



IEC 60286-2

Edition 3.0 2008-03

# INTERNATIONAL STANDARD

---

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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE



---

ICS 31.020; 31.240

ISBN 2-8318-9546-4

## CONTENTS

FOREWORD.....	5
1 General .....	7
1.1 Scope.....	7
1.2 Normative references .....	7
2 Terms and definitions .....	7
3 Dimensions .....	8
3.1 Dimensions common to tapes and taped components.....	8
3.1.1 Coordinate system.....	8
3.1.2 Tape width.....	9
3.1.3 Pitches of components and sprocket holes .....	9
3.1.4 Dimensions of either components position from abscissa .....	10
3.1.5 Diameter $d$ of lead terminal and tape thickness.....	11
3.1.6 Maximum permissible deviation .....	12
3.1.7 Maximum permissible protrusion of the ends of the leads (see Figure 2) ...	12
3.2 Dimensions common to tapes and taped components with two leads.....	12
3.2.1 Lead spacing $F$ of components .....	12
3.2.2 Tolerance on lead spacing $F$ .....	12
3.3 Dimensions common to tapes and taped components with three leads .....	13
3.3.1 Lead spacing $F_1$ and $F_2$ of components .....	13
3.3.2 Tolerance on lead spacing $F_1$ and $F_2$ .....	13
3.3.3 Distance $P_2$ .....	13
3.4 Dimensions common to tapes and taped components with short terminal without tape.....	13
3.4.1 Type of taping with short terminal without tape .....	13
3.4.2 Distance $H_2$ .....	14
3.4.3 Distance $K$ .....	14
3.4.4 Diameter $d_1$ of short terminal without tape.....	14
3.4.5 Position and tolerance of short terminal without tape .....	15
4 Taping.....	15
4.1 Dimensions of taping.....	15
4.2 Splices .....	15
4.3 Leader and trailer of tape .....	15
5 Performance of tape.....	16
5.1 Polarity direction on tape.....	16
5.2 Kinks or bends on tape.....	16
5.3 Pull strength from taping and peel strength of cover tape .....	16
5.4 Break force of tape.....	17
5.5 Material of tape .....	17
5.6 Hold-down tape .....	17
5.7 Storage .....	17
5.8 Missing components.....	17
6 Packing .....	18
6.1 Dimensions of the reel.....	18
6.1.1 Protection of components .....	20
6.1.2 Reel filling .....	20

6.2	Dimensions of the fan-fold container .....	20
6.3	Recycling .....	20
6.4	Marking .....	20
Annex A (informative)	Dimensions for two formed leads, sprocket hole between parts .....	22
Annex B (informative)	Dimensions for two formed leads, sprocket hole between leads .....	24
Annex C (informative)	Dimensions for two straight leads, sprocket hole between parts .....	26
Annex D (informative)	Dimensions for two straight leads, sprocket hole between leads .....	28
Annex E (informative)	Dimensions for three formed leads, sprocket hole between parts .....	30
Annex F (informative)	Dimensions for three formed leads, sprocket hole between leads .....	32
Figure 1	– Short terminal without tape .....	8
Figure 2	– Dimensions common to tapes and taped components .....	8
Figure 3	– Coordinate system .....	9
Figure 4	– Pitches of components sprocket holes .....	10
Figure 5	– Reference plane .....	11
Figure 6	– Diameter $d$ of lead terminal and thickness and maximum permissible deviation .....	11
Figure 7	– Dimensions common to tapes and taped components with two leads .....	12
Figure 8	– Dimensions common to tapes and taped components with three leads .....	13
Figure 9	– Single line for carrier tape with short terminal without tape .....	13
Figure 10	– Double line for carrier tape with short terminal without tape .....	14
Figure 11	– Position and tolerance of short terminal without tape .....	15
Figure 12	– Leader and trailer of tape .....	16
Figure 13	– Pull strength from taping and peel strength of cover tape .....	16
Figure 14	– Missing components .....	18
Figure 15	– Reel dimensions .....	19
Figure 16	– Reeling .....	19
Figure 17	– Outer dimensions for a fan-fold arrangement .....	20
Figure A.1	– Dimensions for two formed leads, sprocket hole between parts .....	22
Figure B.1	– Dimensions for two formed leads, sprocket hole between leads .....	24
Figure C.1	– Dimensions for two straight leads, sprocket hole between parts .....	26
Figure D.1	– Dimensions for two straight leads, sprocket hole between leads .....	28
Figure E.1	– Dimensions for three formed leads, sprocket hole between parts .....	30
Figure F.1	– Dimensions for three formed leads, sprocket hole between leads .....	32
Table 1	– Dimensions common to tapes and taped components with short terminal without tape .....	14
Table 2	– Reel dimensions and unit dimensions .....	19
Table 3	– Outer dimensions for a fan-fold arrangement .....	20
Table A.1	– Dimensions for two formed leads, sprocket hole between parts .....	23
Table B.1	– Dimensions for two formed leads, sprocket hole between leads .....	25
Table C.1	– Dimensions for two straight leads, sprocket hole between parts .....	27

Table D.1 – Dimensions for two straight leads, sprocket hole between leads .....	29
Table E.1 – Dimensions for three formed leads, sprocket hole between parts .....	31
Table F.1 – Dimensions for three formed leads, sprocket hole between leads .....	33

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –****Part 2: Packaging of components with unidirectional leads 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 60286-2 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This third edition cancels and replaces the second edition published in 1997 and its amendment 1 (2002) and constitutes a minor revision related to tables, figures and references.

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

FDIS	Report on voting
40/1870/FDIS	40/1887/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.

A 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

## **PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**

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

#### **1 General**

##### **1.1 Scope**

This part of IEC 60286 applies to the packaging of components with two or more unidirectional leads for use in electronic equipment. In general, the tape is applied to the component leads.

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.

##### **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 60097, *Grid systems for printed circuits*

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

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

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