JEITA

Technical Report of Japan Electronics and Information Technology Industries Association

EIAJ EDR-7604

Technical Report for Measuring Method of Tray

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Technical Report for Measuring Method of Tray

1. Scope

This technical report is applied to the tray based on tray standard enacted by JEITA.

2. Definition of terms

Definition of main terms in this report shall conform with **EIAJ ED-7300** [Recommended practice on standard for the preparation of outline drawings of semiconductor packages].

New terms will be defined in the descriptions of this report.

3. History

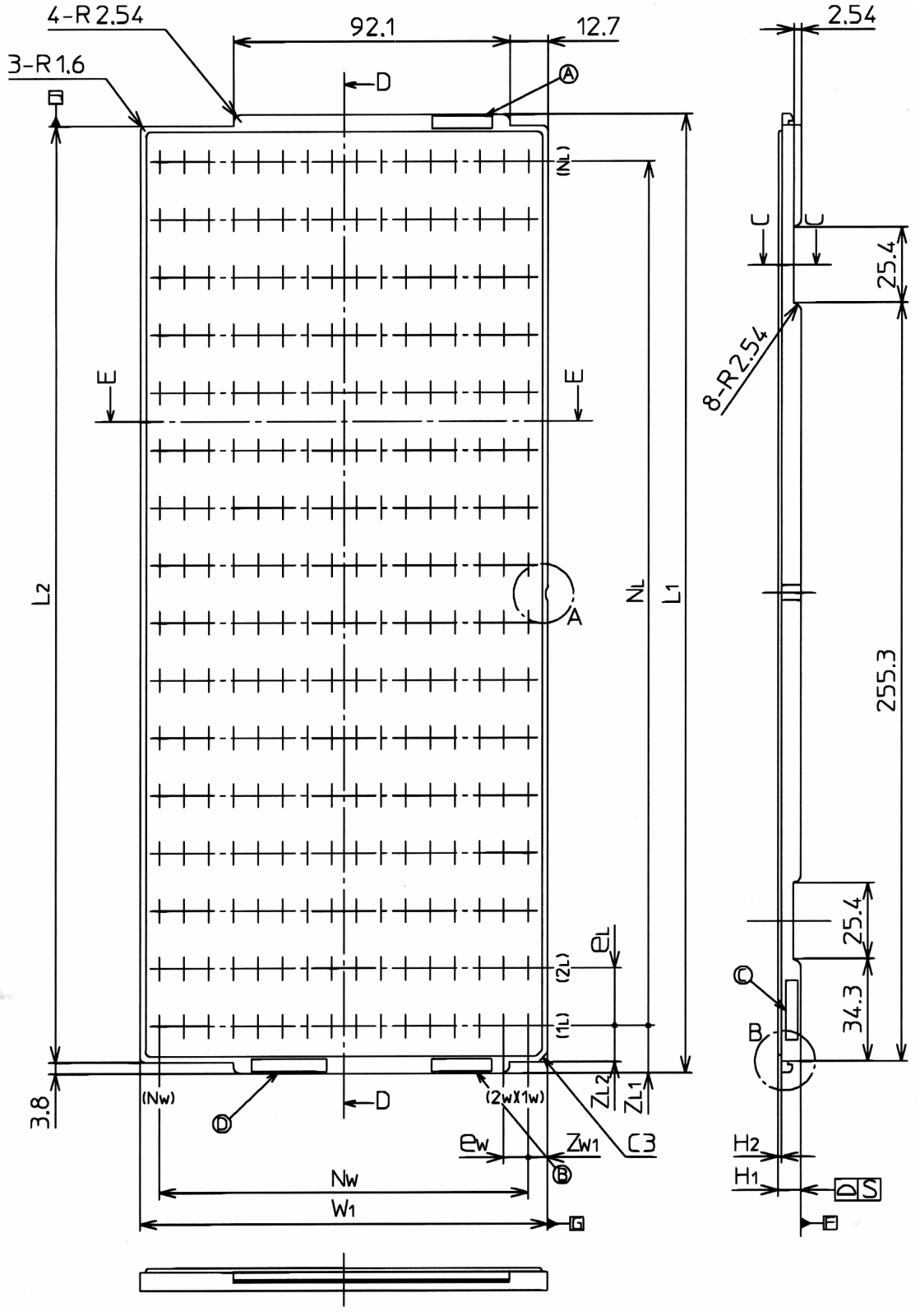
As for the dimension of the tray for the integrated circuit (IC) package, it is prescribed in the independent standard and the design guide. However, the enacted tray dimensions have been measured in a variety of methods by each company. Therefore, a measurement result was different, and a problem occurred between tray manufacturer and users (semiconductor manufacturer). Since the miniaturization trend of semiconductor packages will result in more complicated tray structure in the future, the correspondence between the date measured by the semiconductor manufacturer and ones measured by the tray supplier are important.

This technical report is specifies to make the definitions of enacted dimensions clear and to standardize measurement method of them. This technical report is applied to the tray based on tray standard enacted by JEITA.

4. Reference Symbols and Drawing

4.1 Outline drawing

The outline drawing of the tray is shown in **Figure 1**.



The number in a parenthesis is the coordinates for a pocket position being shown.

Figure 1

4.2 Detailed Cross Section

The detailed drawing of the tray cross section shall comply with **Figure 2** to **6**.

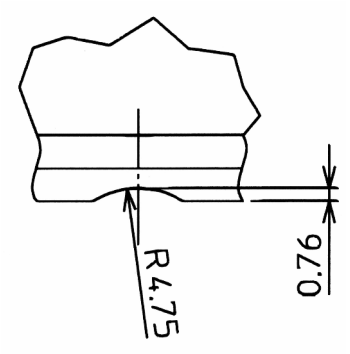


Figure 2 DETAIL A

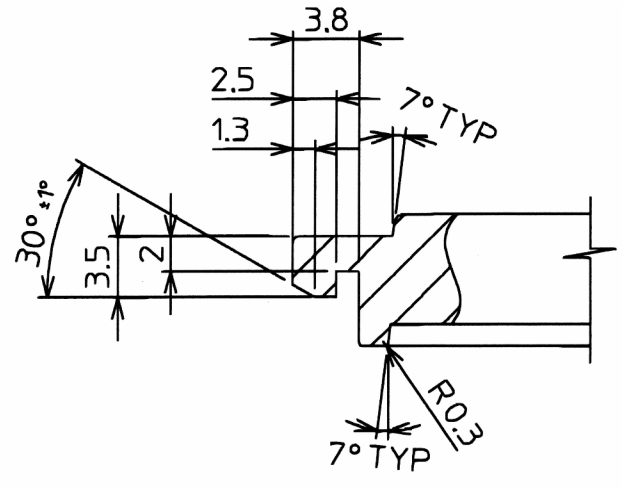


Figure 3 DETAIL B

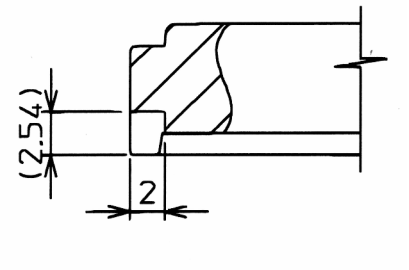


Figure 4 SECTION C-C

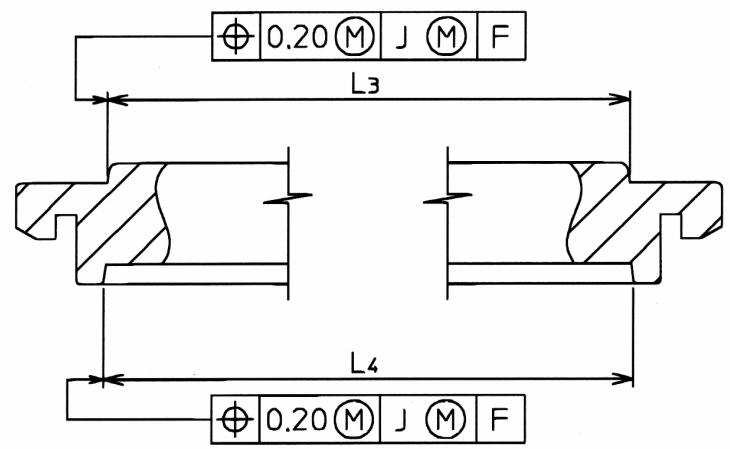


Figure 5 SECTION D-D

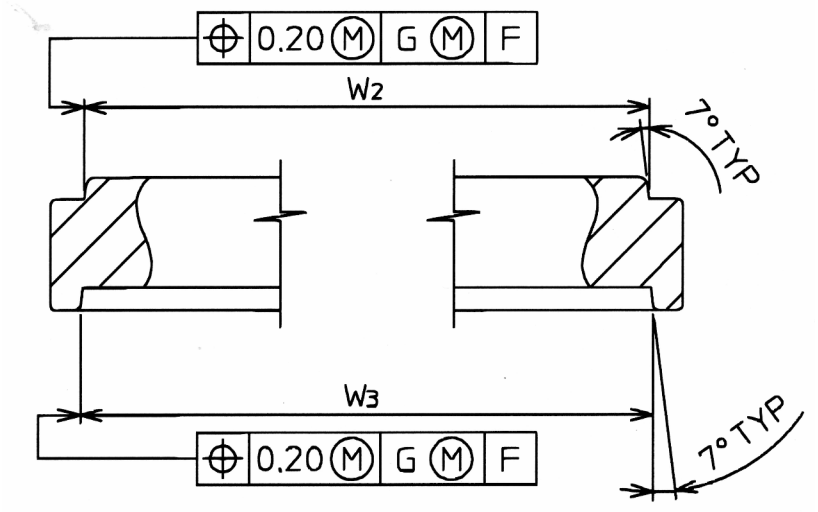


Figure 6 SECTION E-E

5. Measurement Environment

As for the measurement environment, a temperature of 23±2 degrees C and a humidity of 35 to 75 % are recommended.

6. Measurement Method

6.1 Counter dimension L_1, L_2, W_1

(1) Definition

The maximum dimension when a tray is seen from the plane and cross-sectional surface is defined as outer dimension. (Refer to **Figure 7**)

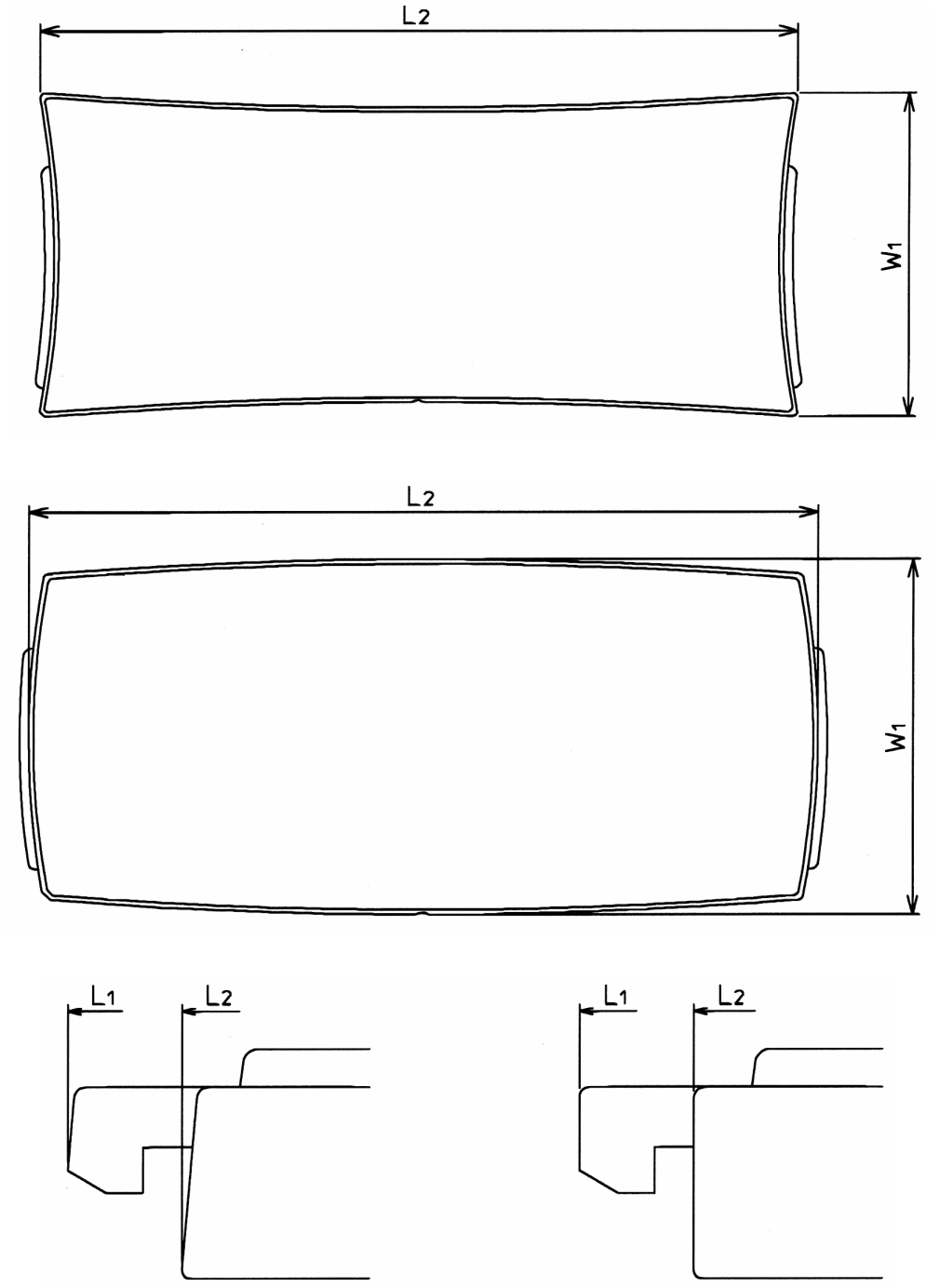


Figure 7

(2) Measurement method (Refer to **Figure 8**)

(A) When it is measured with calipers

The length dimension L_2 is the maximum value around a-a and b-b.

The width dimension W_1 is the maximum value around d-d, e-e and f-f.

The length dimension L_1 should be measured at only one point around the center department c-c.

(B) When it is measured with an optical apparatus (two dimensions, three dimensions).

The length dimension L_2 is the maximum value around a-a and b-b.

The width dimension W_1 is the maximum value around d-d, e-e and f-f.

The length dimension L_1 should be measured around the center line c-c.

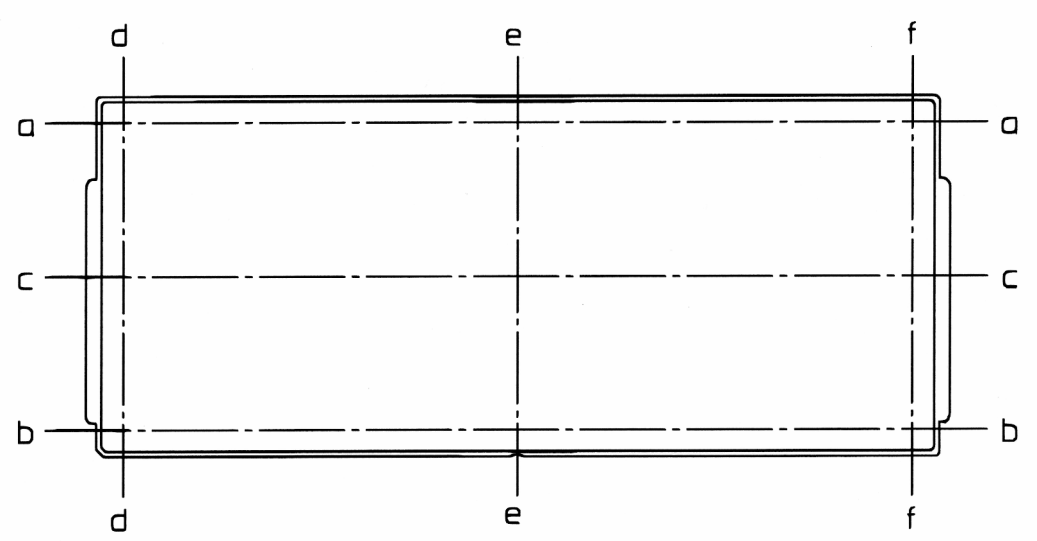


Figure 8

6.2 Height H_1, H_2

(1) Definition

The maximum thickness which doesn't include the deformation of the circumference part is defined as height.

(2) Measurement method (Refer to **Figure 9**)

(A) When it is measured with calipers

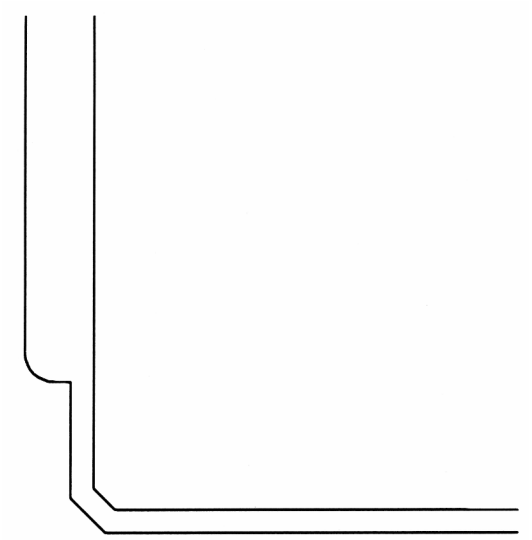
It should be measured by the holding the optical circumference part of the tray with calipers.

(B) When it is measured with an optical apparatus, a dial gauge and equivalent.

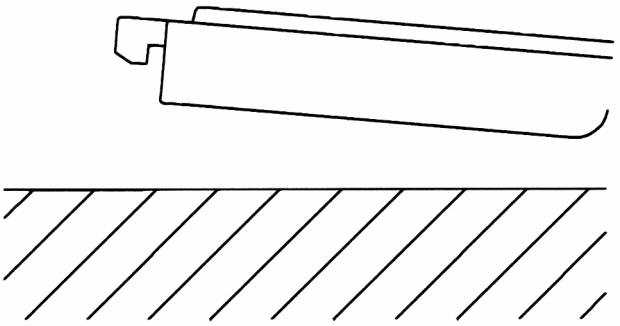
It should be measured under the condition that a measurement part doesn't float.

The position to tray with calipers.

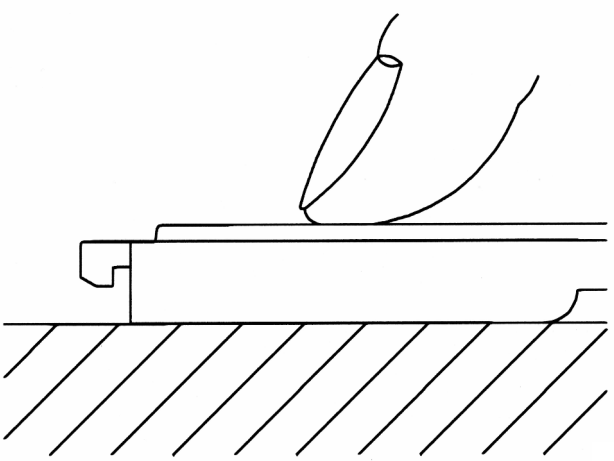
The state which down the float.



The position across which it faces with calipers



The state which floated



The state which pressed down the float

Figure 9

6.3 Stack dimension L_3, L_4, W_2, W_3

(1) Definition

Stack dimension of overlapping portions of stacked trays is defined as stack dimensions.

From the function L_3 and W_2 make the maximum value, L_4 and W_3 make the minimum value.

(2) Measurement method (Refer to **Figure 10**)

(A) When it is measured with calipers

L_3 and W_2 are the maximum values around [a-a, b-b, c-c] and [d-d, e-e, f-f], respectively.

L_4 and L_3 can not be measured precisely with calipers.

(B) When it is measured with an optical apparatus (two-dimensions, three dimensions).

L_3 and W_2 are the maximum values around [a-a, b-b, c-c] and [d-d, e-e, f-f], respectively.

L_4 and W_3 are the maximum values around [a-a, b-b, c-c] and [d-d, e-e, f-f], respectively.

The dimensions should be measured approximately 10 mm from the edge.

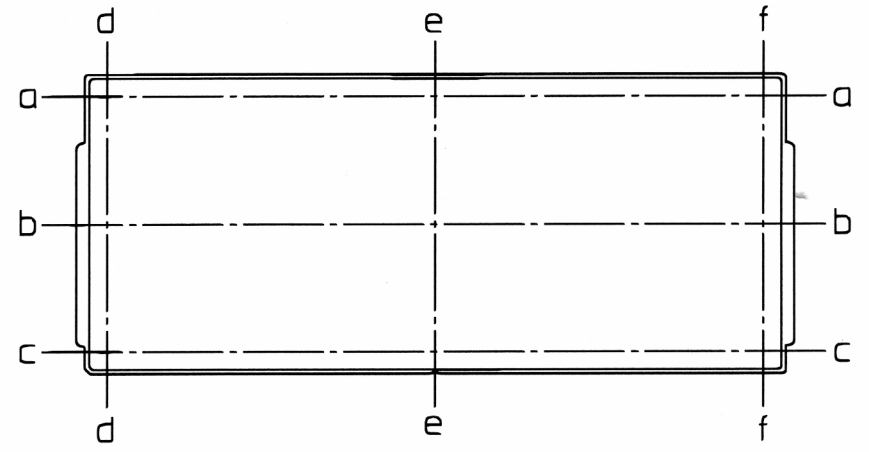


Figure 10

6.4 Positional dimensions of cells ZL_2, ZW_1, eL, eW

(1) Definition

The distance from the outer edge of a tray to center of a first cell is defined as first pitch.

With a pocket pitch, it considers as the distance between centers of an adjacent pocket.

(2) Measurement method (Refer to **Figure 11**)

Since it is difficult to measure these dimensions with calipers precisely, the use of an optical measuring instrument is recommended.

$eL=(X_1+Y_1)/2$, $eW=(X_2+Y_2)/2$

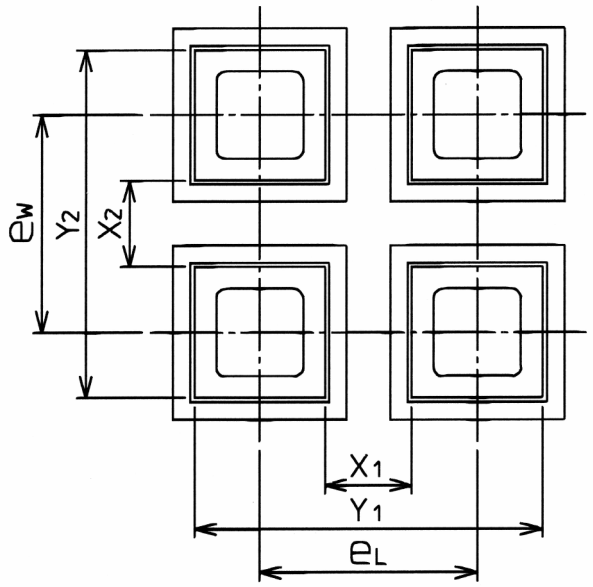


Figure 11

6.5 Warpage

(1) Definition

The amount of tray's own deformations is defined as warpage.

The deformation amount of convex and concave is shown in the **Figure 12**.

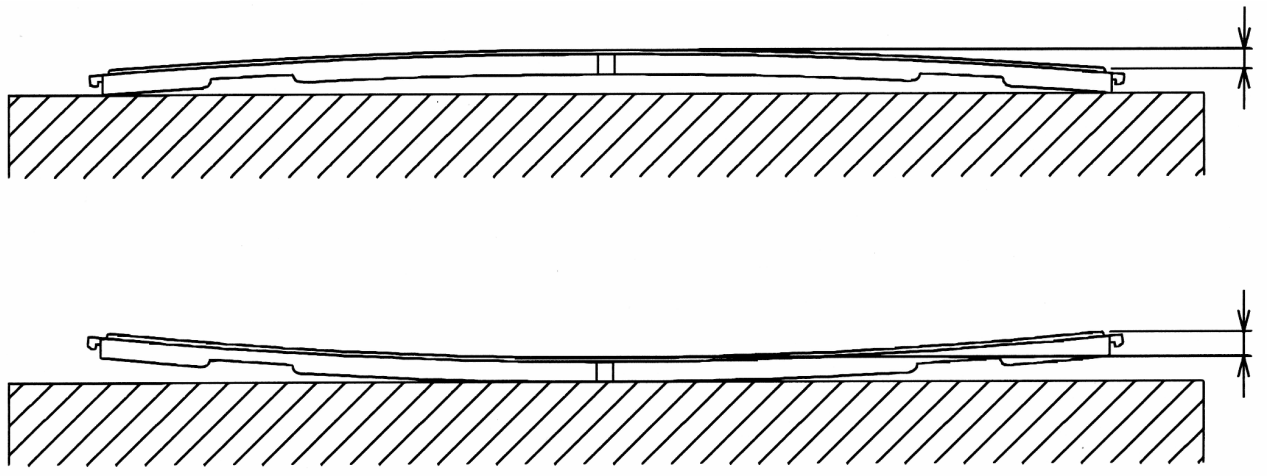


Figure 12

(2) Measurement method

Height around 9 points of a tray (the ○ marks shown in the **Figure 13**) is measured, and the difference between the maximum value and the minimum value is found.

(The measurement instrument of a non-contact type is recommended. In the case of a contact type, as much as possible the apparatus which pressure doesn't apply is recommended.)

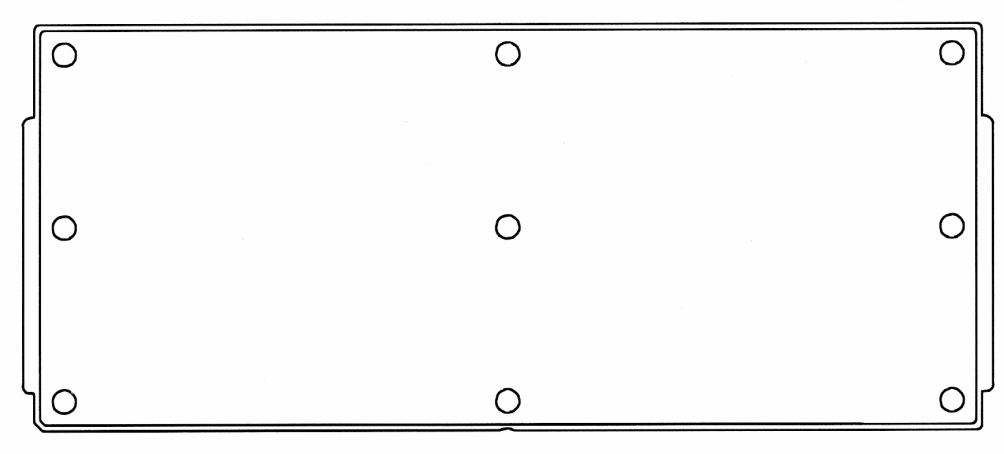


Figure 13

6.6 Surface resistivity

(1) Definition

It is barometer to discharge static electricity from the tray for device protection.

(2) Measurement method (Refer to **Figure 14**)

An example is shown in **Figure 14**.

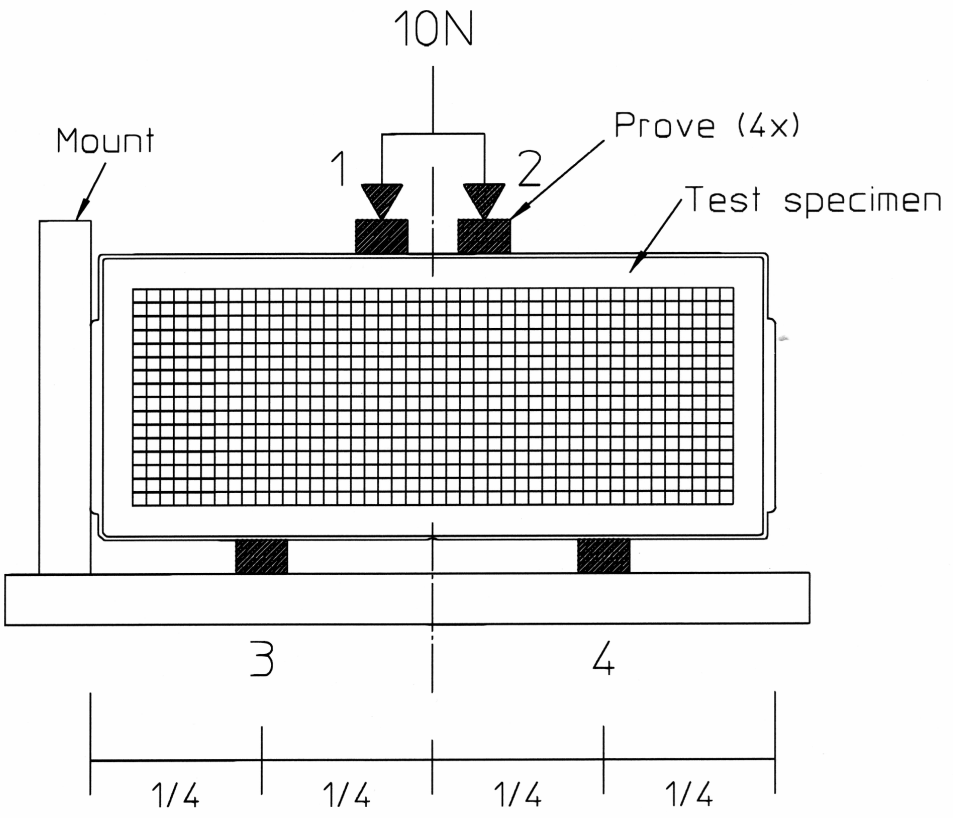


Figure 14

Explanation

1. Purpose of establishment

This technical report is enacted for the purpose of standardization of measuring method of the size and surface electrical resistivity of the tray enacted by JEITA.

Moreover, November 1, 2000, Electronic Industries Association of Japan (EIAJ), and Japan Electronic Industry Development Association (JEIDA) unified to Japan Electronics and Information Technology Industries Association (JEITA).

2. Background

Standardization of tray measuring method was proposed and selected as part of its activity plan at the meeting of the sub-committee on the packing for semiconductor devices in 1999.

At moment discontinued, developed through discussion and consideration by the sub-committee, this technical report was approved and established by the Technical Standardization Committee on Semiconductor Device Package on Dec. 2003. If question occur in the future, it shall be supplemented or corrected as necessary.

3. Issues Settled by Discussion

Although argued about whether we specify a measurement machine, since the difference was in each company possession equipment, we decided to stop to the definition of a measuring method.

We announce an activity plan in JWG#2 in 2002 -- although these contents were indicated in advance to the JEDEC side later, there was especially no comment.

We argued about the measuring method of surface electrical resistivity in 2002, and the contents of [**IEC-60286-5**] which had not been enacted were adopted those days.

4. Deliberation Committee

This technical report was mainly deliberated by the Tray standardization joint project in the Sub-committee on Packing for Semiconductor Device under the Technical Standardization Committee on Semiconductor Device Package. The committee members are shown below.

< Technical Standardization Committee on Semiconductor Device Package >

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< Tray Standarazation joint project >

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