To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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Standard Linear IC

Standard Taping and Magazine Specifications

1. Delivery Format and Quantity

Renesas supports the following packing specifications to handle the automatic assembly equipment used by end-product manufacturers.

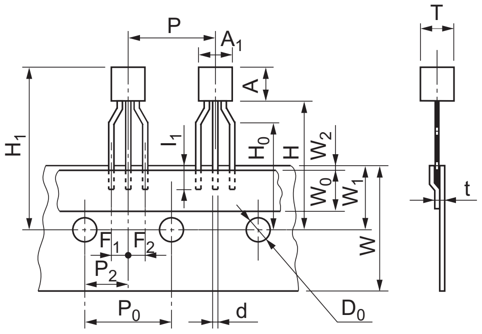
Table 1 Delivery Format and Quantity

Package	Delivery Format	Quantity
TO-92MOD	Radial taping packing (Fan-fold box)	2,500 units per box
TO-92	Radial taping packing (Fan-fold box)	2,500 units per box
SOP	Taping packing	2,000 units per reel (2,500 units per reel)
TSSOP	Taping packing (reel packing)	2,000 units per reel (3,000 units per reel)
UPAK	Horizontal magazine packing	25 units per magazine
	Taping packing (reel packing)	1,000 units per reel
MPAK-5	Taping packing (reel packing)	3,000 units per reel
MPAK	Taping packing (reel packing)	3,000 units per reel
CMPAK-5	Taping packing (reel packing)	3,000 units per reel

2. Radial Taping Packing Specifications (Conforms to the JEITA ET-7102 standard.) (TO-92MOD)

2.1 Taping Dimensions

These dimensions apply to both reel-wound and fan-folded packing.



Item	Symbol	Size (mm)	
		TO-92MOD	**TO-92**
Product width	A_1	5.2 Max	5.2 Max
Product height	A	8.5 Max	5.2 Max
Product thickness	T	4.2 Max	4.2 Max
Lead width	d	0.55 Typ*1	0.5 Typ*1
Mounting lead length	l_1	2.5*3	2.5*3
Inter-product pitch	P	12.7 Typ	12.7 Typ
Sprocket hole pitch	P_0	12.7 Typ*2	12.7 Typ*2
Sprocket hole position	P_2	6.35 Typ	6.35 Typ
Lead spacing	F_1	2.5 Typ	2.5 Typ
Lead spacing	F_2	2.5 Typ	2.5 Typ
Tape width	W	18.0 Typ	18.0 Typ
Mounting tape width	W_0	6.0 Typ	6.0 Typ
Sprocket hole position	W_1	9.0 Typ	9.0 Typ
Mounting tape width	W_2	0.5*3	0.5*3
Lead clinch height	H_0	16.0 Typ	16.0 Typ
Product upper surface position	H_1	28.0 Max	24.7 Max
Sprocket hole diameter	D_0	4.0 Typ	4.0 Typ
Tape thickness (total thickness)	t	0.7 Typ	0.7 Typ
Product lower surface position	H	19.0 Typ	19.0 Typ

Notes: 1. Thickness: 0.5 mm Typ
2. Cumulative pitch error: ±1 mm/ 20 pitches
3. Reference value

Figure 1 Radial Taping Dimensions

3. TO-92 and TO-92MOD Taping Specifications

3.1 Used Parts

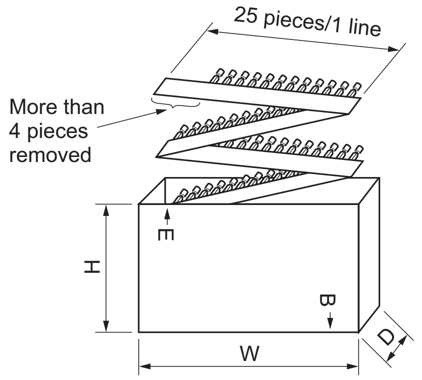
- Taping IC
- Mounting paper
- Adhesive tape
- Corrugated cardboard box

3.2 Quantity

- 2,500 units per box (Typ)

3.3 Fan-Folded Packing Specifications

1. Radial taping packing specifications are adopted. Tape is folded at the length of 25 ICs.
2. At the start and the end of the tape more than 4 pieces are removed.



Unit : mm

Package	W	H	D
TO-92	330	200	43
TO-92MOD	336	262	47

Marking
1. Product name, grade
2. Quantity
3. Lot No.
4. Fan-Fold Box have the former electrode marks with arrows.
   (E: Pin 1, B: Pin 3)

Figure 2 Fan-Folded Box Dimensions and Appearance

3.4 Missing Products

- Consecutive missing products shall be confined to no more than three.

3.5 Splicing

- After cutting, tapes are spliced (in case of completion or cut of tape) by splicing tape as shown figure 3.

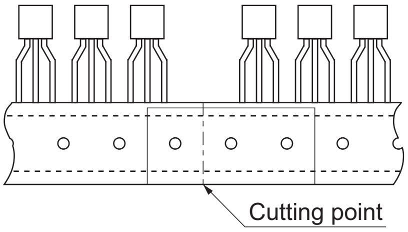
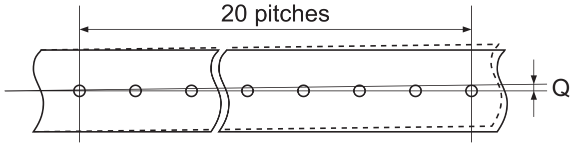


Figure 3 Splicing

- Point of splicing
  1. Cutting method of the tape
     In splicing, edge of tapes shall be cut at the center between hole and hole after putting one tape upon another tape.
  2. Splicing of the tape
     After cutting, splice the tapes as shown in the preceding clause.

Notes: 1. In cutting, holes shall not be cut.
2. Splicing tape will be located on the opposite side of the parts.
3. Splicing tape length is longer than three pitches.
4. After splicing, total tape thickness is less than 1.5 mm.
5. Splicing tape does not fill holes.

- Tolerance of splicing



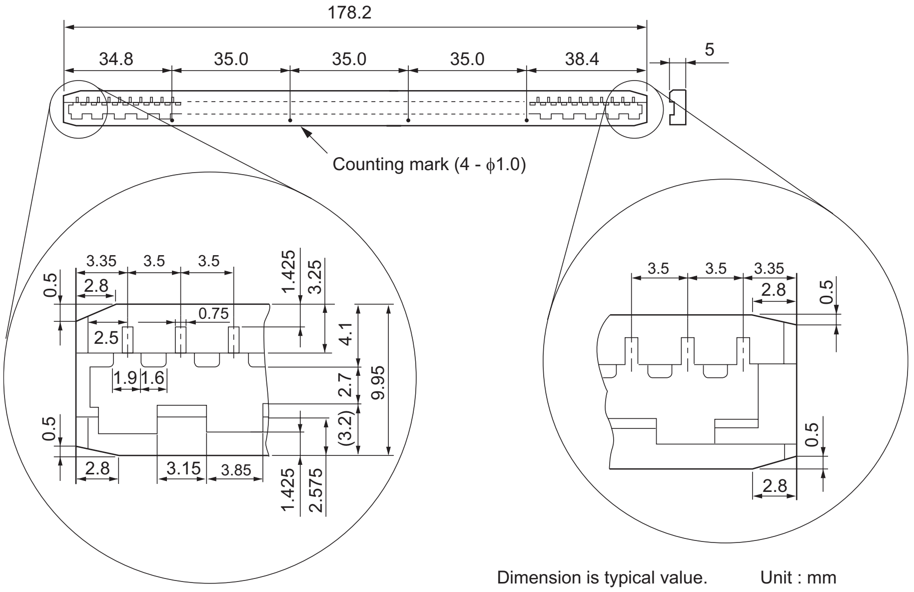
Notes: 1. The splice must be made so that the dimension "Q" shown above shall not be more than 1.0 mm over a length of 20 pitches.
2. Dimensions other than shown above are defined in the dimension specification of radial taping packing specifications attached.

Figure 4 Tolerance of Splicing

4. UPAK Embossed Taping Packing Specifications

4.1 UPAK Horizontal Magazine Packing Specifications

The UPAK package was designed for the horizontal magazine packing format, and thus there is no special identification code for the magazine packing format for UPAK products.



Dimension is typical value. Unit : mm

Figure 5 UPAK Horizontal Magazine Dimensions

4.2 UPAK Taping Specifications

- Leader tape section and empty tape section

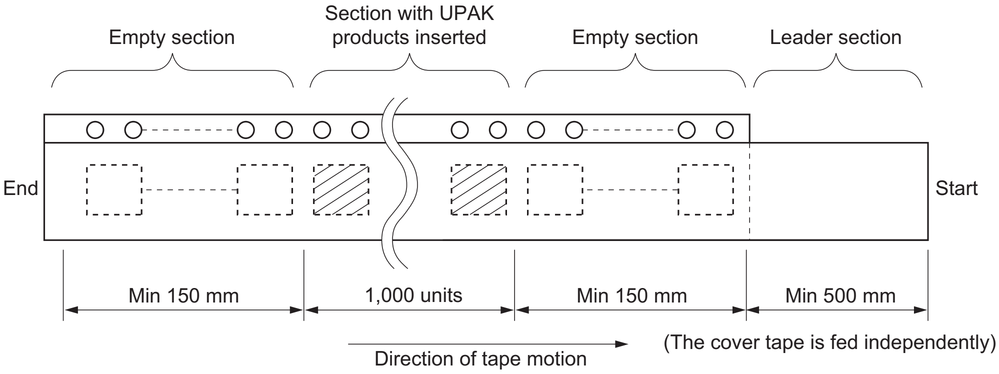


Figure 6 Leader Tape Section and Empty Tape Section

- Taping direction

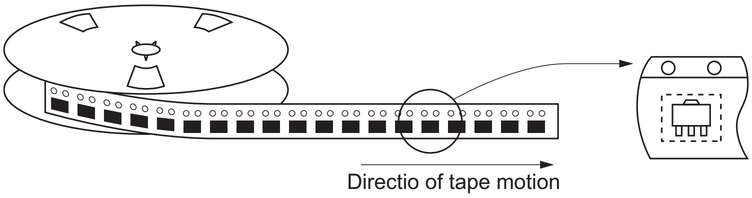


Figure 7 Taping Direction

- Product insertion
  As shown in figure 8, products are inserted with the printed side up and the mounting side down.

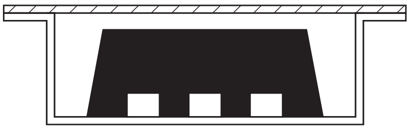
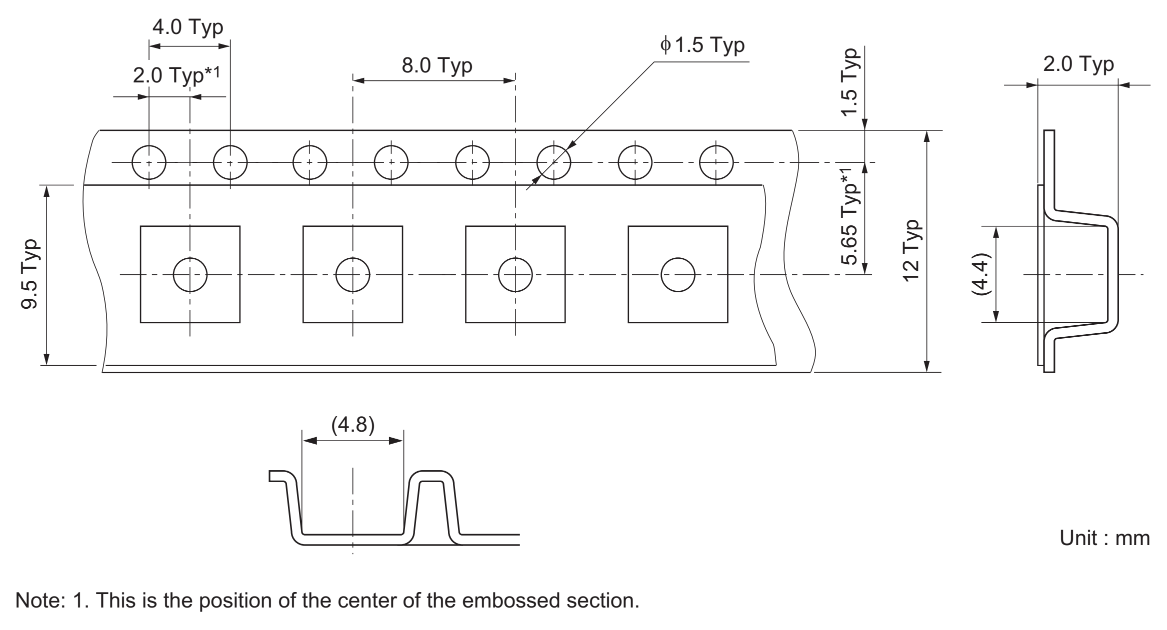


Figure 8 Product Insertion Example

- Missing ICs
  No more than 2 ICs will be missing in a single reel, and there will never be two adjacent missing ICs.

4.3 UPAK Tape Specifications

- Form and dimensions

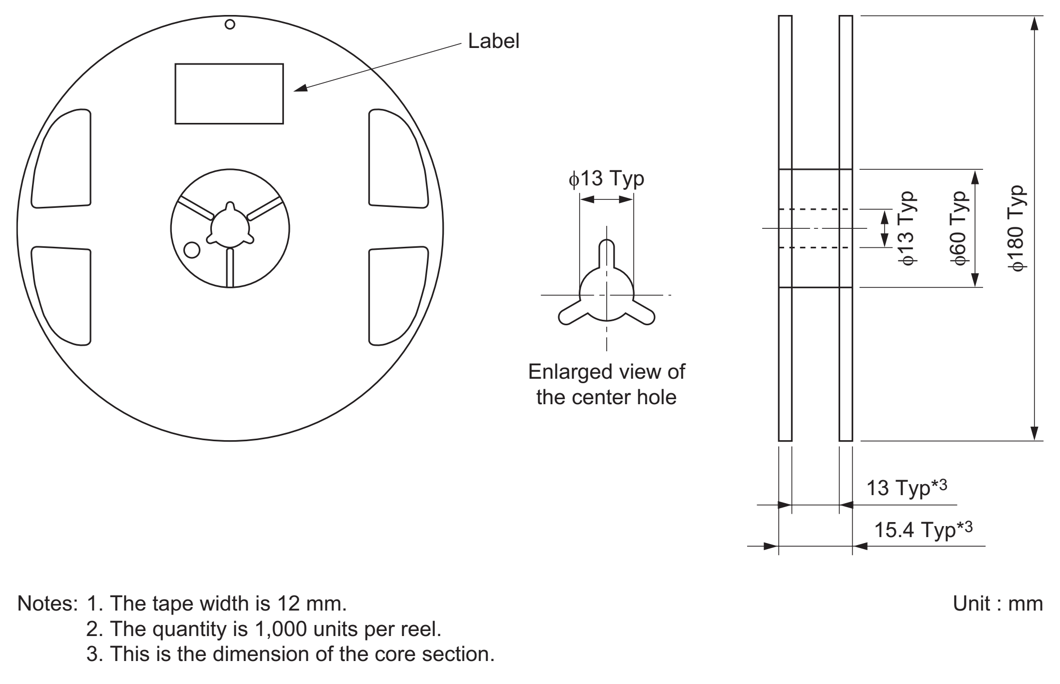


Note: 1. This is the position of the center of the embossed section.

Figure 9 Tape Dimensions (UPAK)

4.4 UPAK Reel Specifications

- Form and dimensions



Notes: 1. The tape width is 12 mm.
2. The quantity is 1,000 units per reel.
3. This is the dimension of the core section.

Figure 10 Reel Dimensions (UPAK)

5. MPAK-5 Embossed Taping Packing Specifications

5.1 MPAK-5 Taping Specifications

- Leader tape section and empty tape section

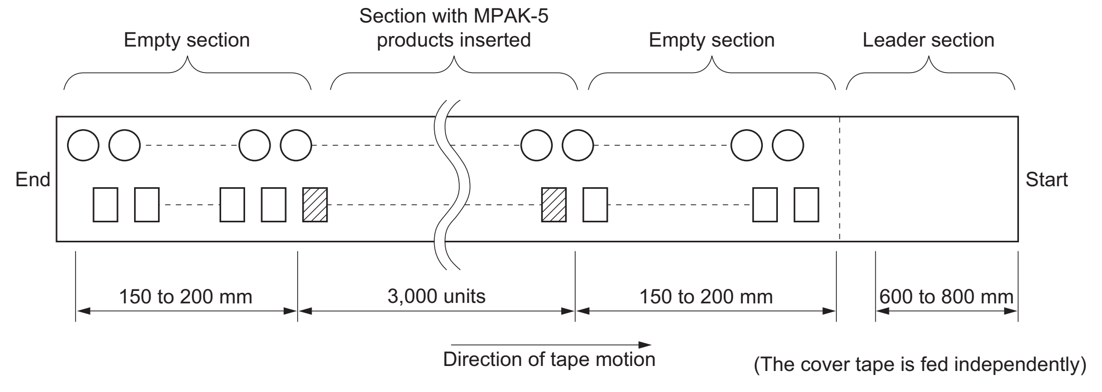


Figure 11 Leader Tape Section and Empty Tape Section

- Taping direction
  It packs up so that pin 1 may come to right side toward the direction of a drawer of a tape.

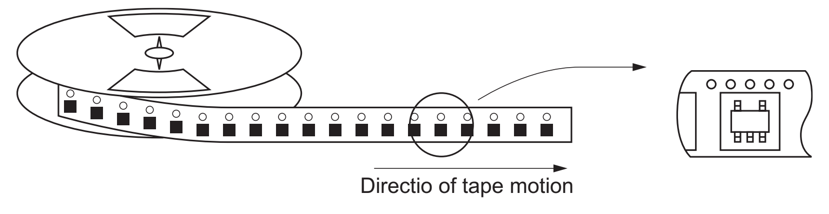


Figure 12 Taping Direction

- Product insertion
  As shown in figure 13, products are inserted with the printed side up and the mounting side down.

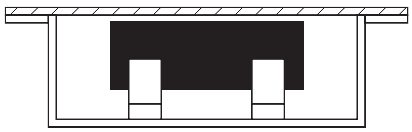
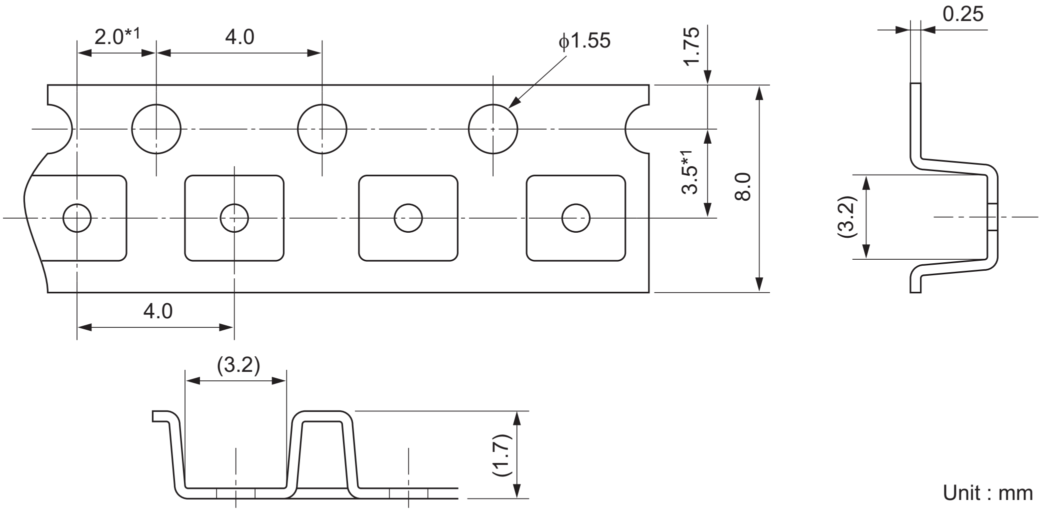


Figure 13 Product Insertion Example

- Missing ICs
  The number of missing ICs shall not exceed 0.2% of the total. However, there shall be no consecutive missing ICs.

5.2 MPAK-5 Tape Specifications

- Form and dimensions



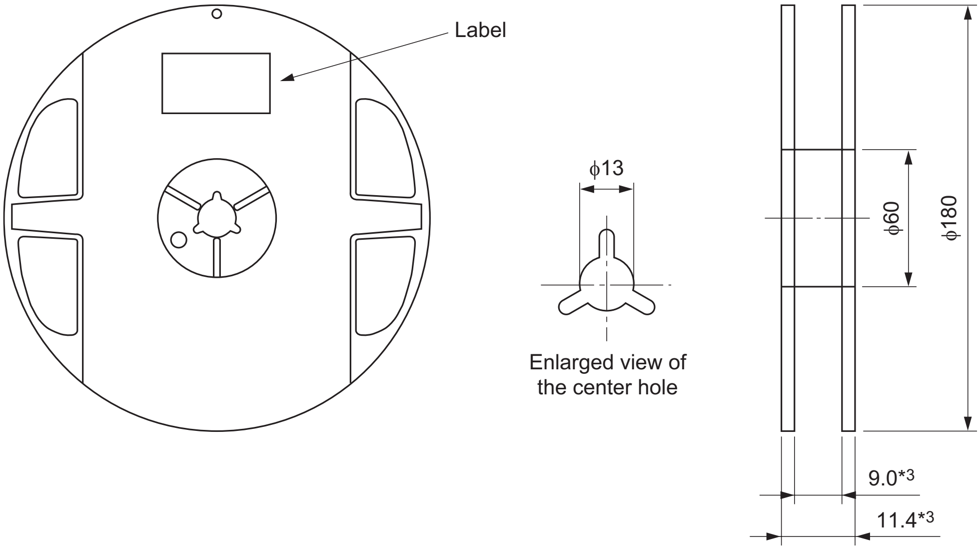
Unit : mm

Note: 1. This is the position of the center of the embossed section.

Figure 14 Tape Dimensions (MPAK-5)

5.3 MPAK-5 Reel Specifications

- Form and dimensions



Notes: 1. The tape width is 8 mm.
2. The quantity is 3,000 units per reel.
3. This is the dimension of the core section.

Unit : mm

Figure 15 Reel Dimensions (MPAK-5)

6. SOP Embossed Taping Packing Specifications

6.1 SOP Taping Specifications

- Leader tape section and empty tape section

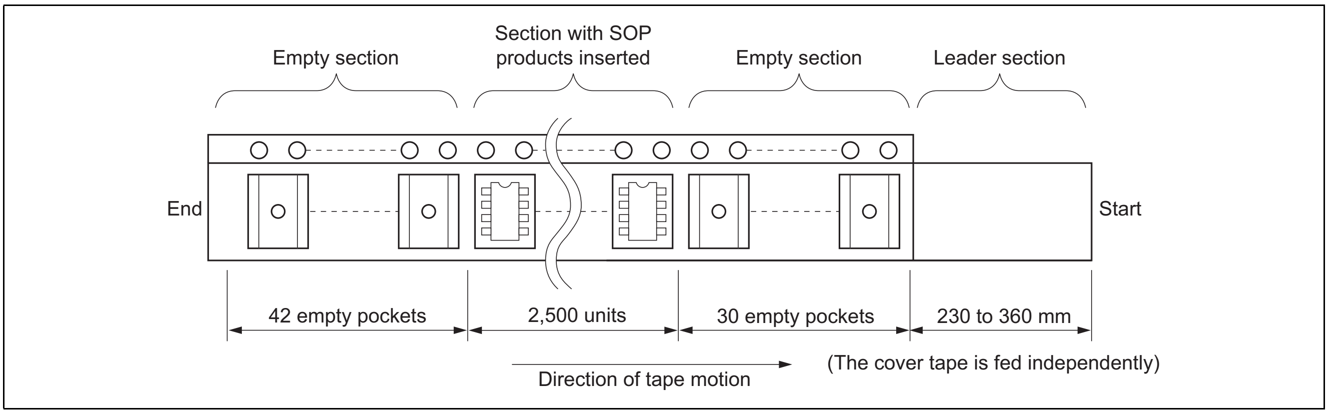


Figure 16 Leader Tape Section and Empty Tape Section

- Taping direction

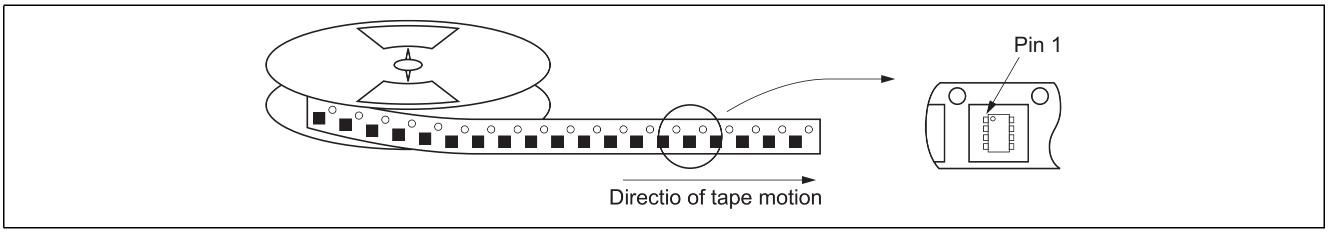


Figure 17 Taping Direction

- Product insertion
  As shown in figure 18, products are inserted with the printed side up and the mounting side down.

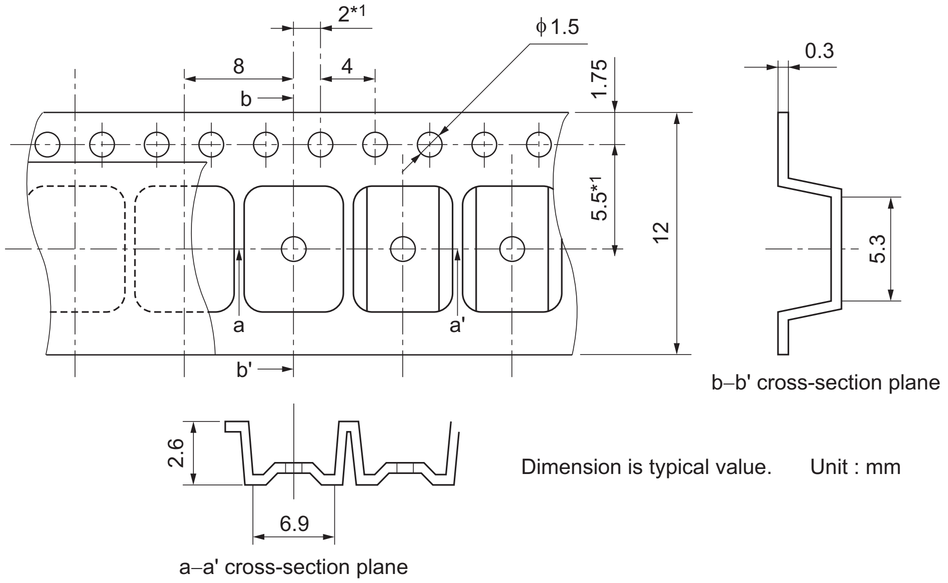
Figure 18 Product Insertion Example

- Missing ICs
  No more than 4 ICs will be missing in a single reel, and there will never be two adjacent missing ICs.

6.2 SOP Tape Specifications

- Form and dimensions

• SOP-8 products (FP-8D, FP-8DC)

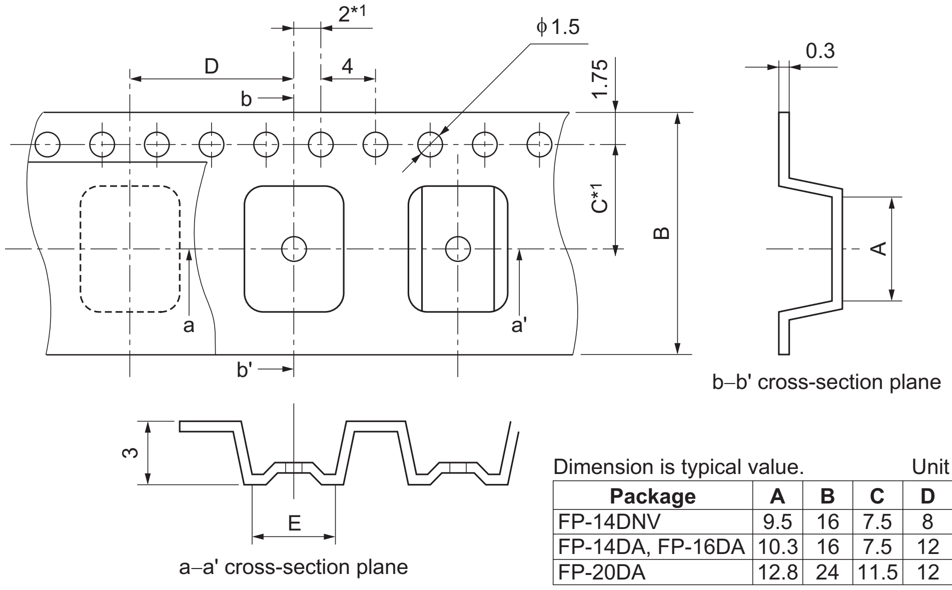


Dimension is typical value. Unit : mm

Note: 1. This is the position of the center of the embossed section.

Figure 19 Tape Dimensions (SOP-8)

• SOP-14, 16, 20 products (FP-14DA, FP-14DNV, FP-16DA, FP-20DA)



Dimension is typical value. Unit : mm

Package	A	B	C	D	E
FP-14DNV	9.5	16	7.5	8	6.8
FP-14DA, FP-16DA	10.3	16	7.5	12	8.8
FP-20DA	12.8	24	11.5	12	8.8

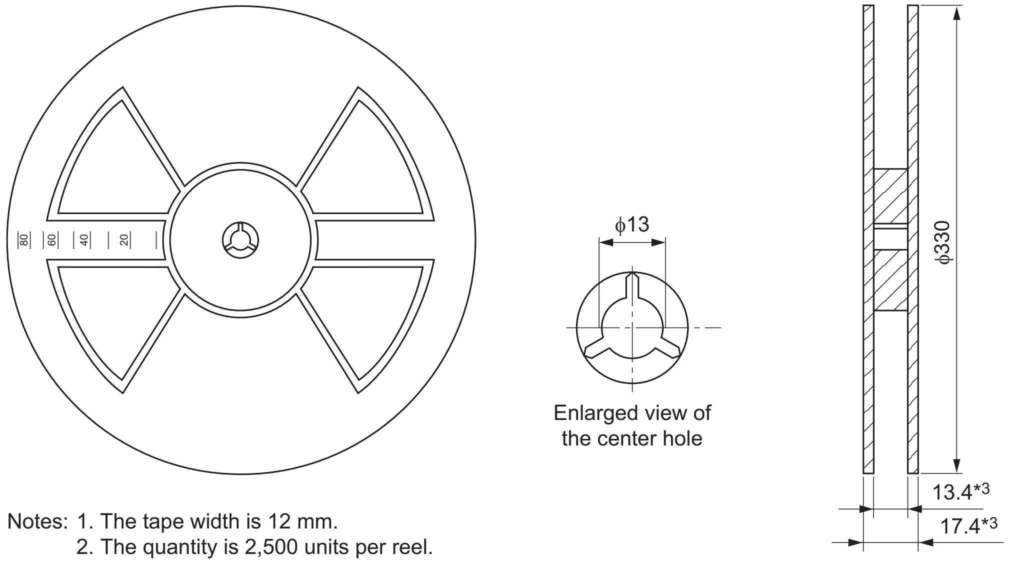
Note: 1. This is the position of the center of the embossed section.

Figure 20 Tape Dimensions (SOP-14, 16, and 20)

6.3 SOP Reel Specifications

- Form and dimensions

• SOP-8 products (FP-8D, FP-8DC)

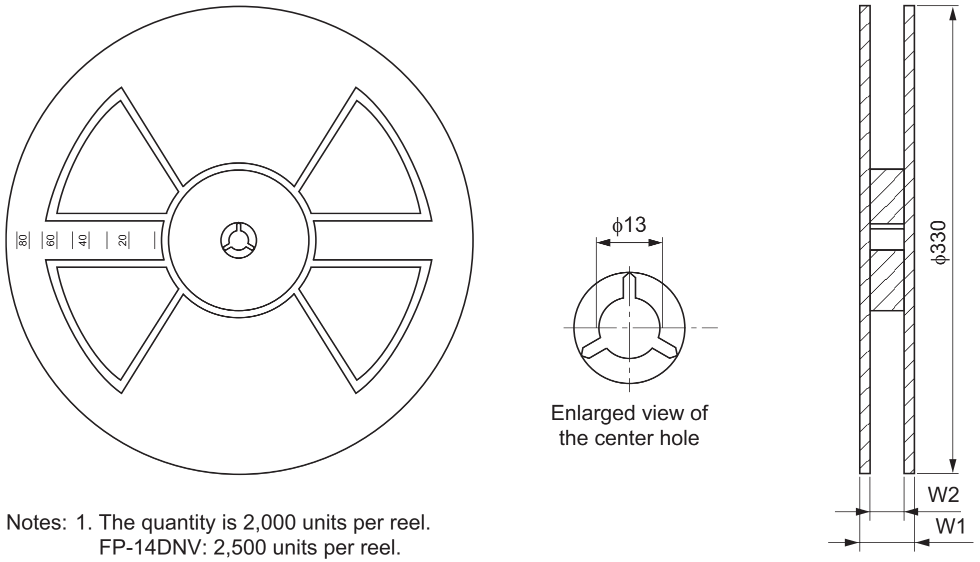


Notes: 1. The tape width is 12 mm.
2. The quantity is 2,500 units per reel.
3. This is the dimension of the core section.

Dimension is typical value. Unit : mm

Figure 21 Reel Dimensions (SOP-8)

• SOP-14, 16, 20 products (FP-14DA, FP-14DNV, FP-16DA, FP-20DA)



Notes: 1. The quantity is 2,000 units per reel.
FP-14DNV: 2,500 units per reel.
2. This is the dimension of the core section.

Dimension is typical value. Unit : mm

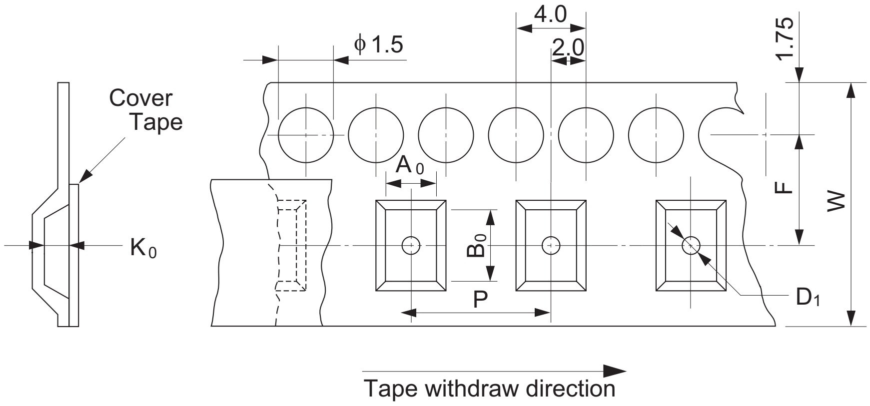
Package	Tape Width	W1	W2
FP-14DA, FP-14DNV, FP-16DA	16	21.4	17.4
FP-20DA	24	29.4	25.4

Figure 22 Reel Dimensions (SOP-14, 16, and 20)

7. TSSOP Embossed Taping Packing Specifications

7.1 TSSOP Tape Specifications

- Form and dimensions

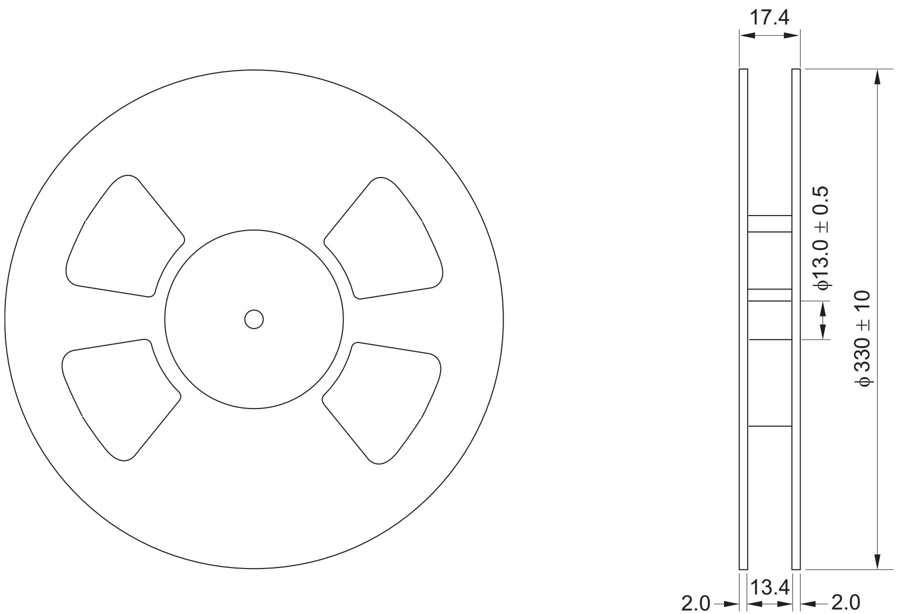


Package code	W	P	A0	B0	K0	F	D1	Maximum storage No.
TTP-8DA	12	8	6.9	3.6	1.7	5.5	1.5	3,000 IC/reel
TTP-14D	12	8	6.5	5.1	1.5	5.5	1.6	2,000 IC/reel

Figure 23 Tape Dimensions (TSSOP)

7.2 TSSOP Reel Specifications

- Form and dimensions



Notes: 1. The tape width is 12 mm.
2. The quantity is 2,000 units per reel.
TTP-8DA: 3,000 units per reel.
3. This is the dimension of the core section.

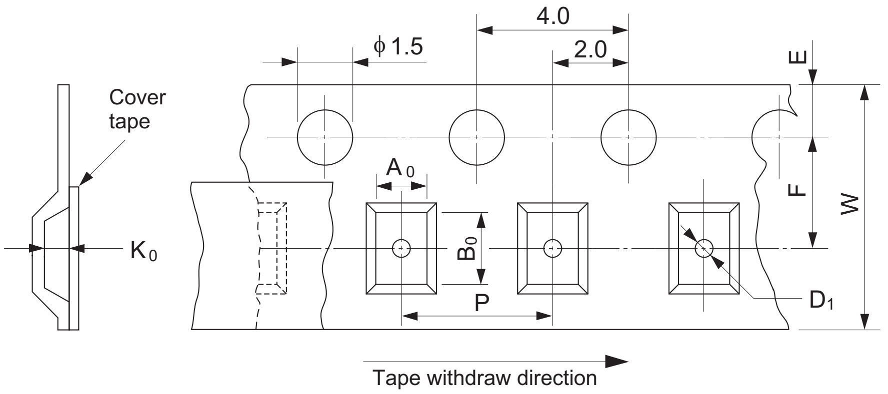
Dimension is typical value. Unit : mm

Figure 24 Reel Dimensions (TSSOP)

8. MPAK Embossed Taping Packing Specifications

8.1 MPAK Tape Specifications

- Form and dimensions

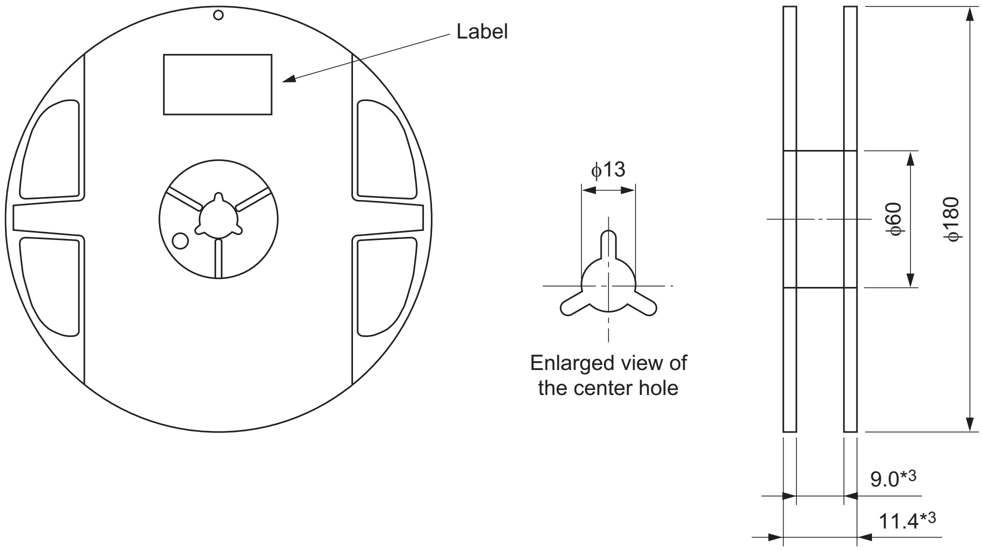


Package code	W	P	Ao	Bo	Ko	E	F	D1	Maximum storage No.
MPAK	8.0	4.0	3.1	3.2	1.25	1.75	3.5	1.1	3,000 IC/reel

Figure 25 Tape Dimensions (MPAK)

8.2 MPAK Reel Specifications

- Form and dimensions



Notes: 1. The tape width is 8 mm.
2. The quantity is 3,000 units per reel.
3. This is the dimension of the core section.

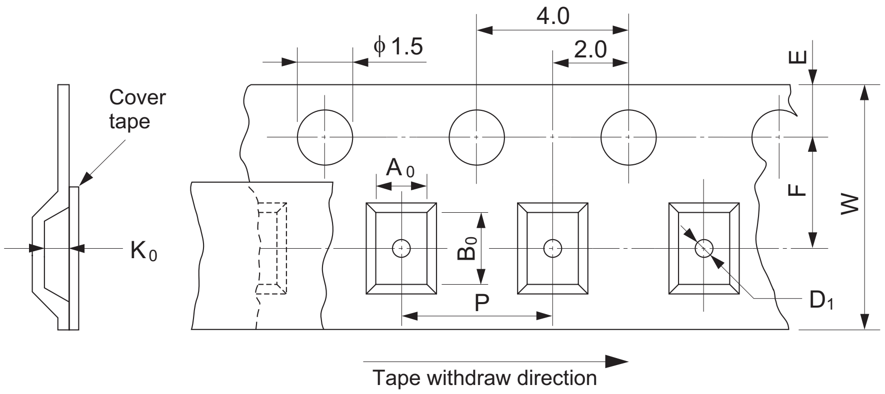
Unit : mm

Figure 26 Reel Dimensions (MPAK)

9. CMPAK-5 Embossed Taping Packing Specifications

9.1 CMPAK-5 Tape Specifications

- Form and dimensions

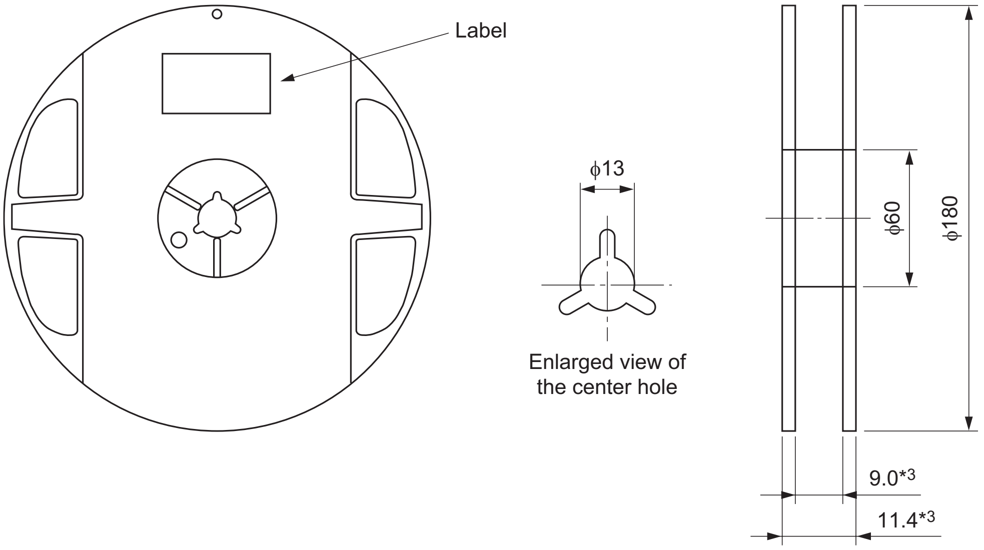


Package code	W	P	Ao	Bo	Ko	E	F	D1	Maximum storage No.
CMPAK-5	8.0	4.0	2.25	2.45	1.1	1.75	3.5	1.05	3,000 IC/reel

Figure 27 Tape Dimensions (CMPAK-5)

9.2 CMPAK-5 Reel Specifications

- Form and dimensions



Notes: 1. The tape width is 8 mm.
2. The quantity is 3,000 units per reel.
3. This is the dimension of the core section.

Unit : mm

Figure 28 Reel Dimensions (CMPAK-5)

Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Jul.28.04	—	First edition issued

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