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(IEC 60286-2 : 2008)

(JEITA/JSA)

**Packaging of components for
automatic handling—
Part 2: Packaging of components
with unidirectional leads on
continuous tapes**

ICS 31.020;31.240

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Electronics and Information Technology Industries Association (JEITA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS C 0806-2:1999** is replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

JIS C 0806 series consists of the following 4 parts under the general title “*Packaging of components for automatic handling*”:

Part 1: Tape packaging of components with axial leads on continuous tapes

Part 2: Packaging of components with unidirectional leads on continuous tapes

Part 3: Packaging of surface mount components on continuous tapes

Part 6: Bulk case packaging for surface mounting components

Packaging of components for automatic handling— Part 2: Packaging of components with unidirectional leads on continuous tapes

Introduction

This Japanese Industrial Standard has been prepared based on the third edition of **IEC 60286-2** published in 2008 without any modifications of the technical contents and the structure.

The portions continuous sidelines or underlined with dots and Annex JA are the matters not given in the corresponding International Standard.

1 General

1.1 Scope

This Standard applies to the tape packaging of components with two or more unidirectional leads for use in electronic equipment. In general, the tape is applied to the component leads for this packaging.

This Standard covers requirements for taping techniques used with equipment for automatic handling, preforming of leads, insertion and other operations and includes only those dimensions which are essential to the taping of components intended for the above-mentioned purposes.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

IEC 60286-2:2008 *Packaging of components for automatic handling—
Part 2: Packaging of components with unidirectional leads on continuous
tapes* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall be applied and any revisions (including amendments) made thereafter shall not be applied. For those without the indication of the year, the most recent edition (including amendments) shall be applied.

JIS K 6999:2004 *Plastics—Generic identification and marking of plastics products*

NOTE : Corresponding International Standard: ISO 11469:2000 *Plastics—
Generic identification and marking of plastics products* (IDT)

IEC 60097 *Grid systems for printed circuits*

IEC 60301 *Preferred diameters of wire terminations of capacitors and resistors*

IEC 60717 *Method for determination of the space required by capacitors and resistors with unidirectional terminations*

2 Terms and definitions

For the purposes of this Standard, the following terms and definitions apply.

2.1 packaging

container and its action to be used for the containment, protection, structured alignment for automatic assembly, handling and delivery of electronic components

2.2 short terminal without tape

terminal in hollow state not held between the carrier tape and the cover tape and shortened length (see figure 1)

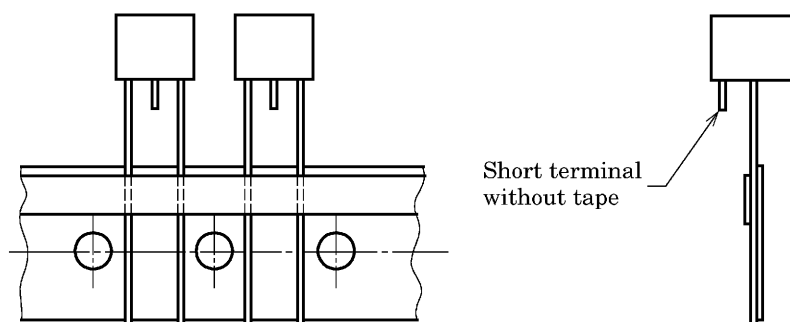


Figure 1 Short terminal without tape

3 Dimensions

For the symbols and dimensions given below, reference is made to figures 2, 4, 6, 7, 8, 9, and 10, and Annex A through Annex F.

3.1 Dimensions common to tapes and taped components

For dimensions common to tapes and taped components, see figure 2 and 3.1.1 to 3.1.7.

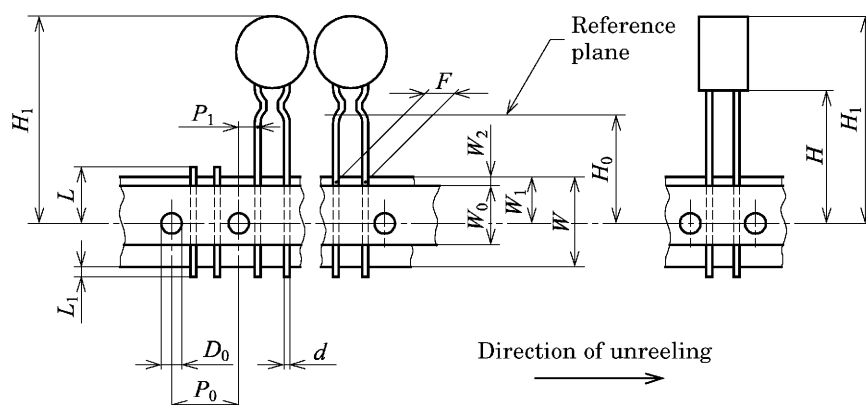


Figure 2 Dimensions common to tapes and taped components

3.1.1 Coordinate system

The coordinate system as shown in figure 3 shall be used as follows.

- The abscissa is a straight line through the centres of the sprocket holes in the direction of unreeling.
- The ordinate is a straight line perpendicular to the abscissa through the centre of the sprocket hole that follows the axis of the component to be checked.

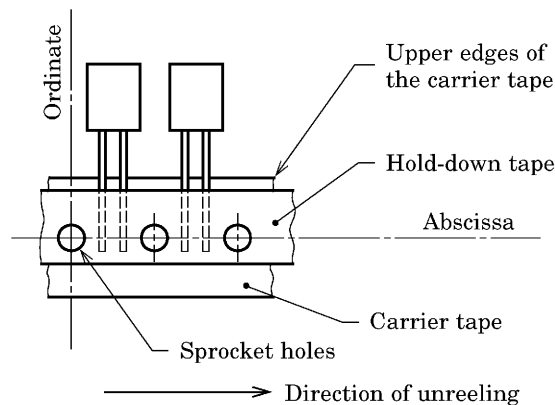


Figure 3 Coordinate system

3.1.2 Tape width

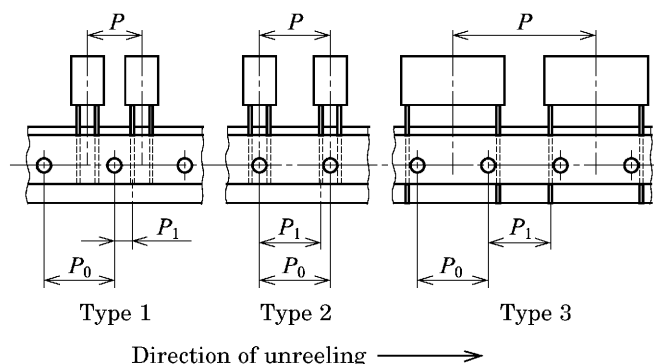
The tape width shall be as follows.

- Carrier tape width W : $W = 18 \text{ mm}^{+1}_{-0.5} \text{ mm}$
- Hold-down tape width W_0 : This dimension is governed by the retention of the components in the tape. The hold-down tape shall not protrude beyond the carrier tape.
- Position of sprocket hole W_1 : $W_1 = 9^{+0.75}_{-0.5} \text{ mm}$
- Distance W_2 : Between the upper edges of the carrier tape and the hold-down tape $W_2 = 3 \text{ mm max.}$

3.1.3 Pitches of components and sprocket holes

The pitches of components and sprocket holes shall be as given in figure 4 and as follows.

- Pitch P of the mutual components (see Annex A to Annex F)
- Pitch P_0 of the sprocket holes (see Annex A to Annex F)
- Pitch P_1 between ordinate and first lead terminal of the drawer side (see Annex A to Annex F)
- Diameter D_0 of the sprocket holes: $D_0 = 4.0 \text{ mm} \pm 0.2 \text{ mm}$



NOTE : The tolerance over any 20 sprockets hole pitches is ± 1 mm.

Figure 4 Pitches of components and sprocket holes

For lead spacing F , the grid dimension of printed circuit specified in **IEC 60097** $e = 2.5$ mm shall be used.

NOTE 1 Components with a lead spacing of $F = 3 \times e$ (7.5 mm) may be delivered with the sprocket holes arranged between the leads of the component (see Type 2 in figure 4).

NOTE 2 Components with a lead spacing of $F = 8 \times e$ (20 mm) to $11 \times e$ (27.5 mm) may be delivered with one or two sprocket holes arranged between the leads of the component (see Type 3 in figure 4).

3.1.4 Dimensions of either components position from abscissa

Dimensions of either components position from abscissa shall be as follows.

- Distance H : Between the abscissa and the bottom plane of the component body
 $H = 18 \text{ mm}^{+2}_0 \text{ mm}$

Seating plane

The method for determining the seating plane is given in **IEC 60717**.

NOTE : The specification in **IEC 60717** is given in Annex JA for reference.

- For components with straight leads: The bottom of the component body, including any projections which support the component on the printed board (line in parallel to the reference abscissa through the bottom point nearest to the tape).
- For components with crimped (or otherwise preformed) leads: The seating plane depends on the profile of the crimp, the diameter of the leads and the hole size in the printed board. For this reason a reference plane is defined, for components with crimped leads only, as follows.

Reference plane

The line parallel to the abscissa through the lowest centre of the radius of curvature of the bending of the crimp (see figure 5).

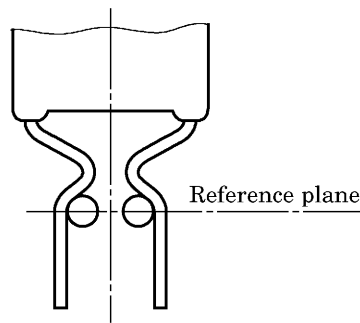


Figure 5 Reference plane

- Distance H_0 (for crimped leads only): Between the abscissa and the reference plane of components with crimped leads $H_0 = 16 \text{ mm} \pm 0.5 \text{ mm}$
- Distance H_1 : Between the abscissa and the top of the body of the components (see Annex A to Annex F).

3.1.5 Diameter d of lead terminal and tape thickness

Diameter d of lead terminal and tape thickness shall be as follows.

- Diameter d of the lead terminal: Diameter d of lead terminal select in accordance with **IEC 60301**.

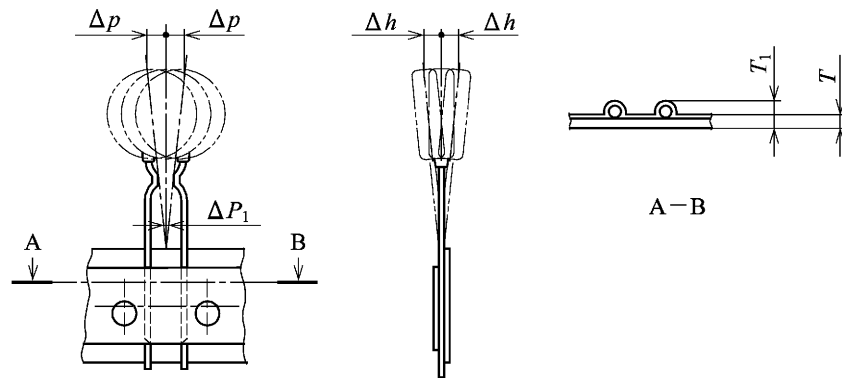
NOTE : The specification in **IEC 60301** is shown below for reference.

Recommended diameters of leads

Unit: mm

Diameter of lead			Diameter of lead		
Minimum value	Nominal value	Maximum value	Minimum value	Nominal value	Maximum value
0.18	0.2	0.23	0.55	0.6	0.66
0.23	0.25	0.28	0.65	0.7	0.77
0.25	0.3	0.33	0.75	0.8	0.88
0.35	0.4	0.44	0.95	1.0	1.10
0.45	0.5	0.55	1.15	1.2	1.30

Market trend for automatic insertion: Where lead spacing is $F = 5 \text{ mm}$, the recommended lead diameters are 0.6 mm max.; and where lead spacing is $F = 7.5 \text{ mm}$, the recommended lead diameters are 0.8 mm max.



NOTE : When the lead type is not a circle, a circle going through the corners of the non-circular cross-section is considered to be the equivalent circular cross-section.

Figure 6 Diameter d of lead terminal and thickness and maximum permissible deviation

— Thickness T : (See Annex A to Annex F.)

— Thickness T_1 : $T_1 = T + d$

3.1.6 Maximum permissible deviation

The maximum permissible deviation shall be as follows.

From the nominal position: Maximum lateral deviation (front-rear) Δh of the component body vertical to the tape plane: $|\Delta h| = 2 \text{ mm max.}$

Maximum deviation (left-right) of the component body in the tape plane Δp : $|\Delta p| = 1.3 \text{ mm max.}$

Maximum deviation of the component leads in the seating plane (valid from the upper edge of the tape for all values of P_1 to the seating plane or reference plane respectively) ΔP_1 : $|\Delta P_1| = 0.7 \text{ mm max.}$

P_1 is the distance between the ordinate and the lead close to the ordinate of the following component (in the direction of unreeling).

NOTE 1 For new designs, the grid dimension of printed circuit specified in **IEC 60097** $e = 2.5 \text{ mm}$ shall be used.

NOTE 2 When this option (sprocket holes between the leads) is used, care should be taken that the leads do not interfere with the sprocket holes.

NOTE 3 For cases where interchangeability cannot be guaranteed, see the notes in **3.1.3**.

3.1.7 Maximum permissible protrusion of the ends of the leads

The maximum permissible protrusion of the ends of the leads shall be as shown in figure 2 and as follows.

— Protrusion L_1 beyond the lower side of the carrier tape $L_1 = 0.5 \text{ mm max.}$

NOTE : Market trend is towards smaller values. The corresponding International Standard specifies $L_1 = 2 \text{ mm}$, but it is obviously wrong. In this Standard 0.5 mm max. specified in tables of Annex A to Annex F is adopted.