJ ED-7311-16A

(2) C-LGA/ C-FLGA standard

In Area Array Package Committee, deliberation and establishment of C-LGA/C-FLGA standards were carried forward from 1998 to 2000 in parallel with deliberation of FBGA/FLGA design guide. And 3 standards of following are established.

EIAJ ED-7311-14 (Standard of integrated circuits package, C-TLGA (1.00mm pitch)), establishment in June, 2000.

EIAJ ED-7311-15 (Standard of integrated circuits package, C-TFLGA (0.80mm pitch)), establishment in June, 2000.

EIAJ ED-7311-16 (Standard of integrated circuits package, C-TFLGA (0.65mm pitch)), establishment in June, 2000.

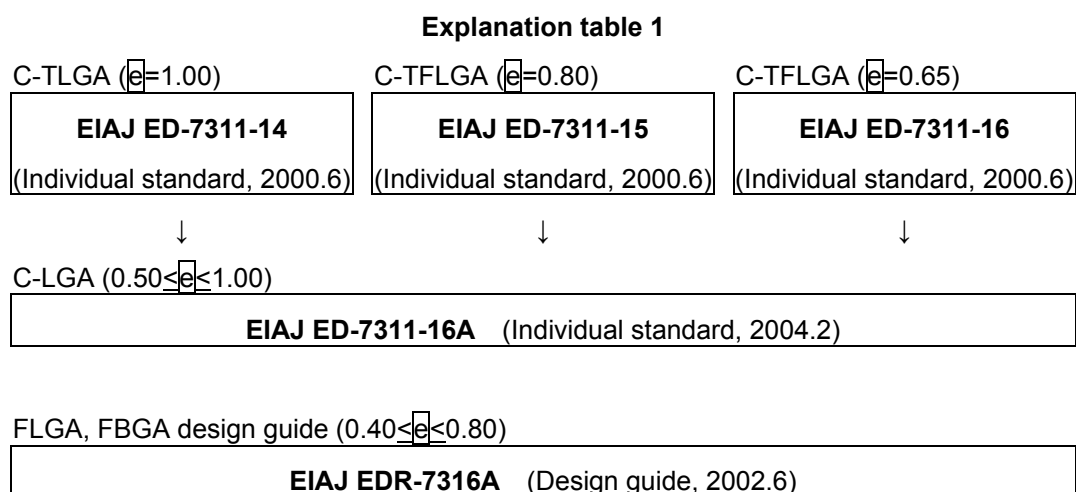
Since 2000, to make terminal pitch a fine moves ahead, in coming to practical use spreading about C-FLGA that terminal pitch is 0.50 mm, too. To deliberate following contents as the standard to have integrated the standard of the three above into in Integrated Circuits Package Subcommittee and to establish were fixed in April, 2003.

It adds terminal pitch $e = 0.50\text{mm}$, 0.40mm

It corresponds to package's becoming thinner, It prescribes seating height, A_{max} = equal to or less than 1.00mm (code: v).

The deliberation ends in Integrated Circuits Package Subcommittee in December 2003. **EIAJ ED-7311-16A** (Standard of integrated circuits package, C-LGA), establishment in February, 2004.

The deliberation elapses of C-LGA relation standards are shown in **Explanation table 1** with the flow chart.



After that, C-LGA relation standard is proposed to **IEC SC47D** from Japan and 2 standards of the following are established.

Amendment 1 to IEC 60191-2 C-FLGA 0.8 mm pitch / 1.0mm pitch, establishment in March 2001.

Amendment 2 to IEC 60191-2 FLGA Family 0.8 0.65 and 0.5mm pitch, establishment in March 2001.

EIAJ ED-7311-16A

3. Background of the dimension rule

(1) Datum

Datum was determined by the terminals, because it was an important parameter during package mounting, especially for fine pitch packages. However, as it is necessary to get a consensus of **Joint Electron Device Engineering Council** (hereinafter referred to as **JEDEC**), datum line definition Determined centers of opposite sides of a package is adapted. Details of the rule way are shown in **4. definition of the datum.**

(2) Nominal dimension

At **EIAJ EDR-7316A** (FBGA/FLGA design guide), it took a consistence to be **JEDEC** and it decided to display in combination (DXE) with package length and width. Defined as the numerical representation of the package length against the package width, considering up to one decimal place of the actual dimensions for Flanged type packages. In the case of Real chip size type packages, it is defined as the numerical representation of the package length against the package width, considering up to two decimal places of the actual dimensions (3rd digit the following of the decimal point abandons), which is necessary to express the CSP concept.

(3) Background on the revision of package length and width (D, E) definition

Based on **EIAJ EDR-7315A** (BGA design guide), the vertical direction defines the package width (D), while the horizontal direction defines the package length (E), upon the condition that the package index is located on the lower left side from the package bottom view. The following two problems arose from this definition.


- (a) When we apply this to the trend of rectangular type BGA package in the market, statements such as " Package width is larger than the package length " will be opposed by " Package length is larger than the package width ".
- (b) This definition of package length and package width contradicts the **JEDEC** design guide. In order to avoid confusion in the industry, we opted to change the definition of the vertical direction as the package length (D) and the horizontal direction to be the package width (E) upon the condition that the package index is located on the lower left side from the package bottom view. Also, we did not define to correlate package length and package width according to size. Since ball layout is defined in a standard, size correlation of package length and package width shall be reversed by a normal ball matrix and memory chip size.

(4) Package length (D) and width (E)

It thinks that the about 20.00 mm SQ chip is the biggest when thinking by the technology level of the present situation. Considering the size, which is prescribed by the **EIAJ EDR-7315A** (BGA design guide), Maximum size was defined to be 21.00mm, which is the same as in the FBGA/FLGA design guide. Minimum size was defined to be 1.50mm, which will allow possibility of further minimizing the package size.

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In the previous standards (EIAJ ED-7311-14 (C-TLGA (1.00mm pitch)), EIAJ ED-7311-15 (C-TFLGA (0.80mm pitch)), EIAJ ED-7311-16 (C-TFLGA (0.65mm pitch)), only $A_{\max}=1.20\text{mm}$ (code: T) was prescribed. EIAJ ED-7311-16A (C-LGA) prescribed $A_{\max} = 1.20, 1.00, 0.80, 0.65, 0.50\text{mm}$ (code: T, V, W, U, X), according to the IEC standard. A name by package seating height repartition is shown in Explanation table 2.

Explanation table 2						
Terminal pitch 						
A_{\max}	1.00	0.80	0.65	0.50	0.40	0.30
1.70>	LGA	FLGA				
1.70	LLGA	LFLGA				
1.20	TLGA	TFLGA				
1.00	VLGA	VFLGA				
0.80	WLGA	WFLGA				
0.65	ULGA	UFLGA				
≤ 0.50	XLGA	XFLGA				

(6) Stand off height (A_1)

(a) FBGA

When making a ball diameter 60% of terminal pitch, 50% of terminal pitch was equivalent to ball height was confirmed by simulation and measurement, it is defined nom. value with standoff height. Stand off height was defined to express min., nom. and max. values. It was considered for socket which is used for Auto mounter and testing. The recommended nom. value is 50% of the package terminal pitch. However, in the case of 0.45mm ball diameter with 0.80mm pitch, which was added as a ball diameter option, stand off height is defined at nom. 0.35mm.

(b) FLGA

There are two terminal type for FLGA, flat type and bump type. Stand off height was defined to be $A_{1\max}$ = less than 0.10mm to distinguish from FBGA.

(7) Package height (A_2)

It shows package height (A_2) in " $A_{2\max} = A_{\max} - A_{1\max}$ ". LGA becomes " $A_{2\max} = A_{\max} - 0.10\text{mm}$ ", because to be provided by $A_{1\max}$ = equal to or less than 0.10 mm.

(8) Terminal pitch ()

Algorithm of 80% reduction was applied as the conventional packages. The basic pitch is 1.00mm and other pitches defined for this design guideline are 0.80/0.65/0.50/0.40mm.

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(9) Terminal diameter (ϕb)

(a) FBGA

The preferable terminal diameter is defined as 60% of terminal pitch. In the case of 0.80mm pitch, $\phi 0.45\text{mm}$ and $\phi 0.40\text{mm}$ were considered to add to this design guideline, because $\phi 0.50\text{mm}$ (60% of terminal pitch) might be difficult for manufacturing. Then, it is decided to add $\phi 0.45\text{mm}$ as an option, and not to add $\phi 0.40\text{mm}$, after the feasibility study of routing of circuit and socket.

(b) FLGA

In the same way FBGA, terminal diameter is defined as 60% of terminal pitch. However, plastic type is defined as 50% of terminal pitch. Because when making a ball diameter in FBGA 60% of terminal pitch, Land diameter of ball installation part becomes 50% of terminal pitch. It considered design of wiring pattern and sharing of the package substrate of FBGA and FLGA. At ceramic type, it stores up that linear expansion coefficient difference from printed circuit board is big. Therefore, to secure a temperature cycle characteristic in mounting device, it needed 60% of size of terminal diameter.

(10) Reinforcement Land (ϕb_4)

As for in mounting of C-LGA, heat shrinkage difference from printed circuit board is big. Therefore, package with reinforcement Land becomes necessary to secure mounting strength by size and terminal pitch of package. In this standard, it prescribed reinforcement Land (ϕb_4) in 4 corners, which stress to package concentrates.

Explanation table 3

Terminal pitch	Reinforcement Land diameter	Terminal diameter
e	$\phi b_{4 \text{ nom}}$	$\phi b_{3 \text{ nom}}$
1.00	1.60	0.60
0.80	1.30	0.50
0.65	1.05	0.40
0.50	0.80	0.30

(11) Parallelism of package top surface (y_1)

Taking into account the limitation of the pick-up of the automatic mounter specified parallelism of top surface.

(12) Terminal co planarity (y)

It adopted the rule of QFP, which is consolidated by the identical printed circuit board.

(13) Positional tolerance of terminal (x)

At EIAJ EDR-7316A (FBGA/FLGA design guide), about 10% of terminal pitch is specified. However, $X_{\text{max}}=0.10\text{mm}$ of the terminal pitch were equal to or less than 0.80mm from the ability value in case of manufacture.

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(14) Tolerance of package lateral profile (v) and Package center offset (w)

At EIAJ ED-7311-16A (FBGA/FLGA design guide), as for Tolerance of package lateral profile (v) and Package center offset (w), it fixed questionnaire investigation by the doing. Tolerance of package lateral profile (v) decided acceptance value on the consideration, which h it was possible to sometimes adjust in package outline at the user. Also, it fixed Package center offset (w), which from the ability value in case of mounting.

(15) Number of terminal matrixes (M_D , M_E) rule

Maximum number for terminal matrixes (hereafter referred to as maximum terminal matrixes) M_{max} (M_{Dmax} , M_{Emax}) was set as an integer which satisfied the inequality noted below, and this integer was stipulated as the standard number of terminal matrixes.

$$M_{Dmax} \leq (\overline{D} - b_{max} - v - w - x - 2(E.C.)) / \overline{e} + 1$$

$$M_{Emax} \leq (\overline{E} - b_{max} - v - w - x - 2(E.C.)) / \overline{e} + 1$$

$\overline{D}, \overline{E}$: Package length and width

b_{max} : Maximum terminal diameter ($b_{nom} + \text{terminal diameter tolerance}$)

v : Tolerance of package lateral profile

w : Tolerance of package center offset

x : Positional tolerance of terminal

E.C. : Edge clearance (0.11mm)

\overline{e} : Terminal pitch

Also for $\overline{D}, \overline{E}$, the M_{Dmax} and M_{Emax} determined as shown above, and the same figure with one row less (offset by one half-pitch), indicated that ($M_{Dmax} - 1$) by ($M_{Emax} - 1$), were added to the stipulation as standard terminal matrixes. Furthermore ($M_{Dmax} + 1$) by ($M_{Emax} + 1$) only for FLGA were added, if E.C. ≥ 0 is satisfied.

(16) Background of calculation that number of terminal matrix

(a) Maximum number of terminal matrix (M_{max})

At first, M_{max} is though assumed the number in the range where the terminal edge does not begin to see the package edge, which can be maximum arranged. There is a demand by which the structure of the tray is assumed to be terminal non-contact to FBGA. Need the area (edge clearance) where some ball does not exist between terminal edge and package edge to prevent the transformation of the ball by the contact of an unexpected ball or the dropout at handling by the maker and the user. That was proposed from semiconductor packing sub-committee and JEDEC JC-11, and it was assumed that this was adopted.

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(b) Offset by one half-pitch maximum number of terminal matrix ($M_{\max} - 1$)

It provided for (M_{\max}) as a number of standard terminal matrix, also it provided for ($M_{\max} - 1$) as offset by one half-pitch number of standard terminal matrix. Number of terminal matrix of both even and odd number of all package externals provided and can be selected by providing for both M_{\max} and $M_{\max} - 1$ as a number of standard terminal matrix. Moreover, in case of FLGA, so a part of package externals was assumed to admit ($M_{\max} + 1$) in the combination from being able multi array ($M_{\max} + 1$) from M_{\max} when pitches were combined by one row about FLGA because there was no ball.

(17) Number of terminals (n)

The maximum terminals is $n_{\max} = M_E \times M_D$. The number of maximum terminals is the latently existing number of terminals. Therefore, as for the fact, the terminal often comes off partially. Then the maximum terminals don't often agree with the actual number of the terminals. (Example: It is depopulation in the package 4 corner). When described according to **EIAJ ED-7303B** [Name and Code for Integrated Circuits Package], The pin display which is in the deficit becomes as it is (Example 64/100), however in case of BGA and LGA, it writes at the number of existing terminals(n).

In case of C-LGA, on the reliability of the mounting, it decided not to recommend a terminal in the package 4 corner as the electric connection terminal especially. Therefore, it provided with $n_{\max} - 4$.

When prescribing reinforcement Land in the package 4 corners, it calculates by the formula below.

terminal pitch $\square_e = 1.00, 0.80, 0.65\text{mm}$ (It makes 4 pins of the package 4 corner reinforcement Land.)

Number of terminals with reinforcement Land (n) = number of maximum terminals (n_{\max}) - 16-1(index)

terminal pitch $\square_e = 0.50\text{mm}$ (It makes 9 pins of the package 4 corner reinforcement Land.)

Number of terminals with reinforcement Land (n) = number of maximum terminals (n_{\max}) - 36-1(index)

(18) The 1 pin display

The example of the concrete way of displaying about the 1 pin display for the automatic mounting machinery to recognize the direction of the package using the terminal, the way of adding one terminal to the corner part with the most internal circumference and the way of removing one terminal of A1 and so on were thought of. However, to prescribe the index display to have standardized on and for it to be unified didn't result in an arrangement for the following reason.

There are the package, which is depopulation terminals in 4 corners already, and the package that the space, which arranges a terminal in the corner part with the most internal circumference, isn't provided for. Also, the point that the user doesn't unify a request to the 1 pin display, too, is the reason. However, actually, in the form according to this, a 1 pin display is implemented.

(19) Center terminal position in package width, length direction(\square_E , \square_D)

It prescribes the position of the terminal which is arranged in the nearest position to the datum line of the package center \square_A , \square_B . When the number of matrix (M) is an odd number, $\square_E = \square_D = 0$, when even number, $\square_E = \square_D = \square_e / 2$.

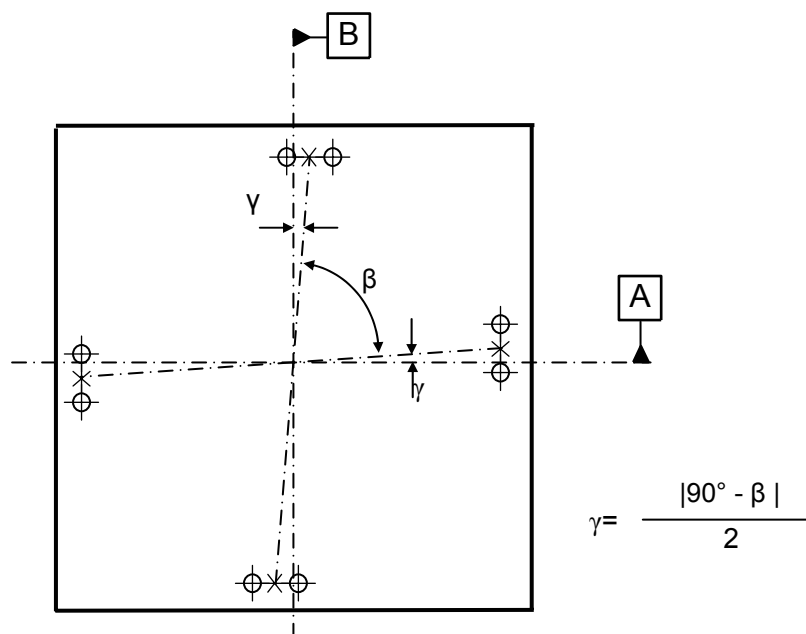
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4. Datum definition

So far the method for calculate the datum **A** and **B** was using ball positions. However, as it is necessary to get a consensus of opinion of **JEDEC**, and it adopts with ball datum definition, there is not a change but the definition way is definite, which is prescribed by clear **EIAJ ED-7304** (BGA measuring method). It is shown below about the definition.

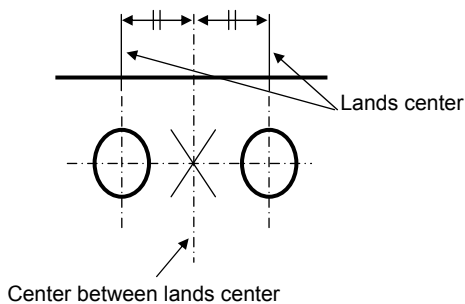
Centers of opposite sides of a package, which are defined below, shall be connected together. An angle β subtended by the two crossing lines shall be obtained. A difference $|90^\circ - \beta|$ of the angle β from 90° shall be equally distributed to the sides to obtain orthogonal axes. The orthogonal axes are depicted as datum lines **A** and **B** of the package.

Explanation figure 1

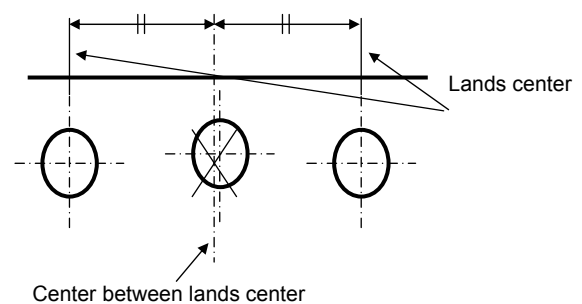


Definition of the center of side

Explanation figure 2 For an even number



Explanation figure 3 For an odd number



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5. The reference standard

(1) IEC standard

Revision of IEC 60191-6 Global drawing format, establishment schedule in 2004

IEC 60191-6 -11 General Design guide for FBGA (Rectangular Type) , establishment in June 2002.

IEC 60191-6 -12 General Design guide for FLGA (Rectangular Type), establishment in June 2002.

Amendment 1 to IEC 60191-2 C-FLGA 0.8 mm pitch / 1.0mm pitch, establishment in March 2001.

Amendment 2 to IEC 60191-2 FLGA Family 0.8 0.65 and 0.5mm pitch, establishment in March 2001.

IEC 60191-6-4/Ed.1 BGA (Ball Grid Array) package measuring method, establishment in XXXX 2002.

(2) JEDEC standard

MO-222A Very Thin Profile, Fine Pitch Land Grid Array Family 0.5 / 0.65mm pitch. SQ/RECT.
establishment in February 2000.

MO-225A Very Thin Profile, Fine Pitch Ball Grid Array Family 0.5 / 0.65mm pitch. SQ/RECT.
establishment in February 2000.

(3) JEITA standard

EIAJ ED-7311-14 (Standard of integrated circuits package C-TLGA(1.00mm pitch)) , establishment in
June 2000.

EIAJ ED-7311-15 (Standard of integrated circuits package C-TFLGA(0.80mm pitch)) , establishment in
June 2000.

EIAJ ED-7311-16 (Standard of integrated circuits package C-TFLGA(0.65mm pitch)) , establishment in
June 2000.

EIAJ ED-7311-16A (Standard of integrated circuits package C-LGA) , revised in February 2004.

EIAJ EDR-7315A (Design guideline of integrated circuits for Ball Grid Array (BGA)), establishment in
November 1998.

EIAJ EDR-7316A (Design guideline of integrated circuits for Fine Pitch Ball Grid Array / Fine Pitch Land
Grid Array (FBGA/FLGA)), establishment in April 2002.

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

EIAJ ED-7303B (Name and Code for Integrated Circuits Package), revised in September 2002.

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6. COMMITTEE MEMBERS

The IC Package Subcommittee of the Technical Standardization Committee on Semiconductor Device Packages has mainly deliberated this standard. The subcommittee members are shown below.

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