

# JEITA

Technical Report of Japan Electronics and Information Technology Industries Association

## ***EIAJ EDR-7331***

### **Design guideline of Integrated circuits for Quad Tape Carrier packages and Carrier ( QTP and Carrier )**

Published in September, 2002

**Investigated by**

Technical Standardization Committee on Semiconductor Device Package

**Published by**

Japan Electronics and Information Technology Industries Association

This document is a translation without guarantee. In the event of any doubt arising, the original standard in Japanese is to be evidenced.

JEITA standards are established independently to any existing patents on the products, materials or processes they cover.

JEITA assumes absolutely no responsibility toward parties applying these standards or toward patent owners.

© 2002 by the Japan Electronics and Information Technology Industries Association

All rights reserved. No part of this standard may be reproduced in any form or by any means without prior permission in writing from the publisher.

## CONTENTS

### Chapter 1 Design guideline of Integrated Circuits for Quad Tape Carrier Packages (QTP)

|  |    |
|--|----|
| 1. Scope of Application .....              | 1  |
| 2. Definition of the Technical Terms ..... | 1  |
| 3. Background .....                        | 2  |
| 4. Definition of QTP .....                 | 2  |
| 5. Numbering of Terminals .....            | 2  |
| 6. Nominal Dimensions .....                | 2  |
| 7. Reference characters and drawing .....  | 3  |
| 8. Outer dimension .....                   | 6  |
| 9. Standard Registration .....             | 17 |
| 10. The standard package list .....        | 18 |

### Chapter 2 Design guideline of Integrated Circuits for Quad Tape Carrier Package Carriers (QTP Carrier)

|  |    |
|--|----|
| 1. Scope of Application .....              | 20 |
| 2. Definition of the Technical Terms ..... | 20 |
| 3. Background .....                        | 21 |
| 4. Definition of QTP Carrier .....         | 21 |
| 5. The way of showing an index .....       | 21 |
| 6. Nominal Dimensions .....                | 21 |
| 7. Reference characters and drawing .....  | 22 |
| 8. Outer dimension .....                   | 24 |

### Explanatory note

|  |    |
|--|----|
| 1. Objective of establishment .....                        | 30 |
| 2. History of review .....                                 | 30 |
| 3. Basic idea .....  | 32 |
| 4. QTP Background for dimensional provisions .....         | 33 |
| 5. QTP Carrier Background for dimensional provisions ..... | 40 |
| 6. The reference standard .....                            | 42 |
| 7. Committee members .....                                 | 43 |

Technical report of Japan Electronics and Information Technology Industries Association

## Design guideline of Integrated circuits for Quad Tape Carrier packages and Carrier ( QTP and Carrier )

### Chapter 1

#### 1. Scope of Application

This technical report regulated outline drawings and dimensions about Quad Tape Carrier package (hereinafter referred to as QTP), which is classified as form G among the Tape Carrier package (hereinafter referred to as TCP) in **EIAJ ED-7300** [Recommended practice on Standard for the preparation of outline drawings of semiconductor packages].

**Note:** This technical report, chapter 1 are the revision version of **EIAJ ED-7431A** (General rules for the preparation of outline drawings of integrated circuits, Quad Tape Carrier package), which the establishment in April 1993. It did **JEDEC JC-11** in the U.S.A and an opinion exchange and this technical report was made. The related standards are shown below.

**JEDEC standard UO- 018B** (QTP, establishment in July 1993)

**JEDEC standard US- 001B** (QTP, establishment in November 1993)

**JEDEC standard CS-006A** (QTP Carrier, establishment in November 1993)

#### 2. Definition of the Technical Terms

The definition of the technical terms used in this technical report is in conformity with **EIAJ ED-7300**, and as for the new term, it depends on the following.

##### (1) Sprocket hole

The holes arrayed at the both sides of a tape at the constant pitch which are used feed the tape. 2 kinds of Super and Wide are prescribed by the size of the sprocket hole.

##### (2) Outerlead

The composition of the package, which was arranged because of the electric, mechanical and thermal connection. It is defined as the terminal in **EIAJ ED-7300**.

##### (3) Test pad

The terminal part which was arranged outside outerlead to examine electricity.

##### (4) Lead pattern

The part which connects the interval of the IC and outerlead at the center and the interval of outerlead and the test pad electrically in the wiring.

##### (5) Outerlead hole

The hole which was opened outside the package main unit to form outerlead.

##### (6) Corner tie bar

The part which separates outerlead hole in the part of the insulation tape which was prepared for the 4 corners of the main unit to maintain a package main unit in the insulation tape.

**(7) Tooling hole**

The hole which was opened by the insulation tape which was arranged in the corner of 4 of the outside of the package main unit to use for the positioning of an electricity examination.

**(8) Metal tooling hole**

It forms a hole with the metallic foil in the purpose to improve positioning precision on the tooling hole. It makes an option. (Explanatory note reference)

**(9) Keeper bar**

The figure of band's insulation tape, which is left at the outer lead tip to maintain the interval of the outer lead in the package main unit by the later processing when separating from the insulation tape.

**(10) Mouse ear**

The part to have made extend a part on the outer lead hall to make it easy to form a keeper bar. It makes an option. (Explanatory note reference)

**(11) Tape format**

The tape format 3 kinds are prescribed which 35 mm, 48 mm, 70 mm. The tape that forms a package main unit inside the sprocket hole and by it the tape unit ranges with more than one piece of continuation. DTP uses only 35 mm of tape format.

**(12) Tape unit**

The part of the tape, which was detached to contain one package main unit, the outerlead and the test pad that is connected with it.

**3. Background**

Recent years, by the appearance of the electronic equipment with very thin types and multifunction, also the integrated circuit package becomes numerous pin and becomes thin. It responds to the demand. This technical report has a purpose of corresponding to use's increasing and promoting the standardization of the package size and securing those compatibilities about Quad Tape Carrier package (hereinafter referred to as QTP). This technical report intended to standardize the outer dimensions of QTP, which use frequency rose, and ensure compatibility between products as far as possible for standardization.

**4. Definition of QTP**

The lead pattern forms in the insulation tape surface, which has a sprocket hole. And the package with the 4-direction lead, it comes out to the direction that is parallel to the seating plane outside the package body.

**5. Numbering of Terminals**

Basically, it follows the rule of **EIAJ ED-7300**. But it makes a package surface the surface where a lead pattern is formed and it gives a number which is peculiar to each of the terminals and the test pads.

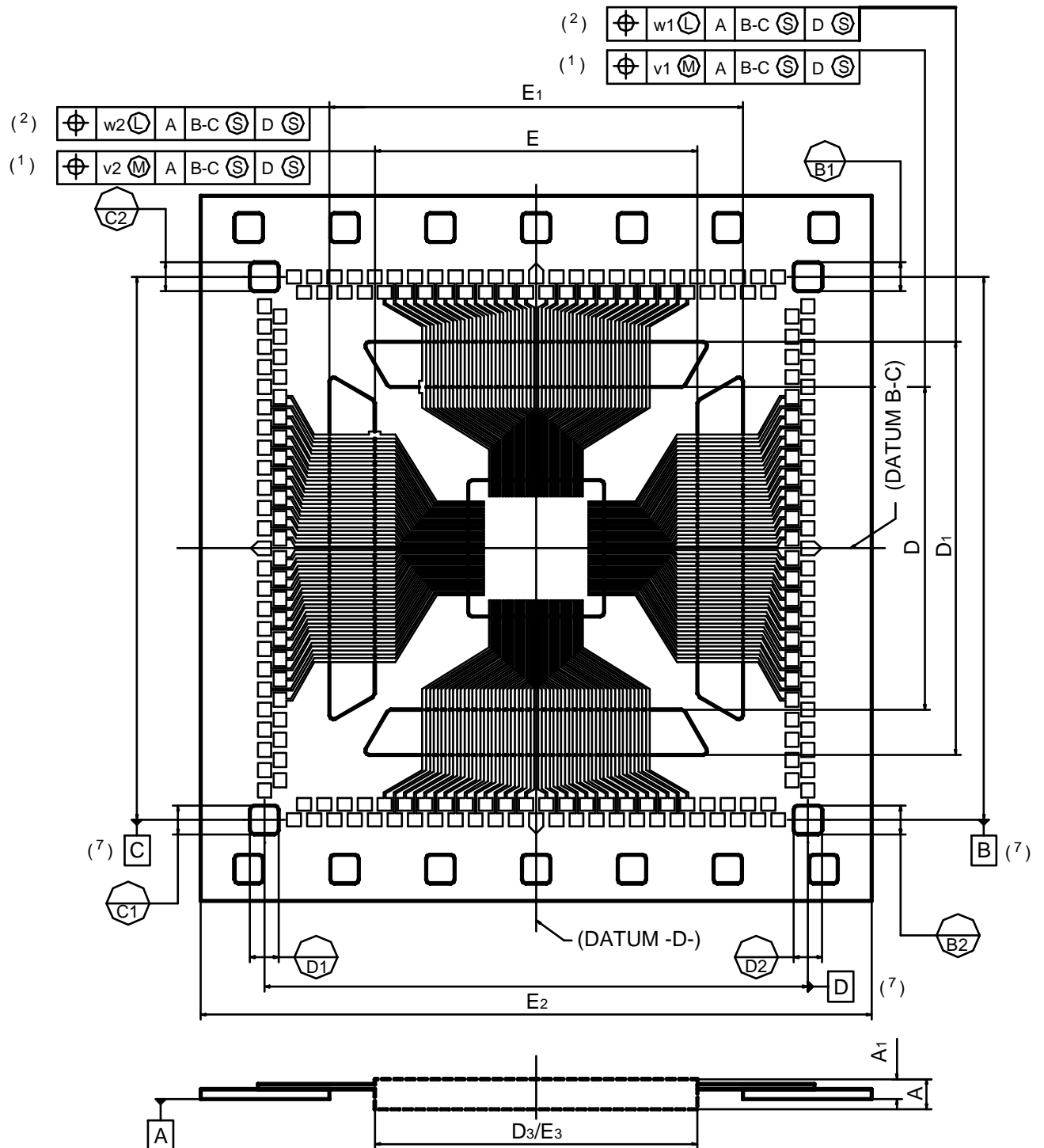
**6. Nominal Dimensions**

Package body size [symbol: D X E] is applied to Nominal dimension.

## 7. REFERENCE CHARACTERS AND DRAWING

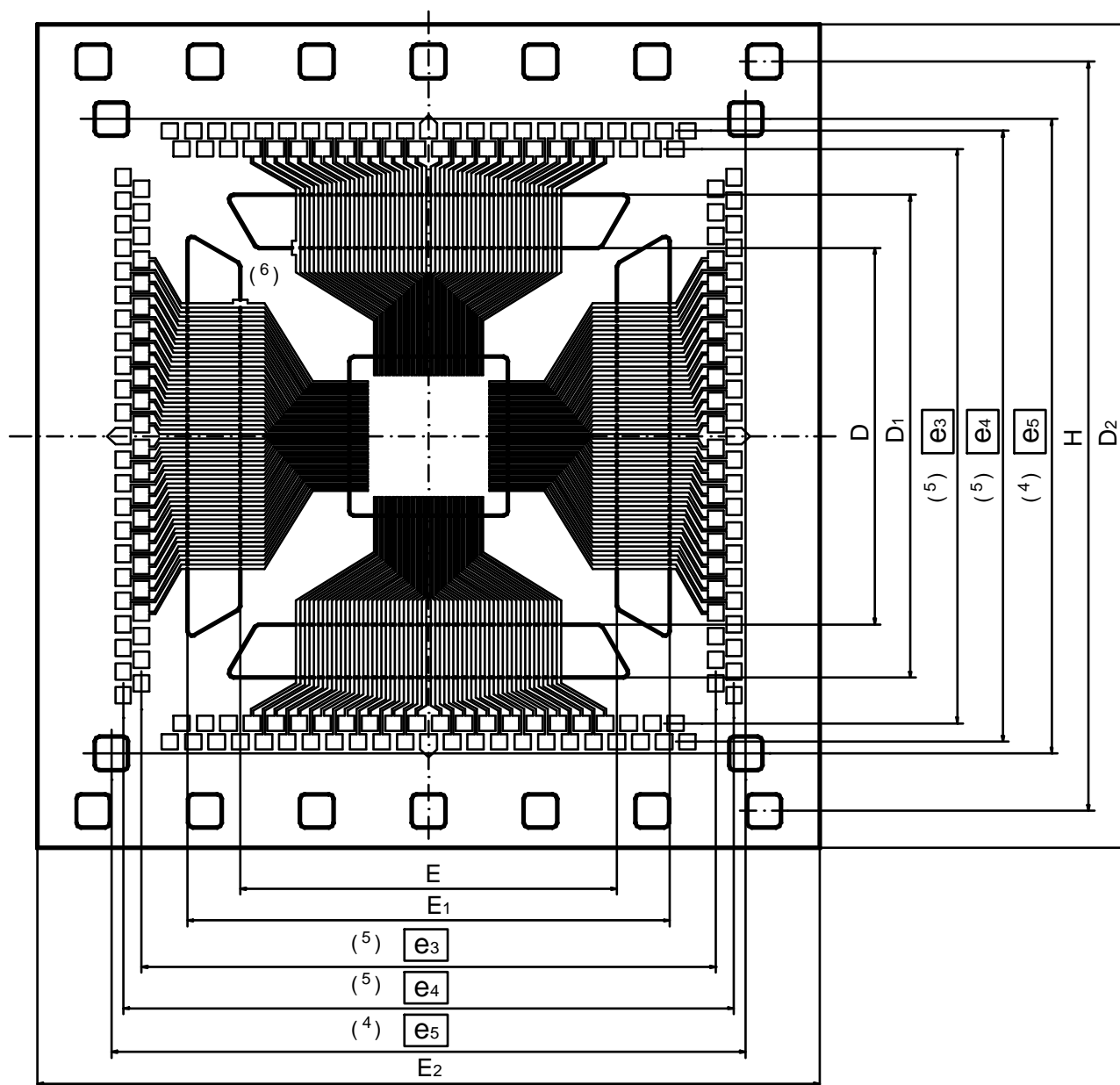
## 7.1 QTP Outline Drawing (1)

Figure 1. (From surface of Cu pattern)



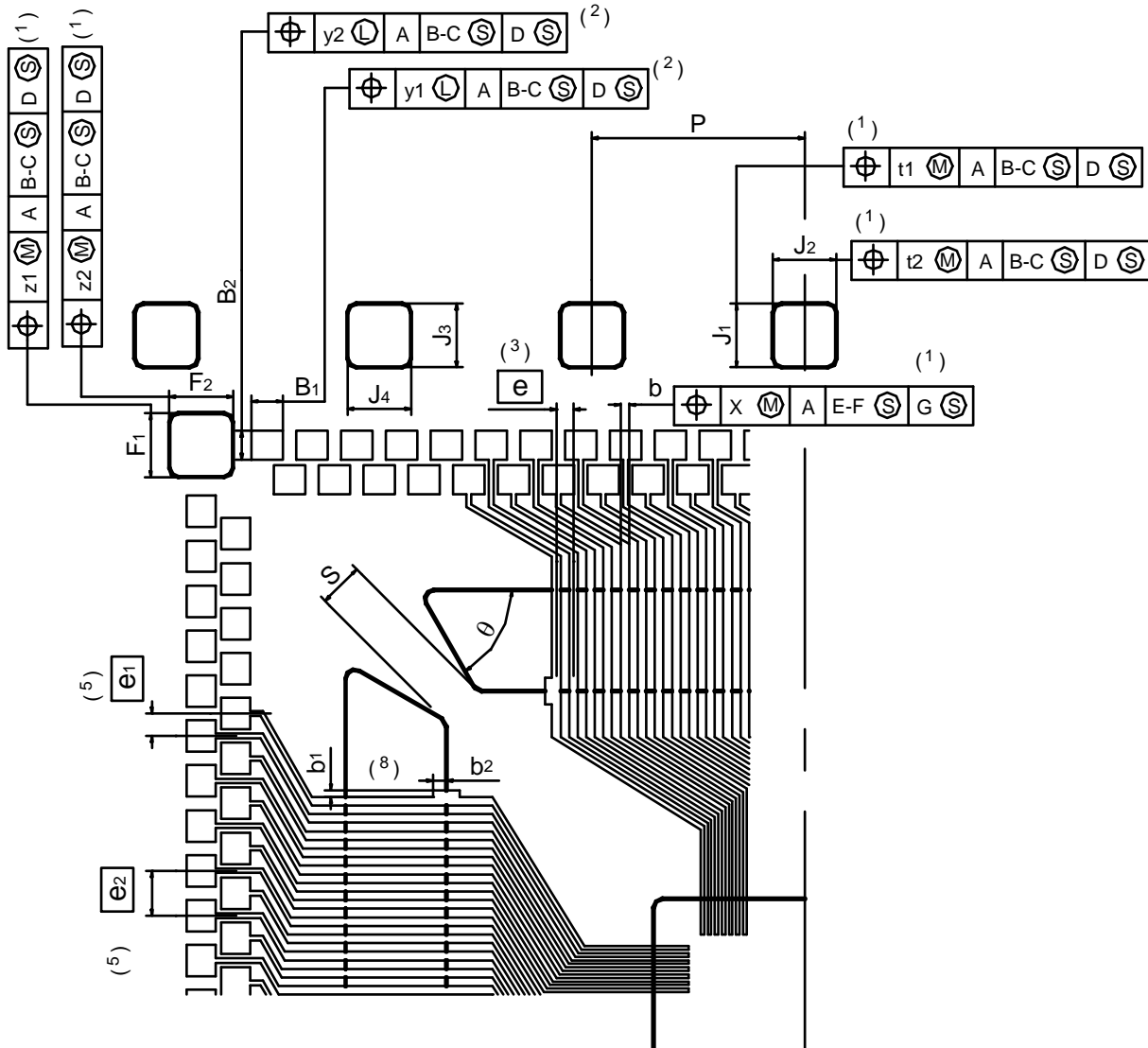
## 7.2 QTP Outline Drawing (2)

Figure 2 (From surface of Cu pattern)



## 7.3 QTP Test pad penumbra and outerlead penumbra detailed figure

Figure 3 (From surface of Cu pattern)

**Note.**

- (1) The maximum material requirements (Refer to **ISO 2692/ JIS B 0023**) apply to the positional tolerance of outerleads and so on.
- (2) The least material requirements (Refer to **ANSI Y14.5M**) apply to the positional tolerance of test pads and outside of outerlead hole.
- (3) Specifies the true geometric position of outerlead axis.
- (4) Specifies the true geometric position of tooling hole axis.
- (5) Specifies the true geometric position of test pad axis.
- (6) The Index mark makes the position of the corner part where the outerlead 1 pin exists. 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.
- (7) Datum plane is supposed to be found from center distance sprocket hole of datum **B C D**. However, datum plane of outerlead supposes that it finds from the test pad of datum **E F G**.
- (8)  $\nabla$  part (Indicated by  $b_1 \times b_2$ ) with outerlead number 1 shows an index mark.
- (9) The measurement in datum plane, it in the condition which lost a curve. It is scissors in the tape by the glass board and so on.
- (10) It makes the round quantity of pulling-out hole corner of the tape equal to or less than 0.20 mm.



## 8. QTP outer dimension

**Table 1** below shows the standard dimensions. Combinations of the standard dimensions shown below allow a number of package variations. If a package is newly designed, their dimensions shall be selected in the **Table 10. Standard Package List**.

**Table 1**

Unit: mm

| Description       | Reference symbol | Standards   | Recommended   | Remarks       |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|-------------------|------------------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---|---|---------------|---------------|---|---------------|---------------|---------------|---|---------------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---|---|
| Nominal dimension | D x E            | <div>(1) Package body size [symbol: D x E] is applied to Nominal dimension.</div> <div>(2) Nominal dimension is shown below.</div> <table><tr><td>D x E</td></tr><tr><td>14.00 x 14.00</td></tr><tr><td>16.00 x 16.00</td></tr><tr><td>18.00 x 18.00</td></tr><tr><td>20.00 x 20.00</td></tr><tr><td>24.00 x 24.00</td></tr><tr><td>26.00 x 26.00</td></tr><tr><td>28.00 x 28.00</td></tr><tr><td>32.00 x 32.00</td></tr><tr><td>36.00 x 36.00</td></tr><tr><td>40.00 x 40.00</td></tr></table>   | D x E         | 14.00 x 14.00 | 16.00 x 16.00 | 18.00 x 18.00 | 20.00 x 20.00 | 24.00 x 24.00 | 26.00 x 26.00 | 28.00 x 28.00 | 32.00 x 32.00 | 36.00 x 36.00 | 40.00 x 40.00 | —             | <div>(1) Nominal dimension is equal to package body size [symbol: D x E].</div> |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| D x E             |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 14.00 x 14.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 16.00 x 16.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 18.00 x 18.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 20.00 x 20.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 24.00 x 24.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 26.00 x 26.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 28.00 x 28.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 32.00 x 32.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 36.00 x 36.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| 40.00 x 40.00     |                  |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| Package width     | E                | <div>(1) It prescribes a standard value as in the following formula.</div> <div><math>E_{nom} (D_{nom}) = 16.00 + 4k</math></div> <div><math>k = 0, 1, 2, 3, 4, 5, 6</math></div> <div>(2) It adds the following value to the standard value.</div> <div>In case of tape format <math>D_2=35</math>, <math>E=16.00, 18.00</math></div> <div>In case of tape format <math>D_2=48</math>, <math>E=26.00</math></div> <div>(3) It makes a tolerance of package width, length as follows.</div> <div><math>E = E_{nom} \pm 0.10</math></div> <div><math>D = D_{nom} \pm 0.10</math></div> <div>(4) It makes package width, length as follows.</div> <table><tr><td><math>D_2</math></td><td>35</td><td>48</td><td>70</td></tr><tr><td rowspan="10">D x E</td><td>14.00 x 14.00</td><td>-</td><td>-</td></tr><tr><td>16.00 x 16.00</td><td>16.00 x 16.00</td><td>-</td></tr><tr><td>18.00 x 18.00</td><td>-</td><td>-</td></tr><tr><td>20.00 x 20.00</td><td>20.00 x 20.00</td><td>-</td></tr><tr><td>24.00 x 24.00</td><td>24.00 x 24.00</td><td>24.00 x 24.00</td></tr><tr><td>-</td><td>26.00 x 26.00</td><td>-</td></tr><tr><td>28.00 x 28.00</td><td>28.00 x 28.00</td><td>28.00 x 28.00</td></tr><tr><td>32.00 x 32.00</td><td>32.00 x 32.00</td><td>32.00 x 32.00</td></tr><tr><td>36.00 x 36.00</td><td>36.00 x 36.00</td><td>36.00 x 36.00</td></tr><tr><td>40.00 x 40.00</td><td>40.00 x 40.00</td><td>40.00 x 40.00</td></tr></table> | $D_2$         | 35            | 48            | 70            | D x E         | 14.00 x 14.00 | -             | -             | 16.00 x 16.00 | 16.00 x 16.00 | -             | 18.00 x 18.00 | -   | - | 20.00 x 20.00 | 20.00 x 20.00 | - | 24.00 x 24.00 | 24.00 x 24.00 | 24.00 x 24.00 | - | 26.00 x 26.00 | - | 28.00 x 28.00 | 28.00 x 28.00 | 28.00 x 28.00 | 32.00 x 32.00 | 32.00 x 32.00 | 32.00 x 32.00 | 36.00 x 36.00 | 36.00 x 36.00 | 36.00 x 36.00 | 40.00 x 40.00 | 40.00 x 40.00 | 40.00 x 40.00 | — | <div>(1) It considered for package body size (D x E) which becomes Nominal dimension to get to do the same becoming of series with QFP.</div> <div>(2) It prescribes a body size (DXE) according to the tape format(<math>D_2</math>), respectively.</div> <div>(3) It makes the same rule with <b>JEDEC standard US- 001B</b>.</div> |
| $D_2$             | 35               | 48  | 70            |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| D x E             | 14.00 x 14.00    | -   | -             |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 16.00 x 16.00    | 16.00 x 16.00   | -             |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 18.00 x 18.00    | -   | -             |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 20.00 x 20.00    | 20.00 x 20.00   | -             |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 24.00 x 24.00    | 24.00 x 24.00   | 24.00 x 24.00 |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | -                | 26.00 x 26.00   | -             |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 28.00 x 28.00    | 28.00 x 28.00   | 28.00 x 28.00 |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 32.00 x 32.00    | 32.00 x 32.00   | 32.00 x 32.00 |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 36.00 x 36.00    | 36.00 x 36.00   | 36.00 x 36.00 |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
|                   | 40.00 x 40.00    | 40.00 x 40.00   | 40.00 x 40.00 |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |
| Package length    | D                |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |               |               |   |               |               |               |   |               |   |               |               |               |               |               |               |               |               |               |               |               |               |   |   |

Table1 (continued)

Unit: mm

| Unit: mm                                       |                  |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
|--|------------------|--|----------------|---|------|-------|------|-------|------|-------|------|-------------------------------------|---|--|
| Description                                    | Reference symbol | Standards  | Recommended    | Remarks   |      |       |      |       |      |       |      |                                     |   |  |
| Outer lead hole outside width                  | E <sub>1</sub>   | (1) It prescribes a standard value as in the following formula.<br>$E_{1nom} = E_{nom} + 2.25 \times 2$<br>(2) The range shall be<br>$E_1 = E_{1nom} \pm 0.10$   | —              | It considered the case to use outer lead for a Gull wing shape. |      |       |      |       |      |       |      |                                     |   |  |
| Outer lead hole outside length                 | D <sub>1</sub>   | (1) It prescribes a standard value as in the following formula.<br>$D_{1nom} = D_{nom} + 2.25 \times 2$<br>(2) The range shall be<br>$D_1 = D_{1nom} \pm 0.10$   | —              |   |      |       |      |       |      |       |      |                                     |   |  |
| Test pad pitch (1)                             | e <sub>1</sub>   | <table><tr><td>e<sub>1</sub></td><td>e<sub>2</sub></td></tr><tr><td>0.50</td><td>1.00</td></tr><tr><td>0.40</td><td>0.80</td></tr><tr><td>0.30</td><td>0.60</td></tr><tr><td>0.25</td><td>0.50</td></tr></table> | e <sub>1</sub> | e <sub>2</sub>  | 0.50 | 1.00  | 0.40 | 0.80  | 0.30 | 0.60  | 0.25 | 0.50                                | — | (1) True geometrical position is shown.<br>(2) e <sub>2</sub> = e <sub>1</sub> X 2 |
| e <sub>1</sub>                                 | e <sub>2</sub>   |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 0.50   | 1.00             |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 0.40   | 0.80             |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 0.30   | 0.60             |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 0.25   | 0.50             |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| Test pad pitch (2)                             | e <sub>2</sub>   |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| Distance of center of the inside test pad row  | e <sub>3</sub>   | <table><tr><td>Tape format</td><td>e<sub>3</sub></td></tr><tr><td>35</td><td>25.40</td></tr><tr><td>48</td><td>34.60</td></tr><tr><td>70</td><td>56.20</td></tr></table>   | Tape format    | e <sub>3</sub>  | 35   | 25.40 | 48   | 34.60 | 70   | 56.20 | —    | True geometrical position is shown. |   |  |
| Tape format                                    | e <sub>3</sub>   |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 35   | 25.40            |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 48   | 34.60            |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| 70   | 56.20            |  |                |   |      |       |      |       |      |       |      |                                     |   |  |
| Distance of center of the outside test pad row | e <sub>4</sub>   | e <sub>4</sub> = e <sub>3</sub> + 1.55   | —              |   |      |       |      |       |      |       |      |                                     |   |  |

Table1 (continued)

Unit: mm

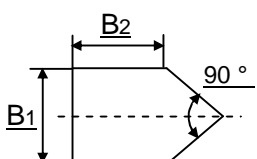
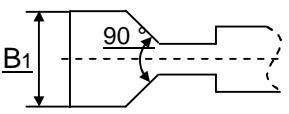






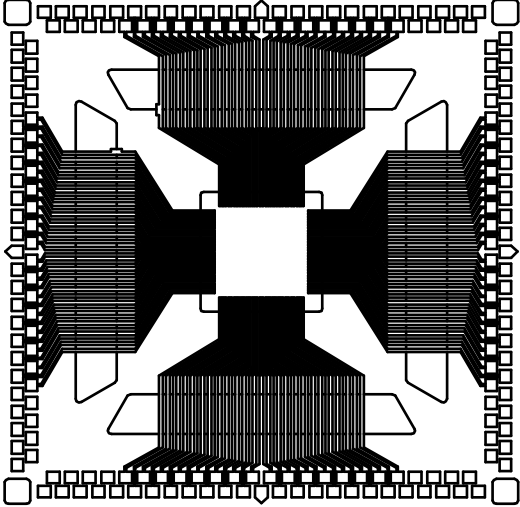
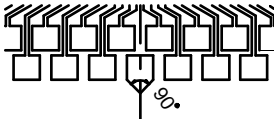
| Description   | Reference symbol | Standards   | Recommended   | Remarks        |                 |      |      |      |      |      |      |      |      |  |   |   |
|---|------------------|---|---|----------------|-----------------|------|------|------|------|------|------|------|------|--|---|---|
| Test pad width  | B <sub>1</sub>   | <table><tr><td><math>\frac{e}{B_{1nom}}</math></td><td></td></tr><tr><td>0.50</td><td>0.70</td></tr><tr><td>0.40</td><td>0.50</td></tr><tr><td>0.30</td><td>0.40</td></tr><tr><td>0.25</td><td>0.32</td></tr></table> <p>The range shall be <math>B_1 = B_{1nom} \pm 0.03</math></p>  | $\frac{e}{B_{1nom}}$  |                | 0.50            | 0.70 | 0.40 | 0.50 | 0.30 | 0.40 | 0.25 | 0.32 | —    | <p>There is a shape of the center test pad like the following figure to make the standard of datum line.</p>  <p>One side is an even number.</p>  <p>One side is an odd number.</p> |   |   |
| $\frac{e}{B_{1nom}}$  |                  |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.50  | 0.70             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.40  | 0.50             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.30  | 0.40             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.25  | 0.32             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| Test pad length   | B <sub>2</sub>   | <p>(1) <math>B_{2nom} = 0.65</math></p> <p>(2) The range shall be <math>B_2 = B_{2nom} \pm 0.03</math></p>  | —   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| Tolerance of test pad center position (1)   | y <sub>1</sub>   | <p>(1) Tolerance of test pad center position shall be specified in the outline drawing.</p> <table><tr><td></td><td>y<sub>1</sub></td></tr></table> <p>(2) Reference symbol “y<sub>1</sub>” shall be replaced as below.</p> <table><tr><td><math>\frac{e}{y_1}</math></td><td></td></tr><tr><td>0.50</td><td>0.10</td></tr><tr><td>0.40</td><td>0.08</td></tr><tr><td>0.30</td><td>0.08</td></tr><tr><td>0.25</td><td>0.05</td></tr></table> |  | y <sub>1</sub> | $\frac{e}{y_1}$ |      | 0.50 | 0.10 | 0.40 | 0.08 | 0.30 | 0.08 | 0.25 | 0.05   | — | — |
|  | y <sub>1</sub>   |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| $\frac{e}{y_1}$   |                  |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.50  | 0.10             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.40  | 0.08             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.30  | 0.08             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| 0.25  | 0.05             |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |
| Tolerance of test pad center position (2)   | y <sub>2</sub>   | <p>(1) Tolerance of test pad center position shall be specified in the outline drawing.</p> <table><tr><td></td><td>y<sub>2</sub></td></tr></table> <p>(2) Reference symbol “y<sub>2</sub>” shall be replaced as below.</p> <p>y<sub>2</sub> 0.10</p>  |  | y <sub>2</sub> | —               | —    |      |      |      |      |      |      |      |  |   |   |
|  | y <sub>2</sub>   |   |   |                |                 |      |      |      |      |      |      |      |      |  |   |   |

Table1 (continued)

Unit: mm

| Description     | Reference symbol | Standards   | Recommended | Remarks  |
|-----------------|------------------|---|-------------|--|
| Test pad layout | —                | <p>(1) It prescribes a test pad layout as follows.</p>  <p>(2) It makes a test pad layout with 2 lines of plover layout and moreover it makes most outside an end test pad of the line outside.</p> <p>(3) The package center and the test pad center of line outside agree.</p> <p>(4) It doesn't use a test pad at the center as the principle.</p> | —           | <p>It makes 4 test pads on the datum line a shape like the following figure as the mark.</p>  |

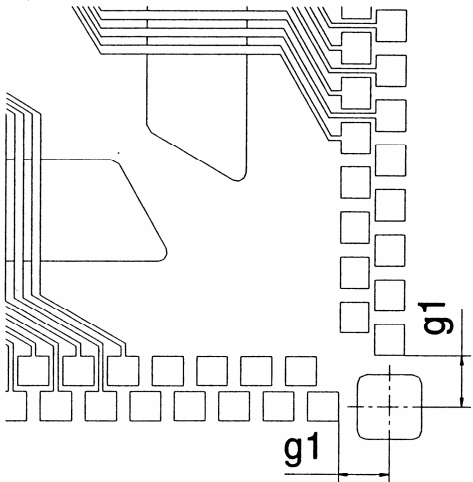
| Number of test pads | N   | <p>(1) It prescribes a test pad layout as follows.</p>  <table border="1" data-bbox="491 790 911 943"> <thead> <tr> <th>Tape format</th><th>35</th><th>48</th><th>70</th></tr> </thead> <tbody> <tr> <td>e=0.50</td><td>196</td><td>260</td><td>436</td></tr> <tr> <td>e=0.40</td><td>244</td><td>324</td><td>548</td></tr> <tr> <td>e=0.30</td><td>324</td><td>436</td><td>724</td></tr> <tr> <td>e=0.25</td><td>338</td><td>532</td><td>884</td></tr> </tbody> </table> | Tape format | 35 | 48 | 70 | e=0.50 | 196 | 260 | 436 | e=0.40 | 244 | 324 | 548 | e=0.30 | 324 | 436 | 724 | e=0.25 | 338 | 532 | 884 | <p>(1) It is due to the rule of the test pad layout.</p> <p>(2) It makes <math>g_{1min}=1.10mm</math> which a minimum value during the test pad and the tolling hole center. It prescribes "N" which number of maximum test pads and it is stored among tooling hole center distance (<math>e_3</math>).</p> <p>(3) The test pad provides the number of maximum test pads regardless of the number of outer leads.</p> |
|---------------------|-----|--|-------------|----|----|----|--------|-----|-----|-----|--------|-----|-----|-----|--------|-----|-----|-----|--------|-----|-----|-----|--|
| Tape format         | 35  | 48   | 70          |    |    |    |        |     |     |     |        |     |     |     |        |     |     |     |        |     |     |     |  |
| e=0.50              | 196 | 260  | 436         |    |    |    |        |     |     |     |        |     |     |     |        |     |     |     |        |     |     |     |  |
| e=0.40              | 244 | 324  | 548         |    |    |    |        |     |     |     |        |     |     |     |        |     |     |     |        |     |     |     |  |
| e=0.30              | 324 | 436  | 724         |    |    |    |        |     |     |     |        |     |     |     |        |     |     |     |        |     |     |     |  |
| e=0.25              | 338 | 532  | 884         |    |    |    |        |     |     |     |        |     |     |     |        |     |     |     |        |     |     |     |  |

Table1 (continued)

Unit: mm

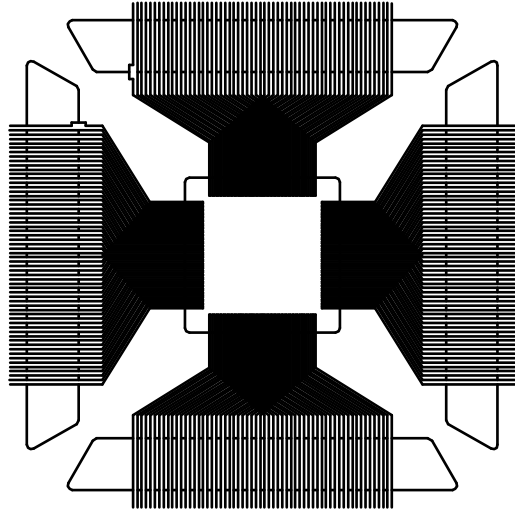
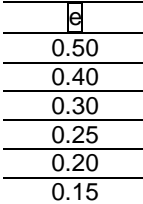
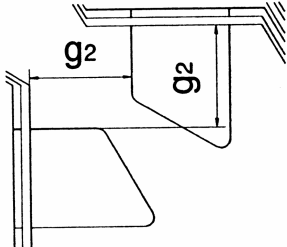
| Description           | Reference symbol | Standards   | Recommended | Remarks   |
|-----------------------|------------------|---|-------------|---|
| Outer lead layout     | —                | <p>(1) It prescribes outer lead layout as follows.</p>  <p>(2) The outer lead center shifts to the package center in <math>e/2</math>.</p> <p>(3) But, in the following case, the package center and outer lead center agree.</p> <p>Nominal dimension 20.00X20.00 of tape format 35</p> <p>Nominal dimension 28.00X28.00 of tape format 48</p>  | —           | —   |
| Outer lead pitch      | $e$              |  <p>0.50</p> <p>0.40</p> <p>0.30</p> <p>0.25</p> <p>0.20</p> <p>0.15</p>   | —           | True geometrical position is shown.   |
| Number of outer leads | n                | <p>(1) It prescribes the number of outer leads as follows.</p>  <p>(1-1) It is due to the rule of the outer leads layout.</p> <p>(1-2) It makes <math>g_{2min}=0.95mm</math>, which a minimum value between outside of outer lead at the end most and package unit corner. It makes either smaller ones "n" that maximum number of terminal or number of test pad (N). It's enters package width (<math>E_{nom}</math>) or package length (<math>D_{nom}</math>).</p> <p>(2) "n" value</p> <p>See 10. Standard Package List.</p> | —           | As for the way of calculating the number of outer leads, it refers to <b>explanatory note</b> . |

Table 1 (continued)

Unit: mm

Unit: mm


| Description                             | Reference symbol  | Standards  | Recommend -ed     | Remarks           |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
|---|-------------------|--|-------------------|-------------------|-------------------|-------------------|------|-------|-------|-------|------|-------------------------------|-------|-------|------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|
| Outer lead width                        | b                 | <p>It makes a maximum and a minimum value a range in the table below, to each outer lead pitch.</p> <table><tr><th>e</th><th>b<sub>min</sub></th><th>b<sub>nom</sub></th><th>b<sub>max</sub></th></tr><tr><td>0.50</td><td>0.17</td><td>0.20</td><td>0.23</td></tr><tr><td>0.40</td><td>0.13</td><td>0.16</td><td>0.19</td></tr><tr><td>0.30</td><td>0.09</td><td>0.12</td><td>0.15</td></tr><tr><td>0.25</td><td>0.08</td><td>0.10</td><td>0.12</td></tr><tr><td>0.20</td><td>0.06</td><td>0.08</td><td>0.10</td></tr><tr><td>0.15</td><td>0.04</td><td>0.06</td><td>0.07</td></tr></table> | e                 | b <sub>min</sub>  | b <sub>nom</sub>  | b <sub>max</sub>  | 0.50 | 0.17  | 0.20  | 0.23  | 0.40 | 0.13                          | 0.16  | 0.19  | 0.30 | 0.09  | 0.12  | 0.15  | 0.25 | 0.08 | 0.10 | 0.12 | 0.20 | 0.06 | 0.08 | 0.10 | 0.15 | 0.04 | 0.06 | 0.07 | — | — |
| e                                       | b <sub>min</sub>  | b <sub>nom</sub>   | b <sub>max</sub>  |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.50                                    | 0.17              | 0.20   | 0.23              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.40                                    | 0.13              | 0.16   | 0.19              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.30                                    | 0.09              | 0.12   | 0.15              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.25                                    | 0.08              | 0.10   | 0.12              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.20                                    | 0.06              | 0.08   | 0.10              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.15                                    | 0.04              | 0.06   | 0.07              |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| Tolerance of outer lead center position | x                 | <p>(1) Tolerance of outer lead center position shall be specified in the outline drawing.</p> <div> X</div> <p>(2) Reference symbol “ x ” shall be replaced as below.</p> <table><tr><th>e</th><th>x</th></tr><tr><td>0.50</td><td>0.10</td></tr><tr><td>0.40</td><td>0.08</td></tr><tr><td>0.30</td><td>0.06</td></tr><tr><td>0.25</td><td>0.05</td></tr><tr><td>0.20</td><td>0.04</td></tr><tr><td>0.15</td><td>0.03</td></tr></table>  | e                 | x                 | 0.50              | 0.10              | 0.40 | 0.08  | 0.30  | 0.06  | 0.25 | 0.05                          | 0.20  | 0.04  | 0.15 | 0.03  | —     | —     |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| e                                       | x                 |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.50                                    | 0.10              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.40                                    | 0.08              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.30                                    | 0.06              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.25                                    | 0.05              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.20                                    | 0.04              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 0.15                                    | 0.03              |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| Tape format                             | D <sub>2</sub>    | <p>(1) It prescribes tape format as follows.</p> <table><tr><th>Tape format</th><th>D<sub>2min</sub></th><th>D<sub>2nom</sub></th><th>D<sub>2max</sub></th></tr><tr><td>35</td><td>34.85</td><td>34.98</td><td>35.10</td></tr><tr><td>48</td><td>48.06</td><td>48.19</td><td>48.81</td></tr><tr><td>70</td><td>69.82</td><td>69.95</td><td>70.07</td></tr></table>   | Tape format       | D <sub>2min</sub> | D <sub>2nom</sub> | D <sub>2max</sub> | 35   | 34.85 | 34.98 | 35.10 | 48   | 48.06                         | 48.19 | 48.81 | 70   | 69.82 | 69.95 | 70.07 | —    | —    |      |      |      |      |      |      |      |      |      |      |   |   |
| Tape format                             | D <sub>2min</sub> | D <sub>2nom</sub>  | D <sub>2max</sub> |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 35                                      | 34.85             | 34.98  | 35.10             |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 48                                      | 48.06             | 48.19  | 48.81             |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 70                                      | 69.82             | 69.95  | 70.07             |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| Tape unit width                         | E <sub>2</sub>    | <p>(1) It prescribes a standard value as in the following formula.</p> <p><math>E_{2nom} = 4.75 \times k</math></p> <p>P = 4.75, k = 7, 10, 14</p> <p>(2) It prescribes tape unit width as follows.</p> <table><tr><th>D<sub>2</sub></th><th>E<sub>2nom</sub></th></tr><tr><td>35</td><td>33.25</td></tr><tr><td>48</td><td>47.50</td></tr><tr><td>70</td><td>66.50</td></tr></table>  | D <sub>2</sub>    | E <sub>2nom</sub> | 35                | 33.25             | 48   | 47.50 | 70    | 66.50 | —    | Tape format (D <sub>2</sub> ) |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| D <sub>2</sub>                          | E <sub>2nom</sub> |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 35                                      | 33.25             |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 48                                      | 47.50             |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |
| 70                                      | 66.50             |  |                   |                   |                   |                   |      |       |       |       |      |                               |       |       |      |       |       |       |      |      |      |      |      |      |      |      |      |      |      |      |   |   |

Table 1 (continued)

Unit: mm

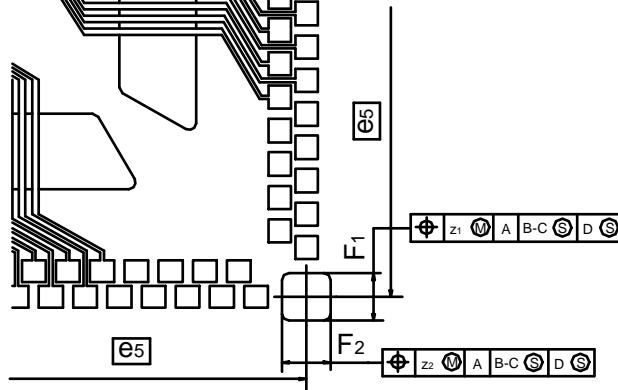
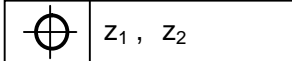
| Description                               | Reference symbol | Standards   | Recommended | Remarks   |      |       |      |       |      |       |      |      |   |   |
|---|------------------|---|-------------|---|------|-------|------|-------|------|-------|------|------|---|---|
| Tooling hole                              | —                | (1) Tooling hole is shown in the following figure.<br>  | —           | —   |      |       |      |       |      |       |      |      |   |   |
| Tooling hole center distance              | $e_5$            | (1) It prescribes tooling hole center distance as follows.<br><table><tr><th>Tape format</th><th><math>e_5</math></th></tr><tr><td>35</td><td>26.95</td></tr><tr><td>48</td><td>36.15</td></tr><tr><td>70</td><td>57.75</td></tr></table>   | Tape format | $e_5$   | 35   | 26.95 | 48   | 36.15 | 70   | 57.75 | —    | —    |   |   |
| Tape format                               | $e_5$            |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 35  | 26.95            |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 48  | 36.15            |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 70  | 57.75            |   |             |   |      |       |      |       |      |       |      |      |   |   |
| Tooling hole width                        | $F_1$            | (1) It prescribes tooling hole width ( $F_1$ ), length ( $F_2$ ) as follows.<br>$F_{1nom} = F_{2nom} = 1.42$  | —           | (1) It makes same rule which sprocket hole width ( $J_1$ ) and length ( $J_2$ ).<br>(Tape format Super) |      |       |      |       |      |       |      |      |   |   |
| Tooling hole length                       | $F_2$            | (2) It prescribes tolerance of tooling hole width, length as follows.<br>$F = F_{nom} \pm 0.03$   |             |   |      |       |      |       |      |       |      |      |   |   |
| Tolerance of tooling hole center position | $Z_1, Z_2$       | (1) Tolerance of tooling hole center position shall be specified in the outline drawing.<br><br>(2) Reference symbol “ $Z_1, Z_2$ ” shall be replaced as below.<br><table><tr><th><math>e_1</math></th><th><math>Z_1, Z_2</math></th></tr><tr><td>0.50</td><td>0.10</td></tr><tr><td>0.40</td><td>0.08</td></tr><tr><td>0.30</td><td>0.08</td></tr><tr><td>0.25</td><td>0.05</td></tr></table> | $e_1$       | $Z_1, Z_2$  | 0.50 | 0.10  | 0.40 | 0.08  | 0.30 | 0.08  | 0.25 | 0.05 | — | — |
| $e_1$                                     | $Z_1, Z_2$       |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 0.50                                      | 0.10             |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 0.40                                      | 0.08             |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 0.30                                      | 0.08             |   |             |   |      |       |      |       |      |       |      |      |   |   |
| 0.25                                      | 0.05             |   |             |   |      |       |      |       |      |       |      |      |   |   |



Table 1 (continued)

Unit: mm

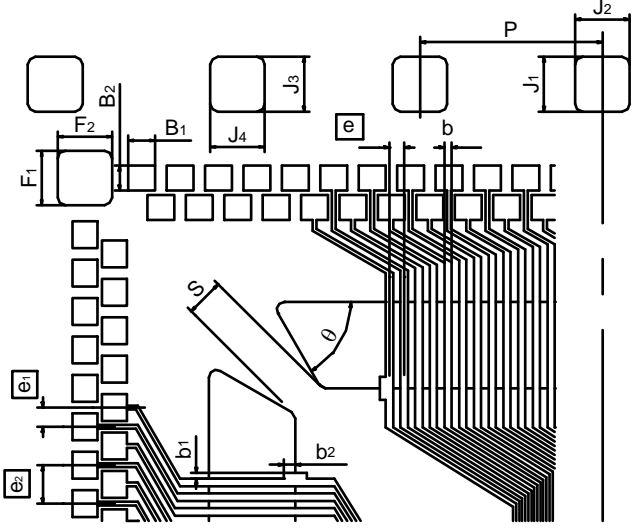
| Description                                   | Reference symbol | Standards   | Recom mended | Remarks                             |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
|---|------------------|---|--------------|-------------------------------------|--|----|-------|------|----|-------|------|--|------|------|----|-------|------|--|------|------|---|---|
| Position of Corner tie bar, and Sprocket hole | —                |   | —            | —                                   |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| Corner tie bar width                          | S                | $S_{nom} = 1.00$  | —            | It makes the same rule with DTP(2). |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| Corner tie bar angle                          |                  | $_{nom} = 60^{\circ}$   | —            | —                                   |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| Sprocket hole width                           | $J_1, J_3$       | <p>(1) It prescribes a standard value below.</p> <table><tr><th colspan="2">Tape format</th><th><math>J_{1nom}=J_{3nom}</math><br/><math>J_{2nom}=J_{4nom}</math></th></tr><tr><td>35</td><td>Super</td><td>1.42</td></tr><tr><td>48</td><td>Super</td><td>1.98</td></tr><tr><td></td><td>Wide</td><td>1.42</td></tr><tr><td>70</td><td>Super</td><td>1.98</td></tr><tr><td></td><td>Wide</td><td>1.42</td></tr></table> <p>(2) It prescribes tolerance of sprocket hole width, length as follows.</p> $J = J_{nom} \pm 0.03$ | Tape format  |                                     | $J_{1nom}=J_{3nom}$<br>$J_{2nom}=J_{4nom}$ | 35 | Super | 1.42 | 48 | Super | 1.98 |  | Wide | 1.42 | 70 | Super | 1.98 |  | Wide | 1.42 | — | (1) kind of the sprocket hole are in following of 2 type of tape formats, Super and Wide.<br>Super : $J_{nom}=1.42$<br>Wide : $J_{nom}=1.98$<br>(2) $J_1$ and $J_2$ are sprocket hole in the package center. $J_3$ and $J_4$ are the other sprocket hole. |
| Tape format                                   |                  | $J_{1nom}=J_{3nom}$<br>$J_{2nom}=J_{4nom}$  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| 35  | Super            | 1.42  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| 48  | Super            | 1.98  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
|   | Wide             | 1.42  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| 70  | Super            | 1.98  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
|   | Wide             | 1.42  |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| Sprocket hole length                          | $J_2, J_4$       |   |              |                                     |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |
| Sprocket hole pitch                           | P                | <p>(1) <math>P_{nom} = 4.75</math></p> <p>(2) The range shall be</p> $P = P_{nom} \pm 0.05$   | —            | —                                   |  |    |       |      |    |       |      |  |      |      |    |       |      |  |      |      |   |   |

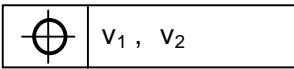
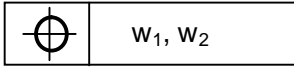
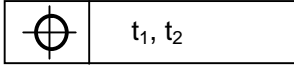
Table 1 (continued)

Unit: mm

| Description                                 | Reference symbol  | Standards   | Recommended | Remarks                                     |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
|---|-------------------|---|-------------|---|------|------|------|------|-------|-------|-------------------------|--|------|-------|-------|-------|----|-------|-------|-------|-------|------|-------|-------|-------|----|-------|-------|-------|-------|------|--|--|--|---|---|
| Distance of center of the sprocket hole row | H                 | (1) It prescribes as in the table below. <table><tr><th colspan="2">Tape format</th><th>Hmin</th><th>Hnom</th><th>Hmax</th></tr><tr><td rowspan="2">35</td><td>Super</td><td>31.76</td><td>31.83</td><td>31.87</td></tr><tr><td>Wide</td><td>42.10</td><td>42.18</td><td>42.26</td></tr><tr><td rowspan="2">48</td><td>Super</td><td>44.78</td><td>44.86</td><td>44.94</td></tr><tr><td>Wide</td><td>63.87</td><td>63.95</td><td>64.03</td></tr><tr><td rowspan="2">70</td><td>Super</td><td>66.72</td><td>66.80</td><td>66.88</td></tr><tr><td>Wide</td><td></td><td></td><td></td></tr></table> | Tape format |   | Hmin | Hnom | Hmax | 35   | Super | 31.76 | 31.83                   | 31.87  | Wide | 42.10 | 42.18 | 42.26 | 48 | Super | 44.78 | 44.86 | 44.94 | Wide | 63.87 | 63.95 | 64.03 | 70 | Super | 66.72 | 66.80 | 66.88 | Wide |  |  |  | — | (1) Range of tape format 35 shall be<br>$H = H_{nom} \begin{matrix} +0.04 \\ -0.07 \end{matrix}$<br><br>(2) Range of tape format 48,70 shall be<br>$H = H_{nom} \pm 0.08$ |
| Tape format                                 |                   | Hmin  | Hnom        | Hmax  |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 35  | Super             | 31.76   | 31.83       | 31.87                                       |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
|   | Wide              | 42.10   | 42.18       | 42.26                                       |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 48  | Super             | 44.78   | 44.86       | 44.94                                       |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
|   | Wide              | 63.87   | 63.95       | 64.03                                       |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 70  | Super             | 66.72   | 66.80       | 66.88                                       |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
|   | Wide              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Outer lead hole width                       | E <sub>1</sub>    | (1) It prescribes a standard value as in the following formula.<br>$E_{1nom} = E_{nom} + (0.35 \times 2)$<br><br>(2) The range shall be<br>$E_1 = E_{1nom} \pm 0.15$  | —           | —   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Package thickness                           | A                 | <table><tr><th>Tape format</th><th>A<sub>max</sub></th></tr><tr><td>35</td><td>2.55</td></tr><tr><td>48</td><td>4.45</td></tr><tr><td>70</td><td>4.45</td></tr></table>   | Tape format | A <sub>max</sub>                            | 35   | 2.55 | 48   | 4.45 | 70    | 4.45  | A <sub>nom</sub> = 0.50 | It makes the same rule with <b>JEDEC standard US-001B.</b> |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Tape format                                 | A <sub>max</sub>  |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 35  | 2.55              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 48  | 4.45              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 70  | 4.45              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Package upper part thickness                | A <sub>1</sub>    | <table><tr><th>Tape format</th><th>A<sub>1max</sub></th></tr><tr><td>35</td><td>1.50</td></tr><tr><td>48</td><td>2.70</td></tr><tr><td>70</td><td>2.70</td></tr></table>  | Tape format | A <sub>1max</sub>                           | 35   | 1.50 | 48   | 2.70 | 70    | 2.70  | —                       | It makes the same rule with <b>JEDEC standard US-001B.</b> |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Tape format                                 | A <sub>1max</sub> |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 35  | 1.50              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 48  | 2.70              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| 70  | 2.70              |   |             |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Sealing length                              | D <sub>3</sub>    | D <sub>3</sub> D  | —           | It makes the same rule with DTP(1), DTP(2). |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |
| Sealing width                               | E <sub>3</sub>    | E <sub>3</sub> E  | —           |   |      |      |      |      |       |       |                         |  |      |       |       |       |    |       |       |       |       |      |       |       |       |    |       |       |       |       |      |  |  |  |   |   |

Table 1 (continued)

Unit: mm

| Description                                       | Reference symbol | Standards   | Recommended | Remarks                                     |
|---|------------------|---|-------------|---|
| Index mark width                                  | $b_1$            | (1) $b_{1nom}=0.15$<br>(2) The range shall be $b_1=b_{1nom} \pm 0.02$ .   | —           | It makes the same rule with DTP(1), DTP(2). |
| Index mark length                                 | $b_2$            | (1) $b_{2nom} = 0.30$<br>(2) The range shall be $b_2 = b_{2nom} \pm 0.15$ .   | —           |   |
| Tolerance of package center position              | $v_1, v_2$       | (1) Tolerance of package center position shall be specified in the outline drawing.<br><br>(2) Reference symbol " $v_1, v_2$ " shall be replaced as below.<br>$v_1, v_2 \quad 0.25$                | —           | —   |
| Tolerance of outer lead center position           | $w_1, w_2$       | (1) Tolerance of outer lead center position shall be specified in the outline drawing.<br><br>(2) Reference symbol " $w_1, w_2$ " shall be replaced as below.<br>$w_1, w_2 \quad 0.25$           | —           | —   |
| Tolerance of center sprocket hole center position | $t_1, t_2$       | (1) Tolerance of center sprocket hole center position shall be specified in the outline drawing.<br><br>(2) Reference symbol " $t_1, t_2$ " shall be replaced as below.<br>$t_1, t_2 \quad 0.10$ | —           | —   |

## 9. Standard Registration

When you need to register a new outline specification on the standard, complete the appendix format 5 in Technical Standardization Committee on Semiconductor Device Package steering rule, in compliance with the Standardization Rule. In order to make a package dimension table, which come under Item 2, Appendix format 5, fill the dimensions marked with (  $\angle$  ) in the following Table.

The rule item of the TCP (QTP, DTP(1), DTP (2)) standard exceeds 30 items. Therefore, complexly when making individual standard registration completely. Then it made the registration table to have narrowed down to the item, which the minimum outward form size needs.

Incidentally, it supposes that it enters package code form type according to **EIAJ ED-7303B** (Name and Code for Integrated Circuits Package).

**Table 2**

| Serial Number    |                        |                   |             |          |
|------------------|------------------------|-------------------|-------------|----------|
| External Type    |                        | T-QTP - . X . - . |             |          |
| Reference Symbol |                        | min               | nom         | max      |
| Group1           | $\underline{D_2}$      |                   | $\angle$    |          |
|                  | $\underline{P}$        |                   | $\angle$    |          |
|                  | $\underline{H}$        |                   | $\angle$    |          |
|                  | $\underline{E}$        |                   | $\angle$    |          |
|                  | $\underline{E_1}$      | $\angle$          | $\angle$    | $\angle$ |
|                  | $\underline{E_2}$      | $\angle$          | $\angle$    | $\angle$ |
|                  | $\underline{D}$        |                   | $\angle$    |          |
|                  | $\underline{D_1}$      | $\angle$          | $\angle$    | $\angle$ |
|                  | $\underline{A}$        |                   |             | $\angle$ |
|                  | $\underline{A_1}$      |                   |             | $\angle$ |
|                  | $\underline{b}$        | $\angle$          |             | $\angle$ |
|                  | $\underline{e}$        |                   | $\angle(*)$ |          |
|                  | $\underline{e_1}$      |                   | $\angle(*)$ |          |
|                  | $\underline{e_2}$      |                   | $\angle(*)$ |          |
|                  | $\underline{e_3}$      |                   | $\angle(*)$ |          |
|                  | $\underline{e_4}$      |                   | $\angle(*)$ |          |
|                  | $\underline{e_5}$      |                   | $\angle(*)$ |          |
|                  | $\underline{n}$        |                   | $\angle$    |          |
|                  | $\underline{N}$        |                   | $\angle$    |          |
|                  | $\underline{J_1, J_3}$ |                   | $\angle$    |          |
|                  | $\underline{J_2, J_4}$ |                   | $\angle$    |          |
|                  | $\underline{F_1}$      |                   | $\angle$    |          |
|                  | $\underline{F_2}$      |                   | $\angle$    |          |

(\*) true geometrical position

## 10. Standard Package List

To further clarify the combinations of part dimensions, the combinations of recommended package classifications shall be indicated as shown below as assistance in the design and development of new package in the future.

**10.1** Code that is “serial number” of the standard package list is shown in **explanation table 1**. (It makes the same rule with **JEDEC standard US- 001B**)

**Explanation table 1**

| Tape format    |     | Package body size |     | Test pad pitch(1) |     | Outer lead pitch |     |
|----------------|-----|-------------------|-----|-------------------|-----|------------------|-----|
| D <sub>2</sub> | 1st | DXE               | 2nd | e <sub>1</sub>    | 3rd | e                | 4th |
| 35S            | A   | 14.00X14.00       | A   | 0.50              | 1   | 0.50             | 1   |
| 48S            | B   | 16.00X16.00       | B   | 0.40              | 2   | 0.40             | 2   |
| 70S            | C   | 18.00X18.00       | C   | 0.30              | 3   | 0.30             | 3   |
| 48W            | D   | 20.00X20.00       | D   | 0.25              | 4   | 0.25             | 4   |
| 70W            | E   | 24.00X24.00       | E   | 0.20              | 5   | 0.20             | 5   |
|                |     | 26.00X26.00       | F   | 0.15              | 6   | 0.15             | 6   |
|                |     | 28.00X28.00       | G   | 0.10              | 7   | 0.10             | 7   |
|                |     | 32.00X32.00       | H   |                   |     | 0.08             | 8   |
|                |     | 36.00X36.00       | J   |                   |     | 0.065            | 9   |
|                |     | 40.00X40.00       | K   |                   |     | 0.050            | -   |

**Table 2 Standard Package Dimension List (1/2)**

Numerical value in the table (number of the terminals: n)

| Test pad pitch(1) | Tape format<br>S: Super<br>W: Wide<br>D <sub>2</sub> | Test pad N | Package body size<br>DXE (code)   | e=0.50<br>(XX-X1)                 | e=0.40<br>(XX-X2)                   | e=0.30<br>(XX-X3)                           | e=0.25<br>(XX-X4)                           | e=0.20<br>(XX-X5)                                   | e=0.15<br>(XX-X6)                                   |
|-------------------|--|------------|---|-----------------------------------|-------------------------------------|---|---|---|---|
| e <sub>1</sub>    |  | N          |   |                                   |                                     |   |   |   |   |
| 0.50<br>(XX-1X)   | 35<br>S:(AX-XX)<br>W:(none)                          | 196        | 14.00X14.00 (XA-XX)<br>16.00X16.00 (XB-XX)<br>18.00X18.00 (XC-XX)<br>20.00X20.00 (XD-XX)                        | 96<br>112<br>128<br>140(*3)       | 120<br>136<br>160<br>-(*4)          | 160<br>184<br>160<br>-(*4)                  | 192<br>192(*1)<br>-(*2)<br>-(*4)            | 192(*1)<br>192(*1)<br>-(*2)<br>-(*4)                | 192(*1)<br>-(*2)<br>-(*2)<br>-(*4)                  |
|                   | 48<br>S:(BX-XX)<br>W:(DX-XX)                         | 260        | 16.00X16.00 (XB-XX)<br>20.00X20.00 (XD-XX)<br>24.00X24.00 (XE-XX)<br>26.00X26.00 (XF-XX)<br>28.00X28.00 (XG-XX) | 112<br>144<br>176<br>192<br>204   | 136<br>176<br>216<br>240<br>-(*4)   | 184<br>240<br>256(*1)<br>-(*2)<br>-(*4)     | 224<br>256(*1)<br>256(*1)<br>-(*2)<br>-(*4) | 256(*1)<br>256(*1)<br>256(*1)<br>-(*2)<br>-(*4)     | 256(*1)<br>256(*1)<br>-(*2)<br>-(*2)<br>-(*4)       |
|                   | 70<br>S:(CX-XX)<br>W:(EX-XX)                         | 436        | 24.00X24.00 (XE-XX)<br>28.00X28.00 (XG-XX)<br>32.00X32.00 (XH-XX)<br>36.00X36.00 (XJ-XX)<br>40.00X40.00 (XK-XX) | 176<br>208<br>240<br>272<br>304   | 216<br>256<br>296<br>336<br>376     | 296(*5)<br>344<br>400<br>432(*1)<br>432(*1) | 352<br>416<br>432(*1)<br>432(*1)<br>432(*1) | 432(*1)<br>432(*1)<br>432(*1)<br>432(*1)<br>432(*1) | 432(*1)<br>432(*1)<br>432(*1)<br>432(*1)<br>432(*1) |
| 0.40<br>(XX-2X)   | 35<br>S:(AX-XX)<br>W:(none)                          | 244        | 14.00X14.00 (XA-XX)<br>16.00X16.00 (XB-XX)<br>18.00X18.00 (XC-XX)<br>20.00X20.00 (XD-XX)                        | 96<br>112<br>128<br>-(*4)         | 120<br>136<br>160<br>180(*3)        | 160<br>184<br>208(*2)<br>-(*4)              | 192<br>224<br>-(*2)<br>-(*4)                | 240<br>232(*2)<br>-(*2)<br>-(*4)                    | 240(*1)<br>-(*2)<br>-(*2)<br>-(*4)                  |
|                   | 48<br>S:(BX-XX)<br>W:(DX-XX)                         | 324        | 16.00X16.00 (XB-XX)<br>20.00X20.00 (XD-XX)<br>24.00X24.00 (XE-XX)<br>26.00X26.00 (XF-XX)<br>28.00X28.00 (XG-XX) | 112<br>144<br>176<br>192<br>-(*4) | 136<br>176<br>216<br>240<br>260(*3) | 184<br>240<br>296(*5)<br>320<br>-(*4)       | 224<br>288<br>320(*1)<br>-(*2)<br>-(*4)     | 280<br>320(*1)<br>-(*2)<br>-(*2)<br>-(*4)           | 320(*1)<br>320(*1)<br>-(*2)<br>-(*2)<br>-(*4)       |
|                   | 70<br>S:(CX-XX)<br>W:(EX-XX)                         | 548        | 24.00X24.00 (XE-XX)<br>28.00X28.00 (XG-XX)<br>32.00X32.00 (XH-XX)<br>36.00X36.00 (XJ-XX)<br>40.00X40.00 (XK-XX) | 176<br>208<br>240<br>272<br>304   | 216<br>256<br>296<br>336<br>376     | 296(*5)<br>344<br>400<br>456(*5)<br>504     | 352<br>416<br>480<br>544<br>544(*1)         | 440<br>520<br>544(*1)<br>544(*1)<br>544(*1)         | 544(*1)<br>544(*1)<br>544(*1)<br>544(*1)<br>-(*2)   |

**Note** (\*1) limitation on the number of the pins by the test pad

(\*2) Between outer lead to test pad design rule (Line/Space=60μm/60μm)

(\*3) There is not an outer lead area, Between outer lead to test pad design rule.

(\*4) There is not an area, Between outer lead to test pad design rule.

(\*5) The decrease of the number of the pins, because g<sub>2</sub> range is too small.

Table 3 Standard Package Dimension List (2/2)

Numerical value in the table (number of the terminals: n)

| Test pad pitch(1)<br>$e_1$ | Tape format<br>S: Super<br>W: Wide<br>$D_2$ | Test pad N<br>N | Package body size<br>DXE (code) | $e=0.50$ | $e=0.40$ | $e=0.30$ | $e=0.25$ | $e=0.20$ | $e=0.15$ |
|----------------------------|---|-----------------|---------------------------------|----------|----------|----------|----------|----------|----------|
|                            |   |                 |                                 | (XX-X1)  | (XX-X2)  | (XX-X3)  | (XX-X4)  | (XX-X5)  | (XX-X6)  |
| 0.30<br>(XX-3X)            | 35<br>S:(AX-XX)<br>W:(none)                 | 324             | 14.00X14.00 (XA-XX)             | 96       | 120      | 160      | 192      | 240      | 320(*1)  |
|                            |   |                 | 16.00X16.00 (XB-XX)             | 112      | 136      | 184      | 224      | 280      | -(*)2    |
|                            |   |                 | 18.00X18.00 (XC-XX)             | 128      | 160      | 216(*5)  | 256      | -(*)2    | -(*)2    |
|                            |   |                 | 20.00X20.00 (XD-XX)             | -(*)4    | -(*)4    | 236(*3)  | -(*)4    | -(*)4    | -(*)4    |
|                            | 48<br>S:(BX-XX)<br>W:(DX-XX)                | 436             | 16.00X16.00 (XB-XX)             | 112      | 136      | 184      | 224      | 280      | 376(*5)  |
|                            |   |                 | 20.00X20.00 (XD-XX)             | 144      | 176      | 240      | 288      | 360      | 432(*1)  |
|                            |   |                 | 24.00X24.00 (XE-XX)             | 176      | 216      | 296(*5)  | 352      | 432(*1)  | -(*)2    |
|                            |   |                 | 26.00X26.00 (XF-XX)             | 192      | 240      | 320      | 384      | -(*)2    | -(*)2    |
|                            |   |                 | 28.00X28.00 (XG-XX)             | -(*)4    | -(*)4    | 348(*3)  | -(*)4    | -(*)4    | -(*)4    |
|                            | 70<br>S:(CX-XX)<br>W:(EX-XX)                | 724             | 24.00X24.00 (XE-XX)             | 176      | 216      | 296(*5)  | 352      | 440      | 584      |
|                            |   |                 | 28.00X28.00 (XG-XX)             | 208      | 256      | 344      | 416      | 520      | 696(*5)  |
|                            |   |                 | 32.00X32.00 (XH-XX)             | 240      | 296      | 400      | 480      | 600      | 720(*1)  |
|                            |   |                 | 36.00X36.00 (XJ-XX)             | 272      | 336      | 456(*5)  | 544      | 680      | 720(*1)  |
| 0.25<br>(XX-4X)            | 35<br>S:(AX-XX)<br>W:(none)                 | 338             | 14.00X14.00 (XA-XX)             | 96       | 120      | 160      | 192      | 240      | 320(*5)  |
|                            |   |                 | 16.00X16.00 (XB-XX)             | 112      | 136      | 184      | 224      | 280      | -(*)2    |
|                            |   |                 | 18.00X18.00 (XC-XX)             | 120(*2)  | 152(*2)  | 216(*5)  | 256      | -(*)2    | -(*)2    |
|                            |   |                 | 20.00X20.00 (XD-XX)             | -(*)4    | -(*)4    | -(*)4    | 284(*4)  | -(*)4    | -(*)4    |
|                            | 48<br>S:(BX-XX)<br>W:(DX-XX)                | 532             | 16.00X16.00 (XB-XX)             | 112      | 136      | 184      | 224      | 280      | 376(*5)  |
|                            |   |                 | 20.00X20.00 (XD-XX)             | 144      | 176      | 240      | 288      | 360      | 480(*5)  |
|                            |   |                 | 24.00X24.00 (XE-XX)             | 176      | 216      | 296(*5)  | 352      | 440      | -(*)2    |
|                            |   |                 | 26.00X26.00 (XF-XX)             | 192      | 240      | 320      | 384      | -(*)2    | -(*)2    |
|                            |   |                 | 28.00X28.00 (XG-XX)             | -(*)4    | -(*)4    | -(*)4    | 412(*3)  | -(*)4    | -(*)4    |
|                            | 70<br>S:(CX-XX)<br>W:(EX-XX)                | 884             | 24.00X24.00 (XE-XX)             | 176      | 216      | 296(*5)  | 352      | 440      | 584      |
|                            |   |                 | 28.00X28.00 (XG-XX)             | 208      | 256      | 344      | 416      | 520      | 696(*5)  |
|                            |   |                 | 32.00X32.00 (XH-XX)             | 240      | 296      | 400      | 480      | 600      | 800(*5)  |
|                            |   |                 | 36.00X36.00 (XJ-XX)             | 272      | 336      | 456(*5)  | 544      | 680      | 880(*1)  |
|                            |   |                 | 40.00X40.00 (XK-XX)             | 304      | 376      | 504      | 608      | 760      | -(*)2    |

**Note** (\*1) limitation on the number of the pins by the test pad

(\*2) Between outer lead to test pad design rule (Line/Space=60μm/60μm)

(\*3) There is not an outer lead area, Between outer lead to test pad design rule.

(\*4) There is not an area, Between outer lead to test pad design rule.

(\*5) The decrease of the number of the pins, because  $g_2$  range is too small.

## Chapter 2

### 1. Scope of Application

This technical report regulated outline drawings and dimensions about Quad Tape Carrier package Carrier (hereinafter referred to as QTP Carrier). QTP Carrier, which is used for QTP. And QTP is classified as form G among the Tape Carrier package (hereinafter referred to as TCP) in **EIAJ ED-7300** [Recommended practice on Standard for the preparation of outline drawings of semiconductor packages].

**Note:** This technical report, chapter 2 are the revision version of **EIAJ ED-7431-1A** (Recommended outline drawings for Carriers, Quad Tape Carrier package Carriers), which the establishment in February 1994. It did JEDEC JC-11 in the U.S.A and an opinion exchange and this technical report was made. The related standards are shown below.

**JEDEC standard UO-018B** (QTP, establishment in July 1993)

**JEDEC standard US-001B** (QTP, establishment in November 1993)

**JEDEC standard CS-006A** (QTP Carrier, establishment in November 1993)

### 2. Definition of the Technical Terms

The definition of the technical terms used in this technical report is in conformity with **EIAJ ED-7300**, and as for the new term, it depends on the following.

#### 2.1 QTP

##### (1) Sprocket hole

The holes arrayed at the both sides of a tape at the constant pitch which are used feed the tape. 2 kinds of Super and Wide are prescribed by the size of the sprocket hole.

##### (2) Test pad

The terminal part which was arranged outside outerlead to examine electricity.

##### (3) Tooling hole

The hole which was opened by the insulation tape which was arranged in the corner of 4 of the outside of the package main unit to use for the positioning of an electricity examination.

##### (4) Tape format

The tape format 3 kinds are prescribed which 35 mm, 48 mm, 70 mm. The tape that forms a package main unit inside the sprocket hole and by it the tape unit ranges with more than one piece of continuation. DTP uses only 35 mm of tape format.

##### (5) Tape unit

The part of the tape, which was detached to contain one package main unit, the outerlead and the test pad that is connected with it.

#### 2.2 QTP Carrier

##### (1) Registration hole

The hole which was provided at the same position as the center hole of the QTP sprocket hole.

##### (2) Tape retention area

The area provide a support for retaining the tape at the carrier. The support shall mean an elastic hook in case of one peace type and a cover to secure the tape in case of two-peace type.

##### (3) Tape fine alignment hole

The hole which was provided for position which is same as the tooling hole of QTP. In case of the positioning with the socket and so on, the escape hole of alignment pin which is inserted in the tooling hole.

##### (4) Opening

The escape hole which is located at the center of the carrier for the package lead to be cut.

### **3. Background**

Recent years, by the appearance of the electronic equipment with very thin types and multifunction, also the integrated circuit package becomes numerous pin and becomes thin. It responds to the demand. The use of QTP increased. QTP considers handling by the process, it generally inserts in the carrier and an electricity examination, processing(cutting of the lead and so on), conveyance and so on are done. This technology report has a purpose of promoting the standardization of the QTP Carrier size and securing an automatic machine, a storage magazine and the compatibility of the test socket. It aims for a design standard value, i.e. a concept in the design center to be shown as much as possible about hitting a rule with each size and to improve a role as the standardization index.

### **4. Definition of QTP Carrier**

The case for the conveyance to protect QTP and to facilitate treatment.

### **5. The way of putting an index**

In 4 corners of the QTP carrier, it C shape cuts only 1 corner. Basically, it makes the corner index which is the same as 1st pin of the terminal and 1st of the test pad of QTP.

### **6. Nominal Dimensions**

It combines and it calls a used tape format and the initial of Super and Wide.



## 7. REFERENCE CHARACTERS AND DRAWING (QTP Carrier Outline Drawing)

Figure 1

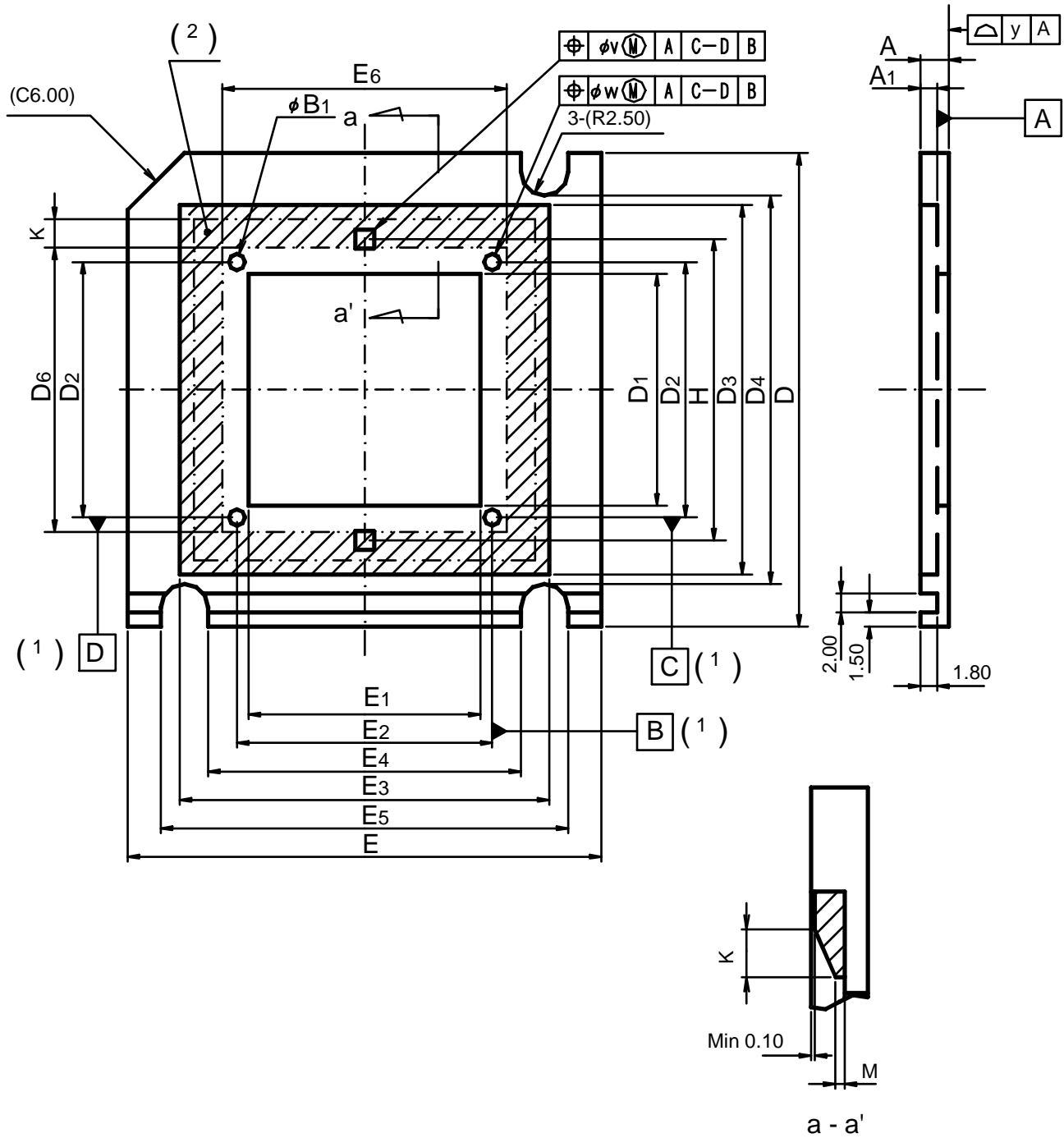


Figure 2 (square registration hole)

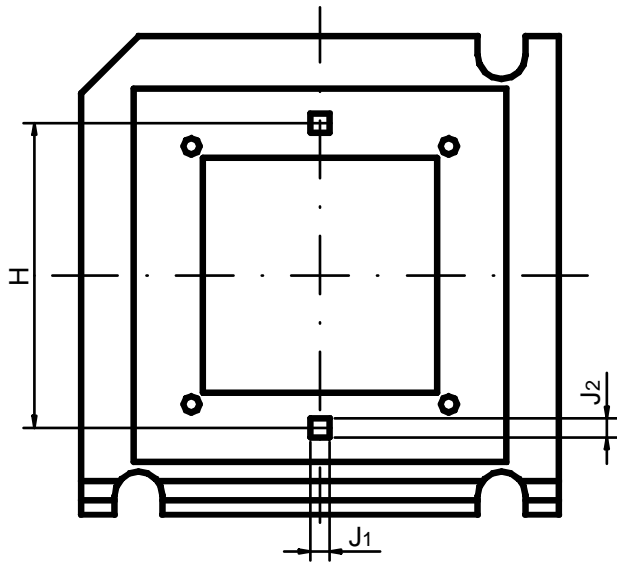


Figure 3 (circularity registration hole)

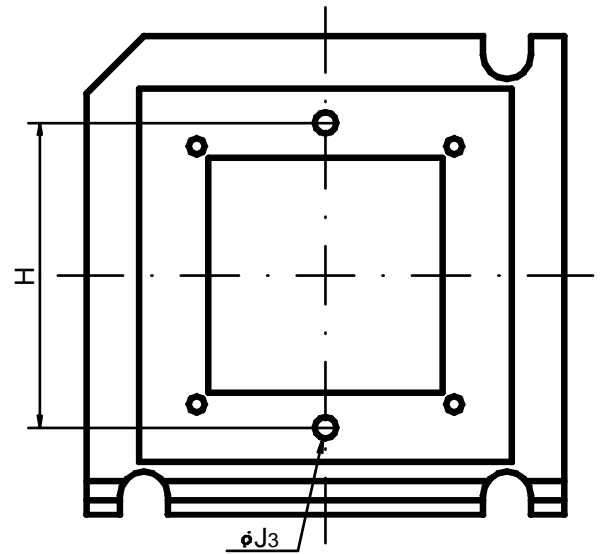
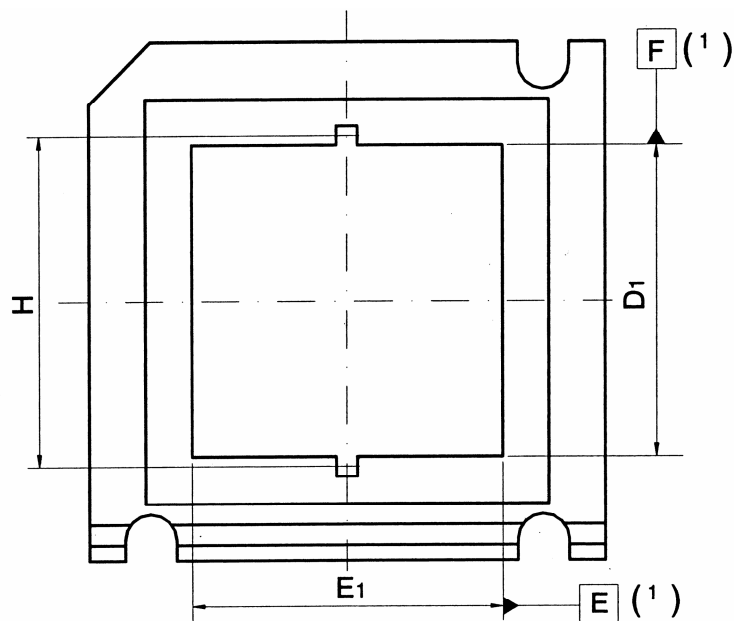


Figure 4 (Option) (3)



**Note**(1) Datum plane finds from the tape fine alignment hole center interval that  $\boxed{B}$   $\boxed{C}$   $\boxed{D}$  .

However, It supposes that the big type with the width ( $E_1$ ) and length ( $D_1$ ) of the opening finds datum  $\boxed{E}$  and  $\boxed{F}$  , because the tape fine alignment hole doesn't exist. (**Figure 4** reference)

(2) The slanted line part shows tape retention area.

(3) It considers permission by the cutting size of the tape. It prepared the QTP carrier, which can correspond to the size with big cutting size as the option. It makes the width ( $E_1$ ) of the opening and the length ( $D_1$ ) of the opening as follows.

In case of 35 mm of tape formats,  $D_1 = E_1 = 30.00\text{mm}$

In case of 48 mm of tape formats,  $D_1 = E_1 = 40.00\text{mm}$

## 8. QTP Carrier outer dimension

It shows standard value with each part size in **table 1**.

**Table 1**

Unit: mm

| Description            | Reference symbol                      | Standards  | Recommended | Remarks                               |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
|------------------------|---------------------------------------|--|-------------|---------------------------------------|---------|-------|-------|-------|-------|--------------|-----|--|-----|-------|--------------|-----|-------|-----|---|---|
| Code                   | —                                     | (1) It gives W(Wide) and S(Super) in front of the tape format of QTP which is inserted in the carrier and it makes a code.<br>(2) Code is shown below. <table><tr><th colspan="2">Tape format</th><th>Code</th></tr><tr><td>35</td><td>Super</td><td>S35</td></tr><tr><td rowspan="2">48</td><td>Super</td><td>S48</td></tr><tr><td>Wide</td><td>W48</td></tr><tr><td rowspan="2">70</td><td>Super</td><td>S70</td></tr><tr><td>Wide</td><td>W70</td></tr></table> | Tape format |                                       | Code    | 35    | Super | S35   | 48    | Super        | S48 | Wide   | W48 | 70    | Super        | S70 | Wide  | W70 | — | Super and Wide of the tape format are the kind of the sprocket hole.  |
| Tape format            |                                       | Code   |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 35                     | Super                                 | S35  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 48                     | Super                                 | S48  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
|                        | Wide                                  | W48  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 70                     | Super                                 | S70  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
|                        | Wide                                  | W70  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| Carrier outline width  | E                                     | (1) It prescribes a standard value as in the table below. <table><tr><th>Tape format</th><th>E<sub>nom</sub> = D<sub>nom</sub></th></tr><tr><td>35</td><td>50.00</td></tr><tr><td>48</td><td>63.00</td></tr><tr><td>70</td><td>89.00</td></tr></table>   | Tape format | E <sub>nom</sub> = D <sub>nom</sub>   | 35      | 50.00 | 48    | 63.00 | 70    | 89.00        | —   | It makes the same size that carrier outline width and length.<br>E <sub>nom</sub> = D <sub>nom</sub> |     |       |              |     |       |     |   |   |
| Tape format            | E <sub>nom</sub> = D <sub>nom</sub>   |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 35                     | 50.00                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 48                     | 63.00                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 70                     | 89.00                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| Carrier outline length | D                                     | (2) Tolerance of Carrier outline width and length as follows.<br><br>E = E <sub>nom</sub> ± 0.13<br>D = D <sub>nom</sub> ± 0.13  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| Opening width          | E <sub>1</sub>                        | (1) It prescribes a standard value as in the table below. <table><tr><th>Tape format</th><th>E<sub>1nom</sub> = D<sub>1nom</sub></th><th>Remarks</th></tr><tr><td rowspan="2">35</td><td>24.50</td><td></td></tr><tr><td>30.00</td><td>See, Remarks</td></tr><tr><td rowspan="2">48</td><td>33.00</td><td></td></tr><tr><td>40.00</td><td>See, Remarks</td></tr><tr><td>70</td><td>52.00</td><td></td></tr></table>  | Tape format | E <sub>1nom</sub> = D <sub>1nom</sub> | Remarks | 35    | 24.50 |       | 30.00 | See, Remarks | 48  | 33.00  |     | 40.00 | See, Remarks | 70  | 52.00 |     | — | It considers permission by the cutting size of the tape. It prepared QTP carrier, which can correspond to size with big cutting size as the option. (7. Reference characters and drawing, Figure4 reference.) |
| Tape format            | E <sub>1nom</sub> = D <sub>1nom</sub> | Remarks  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 35                     | 24.50                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
|                        | 30.00                                 | See, Remarks   |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 48                     | 33.00                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
|                        | 40.00                                 | See, Remarks   |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| 70                     | 52.00                                 |  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |
| Opening length         | D <sub>1</sub>                        | (2) Tolerance of opening width and length as follows.<br><br>E <sub>1</sub> = E <sub>1nom</sub> ± 0.05<br><br>D <sub>1</sub> = D <sub>1nom</sub> ± 0.05  |             |                                       |         |       |       |       |       |              |     |  |     |       |              |     |       |     |   |   |

**Table 1** (continued)

Unit: mm

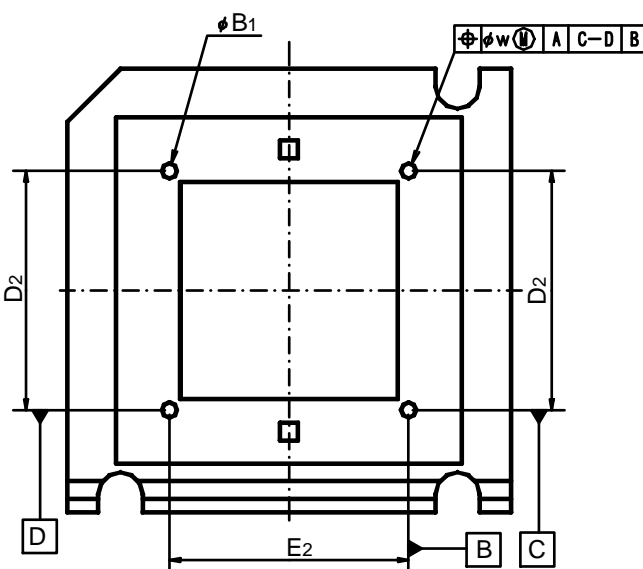
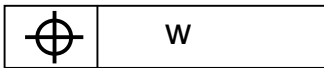
| Description   | Reference symbol | Standards   | Recommend ed                          | Remarks                               |    |       |    |       |    |       |   |   |
|---|------------------|---|---------------------------------------|---------------------------------------|----|-------|----|-------|----|-------|---|---|
| Distance between the tape fine alignment hole         | E <sub>2</sub>   | <p>(1) It prescribes a standard value as in the table below.</p>  <table border="1" data-bbox="566 1037 954 1153"><thead><tr><th>Tape format</th><th>E<sub>2nom</sub> = D<sub>2nom</sub></th></tr></thead><tbody><tr><td>35</td><td>26.95</td></tr><tr><td>48</td><td>36.15</td></tr><tr><td>70</td><td>57.75</td></tr></tbody></table> | Tape format                           | E <sub>2nom</sub> = D <sub>2nom</sub> | 35 | 26.95 | 48 | 36.15 | 70 | 57.75 | — | It makes the value, which is the same as tooling hole center distance (es). |
|   | Tape format      |   | E <sub>2nom</sub> = D <sub>2nom</sub> |                                       |    |       |    |       |    |       |   |   |
| 35  | 26.95            |   |                                       |                                       |    |       |    |       |    |       |   |   |
| 48  | 36.15            |   |                                       |                                       |    |       |    |       |    |       |   |   |
| 70  | 57.75            |   |                                       |                                       |    |       |    |       |    |       |   |   |
| D <sub>2</sub>  |                  |   |                                       |                                       |    |       |    |       |    |       |   |   |
| Tolerance of tape fine alignment hole center position | w                | <p>(1) Tolerance of tape fine alignment hole center position shall be specified in the outline drawing.</p>  <p>(2) Reference symbol “w” shall be replaced as below.</p> <p>w 0.10</p>   | —                                     | —                                     |    |       |    |       |    |       |   |   |
| Diameter of tape fine alignment hole                  | B <sub>1</sub>   | <p>It considers and it prescribes the permission value of Tooling hole width (F<sub>1</sub>) and length (F<sub>2</sub>) and tolerance of tooling hole center position of QTP as follows.</p> <p>B<sub>1</sub> = 1.70 ~ 1.95</p>   | —                                     | —                                     |    |       |    |       |    |       |   |   |

Table 1 (continued)

Unit: mm

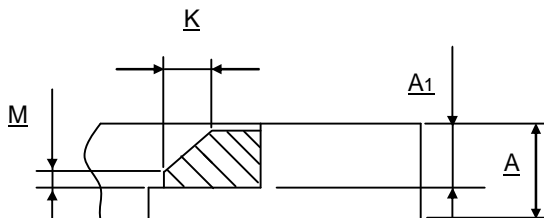
| Unit: mm                  |                                       |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
|---------------------------|---------------------------------------|--|-------------|---------------------------------------|------------------|-------|------|-------|----|-------|------|--|---|--|
| Description               | Reference symbol                      | Standards  | Recommended | Remarks                               |                  |       |      |       |    |       |      |  |   |  |
| Width of the tape insert  | E <sub>3</sub>                        | (1) It prescribes a standard value as in the table below. <table><tr><th>Tape format</th><th>E<sub>3nom</sub> = D<sub>3nom</sub></th></tr><tr><td>35</td><td>39.00</td></tr><tr><td>48</td><td>52.00</td></tr><tr><td>70</td><td>74.00</td></tr></table>   | Tape format | E <sub>3nom</sub> = D <sub>3nom</sub> | 35               | 39.00 | 48   | 52.00 | 70 | 74.00 | —    | It makes the value to have added to the QTP tape format by about 4 mm. |   |  |
| Tape format               | E <sub>3nom</sub> = D <sub>3nom</sub> |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 35                        | 39.00                                 |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 48                        | 52.00                                 |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 70                        | 74.00                                 |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| Length of the tape insert | D <sub>3</sub>                        | (2) Tolerance of Width and Length of the tape insert as follows. <div>E<sub>3</sub> = E<sub>3nom</sub> ± 0.50</div> <div>D<sub>3</sub> = D<sub>3nom</sub> ± 0.50</div>   |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| Depth of the tape insert  | A <sub>1</sub>                        | (1) It prescribes a standard value as in the table below. <table><tr><th>Tape format</th><th>A<sub>1nom</sub></th><th>A<sub>nom</sub></th></tr><tr><td>35</td><td>1.80</td><td>3.00</td></tr><tr><td>48</td><td rowspan="2">3.00</td><td rowspan="2">5.00</td></tr><tr><td>70</td></tr></table> <div>(2) Tolerance of depth of the tape insert and tolerance of carrier thickness as follows.</div> <div>A<sub>1</sub> = A<sub>1nom</sub> ± 0.05</div> <div>A = A<sub>nom</sub> ± 0.05</div> | Tape format | A <sub>1nom</sub>                     | A <sub>nom</sub> | 35    | 1.80 | 3.00  | 48 | 3.00  | 5.00 | 70   | — | 7. Reference characters and drawing, Figure 1 reference. |
| Tape format               | A <sub>1nom</sub>                     | A <sub>nom</sub>   |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 35                        | 1.80                                  | 3.00   |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 48                        | 3.00                                  | 5.00   |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| 70                        |                                       |  |             |                                       |                  |       |      |       |    |       |      |  |   |  |
| Carrier thickness         | A                                     |    |             |                                       |                  |       |      |       |    |       |      |  |   |  |

Table 1 (continued)

Unit: mm

Unit: mm

| Description  | Reference symbol  | Standards  | Recommended | Remarks           |    |       |    |       |    |       |   |   |
|--|-------------------|--|-------------|-------------------|----|-------|----|-------|----|-------|---|---|
| Inner distance between the carrier positioning notches | E <sub>4</sub>    | <p>(1) It prescribes a standard value below.</p> <table><tr><th>Tape format</th><th>E<sub>4nom</sub></th></tr><tr><td>35</td><td>33.00</td></tr><tr><td>48</td><td>46.00</td></tr><tr><td>70</td><td>72.00</td></tr></table> <p>(2) Tolerance of inner distance between the carrier positioning notches as follows.</p> <p>E<sub>4</sub> = E<sub>4nom</sub> <math>\begin{matrix} 0.00 \\ -0.20 \end{matrix}</math></p> | Tape format | E <sub>4nom</sub> | 35 | 33.00 | 48 | 46.00 | 70 | 72.00 | — | —   |
| Tape format  | E <sub>4nom</sub> |  |             |                   |    |       |    |       |    |       |   |   |
| 35   | 33.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 48   | 46.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 70   | 72.00             |  |             |                   |    |       |    |       |    |       |   |   |
| Distance between the carrier positioning notches       | D <sub>4</sub>    | <p>(1) It prescribes a standard value below.</p> <table><tr><th>Tape format</th><th>D<sub>4nom</sub></th></tr><tr><td>35</td><td>41.00</td></tr><tr><td>48</td><td>54.00</td></tr><tr><td>70</td><td>80.00</td></tr></table> <p>(2) Tolerance of distance between the carrier positioning notches as follows.</p> <p>D<sub>4</sub> = D<sub>4nom</sub> <math>\begin{matrix} 0.00 \\ -0.20 \end{matrix}</math></p>       | Tape format | D <sub>4nom</sub> | 35 | 41.00 | 48 | 54.00 | 70 | 80.00 | — | —   |
| Tape format  | D <sub>4nom</sub> |  |             |                   |    |       |    |       |    |       |   |   |
| 35   | 41.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 48   | 54.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 70   | 80.00             |  |             |                   |    |       |    |       |    |       |   |   |
| Outer distance between the carrier positioning notches | E <sub>5</sub>    | <p>(1) It prescribes a standard value below.</p> <table><tr><th>Tape format</th><th>E<sub>5nom</sub></th></tr><tr><td>35</td><td>43.00</td></tr><tr><td>48</td><td>56.00</td></tr><tr><td>70</td><td>82.00</td></tr></table> <p>(2) Tolerance of outer distance between the carrier positioning notches as follows.</p> <p>E<sub>5</sub> = E<sub>5nom</sub> <math>\begin{matrix} +0.20 \\ 0.00 \end{matrix}</math></p> | Tape format | E <sub>5nom</sub> | 35 | 43.00 | 48 | 56.00 | 70 | 82.00 | — | <p>(1) It makes 5.00mm, which the width of carrier positioning notches.</p> <p>(2) It makes inner width of notches (E<sub>4</sub>) and outer width of notches (E<sub>5</sub>) as follows.</p> <p>E<sub>5</sub> = E<sub>4</sub> +10.00</p> |
| Tape format  | E <sub>5nom</sub> |  |             |                   |    |       |    |       |    |       |   |   |
| 35   | 43.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 48   | 56.00             |  |             |                   |    |       |    |       |    |       |   |   |
| 70   | 82.00             |  |             |                   |    |       |    |       |    |       |   |   |

Table 1 (continued)

Unit: mm


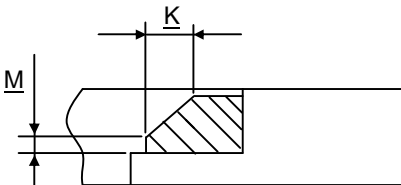



| Description                                    | Reference symbol | Standards   | Recommended | Remarks |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|--|------------------|---|-------------|---------|---------------------------------------|----|-------|-------|----|-------|-------|------|-------|----|-------|-------|------|-------|--|--|
| Registration hole center distance              | H                | <table><tr><th colspan="2">Tape format</th><th>H<sub>nom</sub></th></tr><tr><td>35</td><td>Super</td><td>31.83</td></tr><tr><td rowspan="2">48</td><td>Super</td><td>42.18</td></tr><tr><td>Wide</td><td>44.86</td></tr><tr><td rowspan="2">70</td><td>Super</td><td>63.95</td></tr><tr><td>Wide</td><td>66.80</td></tr></table>                | Tape format |         | H <sub>nom</sub>                      | 35 | Super | 31.83 | 48 | Super | 42.18 | Wide | 44.86 | 70 | Super | 63.95 | Wide | 66.80 | —  | (1) It makes same value which distance of center of the sprocket hole row of QTP(H).<br><br>(2) It makes the same rule with <b>JEDEC standard CS-006A</b> .  |
| Tape format                                    |                  | H <sub>nom</sub>  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 35   | Super            | 31.83   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 48   | Super            | 42.18   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 44.86   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 70   | Super            | 63.95   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 66.80   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| Tolerance of registration hole center position | v                | (1) Tolerance of registration hole center position shall be specified in the outline drawing.<br><div></div><br>(2) Reference symbol “ v ” shall be replaced as below.<br><div>v 0.10</div>  | —           | —       |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| Registration hole width                        | J <sub>1</sub>   | <table><tr><th colspan="2">Tape format</th><th>J<sub>1min</sub> = J<sub>2min</sub></th></tr><tr><td>35</td><td>Super</td><td>2.00</td></tr><tr><td rowspan="2">48</td><td>Super</td><td>2.00</td></tr><tr><td>Wide</td><td>2.50</td></tr><tr><td rowspan="2">70</td><td>Super</td><td>2.00</td></tr><tr><td>Wide</td><td>2.50</td></tr></table> | Tape format |         | J <sub>1min</sub> = J <sub>2min</sub> | 35 | Super | 2.00  | 48 | Super | 2.00  | Wide | 2.50  | 70 | Super | 2.00  | Wide | 2.50  | As for tolerance of registration hole, it designs tolerance of QTP sprocket hole size<br><br>J = J <sub>nom</sub> ± 0.03<br><br>as the standard. | (1) It makes the value to have added to QTP sprocket hole by about 0.5mm.<br><br>(2) It makes the same rule with <b>JEDEC standard CS-006A</b> .<br><br>(3) 7.Reference characters and drawing, Figure2 reference. |
| Tape format                                    |                  | J <sub>1min</sub> = J <sub>2min</sub>   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 35   | Super            | 2.00  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 48   | Super            | 2.00  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 2.50  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 70   | Super            | 2.00  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 2.50  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| Registration hole length                       | J <sub>2</sub>   |   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| Registration hole diameter                     | J <sub>3</sub>   | <table><tr><th colspan="2">Tape format</th><th>J<sub>3min</sub></th></tr><tr><td>35</td><td>Super</td><td>2.26</td></tr><tr><td rowspan="2">48</td><td>Super</td><td>2.26</td></tr><tr><td>Wide</td><td>2.82</td></tr><tr><td rowspan="2">70</td><td>Super</td><td>2.26</td></tr><tr><td>Wide</td><td>2.82</td></tr></table>                    | Tape format |         | J <sub>3min</sub>                     | 35 | Super | 2.26  | 48 | Super | 2.26  | Wide | 2.82  | 70 | Super | 2.26  | Wide | 2.82  | —  | (1) It makes the same rule with <b>JEDEC standard CS-006A</b> .<br><br>(2) 7. Reference characters and drawing, Figure 3 reference.  |
| Tape format                                    |                  | J <sub>3min</sub>   |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 35   | Super            | 2.26  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 48   | Super            | 2.26  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 2.82  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
| 70   | Super            | 2.26  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |
|  | Wide             | 2.82  |             |         |                                       |    |       |       |    |       |       |      |       |    |       |       |      |       |  |  |

Table 1 (continued)

Unit: mm

| Description   | Reference symbol                      | Standards  | Recommended   | Remarks  |                  |                  |    |       |      |       |      |    |
|---|---------------------------------------|--|---|--|------------------|------------------|----|-------|------|-------|------|----|
| Tape retention area width   | E <sub>6</sub>                        | <table><tr><th>Tape format</th><th>E<sub>6min</sub> = D<sub>6min</sub></th></tr><tr><td>35</td><td>30.00</td></tr><tr><td>48</td><td>40.00</td></tr><tr><td>70</td><td>62.00</td></tr></table>   | Tape format   | E <sub>6min</sub> = D <sub>6min</sub>  | 35               | 30.00            | 48 | 40.00 | 70   | 62.00 | —    | —  |
| Tape format   | E <sub>6min</sub> = D <sub>6min</sub> |  |   |  |                  |                  |    |       |      |       |      |    |
| 35  | 30.00                                 |  |   |  |                  |                  |    |       |      |       |      |    |
| 48  | 40.00                                 |  |   |  |                  |                  |    |       |      |       |      |    |
| 70  | 62.00                                 |  |   |  |                  |                  |    |       |      |       |      |    |
| Tape retention area length  | D <sub>6</sub>                        |  |   |  |                  |                  |    |       |      |       |      |    |
| Slope length of tape retention area   | K                                     |   | —   | <b>7. Reference characters and drawing, Figure 1 a-a' cross section reference.</b> |                  |                  |    |       |      |       |      |    |
| Slope height of Tape retention area   | M                                     | <table><tr><th>Tape format</th><th>K<sub>min</sub></th><th>M<sub>max</sub></th></tr><tr><td>35</td><td>2.50</td><td rowspan="3">0.50</td></tr><tr><td>48</td><td rowspan="2">4.00</td></tr><tr><td>70</td></tr></table>  | Tape format   |  | K <sub>min</sub> | M <sub>max</sub> | 35 | 2.50  | 0.50 | 48    | 4.00 | 70 |
| Tape format   | K <sub>min</sub>                      | M <sub>max</sub>   |   |  |                  |                  |    |       |      |       |      |    |
| 35  | 2.50                                  | 0.50   |   |  |                  |                  |    |       |      |       |      |    |
| 48  | 4.00                                  |  |   |  |                  |                  |    |       |      |       |      |    |
| 70  |                                       |  |   |  |                  |                  |    |       |      |       |      |    |
| Co planarity of the carrier   | y                                     | <p>(1) Co planarity of the carrier shall be specified in the outline drawing.</p> <table><tr><td></td><td>y</td><td>A</td></tr></table> <p>(2) Reference symbol “ y ” shall be replaced as below.</p> <p>y 0.10</p> |  | y  | A                | —                | —  |       |      |       |      |    |
|  | y                                     | A  |   |  |                  |                  |    |       |      |       |      |    |



## EXPLANATORY NOTES

### 1. Objective of establishment

This technical report accounts for the industrial standard of Quad Tape Carrier packages and Carrier (hereinafter referred to as QTP, QTP Carrier). It was established to provide the design guideline of QTP and QTP Carrier when it is made in to product or when Automatic mounting machinery and associated parts are developed.

### 2. History of review

Recently, electronic appliances become smaller and their functions are diversified, and the terminals integrated circuits increase rapidly. On such background, demand to the thin and numerous pin package increase. As for QTP, effectively was admitted as the numerous pin package which is possible to with equal to or less than 0.50 mm of outer lead pitch of surface mount device. It expected that the application range expanded. It stores up to correspond to the trend, in April 1989, it starts " TCP standardization WG " which was under Special Technical Committee on Semiconductor Device Package Outlines (currently, Technical Standardization Committee on Semiconductor Device Package). It fixed as taking up standard creating by the standardization of DTP (1), DTP (2) and QTP as the business plan. First, to deliberate about DTP (1), DTP (2) after deciding a basic item about QTP was fixed. After that, in 1991, TCP standardization WG disperses. It wasn't deliberated for about 1 year because to have been taken over by the plastic package subcommittee (currently, Integrated Circuits Package Subcommittee) but the professional field was different. Recurrence addition " TCP standardization WG " and a full-scale deliberation were begun in April 1992.

At abroad, as the standard of QTP, **UO-017A** (establishment in October, 1988) existed and it was standardized by JC-11 under Joint Electron Device Engineering Council (hereinafter referred to as JEDEC). However, there was a part which is difficult about both standardization concept and manufacturing technology. Therefore, it established QTP outline general rule newly. The deliberation became the long-range interval, because it crossed to varying as QTP and QTP Carrier that is used for the conveyance and testing, it discuss at the same time. The other hand, **UO-018B** (Metric TAB, establishment in July, 1993) that JEDEC improved **UO-017A** was deliberated and was being established. **US-001B** (establishment in November, 1993), too, was deliberated based on these and was being established. Also, The standard of the QTP Carrier, too, was deliberated as **CS-006A** (establishment in November, 1993) and was being established. A deliberation was carried forward while considering these standard plans in TCP standardization WG.

In April 1993, QTCP which was former name was changed QTP at the Special Technical Committee on Semiconductor Device Package Outlines. Also A working group name, too, was changed with " Tape Carrier Package WG ". The standardization of the package naming was deliberated in " General rule package standardization WG " (currently, general rule of semiconductor package Subcommittee), which is under The Special Technical Committee on Semiconductor Device Package Outlines. This change is because the 4 character composition of QTCP which becomes basic type of the package form came off the standard. But, the name of QTP was approved in "Quad Tape Carrier package". Via above mentioned deliberation elapse, Tape Carrier package WG ends the last deliberation in 1993, and pass in the semiconductor package special committee approval. It was established as JEITA standard **EIAJ ED-7431** (QTP) in April 1993 and **EIAJ ED-7431-1** (QTP Carrier) in February 1994.

After that, when showing **EIAJ ED-7431** (QTP) and **EIAJ ED-7431-1** (QTP Carrier) to JEDEC, JC11 in

May 1994 at JWG#2 Kobe conference, it pointed out the mistake match of JEDEC standards **US- 001B** (QTP) and **CS-006A** (QTP Carrier) from the JEDEC side. The point that, **EIAJ ED-7431** and **EIAJ ED-7431-1** doesn't fit the rule value(recommendation value) of **US-001B** and **CS-006A**. Then, JEDEC opinion which can not admit **EIAJ ED-7431** and **EIAJ ED-7431-1** was shown. Also, before this pointing-out, it consulted an opinion in the JEITA side, too, and there was a background to have deliberated JEDEC standard of QTP and the QTP carrier so far for about 5 years.

Receiving this, in June 1994, to revise for **EIAJ ED-7431** and **EIAJ ED-7431-1** to agree with **US-001B** and **CS-006A** were fixed at Tape Carrier Package WG. **EIAJ ED-7431A** (QTP) was revised in October 1994, and **EIAJ ED-7431-1A** (QTP Carrier) was revised in December 1994.

In January, 2002, It began questionnaire investigation about the reconsideration of the elapse in 10 years about the TCP standards (QTP, DTP(1), DTP(2)) in Integrated Circuits Package Subcommittee. As a result, There is an answer from 12 companies in Japan, and the opinion that equal to or more than 2 companies, the revision (It keeps just as it is) are necessary was gotten about the TCP standards (QTP, DTP(1), DTP (2)). In March 2002, it was fixed that to carry forward the revision of the TCP standards in WG. Also, the consideration when implementing a standardization proposal by IEC, SC47D/WG1, According to the IEC format, we placed in the design guide of integrated circuits package as the classification. QTP relation technical report was established in September 2002 as **EIAJ EDR-7331** (QTP and QTP Carrier).

TCP relation standard, the following standard exists and results in the today.

- (1) **EIAJ ED-7431, EIAJ ED-7431A** (General rules for the preparation of outline drawings of integrated circuits, Quad Tape Carrier package (QTP)), The deliberation begins from April 1989 by " TCP standardization WG " which was temporarily placed under Special Technical Committee on Semiconductor Device Package Outlines. After that, it was deliberated in the continuation in " Tape Carrier Package WG " and it was established in April 1993, then it was revised in October 1994.
- (2) **EIAJ ED-7431-1, EIAJ ED-7431-1A** (Recommended Outline Drawings for Carriers, Quad Tape Carrier package Carriers (QTP Carrier)), The deliberation begins from April 1989 by " TCP standardization WG " which was temporarily placed under Special Technical Committee on Semiconductor Device Package Outlines. After that, it was deliberated in the continuation in " Tape Carrier Package WG " and it was established in February 1993, then it was revised in December 1994.
- (3) **EIAJ EDR-7331** (Design guideline of integrated circuits for Quad Tape Carrier package and Carrier (QTP and QTP Carrier)), Reconsideration in 10 years was admitted to be necessary about the TCP standards (QTP, DTP(1), DTP(2)) in Integrated Circuits Package Subcommittee which is under Technical Standardization Committee on Semiconductor Device Package. It was deliberated from March 2002 and it was established in September 2002. It integrated **EIAJ ED-7431A** and **EIAJ ED-7431-1A** as the standard of QTP and the carrier and it issued them as the identical book. As the custom way, in Technical Standardization Committee on Semiconductor Device Package, packaging, a socket, a tray and so on are published as another standard. When integrating the standard of QTP and the carrier, it got agreement by Integrated Circuits Package Subcommittee and socket Subcommittee that are under in Technical Standardization Committee on Semiconductor Device Package and the JEITA secretariat. Also, as for standard No, it gave **EIAJ EDR-73XX**, which is the package relation standard No (socket relation standard No is **EIAJ EDR-77XX**).

- (4) **EIAJ ED-7432** (General rules for the preparation of outline drawings of integrated circuits, Dual Tape Carrier packages Type (DTP( )), The deliberation begins from April 1989 by " TCP standardization WG " which was temporarily placed under Special Technical Committee on Semiconductor Device Package Outlines. After that, it was deliberated in the continuation in " Tape Carrier Package WG " and it was established in February 1993, then it was revised in December 1994.
- (5) **EIAJ ED-7433** (General rules for the preparation of outline drawings of integrated circuits, Dual Tape Carrier packages Type (DTP( )), The deliberation begins from April 1989 by " TCP standardization WG " which was temporarily placed under Special Technical Committee on Semiconductor Device Package Outlines. After that, it was deliberated in the continuation in " Tape Carrier Package WG " and it was established in February 1993, then it was revised in December 1994.
- (6) **EIAJ EDR-7332** (Design guideline of Integrated Circuits for Dual Tape Carrier packages Type 1, Type 2(DTP(1), DTP(2)), Reconsideration in 10 years was admitted to be necessary about the TCP standards (QTP, DTP(1), DTP(2)) in Integrated Circuits Package Subcommittee which is under Technical Standardization Committee on Semiconductor Device Package. It was deliberated from March 2002 and it was established in September 2002. It is **EIAJ ED-7432** and **EIAJ ED-7433** integration versions.

The elapses of the deliberation of TCP relation standards are shown in **explanation table 2-1** with the flow chart.

**Explanation table 2-1**

| QTP Carrier   | QTP   | DTP(1)   | DTP(2)   |
|---|---|--|--|
| <b>EIAJ ED-7431-1A</b><br>(Outline drawing,<br>1994.12)       | <b>EIAJ ED-7431A</b><br>(Outline drawing,<br>1994.10)                   | <b>EIAJ ED-7432</b><br>(Outline drawing,<br>1993.12)   | <b>EIAJ ED-7433</b><br>(Outline drawing,<br>1993.12) |
| <b>EIAJ EDR-7331</b><br>(Design guide, 2002.9)                |   | <b>EIAJ EDR-7332</b><br>(Design guide, 2002.9)   |  |
| Reference standard<br><b>JEDEC standard</b><br><b>CS-006A</b> | Reference standard<br><b>JEDEC standard</b><br><b>UO- 018B,US- 001B</b> | Reference standard, IEC standard<br>Amendment 1 to <b>IEC 60191-6</b><br>(TSOP(1) and TSOP(2)) |  |

### 3. Basic idea

#### (1) Datum

Based on IEC global drawing format (Revision of **IEC 60191-6** Global drawing format (establishment schedule in 2002)), this technical report adopts a datum, a geometrical tolerance and the point of view.

In case of adoption of the datum, it is reference in the JEDEC standard and the registration packages.

#### (2) Dimensions display

The display dimension in this technical report was based on the ISO standard and made "mm" display.

In the way of converting from " inch " to the "mm ", it quoted **IEC Publication 191-3** and it made the number of the effective digits 2 digits of the following of the decimal point.

Minimum values (min): The third decimal places to be reckoned as an unit.

Recommended values (nom): The third decimal places to be rounded off.

Maximum values (max): The third decimal places to be omitted.

Furthermore, in specifying each dimensional value, the concept set by the design centers was clearly shown by means of using the designed standard values (recommended nominal value) as guideline for standardization.

### (3) Tolerance of dimension

As for Tolerance of dimension of each part, because it was important values such as the position adjustment of QTP and the socket, positioning to mount QTP on print circuit board and so on. It to be long took time with the deliberation, but It isn't possible to agree among each of company because few results occur and the part to have set a temporary value, too, exists.

### (4) Concept of the package design

When standardizing TCP outline, it considered for standardization of the examination, the handling, the package size to become possible especially. Therefore, It made a concept basic that " Fixed Test Pad Layout, Variable Package Size " " Fixed Package Size, Variable Terminal Pitch ".

By JEDEC standard **UO-017A** (establishment in October 1988), The concept to make the outer lead pitch and the test pad pitch of QTP identical and moreover, that try to design a package by fixing package body size and changing an outer lead pitch. That is, it was introducing the concept of " Fixed Package Size, Variable Pad Pitch & Layout " " Fixed Test Pad Pitch, Fixed Terminal Pitch ".

However, this doesn't become about not preparing a test socket by it every package, and moreover, as for the package with the fine pitch, which is the advantage of QTP, the test pad, too, becomes a fine pitch. Therefore, there is a fault that the test becomes very difficult. Then, it made a test pad constant regardless of the lead pitch and moreover, it made the concept to design a package by fixing package body size and changing an outer lead pitch. This concept was adopted for the JEDEC standard **US- 001B** (establishment in November 1993), and applied to the JEITA standard **EIAJ EDR-7331** (QTP, QTP Carrier), **EIAJ EDR-7332** (DTP (1), DTP (2)), too.

## 4. QTP background for dimensional provisions

### (1) Nominal dimension ( D X E )

As for QTP, outer lead shapes in surface mounting are various with the user. Then, package body size [symbol: D X E] is applied to Nominal dimension, because package outline can be plainly expressed.

### (2) Serial Number

It makes the following combination serial number.

Tape format [symbol:  $D_2$  ]

Package body size [symbol: D X E]

Test pad pitch (1) [symbol:  $e_1$  ]

Outer lead pitch [symbol:  $e$  ]

In the JEDEC standard **US-001B**, it codes to the alphabet and the numerical value which Tape format [symbol:  $D_2$  ], Package body size [symbol: D X E], Test pad pitch (1) [symbol:  $e_1$  ], Outer lead pitch [symbol:  $e$  ] and it is writing all package types. At former **EIAJ ED-7431A**, it judged that this notation way is rational and it was adopted as " Nominal dimension ". In this technical report **EIAJ EDR-7331**, it switched over this code from " Nominal dimension " to " Serial number ". Also, according to **EIAJ**

**ED-7303B** (Name and Code for Integrated Circuits Package), package body size [symbol: D X E] is applied to " Nominal dimension ".

Code composition with " Serial number " is shown in **explanation table 4-1**.

**Explanation table 4-1**

| Tape format         |     | Package body size |     | Test pad pitch |     | Outer lead pitch |     |
|---------------------|-----|-------------------|-----|----------------|-----|------------------|-----|
| D <sub>2</sub>      | 1st | DXE               | 2nd | e <sub>1</sub> | 3rd | e                | 4th |
| 35S                 | A   | 14.00X14.00       | A   | 0.50           | 1   | 0.50             | 1   |
| 48S                 | B   | 16.00X16.00       | B   | 0.40           | 2   | 0.40             | 2   |
| 70S                 | C   | 18.00X18.00       | C   | 0.30           | 3   | 0.30             | 3   |
| 48W                 | D   | 20.00X20.00       | D   | 0.25           | 4   | 0.25             | 4   |
| 70W                 | E   | 24.00X24.00       | E   | 0.20           | 5   | 0.20             | 5   |
| S: Super<br>W: Wide |     | 26.00X26.00       | F   | 0.15           | 6   | 0.15             | 6   |
|                     |     | 28.00X28.00       | G   | 0.10           | 7   | 0.10             | 7   |
|                     |     | 32.00X32.00       | H   |                |     | 0.08             | 8   |
|                     |     | 36.00X36.00       | J   |                |     | 0.065            | 9   |
|                     |     | 40.00X40.00       | K   |                |     | 0.050            | -   |

### (3) Package body size series ( D X E )

It made the gap of the number of the outer lead every package small and it made to make a series with the 4.00 mm step basic to include Package body size series of QFP. As for tape format 35 mm, it added Package body size of 14.00X14.00mm, 18.00X18.00mm and 20.00X20.00mm. Also, as for tape format 48 mm, it added Package body size of 26.00X26.00mm and 28.00X28.00mm. Package body size, which exceeds 40.00X40.00mm in tape format 70 mm, was deleted because it was unrealistic (Specification which is the same as the **JEDEC standard US-001B**). Package body size ( D X E ) is shown in **explanation table 4-2** according to the tape format ( D<sub>2</sub> ).

Explanation table 4-2

| D <sub>2</sub> | 35          | 48          | 70          |
|----------------|-------------|-------------|-------------|
| DXE            | 14.00X14.00 | -           | -           |
|                | 16.00X16.00 | 16.00X16.00 | -           |
|                | 18.00X18.00 | -           | -           |
|                | 20.00X20.00 | 20.00X20.00 | -           |
|                | 24.00X24.00 | 24.00X24.00 | 24.00X24.00 |
|                | -           | 26.00X26.00 | -           |
|                | 28.00X28.00 | 28.00X28.00 | 28.00X28.00 |
|                | 32.00X32.00 | 32.00X32.00 | 32.00X32.00 |
|                | 36.00X36.00 | 36.00X36.00 | 36.00X36.00 |
|                | 40.00X40.00 | 40.00X40.00 | 40.00X40.00 |

**(4) Tape unit width ( E<sub>2</sub> )**

It considered the following item and it fixed tape unit width( E<sub>2</sub> ). Also, it prescribed only standard value and it decided not to set tolerance.

- (4-1) It introduces the concept of " Fixed Test Pad Layout, Variable Package Size ".
- (4-2) It handles only a square package outline, and it makes a test pad line, too, a square layout from reason for tape design and so on.
- (4-3) It considers manufacture and it makes tape length sprocket hole pitch (P) integral multiple.
- (4-4) The size which needs tape unit width ( E<sub>2</sub> ) to maintain a tape unit and QTP carrier appropriately. Therefore, the range is fixed from the limit of retention of the carrier and it makes have the range sufficiently.
- (4-5) As for tape unit width ( E<sub>2</sub> ), the cutting precision depends on the way of cutting a tape every unit. And, the setting of tolerance is difficult because a various way of being cut is used.
- (4-6) As the reference, the range of tape unit width ( E<sub>2</sub> ) which is found out from the retention limit of carrier. It is shown in **explanation table 4-3**.

Explanation table 4-3

| Tape format (D <sub>2</sub> ) | E <sub>2</sub> min | E <sub>2</sub> max |
|-------------------------------|--------------------|--------------------|
| 35                            | 31.60              | 38.00              |
| 48                            | 45.85              | 51.00              |
| 70                            | 64.85              | 73.00              |

**(5) Tape format ( D<sub>2</sub> )**

3 kinds of tape formats that 35mm, 48mm, 70 mm are prescribed. The tape, which forms a package main unit inside sprocket hole and by it tape unit joins with continuation. At former **EIAJ ED-7431A**, at first, it was examining a tape format size at 3 digits of decimal points. But, it changed into 2 digits of decimal points by arrangements with JEDEC (It refers to 3. Basic idea (2) Dimensions display). With this, the size rule with of tape format 48mm became  $48.18 \pm 0.13 / -0.12$ . However, it made  $49.18 \pm 0.12 / -0.13$ , because purpose to adjust tolerance of tape format 35mm and 70mm.

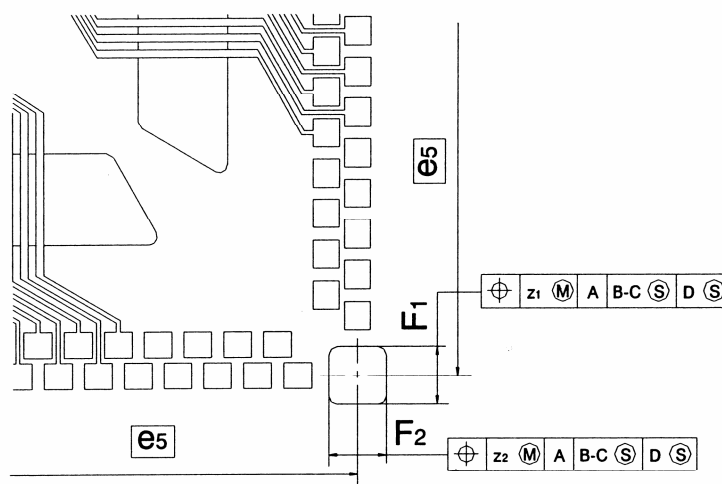
**(6) Sprocket hole (  $J_1 \times J_2$  ,  $J_3 \times J_4$  )**

At first, it tried to make a standard that tape format 35mm is Super wide, and tape format 48mm, 70mm is Wide. But, 35mm decided to standardize Super wide, only. And 48mm, 70mm decided to standardize on both which Super wide/Wide.

**(7) Tooling hole (  $F_1 \times F_2$  )**

Tooling hole which becomes necessary that adjustment of QTP and the socket, and QTP positioning of surface mount on print circuit board. And when fixing a size and a position, it was possible to have divided an opinion by socket manufacturer and tape manufacturer, because tooling hole has an influence on the QTP test realization right or wrong mainly. After all, there were not results, it didn't result in the arrangement to understand and it prescribed that position and size as temporary. It makes  $g_{1min}=1.10mm$  which a minimum value between the test pad and the tolling hole center. In the **JEDEC standard UO-017A**, tolling hole of setting angle at  $45^\circ$ , however, It made tolling hole of setting angle at  $0^\circ$ , because it thinks that  $0^\circ$  of the adjustment of QTP and socket suit more (Specification that is the same as the **JEDEC standard US-001B**).

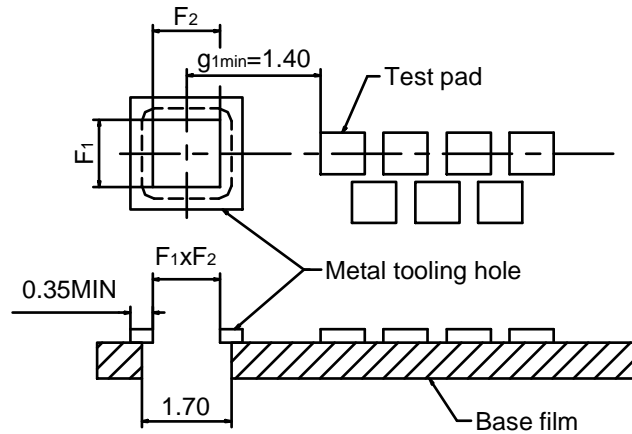
### Explanation figure 4-1



**(8) Metal tooling hole (  $F_1 \times F_2$  )**

Sometimes it forms tooling hole by metal as means of making test pad position tolerance severe, because test realization of fine pitch. Metal tooling hole needs note when it uses because it is easy for it to give the hole damage. Also, It makes  $g_{1min}=1.40mm$  which a minimum value between the test pad and the metal tolling hole center. In this technical report, it sets as the option (**Explanation figure 4-2** reference).

Explanation figure 4-2



#### (9) Number of test pads (N) and Test pad layout

In this technical report, as the standard outline which can be realized, it calculated the number of test pads (N) in the following presupposition.

##### (9-1) Between the test pad and the metal tolling hole center ( $g_1$ )

It makes  $g_{1min}=1.10\text{mm}$  which a minimum value between the test pad and the tolling hole center. However, when using metal tolling hole which was set as option, it makes  $g_{1min}=1.40\text{mm}$  (Explanation figure 4-2 reference).

##### (9-2) Test pad layout

It makes a test pad layout with 2 lines of plover layout and moreover it makes most outside an end test pad of the line outside. However, when using metal tolling hole, which was set as option, it makes most outside an end test pad of the line inside (Explanation figure 4-2 reference).

(9-3) The package center and the test pad center of line outside agree.

(9-4) Number of test pads, which exist in one side of the package, are odd numbers ( $N/4$ ).

#### (10) Number of outer leads (n) and Outer leads layout

In this technical report, as the standard outline which can be realized, it calculated the number of outer leads(n) in the following presupposition. Incidentally, as for the lead thickness, it assumed  $35\text{ }\mu\text{m}$ .

(10-1) Between outside of outer lead at the end most and package unit corner ( $g_2$ ) It makes  $g_{2min}=0.95\text{mm}$ , which a minimum value between outside of outer lead at the end most and package unit corner. (8.

**QTP outer dimension** "Number of outer leads" supplement figure reference)

(10-2) Number of outer leads, which exist in one side of the package ( $n/4$ ) It makes even basically. But,

Tape format ( $D_2$ ) 35mm, package body size (D X E) 20.00X20.00mm

Tape format ( $D_2$ ) 48mm, package body size (D X E) 28.00X28.00mm

Above-mentioned case, it makes the number of outer leads, which exists in one odd, because from the outer lead to the test pad wiring is impossible.

(10-3) It makes Maximum number of outer leads ( $n_{max}$ ) below Number of test pads (N).

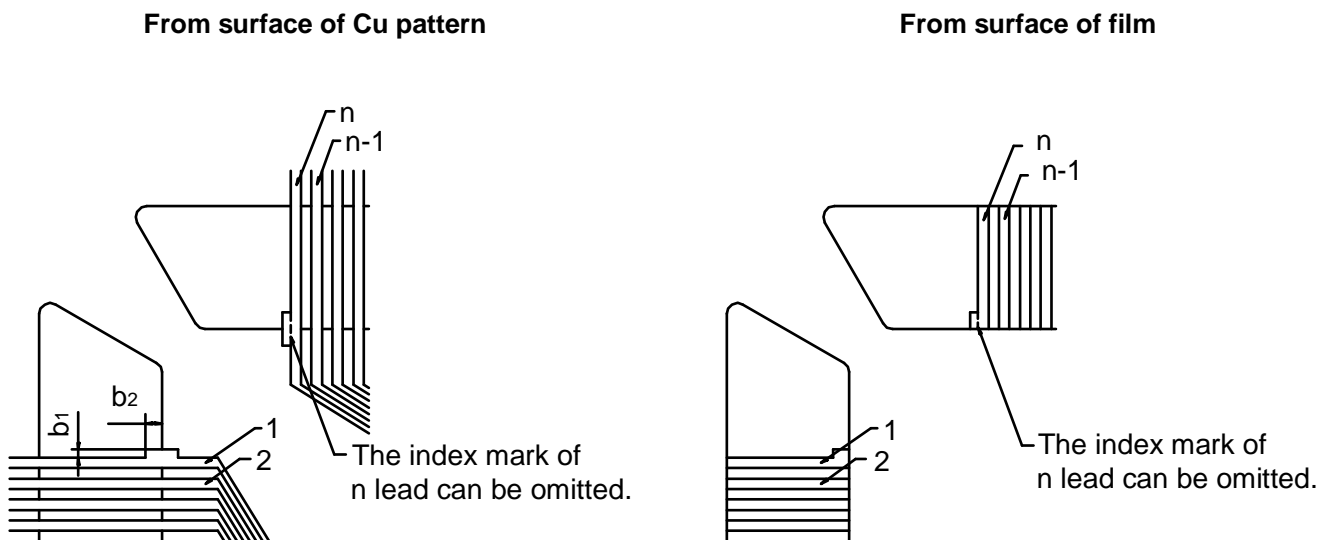


(10-4) It is reduced lead pattern pitch from outer lead to test pad, when there are many number of the outer leads in bigness of outer lead hole size. In this technical report, It fixed the number of outer lead, when it makes a lead pattern pitch min  $120\ \mu\text{m}$  and it made straight part which range of min  $0.10\text{mm}$  from inside inner line test pad and reaching of min  $0.15\text{mm}$  from outside of outer lead hole. For number of outer leads details, it refers to **10. Standard Package List**.

**(11) Index mark width ( $b_1$ ), length ( $b_2$ )**

TCP standards (QTP, DTP(1), DTP(2)) prescribes index mark width with  $b_1=0.15\pm0.02\text{mm}$ , length with  $b_2=0.30\pm0.15\text{mm}$ . It made the same rule which **JEDEC standard US-001B**. Details are shown in **Explanation figure 4-3**.

**Explanation figure 4-3**



**(12) Number of test pads(N) and Number of outer leads(n)**

TCP (QTP, DTP(1), DTP(2)) is a semi-processed article basically and it is impossible to give a terminal number, considering until jisso process. It follows **EIAJ ED-7300** in Number of test pads(N) and Number of outer leads(n), together. It made a copper foil surface the upper side (From surface of Cu pattern) and it prescribed the lower left counterclockwise as the 1st. Also, it doesn't use all test pads. And it gives a number to outer lead and the test pad as follows.

Number of outer leads : 1, 2, 3 ..... n

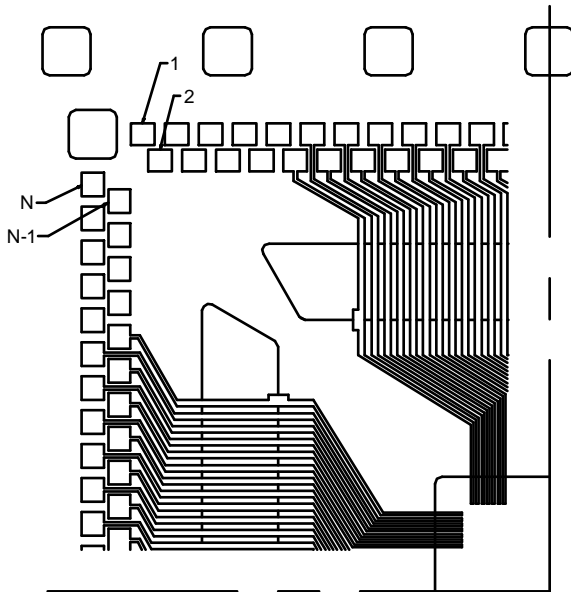
Number of test pads : 1, 2, 3 ..... N

**(13) Layout of Number of test pads(N) and Number of outer leads(n)**

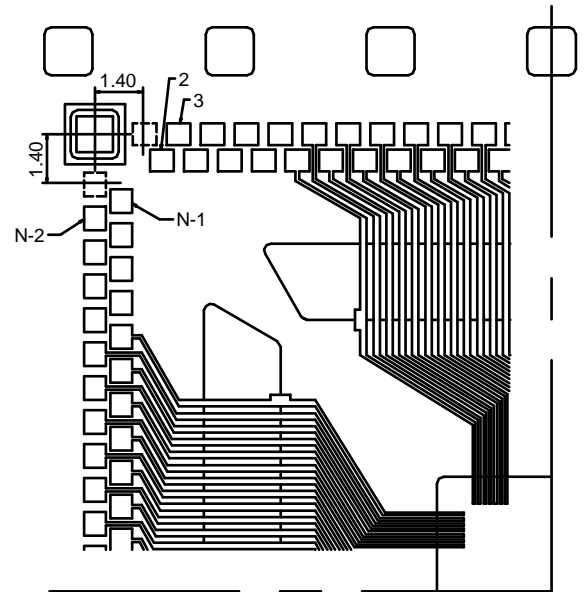
A way of putting the test pad number (N) when forming a tooling hole is shown in **explanation figure 4-4**. But, corner test pad sometimes belongs to the line inside, when using a metal tooling hole, only. In this case, it gives a test pad number (N) in the way of being shown in **explanation figure 4-5**. However, in case of metal tooling hole, when the corner test pad belongs to the line outside, it follows **explanation figure 4-4**.

## Layout of Number of test pads( N ) and Number of outer leads( n )

Explanation figure 4-4 Tooling hole  
(From surface of Cu pattern)



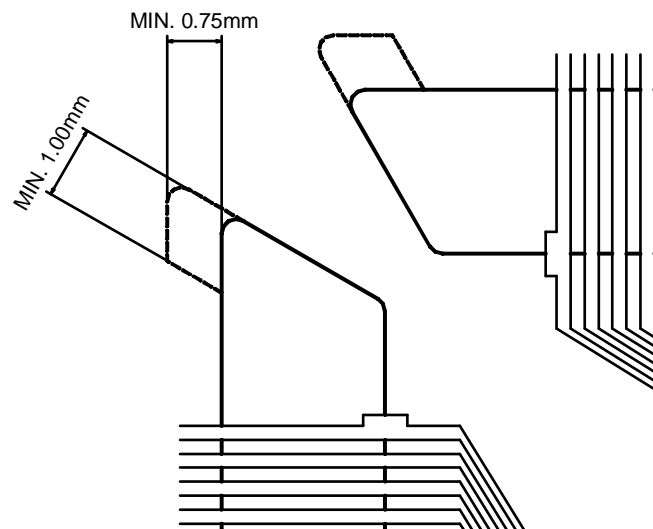
Explanation figure 4-5 Metal tooling hole  
(From surface of Cu pattern)



## (14) Mouse ear

The lead skew is an important factor. Keeper bar, which leaves polyimide outside the outer lead as the means of improving a lead skew, is effective. Mouse ear which the part to have made extend a part on the outer lead hole, to make it easy to form keeper bar (**Explanation figure 4-6** reference).

Explanation figure 4-6



## 5. QTP Carrier background for dimensional provisions

When QTP carrier was standardized, it prescribed only a basic part about outline and size. It supposed only that it adopted as the reference as the following about the part which depends on the individual specifications such as structure of carrier and that it showed a characteristic.

### (1) Structure of QTP Carrier

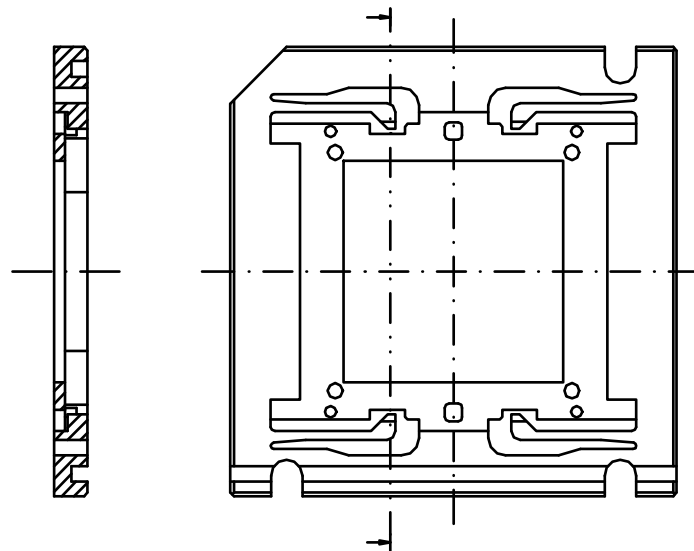
Generally, it is used that 3 typical types are shown below. The characteristic of each type is described as the reference.

- (1-1) One peace type It is composed only of main unit and it gets, and it hitches a elasticity notch to the periphery of the tape and it maintains it.

Advantage: It is possible to compose at the low cost.

Disadvantage: It is easy for loose tension to occur to the tape because keeping area is limited.

Explanation figure 5-1



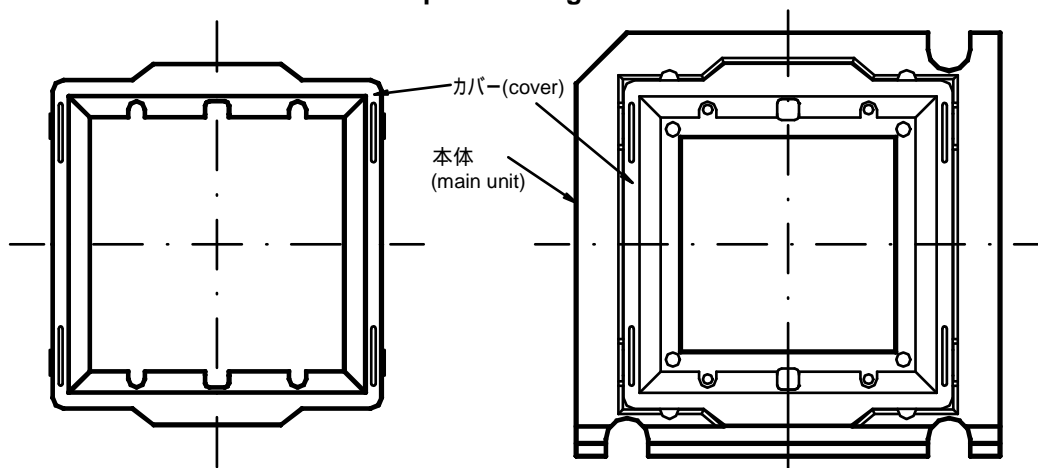
### (1-2) Two-peace sandwich type

It is composed of two of the main units and the covers and it gets. After insertion tape, it puts in a cover and it lock.

Advantage: It is highly reliable to lock the periphery of the tape uniformly.

Disadvantage: A carrier is composed of two, so it is disadvantageous to the cost.

Explanation figure 5-2



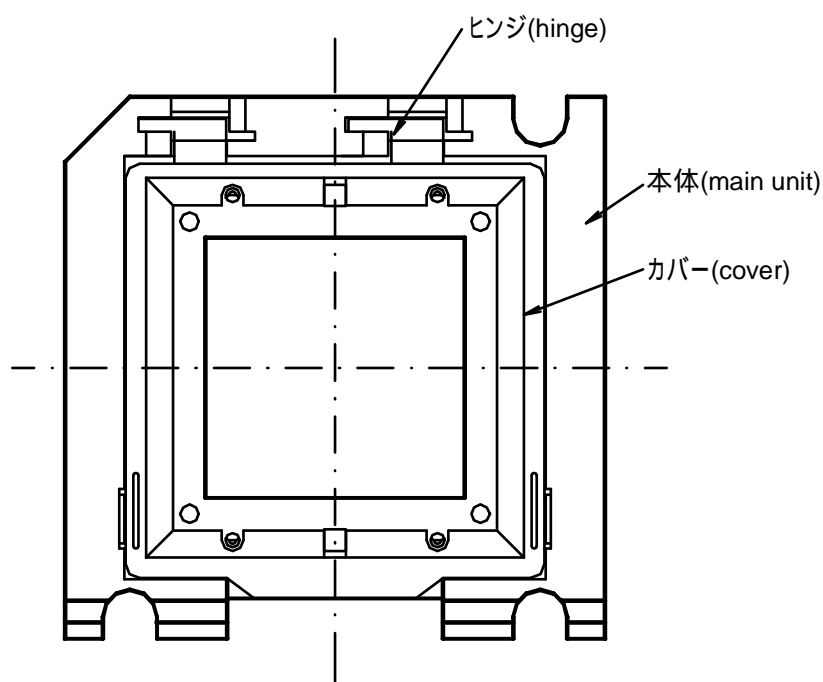
### (1-3) Two-piece hinge type

The main unit and the cover be a turning hinge and connect. After insertion tape, it turns and it locks a cover.

Advantage: The treatment is easy. It is highly reliable to lock the periphery of the tape uniformly.

Disadvantage: A carrier is composed of two, so it is disadvantageous to the cost.

Explanation figure 5-3



### (2) The positioning of carrier and tape

At **JEDEC standard CS-006A**, It is positioning on sprocket hole of tape and tape locating pin. But, in this technical report, As for the way of positioning a tape, it considered the sharing of the tape, which owns a different sprocket hole and the insert-ability of the tape and it decided not to limit them.

## 6. The reference standard

### (1) IEC standard

Revision of **IEC 60191-6** Global drawing format (establishment schedule in 2002)

**Amendment 1 to IEC 60191-6** (TSOP(1) and TSOP(2), establishment in 2000) (The related standard, **EIAJ EDR-7312** and **EIAJ EDR-7313**, establishment in April, 1996)

### (2) JEDEC standard

**UO-017A** (QTP, establishment in October, 1988) (The related standard, **CO-009A**)

**UO-018B** (QTP, establishment in July, 1993) (The related standard, **EIAJ EDR-7331**)

**US-001B** (QTP, establishment in November, 1993) (The related standard, **EIAJ EDR-7331**)

**CO-009A** (QTP Carrier, establishment in July, 1989) (The related standard, **UO-017A**)

**CS-006A** (QTP Carrier, establishment in November, 1993) (The related standard, **EIAJ EDR-7331**)

**CS-001B** (QTP Carrier magazine, establishment in March, 1996)

### (3) JEITA standard

**EIAJ EDR-7312** (Design guideline of integrated circuits for Thin Small Outline Package(Type ), TSOP( ) ), establishment in April, 1996.

**EIAJ ED-7311-1** (Standard of integrated circuits package, TSOP(1)) establishment in August, 1997.

**EIAJ EDR-7313** (Design guideline of integrated circuits for Thin Small Outline Package(Type ), TSOP( ) ), establishment in April, 1996.

**EIAJ ED-7311-2** (Standard of integrated circuits package, TSOP(2)) establishment in August, 1997.

**EIAJ EDR-7332** (Design guideline of integrated circuits for Dual Tape Carrier package Type1, Type2 (DTP (1), DTP (2)), establishment in September, 2002.

**EIAJ ED-7303B** (Name and Code for Integrated Circuits Package), establishment schedule in 2002.

## 7. COMMITTEE MEMBERS

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

### <Technical Standardization Committee on Semiconductor Device Package>

|          |            |                 |
|----------|------------|-----------------|
| Chairman | SONY CORP. | Kazuo Nishiyama |
|----------|------------|-----------------|

### < IC Package Sub-committee>

|       |                           |                 |
|-------|---------------------------|-----------------|
| Chief | MITSUBISHI ELECTRIC CORP. | Kazuya Fukuhara |
|-------|---------------------------|-----------------|

|           |               |                 |
|-----------|---------------|-----------------|
| Co- chief | TOSHIBA CORP. | Yasuhiro Koshio |
|-----------|---------------|-----------------|

|  |              |                  |
|--|--------------|------------------|
|  | HITACHI LTD. | Yoshinori Miyaki |
|--|--------------|------------------|

|  |              |               |
|--|--------------|---------------|
|  | FUJITSU LTD. | Hiroshi Inoue |
|--|--------------|---------------|

|  |  |                 |
|--|--|-----------------|
|  | MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. | Tomohiro Tamaki |
|--|--|-----------------|

|         |                              |                   |
|---------|------------------------------|-------------------|
| Members | AMKOR THECHNOLOGY JAPAN. INC | Kazuaki Sorimachi |
|---------|------------------------------|-------------------|

|  |                     |                 |
|--|---------------------|-----------------|
|  | ELPIDA MEMORY, INC. | Fumitake Okutsu |
|--|---------------------|-----------------|

|  |              |               |
|--|--------------|---------------|
|  | ENPLAS CORP. | Hisao Ohshima |
|--|--------------|---------------|

|  |                                 |               |
|--|---------------------------------|---------------|
|  | OKI ELECTRIC INDUSTRY CO., LTD. | Yoshihiko Ino |
|--|---------------------------------|---------------|

|  |               |                   |
|--|---------------|-------------------|
|  | KYOCERA CORP. | Akihiro Funahashi |
|--|---------------|-------------------|

|  |                      |                  |
|--|----------------------|------------------|
|  | SANYO ELECTRIC CORP. | Hideyuki Iwamura |
|--|----------------------|------------------|

|  |                      |              |
|--|----------------------|--------------|
|  | SANYO ELECTRIC CORP. | Kiyoshi Mita |
|--|----------------------|--------------|

|  |                   |               |
|--|-------------------|---------------|
|  | SUMITOMO 3M CORP. | Akiko Tsubota |
|--|-------------------|---------------|

|  |                   |                |
|--|-------------------|----------------|
|  | SEIKO EPSON CORP. | Yoshiaki Emoto |
|--|-------------------|----------------|

|  |            |                   |
|--|------------|-------------------|
|  | SONY CORP. | Nobuhisa Ishikawa |
|--|------------|-------------------|

|  |           |                |
|--|-----------|----------------|
|  | NEC CORP. | Kohichi Hirose |
|--|-----------|----------------|

|  |                 |                  |
|--|-----------------|------------------|
|  | IBM JAPAN CORP. | Tsuneo Kobayashi |
|--|-----------------|------------------|

|  |                              |                   |
|--|------------------------------|-------------------|
|  | TEXAS INSTRUMENTS JAPAN LTD. | Takayuki Ohuchida |
|--|------------------------------|-------------------|

|  |                    |                  |
|--|--------------------|------------------|
|  | HITACHI Cable LTD. | Tadashi Kawanobe |
|--|--------------------|------------------|

|  |              |                    |
|--|--------------|--------------------|
|  | FUJITSU LTD. | Shigeyuki Maruyama |
|--|--------------|--------------------|

|  |                         |                 |
|--|-------------------------|-----------------|
|  | FUJI ELECTRIC CO., LTD. | Osamu Hirohashi |
|--|-------------------------|-----------------|

|  |            |                 |
|--|------------|-----------------|
|  | MELCO INC. | Tsuneo Watanabe |
|--|------------|-----------------|

|  |                                |                   |
|--|--------------------------------|-------------------|
|  | YAMAICHI ELECTRONICS CO., LTD. | Noriyuki Matsuoka |
|--|--------------------------------|-------------------|

|  |                |                   |
|--|----------------|-------------------|
|  | UNITECHNO INC. | Hitoshi Matsunaga |
|--|----------------|-------------------|

|  |                |                |
|--|----------------|----------------|
|  | ROHM CO., LTD. | Sadamasa Fujii |
|--|----------------|----------------|

|                 |                   |            |
|-----------------|-------------------|------------|
| Special Members | SHIN-ETSU POLYMER | Ken Tamura |
|-----------------|-------------------|------------|

|  |                     |                |
|--|---------------------|----------------|
|  | TOYOJUSHI CO., LTD. | Hitoshi Kazama |
|--|---------------------|----------------|

### < Working Group >

|        |  |                  |
|--------|--|------------------|
| Leader | MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. | Toshiyuki Fukuda |
|--------|--|------------------|

|  |                     |                 |
|--|---------------------|-----------------|
|  | ELPIDA MEMORY, INC. | Fumitake Okutsu |
|--|---------------------|-----------------|

|  |                              |                   |
|--|------------------------------|-------------------|
|  | TEXAS INSTRUMENTS JAPAN LTD. | Takayuki Ohuchida |
|--|------------------------------|-------------------|

|  |                                |                   |
|--|--------------------------------|-------------------|
|  | YAMAICHI ELECTRONICS CO., LTD. | Noriyuki Matsuoka |
|--|--------------------------------|-------------------|

|  |           |                    |
|--|-----------|--------------------|
|  | NEC CORP. | Hiroshi Yamanouchi |
|--|-----------|--------------------|

**EIAJ EDR-7331**

Published in September, 2002

Published by Technical Standardization Center of Japan Electronics &  
Information Technology Industries Association

11, Kanda-Surugadai 3-chome, Chiyoda-ku, Tokyo 101-0062, Japan

TEL +81-3-3518-6434      FAX +81-3-3295-8727