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TN1206
Technical note

Tape and reel shipping media for STM8 and STM32 microcontrollers in QFP packages

Introduction

QFP packages can be supplied in tape and reel shipping media.

The reels have a 13” typical diameter.

The types of reel used are in plastic either anti static or conductive, with a black conductive cavity tape. The cover tape is transparent anti static or conductive.

The devices are positioned in the cavities with the identifying pin (normally Pin “1”) on the same side as the sprocket holes in the tape.

STMicroelectronics tape and reels are compliant with EIA 481 and IEC 60286-3 standard specifications.

Table 1 lists the QFP packages available for STM8 and STM32 microcontrollers, as well as the corresponding shipping media.

Table 1. QFP packages available in tape and reel packing

Package	Description	Package code	Reel diameter	Tape width	Tape pitch
TQFP 10x10	LQFP44 leads, 10x10x1.4 mm, 1.0 mm	4Y	13”	24 mm	16 mm
	LQFP64 leads, 10x10x1.4 mm, 1 mm	5W			
	LQFP52 leads, 10x10x1.4 mm	DC			
TQFP 14x14	LQFP100 leads, 14x14x1.4 mm 1 mm	1L		32 mm	24 mm
	LQFP64 leads, 14x14x1.4 mm, 1 mm	1R			
	LQFP80 leads, 14x14x1.4 mm, 1 mm	1S			
	LQFP128 leads, 14x14x1.4 mm, 1.0 mm	TC			
TQFP 20x20	LQFP144 leads, 20x20x1.4 mm, 2 mm	1A		44 mm	32 mm
TQFP 7x7	LQFP48 leads, 7x7x1.4 mm, 1 mm	5B		16 mm	12 mm
	LQFP32,leads, 7x7x1.4 mm, 1 mm	5V			

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1 Reel description

Figure 1. Reel diagram

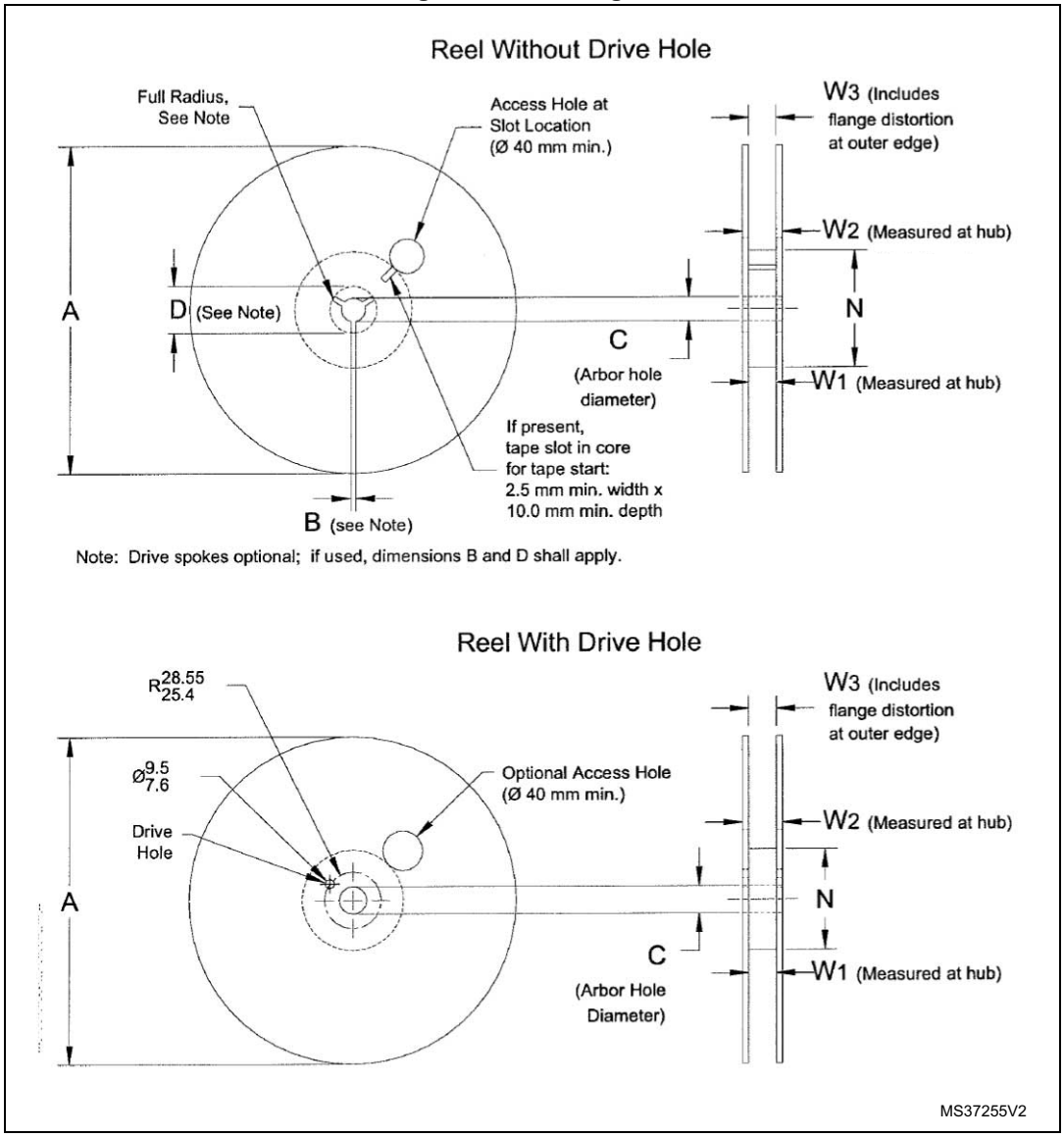


Table 2. Reel dimensions[1]

Reel size (inch)	Tape size (mm)	A max. (mm)	Reeds without drive hole			Reeds with drive hole			N(mm)	W1(mm)[2]	W2 max.(mm)
			B min. (mm)	C (mm)	D min.(mm)	B min.(mm)	C max.(mm)	D min.(mm)			
13	16	330	1.5	13.0+0.5/-0.2	20.2	NA	29.2	NA	100	16.4+2/-0	22.4
									178±5		
	24								100	24.4+2/-0	30.4
									178		
	32								100	32.4+2/-0	38.4
									178		
	44								150	44.4+2/-0	50.4
									170		
									177		

1. NA stands for “not applicable”.
2. W1 is measured at the hub.

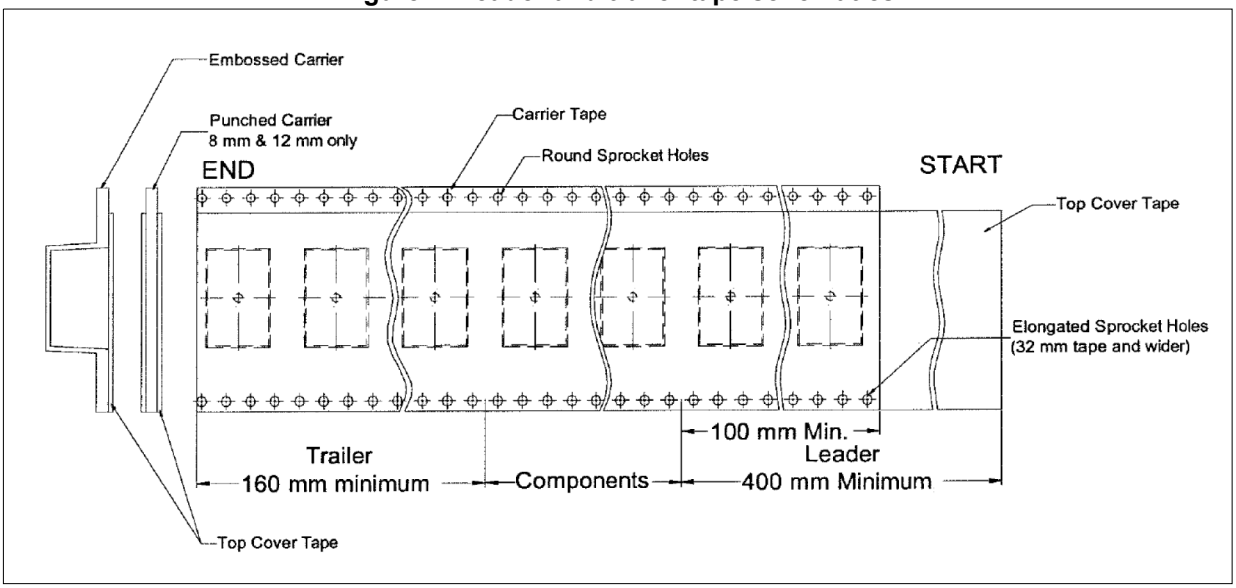
2 Leader and trailer tape specifications

The leader has a minimum width of 400 mm which includes at least 100 mm of carrier tape with empty cavities and sealed cover tape (see *Figure 2*). The leader tape is affixed to the last turn of carrier tape by using a transparent adhesive anti static or paper based tape of a width not higher than the one of the cover tape.

The trailer is a carrier tape which minimum width is 160 mm with empty cavities and sealed cover tape, as shown in *Figure 2*. The trailer tape must be affixed to the reel by using the tape slot of the reel hub.

During the unwinding operation, the entire carrier tape must be easily released from the reel hub as the last portion of the tape unwinds from the reel without damaging the carrier tape and the remaining components in the cavities.

Figure 2. Leader and trailer tape schematics



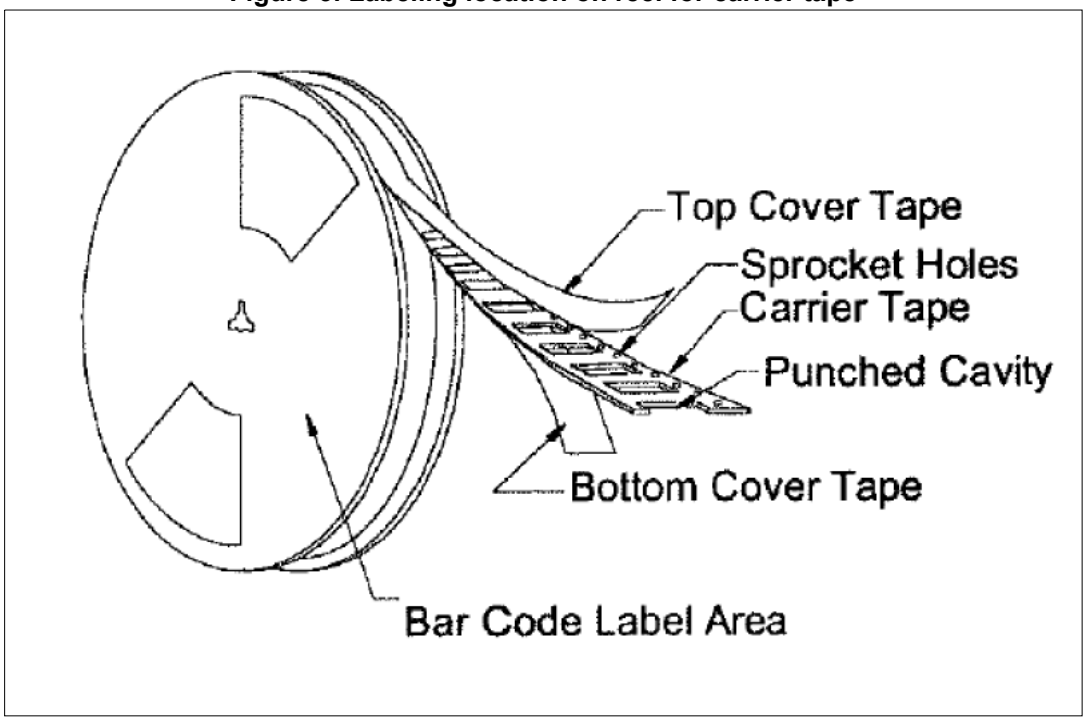
3 Labeling

STMicroelectronics “inner box” standard label is placed on each reel at the following locations:

- On the box that directly holds the reel
- On the damp proof bag if the units are dry packed
- On the reel itself

  The label is attached to the flange that is facing the user when the tape is extracted from the reel at the top right (see *Figure 3*).

Figure 3. Labeling location on reel for carrier tape

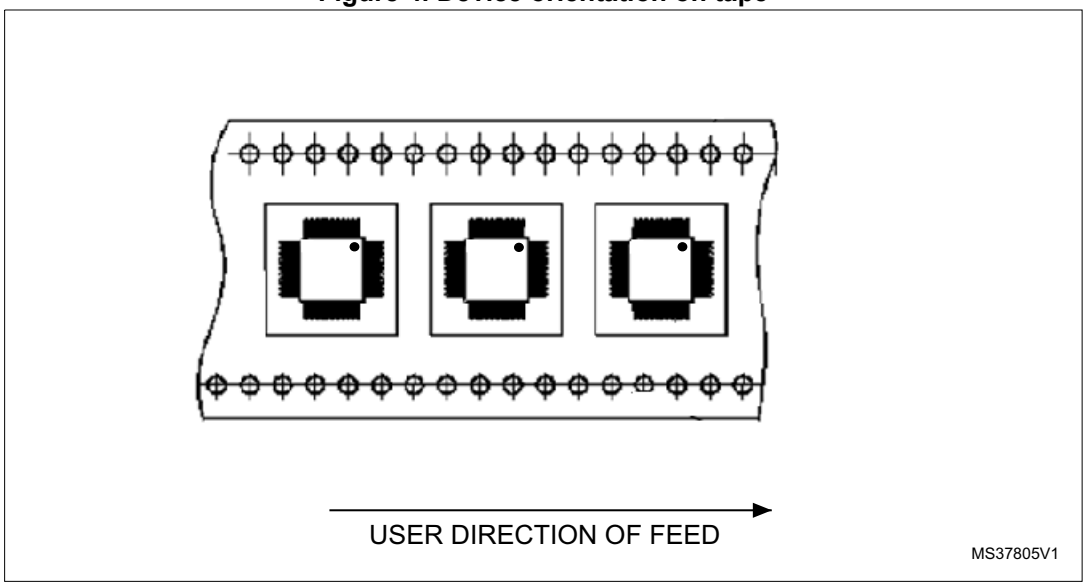


4 Device Orientation

The largest axis of the component outline is perpendicular to the tape length.

The device is positioned in the carrier tape cavity as shown in *Figure 4: Device orientation on tape*. Pin 1 is located on the top right corner of the package.

Figure 4. Device orientation on tape



5 Carrier tape mechanical dimensions

5.1 Carrier tape width ≤ 24 mm

Possible widths are 16 and 24 mm (refer to *Table 1: QFP packages available in tape and reel packing*).

Figure 5. Embossed carrier tape (width ≤ 24 mm)

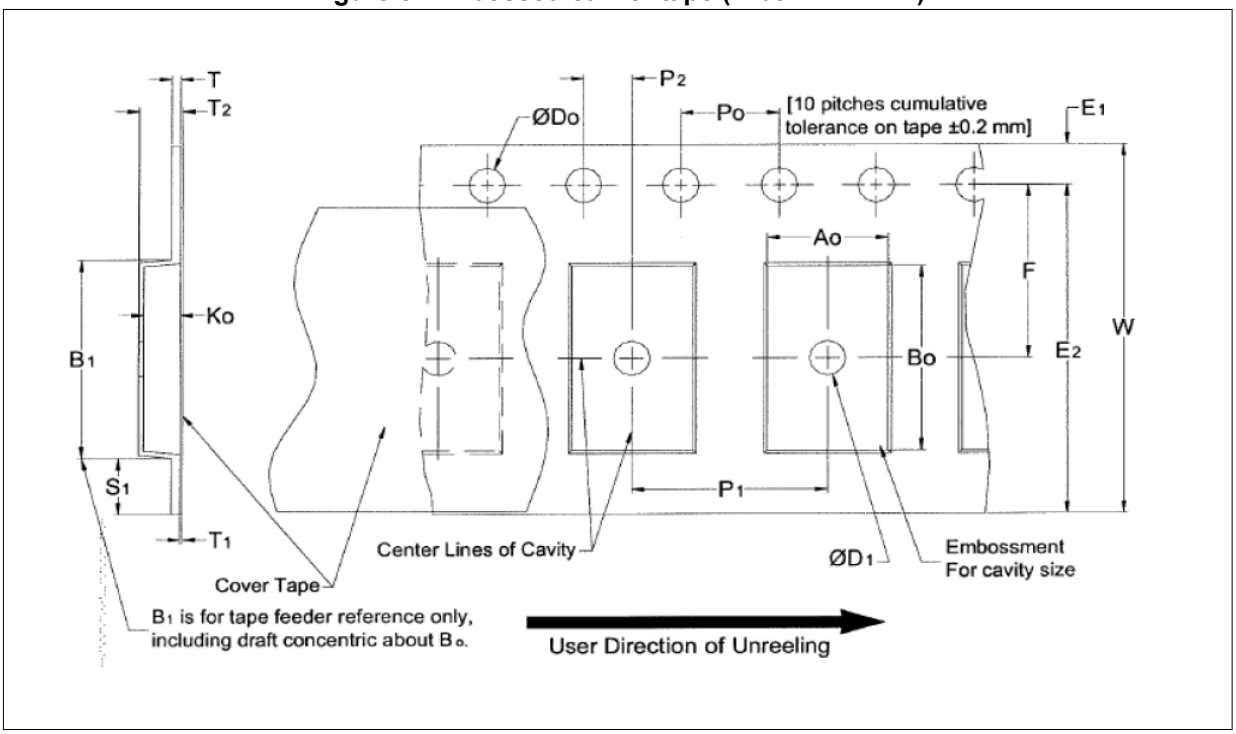


Table 3. Carrier tape constant dimensions (width ≤ 24 mm)

Tape width	D0	D1 min	E1	P0	P2	R(1)	S1	T max.	T1 max.	Unit
16 mm	1.5+0.1 /-0.0	1.5	1.75±0.1	4.0±0.1	2.0±0.1	30	0.6	0.6	0.1	mm
24 mm										

1. The maximum radius the tape with or without components can bend without damage is specified in *Section 6: Bending radius requirements*).

Table 4. Carrier tape variable dimensions (width ≤ 24 mm)

Tape width	B1	E2	F	P1	T2 max.	W max.	A0, B0, K0	Unit
16 mm	12.1	14.25	7.5±0.1	12.0±0.1	8.0	16.3	See (1)	mm
24 mm	20.1	22.25	11.5±0.1	16.0±0.1	12.0	24.3		

1. The cavity defined by A0, B0 and K0 surrounds the component with sufficient clearance so that:
   - The component does not protrude above the top surface of the carrier tape.
   - The component can be removed vertically from the cavity without mechanical restriction, after the top cover tape has been removed.
   - Rotation of the component is limited to 20° maximum for 12 mm tapes and to 10° maximum for 16 mm and 24mm tapes.
   - Lateral movements of the component are restricted to 1.0 mm maximum for 16 mm and 24 mm tapes.

5.2 Carrier tape width > 24 mm

Possible widths are 32 and 44 mm (refer to *Table 1: QFP packages available in tape and reel packing*).

Figure 6. Embossed carrier tape (width > 24 mm)

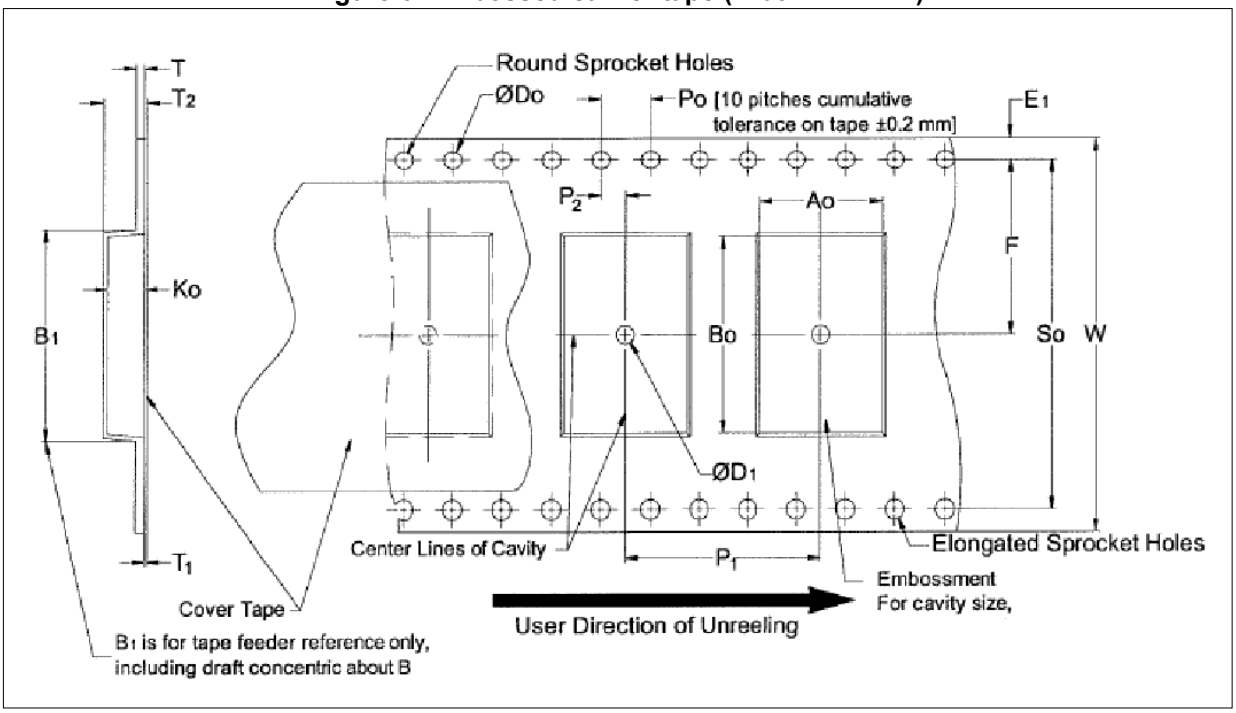


Table 5. Carrier tape constant dimensions (width > 24 mm)

Tape width	D0	D1 min	E1	P0	P2	R(1)	S1	T max.	T1 max.	Unit
32 mm	1.5+0.1-0.0	2.0	1.75±0.1	4.0±0.1	2.0±0.1	50	0.6	0.6	0.1	mm
44 mm					2.0±0.15					

1. The maximum radius the tape with or without components can bend without damage is specified in *Section 6: Bending radius requirements*).

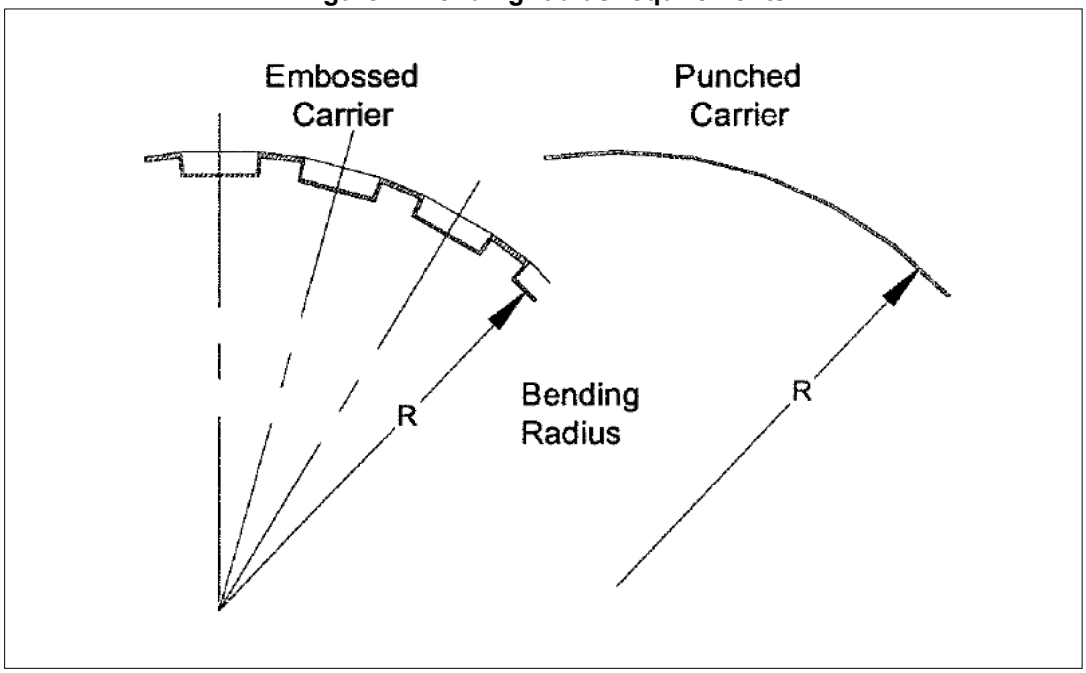
Table 6. Carrier tape variable dimensions (width > 24 mm)

Tape width	B1	F	P1	S0	T2 max.	W max.	A0, B0, K0	Unit
32 mm	23.0	14.2±0.10	24.0±0.1	28.4±0.1	12.0	32.0±0.3	See (1)	mm
44 mm	35.0	20.2±0.15	32.0±0.1	40.4±0.1	16.0	44.0±0.3		

1. The cavity defined by A0, B0 and K0 surrounds the component with sufficient clearance so that:
   - The component does not protrude above the top surface of the carrier tape.
   - The component can be removed vertically from the cavity without mechanical restriction, after the top cover tape has been removed.
   - Rotation of the component is limited to 10° maximum for 44 mm tapes.
   - Lateral movements of the component are restricted to 1.0 mm maximum.

6 Bending radius requirements

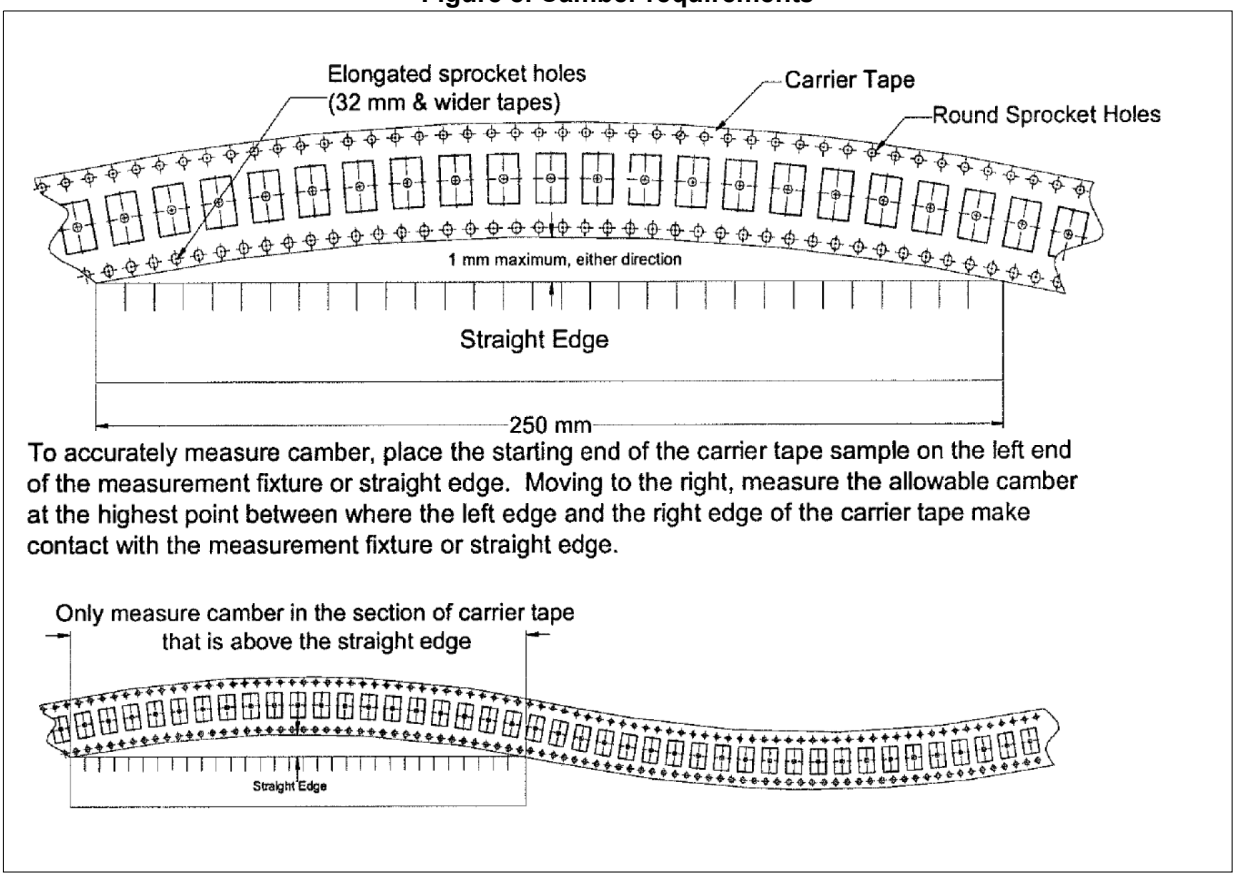
Figure 7. Bending radius requirements



7 Camber requirements

Carrier camber should not exceed more than 1 mm in 250 mm of carrier tape length.

Figure 8. Camber requirements



8 Revision history

Table 7. Document revision history

Date	Revision	Changes
19-Feb-2015	1	Initial release.
30-Mar-2015	2	Updated *Figure 4: Device orientation on tape*.
21-Apr-2015	3	Removed LQFP176 and LQFP208. Updated pin 1 location in *Section 4: Device Orientation*. Updated P1 dimension and note *1.* in *Table 4: Carrier tape variable dimensions (width ≤ 24 mm)*. Updated P1 dimension in *Table 6: Carrier tape variable dimensions (width > 24 mm)*.