



Application Note

AN_116

FTDI Devices T&R Dimensions

Version 1.7

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This document provides information on the tape and reel dimensions for FT232BL, FT245BL, FT232BQ, FT245BQ, FT232RL, FT245RL, FT232RQ, FT245RQ, FT2232D, FT2232HL, FT2232HQ, FT4232HL, FT4232HQ, FT-X series chips, FT12 series chips, FT311D, FT313H, FT4222HQ, VNC1L and VNC2

This Application Note supersedes the FTDI Application Note AN232B-11

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1 Introduction

This document provides information on the tape and reel dimensions for FT232BL, FT245BL, FT232BQ, FT245BQ, FT232RL, FT245RL, FT232RQ, FT245RQ, FT2232D, FT2232HL, FT2232HQ, FT4232HL, FT4232HQ, FT-X series chips, FT12 series chips, FT311D, FT313H, FT4222HQ, VNC1L and VNC2.

2 Packaging options

FTDI can supply devices packaged in tape and reel packaging or in trays or tubes. The quantities in each package type are described below.

2.1 Tape and Reel Packaging

IC – Tape and Reel	Package	Quantities (pieces)
FT232BL, FT245BL – R	LQFP	1000
FT232BQ, FT245BQ – R	QFN	2500
FT232RL, FT245RL – R	SSOP	2000
FT232RQ, FT245RQ – R	QFN	6000
FT2232D – R	LQFP	1000
FT2232HL – R	LQFP	1000
FT2232HQ – R	QFN	4000
FT4232HL – R	LQFP	1000
FT4232HQ – R	QFN	4000
VINC1L – A – R	LQFP	2000
VNC2-32LQFP	LQFP	1500
VNC2-48LQFP	LQFP	1500
VNC2-64LQFP	LQFP	1000
VNC2-32 QFN 7x7x.9	QFN	3000
VNC2-48 QFN 8x8x.9	QFN	3000
VNC2-64 QFN 8x8x.9	QFN	3000
FT311DLQFP	LQFP	1500
FT311D QFN 7X 7 X .9	QFN	3000
FT200XD- R, FT234XD-R	DFN	5000
FT201XS – R, FT220XS – R, FT221XS – R, FT230XS – R, FT231XS – R, FT240XS – R	SSOP	3000
FT201XQ- R, FT220XQ – R, FT221XQ – R, FT230XQ – R, FT231XQ – R, FT240XQ – R	QFN	5000
FT120T- R, FT121T – R , FT122T – R	TSSOP	2500
FT120Q- R, FT121Q – R, FT122Q – R	QFN	6000
FT313HQ – R	QFN	3000
FT313HL – R	LQFP	1000
FT313HP – R	TQFP	2500

FT4222HQ-R	VQFN	5000
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Table 2.1 – Tape and Reel Quantities

2.2 Tray/Tube Packaging

IC – Tray/Tube	Package	Quantities (pieces)	Box of Trays/Tube (pieces)
FT232BL, FT245BL – Tray	LQFP	250	2500
FT232BQ, FT245BQ	QFN	250	-
FT232RQ, FT245RQ – Tray	QFN	490	4900
FT2232D – Tray	LQFP	250	2500
FT2232HL – Tray	LQFP	160	-
FT2232HQ – Tray	QFN	260	-
FT4232HL – Tray	LQFP	160	-
FT4232HQ – Tray	QFN	260	-
VINC1L – A – Tray	LQFP	250	2500
VNC2-32LQFP	LQFP	250	
VNC2-48LQFP	LQFP	250	
VNC2-64LQFP	LQFP	160	
VNC2-32 QFN 7x7x.9	QFN	260	
VNC2-48 QFN 8x8x.9	QFN	260	
VNC2-64 QFN 8x8x.9	QFN	260	
FT311DLQFP	LQFP	250	
FT311D QFN 7X 7 X .9	QFN	260	
FT200XD- T, FT234XD-T	DFN	490	
FT201XS- U, FT220XS- U, FT230XS- U,	SSOP	100	
FT240XS - U, FT231XS- U	SSOP	58	
FT201XQ- T, FT220XQ- T, FT230XQ- T, FT240XQ- T	QFN	490	
FT120T- U, FT122T - U	TSSOP	50	
FT120Q- T, FT121Q - T, FT122Q - T	QFN	490	
FT121T- U	TSSOP	96	
FT313HP - T	TQFP	2500	
FT313HQ – T	QFN	2600	
FT313HL – T	LQFP	1600	

Table 2.2 – Tube/Tray Quantities

3 FT232BL, FT245BL and FT2232D Tape Dimensions

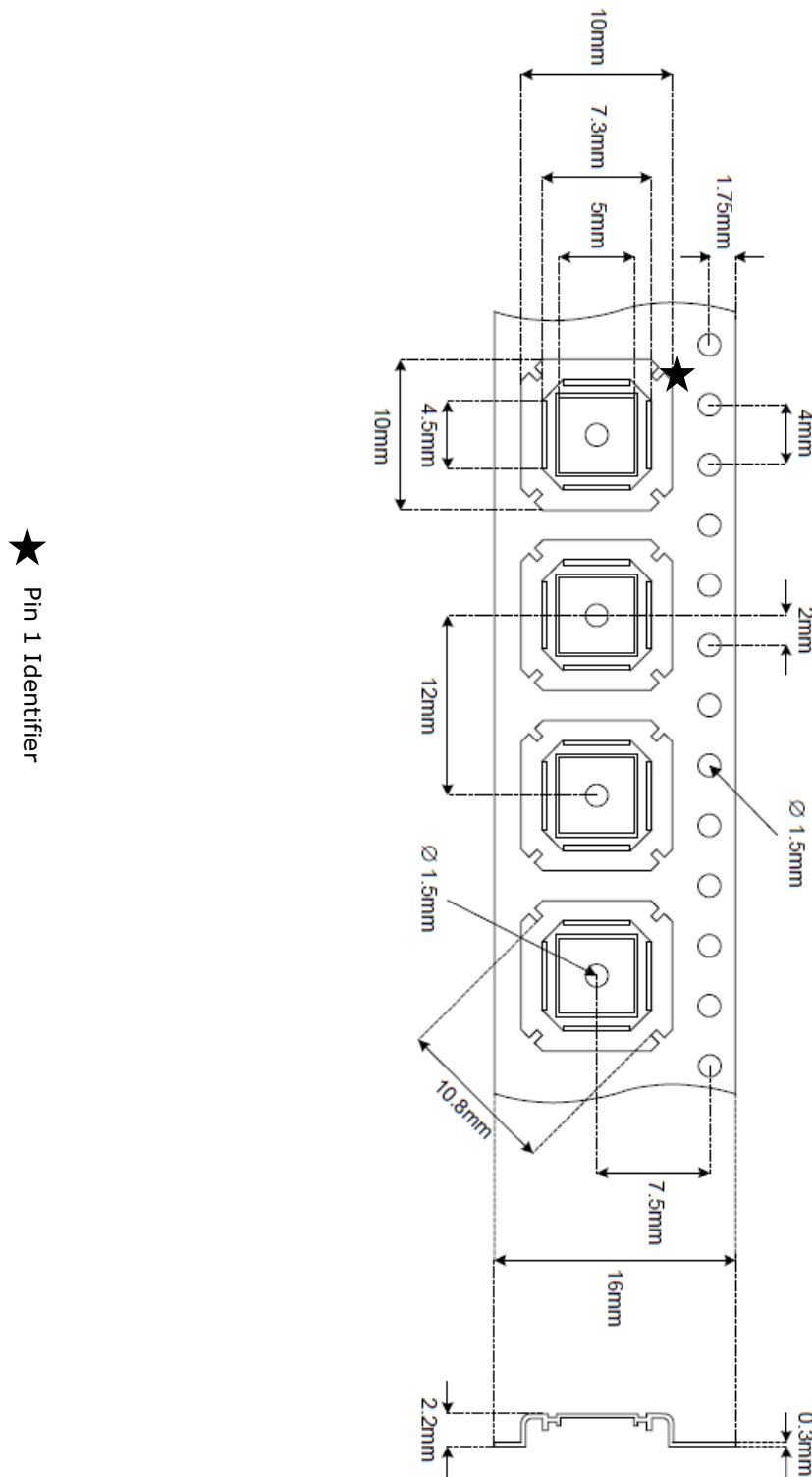


Figure 3.1 – FT232BL, FT245BL and FT2232D Tape Dimensions

4 FT232BL, FT245BL and FT2232D Reel Dimensions

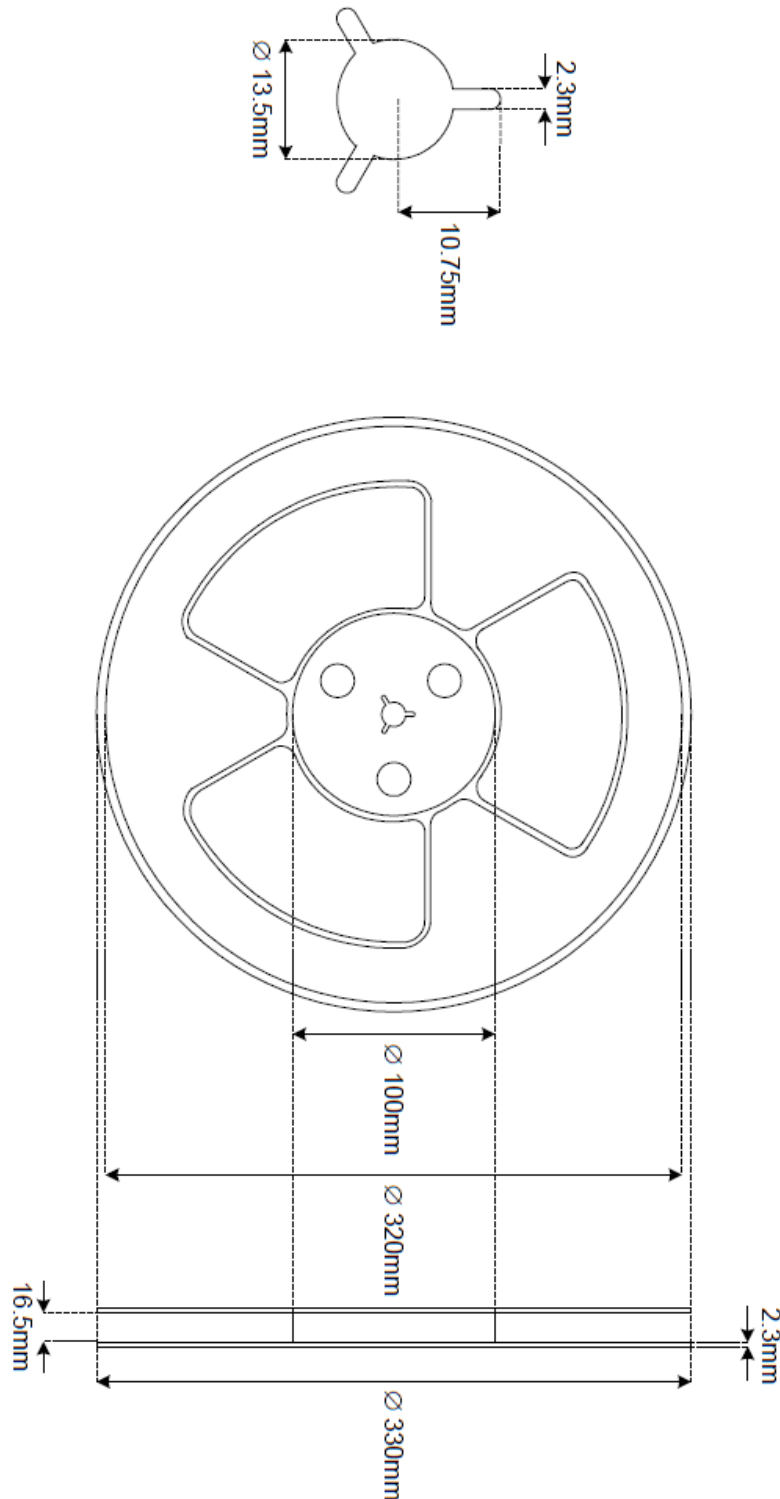
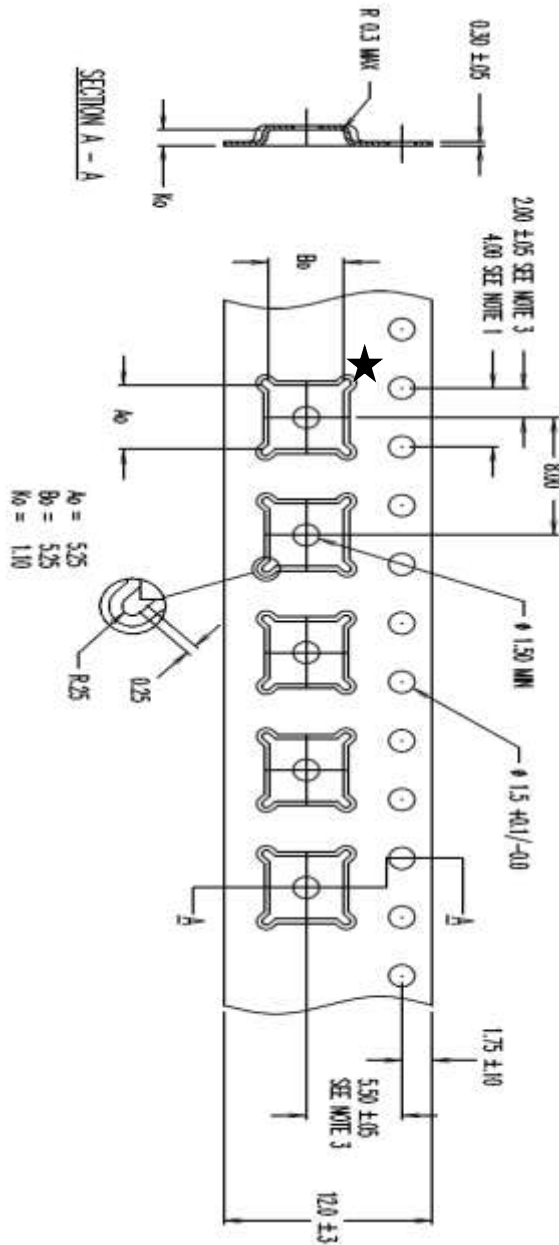


Figure 4.1 – FT232BL, FT245BL and FT2232D Reel Dimensions

5 FT232BQ and FT245BQ Tape Dimensions



Notes:

1. 10 sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed 1mm in 100mm.
3. Material: Black Advantek Polystyrene.
4. A_0 and B_0 measured on a plane 0.5mm above the bottom of the pocket.
5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

★ Pin 1 Identifier

Figure 5.1 – FT232BQ and FT245BQ Tape Dimensions

6 FT232BQ and FT245BQ Reel Dimensions

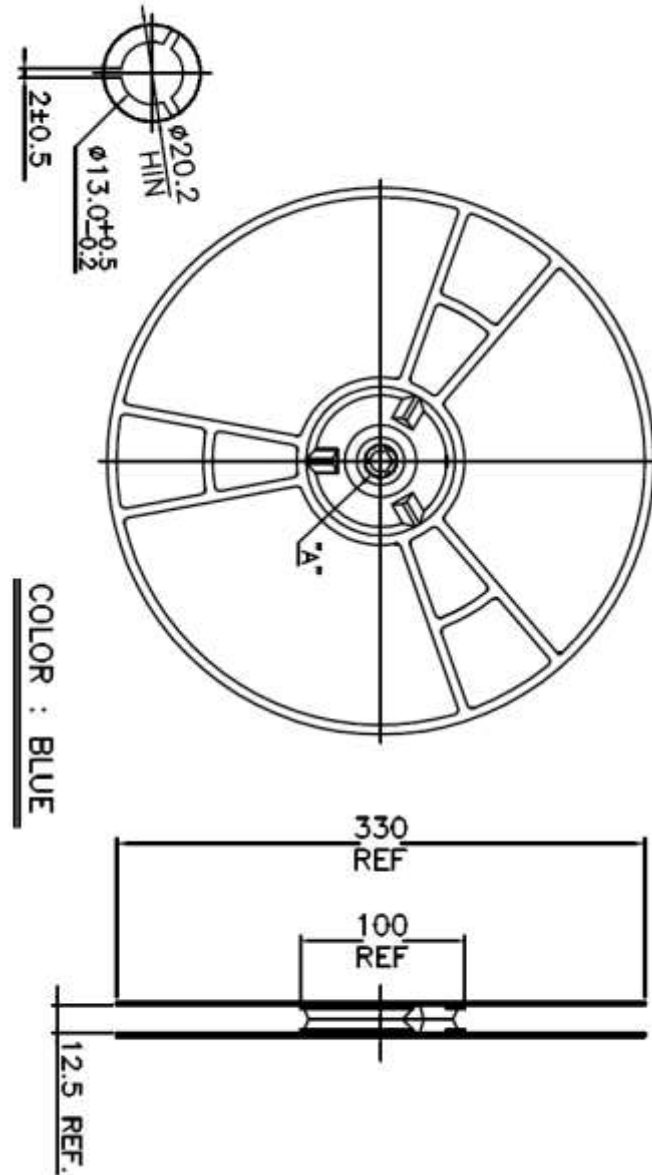


Figure 6.1 – FT232BQ and FT245BQ Reel Dimensions

7 FT232RL and FT245RL Tape Dimensions

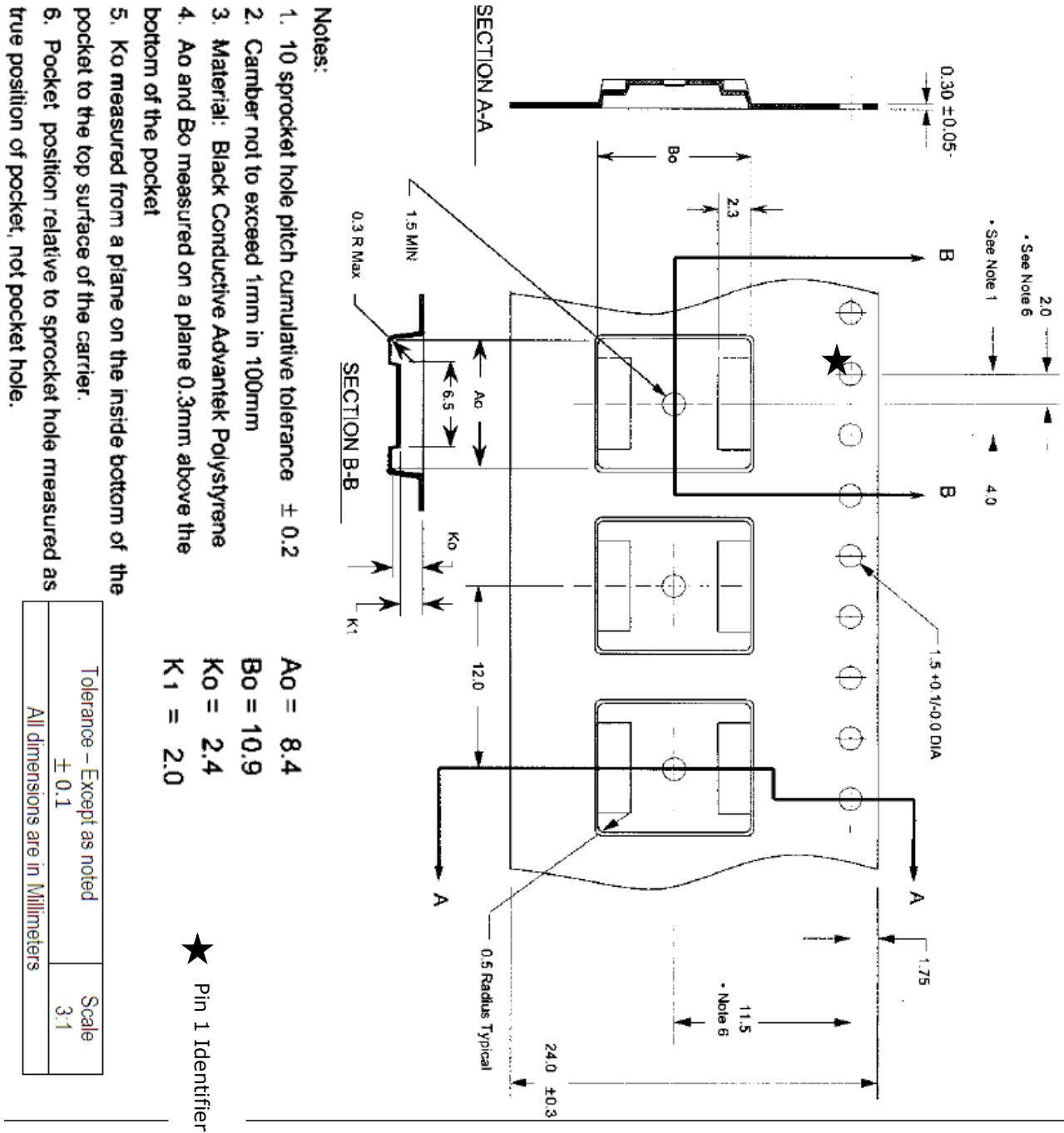


Figure 7.1 – FT232RL and FT245RL Tape Dimensions

8 FT232RL and FT245RL Reel Dimensions

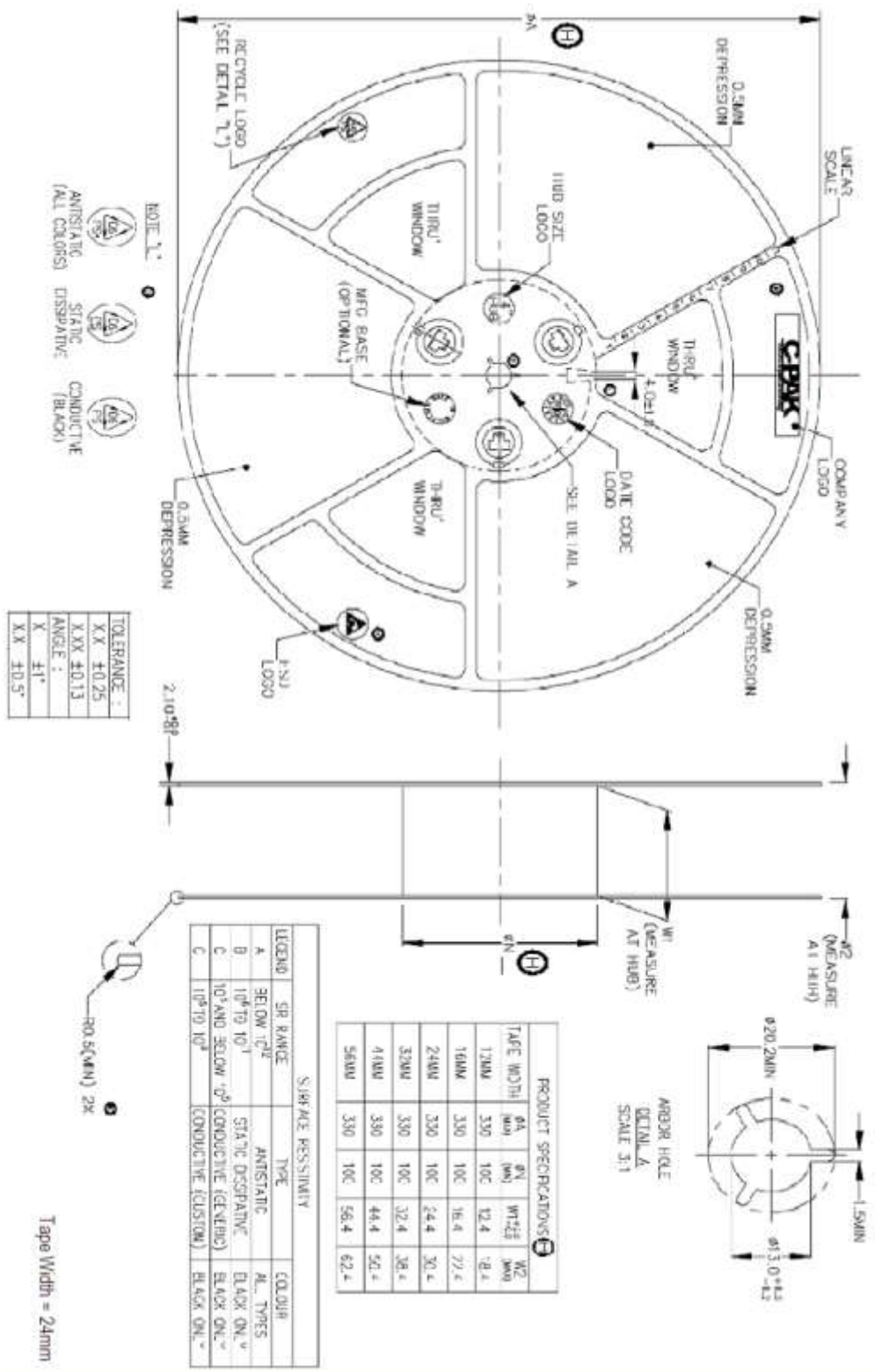


Figure 8.1 - FT232RL and FT245RL Reel Dimensions

9 FT232RQ and FT245RQ Tape Dimensions

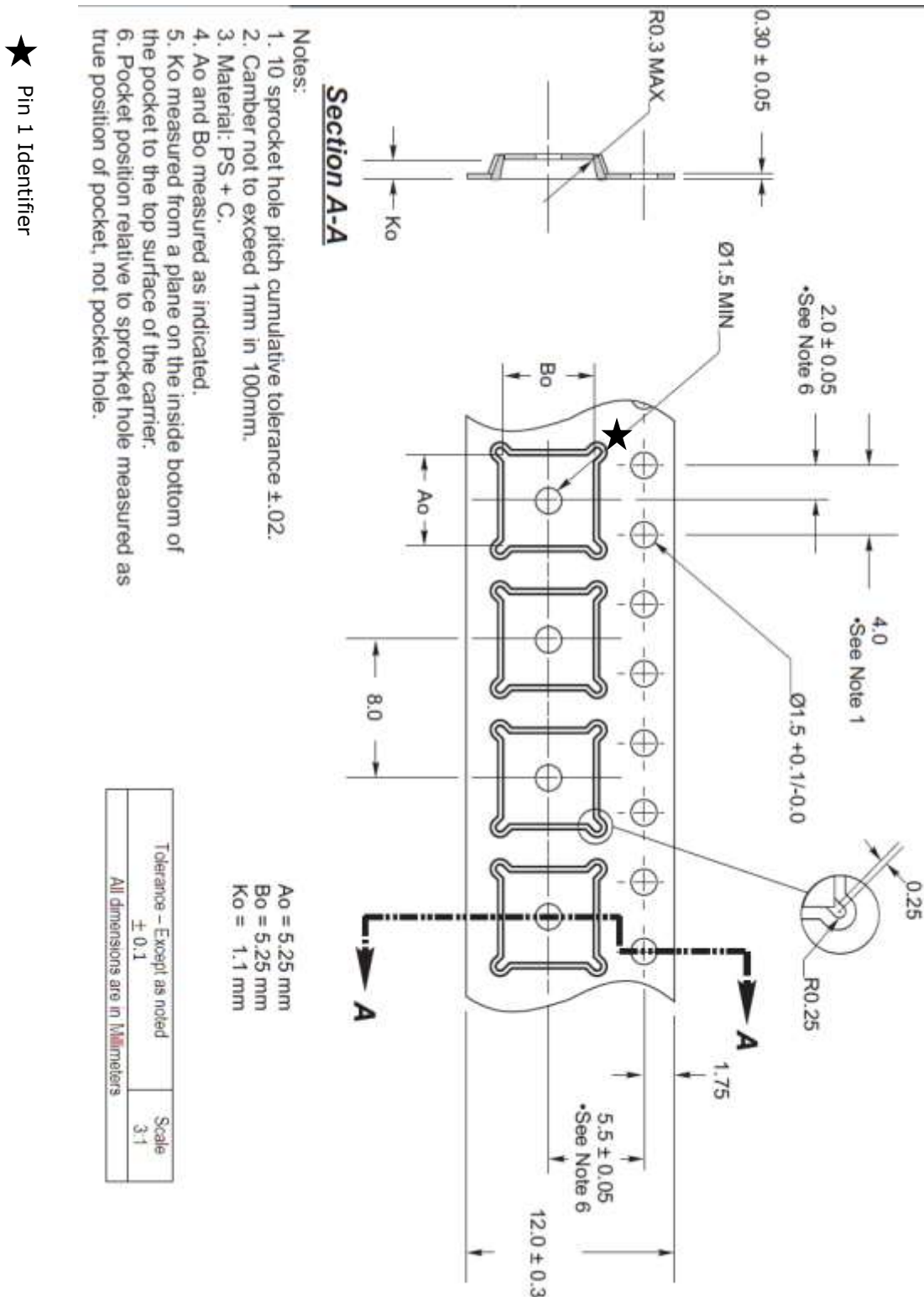


Figure 9.1 – FT232RQ and FT245RQ Tape Dimensions

10 FT232RQ and FT245RQ Reel Dimensions

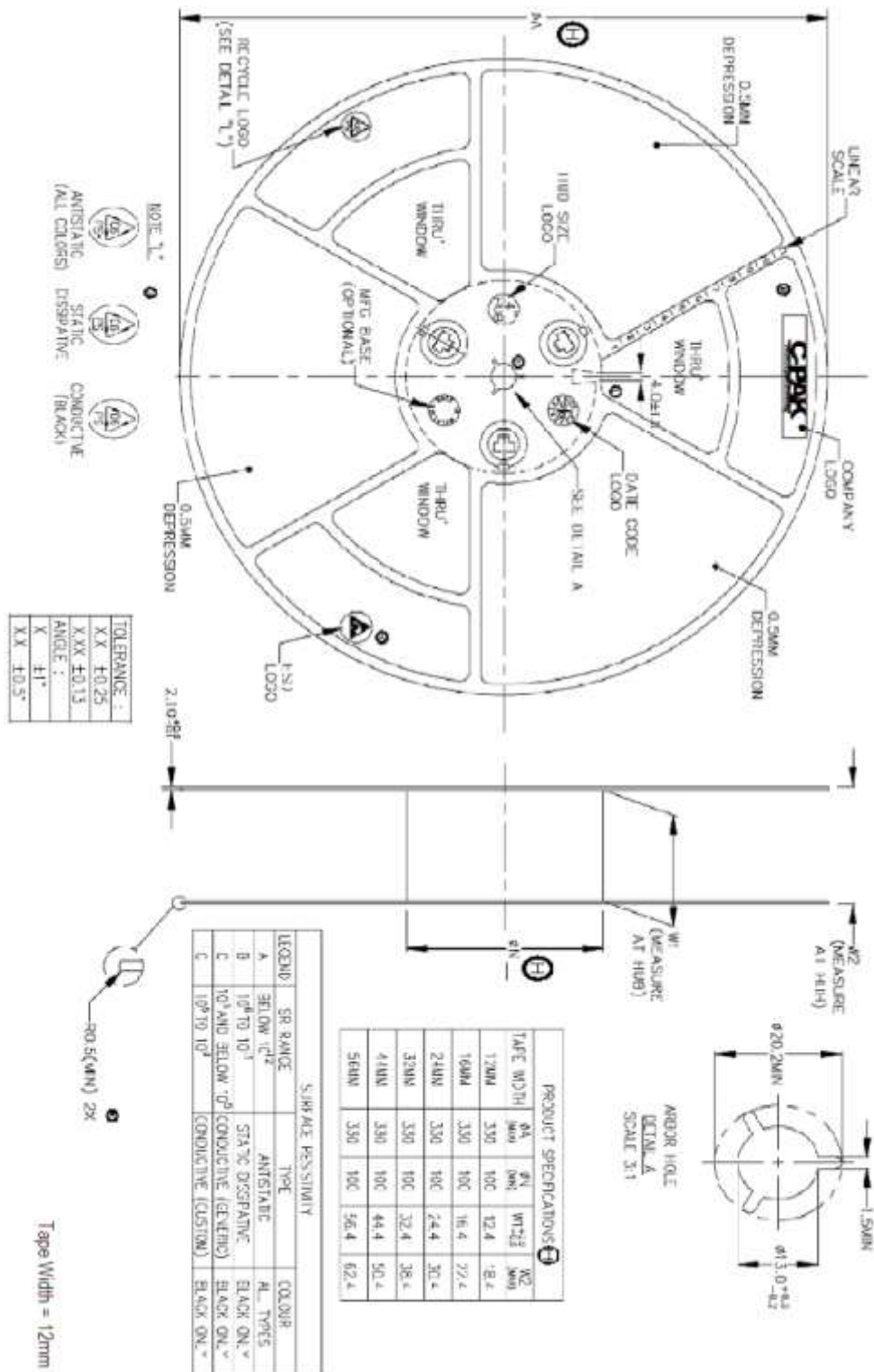


Figure 10.1 – FT232RQ and FT245RQ Reel Dimensions

11 FT2232HL and FT4232HL Tape Dimensions

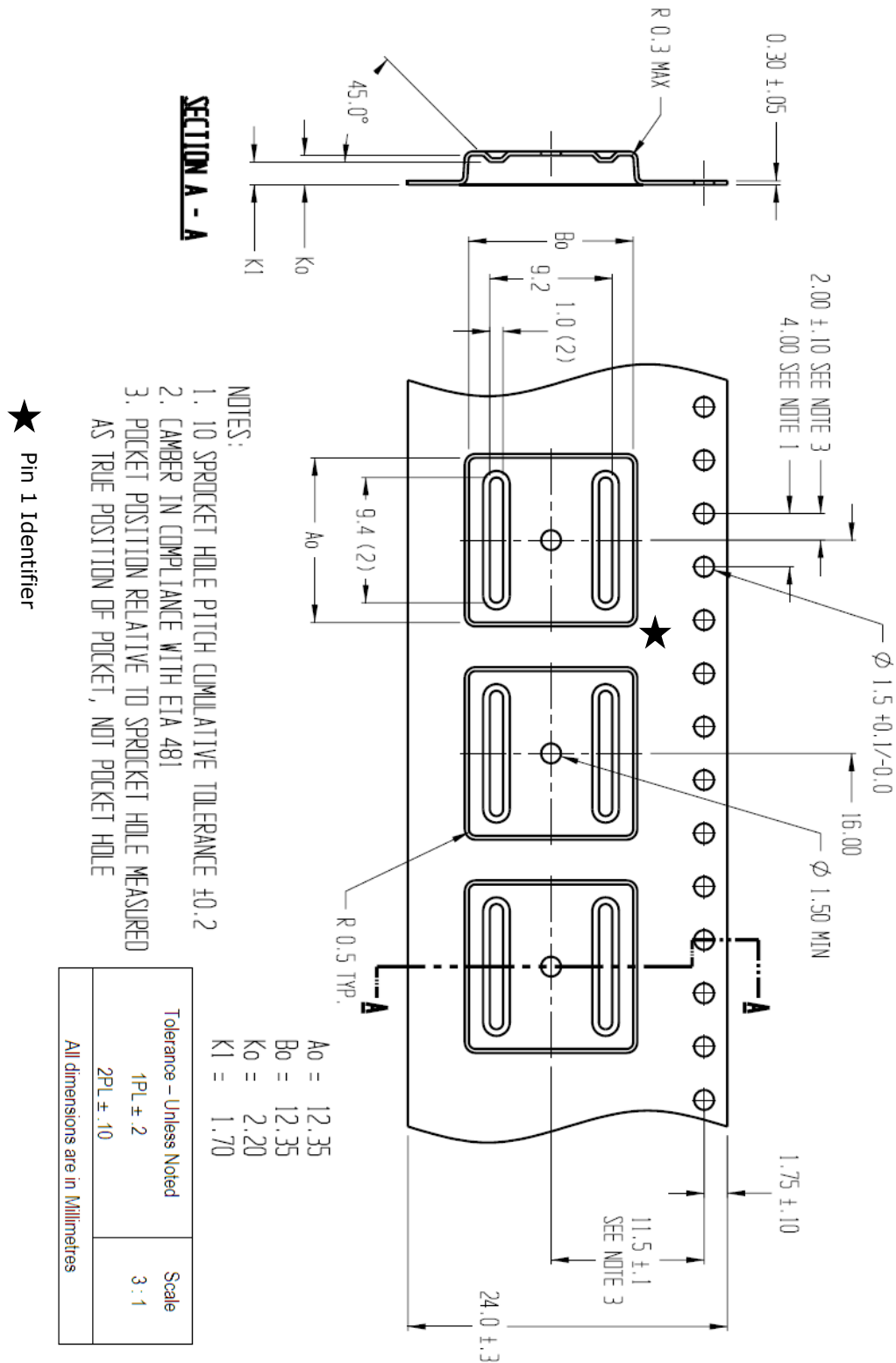


Figure 11.1 - FT2232HL and FT4232HL Tape Dimensions

12 FT2232HL and FT4232HL Reel Dimensions

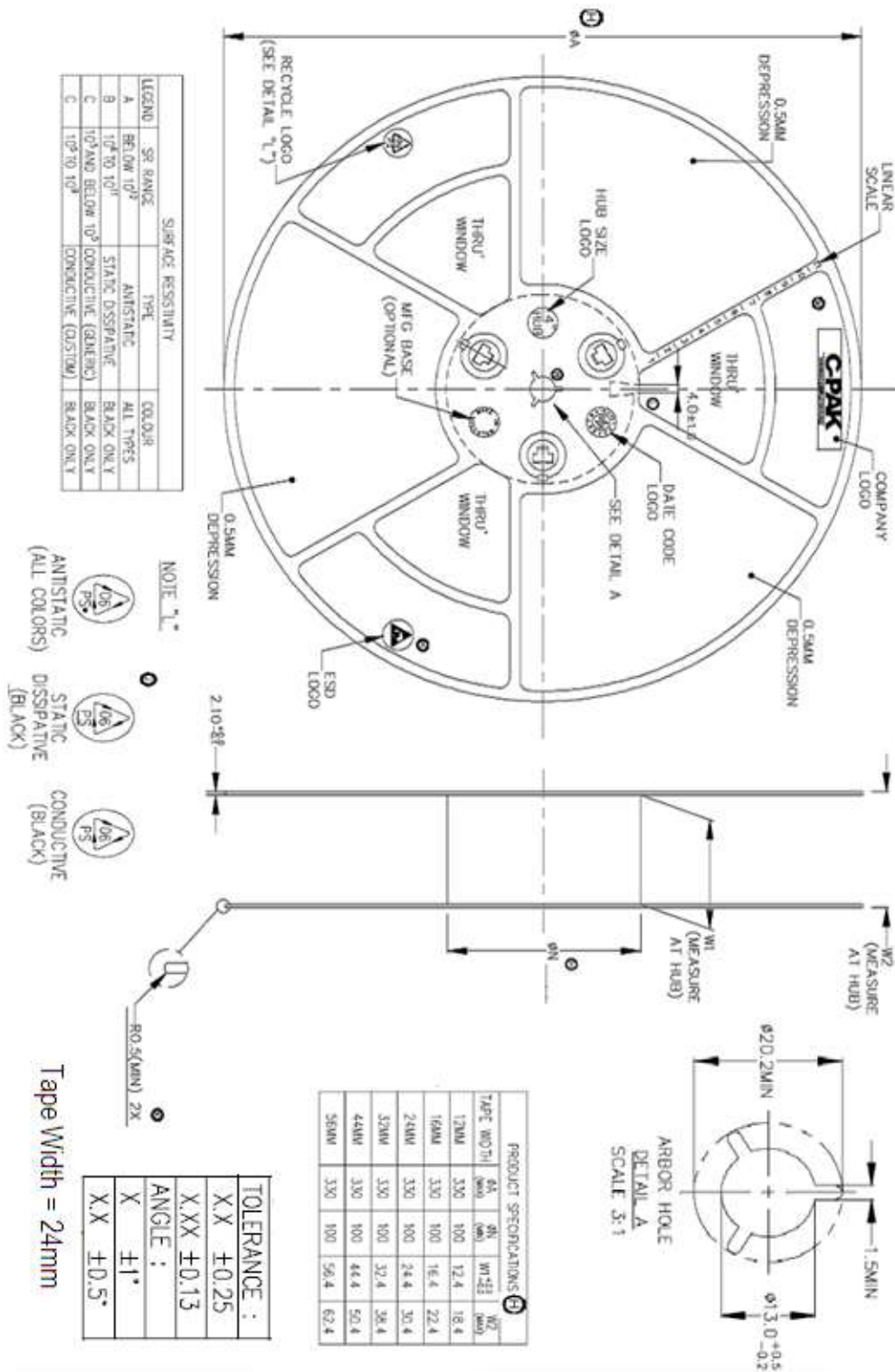


Figure 12.1 - FT2232HL and FT4232HL Reel Dimensions

13 FT2232HQ and FT4232HQ Tape Dimensions

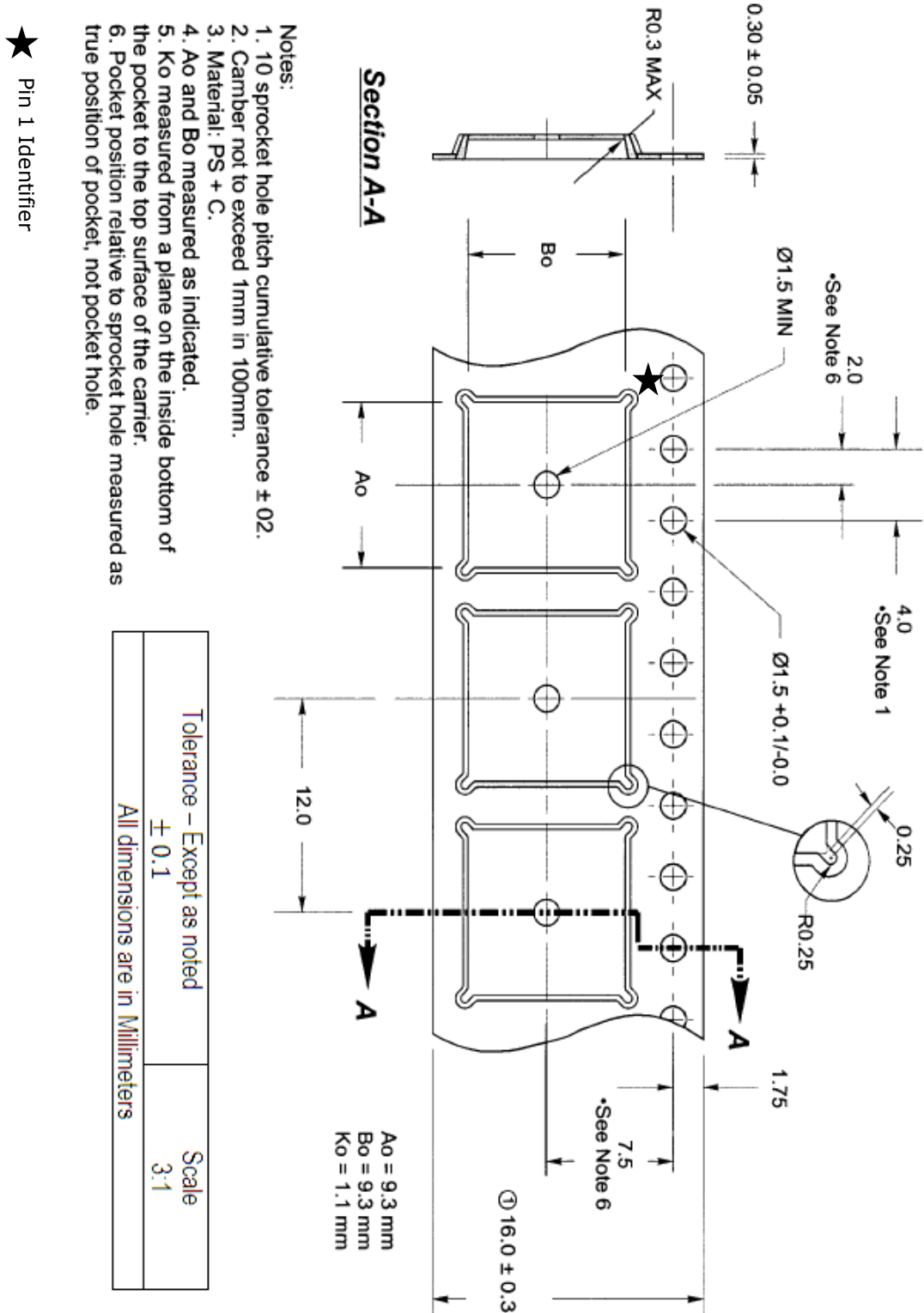


Figure 13.1 – FT2232HQ and FT4232HQ Tape Dimensions

14 FT2232HQ and FT4232HQ Reel Dimensions

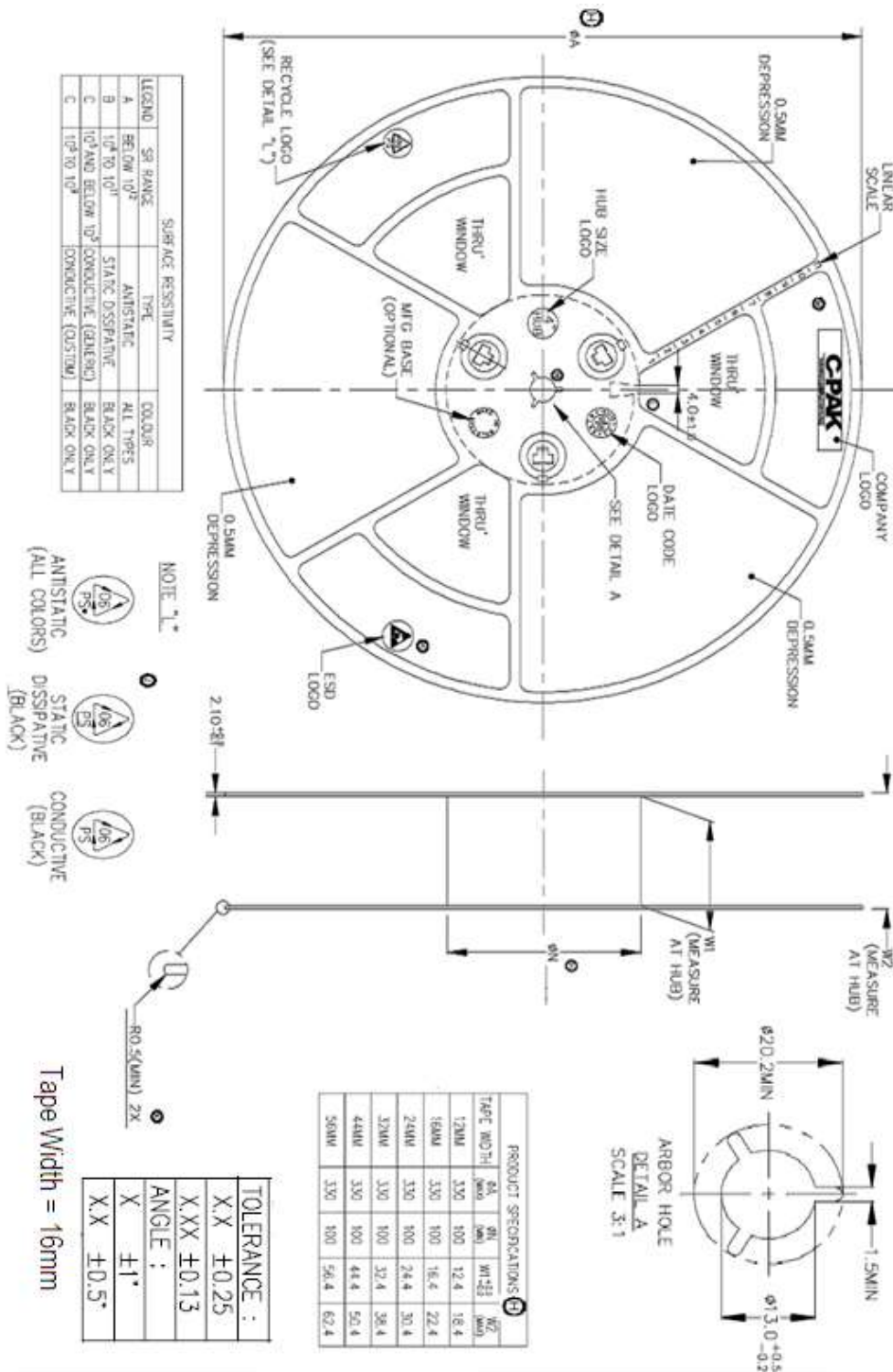


Figure 14.1 – FT2232HQ and FT4232HQ Reel Dimensions

15 FT232HL and FT232HQ Reel Dimensions

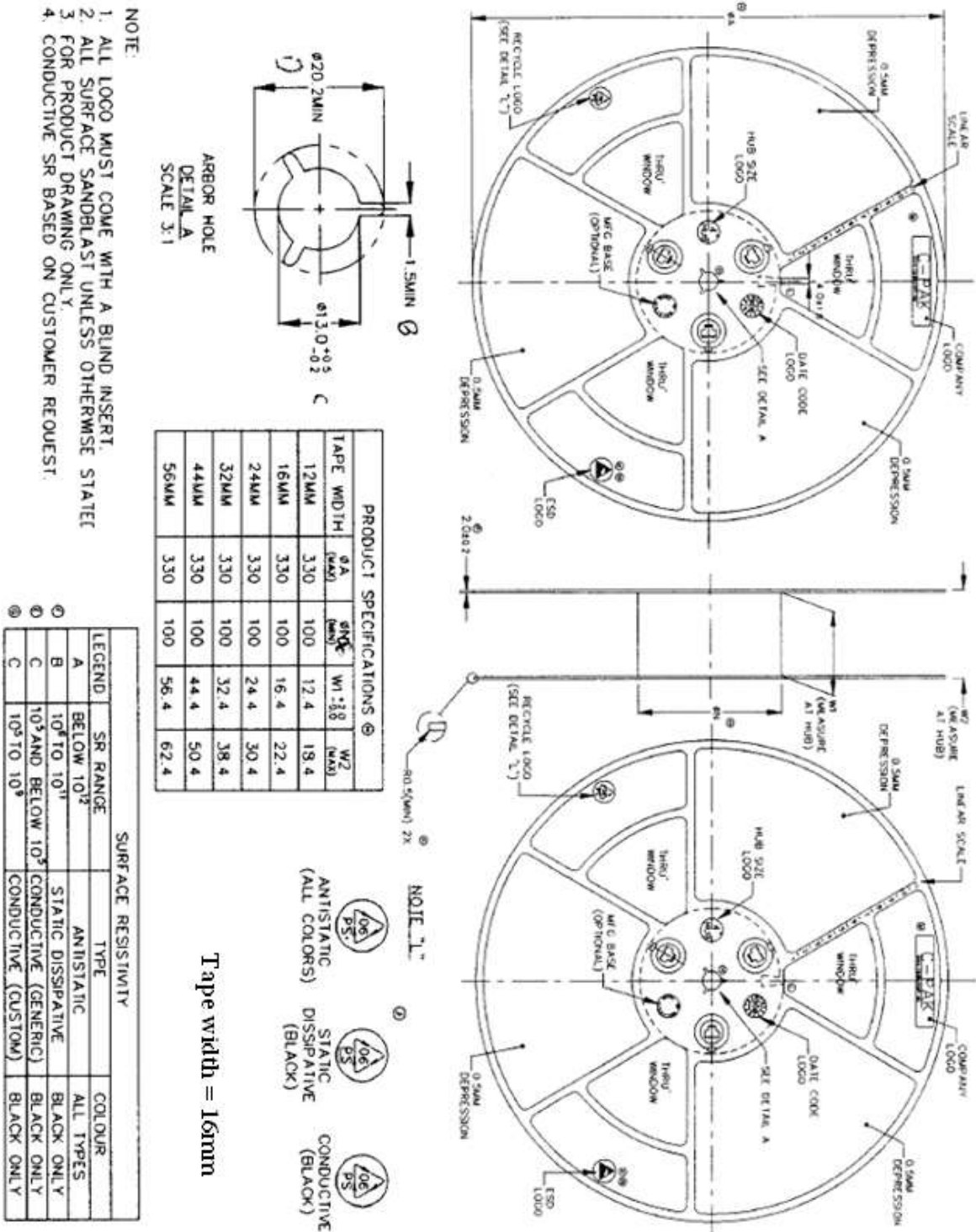


Figure 15.1 – FT232HL and FT232HQ Reel Dimensions

16 FT232HL Cover Tape Dimensions

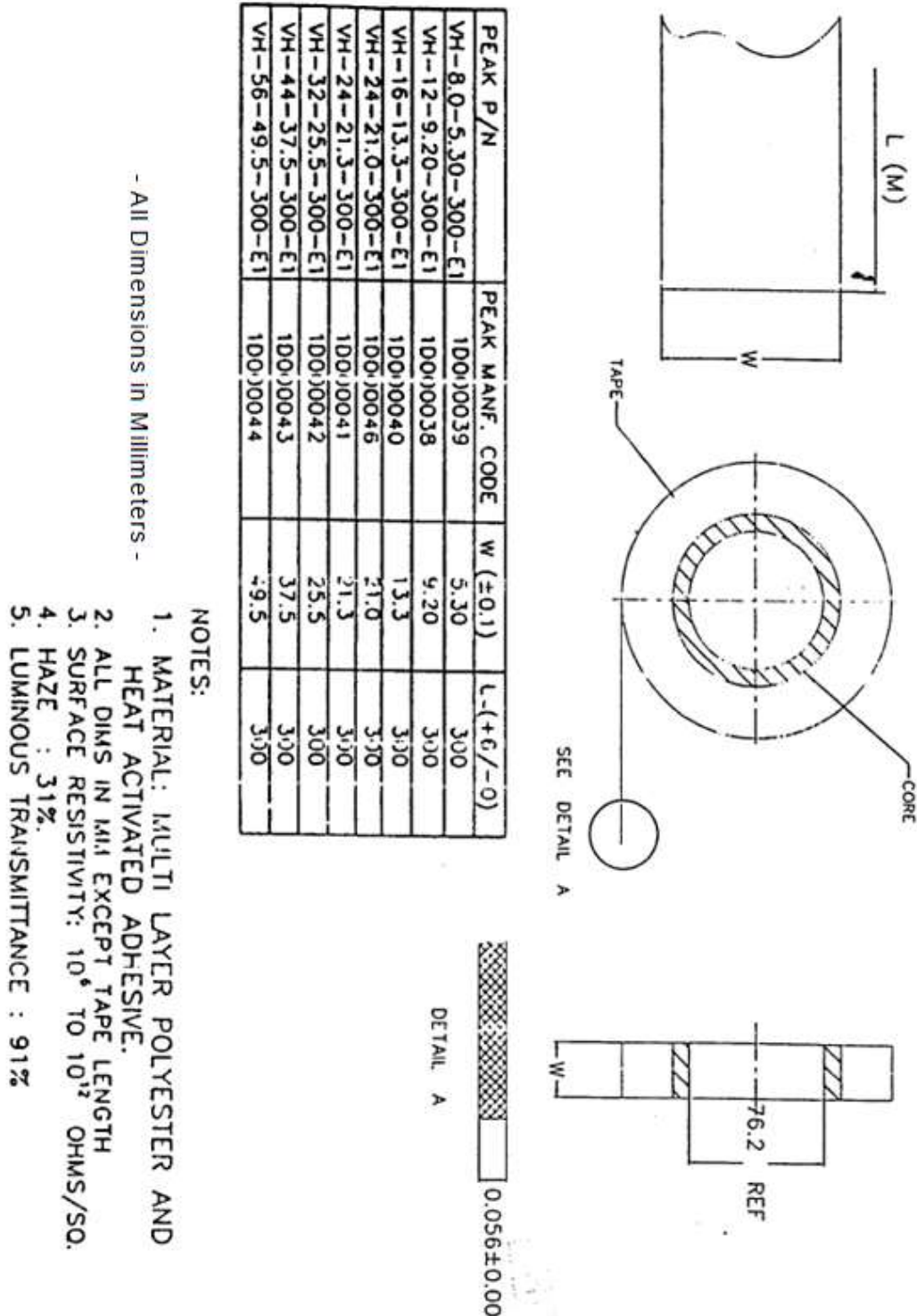


Figure 16.1 - FT232HL Cover Tape Dimensions

17 FT232HQ Cover Tape Dimensions

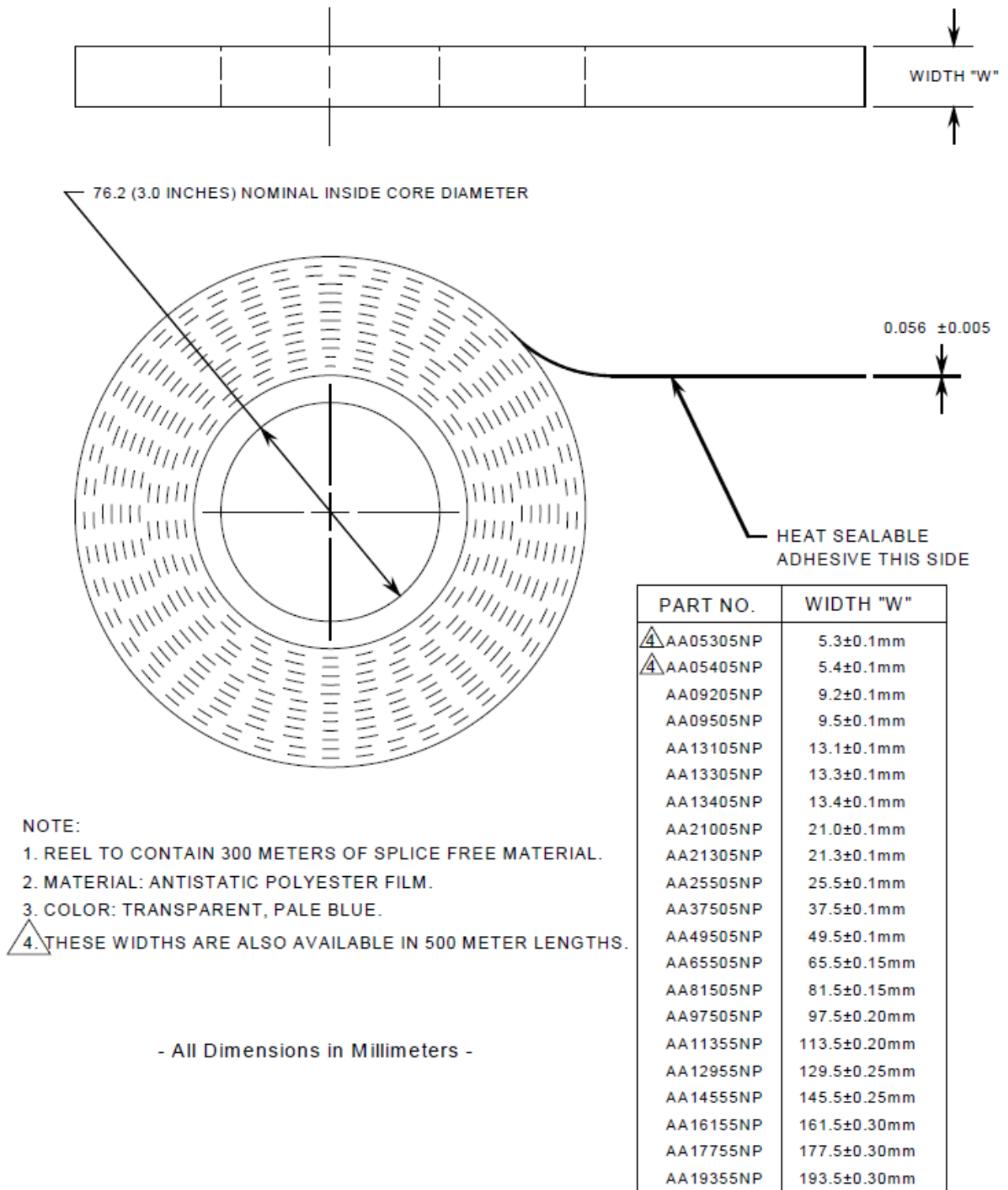
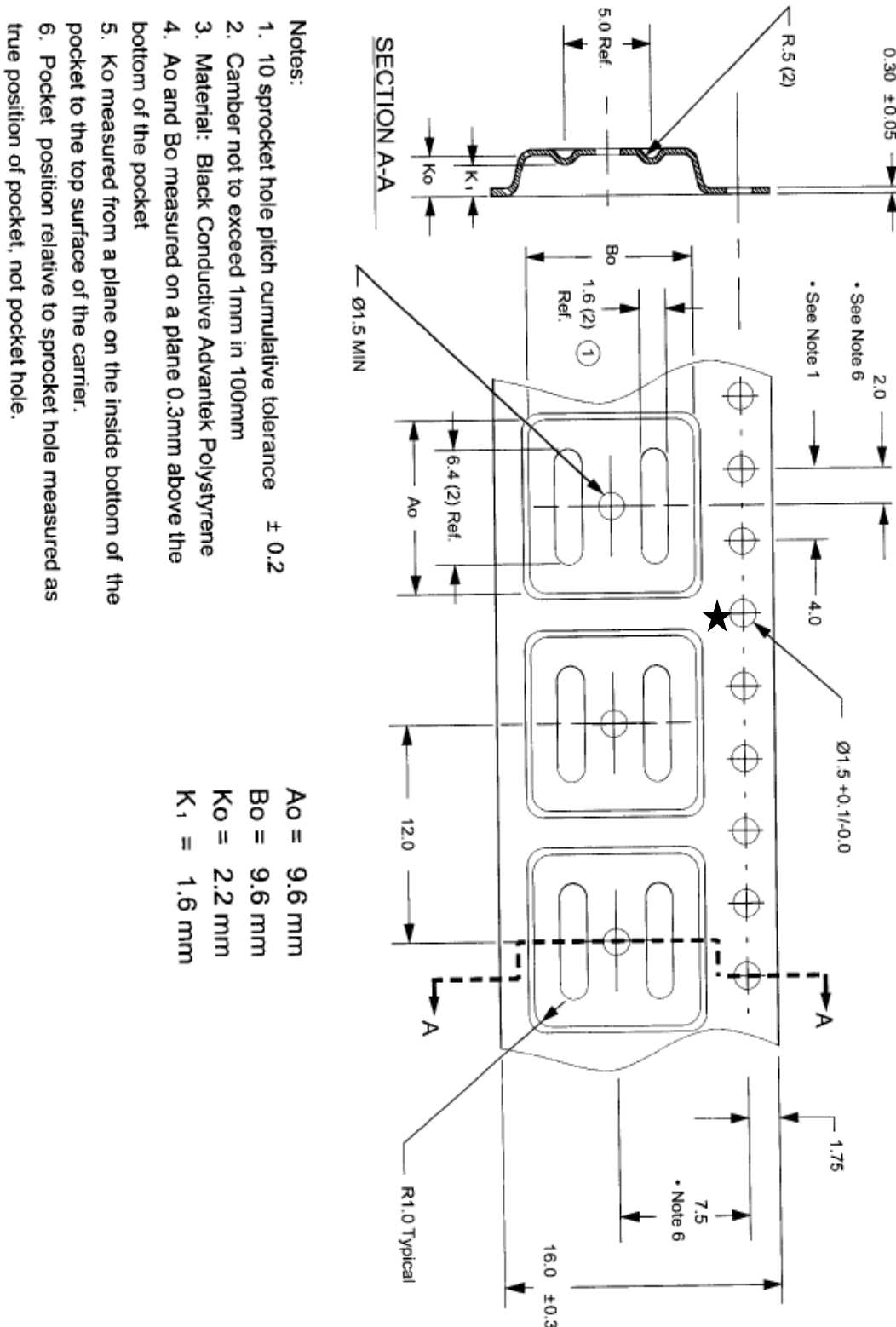


Figure 17.1 – FT232HQ Cover Tape Dimensions

18 FT232HL Carrier Tape Dimensions



★ Pin 1 Identifier

Figure 18.1 - FT232HL Carrier Tape Dimensions

19 FT232HQ Carrier Tape Dimensions

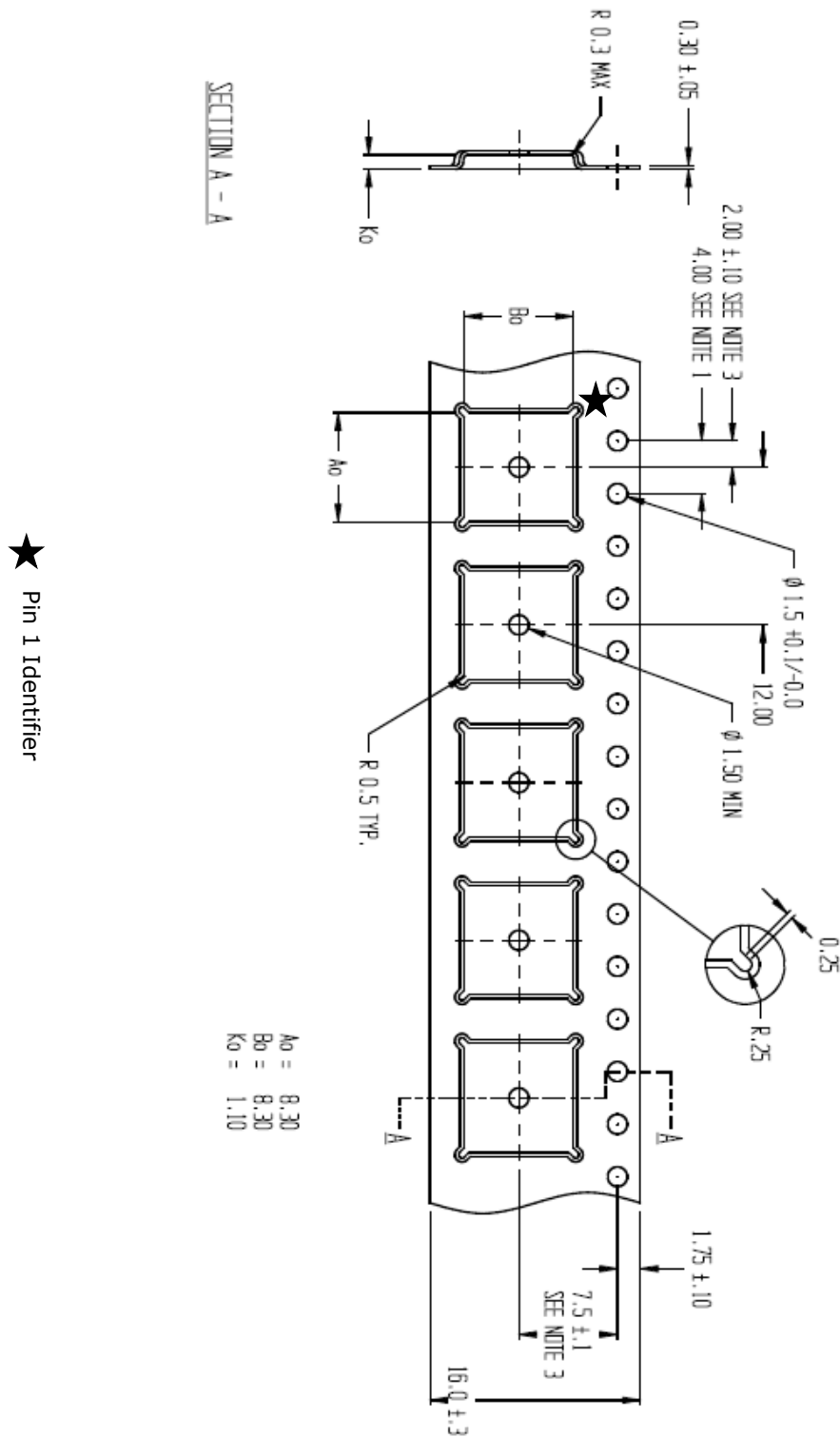


Figure 19.1 – FT232HQ Carrier Tape Dimensions

20 FT232HL Tray Dimensions

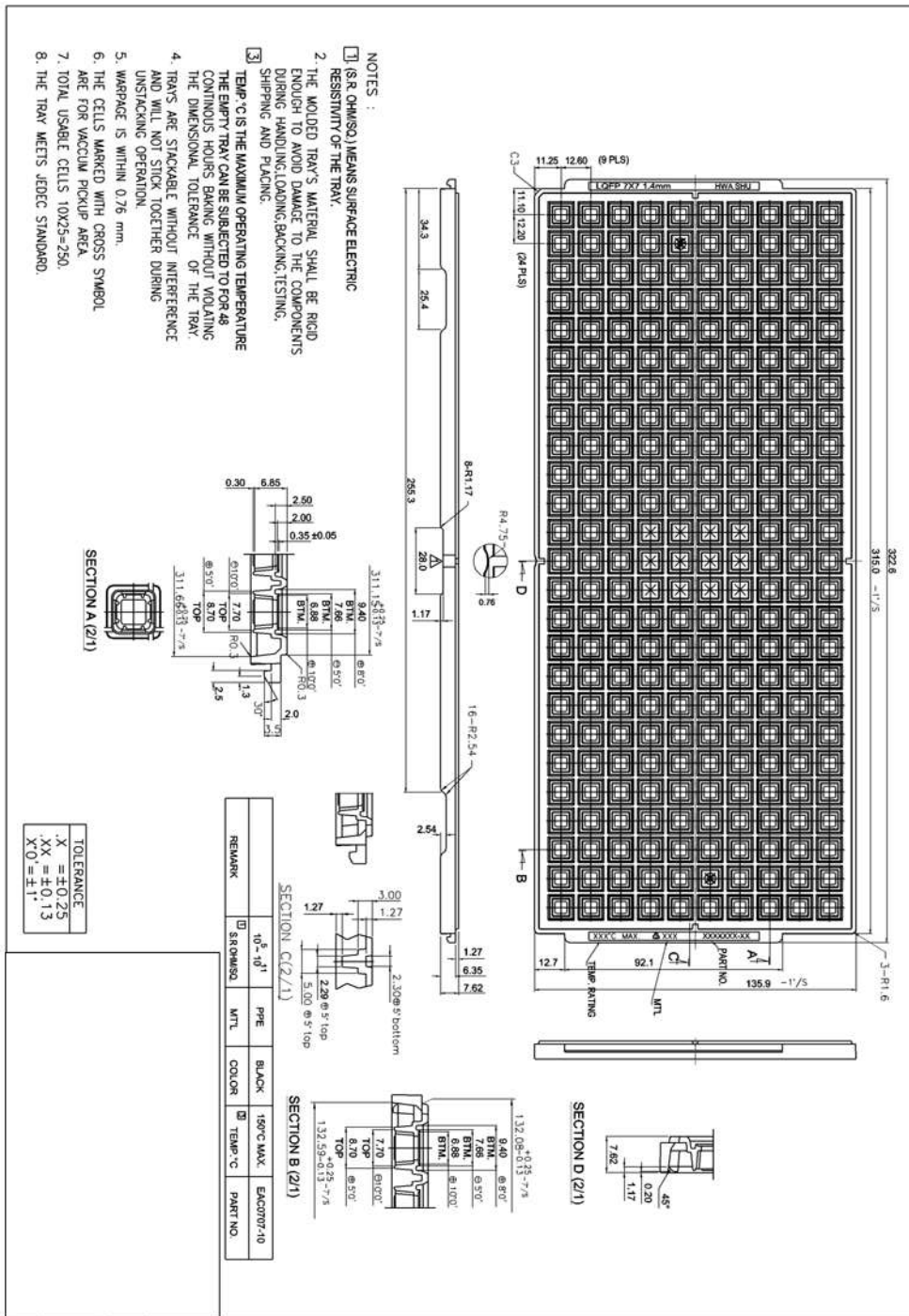


Figure 20.1 – FT232HL Tray Dimensions

21 FT232HL Tray Dimensions – Side View

	e	i	j	n	a	g
TRAY	7.050	7.500	0.460	9.771	7.300	1.540
PKG	8.305	7.800	0.838	9.000	8.891	1.400
GAP	0.063	0.120	0.284	0.178	0.238	0.386
RESULT	PASS	PASS	PASS	PASS	PASS	PASS

- CRITERION FOR PACKAGE & TRAY COMPATIBILITY**
1. A > ZERO ACCEPT
 2. B, F > A ACCEPT
 3. C, D, E > ZERO ACCEPT
 4. G > A ACCEPT
 5. H > ZERO ACCEPT
 6. E > H ACCEPT

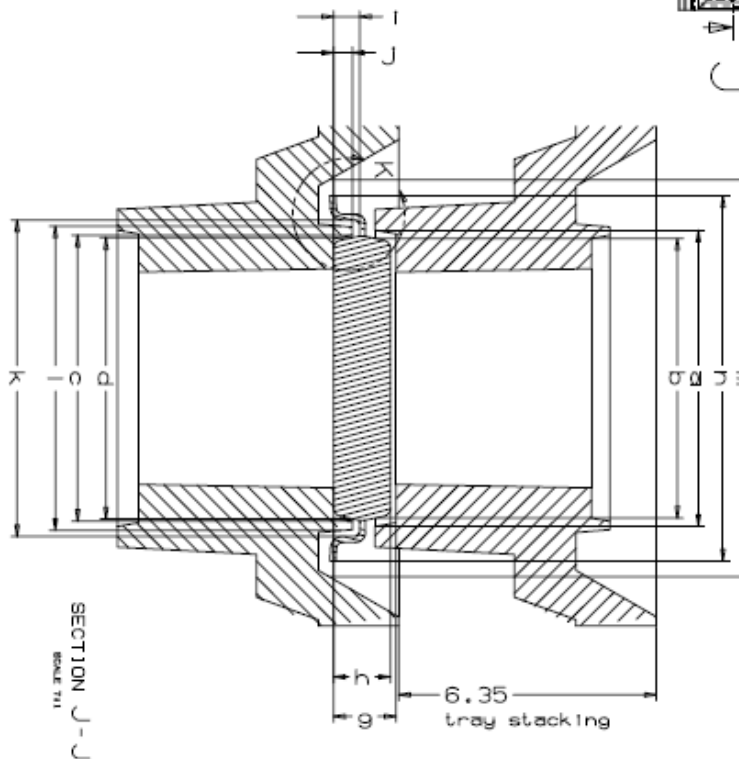
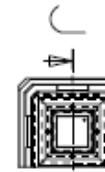
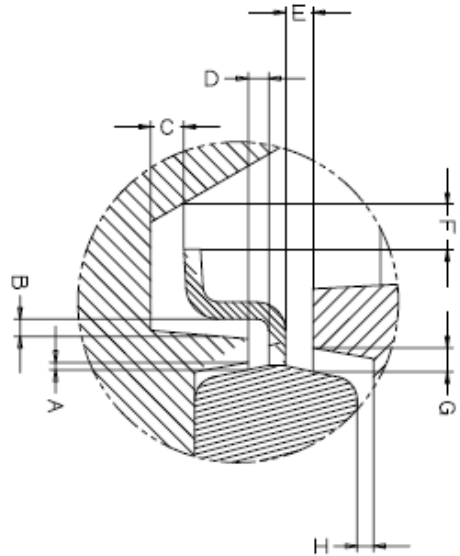
TYPICAL CONDITION
 TRAY – NOMINAL
 PKG – NOMINAL

GENERAL TOLERANCES

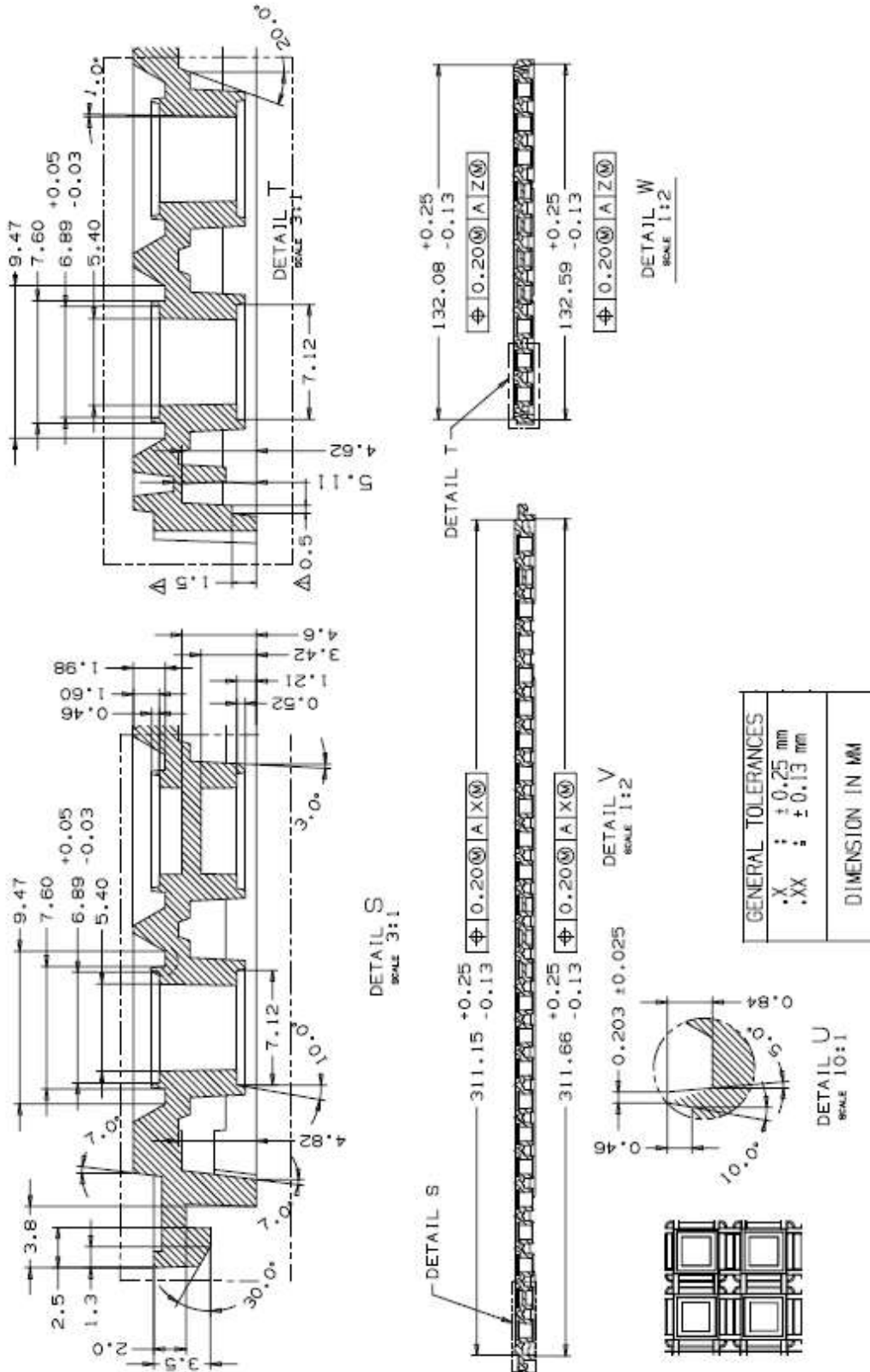
.X ± 0.25 mm
 .XX ± 0.13 mm

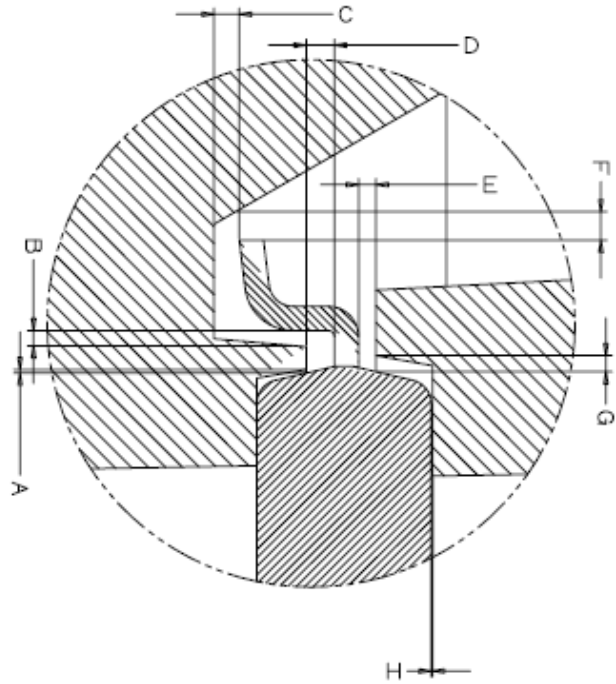
DIMENSION IN MM

DETAIL K
 SCALE 20:1



SECTION J-J
 SCALE 7:1




 DETAIL N
 SCALE 20:1

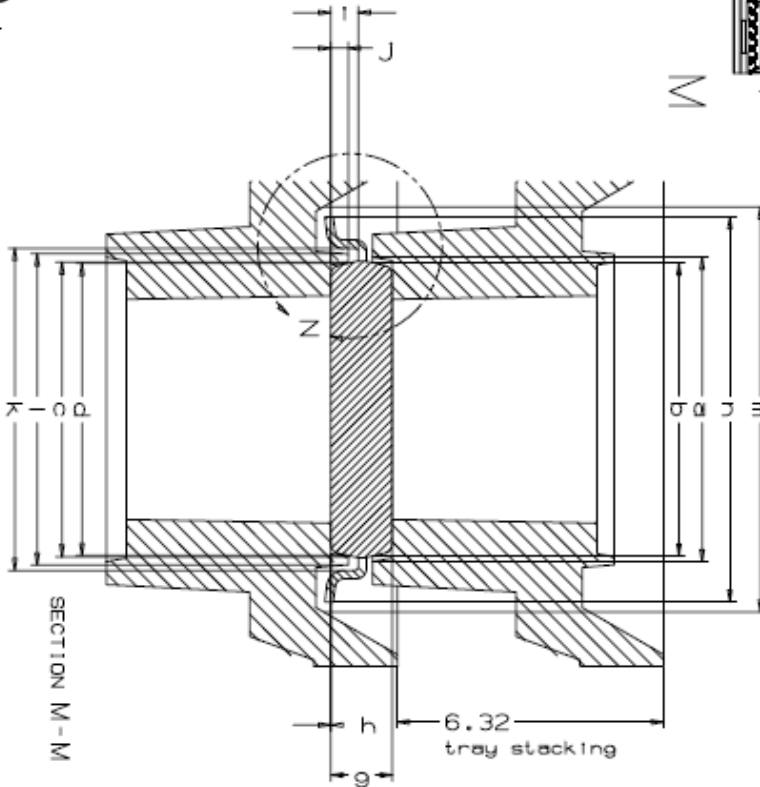
CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A > ZERO ACCEPT
2. B,F > A ACCEPT
3. C,D,E > ZERO ACCEPT
4. G > A ACCEPT
5. H > ZERO ACCEPT
6. E > H ACCEPT

WORST CONDITION(A)
 TRAY - MINIMUM
 PKG - MAXIMUM

TRAY	c	i	j	n	o	q	GENERAL TOLERANCES	
7.002	7.398		0.410	9.628	7.232	1.460	.X	± 0.25 mm
d			t				.XX	± 0.13 mm
PKG	A	B	C	D	E	F	G	H
6.341	7.850		0.845			9.150	6.985	1.450
QWP	A	B	C	D	E	F	G	H
0.030	0.128	0.209	0.235	0.145	0.239	0.134	0.010	
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

DIMENSION IN MM



SECTION M-M

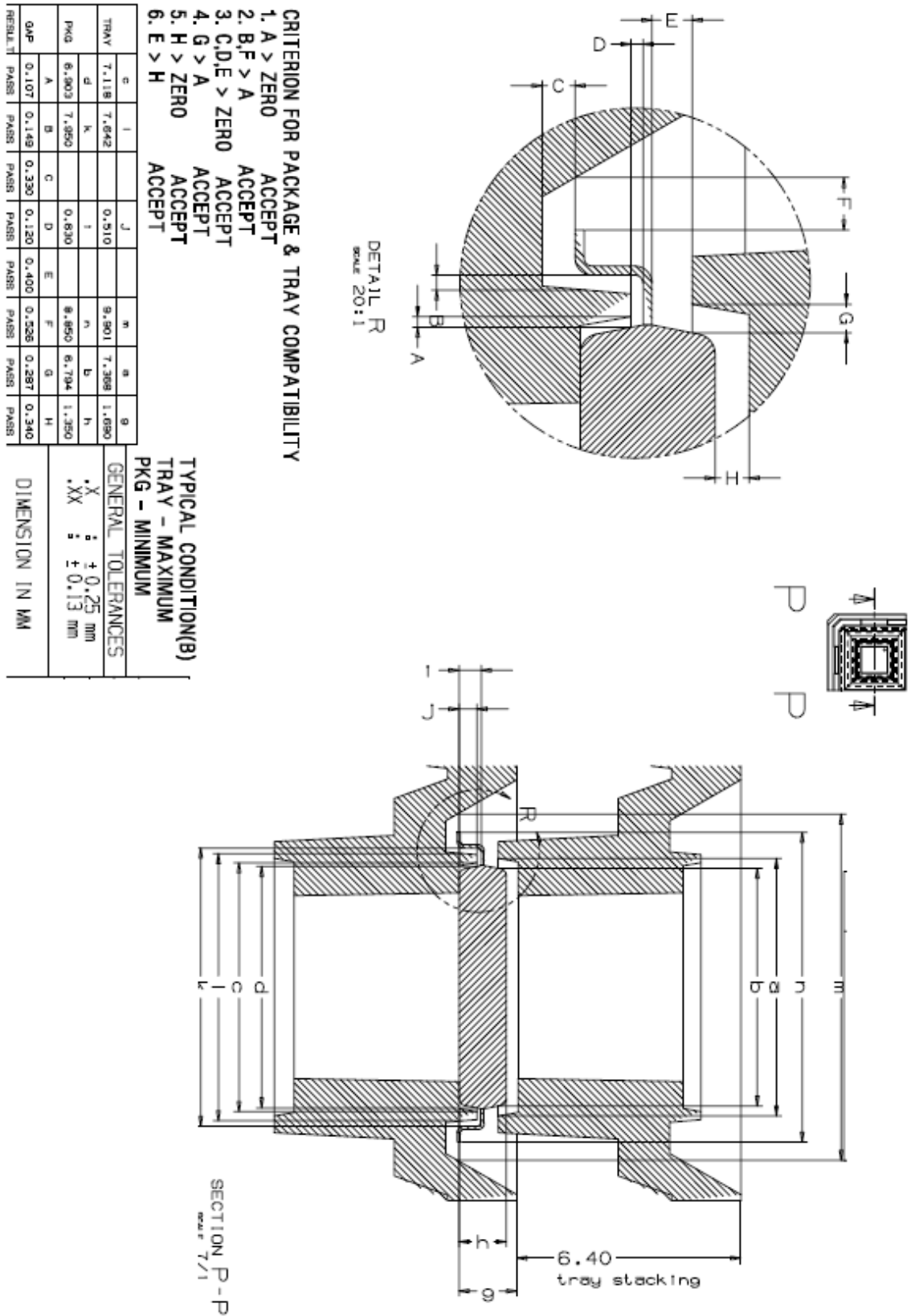


Figure 21.1 - FT232HL Tray Dimensions Side View

22 FT232HQ Tray Dimensions

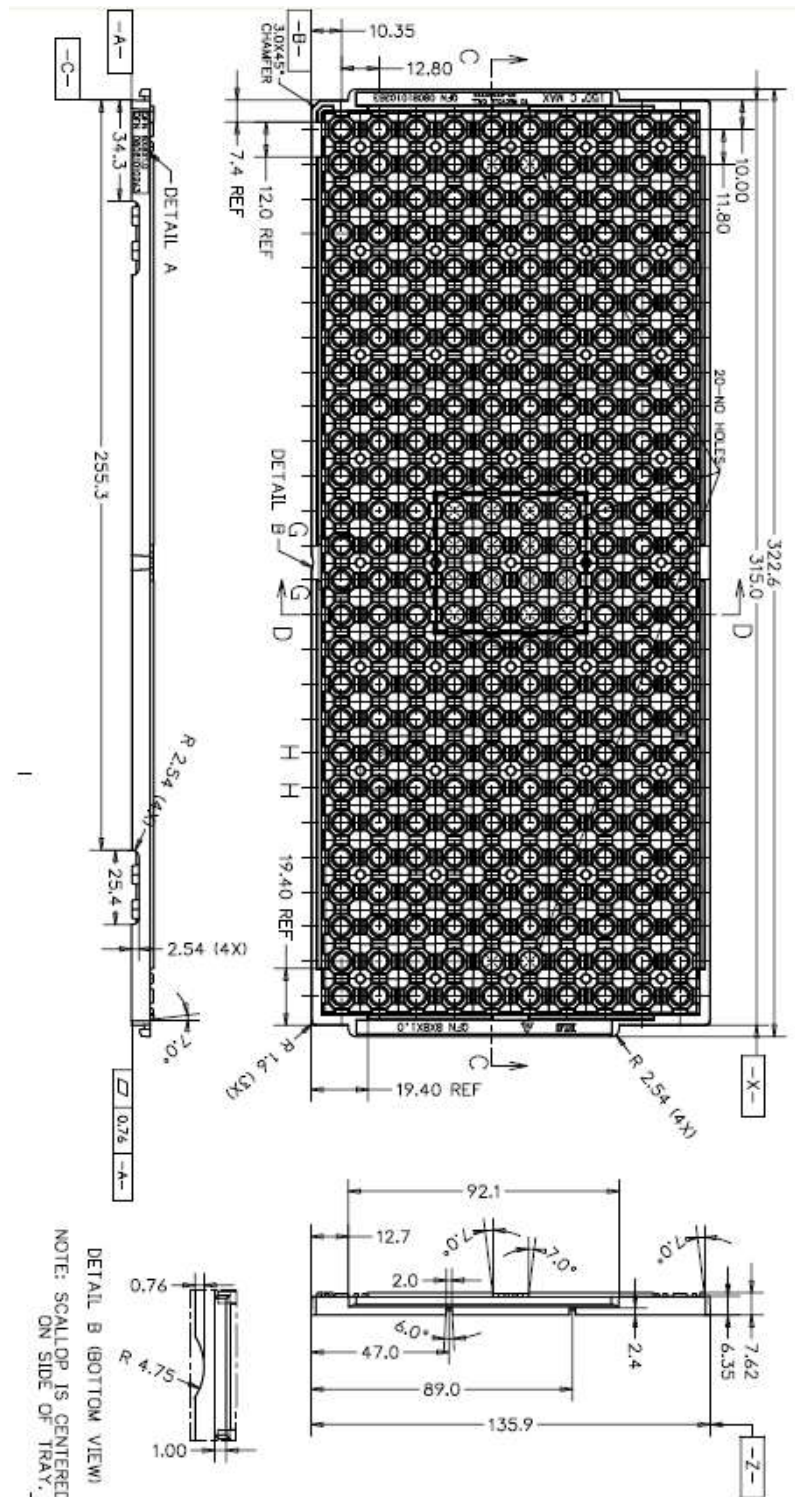
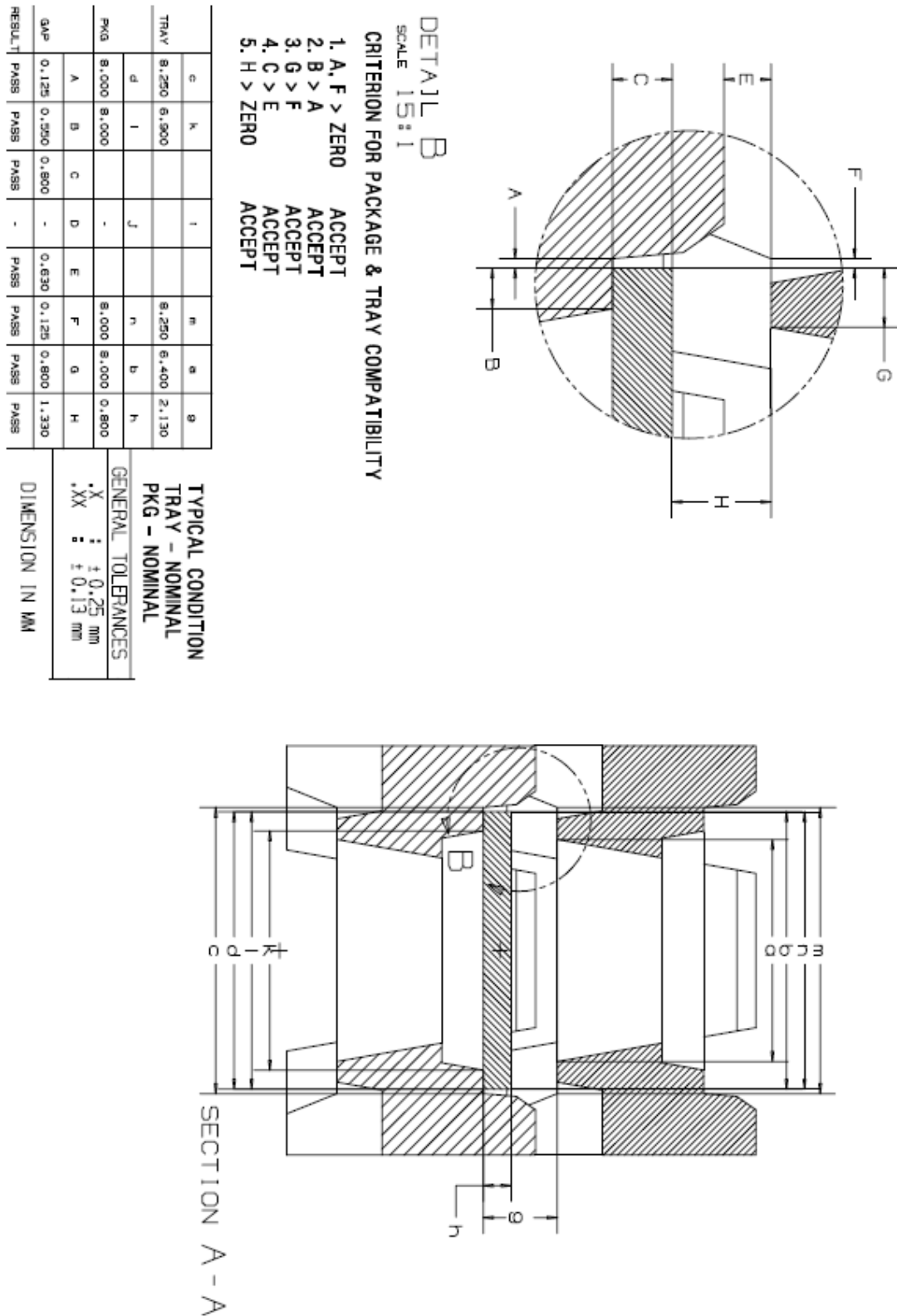
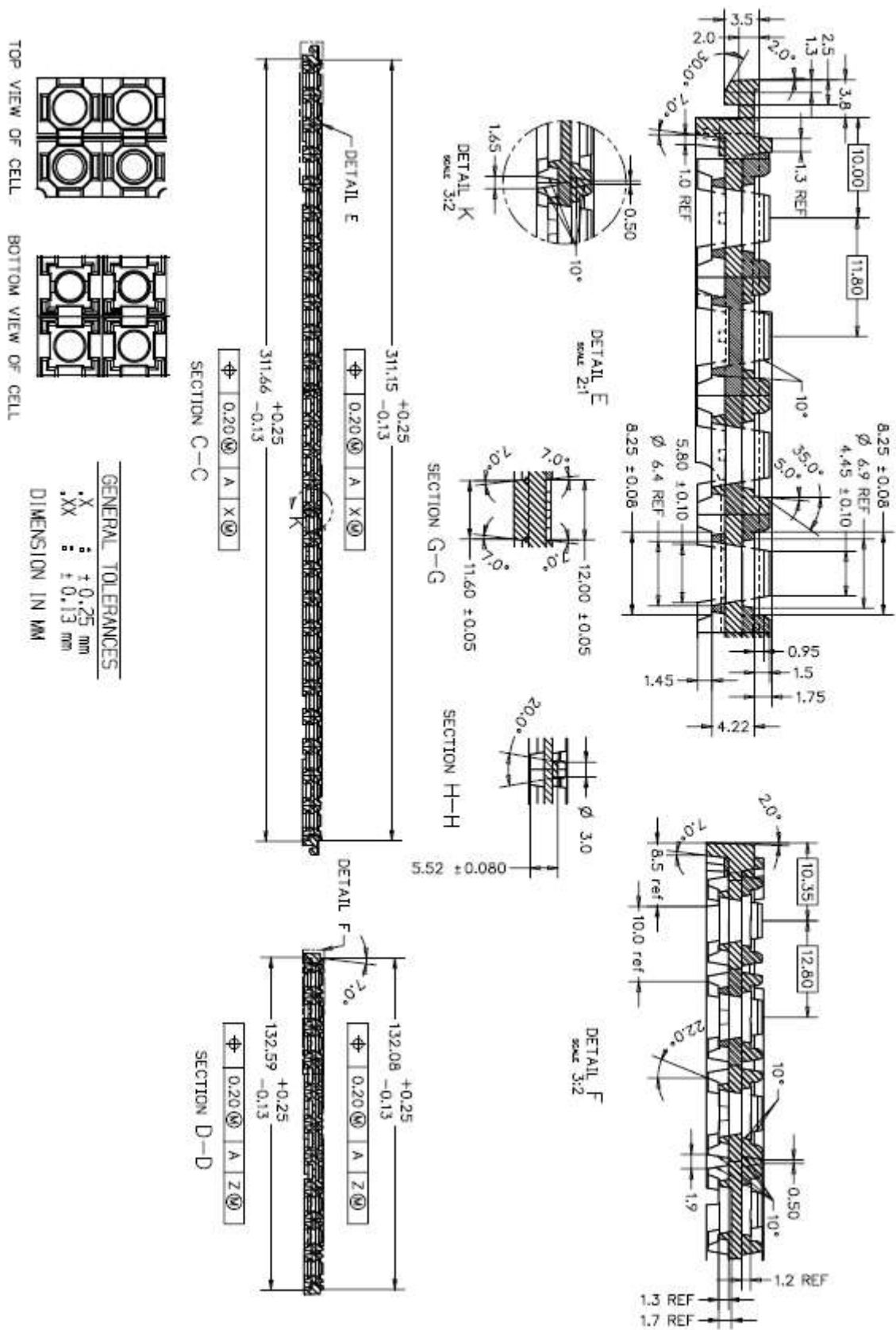
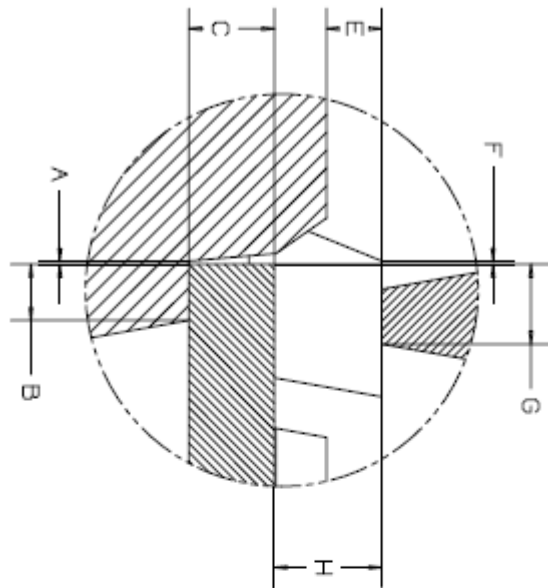


Figure 22.1 – FT232HQ Tray Dimensions

23 FT232HQ Tray Dimensions – Side View





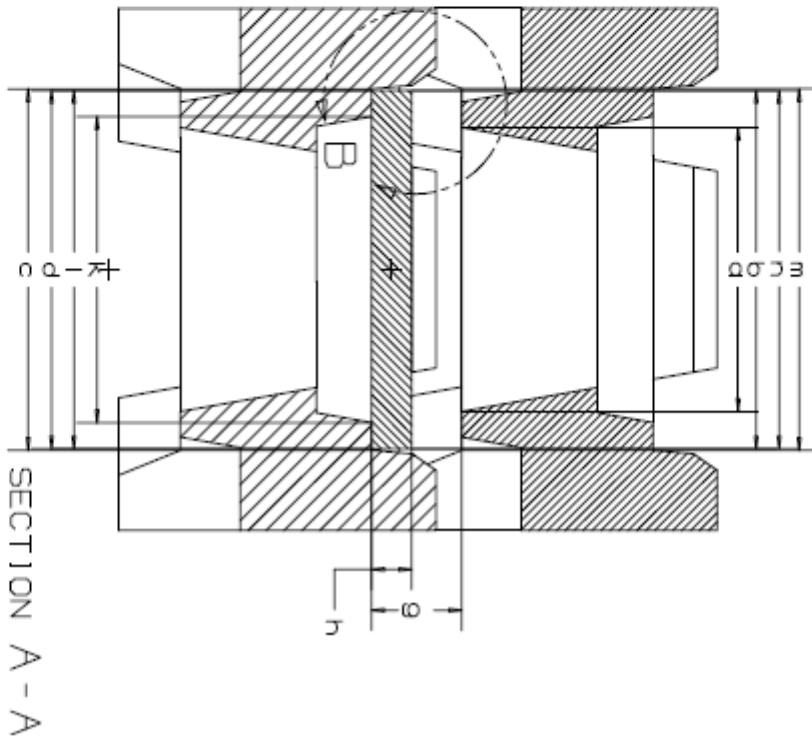


DETAIL B

SCALE 15:1

CRITERION FOR PACKAGE & TRAY COMPATIBILITY

- 1. A, F > ZERO ACCEPT
- 2. B > A ACCEPT
- 3. G > F ACCEPT
- 4. C > E ACCEPT
- 5. H > ZERO ACCEPT



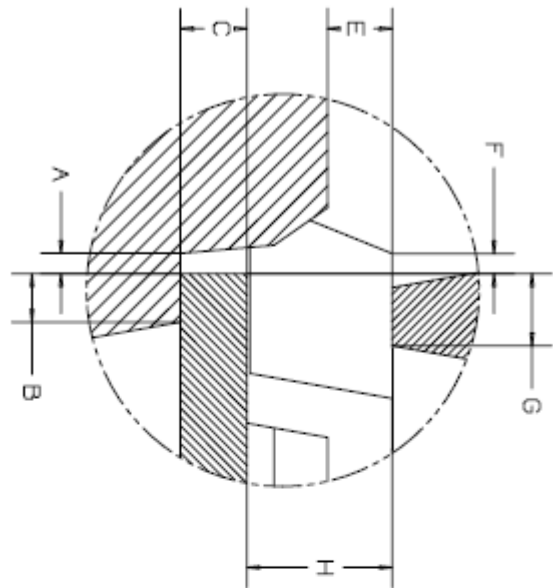
	c	h		i		m	e	g
TRAY	8.168	6.918				8.172	6.418	2.030
	d	i		j		n	b	h
PKG	8.100	8.100		-		8.100	8.100	0.900
	A	B	C	D	E	F	G	H
GAP	0.034	0.591	0.900	-	0.580	0.036	0.841	1.130
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS

WORST CONDITION (A)
TRAY - MINIMUM
PKG - MAXIMUM

GENERAL TOLERANCES

.X ± 0.25 mm
 .XX ± 0.13 mm

DIMENSION IN MM



DETAIL B
 SCALE 15:1

CRITERION FOR PACKAGE & TRAY COMPATIBILITY

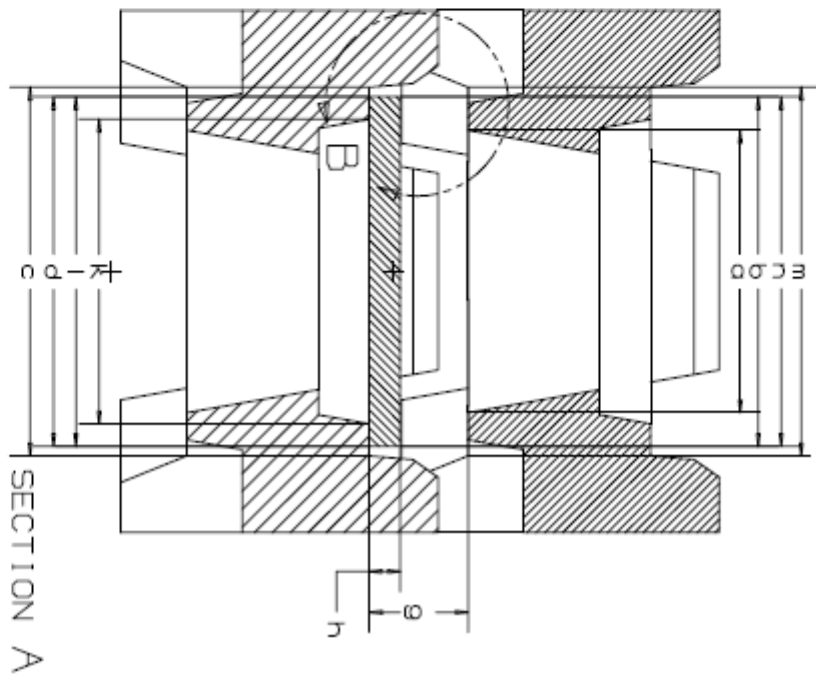
1. A, F > ZERO ACCEPT
2. B > A ACCEPT
3. G > F ACCEPT
4. C > E ACCEPT
5. H > ZERO ACCEPT

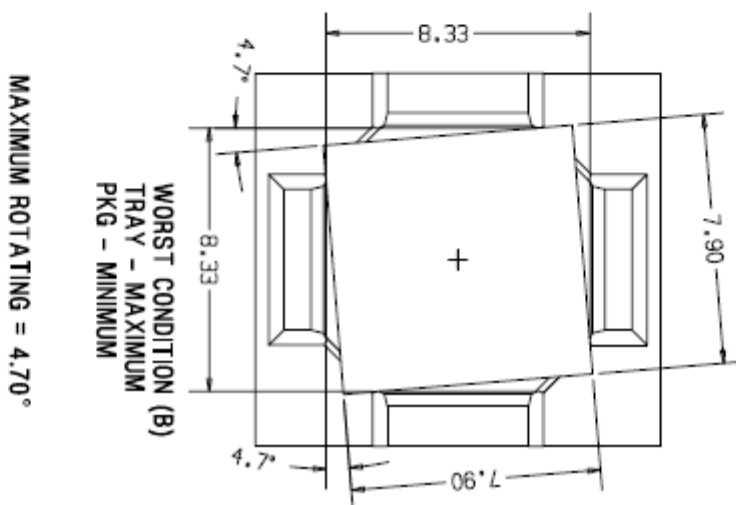
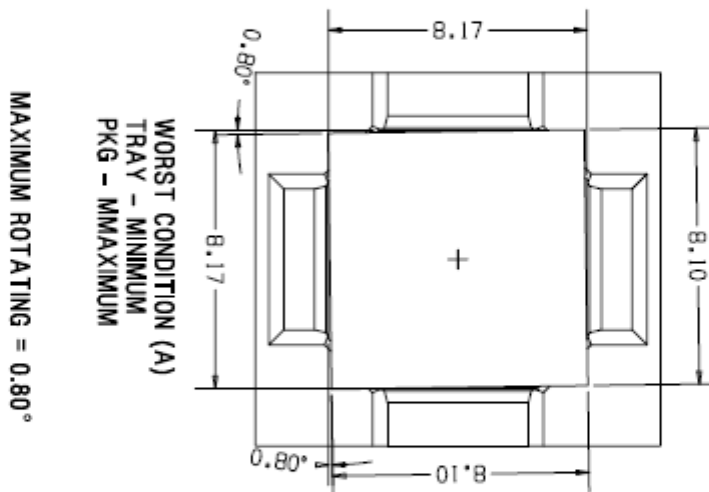
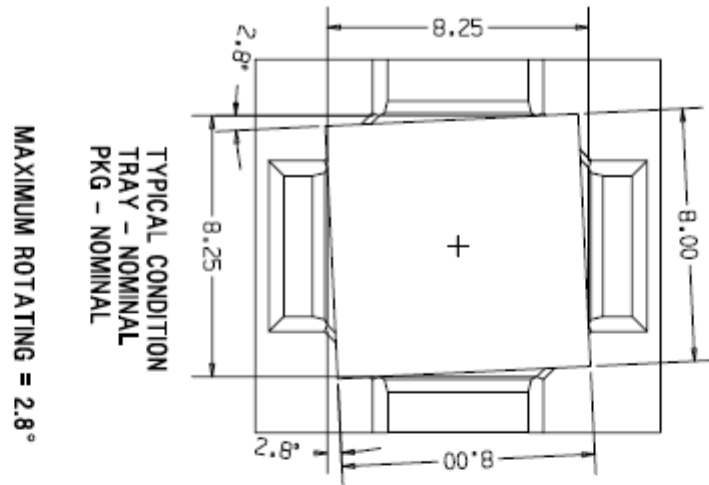
TRAY	g		h		i		m		o		q	
	d	i					n	b				
PKG	7.900	7.900					7.900	7.900	0.700			
GAP	A	B	C	D	E	F	G	H				
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

WORST CONDITION (B)	
TRAY - MAXIMUM	PKG - MINIMUM
8.332	6.982
8.328	6.982
8.230	2.230
7.900	7.900
7.900	7.900
0.700	0.700
0.216	0.509
0.509	0.700
0.680	0.214
0.214	0.759
1.530	1.530

GENERAL TOLERANCES
 .X ± 0.25 mm
 .XX ± 0.13 mm

DIMENSION IN MM





GENERAL TOLERANCES	
.X	± 0.25 mm
.XX	± 0.13 mm
DIMENSION IN MM	

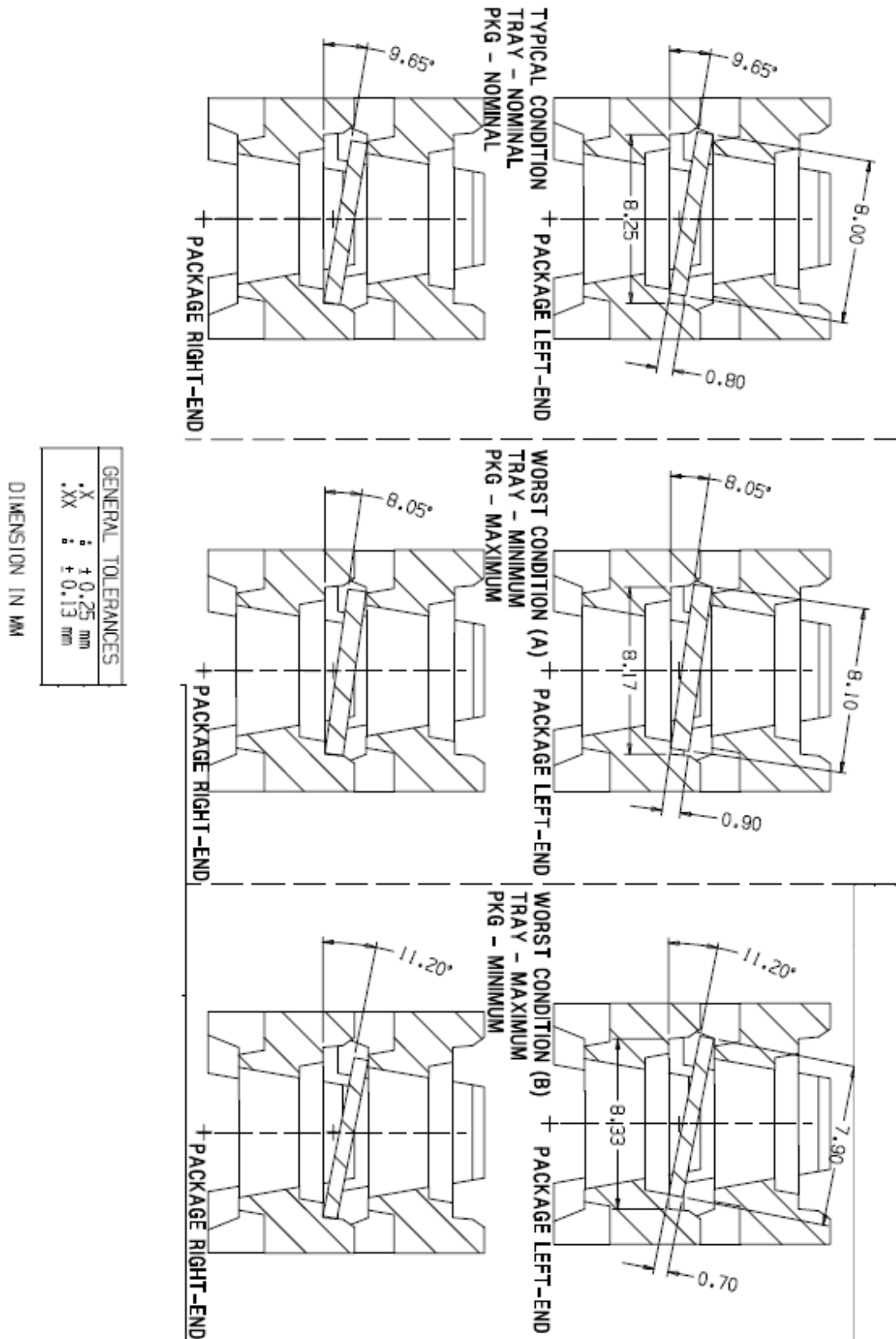


Figure 23.1 - FT232HQ Tray Dimensions Side View

24 FT232HL and FT232HQ Protective Belt

PART NUMBER	TAPE WIDTH	W*
PB10908UC	8	8.3 +0.7/-0.0 mm
PB10912UC	12	12.3 +0.7/-0.0 mm
PB10916UC	16	16.3 +0.7/-0.0 mm
PB10924UC	24	24.3 +0.7/-0.0 mm
PB10932UC	32	32.3 +0.7/-0.0 mm
PB10944UC	44	44.3 +0.7/-0.0 mm
PB10956UC	56	56.3 +0.7/-0.0 mm
PB10972UC	72	72.3 +0.7/-0.0 mm
PB10988UC	88	88.3 +0.7/-0.0 mm
PB109104UC	104	104.3 +0.7/-0.0 mm
PB109120UC	120	120.3 +0.7/-0.0 mm
PB109136UC	136	136.3 +0.7/-0.0 mm
PB109152UC	152	152.3 +0.7/-0.0 mm
PB109168UC	168	168.3 +0.7/-0.0 mm
PB109184UC	184	184.3 +0.7/-0.0 mm
PB109200UC	200	200.3 +0.7/-0.0 mm

- NOTES
1. SURFACE RESISTIVITY $\leq 10^7$ OHMS PER SQUARE.
 2. COLOR - BLACK

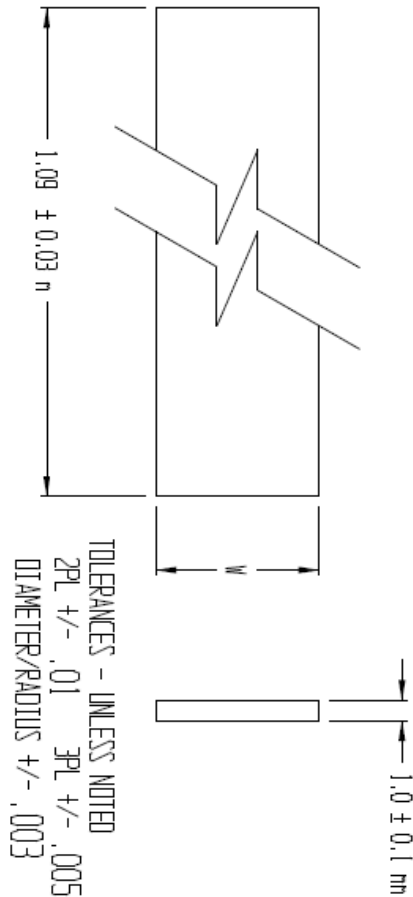


Figure 24.1 – FT232HL and FT232HQ Protective Belt

25 VNC1L – A – Reel Vendor Part No. RD33008SW

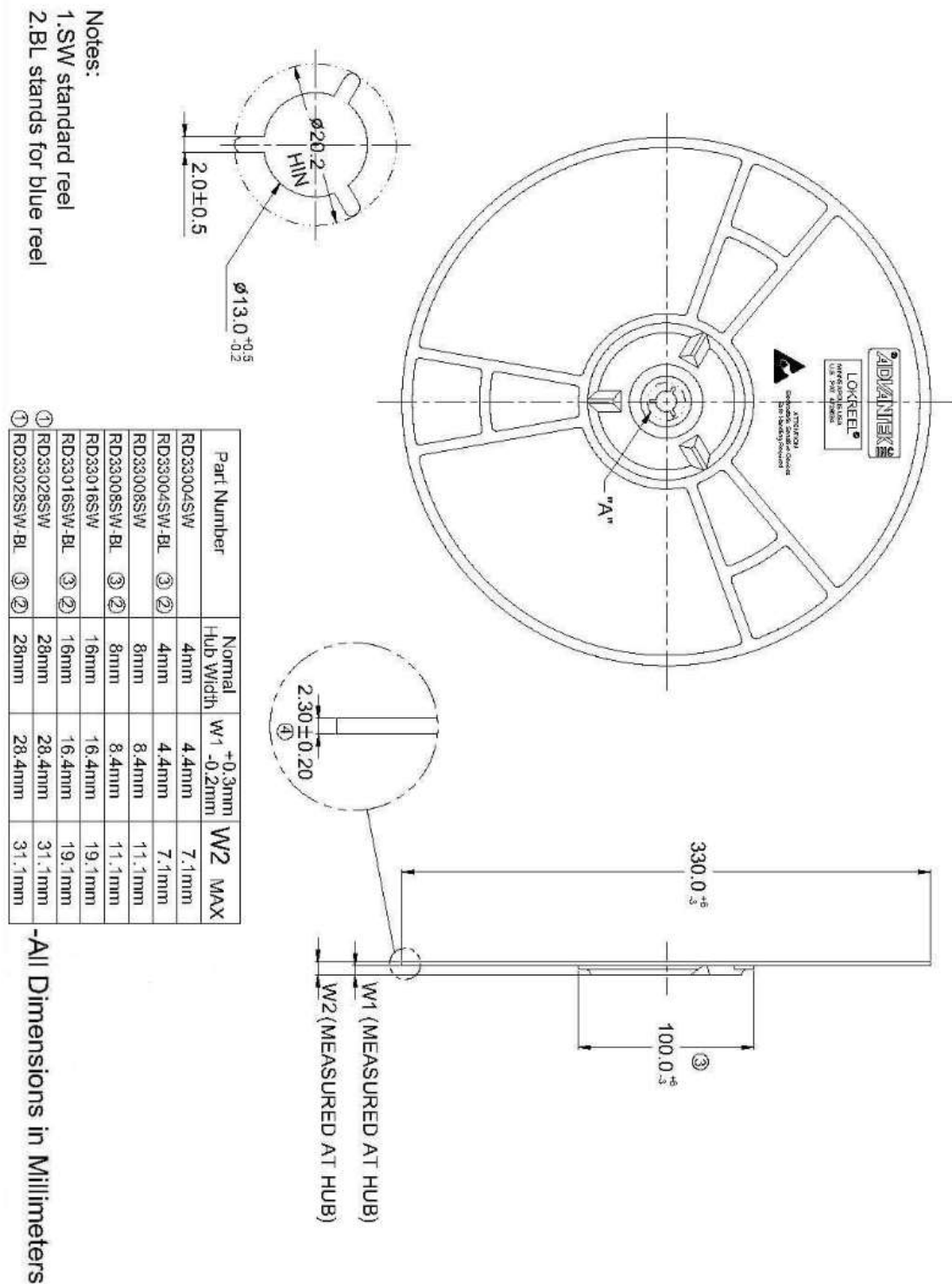


Figure 25.1 – VNC1L – A – Reel Vendor Part No. RD33008SW

26 VNC1L – A – Cover Tape Vendor Part No. AA13305NP

- NOTE:**
1. REEL TO CONTAIN 300 METERS OF SPICE FREE MATERIAL.
 2. MATERIAL: POLYESTER FILM WITH ANTISTATIC COATING AND ADHESIVE COATING.
 3. COLOR: TRANSPARENT, NATURAL.

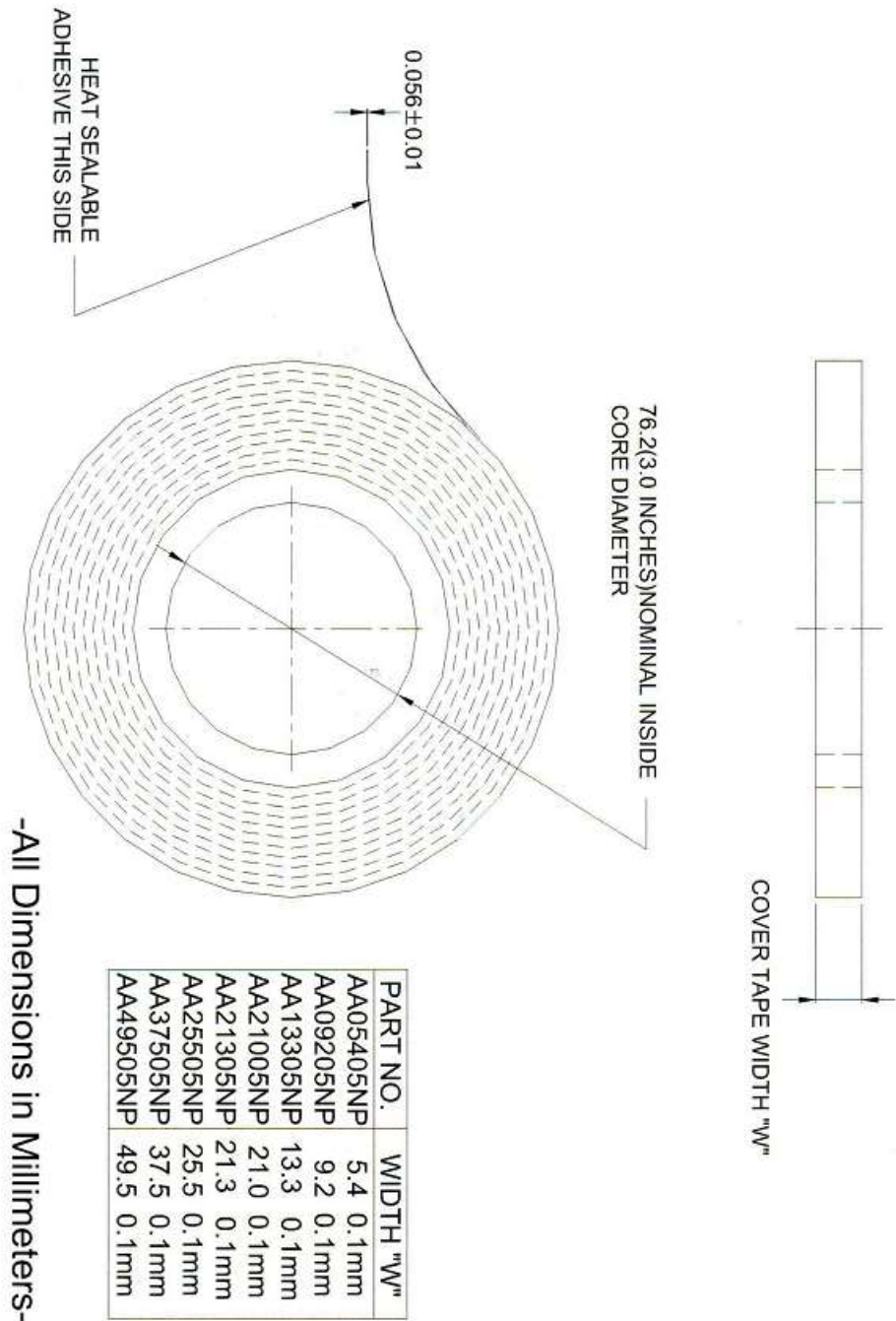


Figure 26.1 – VNC1L – A – Cover Tape Vendor Part No. AA13305NP

27 VNC1L - A - Carrier Tape Vendor Part No. Q07X07-A

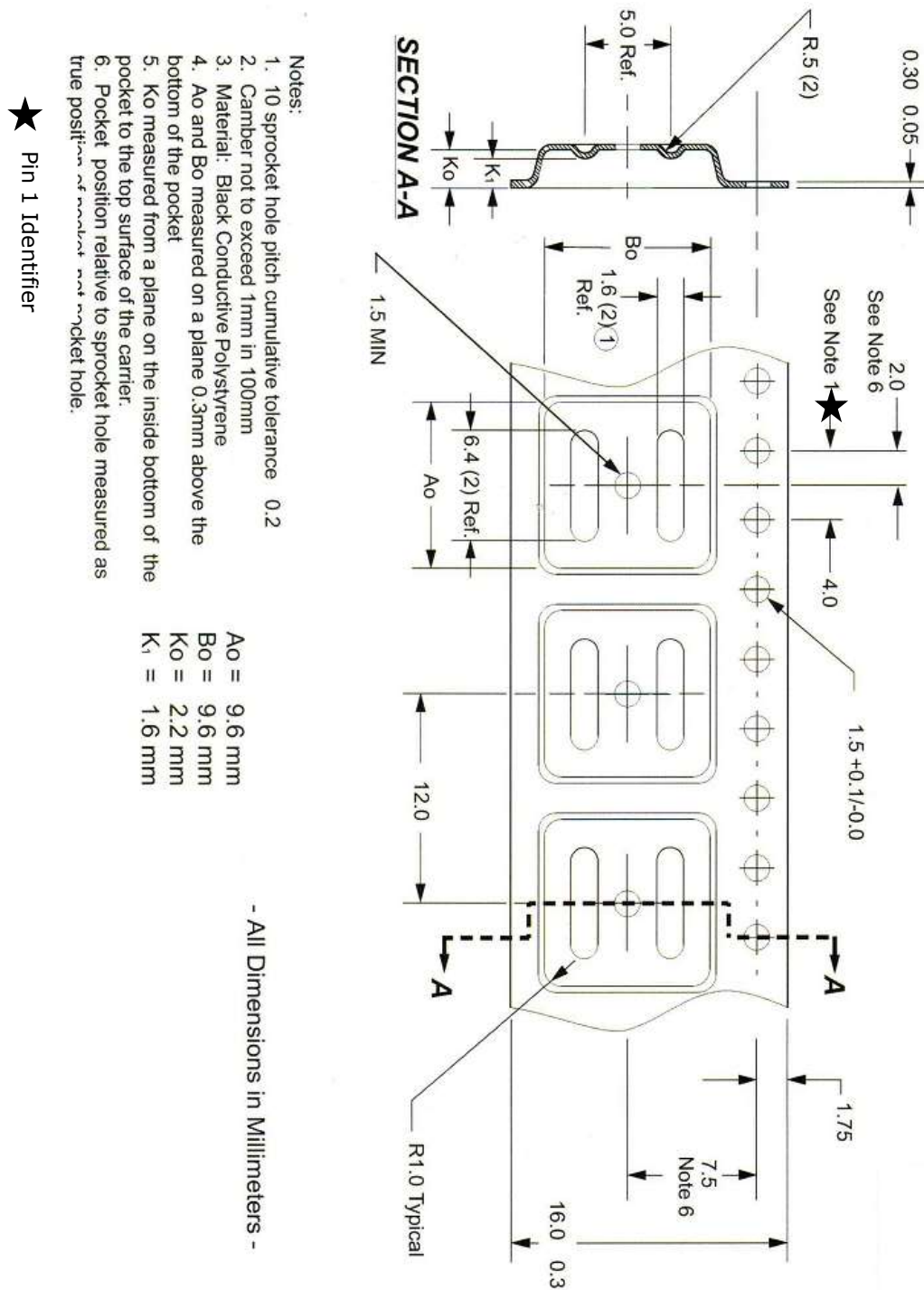


Figure 27.1 - VNC1L - A - Carrier Tape Vendor Part No. Q07X07-A

28 VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48 & QFN-64, FT311D–LQFP Reel Dimensions

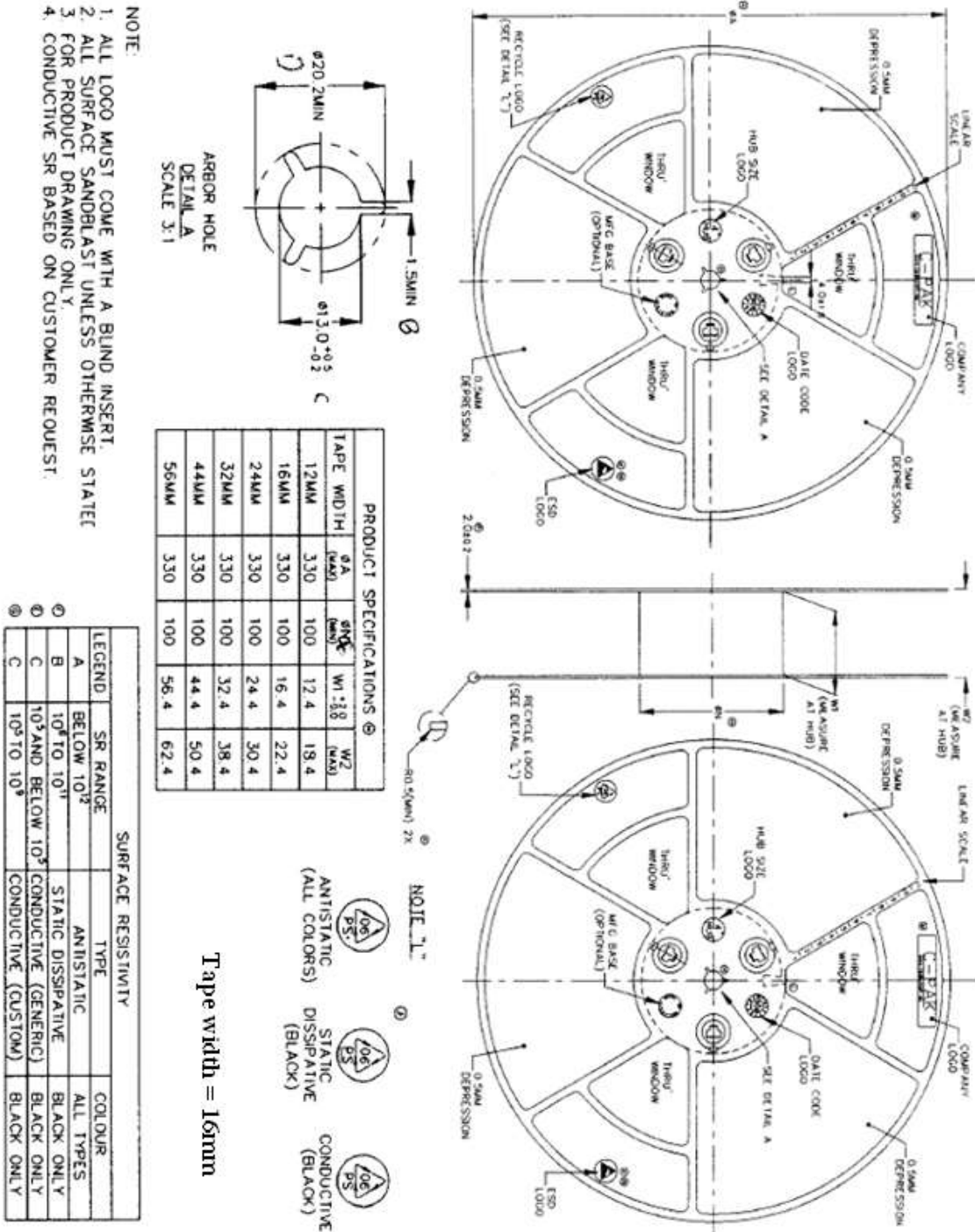


Figure 28.1 – VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48 and QFN-64, FT311D–LQFP Reel Dimensions

29 VNC2 – LQFP-32 VNC2 – LQFP-48, FT311D – LQFP Cover Tape Dimensions

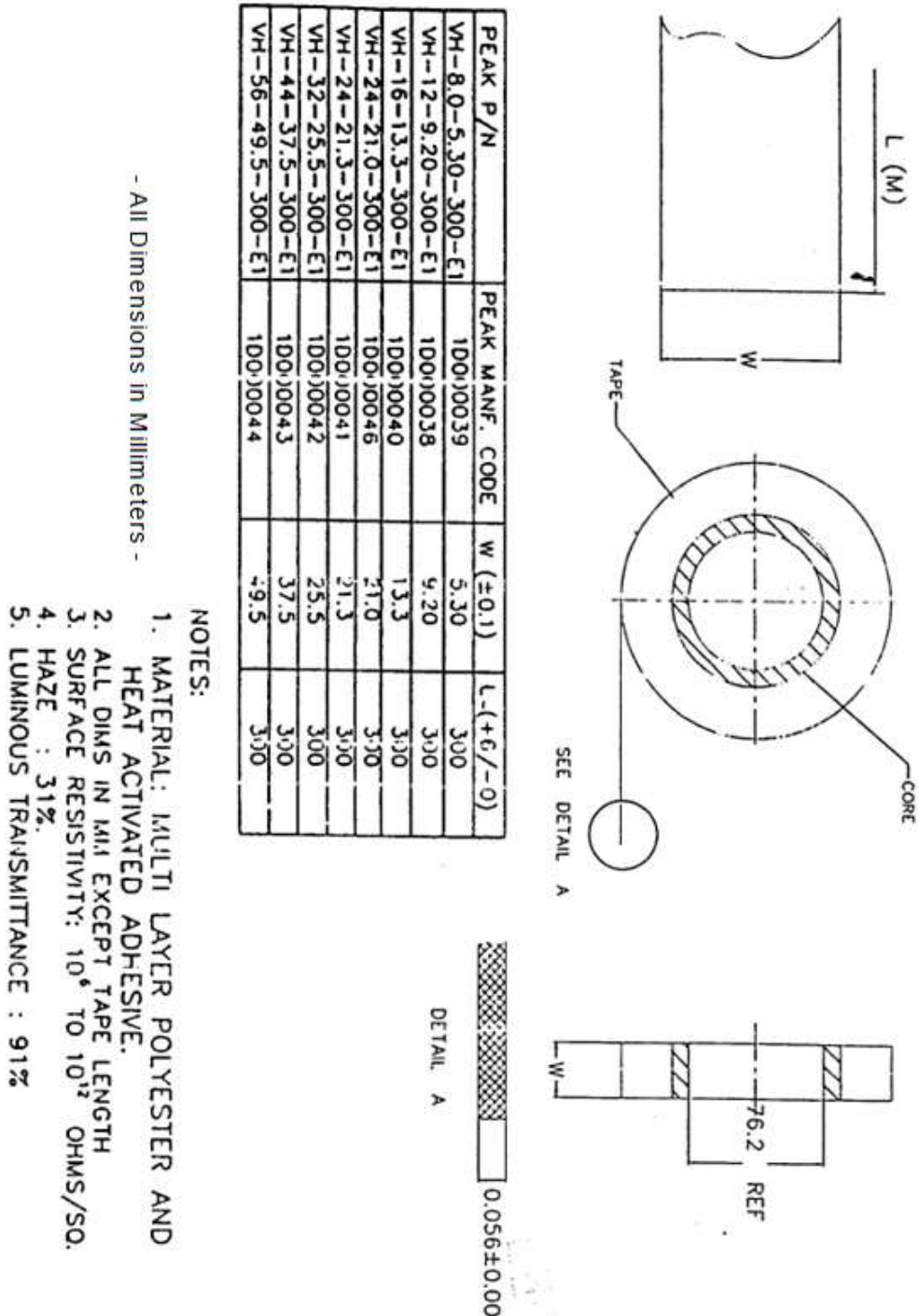


Figure 29.1 VNC2 – LQFP-32 VNC2 – LQFP-48, FT311D – LQFP Cover Tape Dimensions

30 VNC2 –LQFP-64, QFN-32, QFN-48, QFN-64, FT311D-QFN Cover Tape Dimensions

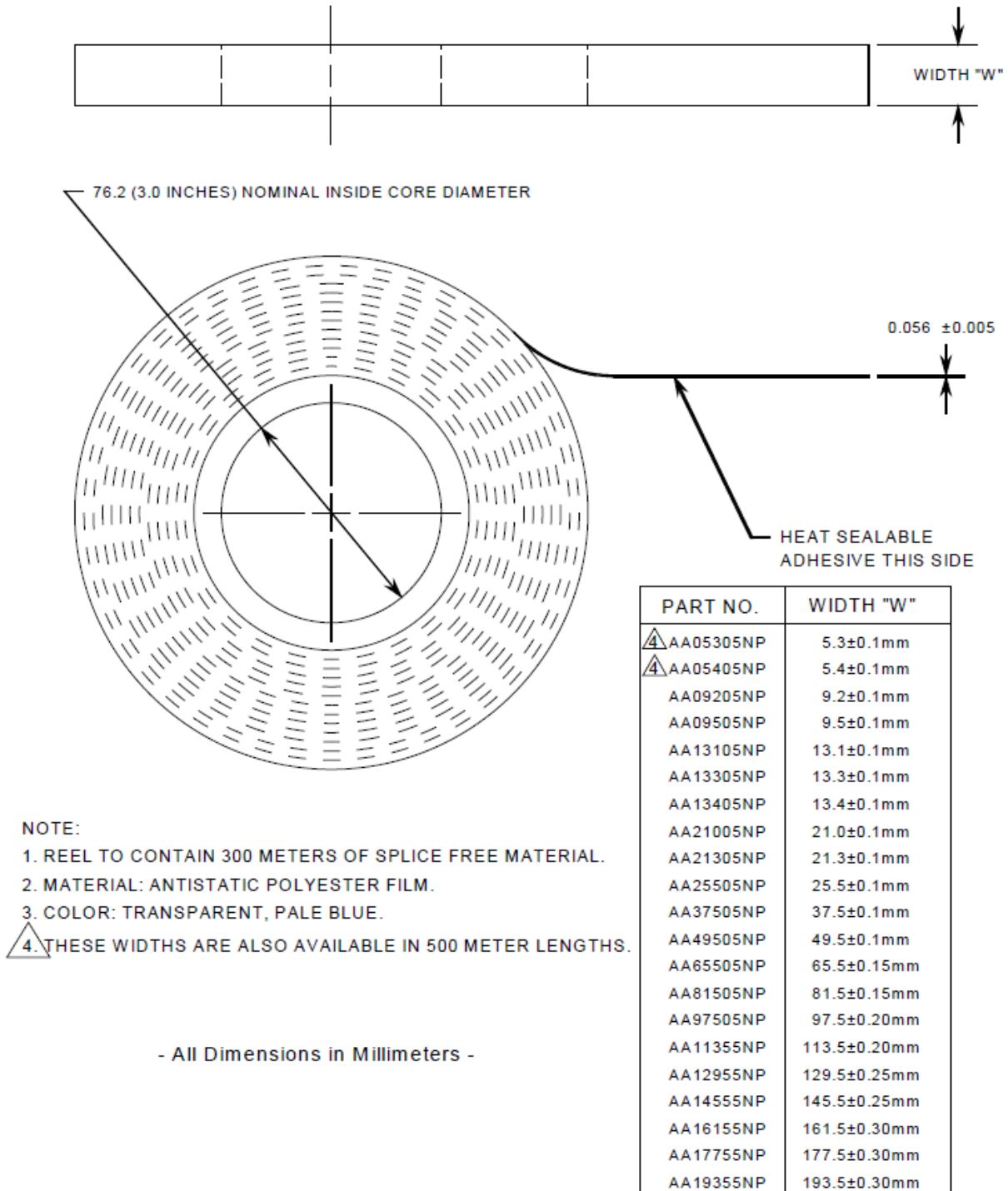


Figure 30.1 VNC2 –LQFP-64, QFN-32, QFN-48, QFN-64, FT311D-QFN Cover Tape Dimensions

31 VNC2 - LQFP-32, VNC2 - LQFP-48, FT311D - LQFP Carrier Tape Dimensions

★ Pin 1 Identifier

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm
 3. Material: Black Conductive Advantek Polystyrene
 4. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket
 5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Ao = 9.6 mm
 Bo = 9.6 mm
 Ko = 2.2 mm
 K₁ = 1.6 mm

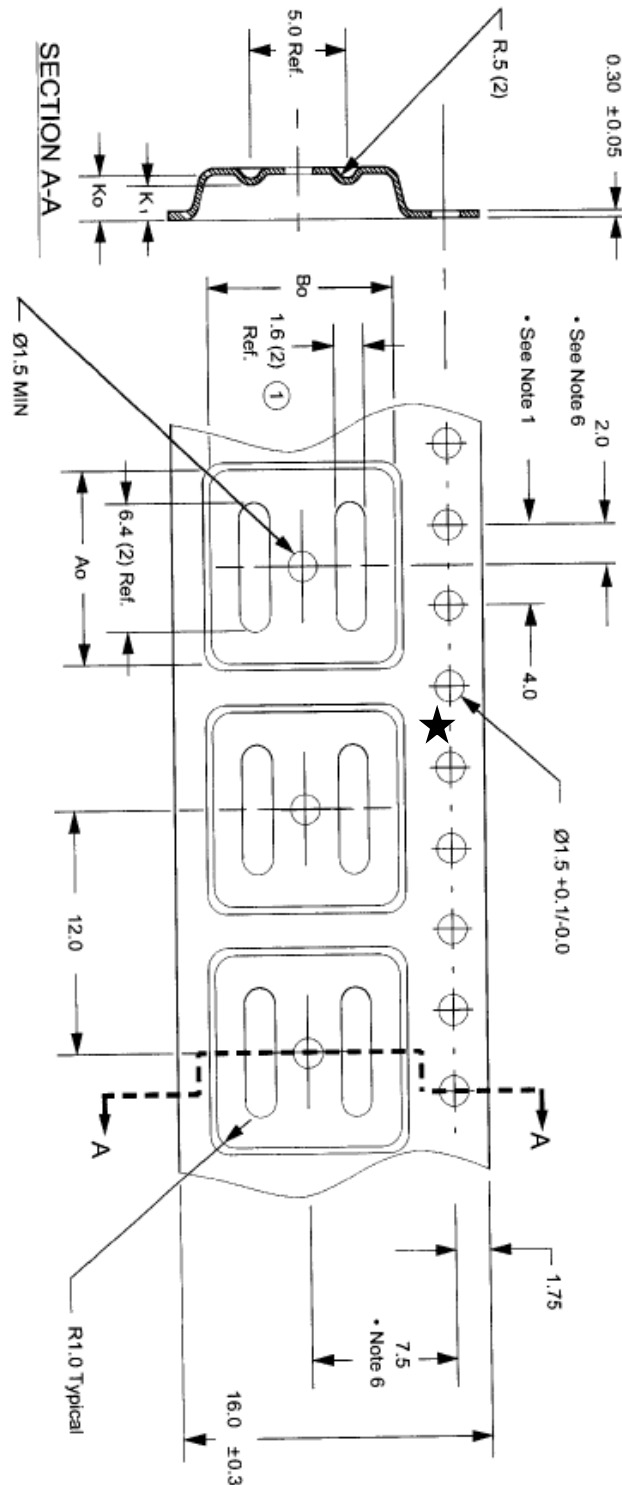


Figure 31.1 VNC2 - LQFP-32, VNC2 - LQFP-48, FT311D - LQFP Carrier Tape Dimensions

32 VNC2 – LQFP-64 Carrier Tape Dimensions

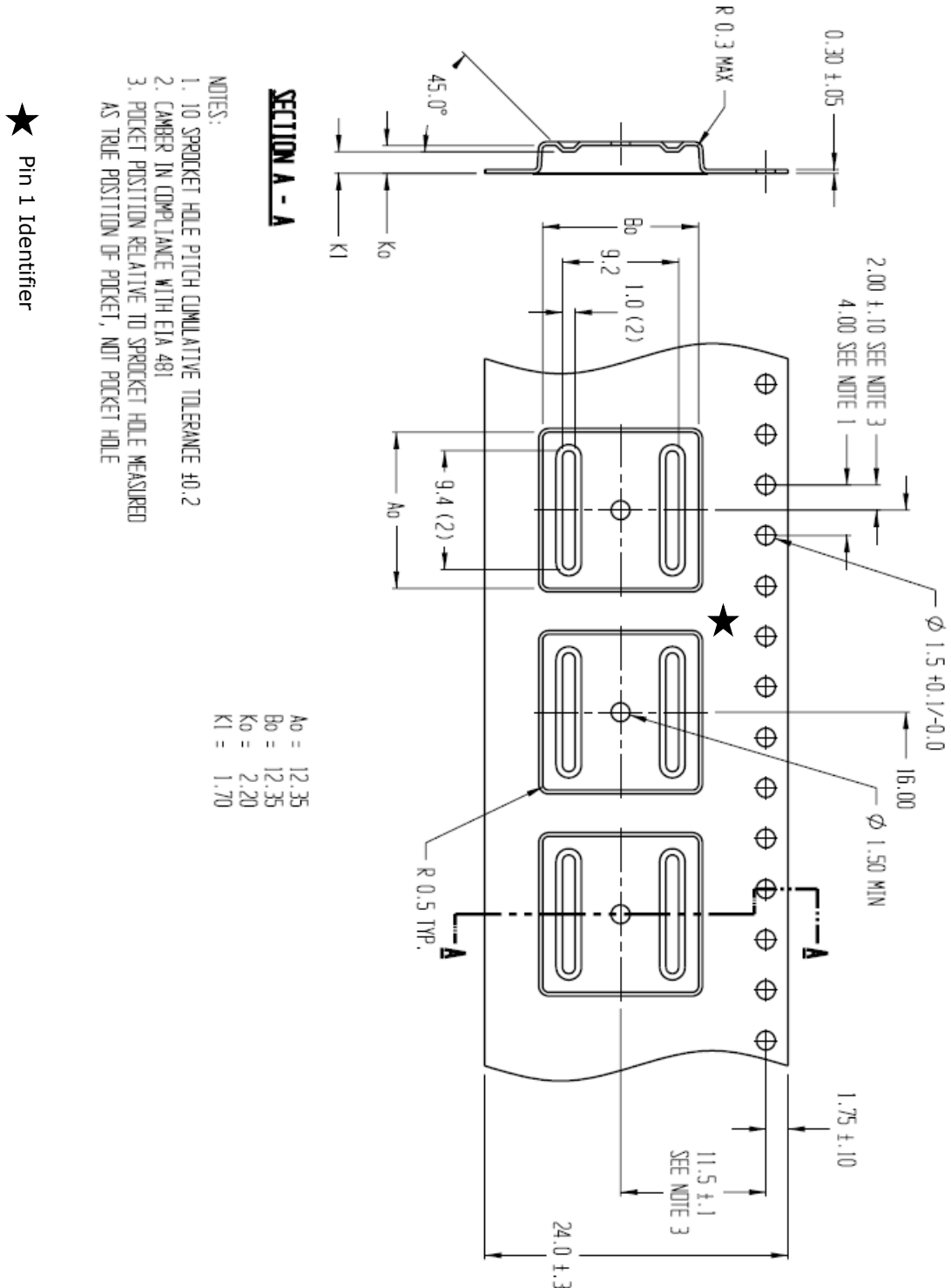


Figure 32.1 VNC2 – LQFP-64 Carrier Tape Dimensions

33 VNC2 – QFN-32, FT311D-QFN Carrier Tape Dimensions

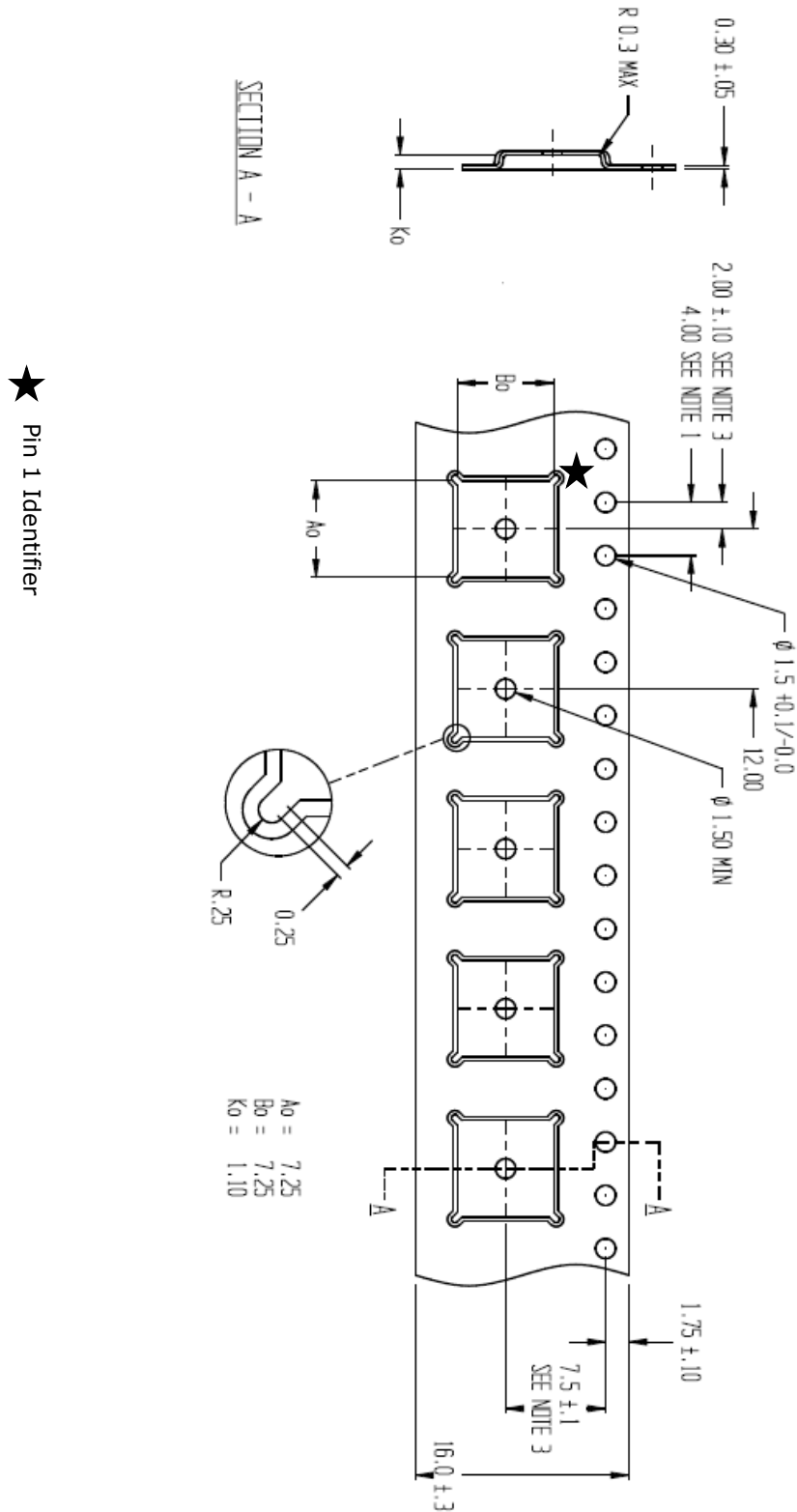


Figure 33.1 VNC2 – QFN-32, FT311D-QFN Carrier Tape Dimensions

34 VNC2 – QFN-48 and QFN-64 Carrier Tape Dimensions

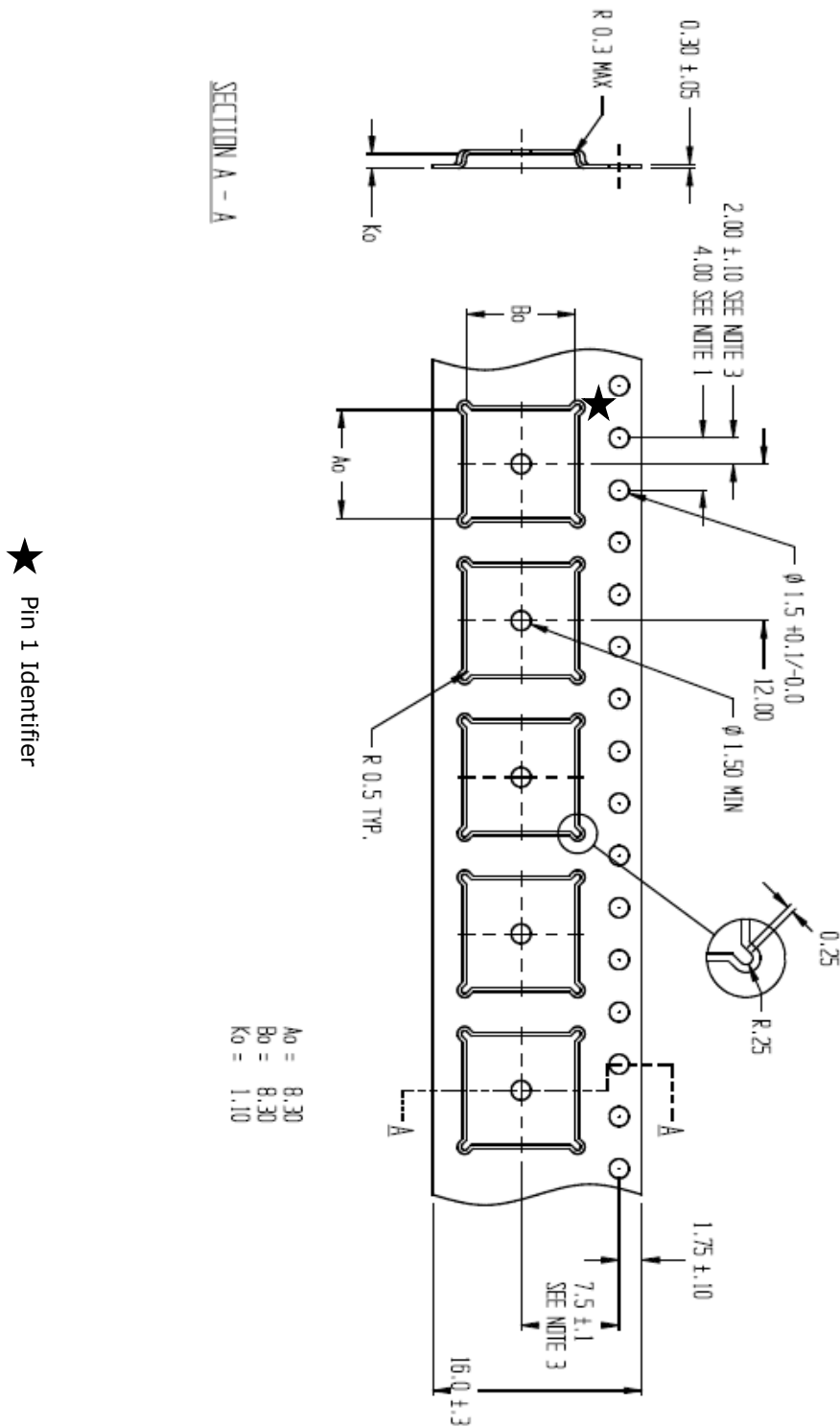


Figure 34.1 VNC2 – QFN-48 and QFN-64 Carrier Tape Dimensions

35 VNC2 – LQFP-32 VNC2 – LQFP-48 and FT311D QFN Tray Dimensions

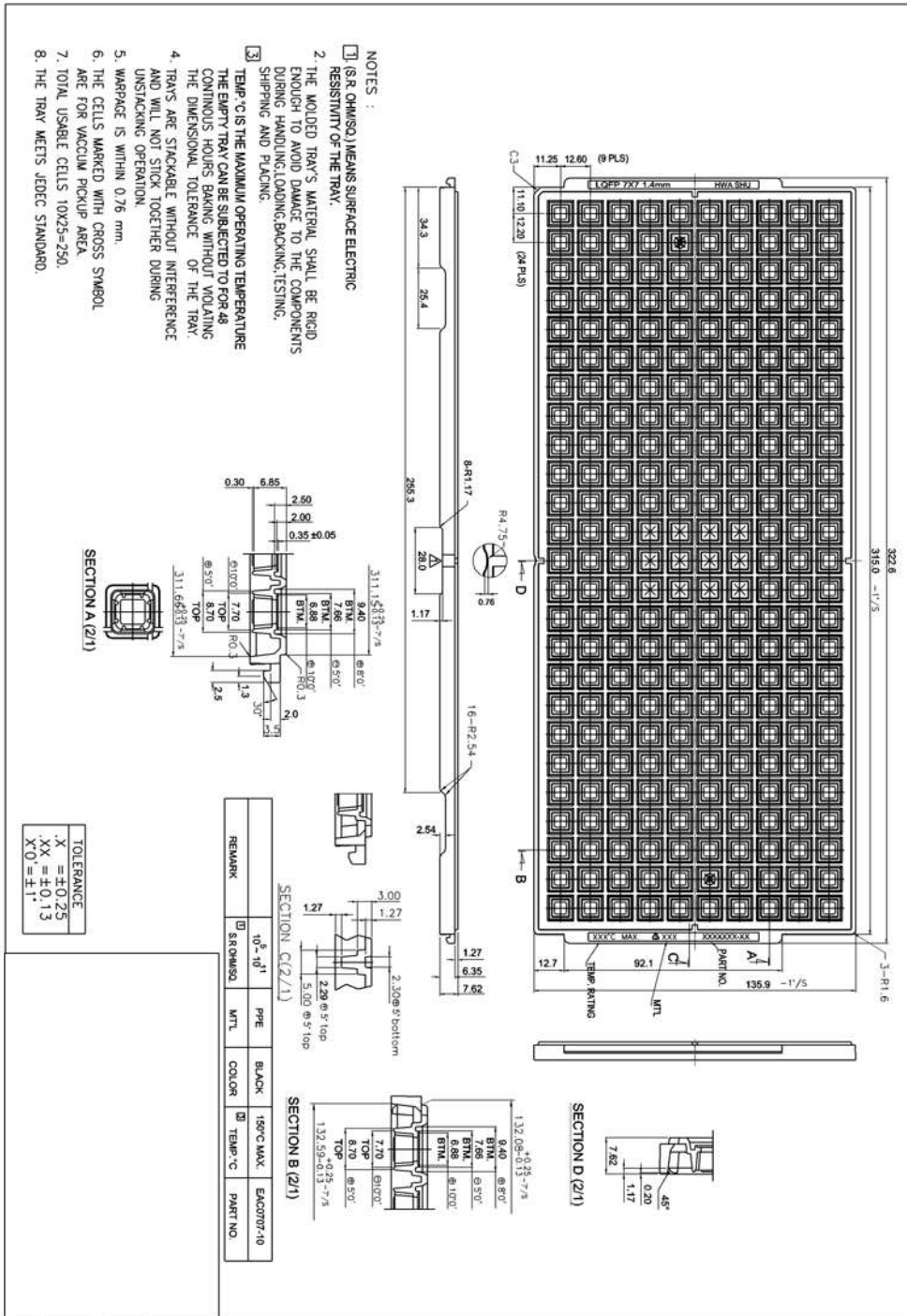


Figure 35.1 VNC2 – LQFP-32 VNC2 – LQFP-48 and FT311D QFN Tray Dimensions

36 VNC2 – LQFP-32, VNC2 – LQFP-48 and FT311D LQFP Tray Dimensions – Side View

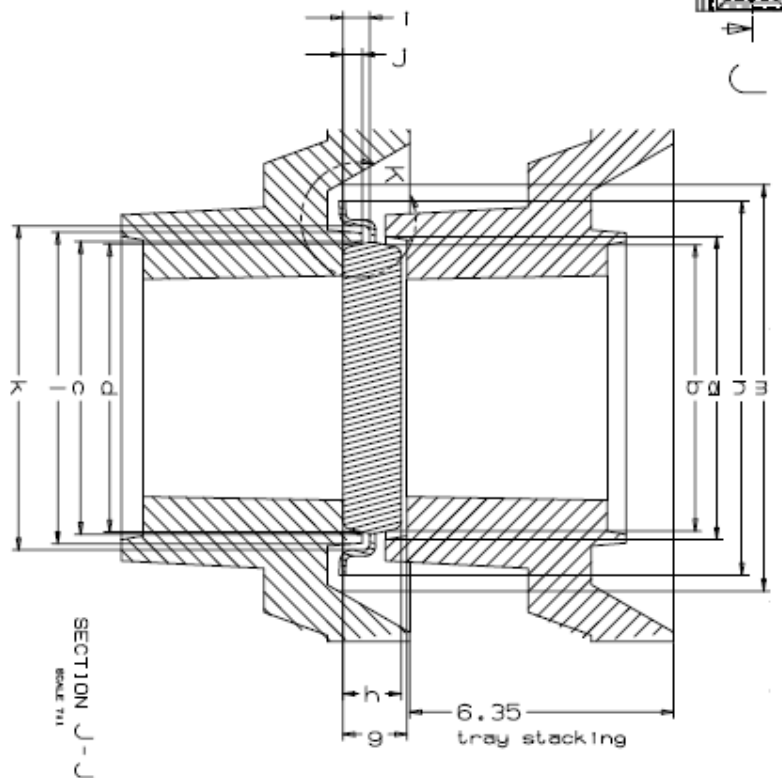
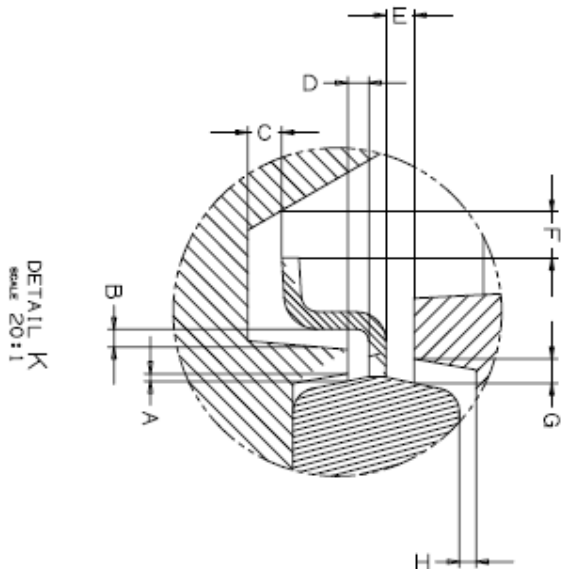
	a	i	j	m	n	o	p	q
TRAY	T_090	T_300	0.480	9.771	T_300	1.540		
	d	k	l					
PKG	8.925	7.803	0.838	9.000	8.891	1.400		
	A	B	C	D	E	F	G	H
GAP	0.083	0.150	0.284	0.178	0.238	0.385	0.205	0.140
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

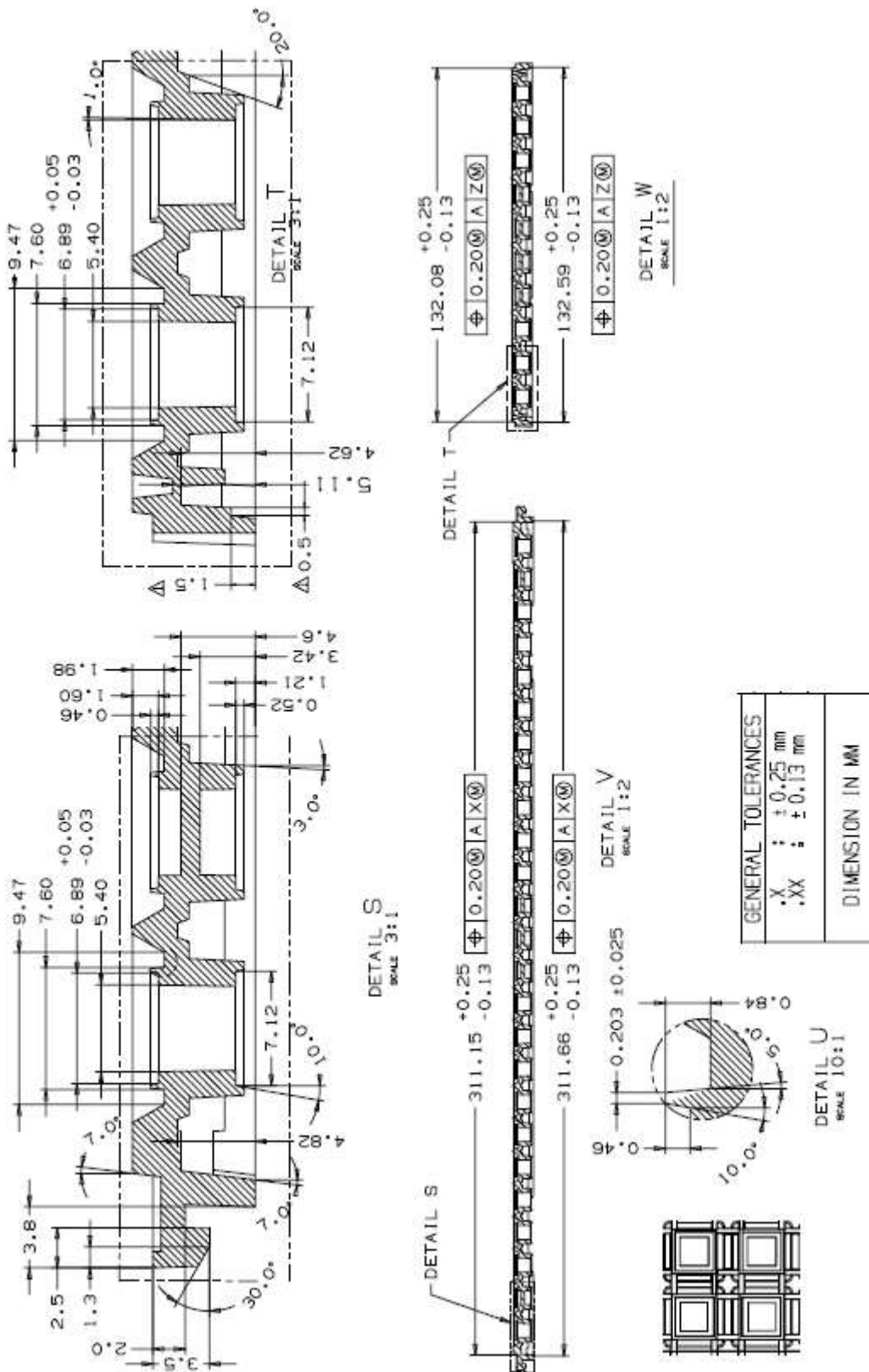
GENERAL TOLERANCES
 *X ± 0.25 mm
 *XX ± 0.13 mm

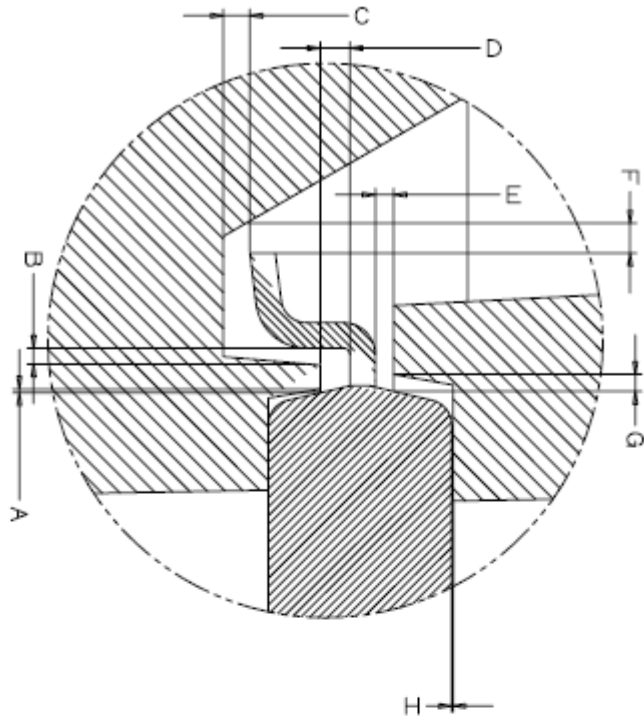
DIMENSION IN MM

- CRITERION FOR PACKAGE & TRAY COMPATIBILITY**
1. A > ZERO ACCEPT
 2. B, F > A ACCEPT
 3. C, D, E > ZERO ACCEPT
 4. G > A ACCEPT
 5. H > ZERO ACCEPT
 6. E > H ACCEPT

TYPICAL CONDITION
 TRAY – NOMINAL
 PKG – NOMINAL






 DETAIL N
 SCALE 20:1

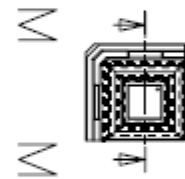
CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A > ZERO ACCEPT
2. B,F > A ACCEPT
3. C,D,E > ZERO ACCEPT
4. G > A ACCEPT
5. H > ZERO ACCEPT
6. E > H ACCEPT

WORST CONDITION(A)

 TRAY - MINIMUM
 PKG - MAXIMUM

TRAY	c	i	J	n	o	g	GENERAL TOLERANCES
T.002	T.398		0.410	9.828	T.232	1.480	.X ± 0.25 mm .XX ± 0.13 mm
PKG	d	k	i	n	b	h	
	6.941	T.650	0.845	9.150	6.985	1.450	DIMENSION IN MM
GAP	A	B	C	D	E	H	
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	



SECTION M-M

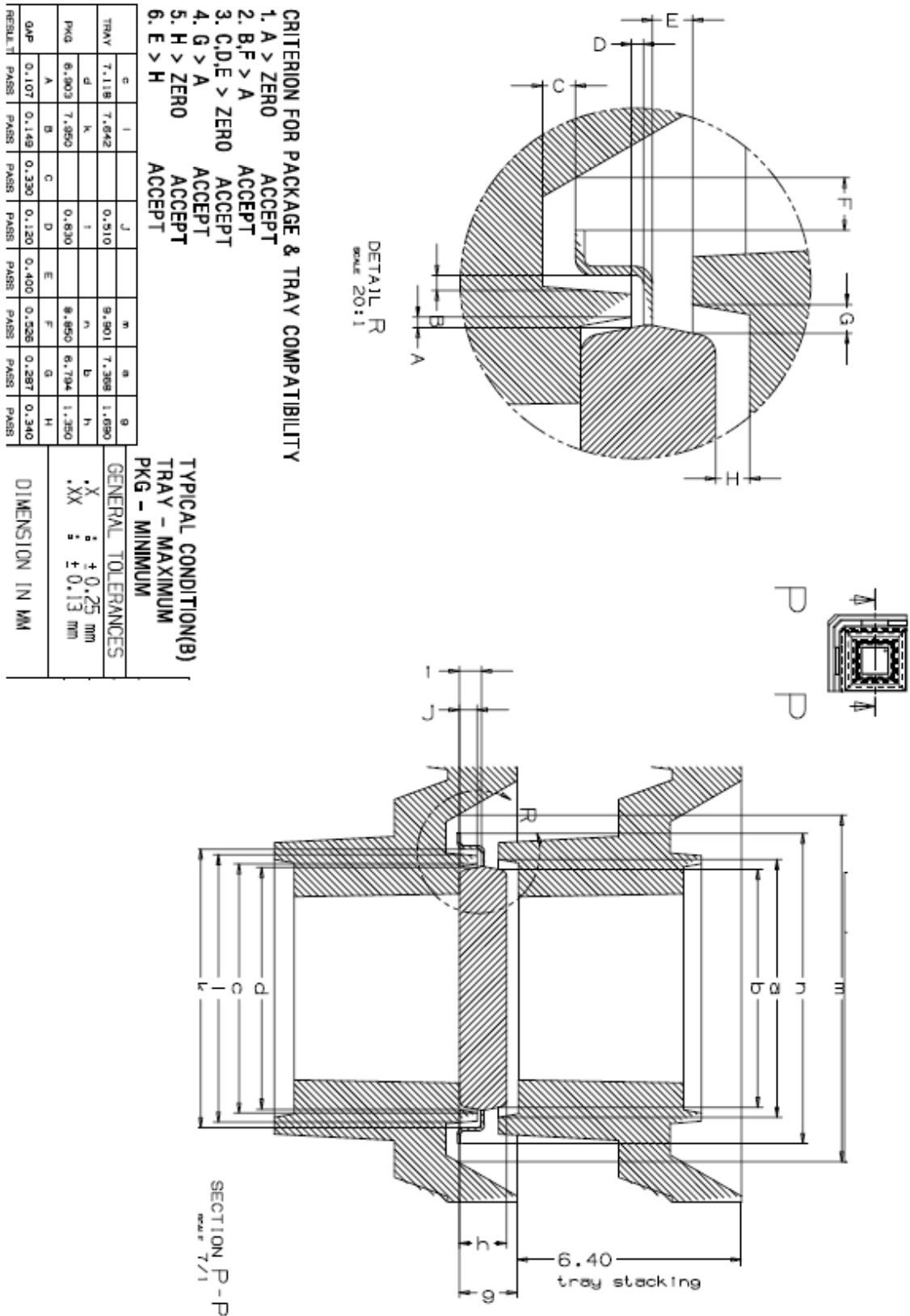


Figure 36.1 VNC2 – LQFP-32, VNC2 – LQFP-48 and FT311D LQFP Tray Dimensions – Side View

37 VNC2 – LQFP-64 Tray Dimensions

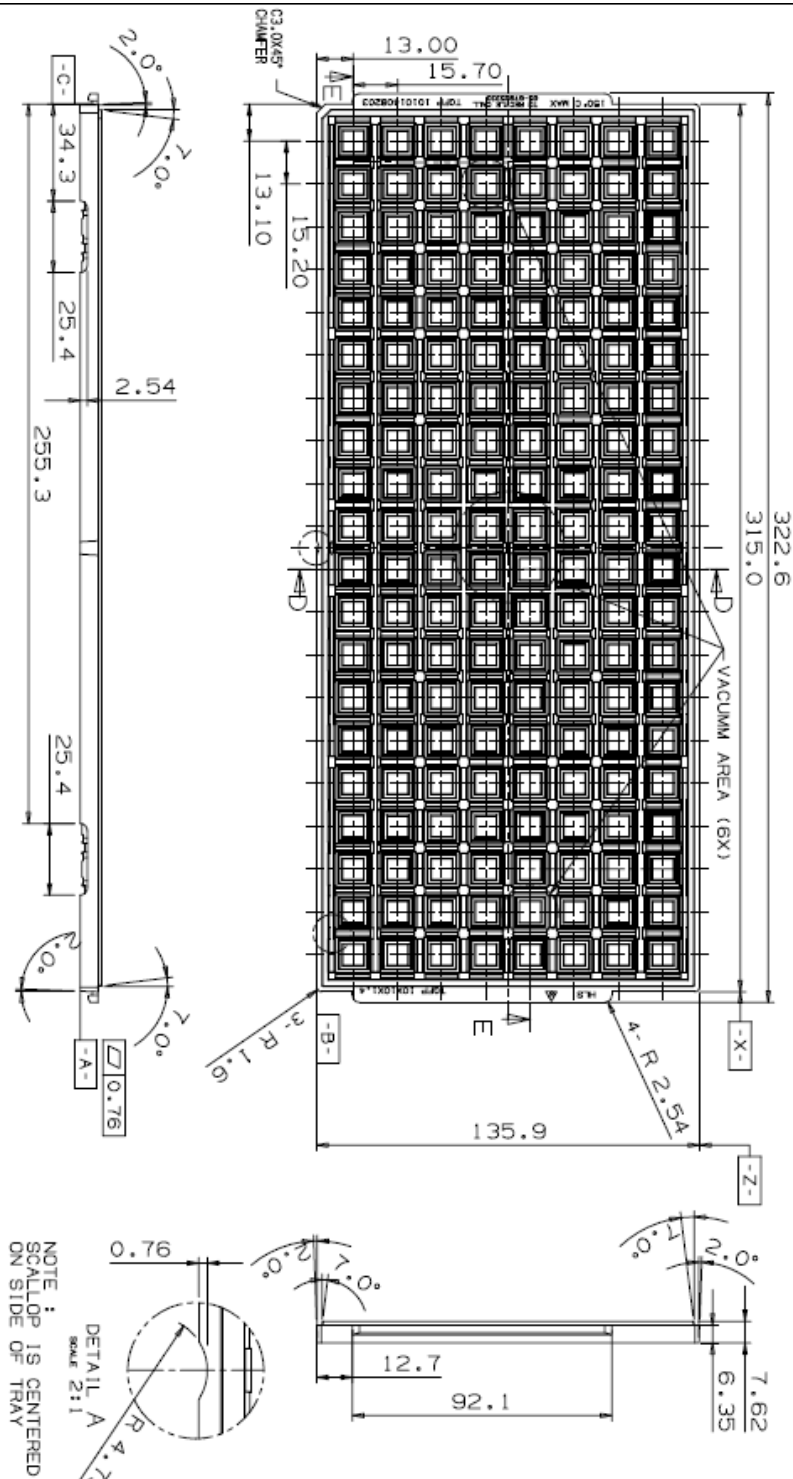
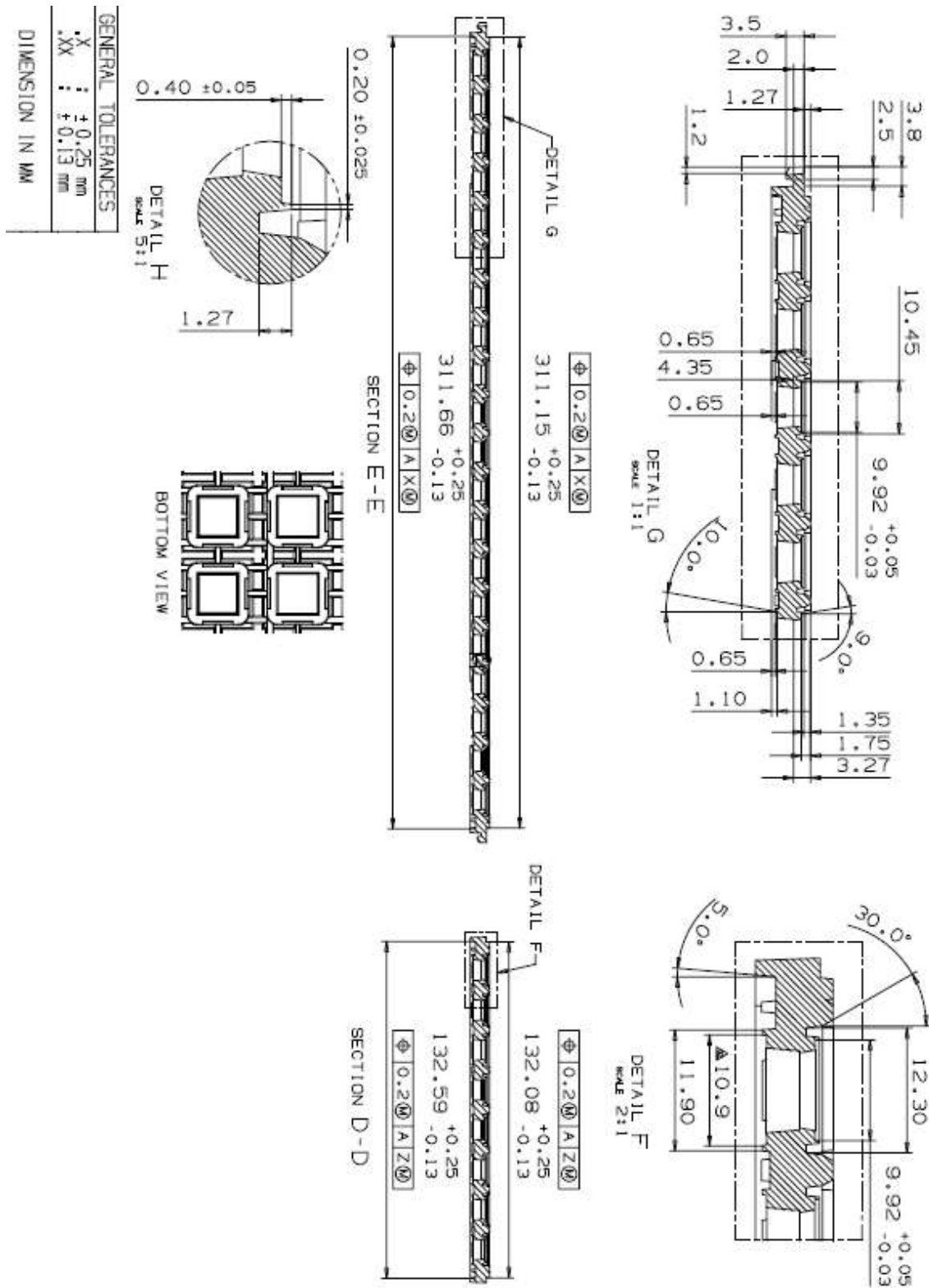
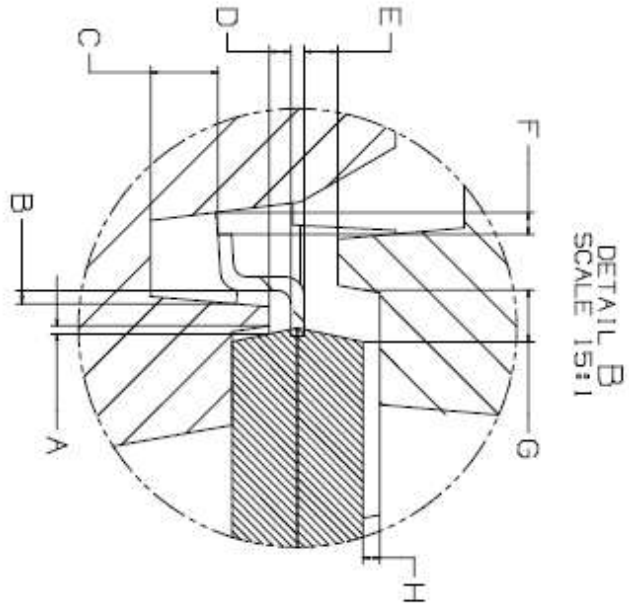
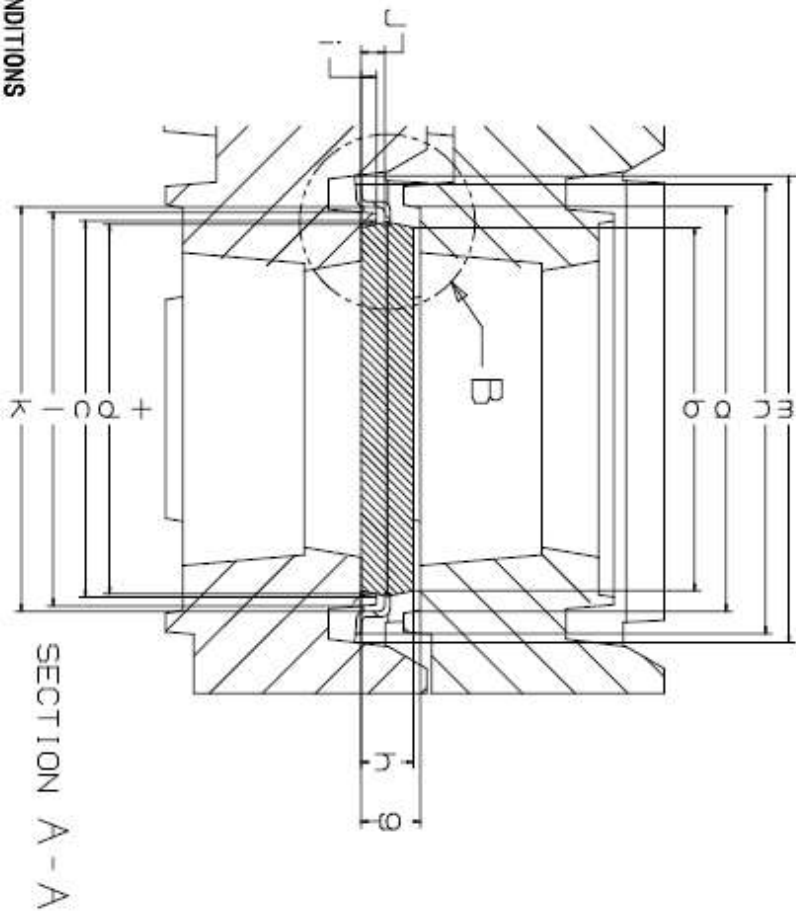


Figure 37.1 VNC2 – LQFP-64 Tray Dimensions

38 VNC2 – LQFP-64 Tray Dimensions – Side View




DETAIL B
 SCALE 15:1

SECTION A - A
CRITERION FOR PACKAGE & TRAY COMPATIBILITY

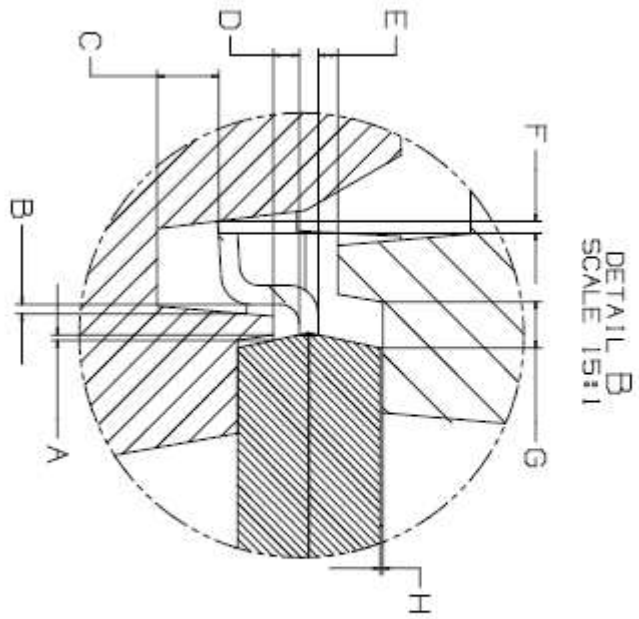
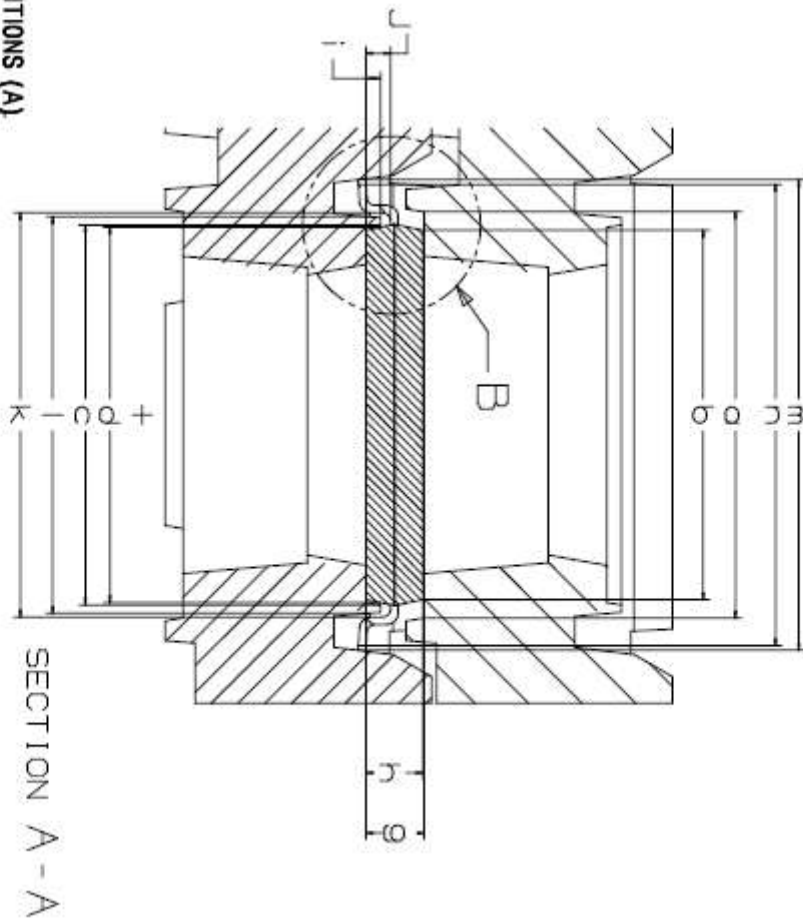
1. A > ZERO ACCEPT
2. B,F > A ACCEPT
3. C,D,E > ZERO ACCEPT
4. G > A ACCEPT
5. H > ZERO ACCEPT
6. E > H ACCEPT

	e	k		l		m	n	a	b	g
TRAY	10.046	10.512		0.400		12.467	10.813	1.580		
	d	l		j						
PKG	9.872	10.802		0.828		12.000	9.702	1.400		
	A	B		C		D	E	F	G	H
GAP	0.087	0.149		0.173		0.228	0.368	0.233	0.096	0.180
RESULT	PASS	PASS		PASS		PASS	PASS	PASS	PASS	PASS

TYPICAL CONDITIONS
 TRAY - NOMINAL
 PKG - NOMINAL

GENERAL TOLERANCES
 .X ± 0.25 mm
 .XX ± 0.13 mm

DIMENSION IN MM


 DETAIL B
 SCALE 15:1


SECTION A - A

CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A > ZERO ACCEPT
2. B, F > A ACCEPT
3. C, D, E > ZERO ACCEPT
4. G > A ACCEPT
5. H > ZERO ACCEPT
6. E > H ACCEPT

	e	k	i	m	a	g												
TRAY	10.008	10.449	0.375	12.403	10.708	1.530												
	d	i	j	n	b	h												
PKG	9.891	10.832	0.690	12.130	9.731	1.500												
	A	B	C	D	E	F	G	H										
GAP	0.099	0.102	0.647	0.228	0.209	0.127	0.489	0.030										
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS										

WORST CONDITIONS (A)
 TRAY - MINIMUM
 PKG - MAXIMUM

GENERAL TOLERANCES

 .X : ± 0.25 mm
 .XX : ± 0.13 mm

DIMENSION IN MM

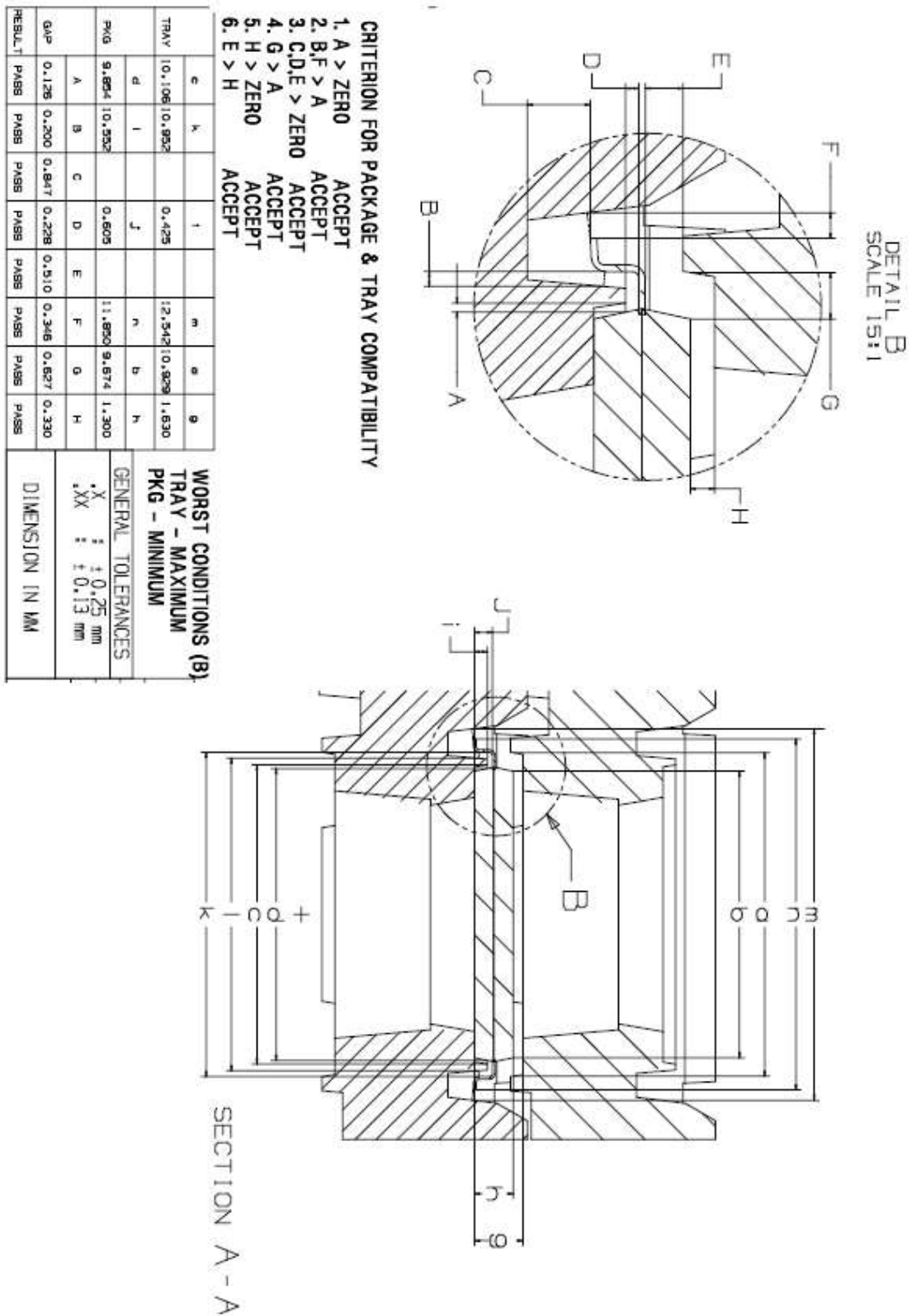


Figure 38.1 VNC2 - LQFP-64 Tray Dimensions - Side View

39 VNC2 – QFN-32 and FT311D QFN Tray Dimensions

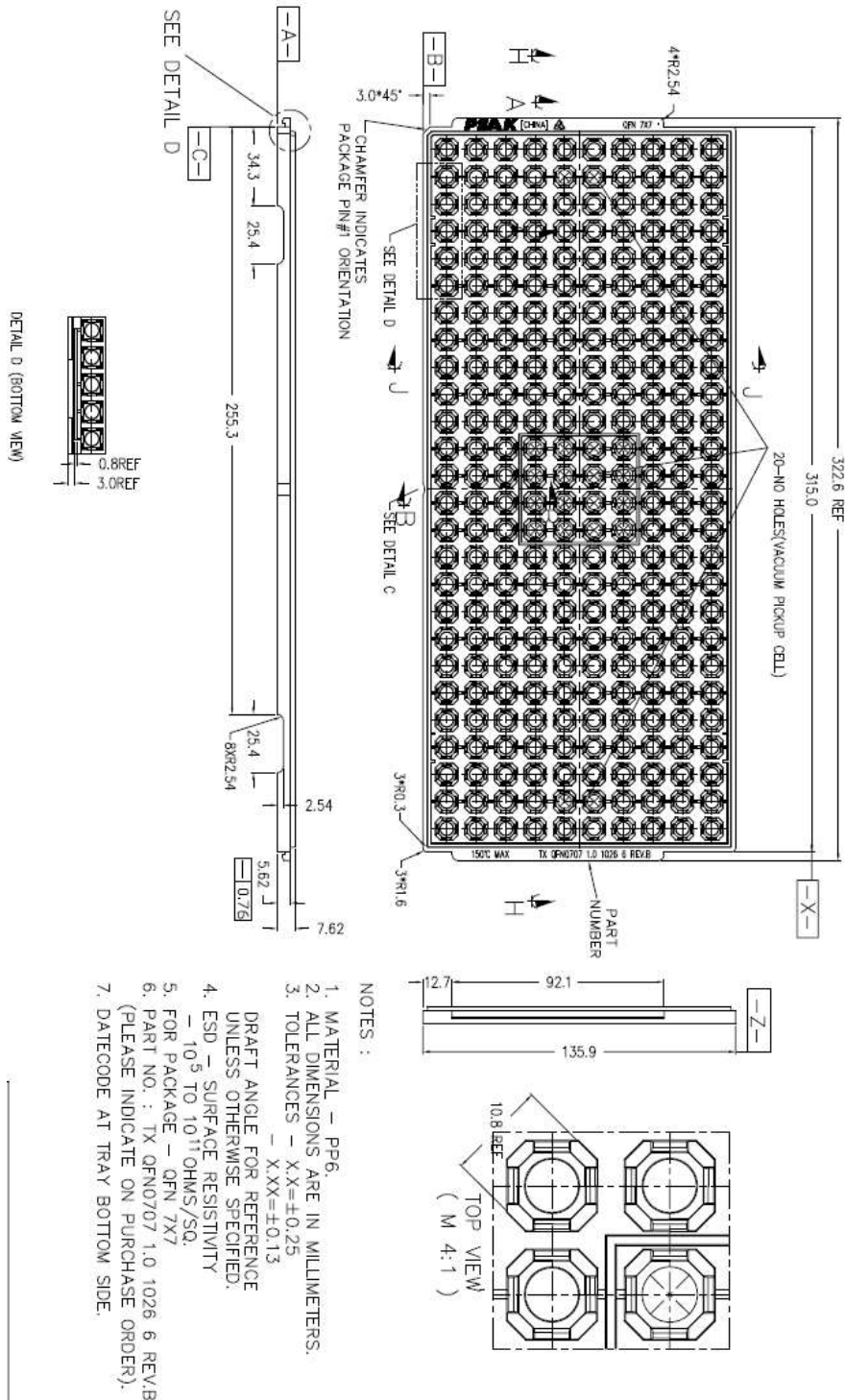


Figure 39.1 VNC2 – QFN-32 and FT311D QFN Tray Dimensions

40 VNC2 – QFN-48 and QFN-64 Tray Dimensions

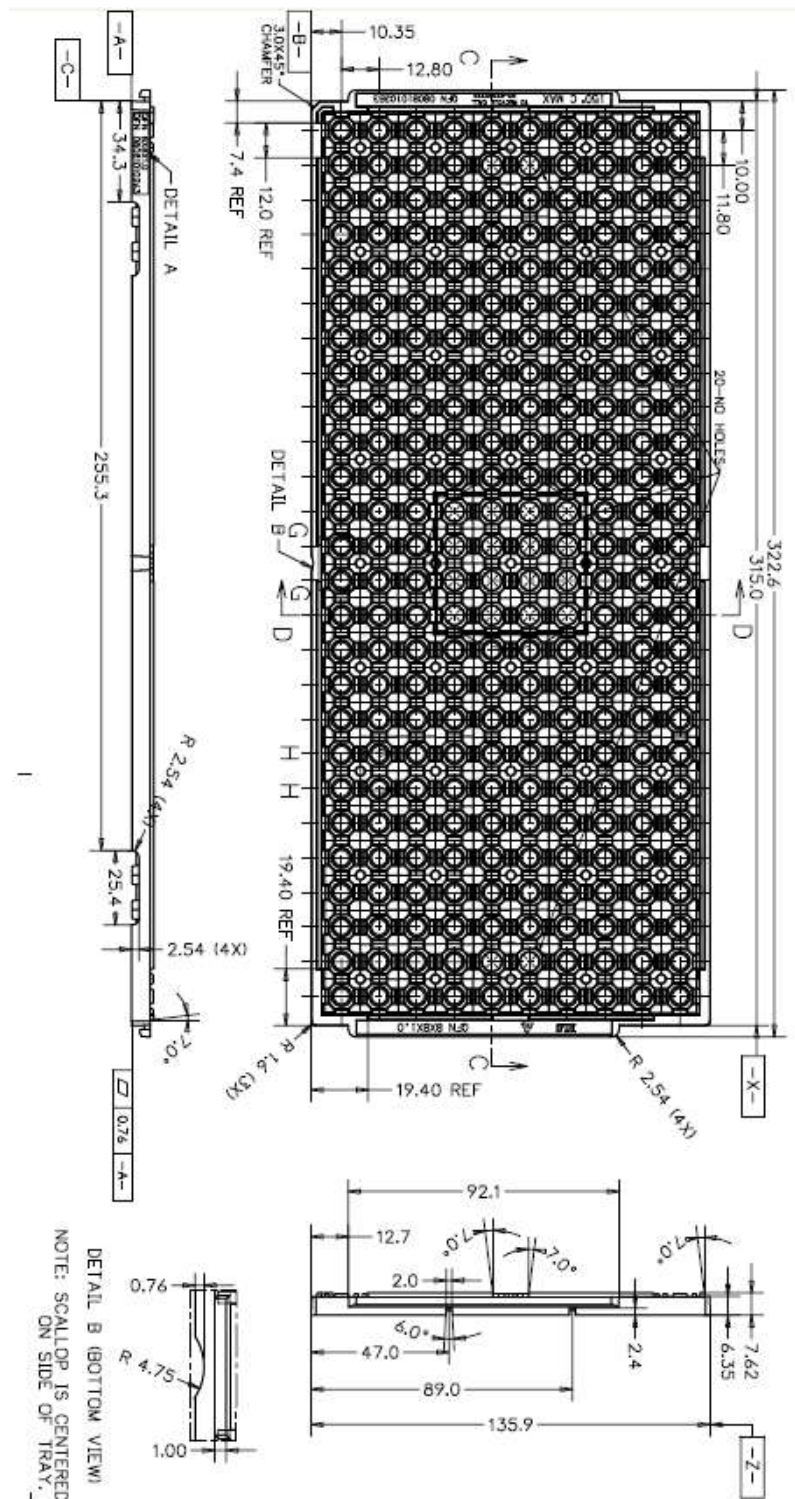
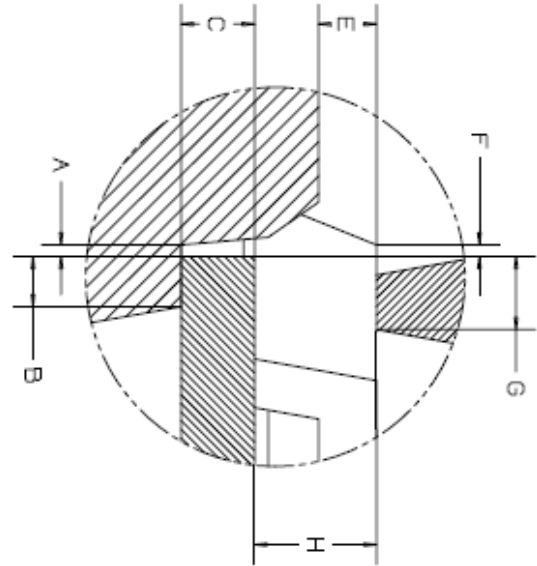


Figure 40.1 VNC2 - QFN-48 and QFN-64 Tray Dimensions

41 VNC2-QFN-48 and QFN-64 Tray Dimensions-Side View



DETAIL B
 SCALE 15:1

CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A, F > ZERO ACCEPT
2. B > A ACCEPT
3. G > F ACCEPT
4. C > E ACCEPT
5. H > ZERO ACCEPT

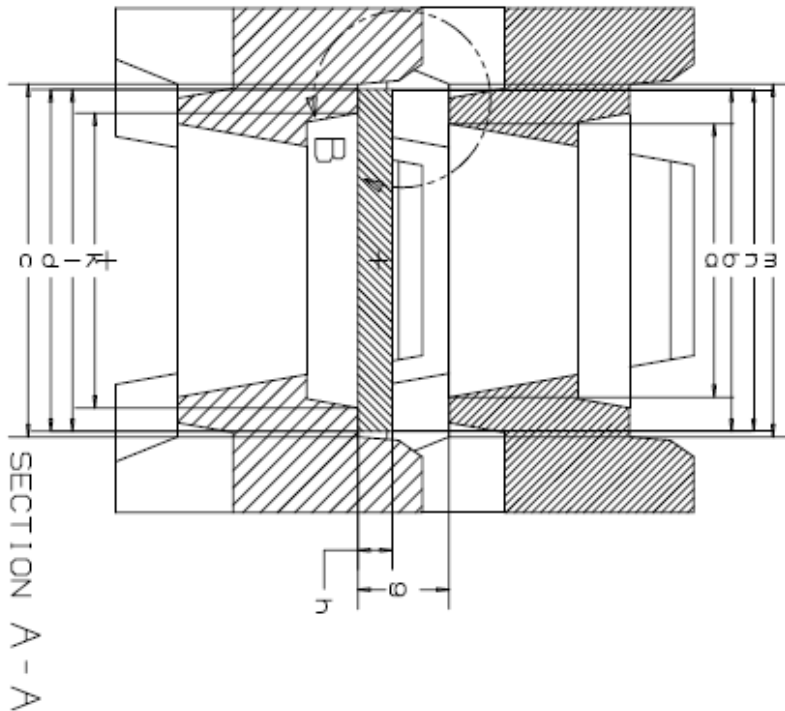
	c	k	i	n	a	b														
TRAY	8,250	6,900		8,250	6,400	2,130														
	d	l	j	n	b	h														
PKG	8,000	8,000		8,000	8,000	0,800														
	A	B	C	D	E	F														
GAP	0,125	0,250	0,800	-	0,630	0,125	0,800	1,330												
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS												

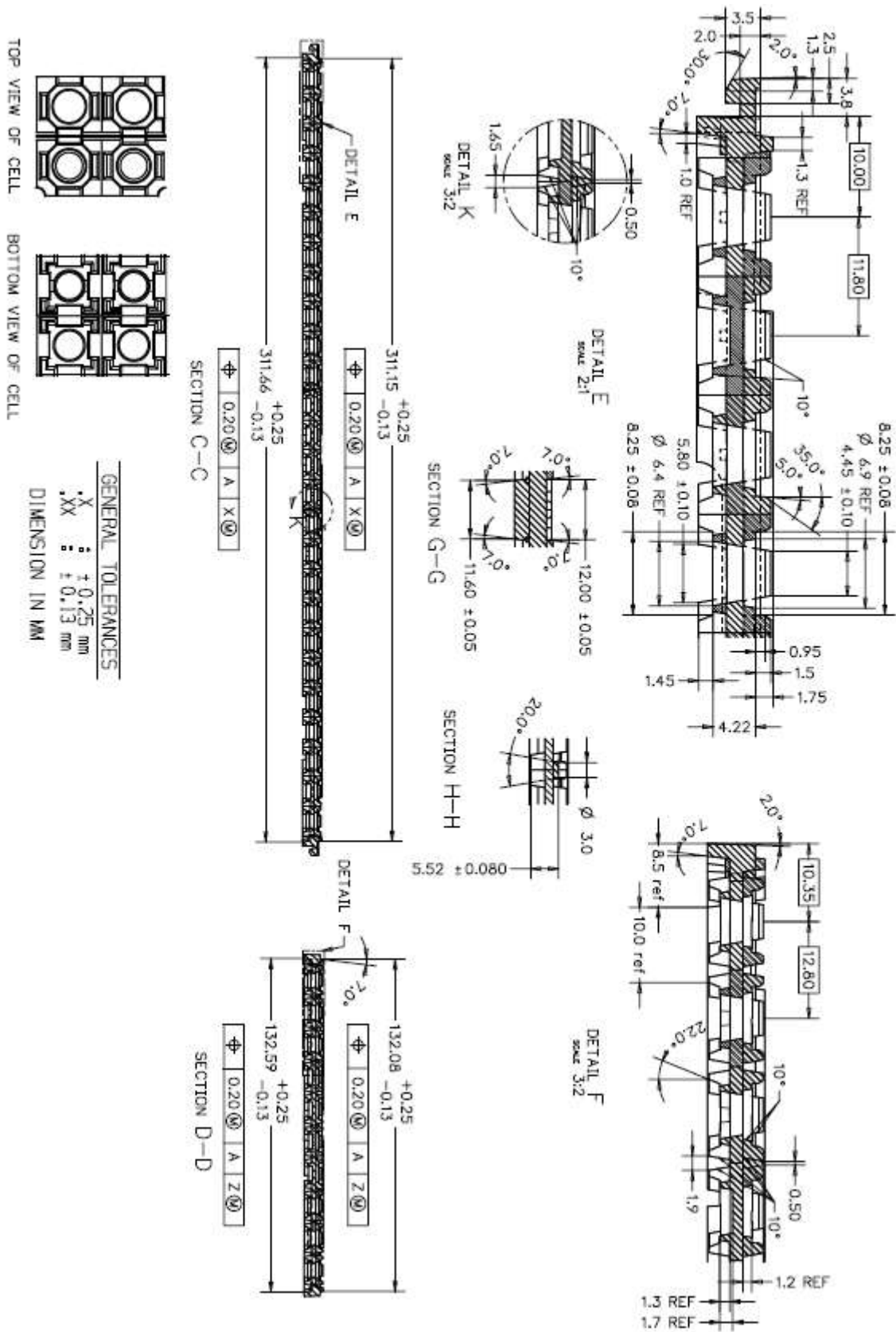
TYPICAL CONDITION
 TRAY - NOMINAL
 PKG - NOMINAL

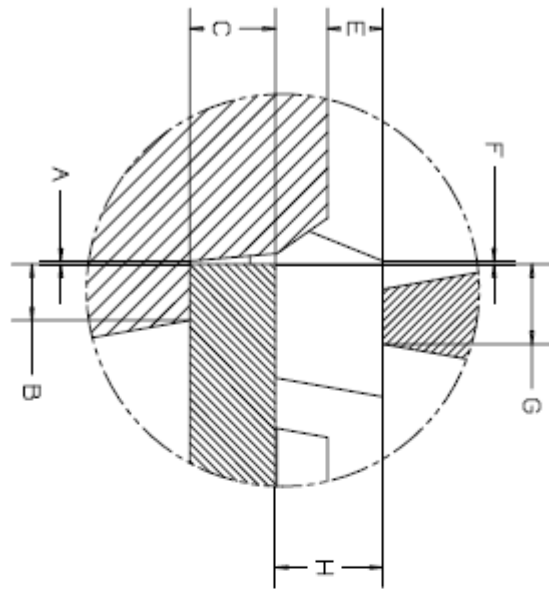
GENERAL TOLERANCES

.X ± 0.25 mm
 .XX ± 0.13 mm

DIMENSION IN MM







DETAIL B
 SCALE 15:1

CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A, F > ZERO ACCEPT
2. B > A ACCEPT
3. G > F ACCEPT
4. C > E ACCEPT
5. H > ZERO ACCEPT

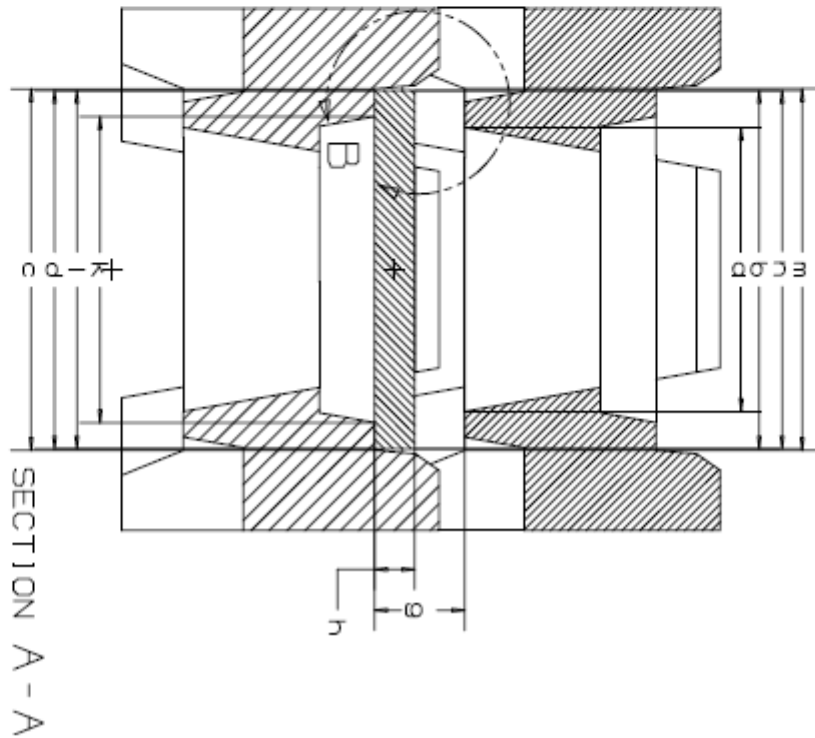
	c	h	i	m	a	g		
TRAY	8.168	6.918		8.172	6.418	2.030		
PKG	d	i	j	n	b	h		
	8.100	8.100	-	8.100	8.100	0.900		
GAP	A	B	C	D	E	F		
	0.034	0.591	0.900	-	0.580	0.036	0.841	1.130
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS

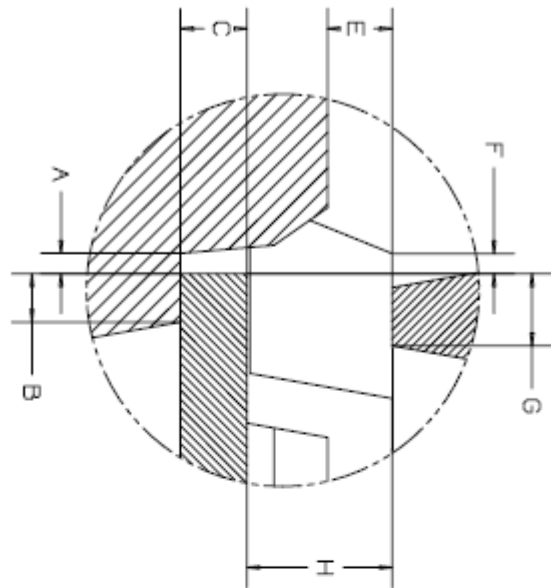
WORST CONDITION (A)
 TRAY - MINIMUM
 PKG - MAXIMUM

GENERAL TOLERANCES

.X ± 0.25 mm
 .XX ± 0.13 mm

DIMENSION IN MM



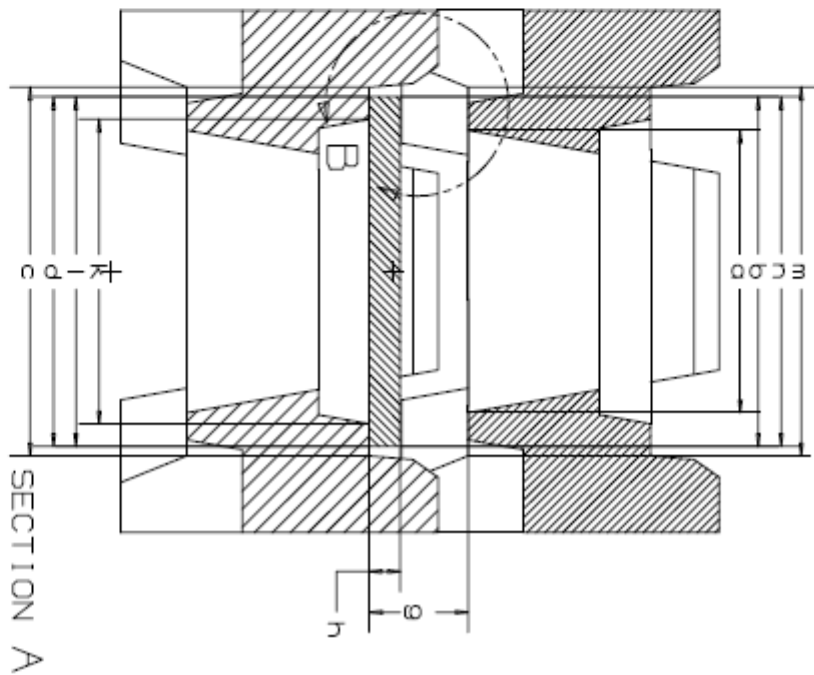

DETAIL B
 SCALE 15:1

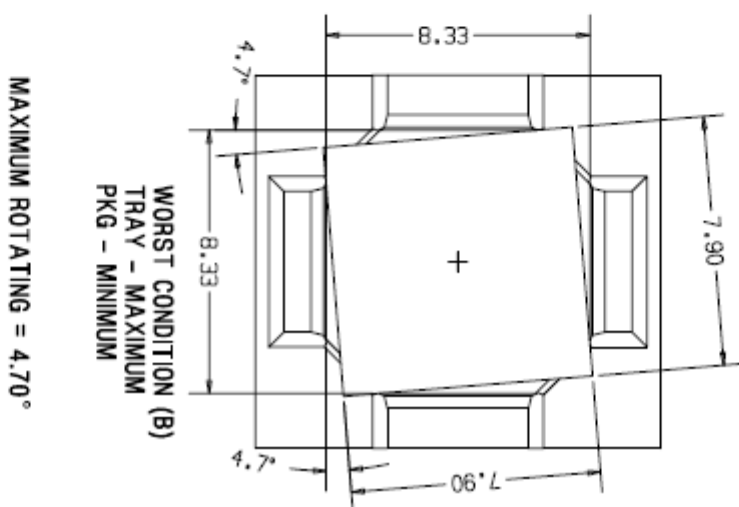
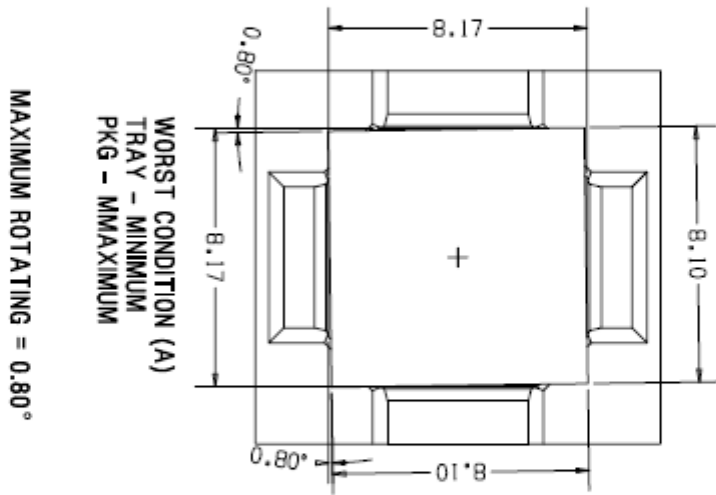
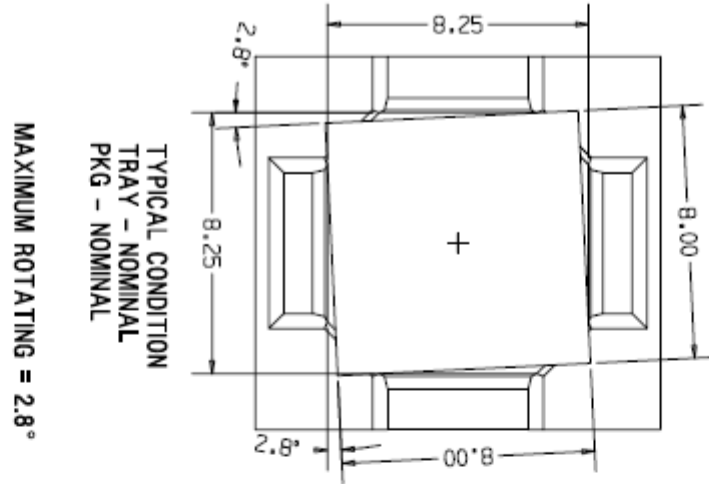
CRITERION FOR PACKAGE & TRAY COMPATIBILITY

1. A, F > ZERO ACCEPT
2. B > A ACCEPT
3. G > F ACCEPT
4. C > E ACCEPT
5. H > ZERO ACCEPT

TRAY	g		h		i		m		o		p	
	d	i					j		n	b	h	
PKG	7.900	7.900						7.900	7.900	7.900	0.700	
GAP	A	B	C	D	E	F	G	H				
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

WORST CONDITION (B)	
TRAY - MAXIMUM	PKG - MINIMUM
GENERAL TOLERANCES	
.X	± 0.25 mm
.XX	± 0.13 mm
DIMENSION IN MM	





GENERAL TOLERANCES	
.X	±0.25 mm
.XX	±0.13 mm
DIMENSION IN MM	

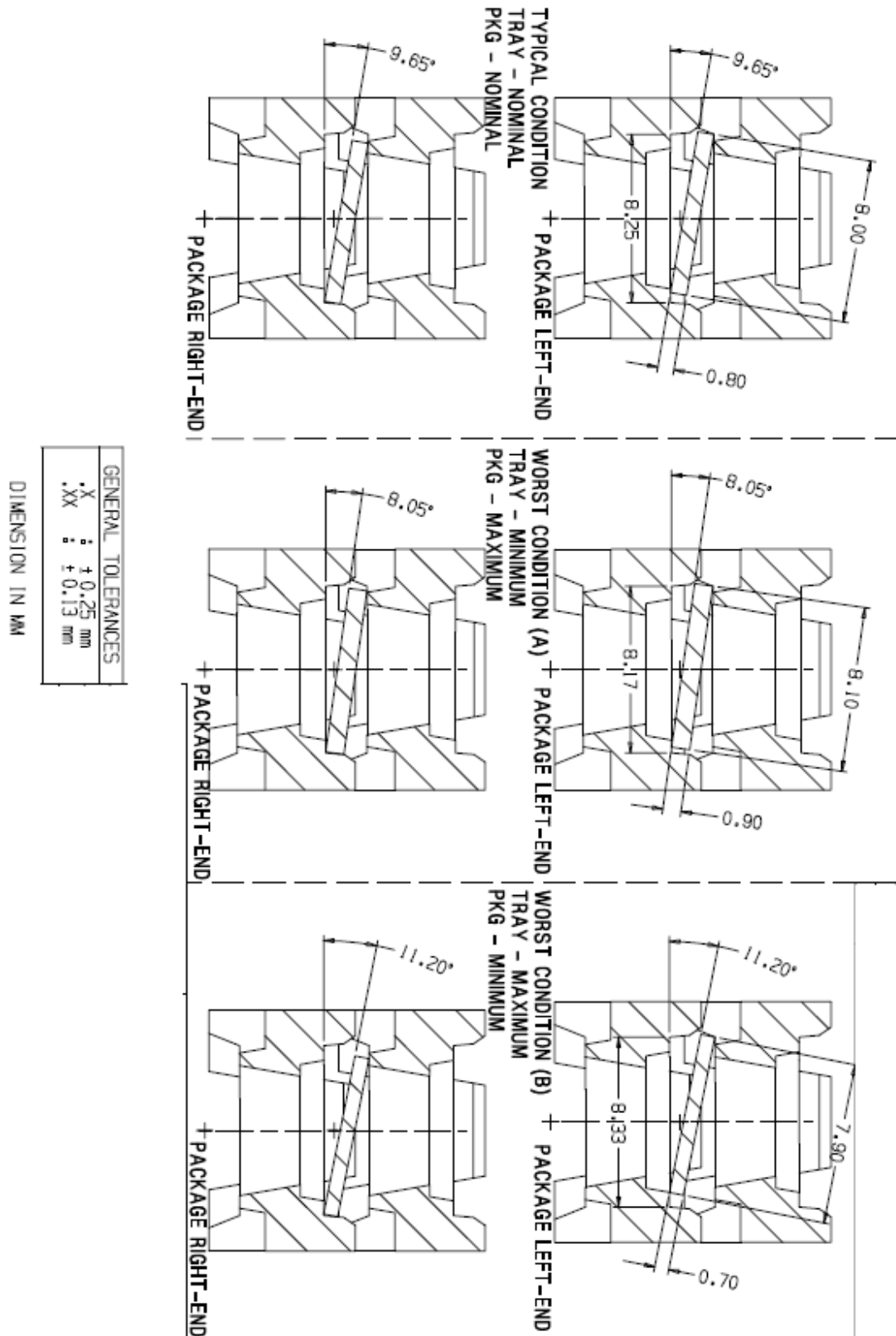


Figure 41.1 VNC2 - QFN-48 and QFN-64 Tray Dimensions - Side View

42 VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48, QFN-64 and FT311D-LQFP, FT311D-QFN Protective Belt

PART NUMBER	TAPE WIDTH	W*
PB109081UC	8	8.3 +0.7/-0.0 mm
PB109121UC	12	12.3 +0.7/-0.0 mm
PB109161UC	16	16.3 +0.7/-0.0 mm
PB109241UC	24	24.3 +0.7/-0.0 mm
PB109321UC	32	32.3 +0.7/-0.0 mm
PB109441UC	44	44.3 +0.7/-0.0 mm
PB109561UC	56	56.3 +0.7/-0.0 mm
PB109721UC	72	72.3 +0.7/-0.0 mm
PB109881UC	88	88.3 +0.7/-0.0 mm
PB1091041UC	104	104.3 +0.7/-0.0 mm
PB1091201UC	120	120.3 +0.7/-0.0 mm
PB1091361UC	136	136.3 +0.7/-0.0 mm
PB1091521UC	152	152.3 +0.7/-0.0 mm
PB1091681UC	168	168.3 +0.7/-0.0 mm
PB1091841UC	184	184.3 +0.7/-0.0 mm
PB1092001UC	200	200.3 +0.7/-0.0 mm

- NOTES
1. SURFACE RESISTIVITY $\leq 10^7$ OHMS PER SQUARE.
 2. COLOR - BLACK

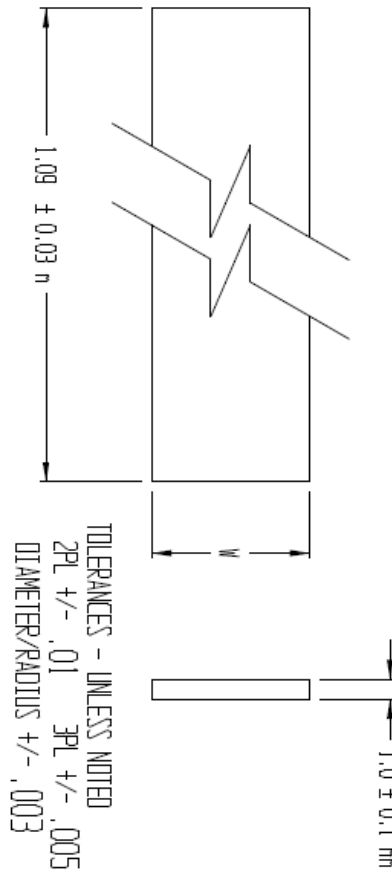


Figure 42.1 VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48, QFN-64 and FT311D-LQFP, FT311D-QFN Protective Belt

43 FT200XD, FT234XD Reel Dimensions

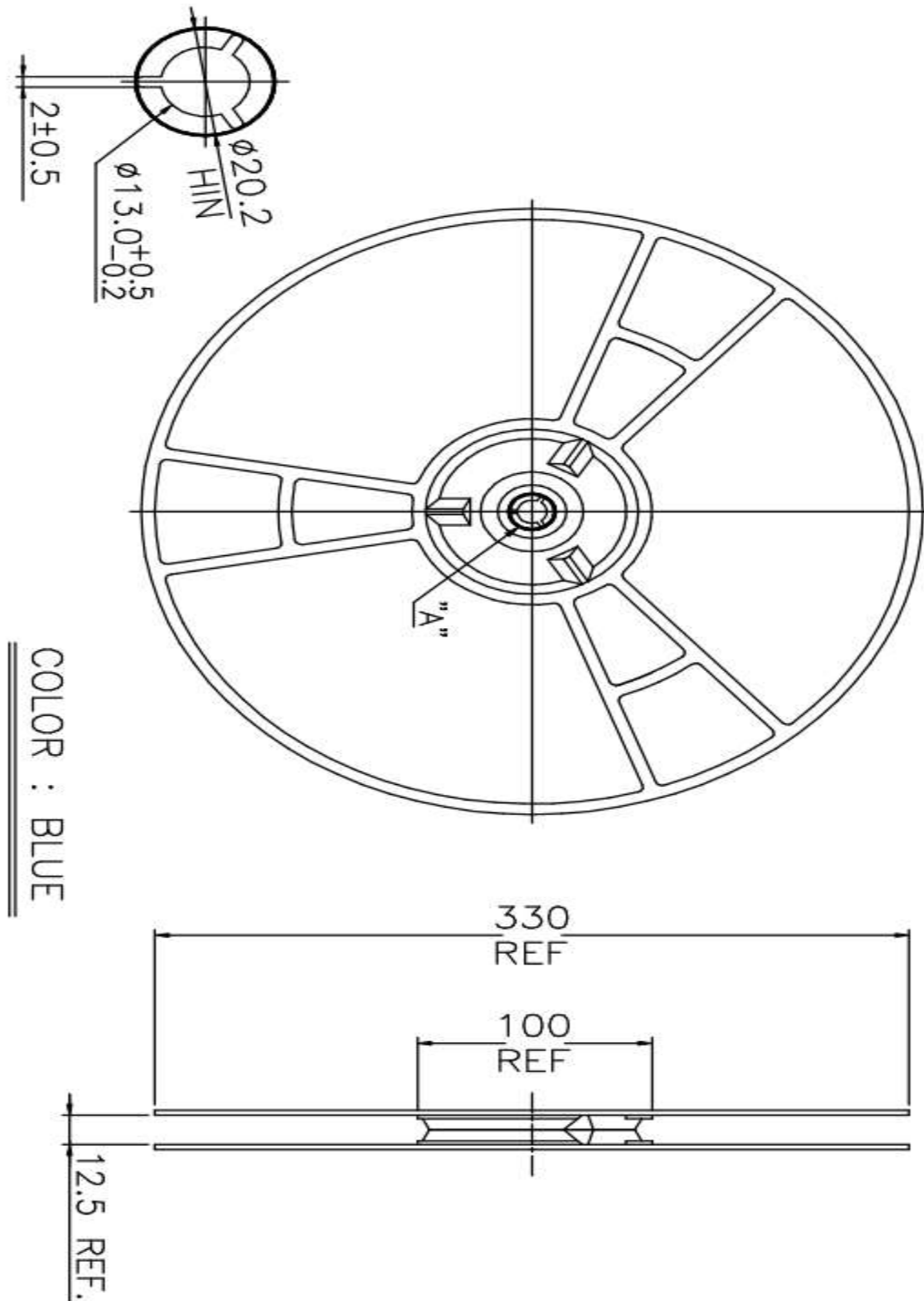


Figure 43.1 FT200XD, FT234XD Reel Dimensions

44 FT200XD, FT234XD Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Black Advantek Polystyrene.
 4. A_0 and B_0 measured on a plane 0.3mm above the bottom of the pocket.
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
 7. Cover Tape width 9.3 \pm 0.1mm.

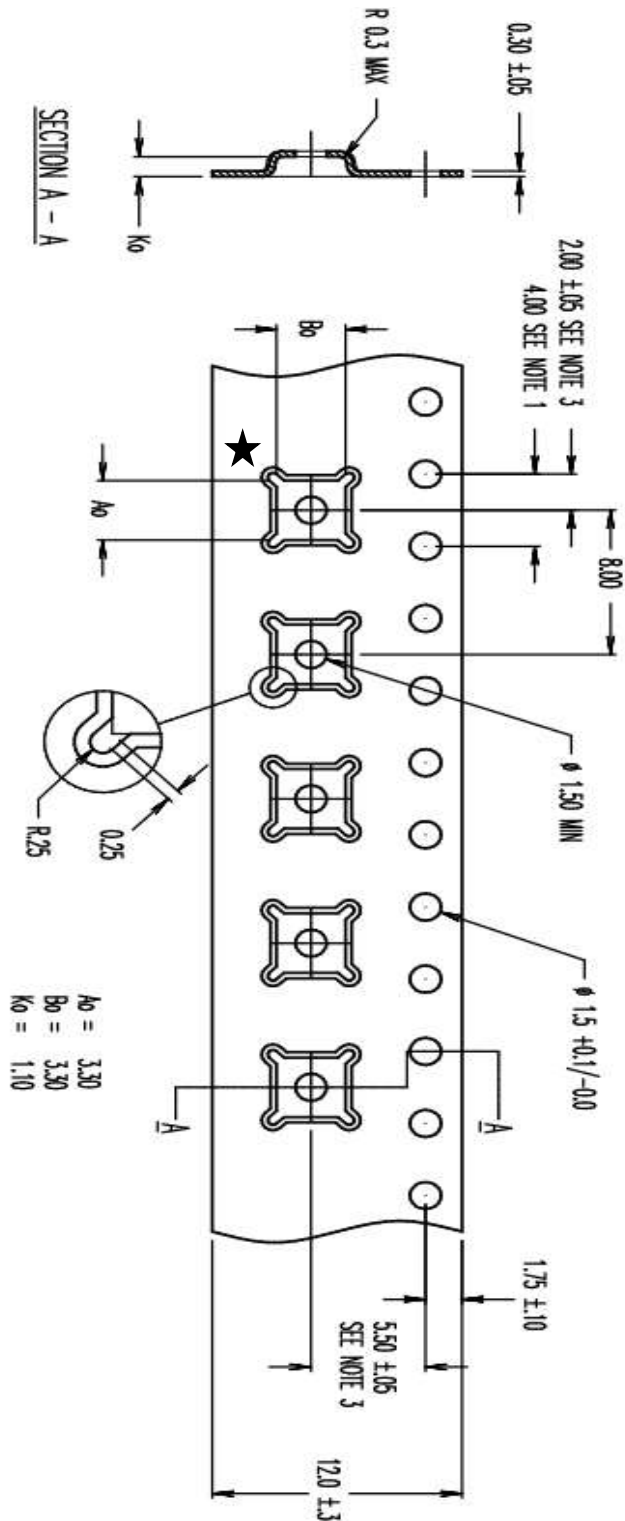


Figure 44.1 FT200XD, FT234XD Tape Dimensions

★ Pin 1 Identifier

45 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Reel Dimensions

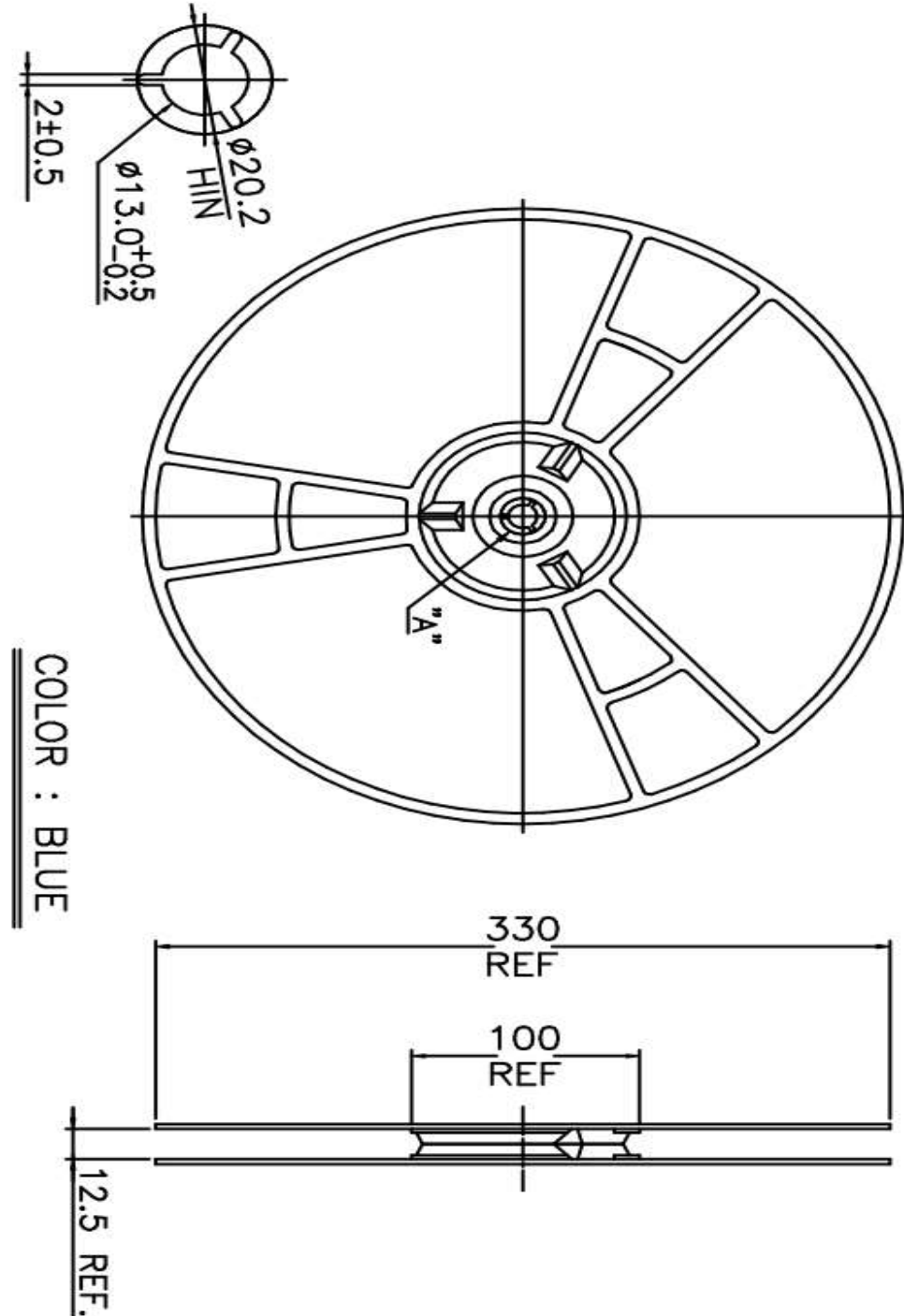


Figure 45.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Reel Dimensions

46 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Black Advantek Polystyrene.
 4. A_0 and B_0 measured on a plane 0.3mm above the bottom of the pocket.
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

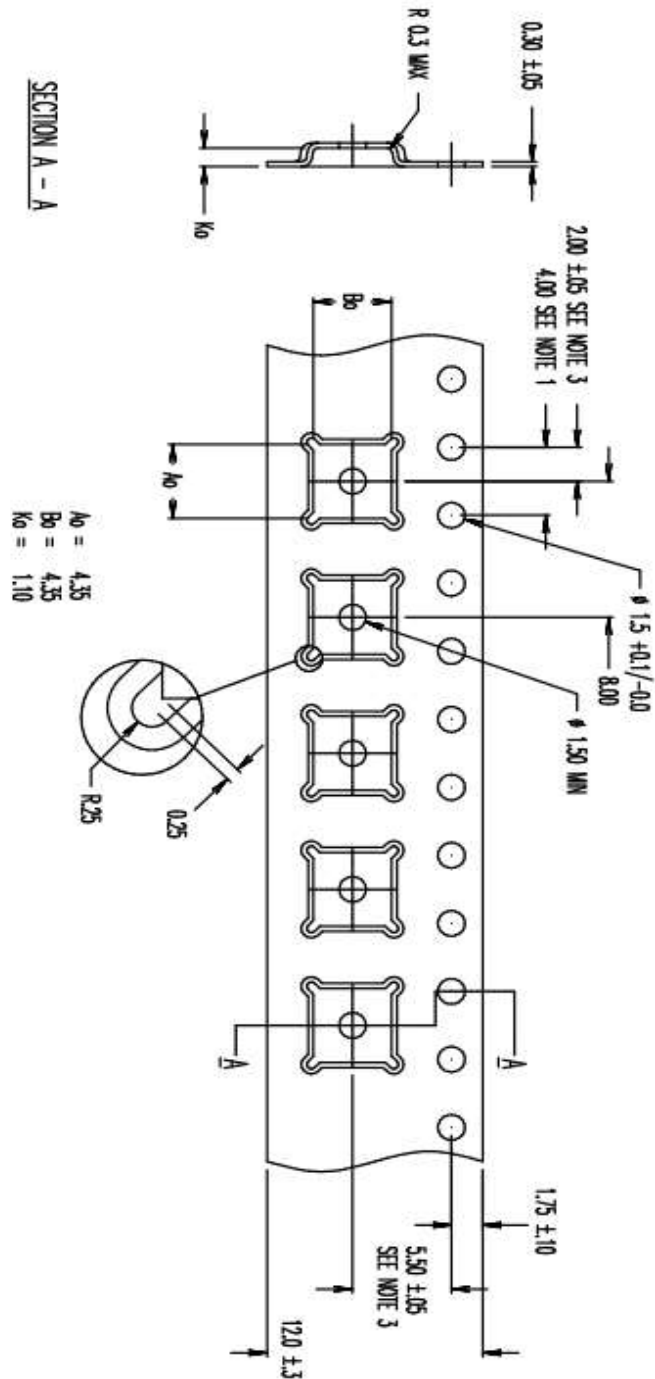


Figure 46.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Tape Dimensions

47 FT201XQ, FT220XQ, FT230XQ SSOP Reel Dimensions

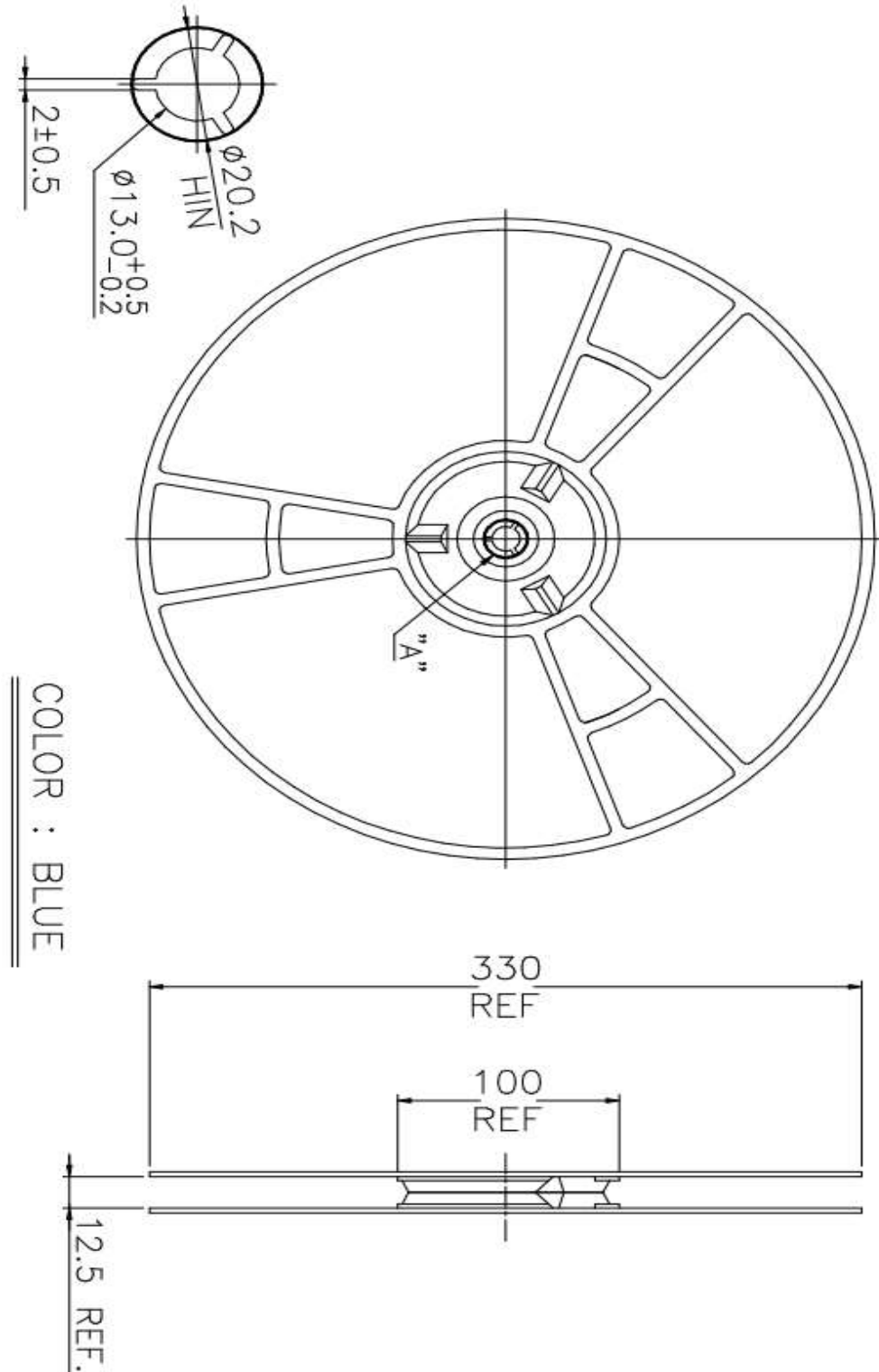


Figure 47.1 FT201XQ, FT220XQ, FT230XQ SSOP Reel Dimensions

48 FT201XQ, FT220XQ, FT230XQ SSOP Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance $\pm 0.2\text{mm}$
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Anti-Static Black Advantek Polystyrene.
 4. A_0 and B_0 measured on a plane 0.3mm above the bottom of the pocket.
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

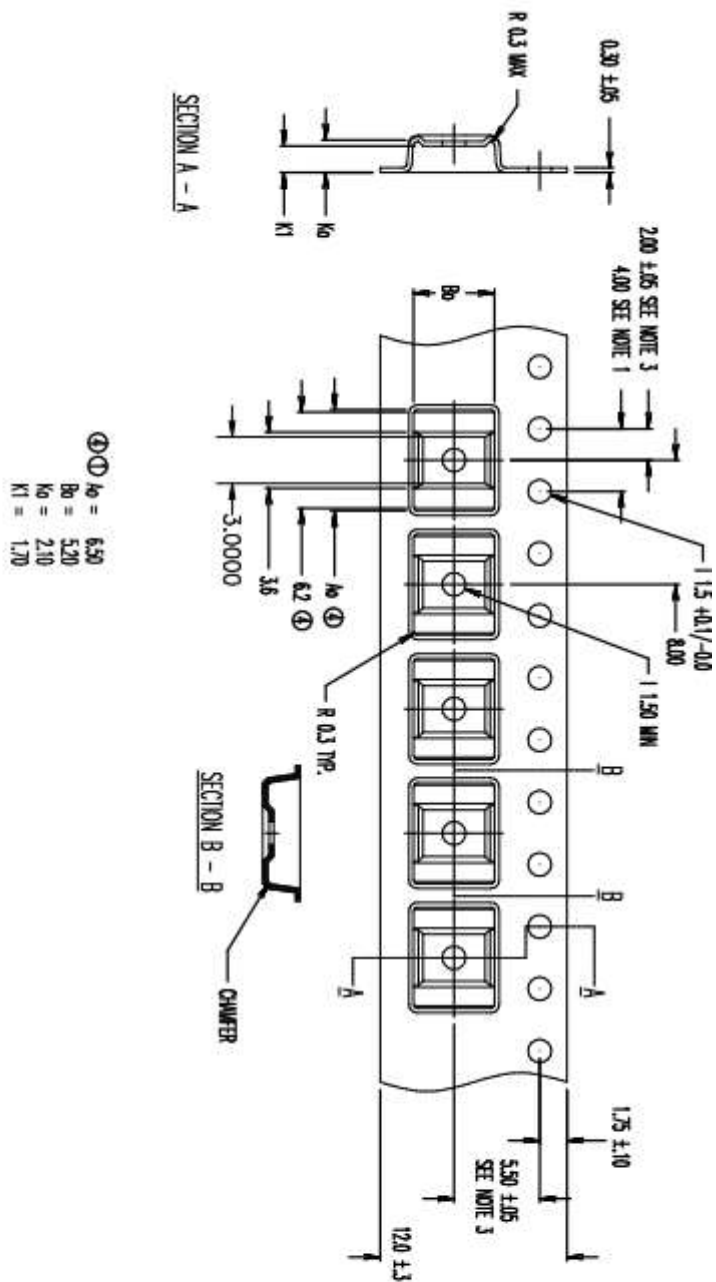


Figure 48.1 FT201XQ, FT220XQ, FT230XQ SSOP Tape Dimensions

49 FT221XQ, FT231XQ, FT240XQ SSOP Reel Dimensions

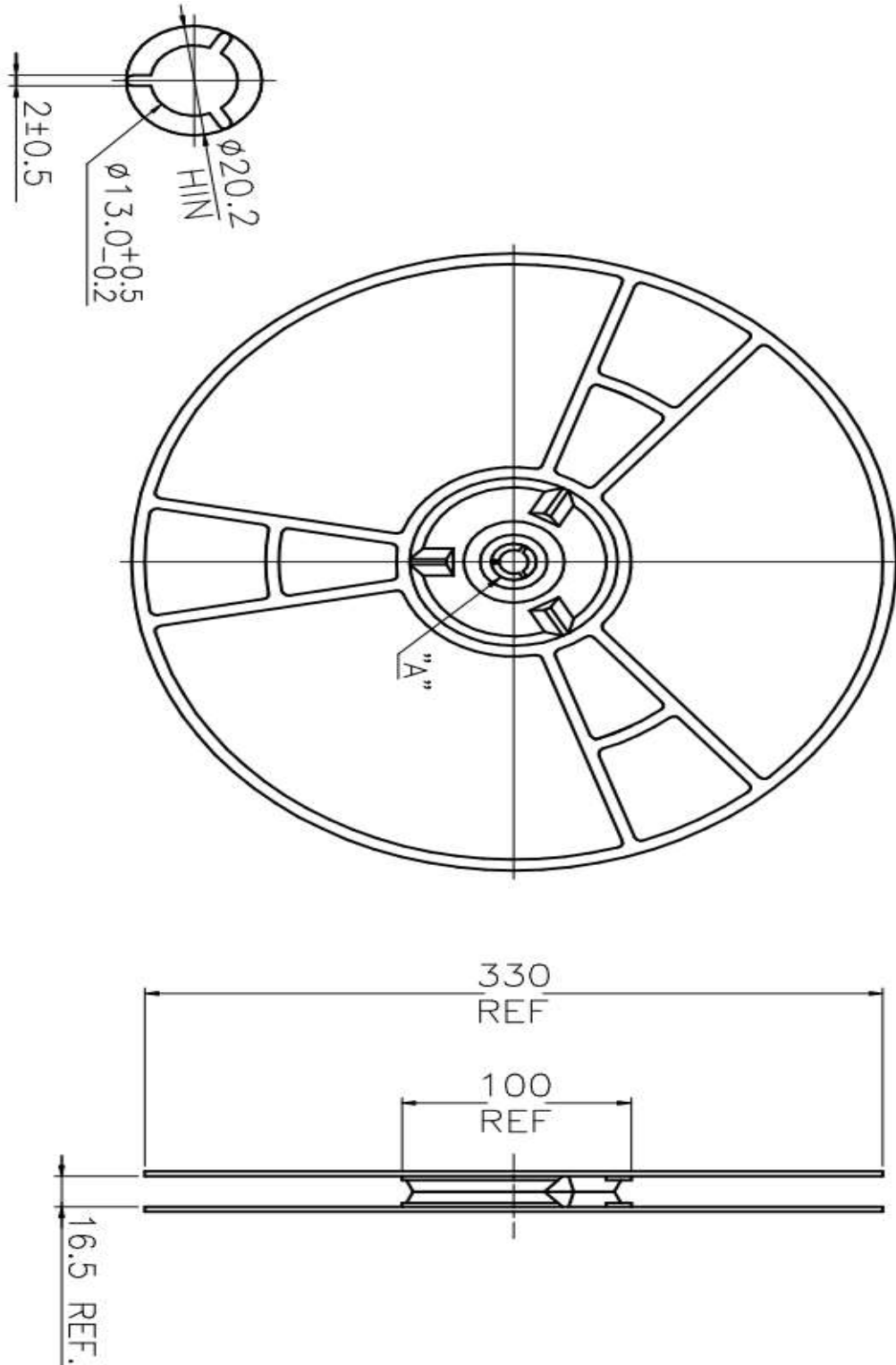


Figure 49.1 FT221XQ, FT231XQ, FT240XQ SSOP Reel Dimensions

50 FT221XQ, FT231XQ, FT240XQ SSOP Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Black Advantek Polystyrene.
 4. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket.
 5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

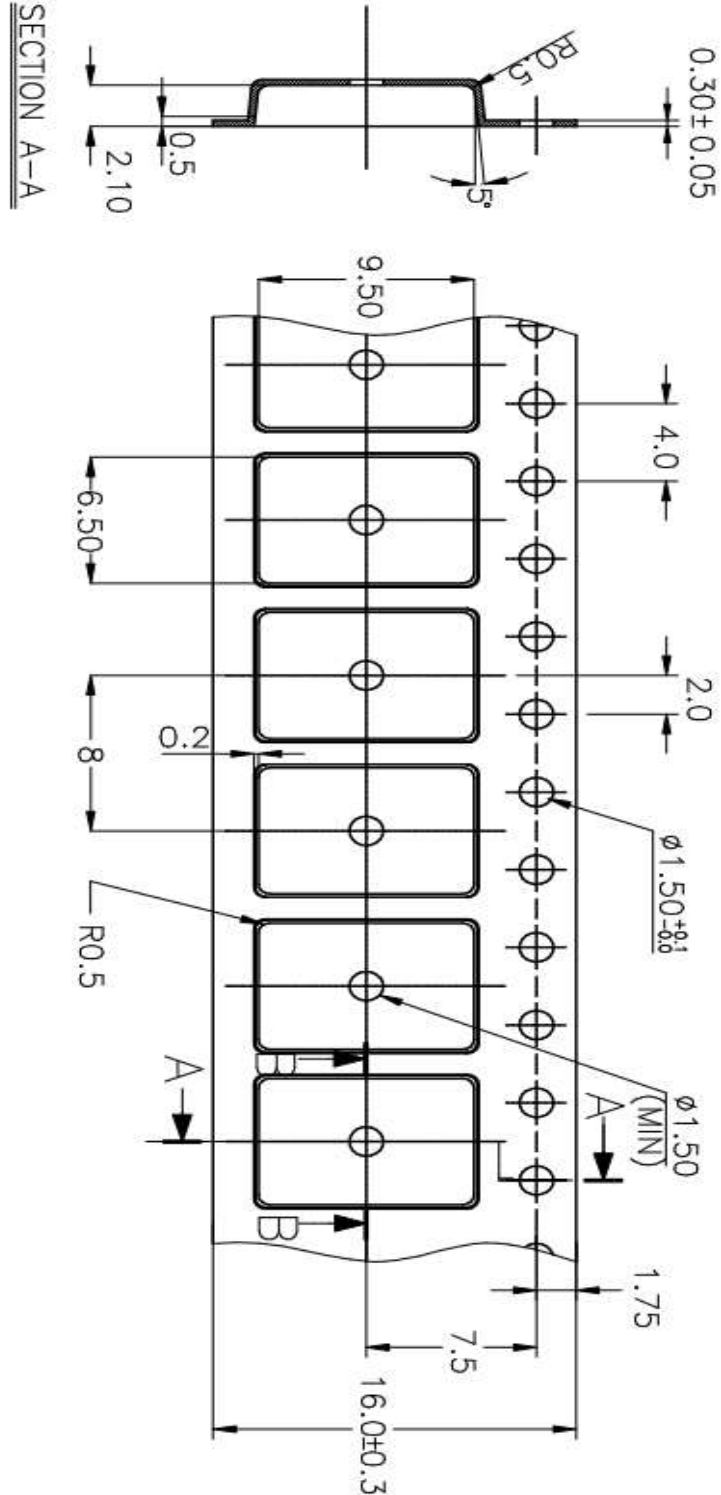
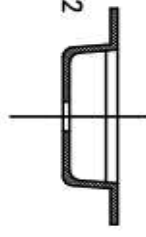


Figure 50.1 FT221XQ, FT231XQ, FT240XQ SSOP Tape Dimensions

51 FT120T, FT122T TSSOP Reel Dimensions

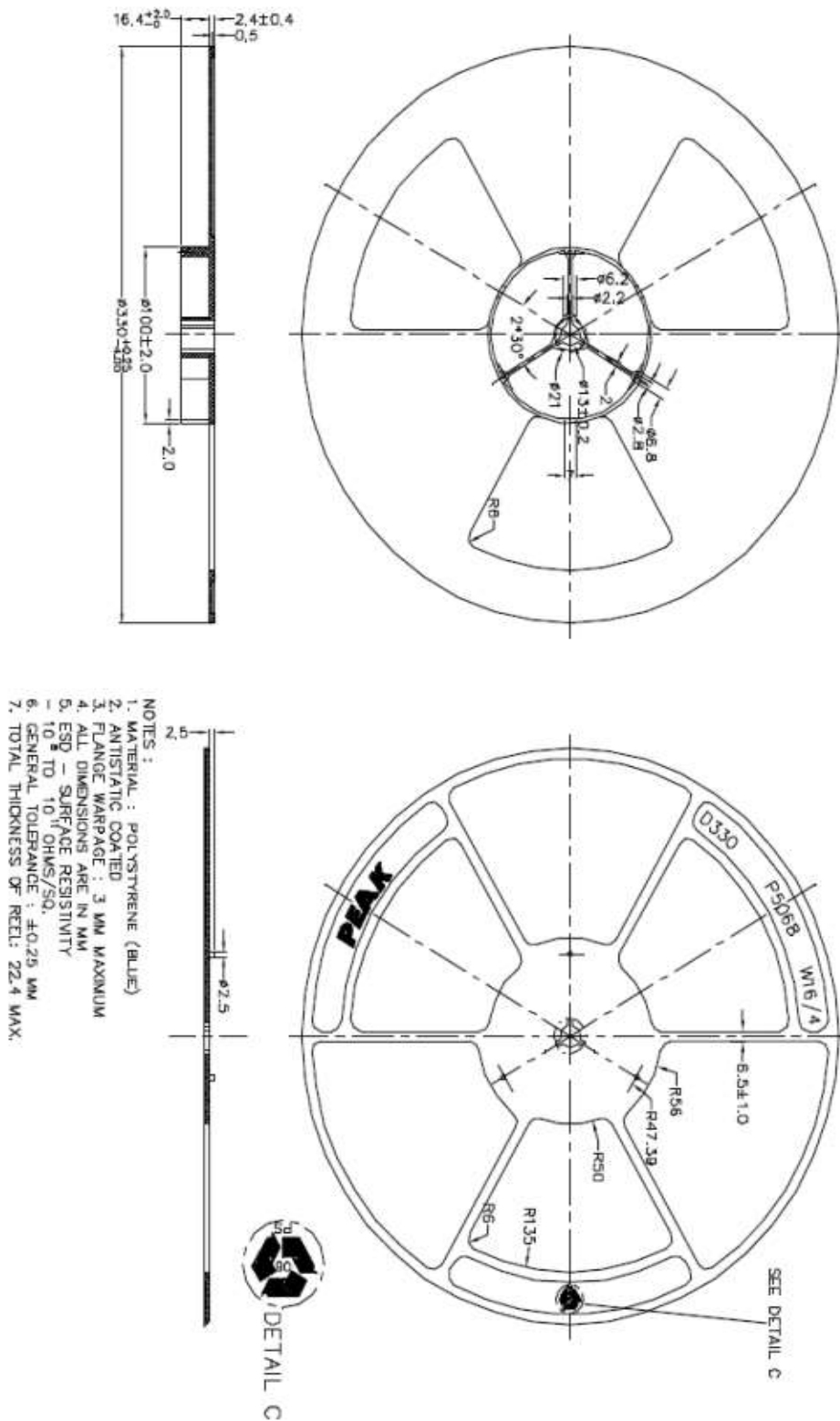
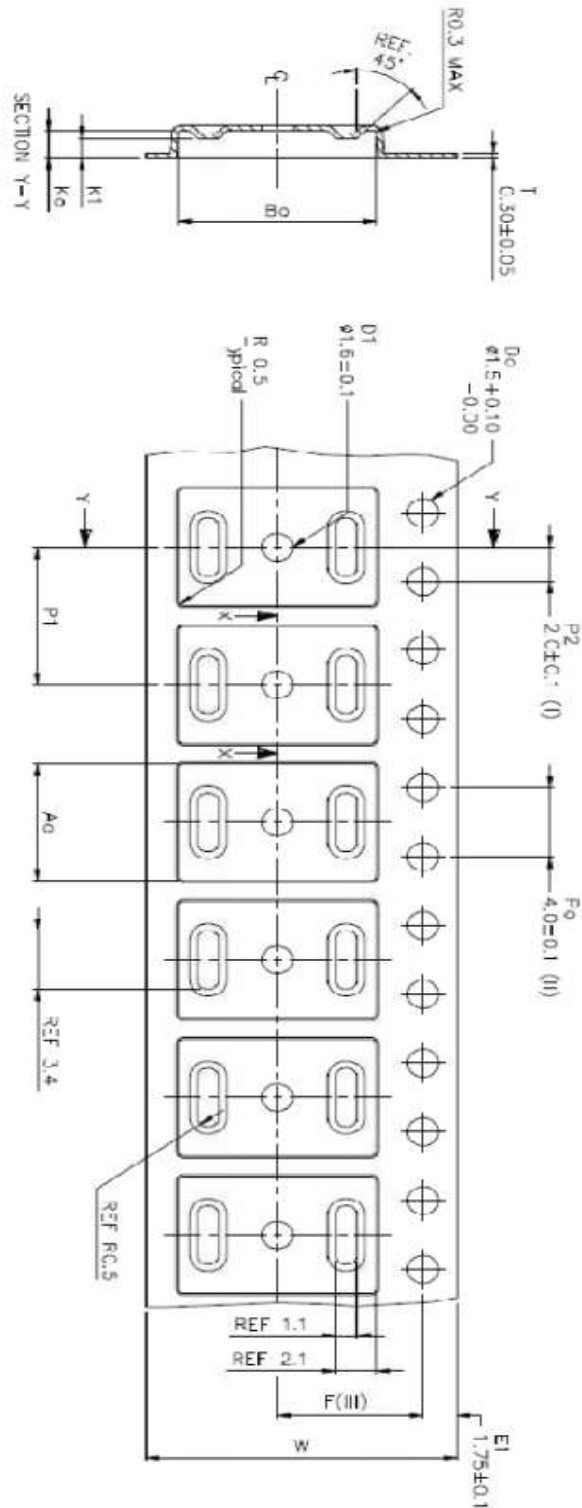


Figure 51.1 FT120T, FT122T TSSOP Reel Dimensions

52 FT120T, FT122T TSSOP Tape Dimensions

A0	6.80 +/-.0.1
B0	10.20 +/-.0.1
K0	1.60 +/-.0.1
K1	1.20 +/-.0.1
F	7.50 +/-.0.1
P1	8.00 +/-.0.1
W	16.00 ± 0.3



- () Measured from centerline of sprocket hole to centerline of pocket.
- (I) Cumulative tolerance of 10 sprocket holes is ± 0.20.
- (II) Measured from centerline of sprocket hole to centerline of pocket.
- (V) Other material available.
- (V) Typical SQ of form tape Max 10 QM/SQ
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

Figure 52.1 FT120T, FT122T TSSOP Tape Dimensions

53 FT121T, FT120Q, FT121Q, FT122Q Reel Dimensions

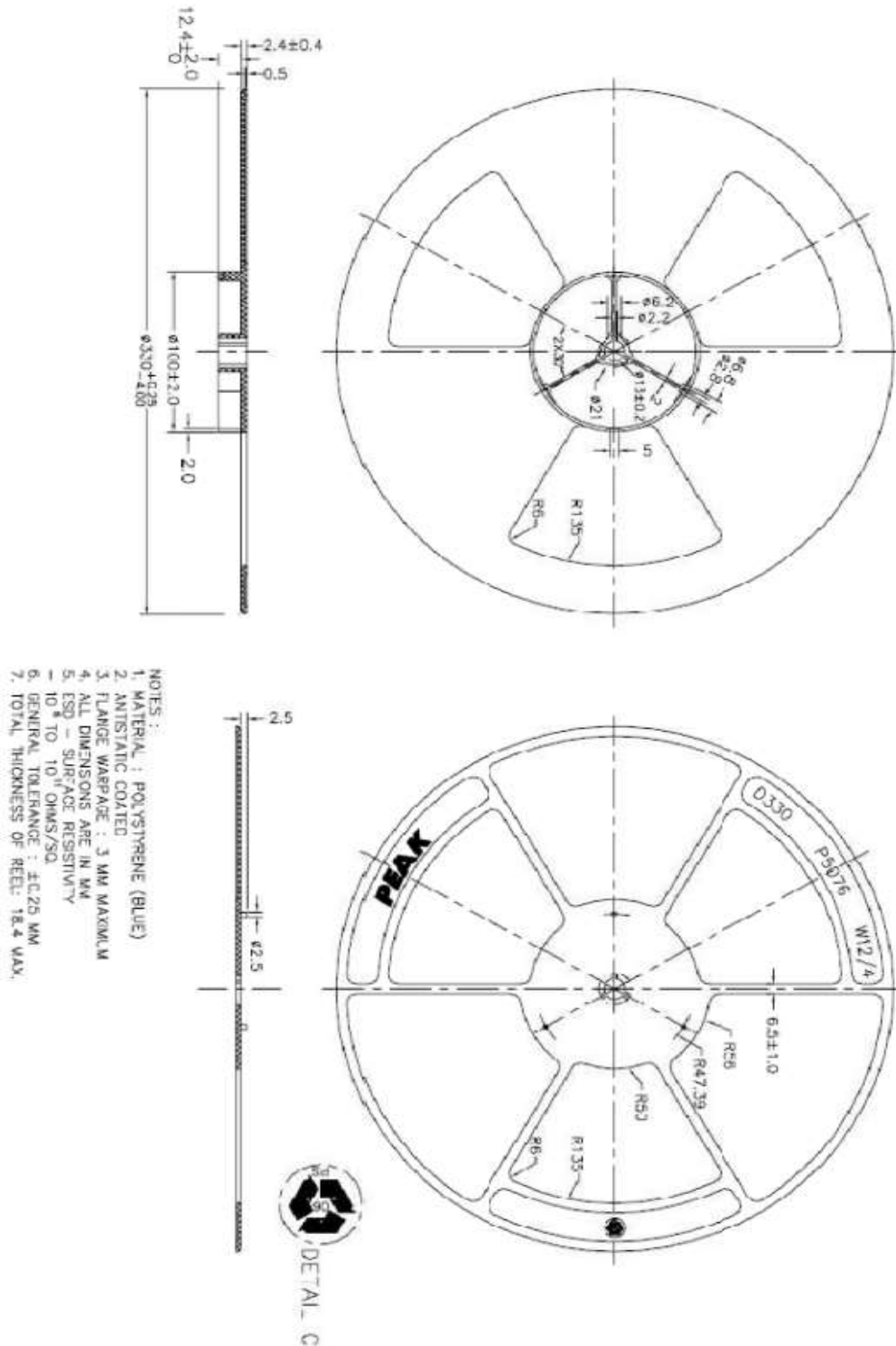


Figure 53.1 FT121T, FT120Q, FT121Q, FT122Q Reel Dimensions

54 FT120Q, FT122Q QFN Tape Dimensions

A ₀	4.35	+/-	0.1
B ₀	4.35	+/-	0.1
K ₀	1.10	+/-	0.1
F	5.50	+/-	0.1
P ₁	8.00	+/-	0.1
W	12.00	+/-	0.3

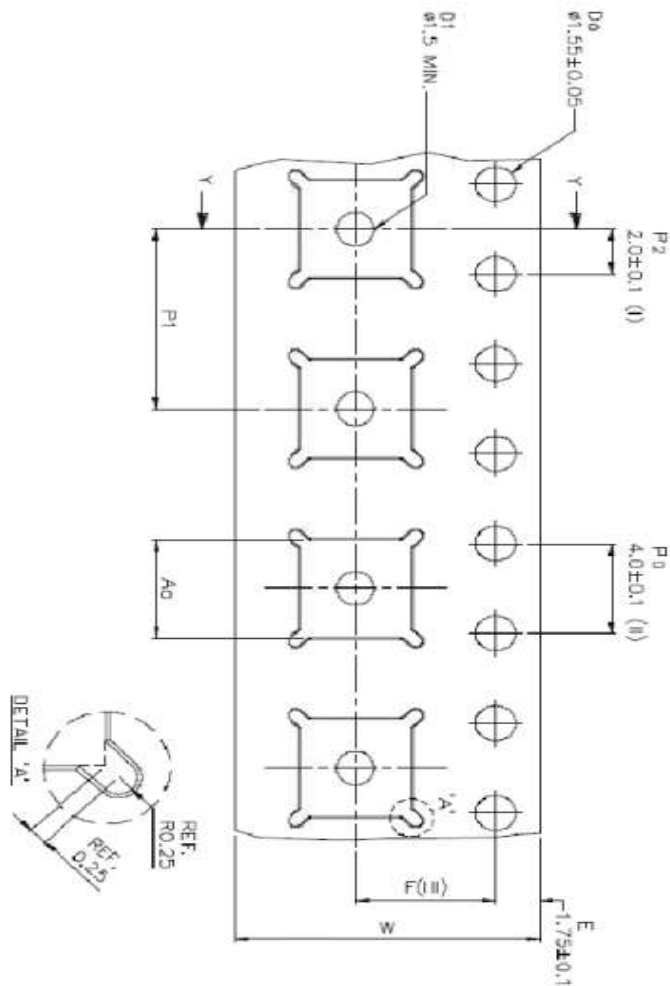
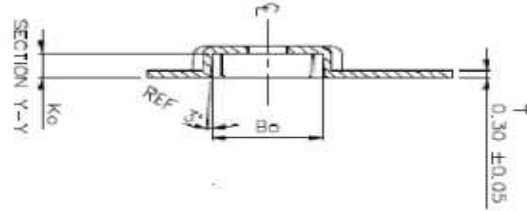


Figure 54.1 FT120Q, FT122Q QFN Tape Dimensions

55 FT121T TSSOP Tape Dimensions

Ao	6.90	+/- 0.1
Ec	5.60	+/- 0.1
Kc	1.60	+/- 0.1
K1	1.30	+/- 0.1
F	5.50	+/- 0.1
F1	8.00	+/- 0.1
W	12.00	+/- 0.3

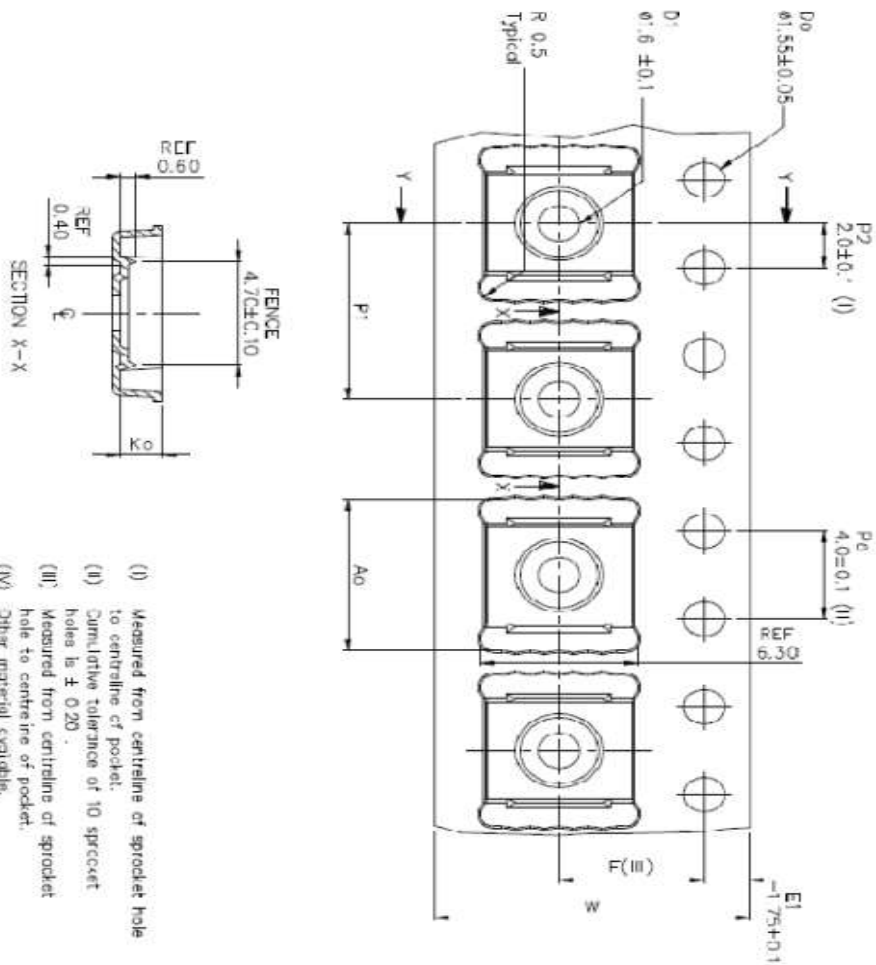
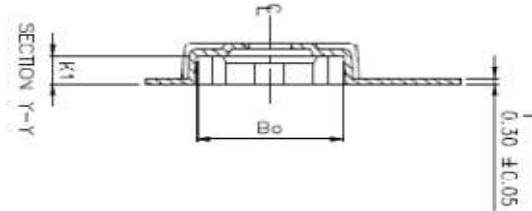
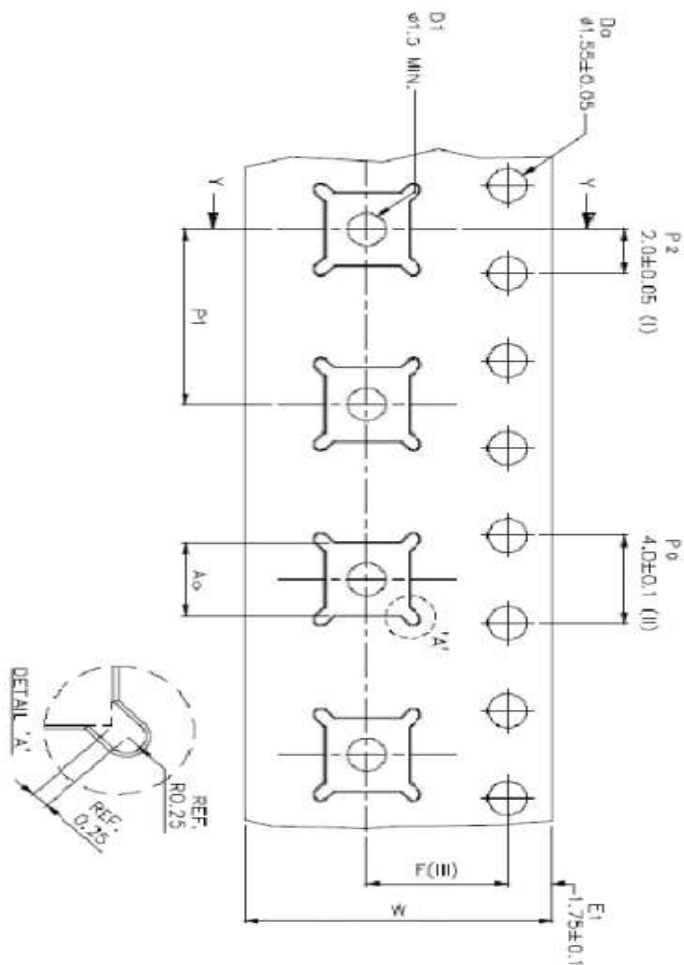
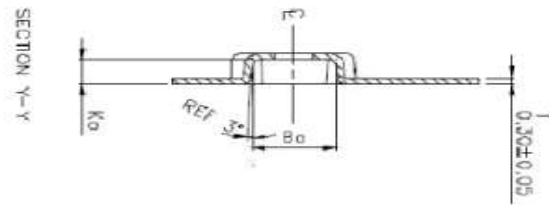


Figure 55.1 FT121T TSSOP Tape Dimensions

56 FT121Q QFN Tape Dimensions

A0	3.30 +/− 0.1
B0	3.30 +/− 0.1
K0	1.10 +/− 0.1
F	5.50 +/− 0.05
P1	8.00 ± 0.1
W	12.00 +/− 0.3



- (I) Measured from centreline of sprocket hole to centreline of pocket.
 (II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
 (III) Measured from centreline of sprocket hole to centreline of pocket.
 (IV) Other material available.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Figure 56.1 FT121Q QFN Tape Dimensions

57 FT201XS, FT220XS, FT230XS, FT240XS Reel Dimensions

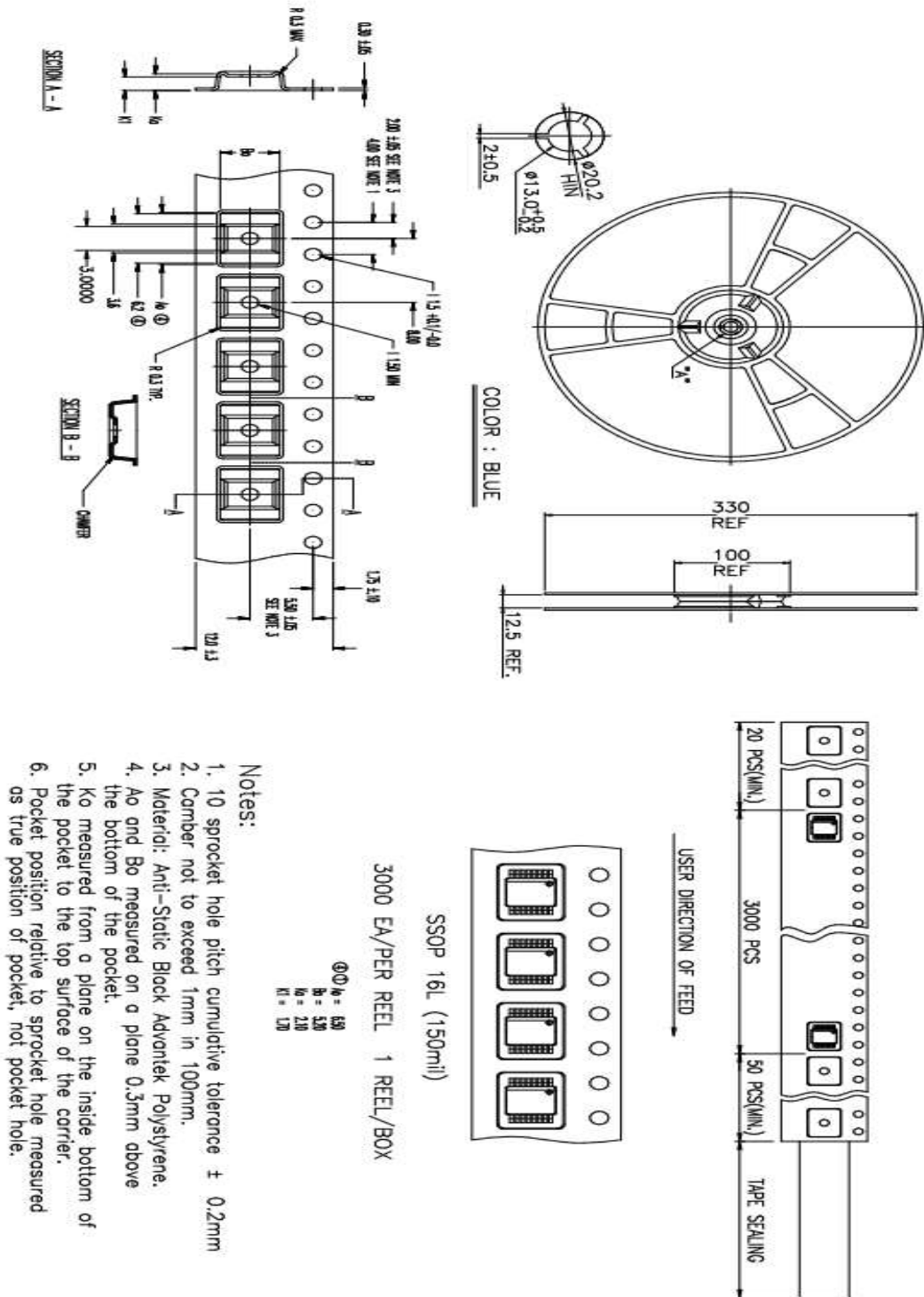


Figure 57.1 FT201XS, FT220XS, FT230XS, FT240XS Reel Dimensions

58 FT221XS, FT231XS Reel Dimensions

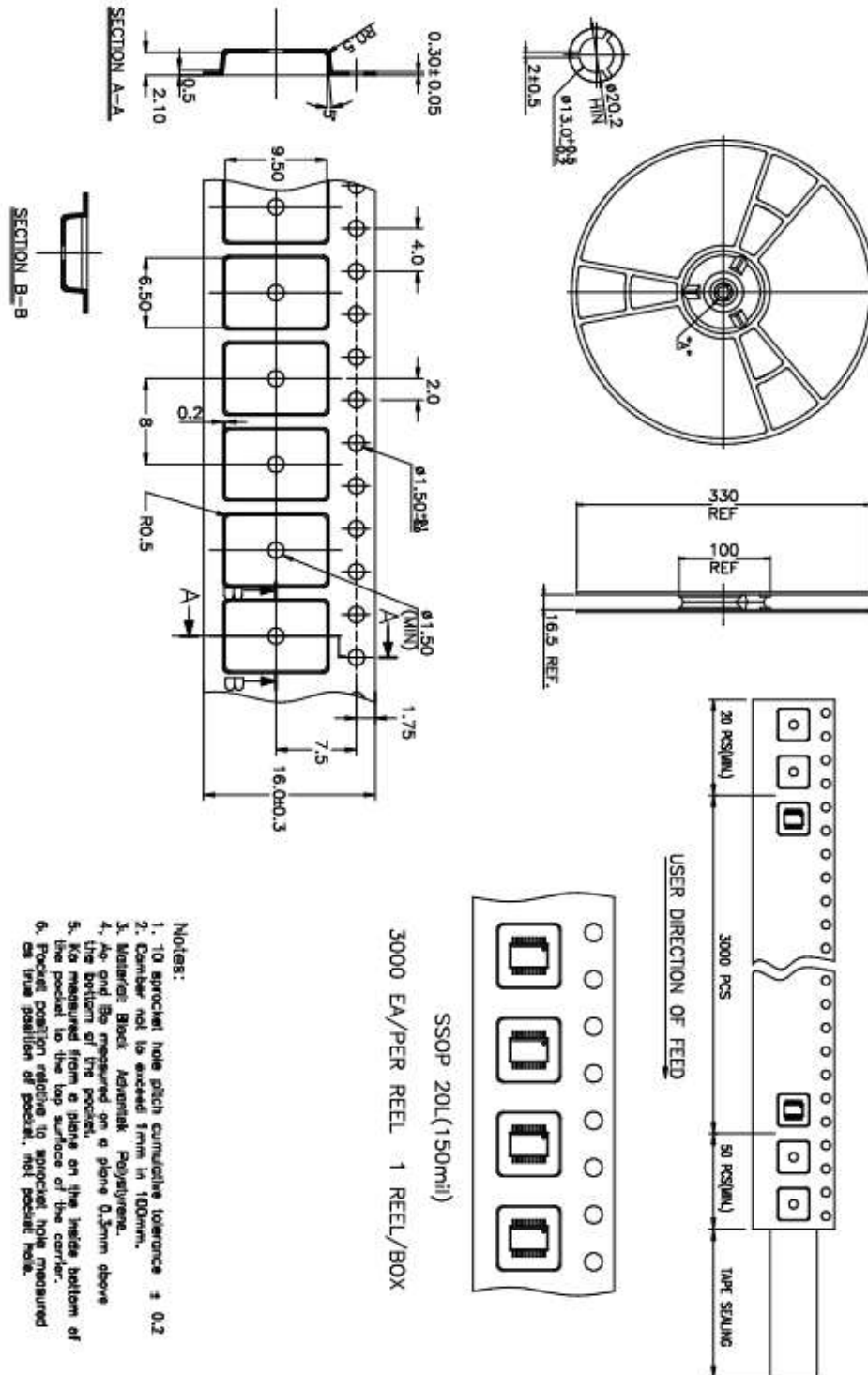


Figure 58.1 FT221XS, FT231XS Reel Dimensions

59 FT231XS Tube Dimensions

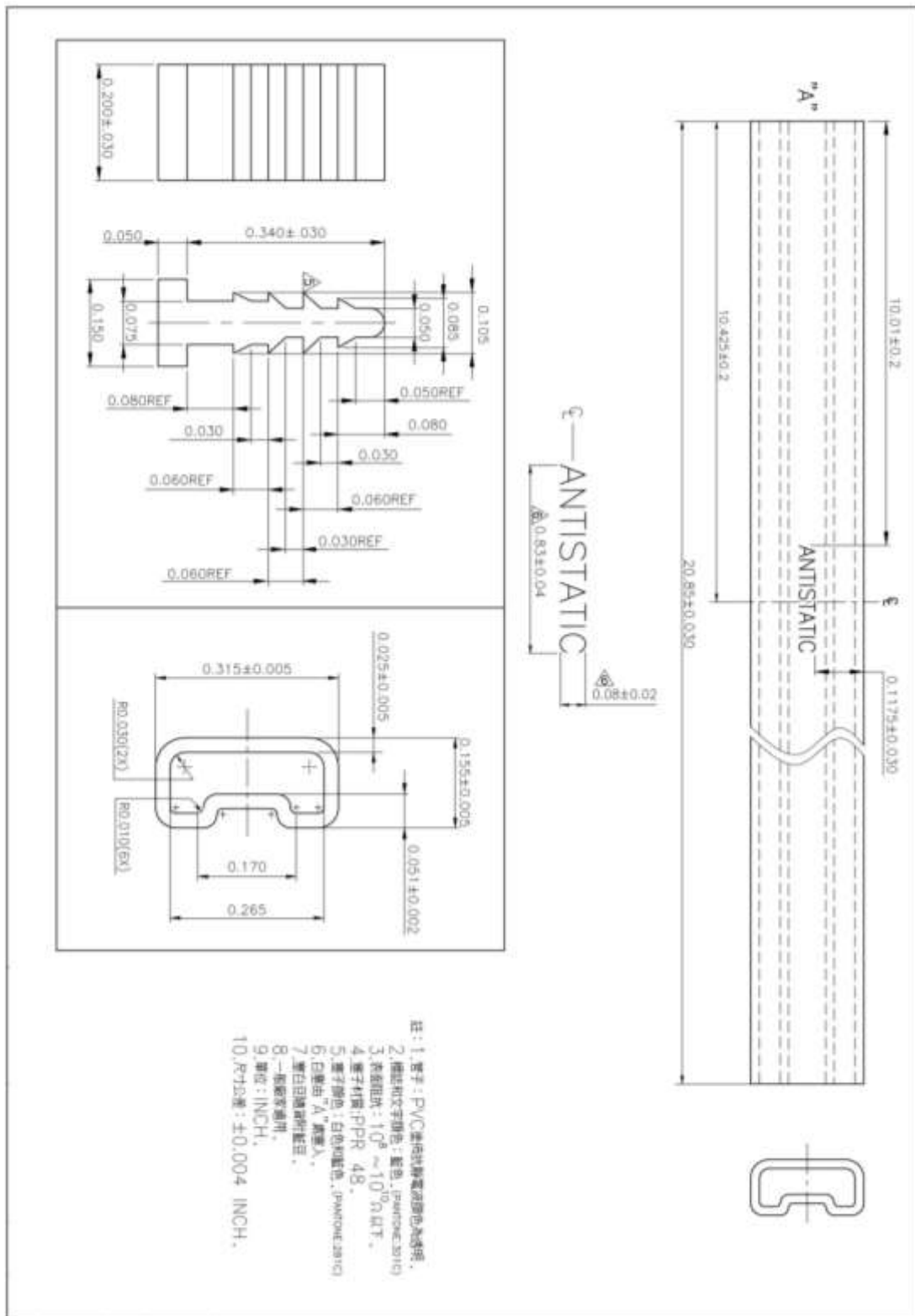


Figure 59.1 FT231XS Tube Dimensions

60 FT313H-QFN Reel Dimensions

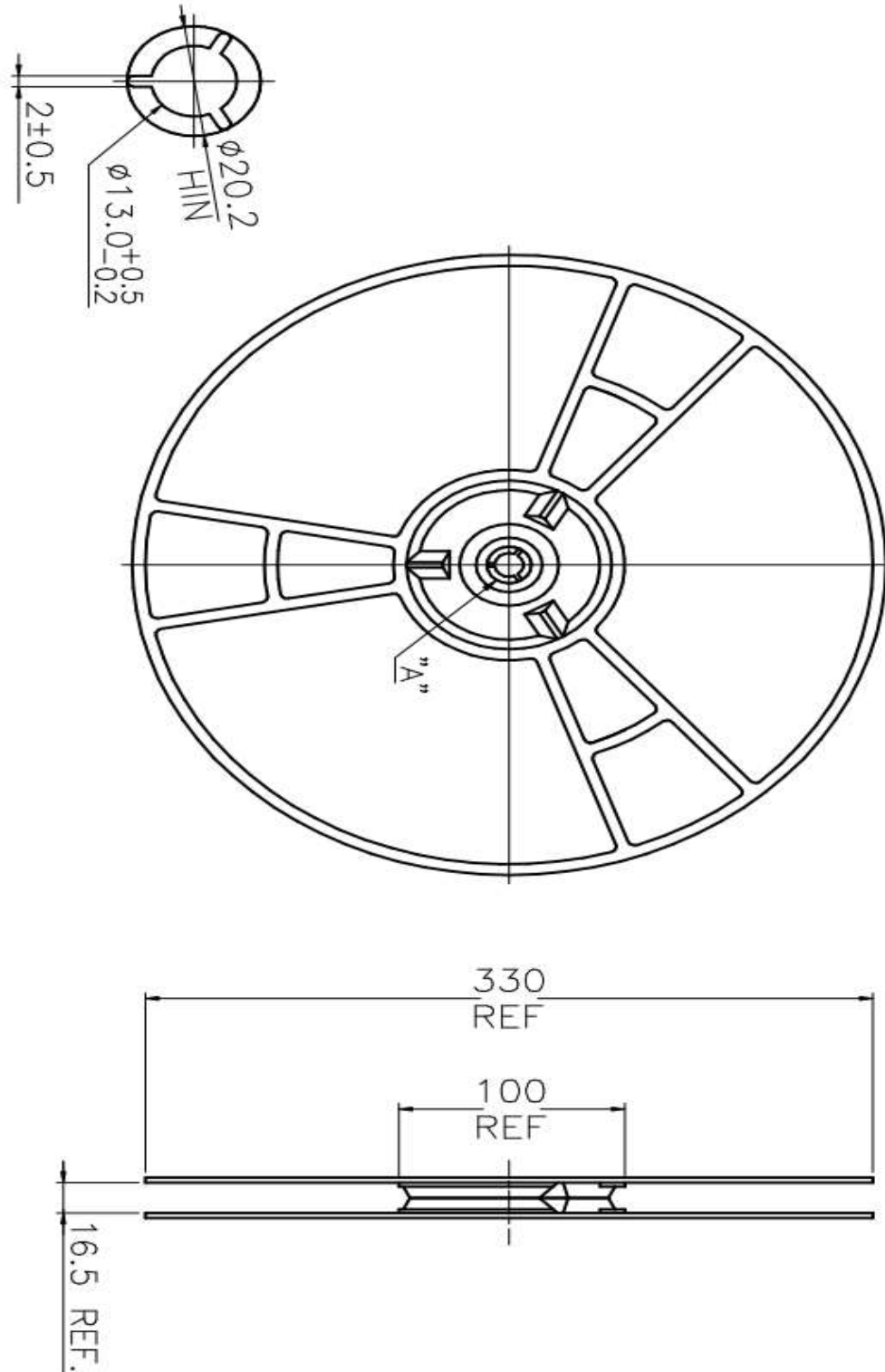


Figure 60.1 FT313H-QFN Reel Dimensions

61 FT313H-QFN Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Black Advantek Polystyrene.
 4. A_0 and B_0 measured on a plane 0.5mm above the bottom of the pocket.
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

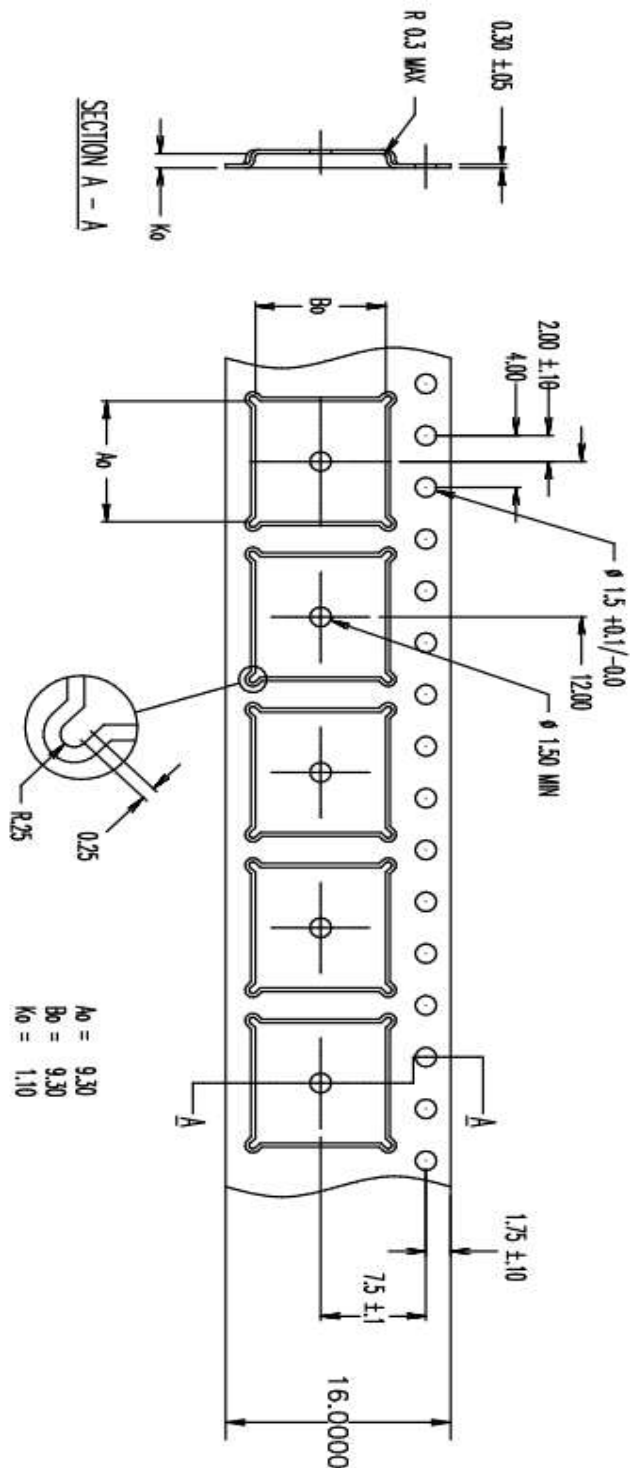


Figure 61.1 FT313H-QFN Tape Dimensions

62 FT313H-LQFP Reel Dimensions

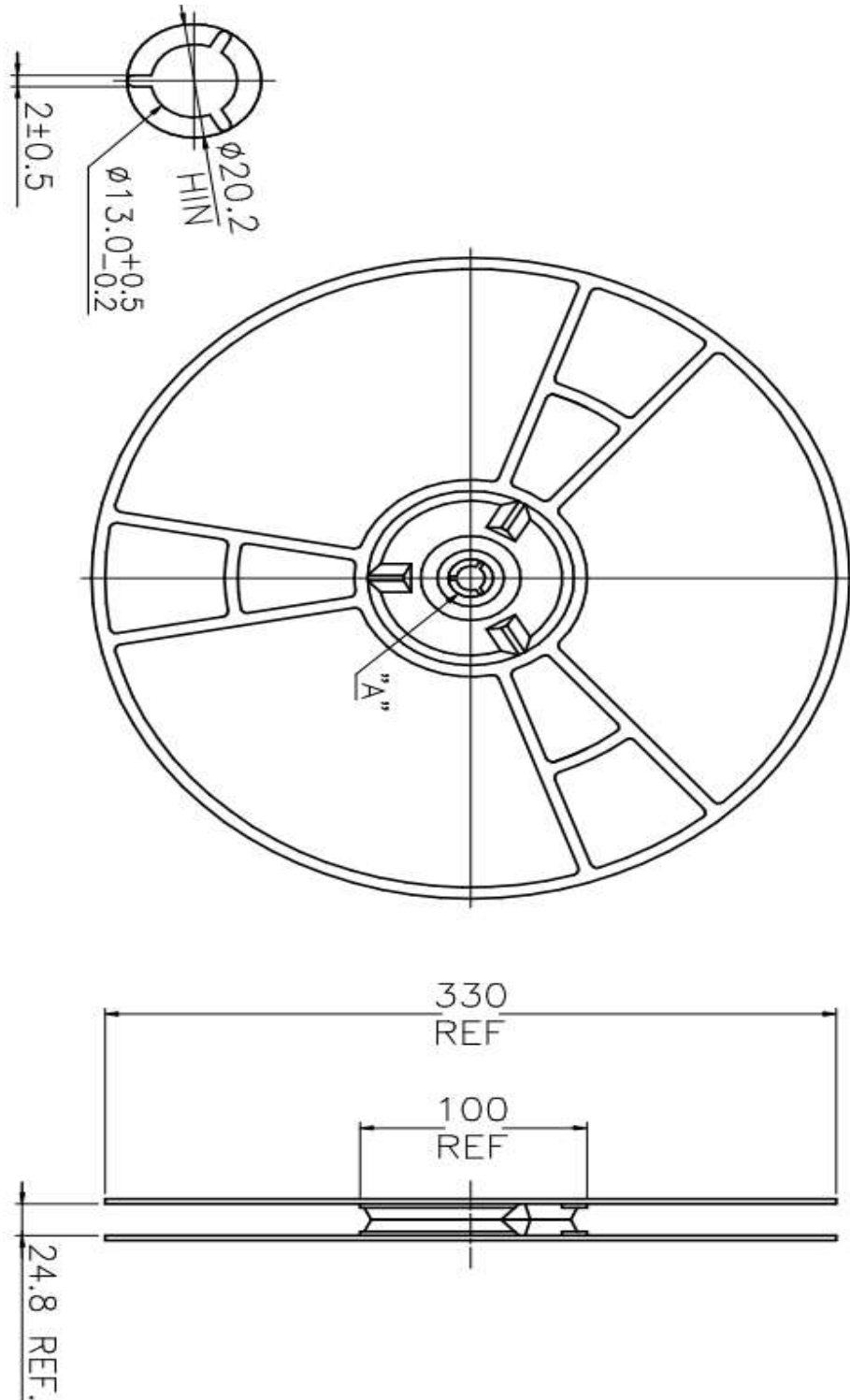


Figure 62.1 FT313H-LQFP Reel Dimensions

63 FT313H-LQFP Tape Dimensions

- NOTES:
1. TO SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
 2. CAMBER IN COMPLIANCE WITH EA 481
 3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
 4. COVER TAPE WIDTH : 21.3±0.1

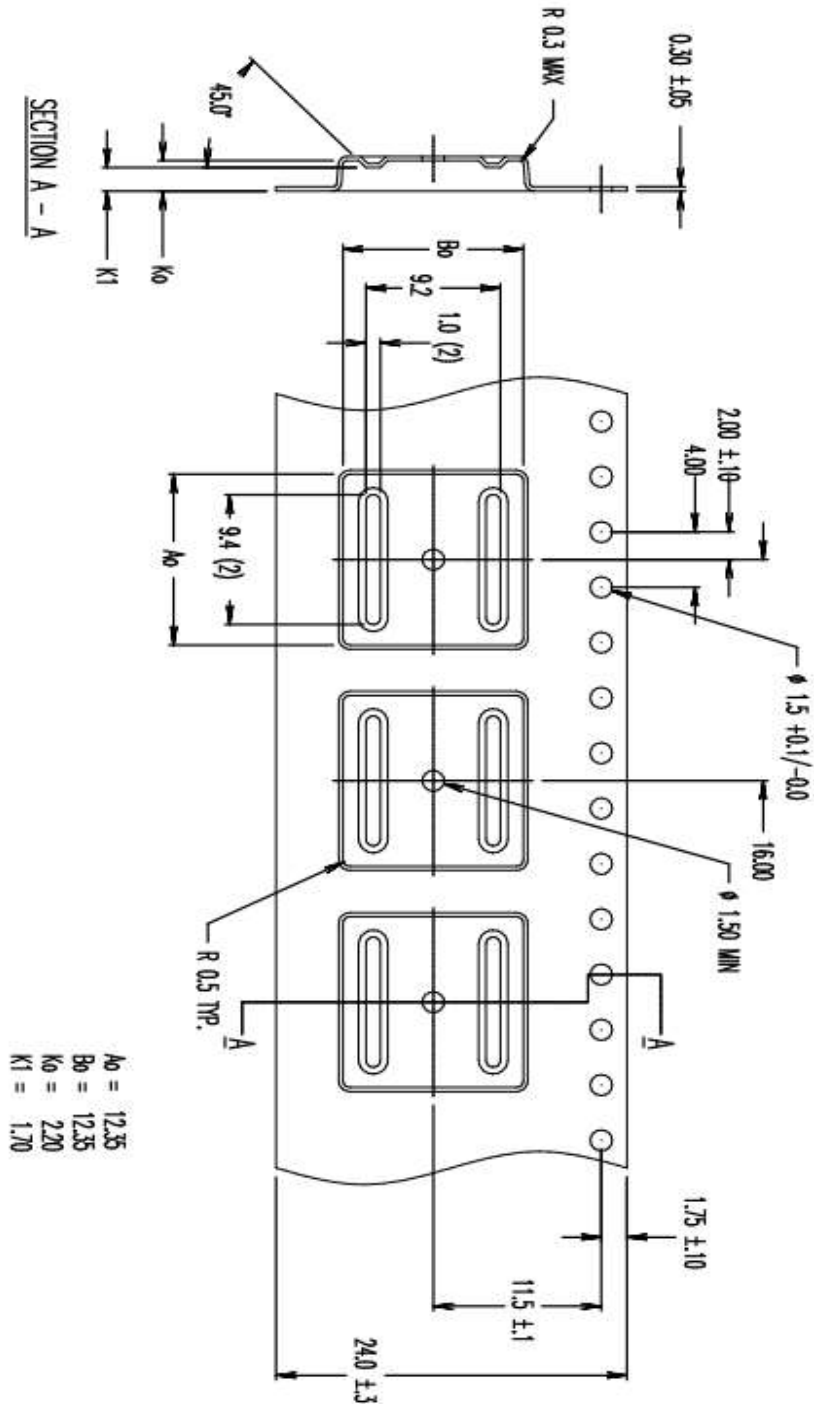


Figure 63.1 FT313H-LQFP Tape Dimensions

64 FT313H-TQFP Reel Dimensions

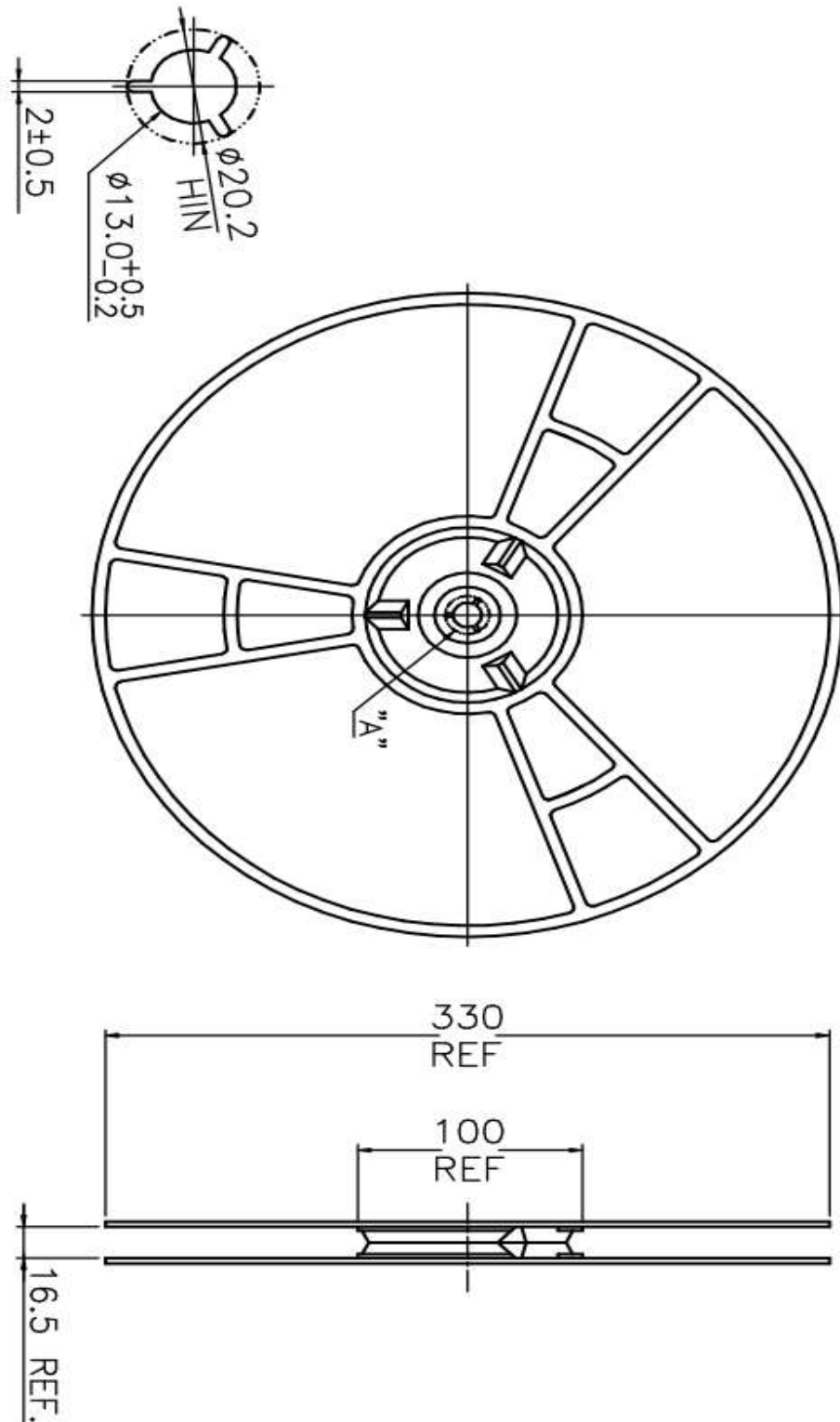


Figure 64.1 FT313H-TQFP Reel Dimensions

65 FT313H-TQFP Tape Dimensions

- NOTES:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ± 0.2
 2. CAMBER IN COMPLIANCE WITH EIA 481
 3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
 4. COVER TAPE WIDTH : 13.3 ± 0.1

$A_0 = 9.30 \pm 0.1$
 $B_0 = 9.30 \pm 0.1$
 $K_0 = 1.80 \pm 0.1$
 $K_1 = 1.20 \pm 0.1$

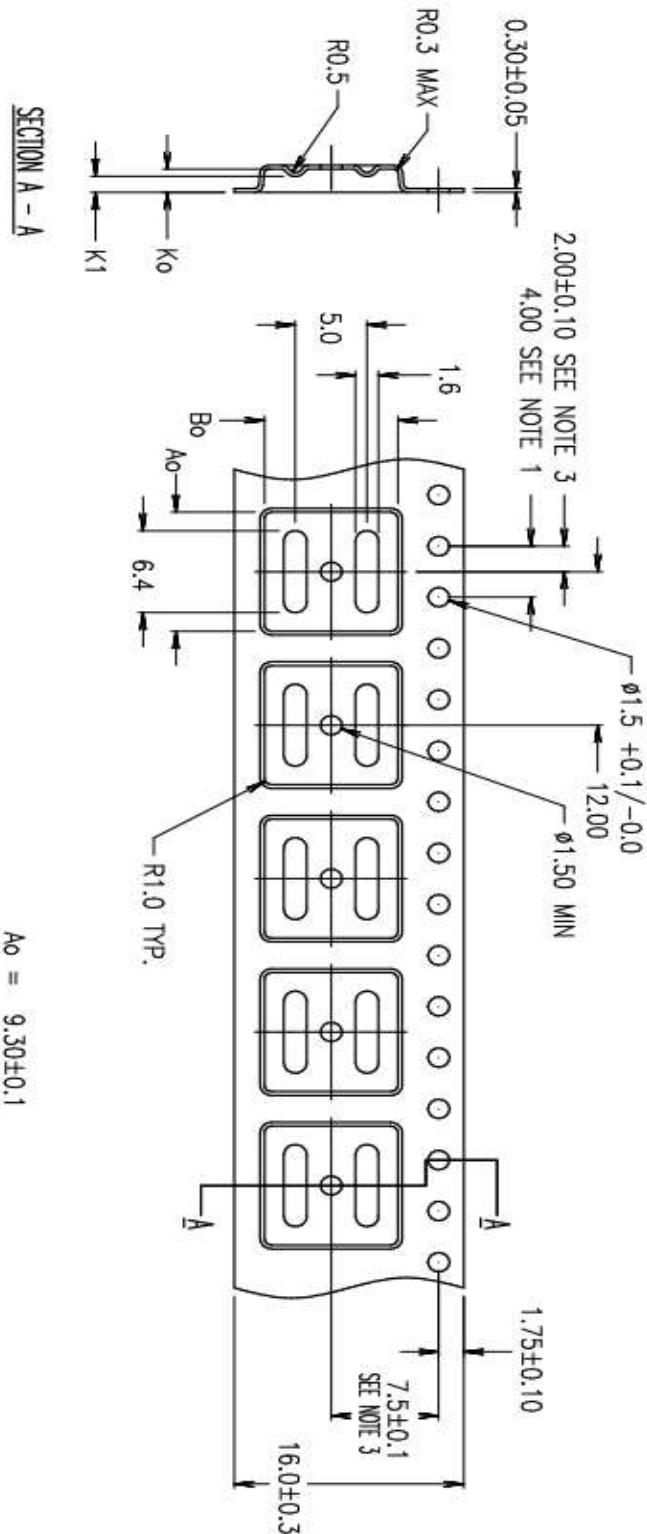


Figure 65.1 FT313H-TQFP Tape Dimensions

66 FT600Q Reel Dimensions

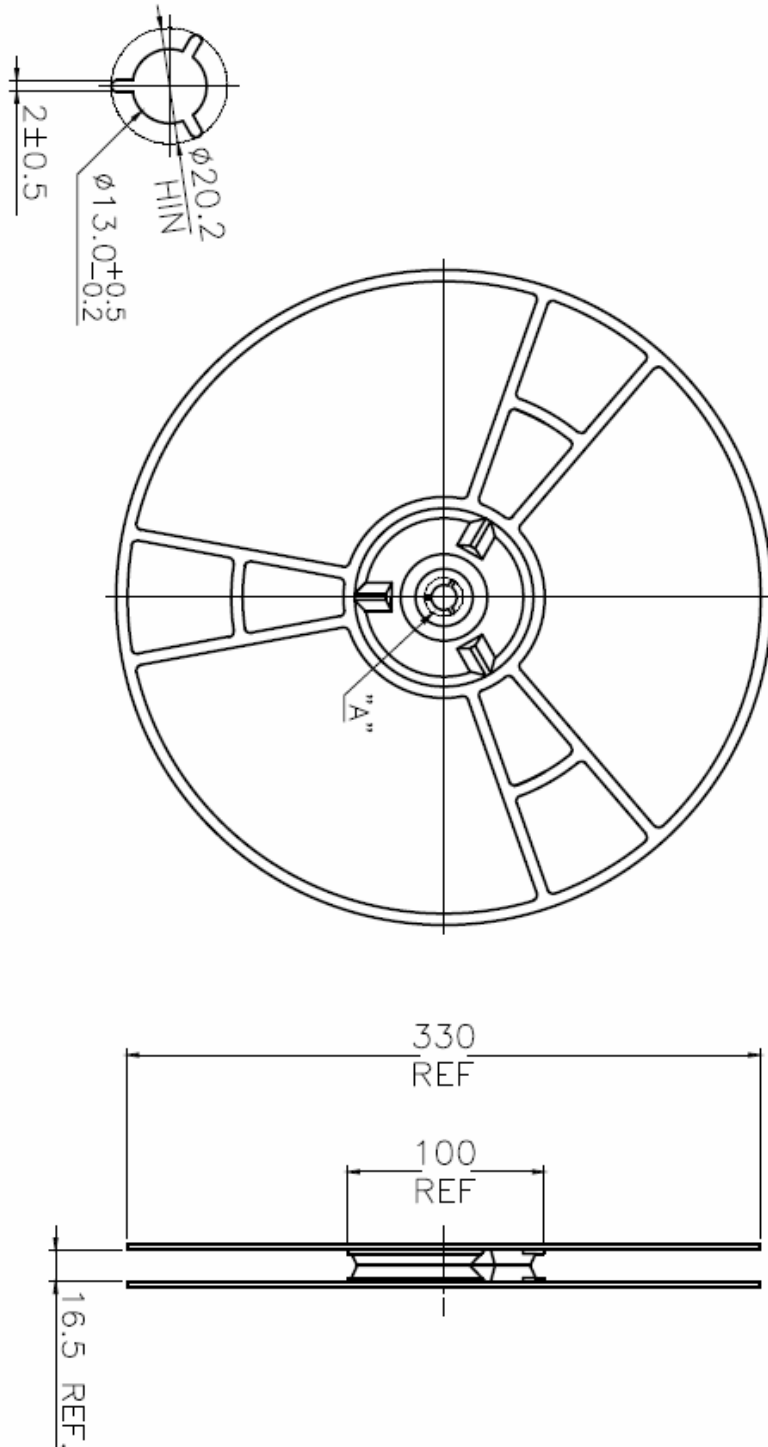


Figure 66.1 FT600Q Reel Dimensions

67 FT600Q Tape Dimensions

- NOTES:
1. DIM IN MM.
 2. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ± 0.2 .
 3. CAMBER NOT TO EXCEED 1 MM IN 100 MM.
 4. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE.
 5. SURFACE RESISTIVITY LESS THAN OR EQUAL TO 1.0×10^7 OHMS/SQ.

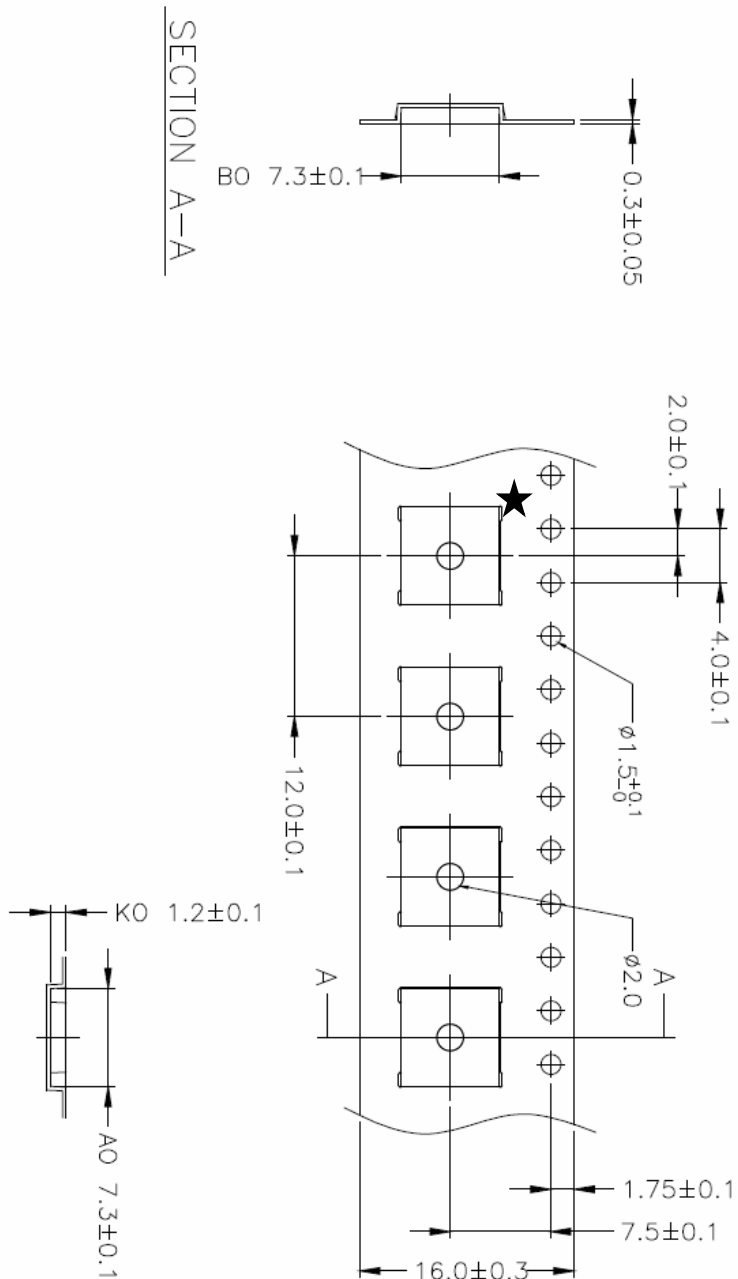


Figure 67.1 FT600Q Tape Dimensions

★ Pin 1 Identifier

68 FT601Q, FT602Q Reel Dimensions

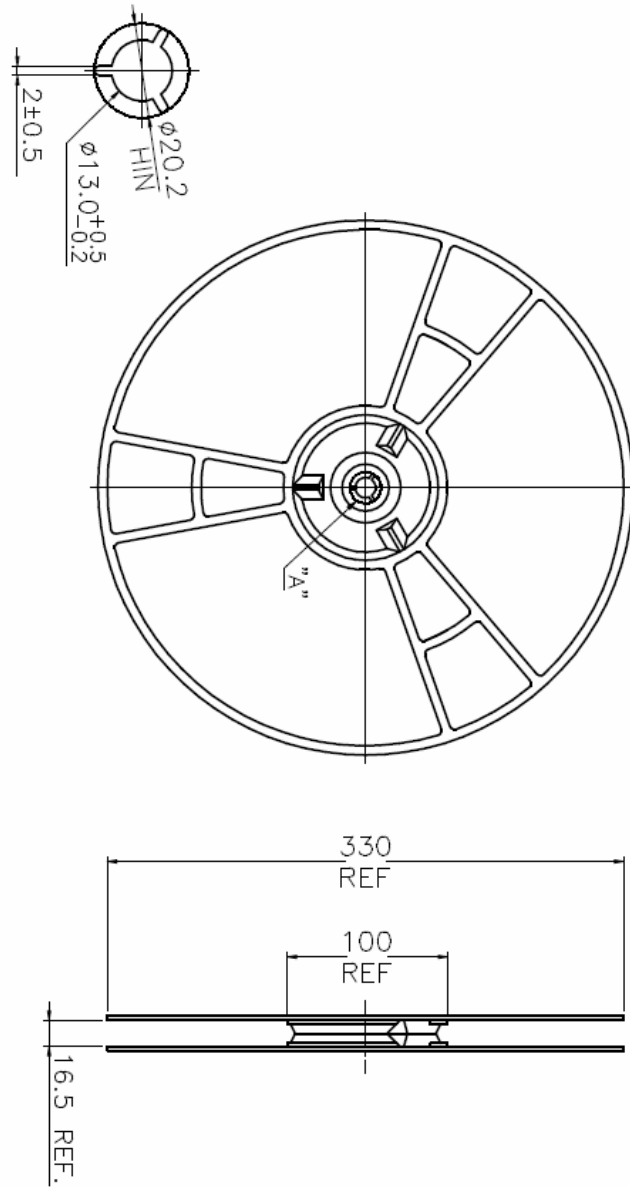


Figure 68.1 FT601Q, FT602Q Reel Dimensions

69 FT601Q, FT602Q Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
 2. Camber not to exceed 1mm in 100mm.
 3. Material: Black Advantek Polystyrene.
 4. A_0 and B_0 measured on a plane 0.5mm above the bottom of the pocket.
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
 6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

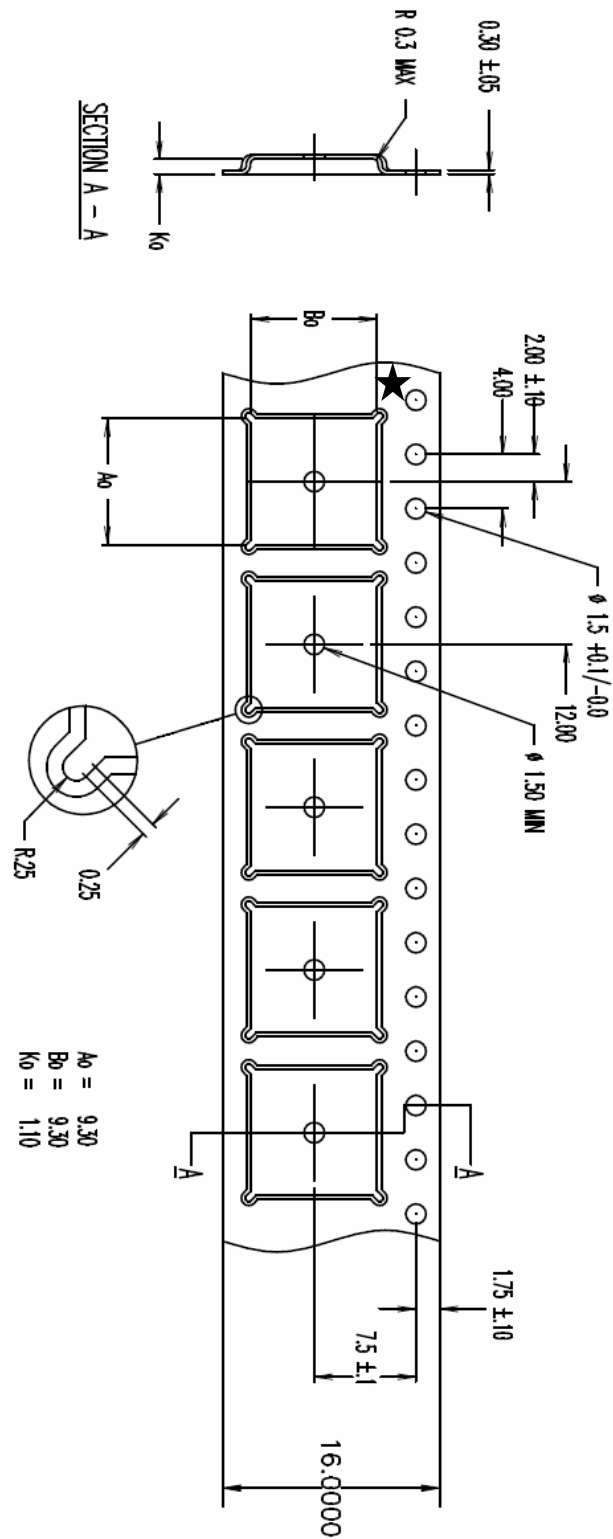


Figure 69.1 FT601Q, FT602Q Tape Dimensions

★ Pin 1 Identifier

70 FT4222HQ Reel Dimensions

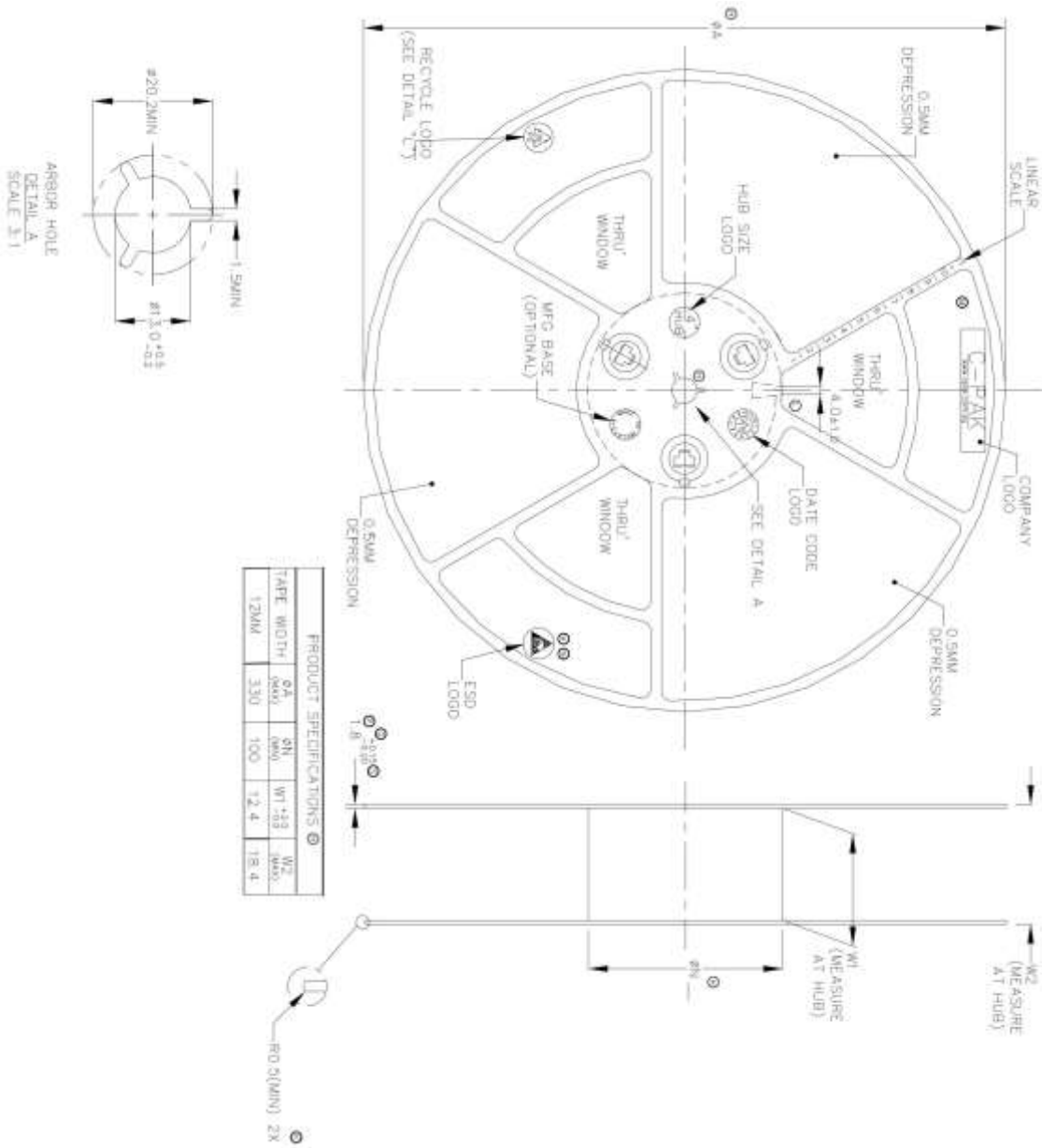


Figure 70.1 FT4222HQ Reel Dimensions

71 FT4222HQ Tape Dimensions

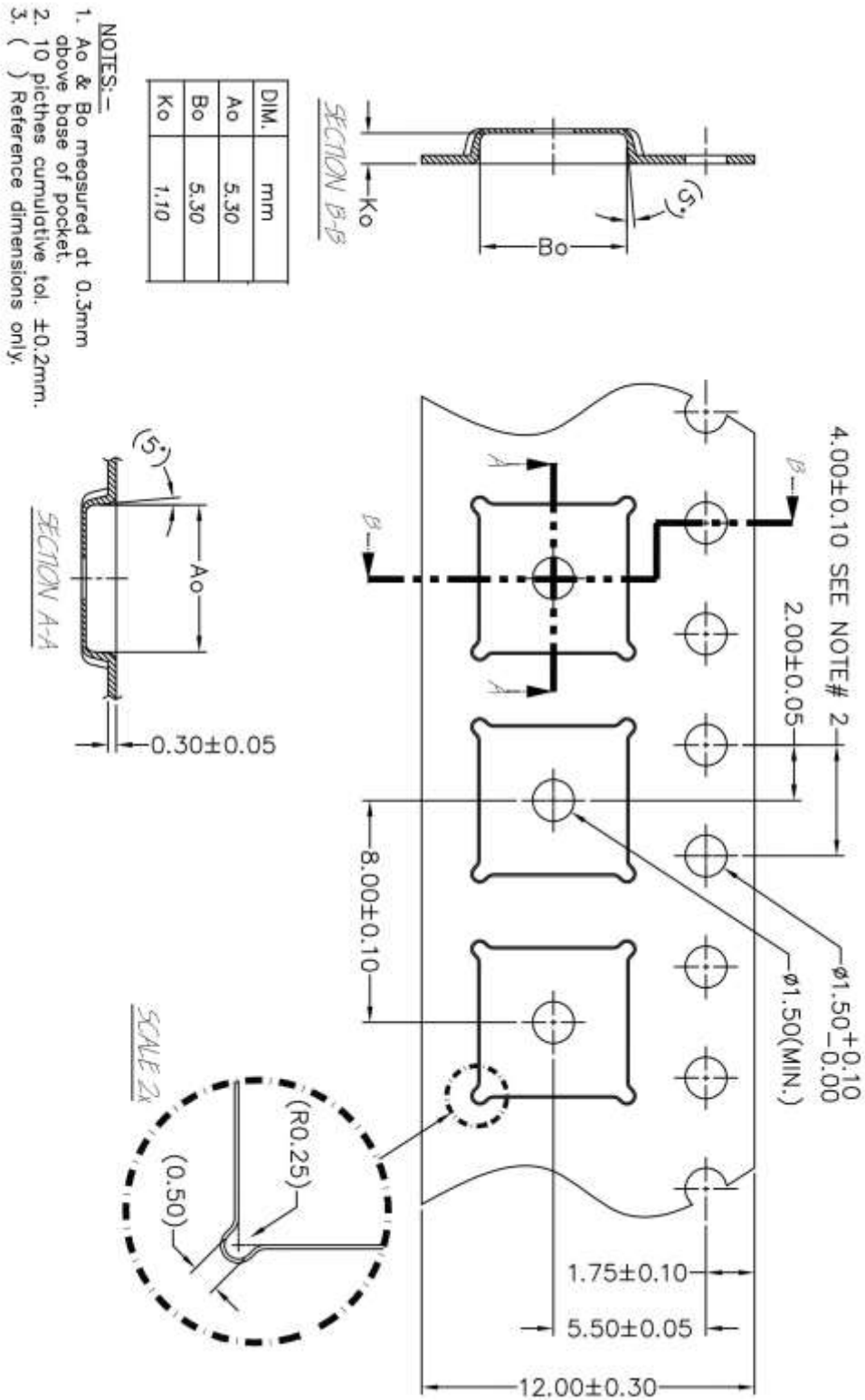


Figure 71.1 FT4222HQ Tape Dimensions

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Appendix A – References

Document References

NA

Acronyms and Abbreviations

Terms	Description
LQFP	Low Profile Quad Flat Pack
QFN	Quad Flat No-Leads Package
TSSOP	Thin Shrink Small Outline Package
VNC2	Vinculum-II

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Appendix C – Revision History

Document Title : AN_116 FTDI Devices T&R Dimensions
 Document Reference No. : FT_000154
 Clearance No. : FTDI# 98
 Product Page : <http://www.ftdichip.com/Products/ICs.htm>
 Document Feedback : [Send Feedback](#)

Revision	Changes	Date
1.0	Initial Release (based on and supersedes AN232B-11)	2009-08-11
1.1	Added the VNC2 tray and T&R dimensions drawings	2010-05-24
1.2	Updated VNC2 tray dimensions drawings	2011-01-17
1.3	Added pin 1 identifier to tapes	2011-02-17
1.4	Added FT232H tape/reel /tray dimensions	2011-11-07
1.5	Add Reel & Tape information of FTX series chips, FT12 series chips, FT311D and FT313H ; Updated contacts page ;	2012-12-06
1.6	Added section FT231XS tube dimension; Added FT234XD tape and reel (same as FT200XD); Added FT200XD, FT234XD pin 1 identifier; Added FT600Q, FT601Q and FT602Q	2017-07-12
1.7	Added Reel & Tape information for FT4222HQ	2017-11-02