

# Surface Mount (SMD) Packaging

## Reel and Carrier Tape Specifications

MINIMUM PACKING QUANTITY					
PACKAGE TYPE	Bulk Type Quantity	7" Tape and Reel		13" Tape and Reel	
		Quantity	Part Number Suffix	Quantity	Part Number Suffix
DFN Series (Note 4)	NA	3K	-7, TA	10K*	-13
DFN0806	NA	10K	-7B	NA	NA
DFN1006	NA	3K	-7	10K	-13
		10K	-7B	NA	NA
DFN1010, DFN1409, DFN1410	NA	5K	-7	NA	NA
DFN/QFN3030 (Note 5)	NA	3K	-7	3K*	TC
DFN4030-12	NA	NA	NA	3K	-13
DFN4030-12 Type B, C, D	NA	NA	NA	4K	-13
QFN4040 (Note 6)	NA	1.5K*	-7*	4K	-13
		NA	NA	3K	TC
DFN5020	NA	3K	-7	NA	NA
DFN5060	NA	NA	NA	3K	-13
DF-S	50	NA	NA	1.5K	-T
D <sup>2</sup> PAK	NA	NA	NA	800	-T
FLGA2520	NA	2.5K	-7	NA	NA
MELF	NA	NA	-7	5K	-13
MiniDIP	NA	NA	NA	3K	-T
MiniMELF	NA	2.5K	-7	10K	-13
MSOP-8, MSOP8-EP	100	1K	TA	2.5K	-13
				4K	TC
MSOP-10L	100	1K	TA	2.5K	-13
				4K	TC
POWERDI <sup>®</sup> 5 (Note 7)	NA	1.5K	-7	5K	-13
	NA	NA	NA	5K	-13D
POWERDI <sup>®</sup> 5SP	NA	NA	NA	3.5K	-13, -13R
POWERDI <sup>®</sup> 5SP-B (Note 8)	NA	NA	NA	3K	-13, -13R
POWERDI <sup>®</sup> 123, POWERMITE <sup>®</sup> 3	NA	3K	-7	10K	-13
POWERDI <sup>®</sup> 3030	NA	3K	-7	NA	NA
POWERDI <sup>®</sup> 3333	NA	2K	-7	3K	-13
POWERDI <sup>®</sup> 5060	NA	NA	NA	2.5K	-13
QSOP-16, QSOP20	NA	NA	NA	2.5K	TC
SC59	NA	3K	-7	10K	-13
SM-8	NA	1K	TA	4K	TC
SMA	NA	NA	NA	5K	-13
SMB	NA	NA	NA	3K	-13
SMC	NA	NA	NA	3K	-13
SOD123, SOD323, SOD523	NA	3K	-7, TA	10K	-13, TC
SOD923	NA	10K	-7	NA	NA
POWERDI <sup>®</sup> 323, SOD323F	NA	3K	-7	NA	NA
SO-8, SO-8EP	100	0.5K	TA	2.5K	-13, TC
SO-14	100	NA	NA	2.5K	-13
SO-16	50	NA	NA	2.5K	-13
SOT23	NA	3K	-7, TA	10K	-13
	NA	0.5K	TD	NA	NA
SOT323, SOT353, SOT523, SOT666	NA	3K	-7, TA	10K	-13
SOT363	NA	3K	-7, -7R	10K	-13, -13R
SOT25, SOT26, SC74R	NA	3K	-7, TA	10K	-13
SOT23F	NA	3K	TA	10K	TC



MINIMUM PACKING QUANTITY - Continued					
PACKAGE TYPE	Bulk Type Quantity	7" Tape and Reel		13" Tape and Reel	
		Quantity	Part Number Suffix	Quantity	Part Number Suffix
SOT89	NA	1K	-7, TA, -7R	2.5K	-13
				4K	TC, -13R
SOT89-5	NA	NA	NA	2.5K	-13
SOT143	NA	3K	-7	10K	-13
SOT223	75	1K	TA	2.5K	-13
				4K	TC
SOT553 (Note 9)	NA	3K	-7	NA	NA
	NA	4K	-7	NA	NA
SOT563 (Note 9)	NA	3K	-7	NA	NA
	NA	4K	-7	NA	NA
	NA	8K	-7B	NA	NA
SOT953, SOT963	NA	10K	-7	NA	NA
T-MiniDIP	NA	NA	NA	5K	-13
TO252-3, TO252-4, TO252-5	80	NA	NA	2.5K	-13, TC
TO263-3, TO263-5	50	NA	NA	800	-13
TSSOP-14, TSSOP-16EP	96	NA	NA	2.5K	-13
TSOT25, TSOT26	NA	3K	-7, TA	10K	-13
		0.5K	TD	NA	NA
WLB Series (Note 10)	NA	3K	-7	NA	NA

- Notes:
1. Package quantities given are for minimum packaging quantity only, not minimum order quantity. For minimum order quantity, please contact the Sales Department.
  2. No mixed date codes or partial quantity (less than minimum packaging quantity) per packaging is allowed.
  3. In no case shall there be two or more consecutive components missing from any reel for any reason.
  4. Applies to DFN body sizes smaller than 3.0 x 3.0mm (e.g. DFN3020, DFN1616, etc.) unless otherwise specified in the table. 13" reel may not be available on all packages. Refer to datasheet for details.
  5. QFN3030-16 quantity of 3.0K on 13" (TC Option) is a specific customer requirement.
  6. QFN4040-16 quantity of 1.5K on 7-inch reel is a specific customer requirement.
  7. POWERDI<sup>5</sup> available in 5K quantity on 13-inch reel & 12mm tape, part number suffix "-13D".
  8. POWERDI<sup>5</sup>SP-B part number suffix "-13R" is supplied with device in flipped orientation i.e. marking code side down in the carrier tape pocket.
  9. SOT553 / SOT563 quantity of 4K on 7-inch reel applicable for Logic products
  10. Packing quantities for DFN/QFN/WLB applicable regardless of package seated height (prefixed as V,W,U, X1, X2, etc).

### Device Tape Orientation For Part Marking, Refer to Datasheet

<u>8mm</u>			<u>8mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
X3-DFN0603-2	-7	Bar Denotes Cathode Side 	X2-DFN1010-4 X2-DFN1210-6 X2-DFN1210-8 X2-DFN1409-6 X2-DFN1410-6 X2-DFN1612-8 U-DFN2020-6 Type B U-DFN2020-6 Type C U-DFN2030-8 V-DFN3020-14 U-DFN3030-8 Type E U-DFN3030-10 U-DFN3030-12 U-DFN3030-14 U-QFN3030-16 U-QFN3030-20	-7	
X1-DFN1006-2 X2-DFN1006-2	-7 -13	Dot Denotes Cathode Side 			
X1-DFN1006-2 X2-DFN1006-2	-7B	Bar Denotes Cathode Side 	W-DFN1114-3 X1-DFN1216-4 X2-DFN2015-3 X2-DFN2015-6 W-FLGA2520-17	-7	
X1-DFN1006-3 X2-DFN1006-3	-7 -13	Dot Polarity Identifier 	X1-DFN1212-3 X1-DFN1212-3 Type B	-7 -13	
X2-DFN0606-3 X2-DFN0806-3 X1-DFN1006-3 X2-DFN1006-3	-7B	 Bar Polarity Identifier	X2-DFN1310-6	-7	
X2-DFN1010-6 U-DFN2018-6 X2-DFN3020-6	-7		X1-DFN1411-3 U-DFN2020-3 U-DFN2020-6 Type E X2-DFN2020-6 U-DFN2523-6	TA -7	
X2-DFN1010-4	-7R		X1-DFN1616-6 Type E	-7	

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
 b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed

### Device Tape Orientation For Part Marking, Refer to Datasheet

<u>8mm</u>			<u>8mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
U-DFN1610-6 X2-DFN2015-8 U-DFN3020-8 Type M	-7		V-DFN3020-8 Type B	TA	
U-DFN2020-3	-7		V-DFN3020-8 Type K V-DFN3030-8	-7 TA	
U-DFN2020-3 Type B	TA		W-DFN3020-12	-7	
U-DFN2030-6 Type B	-7 -13		U-DFN3030-4	-7	
X1-DFN2030-8	-7		U-DFN3030-8 U-DFN3030-8 Type B U-DFN3030-8 Type D	-7	
U-DFN2020-6 Type C	-7R		U-QFN3030-16 Type B	TC	
U-DFN2510-10	-7				

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
 b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed

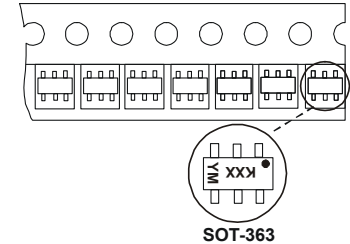
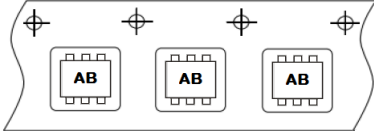
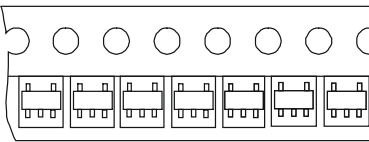
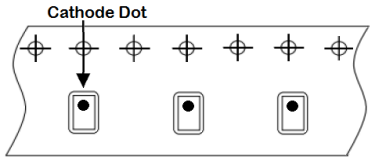
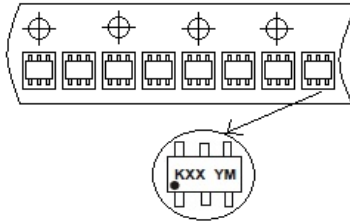
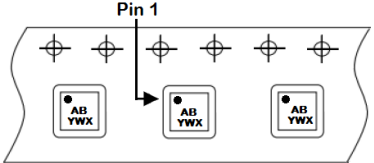
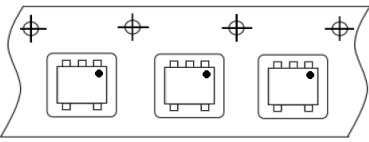
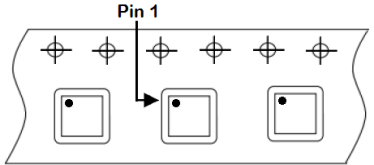
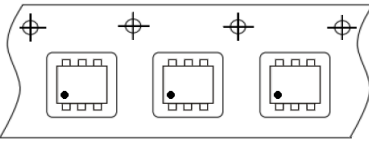
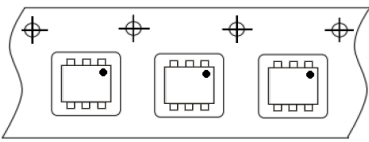
### Device Tape Orientation For Part Marking, Refer to Datasheet

<u>8mm</u>			<u>8mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
POWERDI <sup>®</sup> 123 POWERDI <sup>®</sup> 323 SOD323F	-7		SOT25 SOT353 SOT553	-7 -13 TA	
POWERDI <sup>®</sup> 3030-8	-7		SOT25 SOT353 TSOT25	-7 TA	
SOD123 SOD323 SOD523* SOD923	-7 -13 TA TC	  * SOD-523 only  Part number suffix -7 (3k quantity)	SC74R SOT26 SOT363 SOT563 SOT666 TSOT26 (Asymmetrical)	-7 -13	   SOT-563 / SOT-666    SOT-26/SOT-363    SC-74R
SC59 SOT23 SOT523 SOT23F	-7 TA TD -13		SOT26 SOT363 SOT563 (Symmetrical)	-7 -13	   SOT-26/SOT-363    SOT-563
SOT143	-7		SOT323	-7 -13 TA	


Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed

**Device Tape Orientation  
For Part Marking, Refer to Datasheet**

<b>8mm</b>			<b>8mm</b>		
<b>Package</b>	<b>Suffix</b>	<b>Tape Orientation</b>			
SOT363	-7R -13R		SOT963 Symmetrical	-7	
SOT553 Note: Logic Only	-7 TA		X3-WLCUS0603-3 X3-WLB1608-2	-7	
SOT563	-7B		U-WLB0707-4 U-WLB0808-4	-7	
SOT953	-7		U-WLB1010-4 U-WLB1510-6 U-WLB1515-9	-7	
SOT963 Asymmetrical	-7				
SOT963 Asymmetrical	-7B				

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed 

**Device Tape Orientation**  
For Part Marking, Refer to Datasheet

<u>12mm</u>			<u>12mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
U-DFN4030-12 U-DFN4030-14 U-QFN4040-16	-13		MSOP-8 MSOP-8-EP MSOP-10	TA -13 TC	
U-DFN4030-12 Type B U-DFN4030-12 Type C U-DFN4030-12 Type D	-13		POWERDI®3333-8	-7 -13	
U-DFN4040-8	-13		POWERDI®5	-13D	
W-DFN5020-6	-13		POWERDI®5060-8	-13	
W-DFN5060-4	-13		U-QFN4040-16 Type B U-QFN4040-20 Type B	TC TC	
MELF	-7 -13		U-QFN4040-16 Type C	-13	
MiniDIP T-MiniDIP	-T -13		QSOP-16	TC	

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed

### Device Tape Orientation For Part Marking, Refer to Datasheet

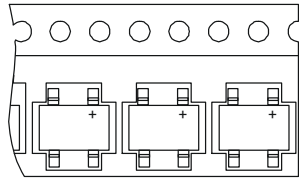
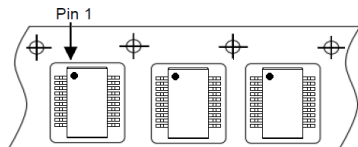
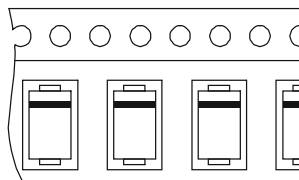
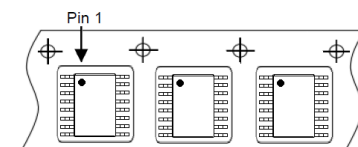
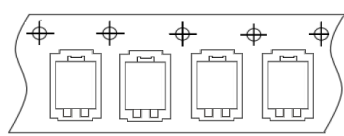
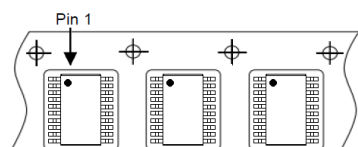
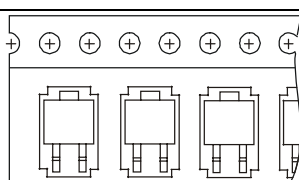
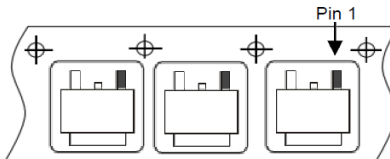
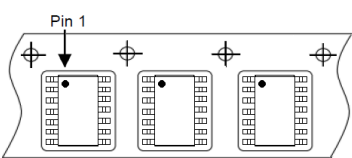
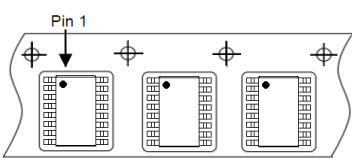
<u>12mm</u>			<u>12mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
SM-8	TA	<p style="text-align: center;">Bevelled</p>	SOT89-5	-13	<p style="text-align: center;">Pin 1</p>
SMA	-13		SOT89-5 (Reverse)	-13	<p style="text-align: center;">Pin 1</p>
SMB	-13		SOT223	-13 TA TC	<p style="text-align: center;">Pin 1</p>
SO-8 SO-8EP	-13 TA TC	<p style="text-align: center;">Pin 1</p>	TSSOP-14 TSSOP-16EP	-13	<p style="text-align: center;">Pin 1</p>
SOT89-3	-7 -13	<p style="text-align: center;">Pin 1</p>			
SOT89-3	-7R -13R	<p style="text-align: center;">Pin 1</p>			
SOT89-3	TA TC	<p style="text-align: center;">Pin 1</p>			

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
 b) Tape and package drawings are not to scale and are shown for device tape orientation only.


Direction of feed



**Device Tape Orientation  
For Part Marking, Refer to Datasheet**

<u>16mm</u>			<u>16mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
DF-S	-T		QSOP-20	TC	
SMC	-13		TSSOP-16EP	TC	
POWERDI® 5	-7 -13		TSSOP-20EP	TC	
POWERMITE® 3	-7 -13				
TO252 (DPAK)	-13 TC				
SOP-14	-13				
SOP-16	-13				

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
b) Tape and package drawings are not to scale and are shown for device tape orientation only.

**Direction of feed** 

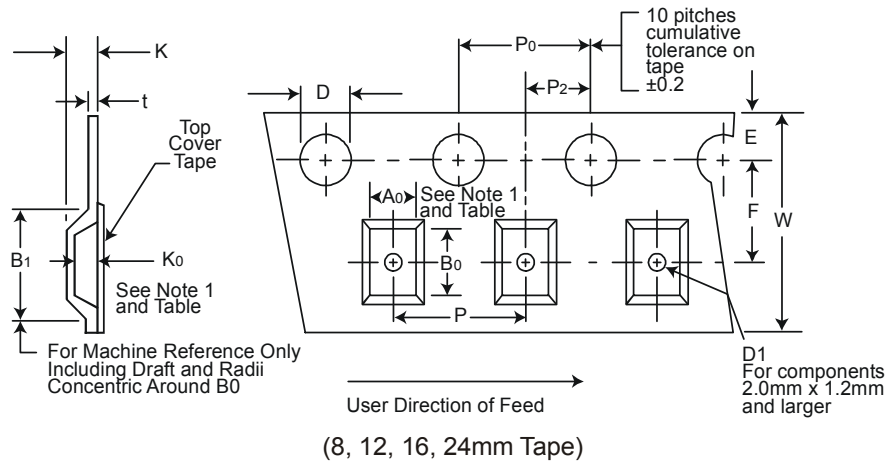
**Device Tape Orientation  
For Part Marking, Refer to Datasheet**

<u>24mm</u>			<u>40.4mm</u>		
Package	Suffix	Tape Orientation	Package	Suffix	Tape Orientation
D2PAK	-T				
TO263	-13		POWERDI 5SP POWERDI 5SP-B	-13	
			POWERDI 5SP-B	-13R	  * Device in flipped orientation (marking code side down)

Note: a) Device tape orientation applicable to all product types unless otherwise specified.  
b) Tape and package drawings are not to scale and are shown for device tape orientation only.

Direction of feed

## EMBOSSED CARRIER TAPE SPECIFICATIONS



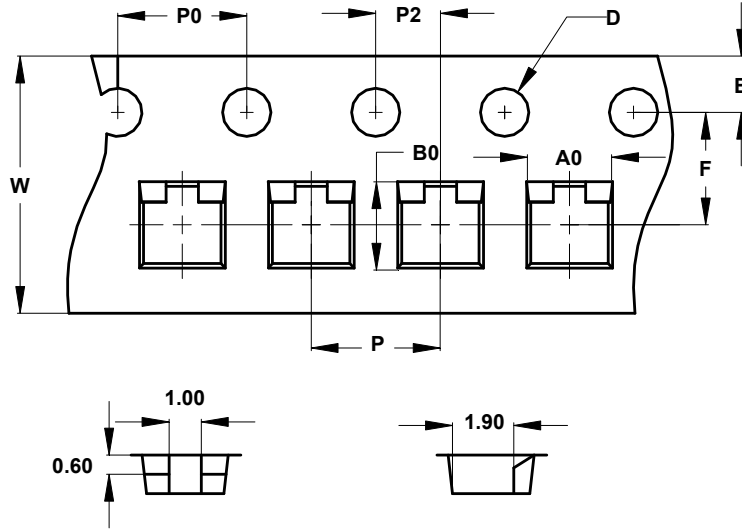
8, 12, 16, 24mm EMBOSSED TAPE DIMENSIONS IN mm						
Tape Size	D	E	P <sub>0</sub>	t <sub>max</sub>	A <sub>0</sub> B <sub>0</sub> K <sub>0</sub>	Constant Dimensions
8, 12, 16, 24mm	1.50 +0.10 -0.0	1.75 ± 0.10	4.0 ± 0.10	0.400	See Note 1	

8, 12, 16, 24mm EMBOSSED TAPE DIMENSIONS IN mm								
Tape Size	B <sub>1</sub> max	D <sub>1</sub> min	F	K max	P <sub>2</sub>	R min	W	Package Type
8mm	4.5	1.0	3.5 ± 0.05	2.4	2.0 ± 0.05	25	8.0 ± 0.30	Refer to the 8mm Device Tape Orientation Table
12mm	8.2	1.5	5.5 ± 0.05	4.5	2.0 ± 0.05	30	12.0 ± 0.30	Refer to the 12mm Device Tape Orientation Table
16mm	12.1	1.4	7.5 ± 0.10	2.25	2.0 ± 0.10	40	16.0 ± 0.30	Refer to the 16mm Device Tape Orientation Table
		1.5	7.5 ± 0.10	3.29	2.0 ± 0.10		16.0 ± 0.30	
		1.5	7.5 ± 0.10	3.70	2.0 ± 0.10		16.0 ± 0.30	
		1.5	7.5 ± 0.05	2.89	2.0 ± 0.05		16.0 ± 0.2	
24mm	20.1	1.5	11.5 ± 0.10	6.5	2.0 ± 0.10	50	24.0 ± 0.30	Refer to the 24mm Device Tape Orientation Table

P					
Tape Size	2.0 ± 0.05	4.0 ± 0.10	8.0 ± 0.10	12.0 ± 0.10	16.0 ± 0.10
8mm	SOD523-76K SOT563 (-7B) SOD923 DFN1006-2/3 (-7B) DFN0603-2 DFN0606-3 DFN0806-2/3 X2-WLCUS0603-2	All other packages using 8mm tape in the Device Orientation tables	—	—	—
12mm	—	SMA, MELF, DFN5020	All other packages using 12mm tape in the Device Orientation tables	—	—
16mm	—	—	All packages using 16mm tape except DF-S	DF-S	—
24mm	—	—	—	—	D <sup>2</sup> PAK; TO263
40.40mm	—	—	—	—	POWERDI <sup>®</sup> 5SP POWERDI <sup>®</sup> 5SP-B

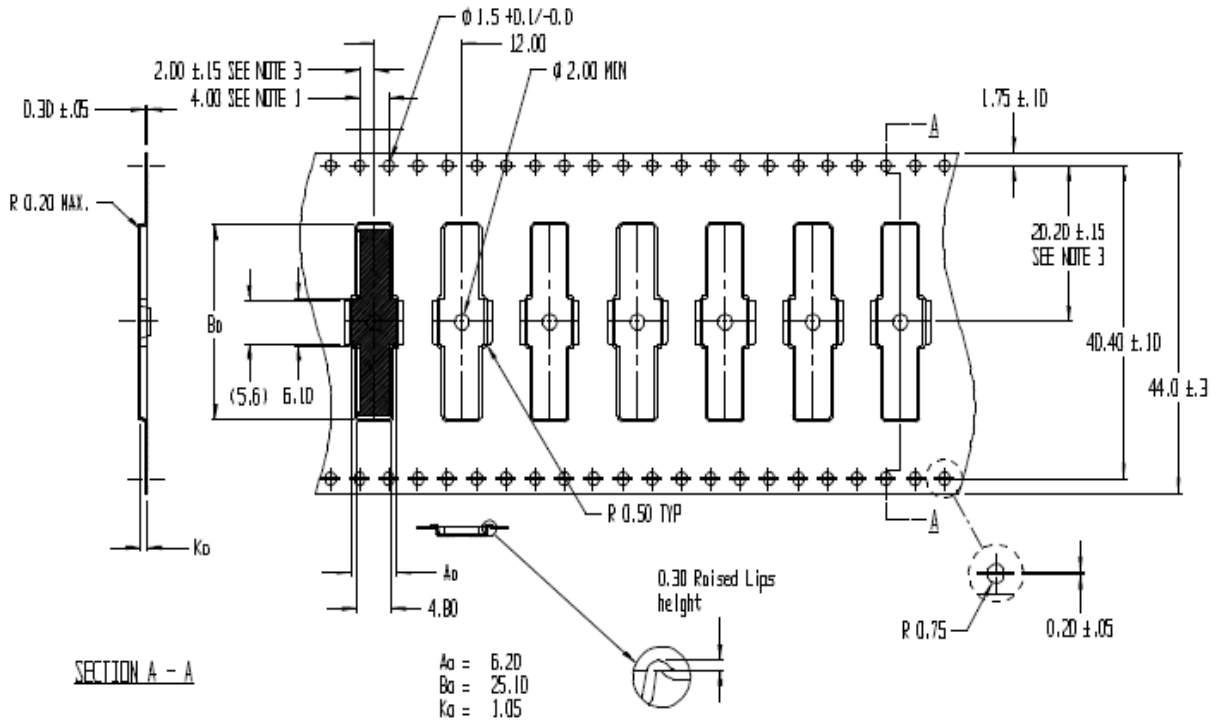
Notes: 1. Ao Bo Ko are determined by component size. The clearance between the component and the cavity must comply to the rotational and lateral movement requirement provided in figures on page 14.

### Carrier Tape Specification for SOT323

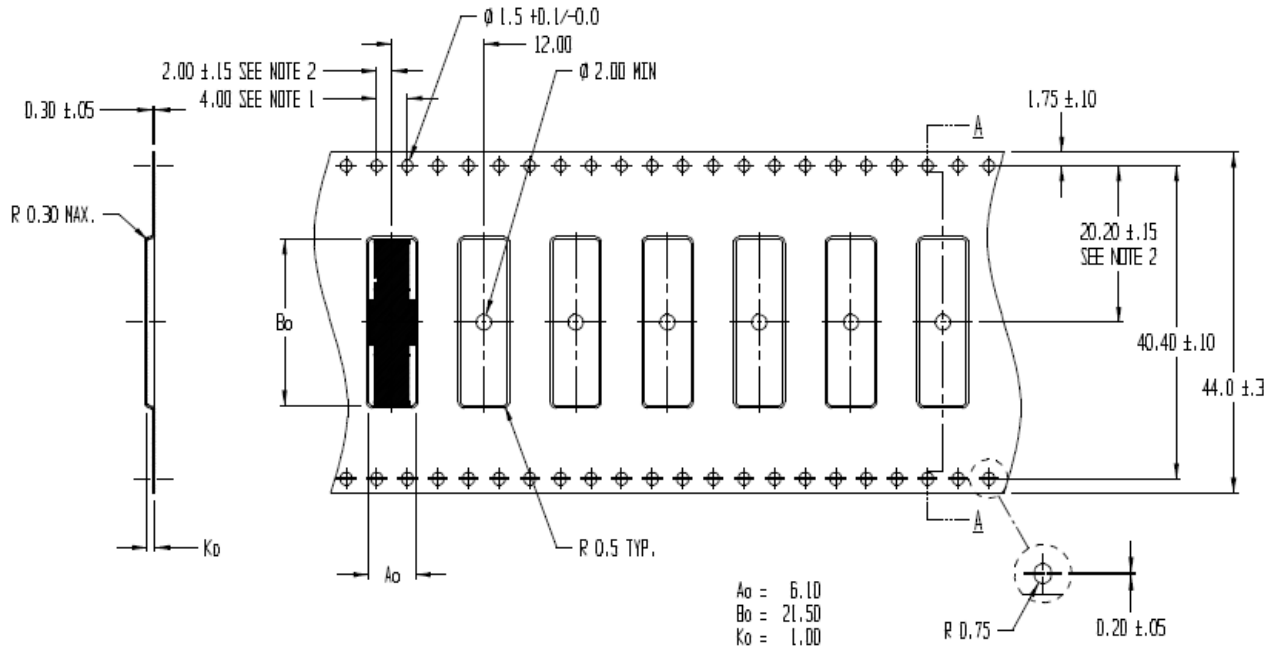


Note: P, P0, P2, D, E, F and W dimensions are the same as provided in the EMBOSSED CARRIER TAPE DIMENSIONS table.

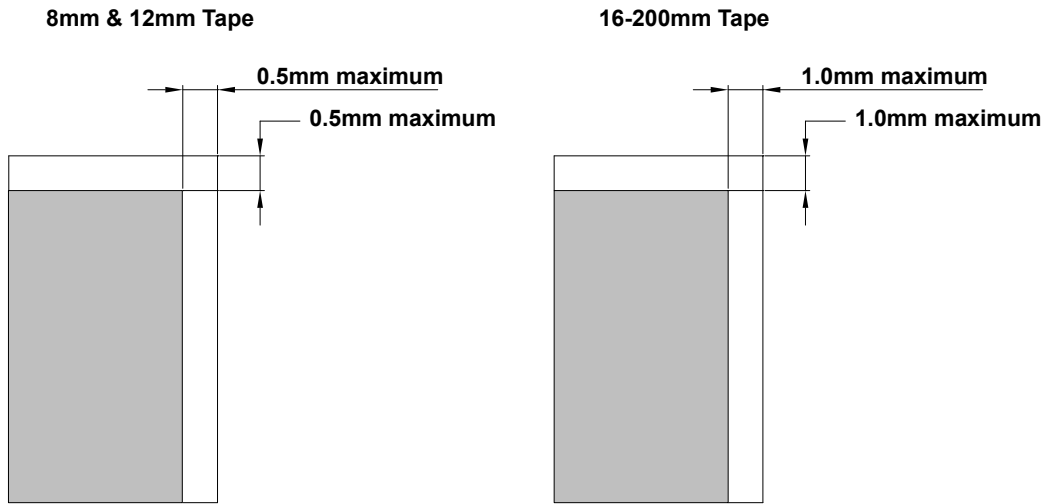
### Carrier Tape Specification for POWERDI<sup>®</sup>5SP



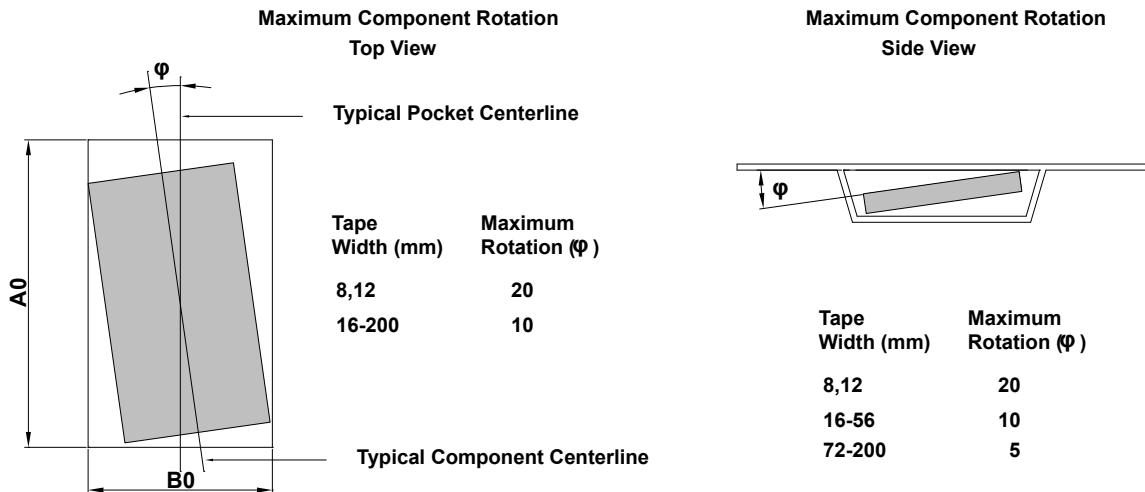
**Carrier Tape Specification for POWERDI®5SP-B**

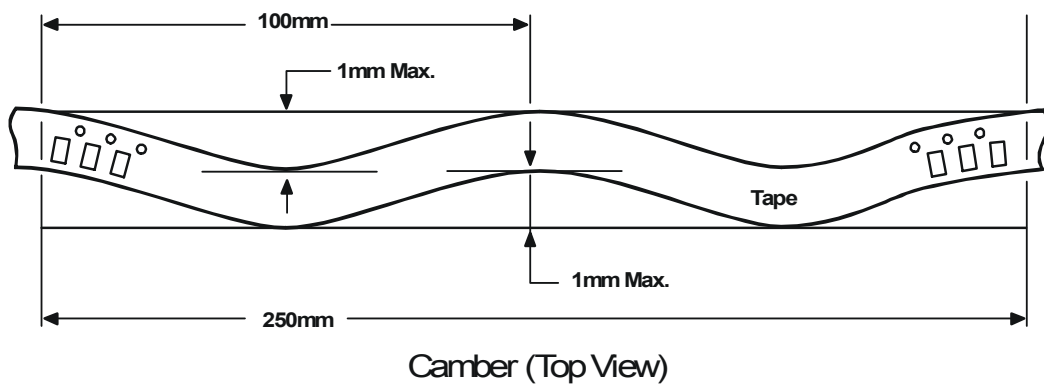
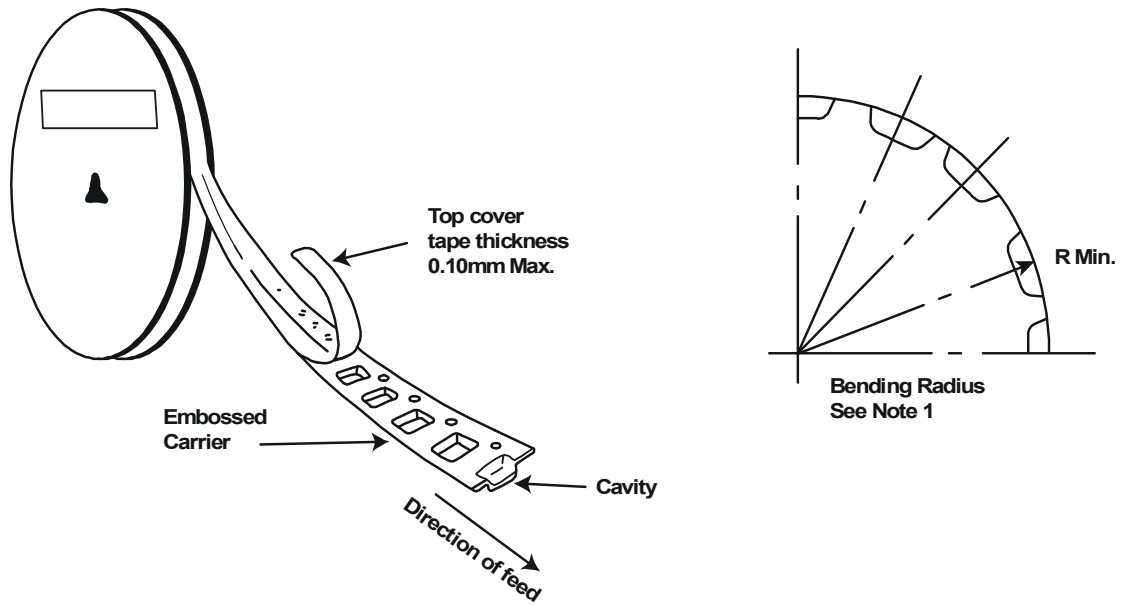


### Component Lateral Movement



### Component Rotational Movement

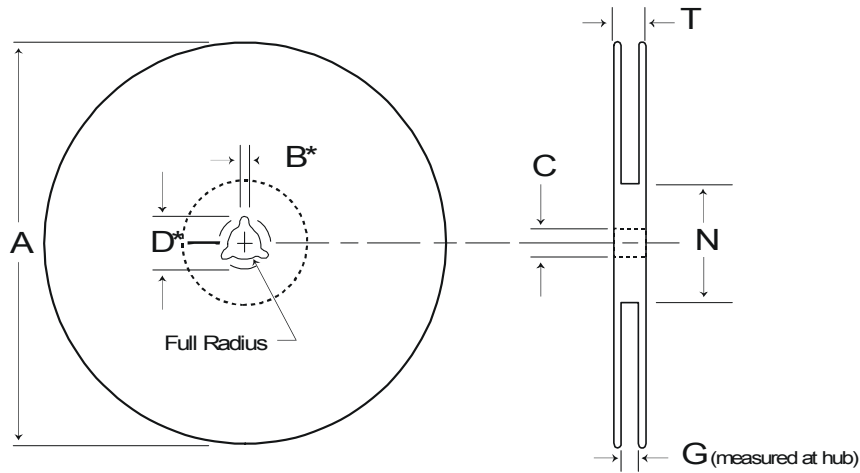




Allowable camber to be 1.0mm/100mm non-accumulative over 250mm

Notes: 1. Tape and components shall pass around radius 'R' without damage.

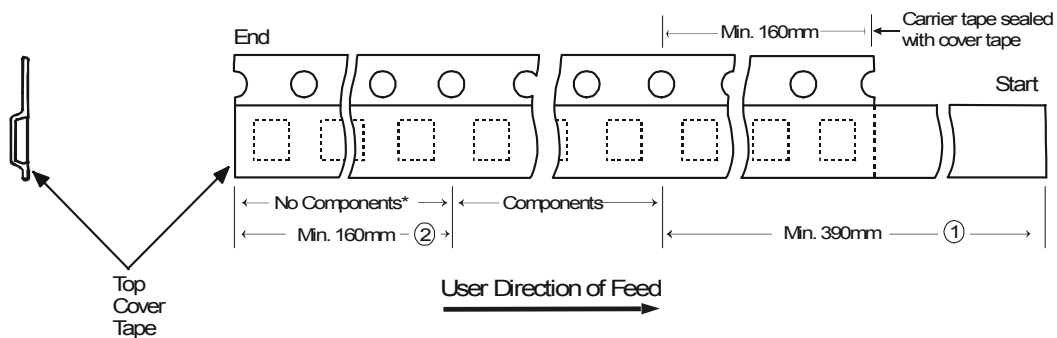
## SURFACE MOUNT REEL SPECIFICATIONS (All Dimensions in mm)



\* Drive spokes optional. If used, dimensions with asterisks apply.

Tape Size	A Max	B* Max	C	D* Max	N Min	G	T Max
8mm	330 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	100 ±2	8.4 +2.0 -0.0	14.4
	178 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	55 ±5	8.4 +1.5 -0.0	14.4
12mm	330 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	100 ±2	12.4 +2.0 -0.0	18.4
	178 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	55 ±5	12.4 +2.0 -0.0	18.4
16mm	330 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	100 ±2	16.4 +2.0 -0.0	22.4
24mm	330 ±2	2.0 +0.5 -0	13 +0.5 -0.2	20.5 ±0.2	100 ±2	24.4 +2.0 -0.0	30.4

### Tape Leader and Trailer



- Notes:
1. There shall be a leader of 230mm [9.05 inches] minimum which may consist of carrier and/or cover tape or a start tape followed by a minimum of 160mm [6.30 inches] of empty carrier tape sealed with cover tape.
  2. There shall be a trailer of 160mm [6.30 inches] minimum of empty carrier tape sealed with cover tape. The entire carrier tape must release from the reel hub as the last portion of the tape unwinds from the reel without damage to the carrier tape and the remaining components in the cavities.

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