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Edition 7.0 2022-11
COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

Packaging of components for automatic handling –
Part 3: Packaging of surface mount components on continuous tapes



IEC 60286-3:2022-11 CMV(en)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 3: Packaging of surface mount components on continuous tapes

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This commented version (CMV) of the official standard IEC 60286-3:2022 edition 7.0 allows the user to identify the changes made to the previous IEC 60286-3:2019 edition 6.0. Furthermore, comments from IEC TC 40 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60286-3 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2019. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition terms and definitions.
b) addition of a table of the classification to symbols concerning drive hole diameter and distance between the reel hole centre and the drive hole centre;
c) addition of drive hole to the reel (optional);
d) revision of reel hole diameter tolerances;
e) revision of 72 mm tape size carrier tape width dimension tolerances;
f) addition of Annex B (informative);
g) addition of component size 0201M.

The text of this International Standard is based on the following documents:

Draft	Report on voting
40/2972/FDIS	40/2984/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60268 series, published under the general title *Packaging of components for automatic handling*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Tape packaging meets the requirements of automatic component placement machines and also covers the use of tape packaging for components and singulated dies for test purposes and other operations.

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 3: Packaging of surface mount components on continuous tapes

1 Scope

This part of IEC 60286 is applicable to the tape packaging of electronic components without leads or with lead stumps, intended to be connected to electronic circuits. It includes only those dimensions that are essential for the taping of components intended for the above-mentioned purposes.

This document also includes requirements related to the packaging of singulated die products including bare die and bumped die (flip chips).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60191-2, *Mechanical standardization of semiconductor devices – Part 2: Dimensions*

IEC 61340-4-5, *Electrostatics – Part 4-5: Standard test methods for specific applications – Methods for characterizing the electrostatic protection of footwear and flooring in combination with a person*

IEC 61340-4-6, *Electrostatics – Part 4-6: Standard test methods for specific applications – Wrist straps*

IEC 61340-4-7, *Electrostatics – Part 4-7: Standard test methods for specific applications – Ionization*

IEC 61340-4-9, *Electrostatics – Part 4-9: Standard test methods for specific applications – Garments* 1

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Definitions apply to all tape types, unless specifically mentioned.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
component
electronic part of a product that cannot be physically divided into smaller parts without losing its particular function

Note 1 to entry: This includes singulated die product.

Note 2 to entry: This is applied to all packaging-types for bare die products unless specifically mentioned otherwise.

3.1.2
component size
size of component that is identified with its metric size code

Note 1 to entry: This size code is followed by a capital M.

Note 2 to entry: To avoid possible confusion with inch-based size codes, an equivalency table is shown in Table 1.

Table 1 – Component size codes

Metric size code	Inch size code
0201M	008004 **2**
0402M	01005
0603M	0201
1005M	0402
1608M	0603
2012M	0805

3.1.3
packaging
product made of any material of any nature to be used for the containment, protection, structured alignment for automatic assembly, handling and delivery

3.1.4
pressed carrier tape
<type 1b> carrier tape with concave cavities formed by compression of the base material

3.1.5
fluff
<type 1b> fibre from the base material attached inside the cavity

Note 1 to entry: See Figure 1.

3.1.6
burr
<type 1b> surface projection of tape unintentially produced when cavity is formed

Note 1 to entry: See Figure 1.

3.1.7
deformation
<type 1b> bulge on the inner wall of the cavity

Note 1 to entry: See Figure 1.

3.1.8
puff
<type 1b> bulge on the reverse side of the cavity

Note 1 to entry: See Figure 1.

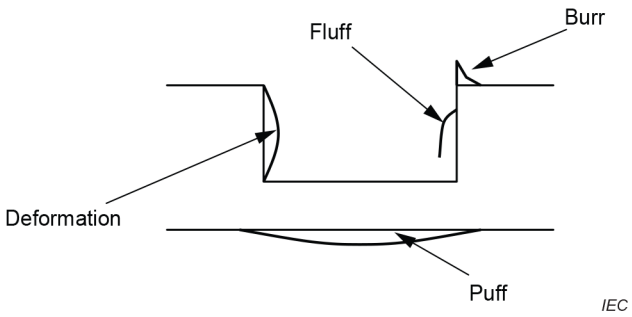


Figure 1 – Sectional view of component cavity (type 1b)

3.1.9
blister carrier tape
embossed carrier tape
carrier tape which is identified as tape belonging to type 2a, type 2b and type3

~~Note 1 to entry These types of carriers are also known as "embossed" carrier types.~~

3.1.10
punched carrier tape
<type 1a> carrier tape on which the concave cavities are formed by punching a hole on the base material and covering up the bottom by the cover tape

3.2 Symbols

The symbols used in this document are listed in Table 2.

Table 2 – Classification to symbols concerning tape, reel and common symbols

Symbols	Definitions	Figure references
A	Reel diameter	26
A_0	Cavity's bottom dimension in direction of unreeling	2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 20 and A.2
B	Reel hole key's groove width	27
B_0	Cavity's bottom dimension in direction of tape width	2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 20 and A.2
B_1	Cavity's rim in direction of tape width	8, 11 and 14
C	Reel hole diameter	26 and 27
C_T	Distance of puff under cavity in direction of tape width	5
d	Difference of diameter between sprocket hole and round foramen	14
D	Reel slot diameter	27
D_0	Sprocket hole diameter	2, 5, 8, 11, 14 and 17
D_1	Cavity's bottom hole diameter	8 and 14
D_{DH}	Drive hole diameter	28
E_1	Shorter distance in direction of width between the origin point of round sprocket hole and the edge of a side of tape	2, 5, 8, 11, 14 and 17

Symbols	Definitions	Figure references
E_2	Longer distance in direction of width between the origin point of round sprocket hole and the edge of a side of tape	2, 5, 8 and 11
F	Distance in direction of width between the origin point of round sprocket hole and the centre of cavity	2, 5, 8, 11 and 14
F_A	Distance in direction of width between the origin point of round sprocket hole and the centre of compartment	17, 19, 24 and 25
G	Shorter distance in direction of width between the cavity and the edge of a side of tape	2, 5, 8, 11 and 17
K_0	Cavity depth	2, 5, 8 ,11, 14 and A.3
M	Distance between the reel hole centre and the drive hole centre	28
N	Hub diameter	26
P_0	Pitch of the sprocket holes	2, 3, 5, 6, 8, 9, 11, 14 and 17
P_1	Cavity pitch	2, 3, 5, 6, 8, 9, 11, 14, 17 and 18
P_2	Pitch between the centre of a cavity on the same line with the origin point of round sprocket hole and the centre of the next cavity in direction of unreeling	2, 3, 5, 6, 8, 9, 11 and 14
P_{2A}	Pitch between the centre line of the origin point of round sprocket hole and the centre line of compartment in direction of unreeling	17, 18, 19, 24 and 25
P_3	Pitch between the centre of a cavity on the same line with the origin point of round sprocket hole and the centre of the second next cavity in direction of unreeling	3 and 6
P_4	Pitch between the centre of a cavity on the same line with the origin point of round sprocket hole and the centre of the third next cavity in direction of unreeling	3 and 6
S	Sprocket hole pitch in direction of width	14
R	Bending radius of carrier tape	21
r	Curvature radius of reel hole key's groove	27
T	Carrier tape thickness without cover tape	2, 5, 8, 11, 14, 17, 25 and A.1
T_1	Top cover tape thickness ~~or bottom cover tape thickness~~	2, 5, 8, 11~~,~~ and 14 ~~and 17~~
T_2	Sum of outer cavity height and top cover tape thickness	8, 11 and 14
T_3	Thickenss of pressed carrier tape including bulge	5 and A.1
T_4	Bottom cover tape thickness or Adhesive tape thickness	2 and 17
V_1	Compartment dimension in direcion of unreeling	17 and 18
V_2	Compartment dimension in direction of width	17 and 18
W	Carrier tape width	2, 5, 8, 11, 14 and 17
W_P	Distance between adhesive tapes	17
W_1	Reel inner width (measured at hub)	26
W_2	Reel overall width	26
W_3	Reel inner width in the rim	26
Z	Component thickness	25