Tape and reel shipping media for STM32 devices in BGA packages

Introduction

BGA 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 antistatic or conductive, with a black conductive cavity tape. The cover tape is transparent antistatic or conductive.

The devices are positioned in the cavities with the identifying ball (normally Ball “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 BGA packages available for STM32 devices, as well as the corresponding shipping media.

Table 1. BGA packages available in tape and reel packing

Package	Tape width	Tape pitch	Reel diameter
UFBGA 5 × 5	12 mm	8 mm	13”
TFBGA 5 × 5	12 mm	8 mm	
UFBGA 6 × 6	16 mm	12 mm	
VFBGA 6 × 6	16 mm	12 mm	
UFBGA 7 × 7	16 mm	12 mm	
TFBGA 7 × 7	16 mm	12 mm	
TFBGA 8 × 8	16 mm	12 mm	
VFBGA 8 × 8	16 mm	12 mm	
TFBGA 9 × 9	16 mm	12 mm	
LFBGA 10 × 10	24 mm	16 mm	
UFBGA 10 × 10	24 mm	16 mm	
VFBGA 10 × 10	24 mm	16 mm	
VFBGA 11 × 11	24 mm	16 mm	
TFBGA 11 × 11	24 mm	16 mm	
VFBGA 12 × 12	24 mm	16 mm	
TFBGA 12 × 12	24 mm	16 mm	
TFBGA 13 × 13	24 mm	20 mm	
LFBGA 14 × 14	24 mm	16 mm	
VFBGA 14 × 14	24 mm	20 mm	
TFBGA 14 × 14	24 mm	20 mm	
LFBGA 16 × 16	24 mm	20 mm	
TFBGA 16 × 16	24 mm	20 mm	
LFBGA 18 × 18	32 mm	24 mm	
TFBGA 18 × 18	32 mm	24 mm	

1 Reel description

Figure 1. Reel diagram

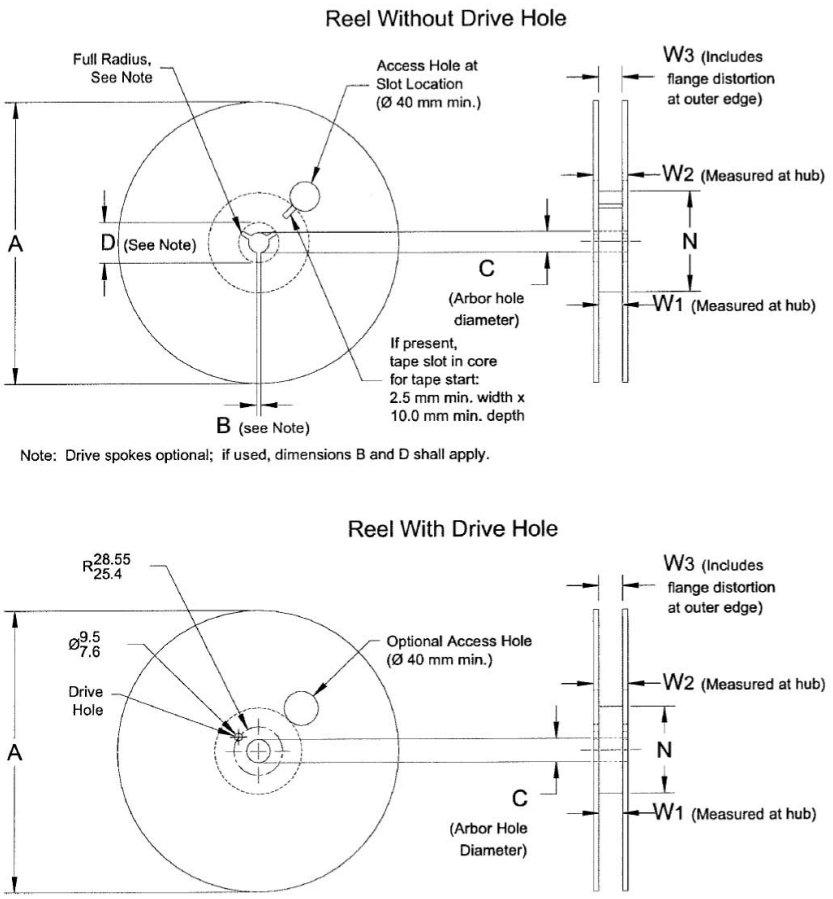

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Table 2. Reel dimensions

Reel size (inch)	Tape width (mm)	A max. (mm)	Reeds without drive hole			Reeds with drive hole			N (mm)	W1 min. (mm)(1)	W2 max. (mm)
			B min. (mm)	C min. (mm)	D min. (mm)	B min. (mm)	C max. (mm)	D min. (mm)			
13	12	330	1.5	13.0 +0.5/-0.2	20.2	NA(2)	29.2	NA	102 ±2	12.4 +2/-0	18.4
									178 ±2		
	16								102 ±2	16.4 +2/-0	22.4
									178 ±2		
	24								178 ±2	24.4 +2/-0	30.4
									178 ±2		
	32								102 ±2	32.4 +2/-0	38.4
									178 ±2		

1. *W1 is measured at the hub.*
2. *NA stands for "not applicable".*

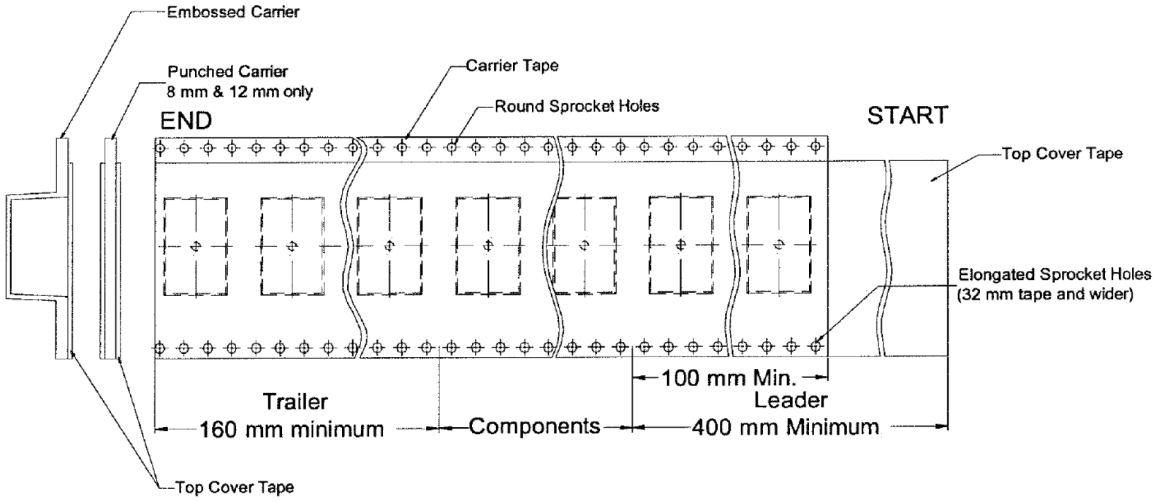
2 Leader and trailer tape specifications

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



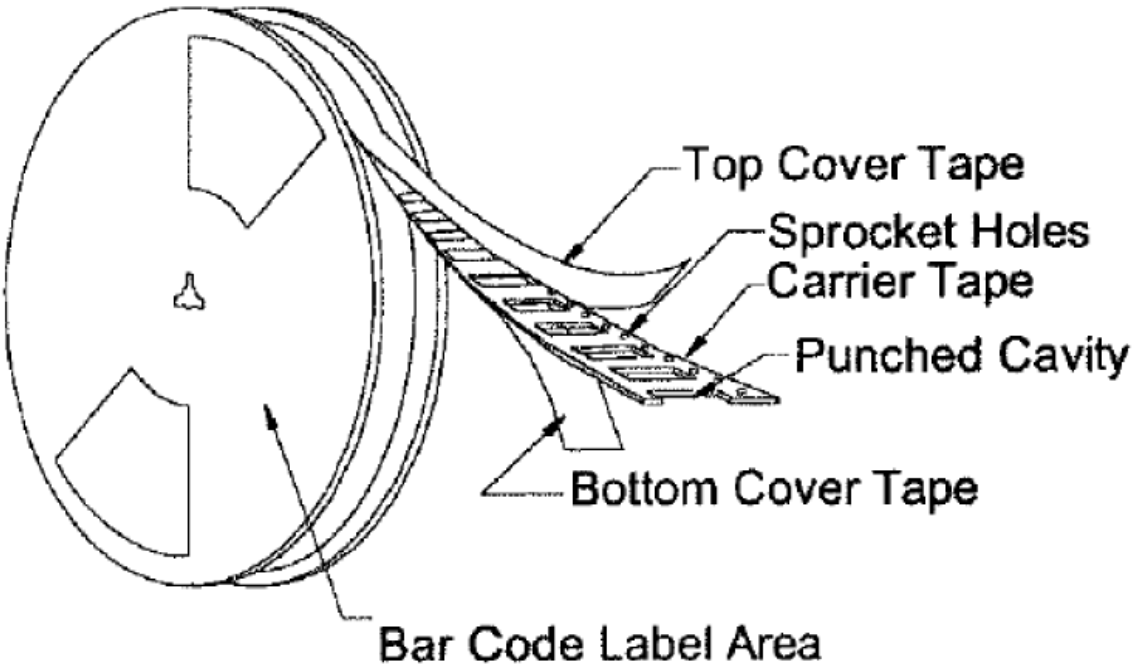
3 Labeling

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

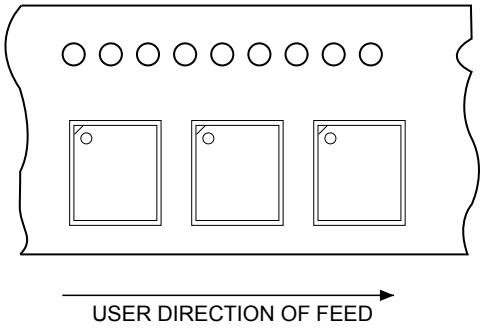


4 Device orientation

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. Ball 1 is located on the top-left corner of the package.

Figure 4. Device orientation on tape



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5 Carrier tape mechanical dimensions

Possible widths are 12 mm, 16 mm, 24 mm, and 32 mm (refer to Table 1. BGA packages available in tape and reel packing).

Figure 5. Embossed carrier tape (12 mm, 16 mm, and 24 mm widths)

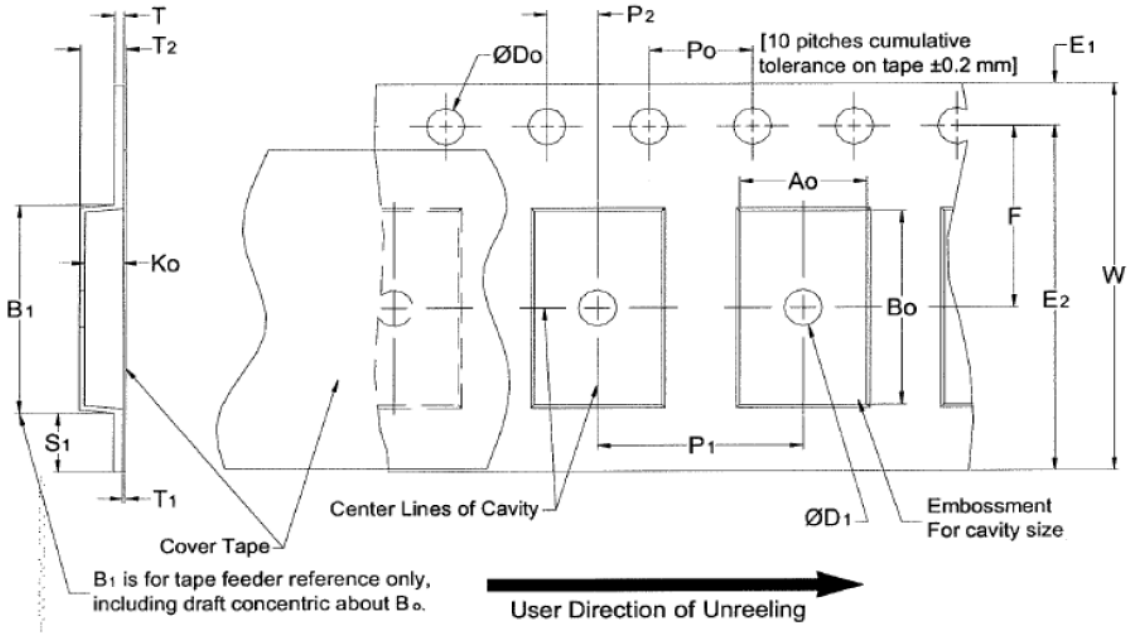


Figure 6. Embossed carrier tape (32 mm widths)

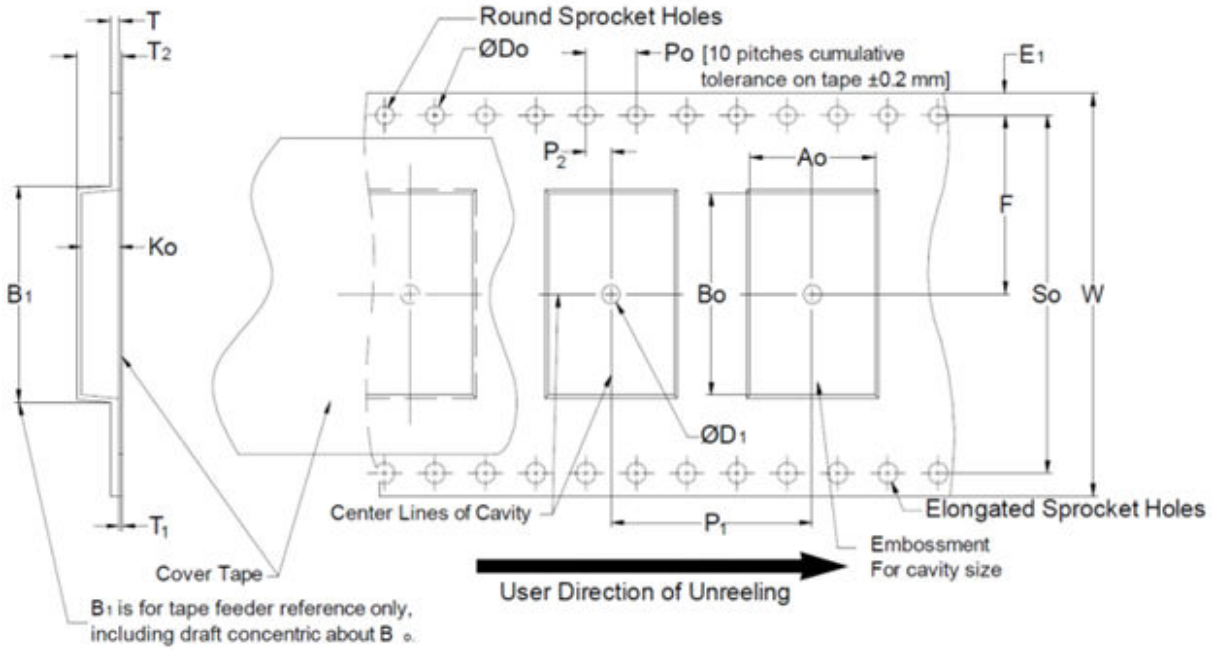


Table 3. Carrier tape constant dimensions

Tape width	D0	D1 min	E1	P0	P2	R(1)	S1	T max.	T1 max.	Unit
12 mm	1.5 +0.1/-0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	25	0.6	0.6	0.1	mm
16 mm					2.0 ±0.1					
24 mm										
32 mm		2.0				40	NA(2)	1.0		

1. *The maximum radius the tape with or without components can bend without damage is specified in Section 6: Bending radius requirements).*
2. *NA stands for "not applicable".*

Table 4. Carrier tape variable dimensions

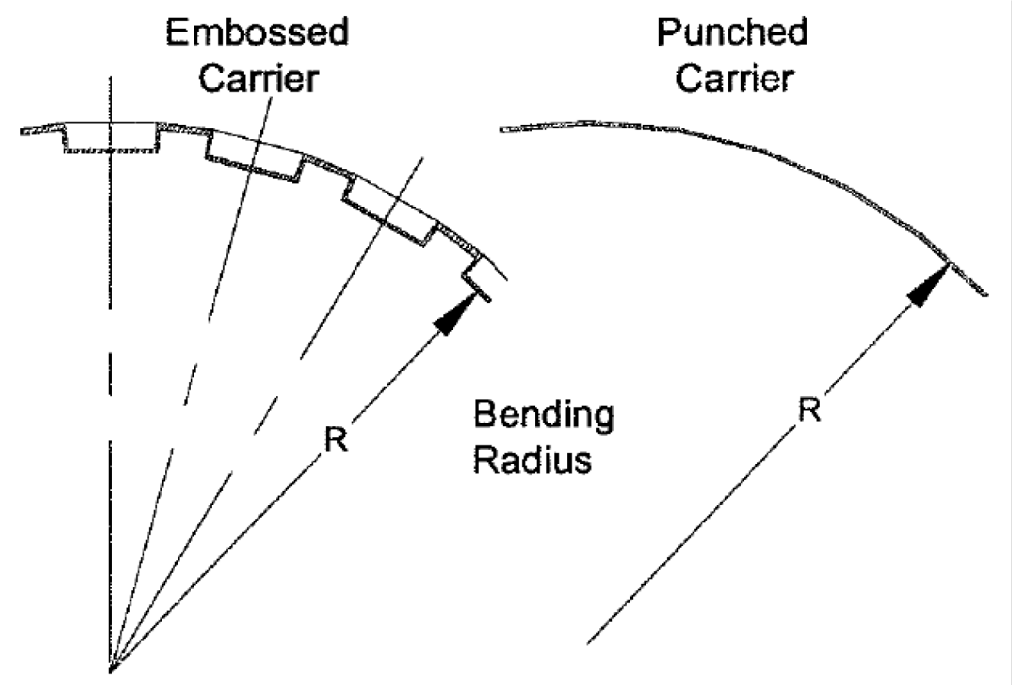
Tape width	B1 max.	E2	F	P1	T2 max.	W	A0, B0, K0	Unit
12 mm	8.2	10.25	5.5 ±0.05	2.0 ±0.05 or 4.0 ±0.1 or 8.0 ±0.1	6.5	12 ±0.3	(1)	mm
16 mm	12.1	14.25	7.5 ±0.1	4.0 ±0.1 to 12.0 ±0.1 by 4.0 increments	8.0	16 ±0.3		
24 mm	20.1	22.25	11.5 ±0.1	4.0 ±0.1 to 20.0 ±0.1 by 4.0 increments	12.0	24 ±0.3		
32 mm	23.0	NA(2)	14.2 ±0.1	4.0 ±0.1 to 32.0 ±0.1 by 4.0 increments	12	32 ±0.3		

1. *The cavity defined by A0, B0, and K0 surrounds the component with sufficient clearance so that:*
   - *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, 24mm, and 32 mm tapes.*
   - *Lateral movements of the component are restricted to 0.5 mm maximum for 12 mm tapes and to 1.0 mm maximum for 16 mm, 24 mm, and 32 mm tapes.*
2. *NA stands for "not applicable".*

Note: For tape widths of 32 mm and above, additional elongated sprocket holes are present at the bottom section of the tape (refer to Figure 6).

6 Bending radius requirements

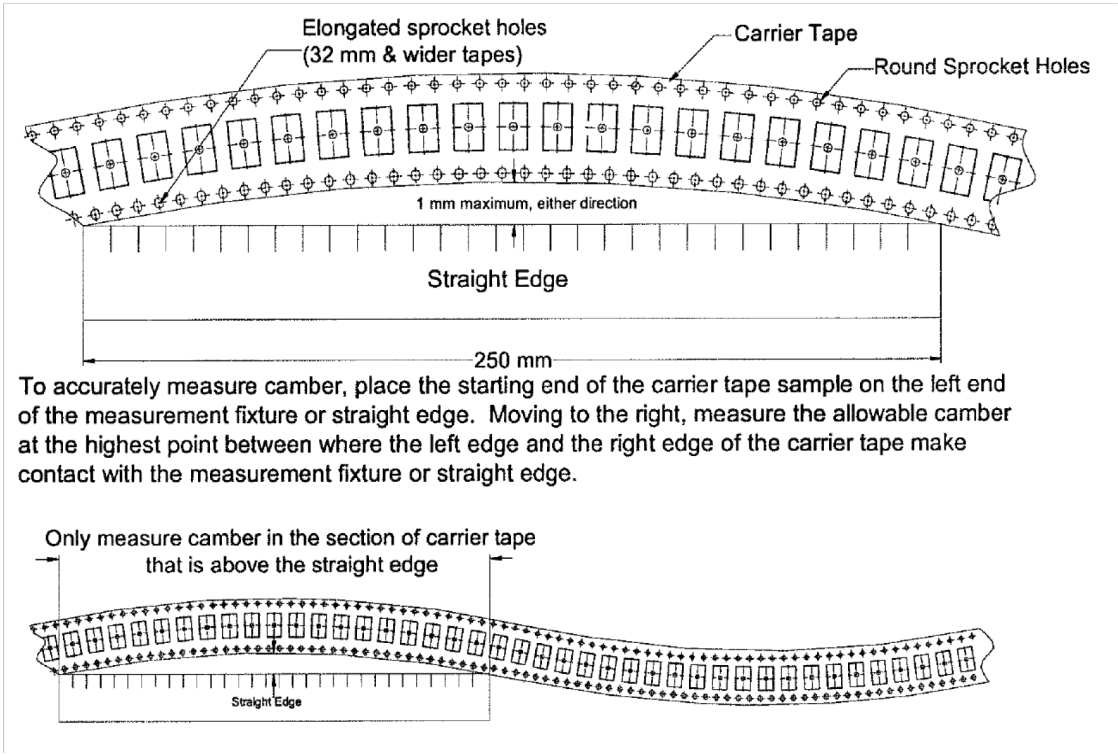
Figure 7. **Bending radius requirements**



7 Camber requirements

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

Figure 8. Camber requirements



Revision history

Table 5. **Document revision history**

Date	Version	Changes
16-Feb-2015	1	Initial release.
19-Feb-2015	2	Updated Figure 1: Reel diagram, Figure 2: Leader and trailer tape schematics and Figure 5: Embossed carrier tape to remove reference to notes.
17-Nov-2025	3	Updated Table 1. BGA packages available in tape and reel packing.
05-Jan-2026	4	Updated the entire document to cover STM32 devices.

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