

INTERNATIONAL STANDARD

IEC
60286-3

Fourth edition
2007-06

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

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

<https://standards.iteh.ai/standards/iec/4623ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>

<https://standards.iteh.ai/standards/iec/4623ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>



Reference number
IEC 60286-3:2007(E)



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2007 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

IEC 60286-3-2007

<https://standards.iec.ch/standards/iec/4623ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>

INTERNATIONAL STANDARD

IEC
60286-3

Fourth edition
2007-06

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

iTech Standards
(<https://standards.itih.ai>)
Document Preview

<https://standards.itih.ai/standards/iec/4623ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>

<https://standards.itih.ai/standards/iec/4623ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

U

For price, see current catalogue

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 General.....	6
1.1 Scope.....	6
1.2 Normative references.....	6
2 Terms and definitions.....	7
3 Structure of the specification.....	7
3.1 Type I – Punched carrier tape, with top and bottom cover tape (8 mm and 12 mm).....	8
3.2 Type II – Blister carrier tape, with single sprocket holes (8 mm, 12 mm, 16 mm and 24 mm).....	10
3.3 Type III – Blister carrier tape, with double sprocket holes (32 mm to 200 mm).....	12
3.4 Type IV – Adhesive-backed punched plastic carrier tape for singulated bare die and other surface mount components (8 mm, 12 mm, 16 mm and 24 mm).....	14
3.4.1 Component positioning and lateral displacement (see Figures 11 and 12).....	16
3.4.2 Coordinate system.....	17
4 Polarity and orientation of components in the tape.....	18
4.1 All tapes.....	18
4.2 Tape reeling.....	18
4.2.1 All types.....	18
4.2.2 Type I.....	18
4.2.3 Types I, II and III only.....	18
4.2.4 Type IV only.....	19
5 Fixing of components and additional tape requirements.....	19
5.1 All types.....	19
5.2 Requirements for Types I, II and III where cover tape is used.....	20
5.3 Specific requirements for Type IV tapes.....	20
5.4 Peel force of the cover tape (for Types I, II and III only).....	20
5.5 Minimum bending radius (for all Types).....	20
5.6 Break force of the cover tapes (for Types I, II & III only).....	21
5.7 Taping materials.....	21
5.8 Camber.....	21
6 Specific requirements for tapes containing die products.....	22
6.1 Tape design for tapes containing die products.....	22
6.2 Cleanliness.....	22
6.3 Component lateral movement (Types I and II).....	22
7 Packing.....	23
7.1 Leader and trailer tape.....	23
7.1.1 Leader.....	23
7.1.2 Trailer.....	23
7.2 Reels.....	23
7.2.1 Reel dimensions related to tape (see Figure 18 and Table 12).....	24
7.2.2 Reel hole dimensions (see Figure 19 and Table 13).....	25
7.2.3 Recycling.....	25
7.3 Missing components.....	25
8 Marking.....	26

Table 1 – Constant dimensions of 8 mm and 12 mm punched carrier tape	9
Table 2 – Variable dimensions of 8 mm and 12 mm punched carrier tape	9
Table 3 – Constant dimensions of 8 mm to 24 mm blister carrier tape	11
Table 4 – Variable dimensions of 8 mm to 24 mm blister carrier tape	11
Table 5 – Constant dimensions of 32 mm to 200 mm blister carrier tape	13
Table 6 – Variable dimensions of 32 mm to 200 mm blister carrier tape	13
Table 7 – Constant dimensions of adhesive backed punched carrier tape	15
Table 8 – Variable dimensions of adhesive-backed punched carrier tape	15
Table 9 – Absolute referencing data for component target position	17
Table 10 – Peel force	20
Table 11 – Minimum bending radius	21
Table 12 – Reel dimensions	24
Table 13 – Reel hole dimensions	25
Figure 1 – 8 mm and 12 mm punched carrier-tape dimensions	8
Figure 2 – Illustration of 2 mm cavity pitch	8
Figure 3 – Maximum component tilt, rotation and lateral movement	8
Figure 4 – Blister carrier tape dimensions (8 mm, 12 mm, 16 mm and 24 mm)	10
Figure 5 – Illustration of 2 mm cavity pitch	10
Figure 6 – Maximum component tilt, rotation and lateral movement	10
Figure 7 – Blister carrier tape	12
Figure 8 – Maximum component tilt, rotation and lateral movement	12
Figure 9 – Adhesive-backed punched carrier-tape dimensions (4 mm compartment pitch)	14
Figure 10 – Illustration of 2 mm compartment pitch	14
Figure 11 – Component clearance and positioning method	16
Figure 12 – Maximum component tilt and lateral displacement	16
Figure 13 – Type IV coordinate system	17
Figure 14 – Tape reeling and label area on the reel	19
Figure 15 – Bending radius	21
Figure 16 – Camber (top view)	22
Figure 17 – Leader and trailer	23
Figure 18 – Reel dimensions	24
Figure 19 – Reel hole presentation	25

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 3: Packaging of surface mount components
on continuous tapes**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

This fourth edition cancels and replaces the third edition issued in 1997. It constitutes a technical revision.

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

- a) implementation of Type IV (adhesive-backed punched plastic carrier tape for singulated bare die and other surface mount components);
- b) minor revisions related to tables, figures and references.

The text of this standard is based on the following documents:

FDIS	Report on voting
40/1838/FDIS	40/1847/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all the parts of the IEC 60286 series, under the general title *Packaging of components for automatic handling*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

A bilingual version of this publication may be issued at a later date

Withdrawn
iTech Standards
(<https://standards.iteh.ai>)
Document Preview

IEC 60286-3:2007

<https://standards.iteh.ai/standards/iec/4633ccb0-d98d-4393-89b3-6278982adf81/iec-60286-3-2007>

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 3: Packaging of surface mount components on continuous tapes

INTRODUCTION

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

1 General

1.1 Scope

This part of IEC 60286 is applicable to the tape packaging of electronic components without leads or with lead stumps which are 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 standard also includes requirements related to the packaging of singulated die products including bare die and bumped die (flip chips).

1.2 Normative references

The following referenced documents are indispensable for the application 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 60191-2:1966, *Mechanical standardization of semiconductor devices – Part 2: Dimensions*

IEC 61340-5-1:1998, *Electrostatics – Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements*

IEC 61340-5-2:1999, *Electrostatics – Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide*

IEC 62258-3:2005, *Semiconductor die products – Part 3: Recommendations for good practice in handling, packing and storage*

ISO/IEC 16388:1999, *Information technology – Automatic identification and data capture techniques – Bar code symbology specifications – Code 39*

ISO 11469:2000, *Plastics – Generic identification and marking of plastics products*

2 Terms and definitions

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

2.1 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 Structure of the specification

The various types of tapes are as follows.

- Type I - Punched carrier tape, with top and bottom cover tape (8 mm and 12 mm)
- Type II - Blister carrier tape, with single sprocket holes (8 mm, 12 mm, 16 mm and 24 mm)
- Type III - Blister carrier tape, with double sprocket holes (32 mm to 200 mm)
- Type IV - Adhesive-backed punched plastic carrier tape for singulated bare die and other surface mount components
- Type V - Continuous pressed carrier tapes (in development)
- Type VI - Blister carrier tapes 4 mm in width (in development)

All dimensions in the tables are in millimetres.

3.1 Type I – Punched carrier tape, with top and bottom cover tape (8 mm and 12 mm)

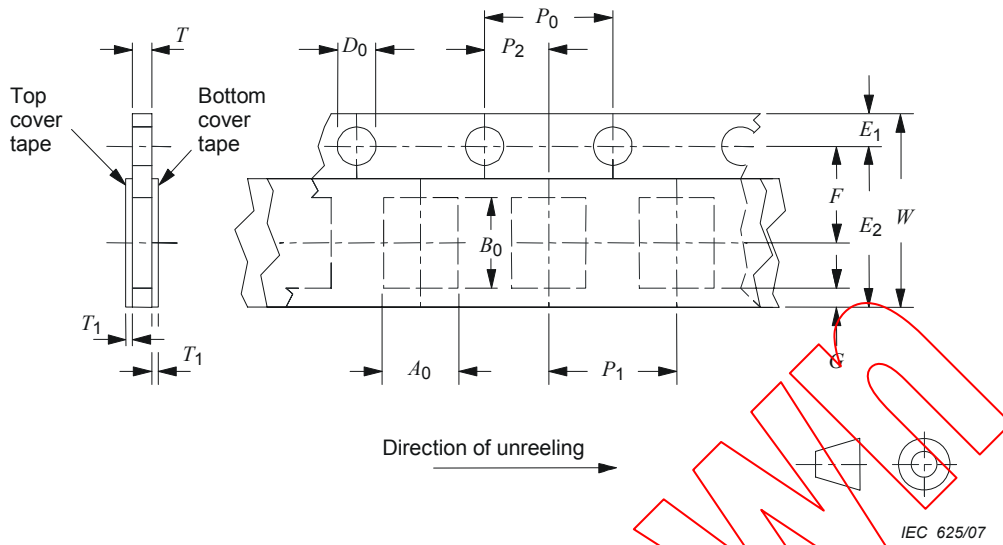


Figure 1 – 8 mm and 12 mm punched carrier-tape dimensions

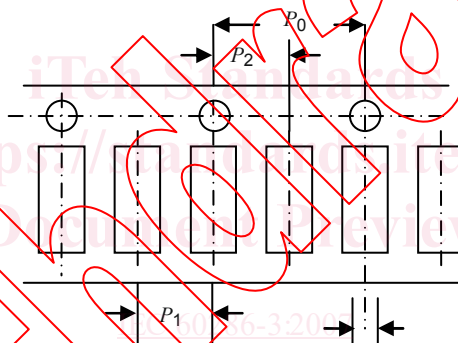


Figure 2 – Illustration of 2 mm cavity pitch

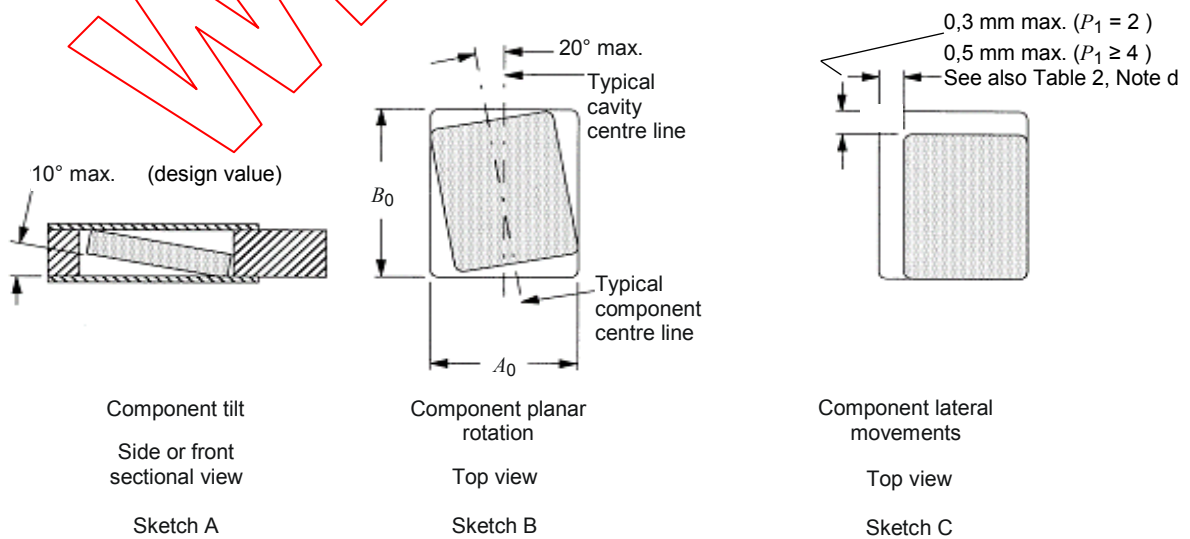


Figure 3 – Maximum component tilt, rotation and lateral movement

Table 1 – Constant dimensions of 8 mm and 12 mm punched carrier tape

Tape size	D_0	E_1	P_0	P_2	G_{\min}	T_{\max}	$T_{1\max}$	Cumulative pitch (over 10 pitches)
8 and 12	$1,5^{+0,1}_0$	$1,75 \pm 0,1$	$4,0 \pm 0,1$ ($P_1 \geq 4$) $4,0 \pm 0,05$ ($P_1 = 2$)	$2,0 \pm 0,05$	0,75	1,1 paper 1,6 non-paper	0,1	$\pm 0,2$

Table 2 – Variable dimensions of 8 mm and 12 mm punched carrier tape

Tape size	$E_{2\min}$	F	P_1	W	A_0, B_0, T
8	6,25	$3,5 \pm 0,05$	$4,0 \pm 0,1$ ($P_1 \geq 4$) $2,0 \pm 0,05$ ($P_1 = 2$)	$8,0^{+0,3}_{-0,1}$	See note
12	10,25	$5,5 \pm 0,05$	$4,0 \pm 0,1$ ($P_1 \geq 4$) $2,0 \pm 0,05$ ($P_1 = 2$)	$12,0^{+0,3}_{-0,1}$	

NOTE The nominal dimensions of the component compartment should be derived from the relevant component specification. The tolerances on the nominal dimensions of the compartment should be chosen so that the components cannot change their orientation within the tape and can be easily removed from the tape, with the following characteristics.

There shall be sufficient clearance surrounding the component so that

- the component does not protrude beyond either surface of the carrier tape;
- the component can be removed from the cavity in a vertical direction without mechanical restriction after the top cover tape has been removed;
- the rotation of the component is limited to a 10° max. tilt (see Figure 3, sketch A) and a 20° max. planar rotation (see Figure 3, sketch B);
- the lateral movement of the component is restricted to 0,5 mm max. ($P_1 \geq 4$), 0,3 mm max. ($P_1 = 2$) (see Figure 3, sketch C).

For components with either length or width dimensions of less than 1,2 mm, market trends are towards a planar rotation limit of 10° max. and a lateral movement of 0,2 mm max. and a component rotation depends on the agreement between suppliers and users. See also Clause 6 for die products.

For defined component positioning, the pocket positions should be defined to an origin point; in this case, the index hole. Pockets should be positioned relative to this hole.

Preferred dimensions for components should be taken from the relevant IEC specifications.

Dimensions $A_0 \leq B_0$