



**Future Technology Devices International Ltd.**

## **Application Note AN\_116**

# **FTDI Devices T&R Dimensions**

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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, VNC1L and VNC2

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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, 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	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

**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	DFN	490	
FT201XS- U, FT220XS- U, FT230XS- U,	SSOP	100	
FT240XS - 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

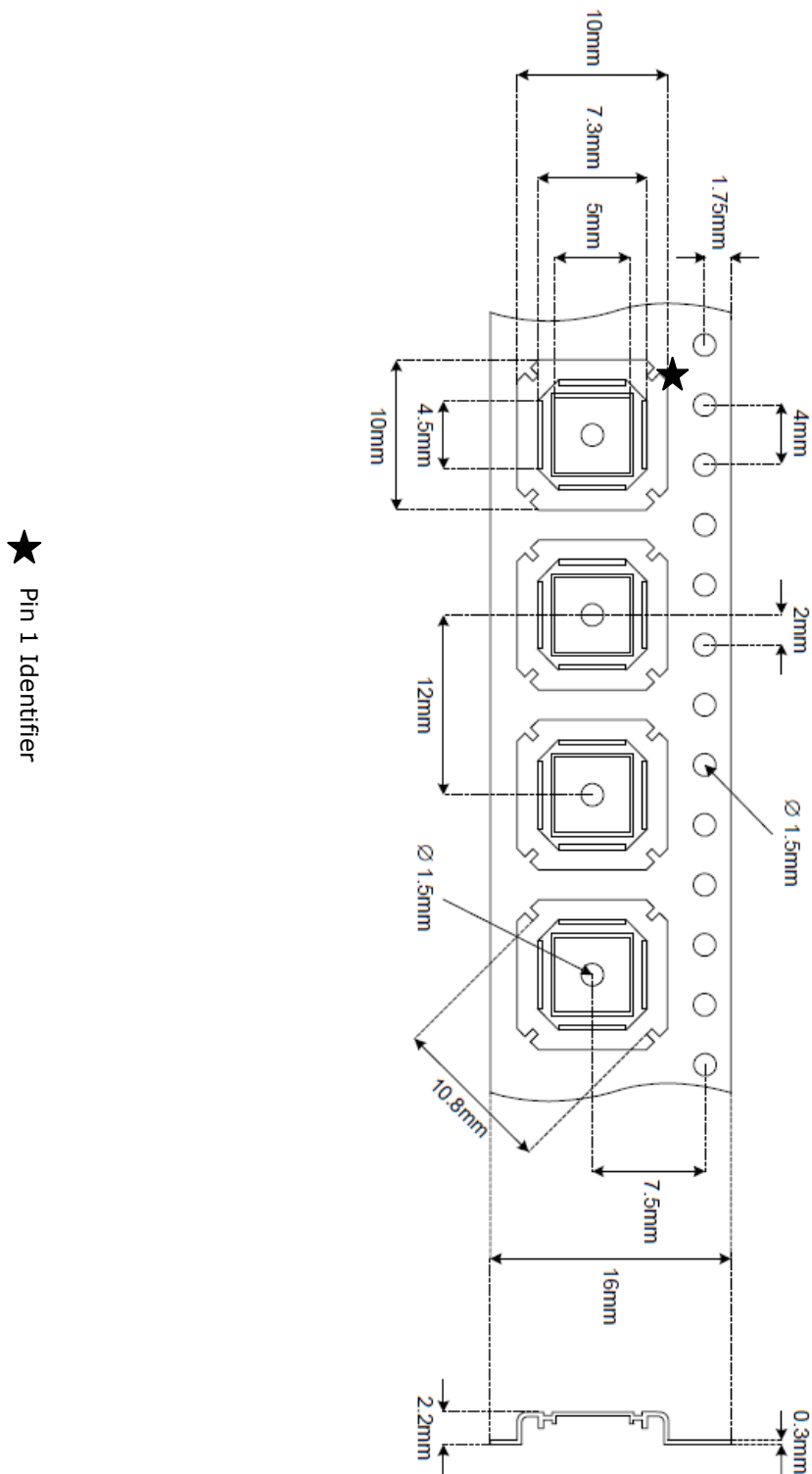


Figure 3.1 – FT232BL, FT245BL and FT2232D Tape Dimensions



#### 4 FT232BL, FT245BL and FT2232D Reel Dimensions

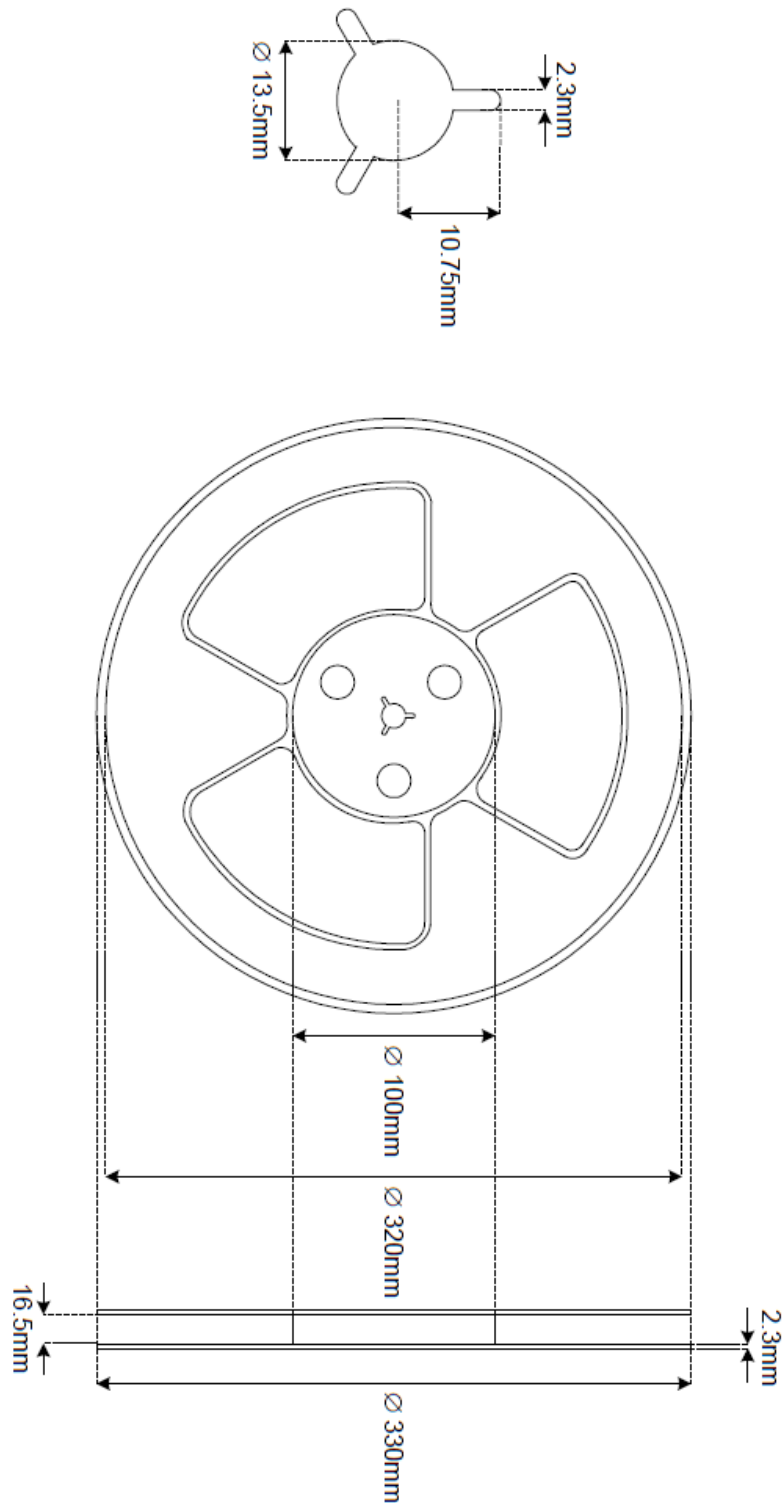
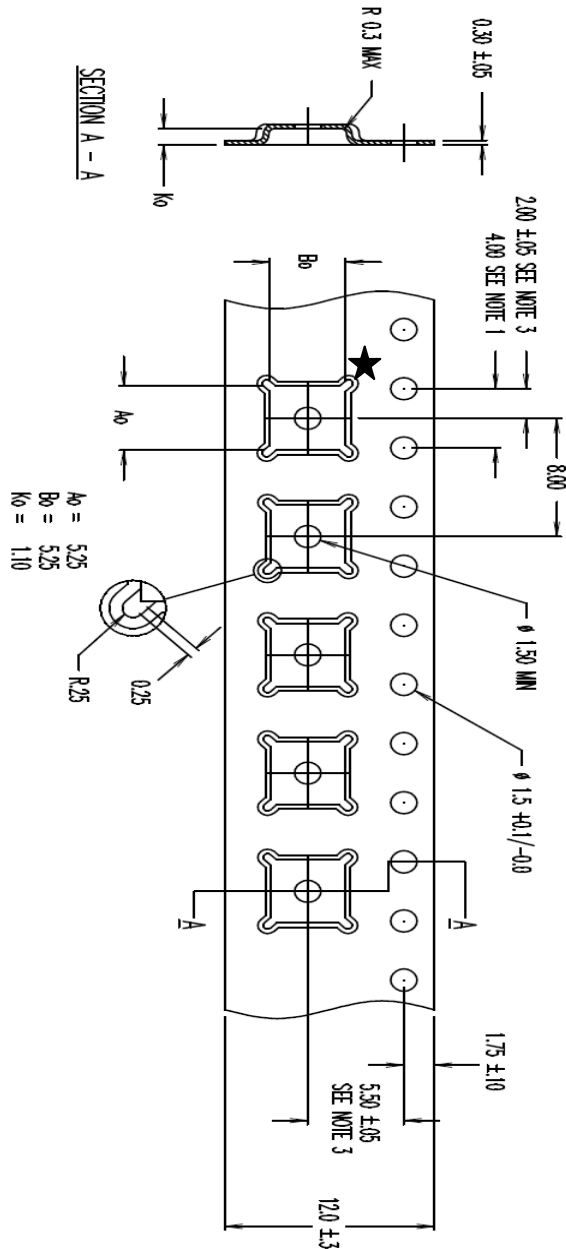


Figure 4.1 – FT232BL, FT245BL and FT2232D Reel Dimensions

## 5 FT232BQ and FT245BQ Tape Dimensions



- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  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.

★ Pin 1 Identifier

Figure 5.1 – FT232BQ and FT245BQ Tape Dimensions

## 6 FT232BQ and FT245BQ Reel Dimensions

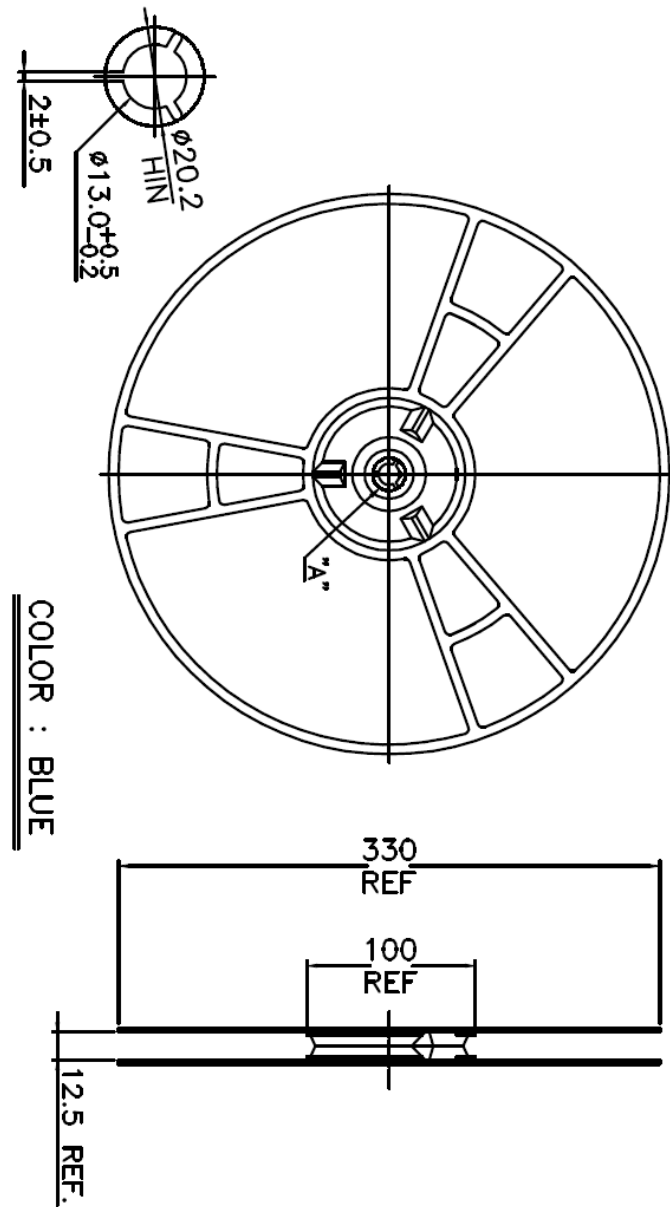
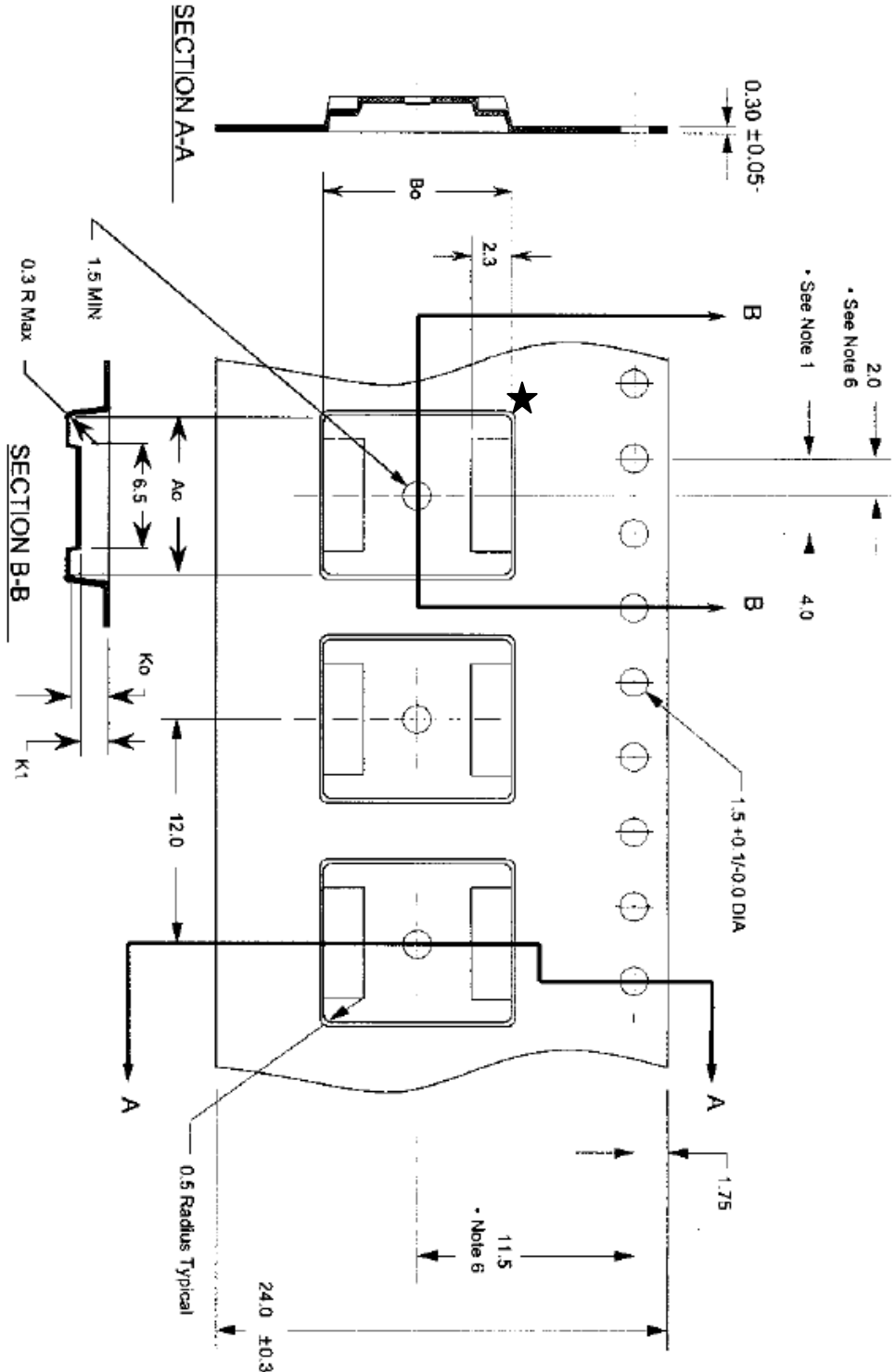


Figure 6.1 – FT232BQ and FT245BQ Reel Dimensions

## 7 FT232RL and FT245RL Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  2. Camber not to exceed 1mm in 100mm
  3. Material: Black Conductive 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.



$A_0 = 8.4$   
 $B_0 = 10.9$   
 $K_0 = 2.4$   
 $K_1 = 2.0$

★ Pin 1 Identifier

Tolerance – Except as noted	Scale
$\pm 0.1$	3:1
All dimensions are in Millimeters	

Figure 7.1 – FT232RL and FT245RL Tape Dimensions

## 8 FT232RL and FT245RL Reel Dimensions

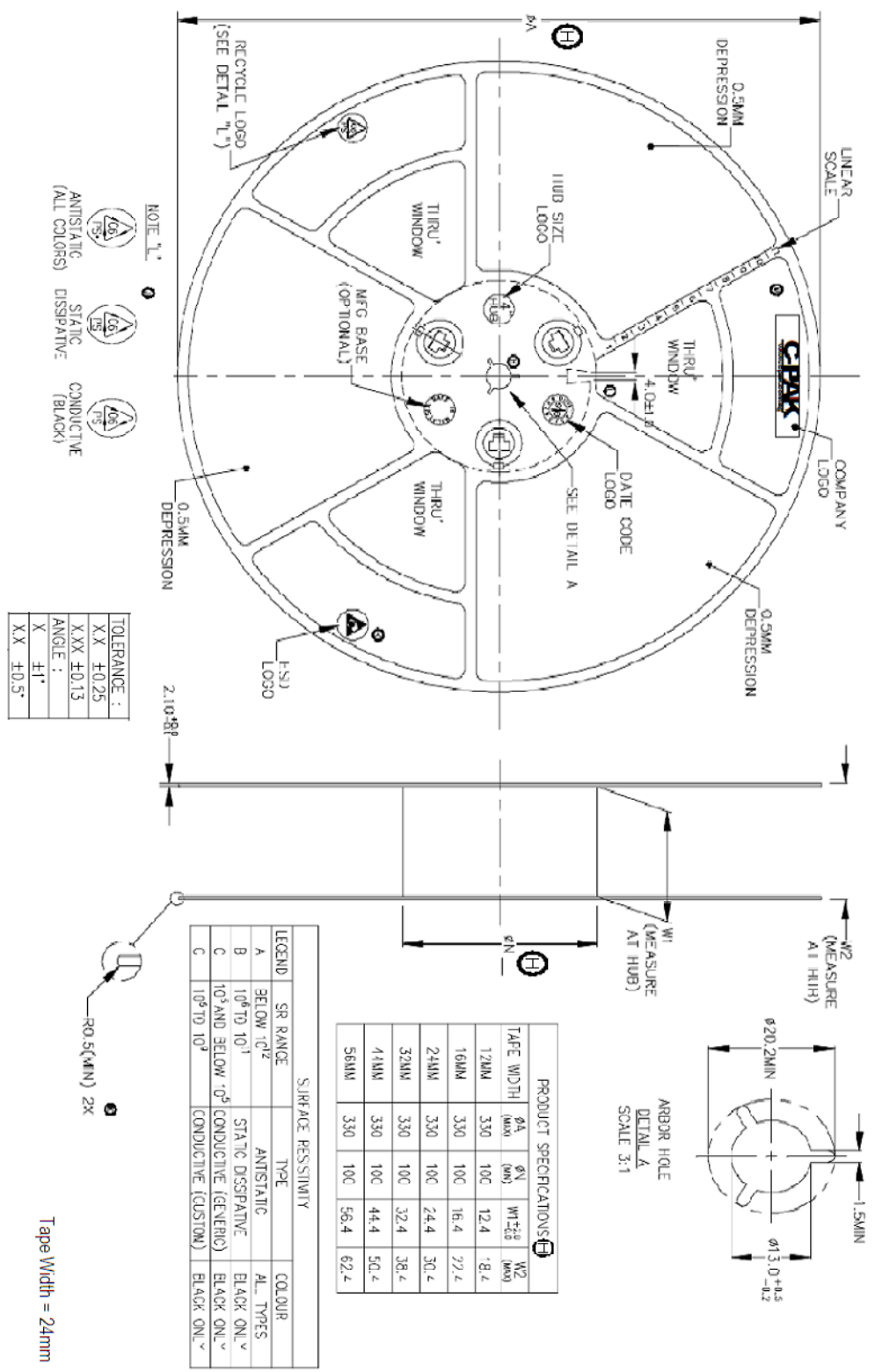


Figure 8.1 – FT232RL and FT245RL Reel Dimensions

## 9 FT232RQ and FT245RQ Tape Dimensions

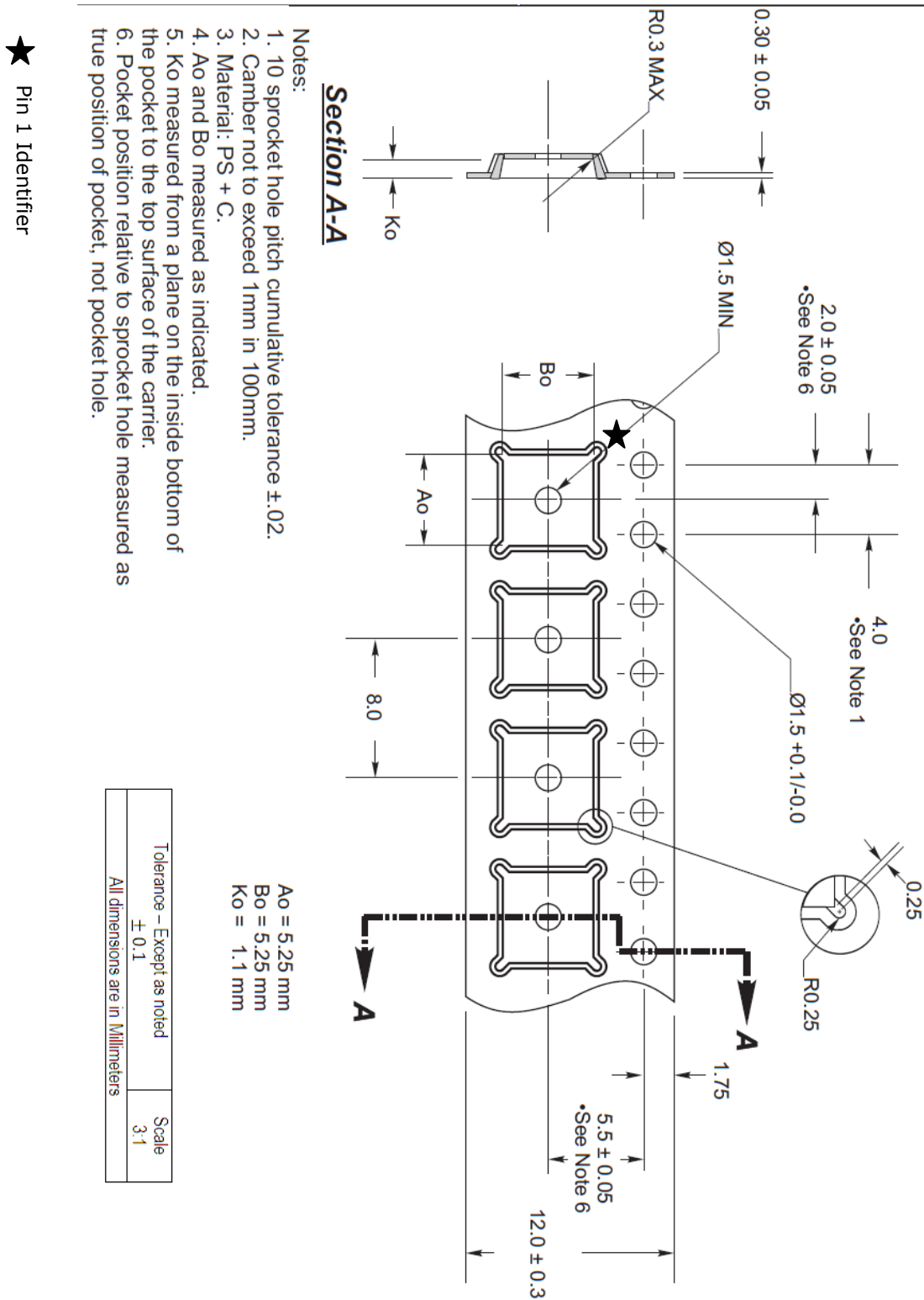


Figure 9.1 – FT232RQ and FT245RQ Tape Dimensions

## 10 FT232RQ and FT245RQ Reel Dimensions

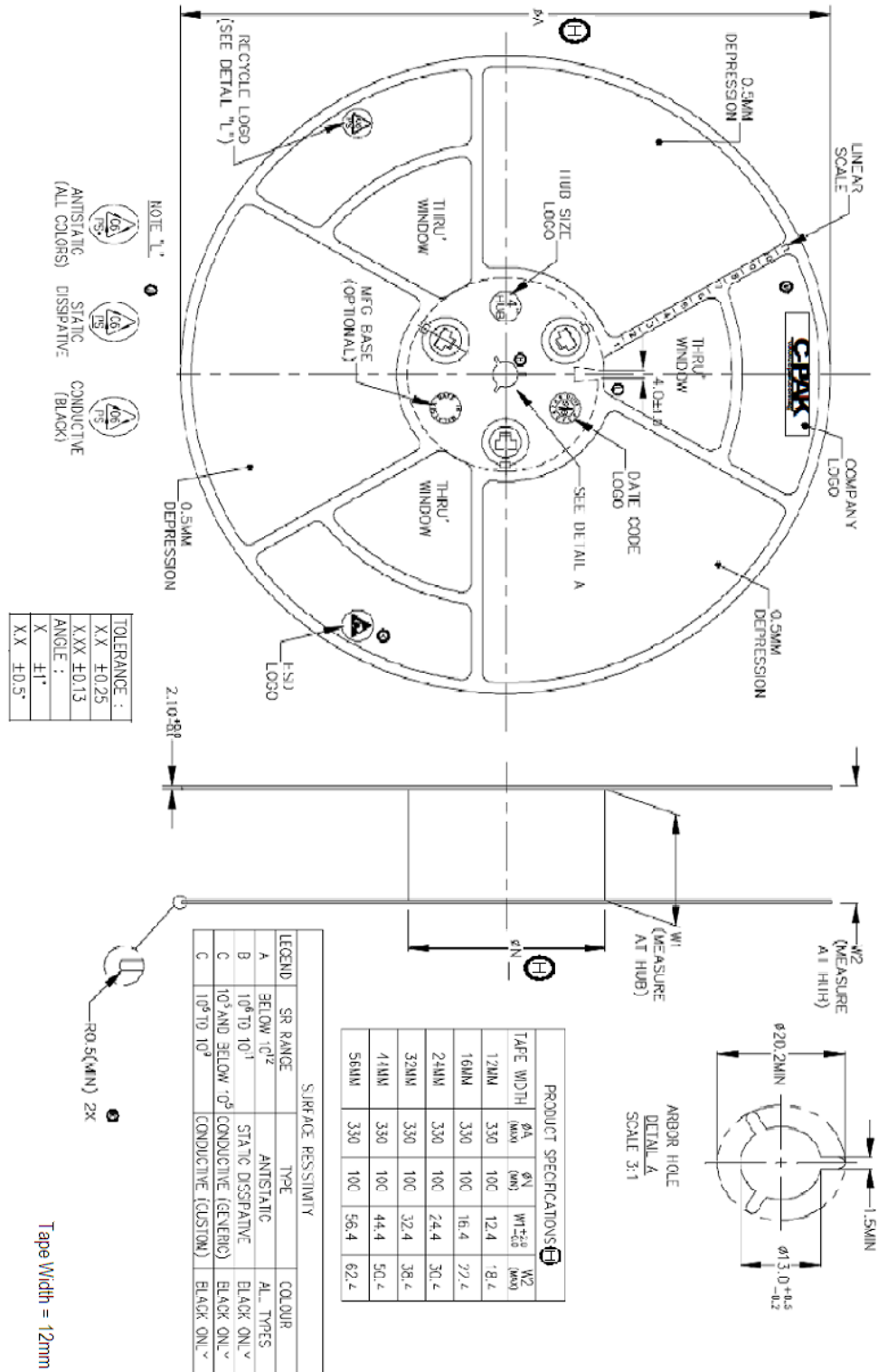


Figure 10.1 – FT232RQ and FT245RQ Reel Dimensions

## 11 FT2232HL and FT4232HL Tape Dimensions

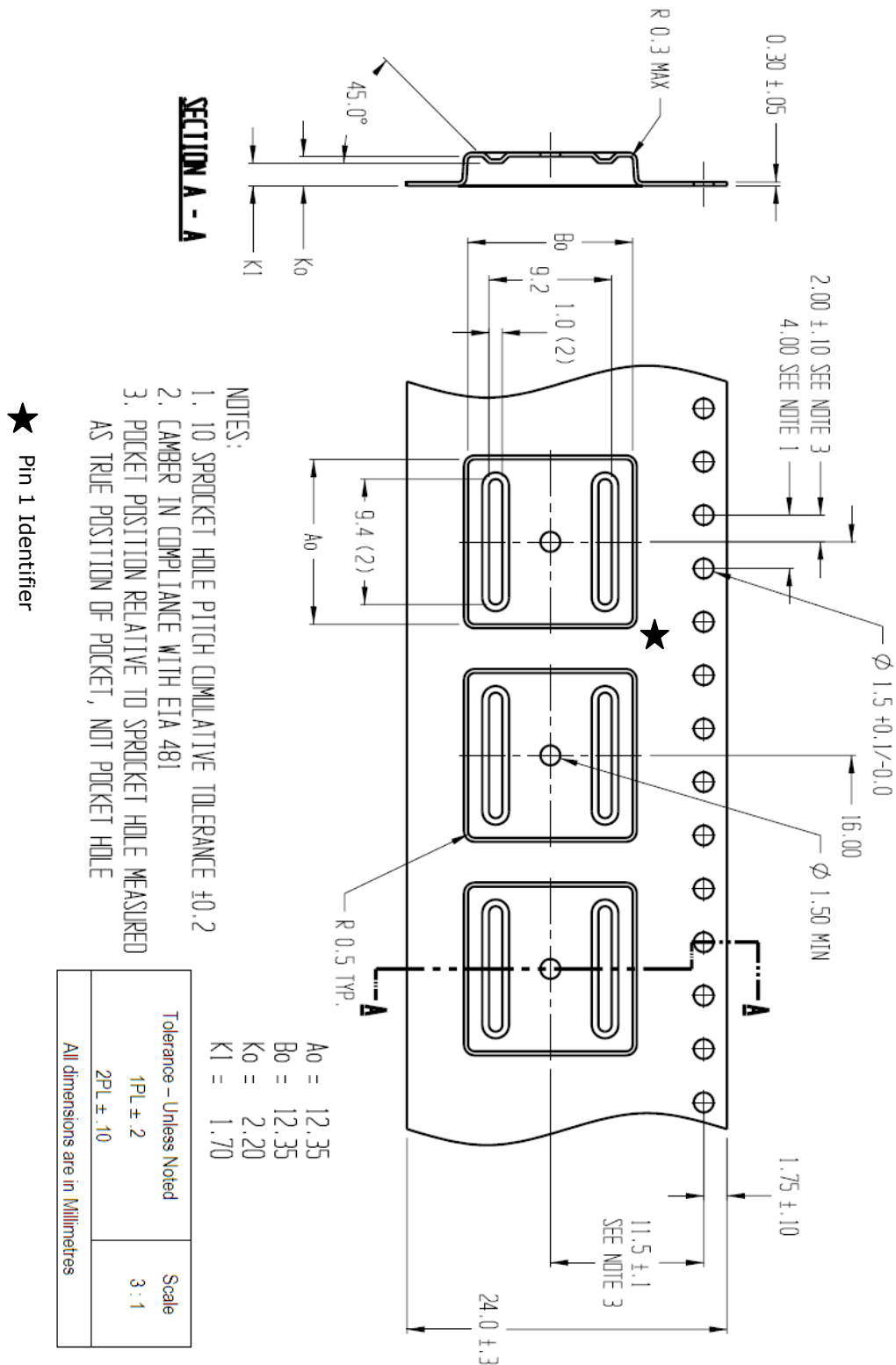


Figure 11.1 – FT2232HL and FT4232HL Tape Dimensions



## 12 FT2232HL and FT4232HL Reel Dimensions

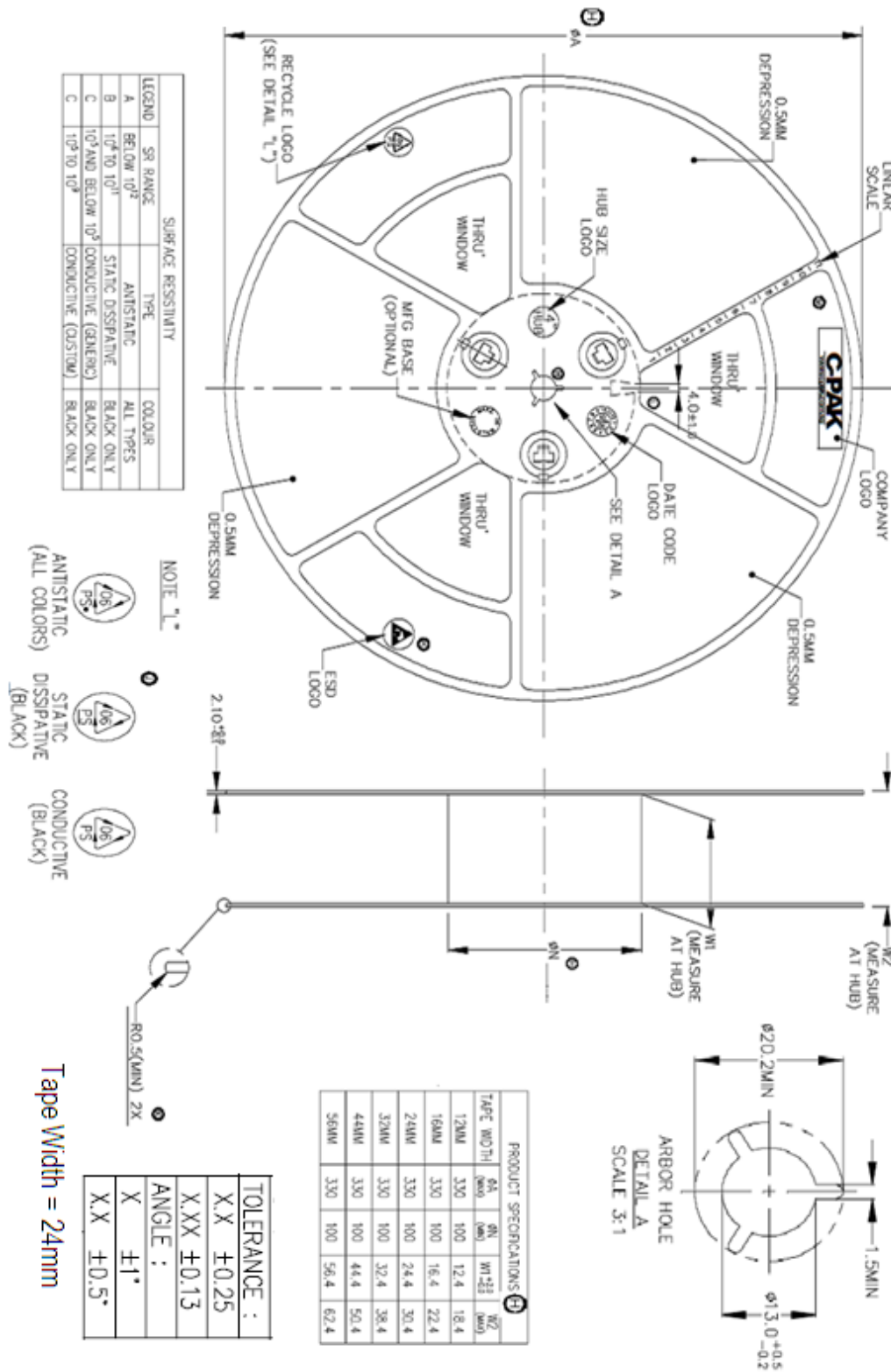


Figure 12.1 – FT2232HL and FT4232HL Reel Dimensions

### 13 FT2232HQ and FT4232HQ Tape Dimensions

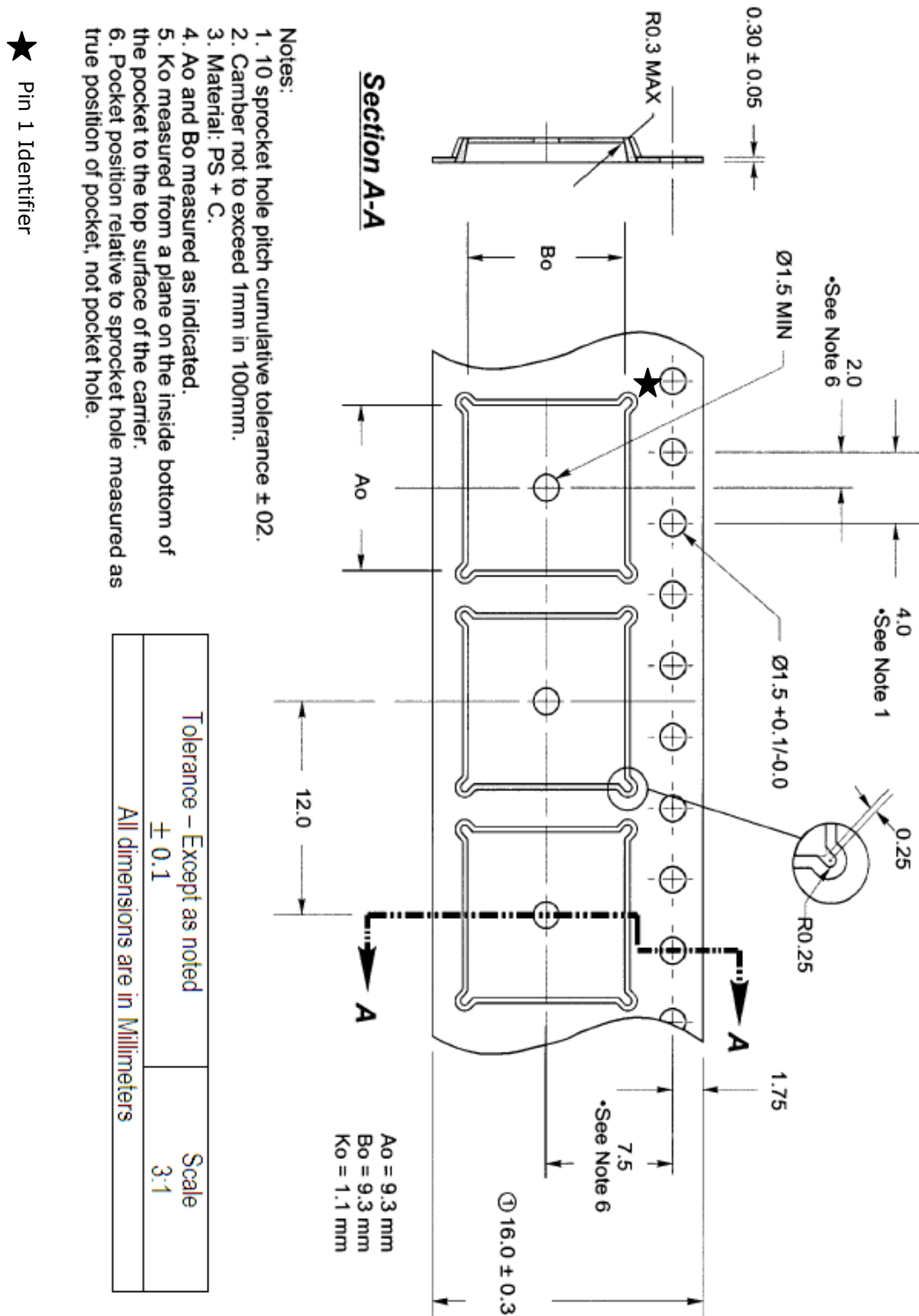


Figure 13.1 – FT2232HQ and FT4232HQ Tape Dimensions

## 14 FT2232HQ and FT4232HQ Reel Dimensions

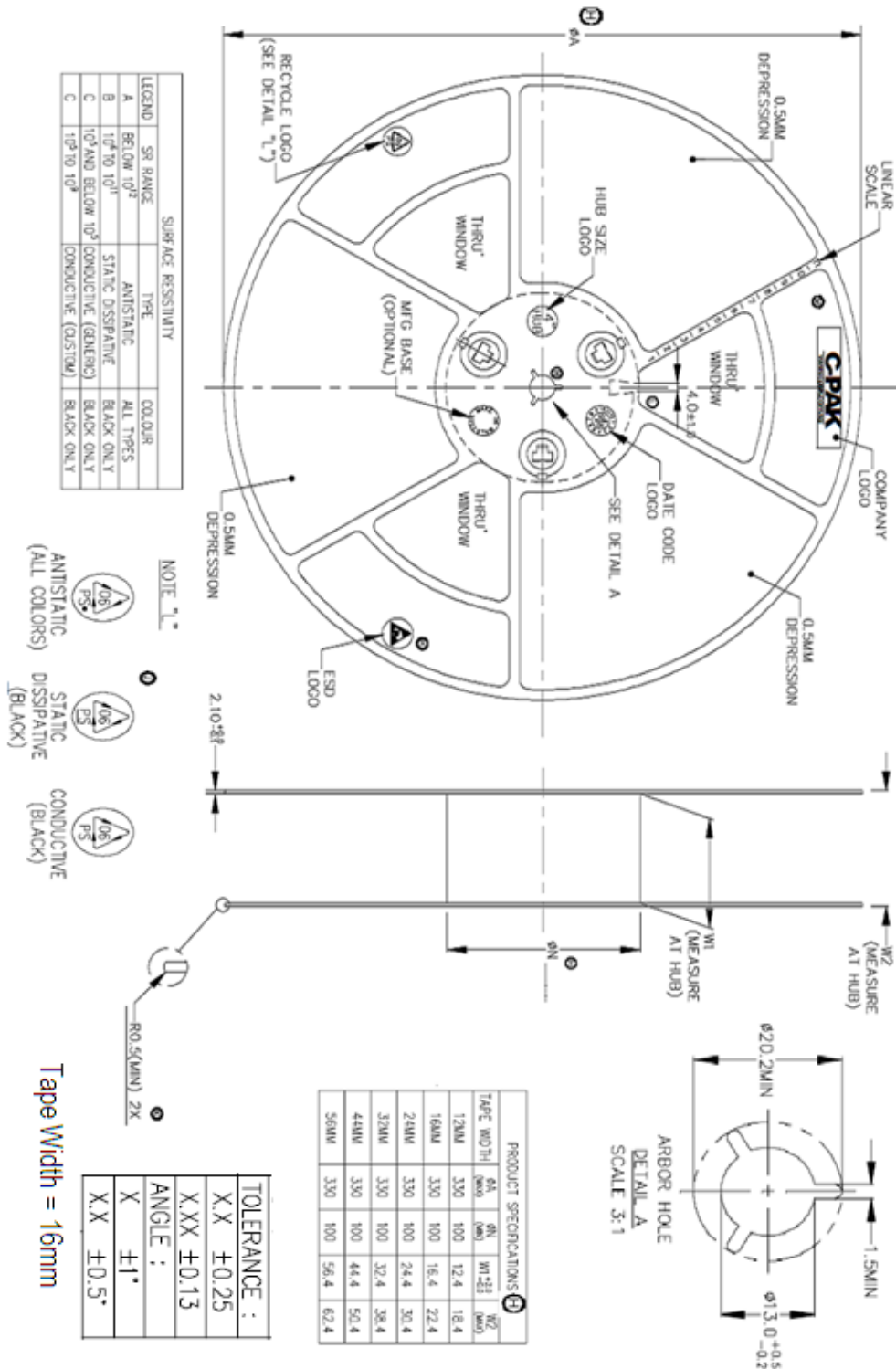


Figure 14.1 – FT2232HQ and FT4232HQ Reel Dimensions

## 15 FT232HL and FT232HQ Reel Dimensions

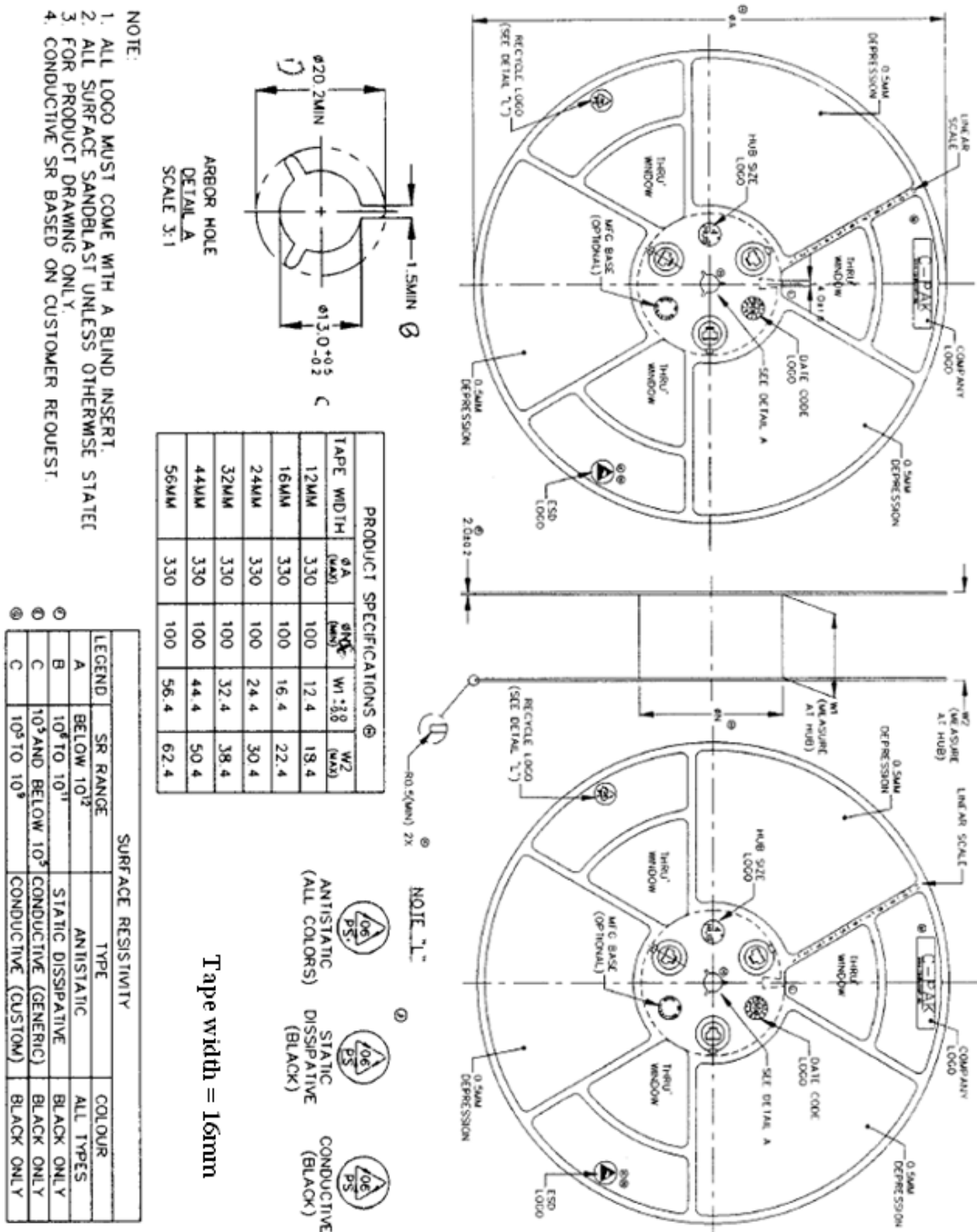


Figure 15.1 – FT232HL and FT232HQ Reel Dimensions

## 16 FT232HL Cover Tape Dimensions

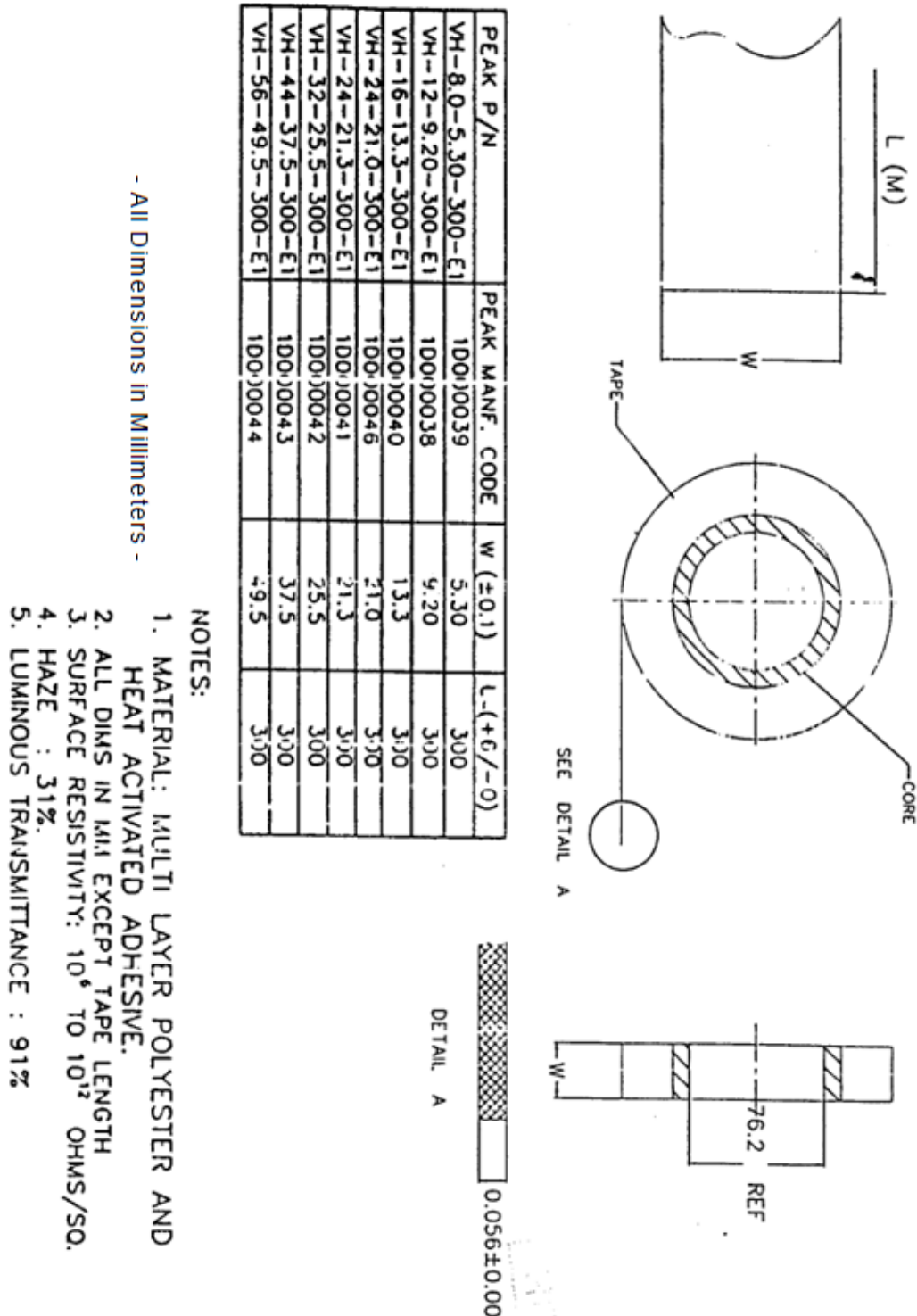


Figure 16.1 – FT232HL Cover Tape Dimensions

## 17 FT232HQ Cover Tape Dimensions

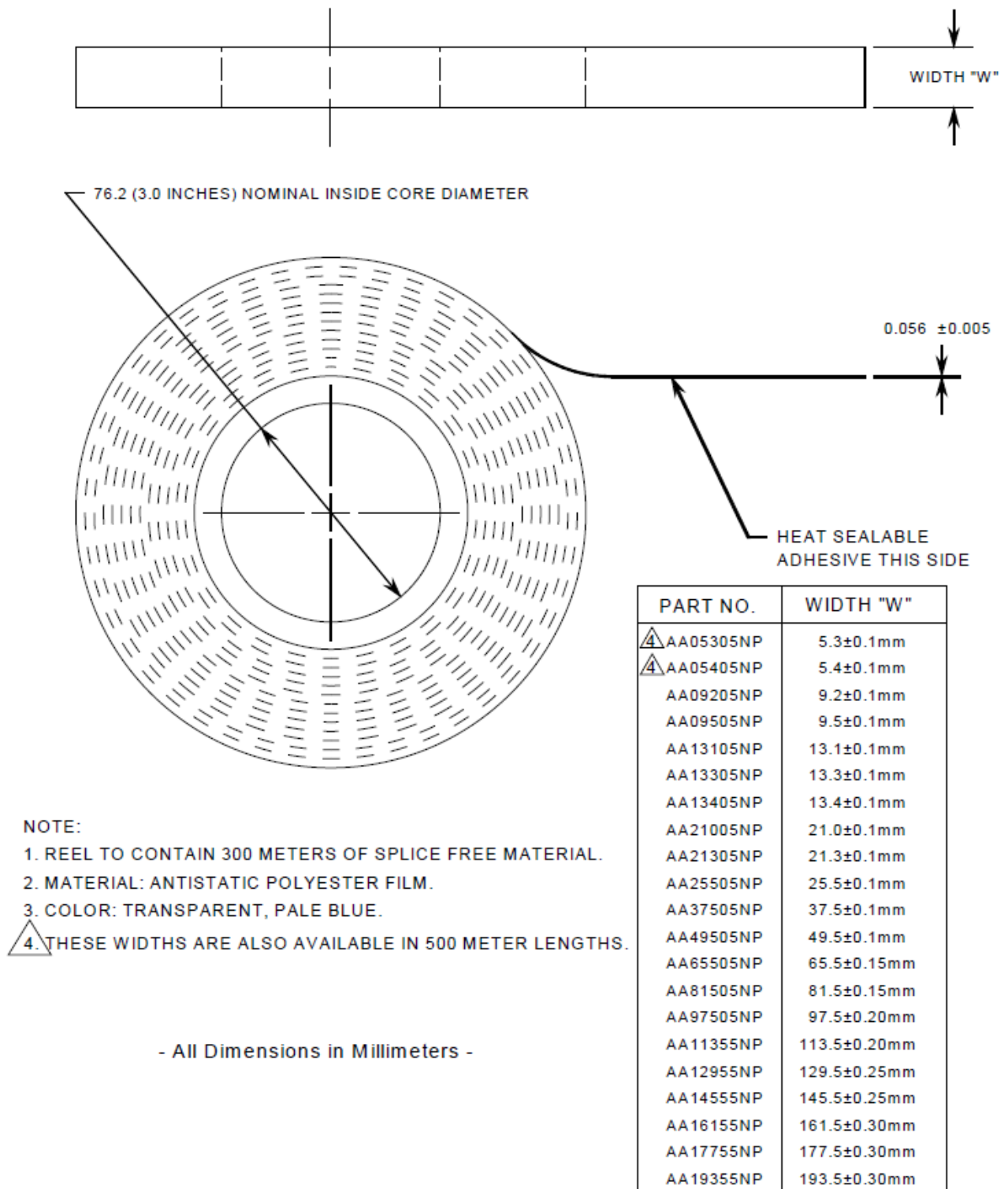


Figure 17.1 – FT232HQ Cover Tape Dimensions

## 18 FT232HL Carrier Tape Dimensions

★ Pin 1 Identifier

- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  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  
 $K_1 = 1.6$  mm

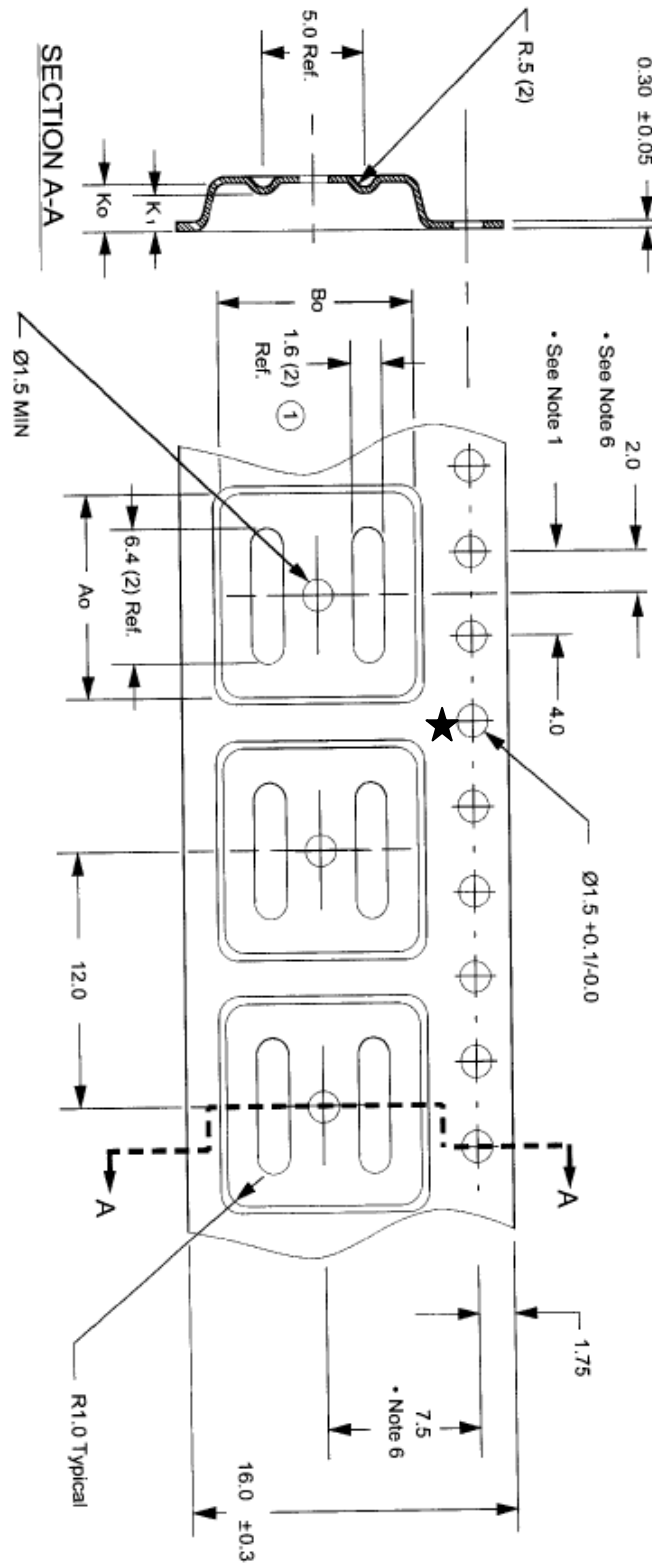


Figure 18.1 – FT232HL Carrier Tape Dimensions

## 19 FT232HQ Carrier Tape Dimensions

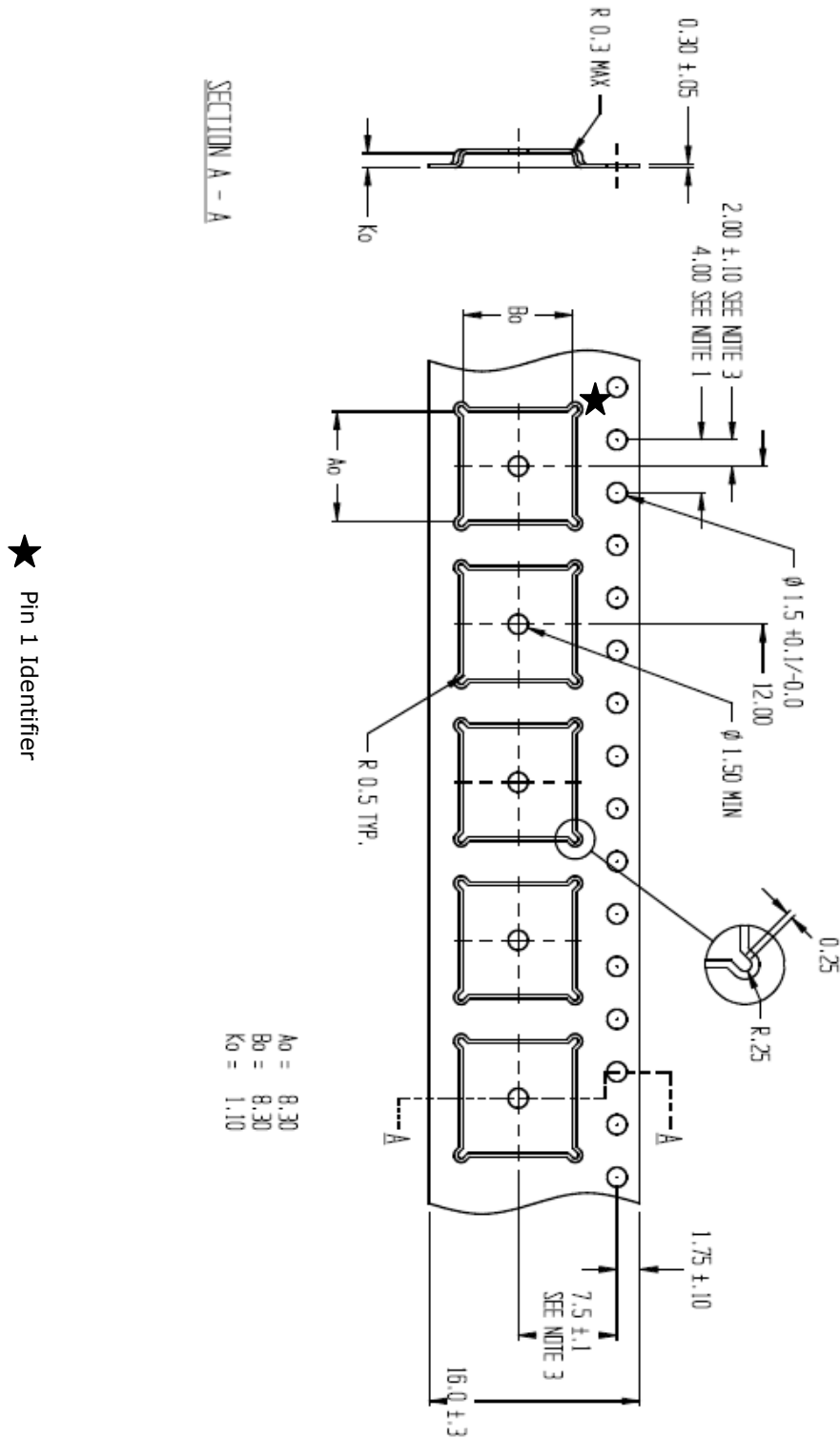


Figure 19.1 – FT232HQ Carrier Tape Dimensions



## 20 FT232HL Tray Dimensions

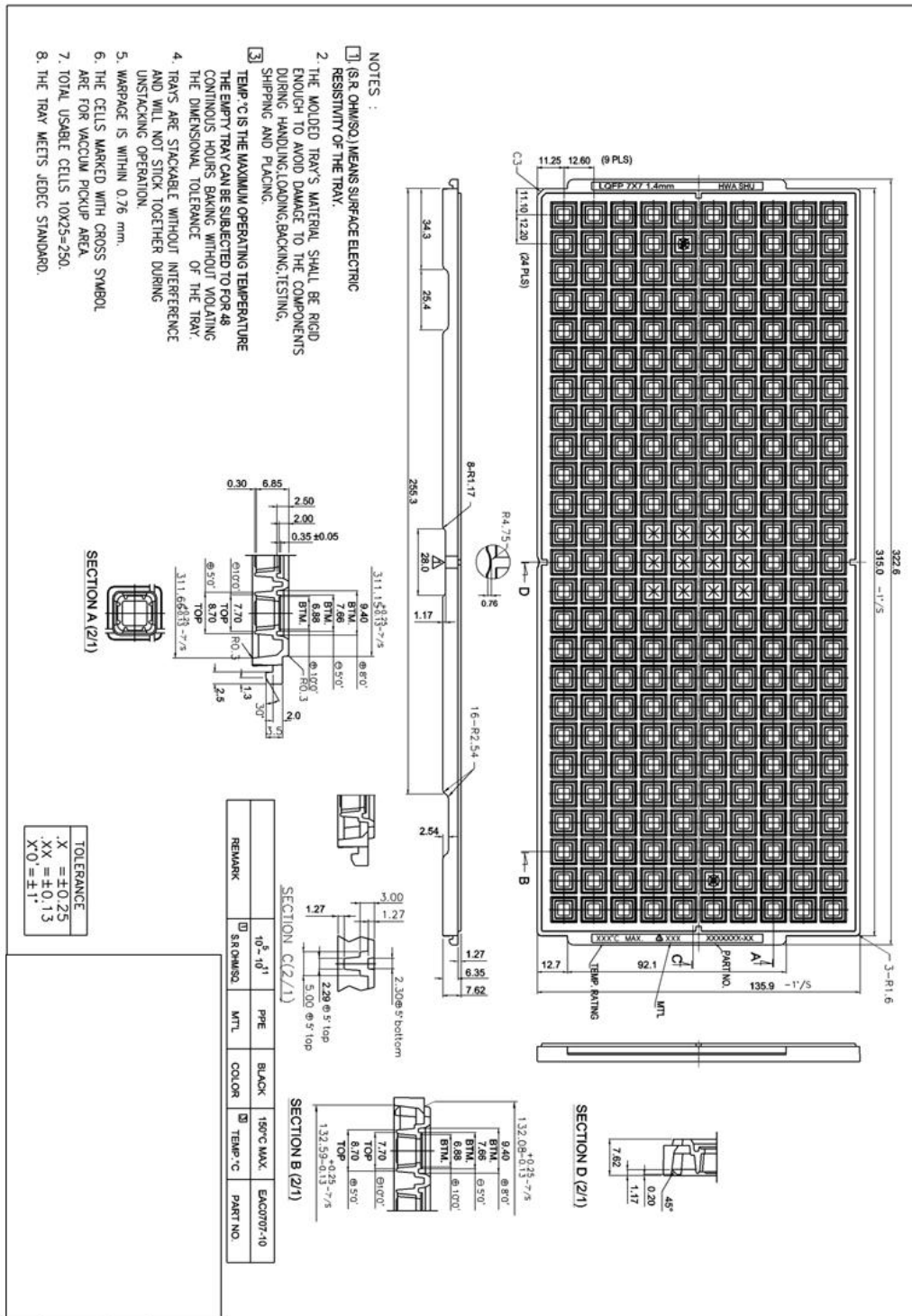


Figure 20.1 – FT232HL Tray Dimensions

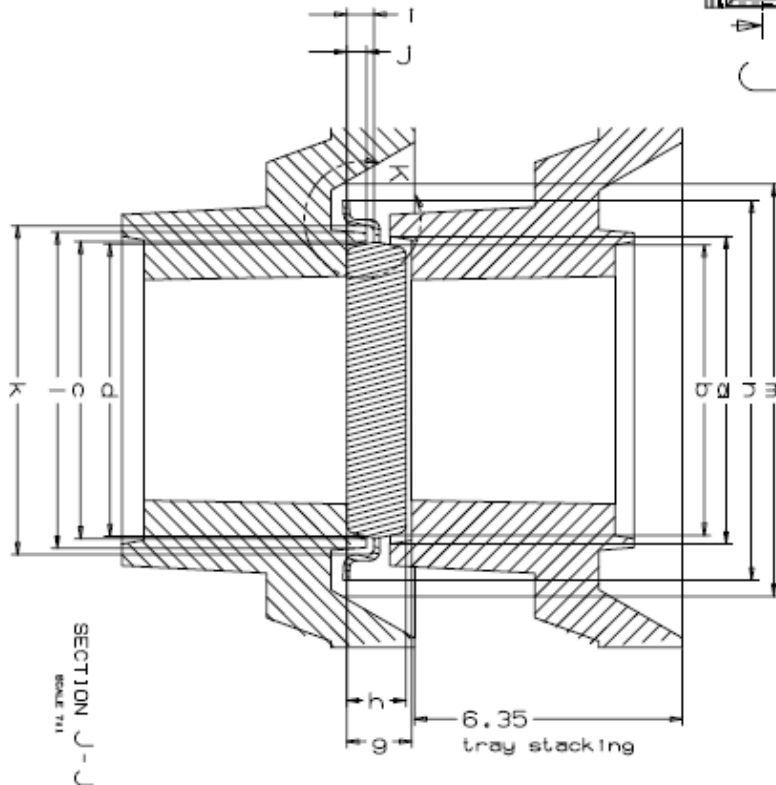
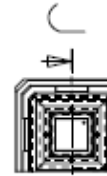
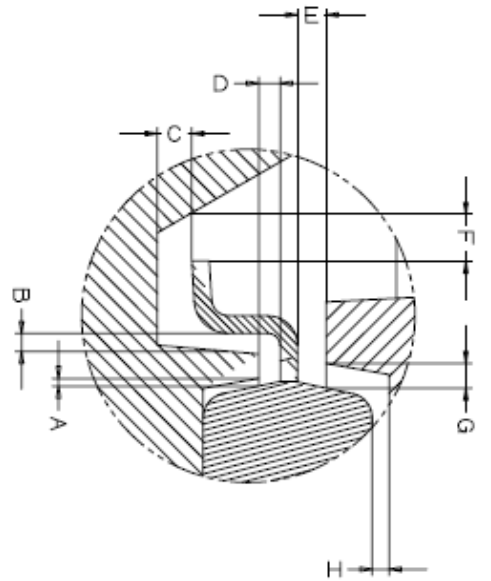
## 21 FT232HL Tray Dimensions – Side View

	c	i	j	n	o	q
TRAY	7.050	7.500	0.460	9.771	7.300	1.540
	d	k	l	m	b	h
PKG	6.825	7.800	0.638	9.000	6.881	1.400
	A	B	C	D	E	H
GAP	0.063	0.120	0.284	0.178	0.238	0.288
RESULT	PASS	PASS	PASS	PASS	PASS	PASS

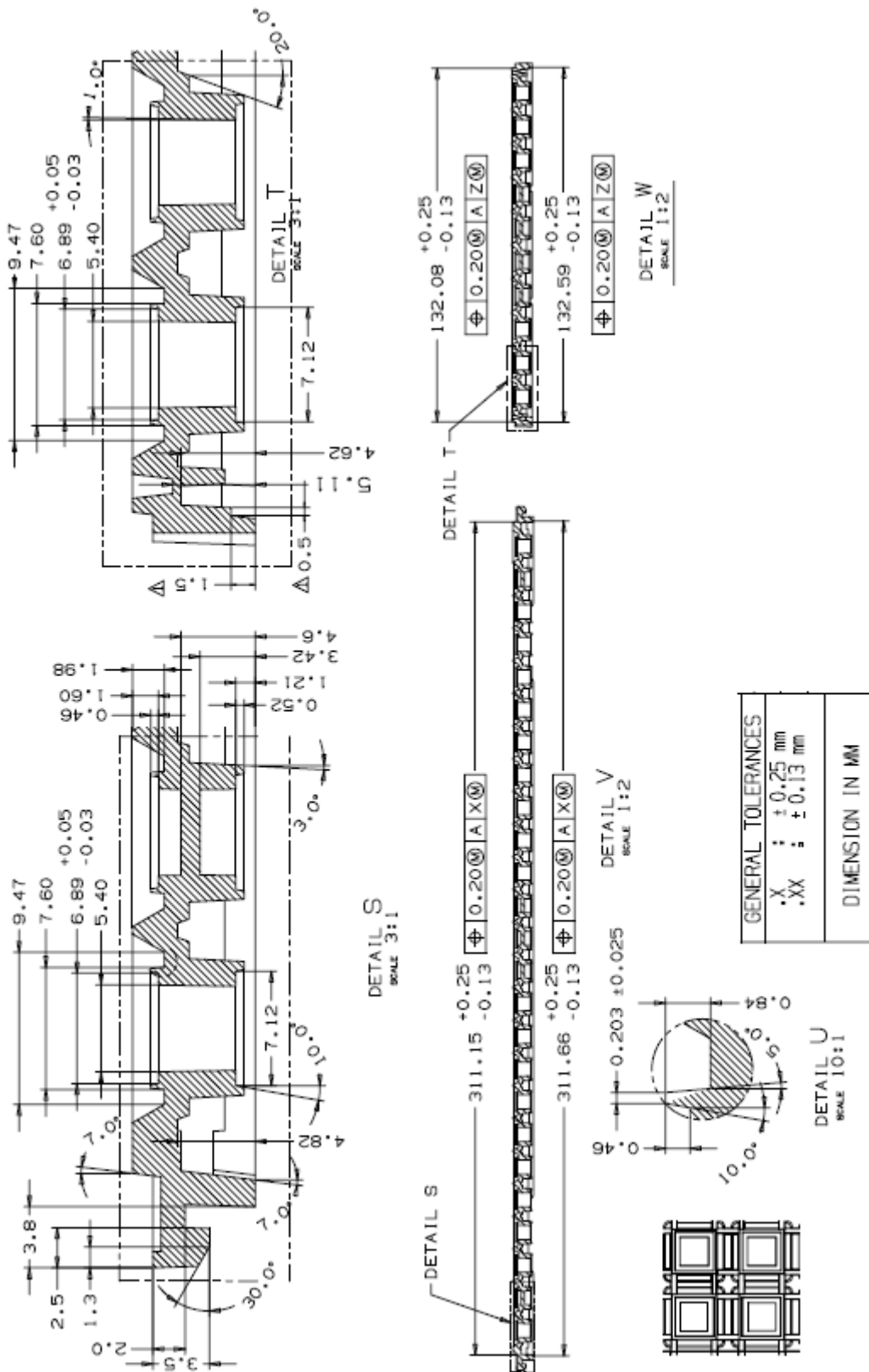
GENERAL TOLERANCES  
 .X ± 0.25 mm  
 .XX ± 0.13 mm  
 DIMENSION IN MM

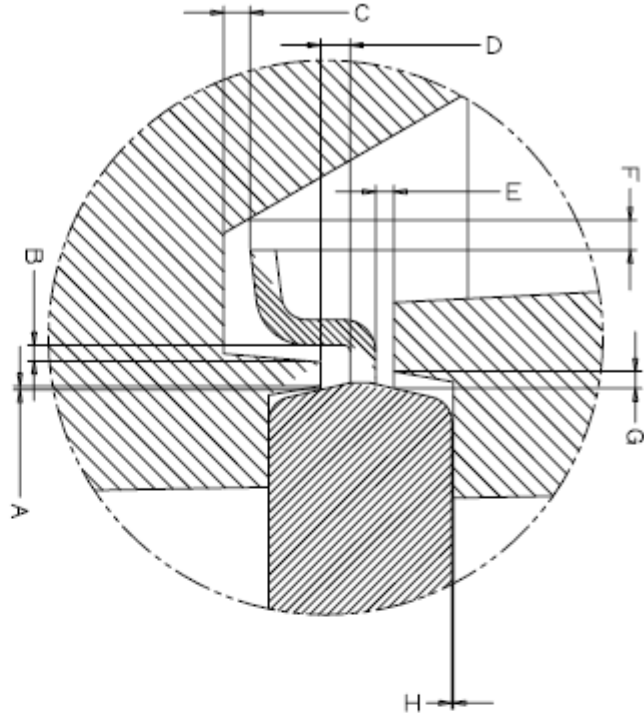
- CRITERION FOR PACKAGE & TRAY COMPATIBILITY**
1. A > ZERO ACCEPT
  2. B, F > A ACCEPT
  3. C, D, E > ZERO ACCEPT
  4. G > A ACCEPT
  5. H > ZERO ACCEPT
  6. E > H ACCEPT

DETAIL K  
 SCALE 20:1



SECTION J-J  
 SCALE 1:1




 DETAIL N  
 SCALE 20:1

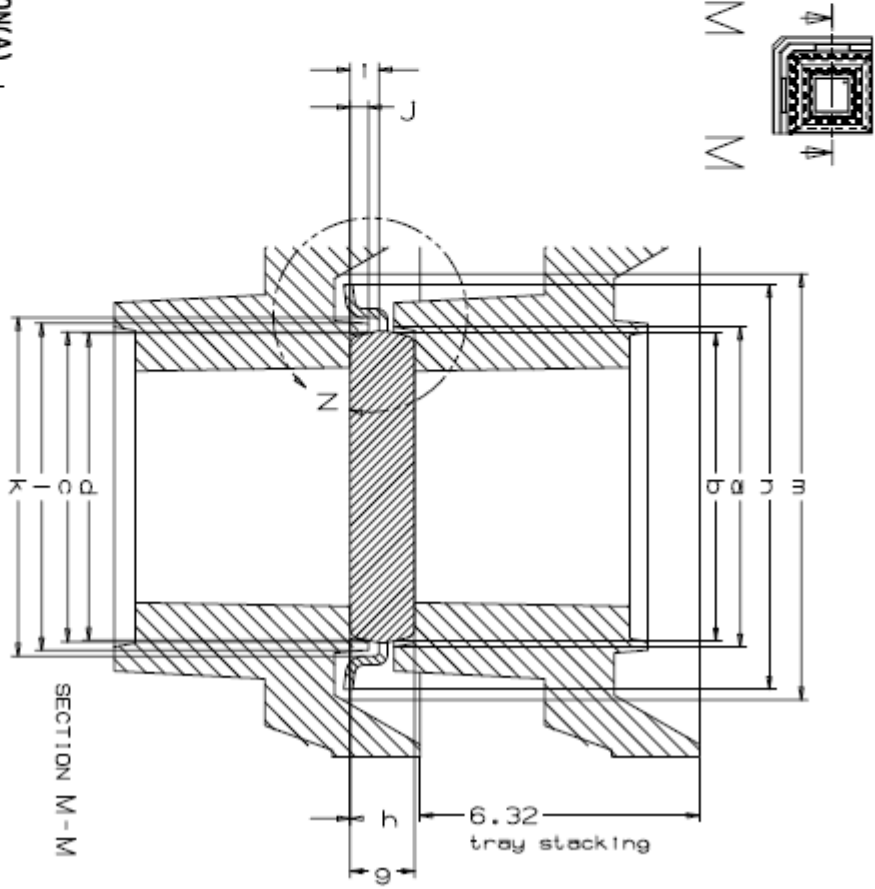
- CRITERION FOR PACKAGE & TRAY COMPATIBILITY**
1. A > ZERO ACCEPT
  2. B, F > A ACCEPT
  3. C, D, E > ZERO ACCEPT
  4. G > A ACCEPT
  5. H > ZERO ACCEPT
  6. E > H ACCEPT

	c	i	j	n	o	q	
TRAY	7.002	7.398	0.410	9.828	7.232	1.480	
	d	k	l	m	p	r	
PKG	6.941	7.650	0.845	9.150	6.985	1.450	
	A	B	C	D	E	F	G
GMP	0.030	0.125	0.209	0.235	0.145	0.239	0.134
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



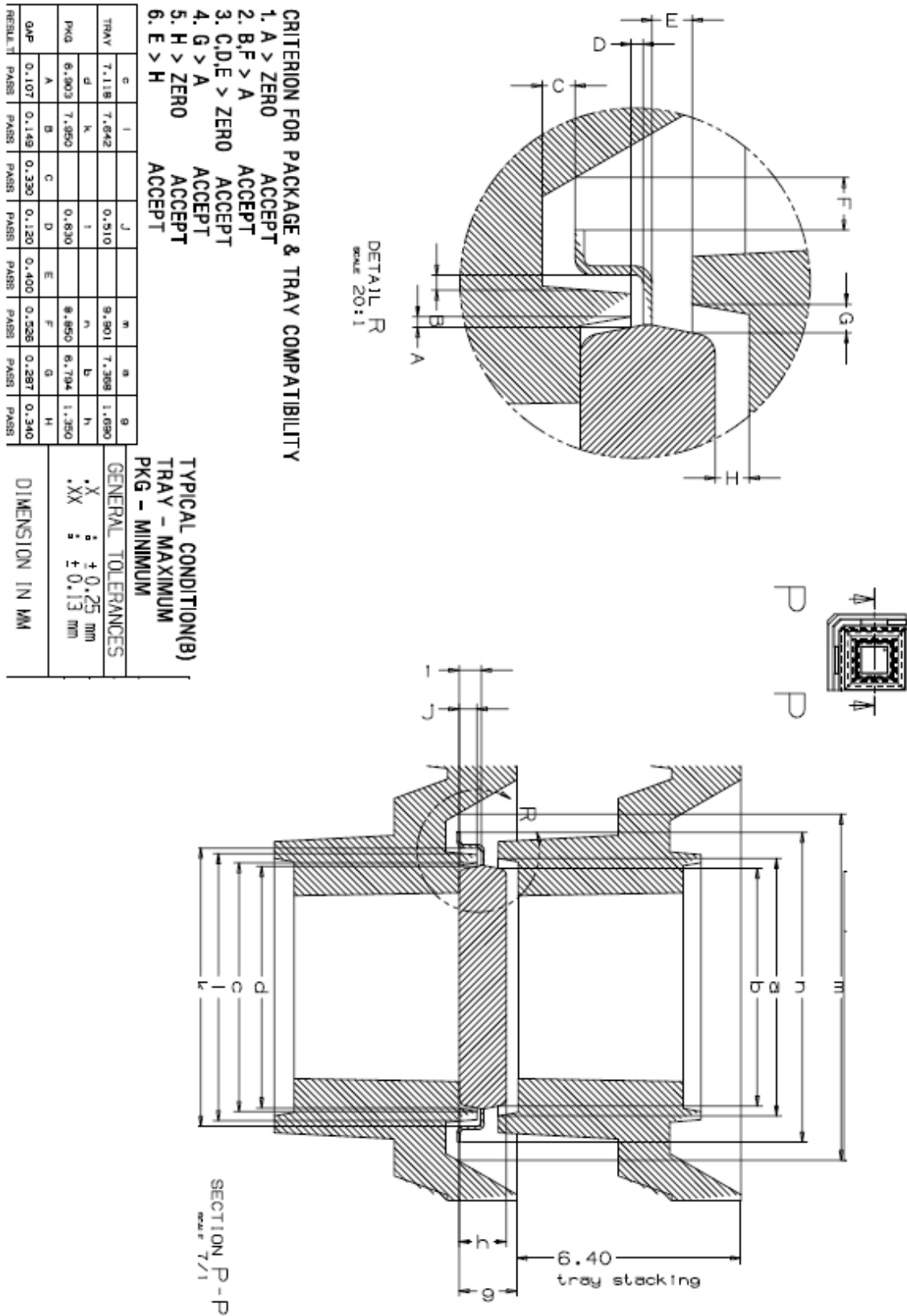


Figure 21.1 – FT232HL Tray Dimensions Side View

## 22 FT232HQ Tray Dimensions

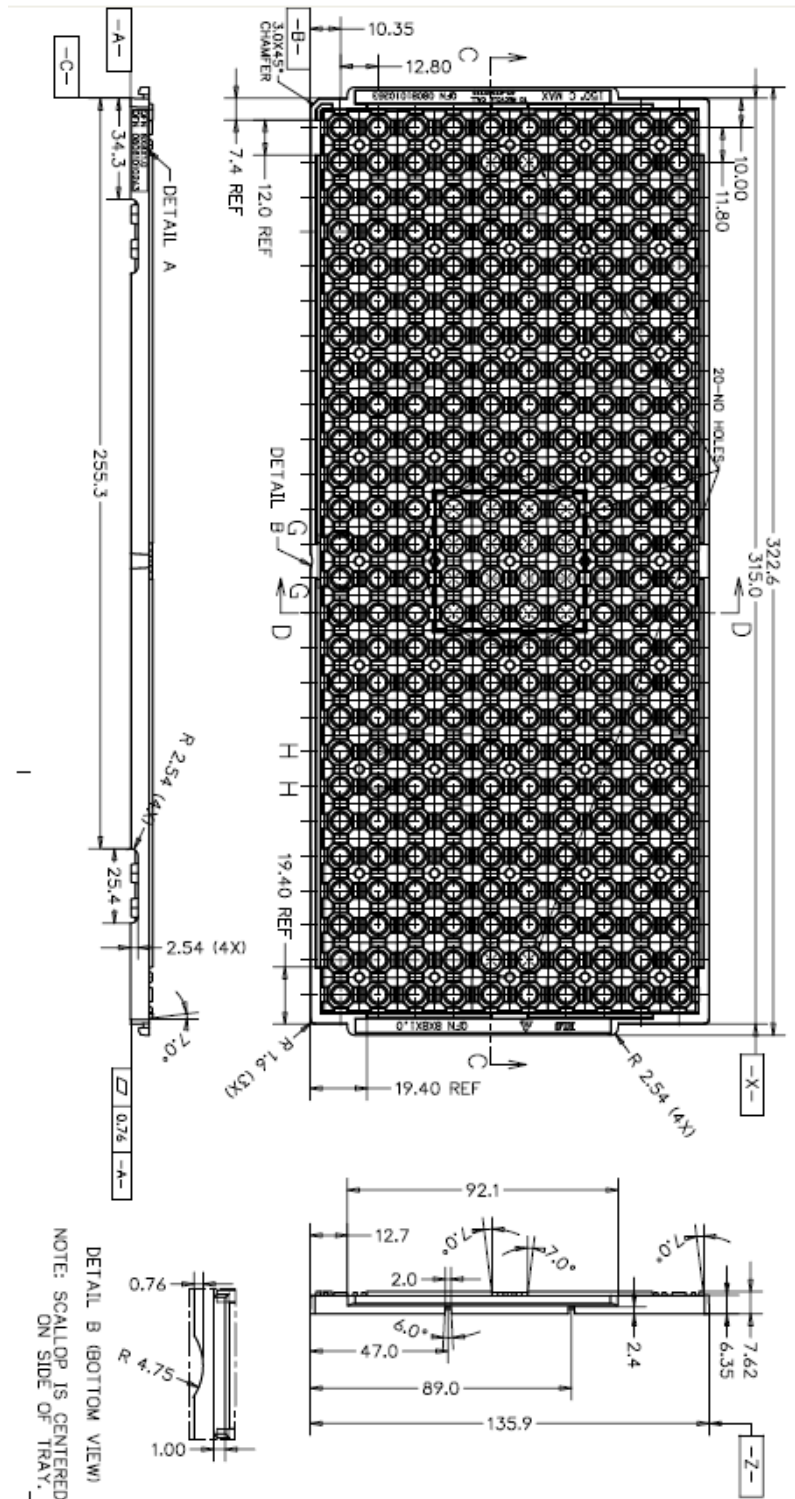
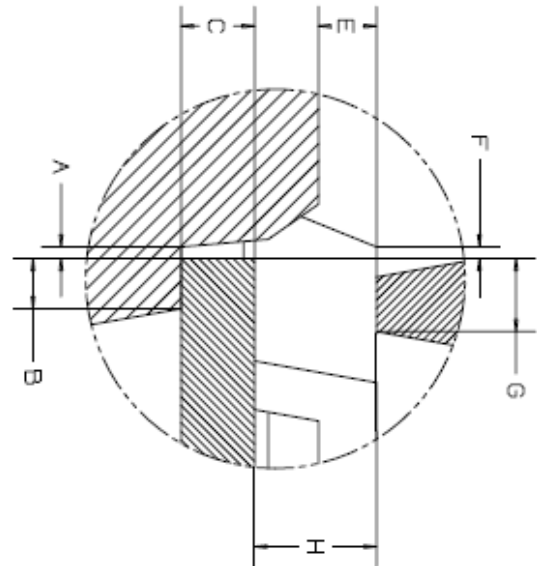


Figure 22.1 – FT232HQ Tray Dimensions

## 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

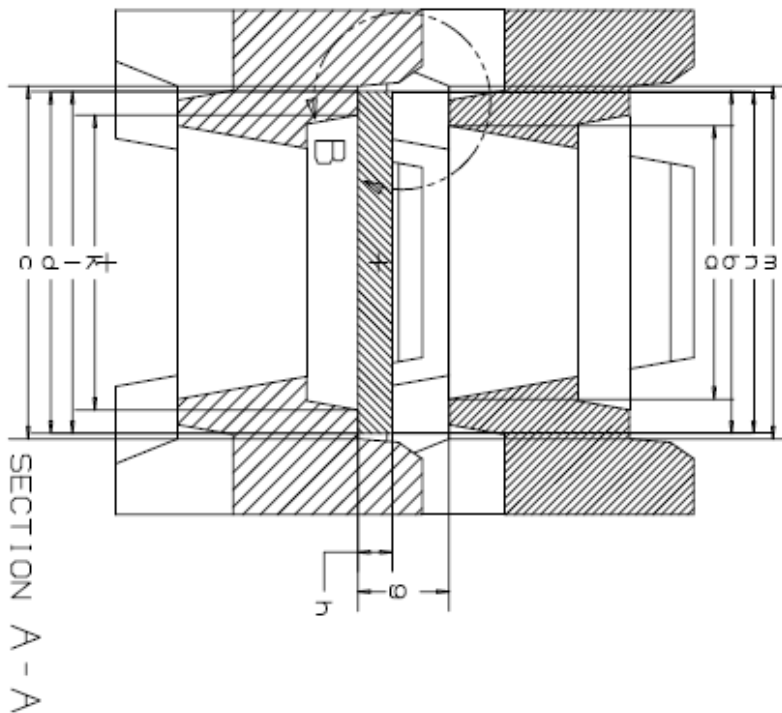
	c	k	i	m	a	g
TRAY	8.250	6.900		8.250	6.400	2.130
	d	l	j	n	b	h
PKG	8.000	8.000	-	8.000	8.000	0.800
	A	B	C	D	E	F
GAP	0.125	0.350	0.800	-	0.630	0.125
RESULT	PASS	PASS	PASS	-	PASS	PASS

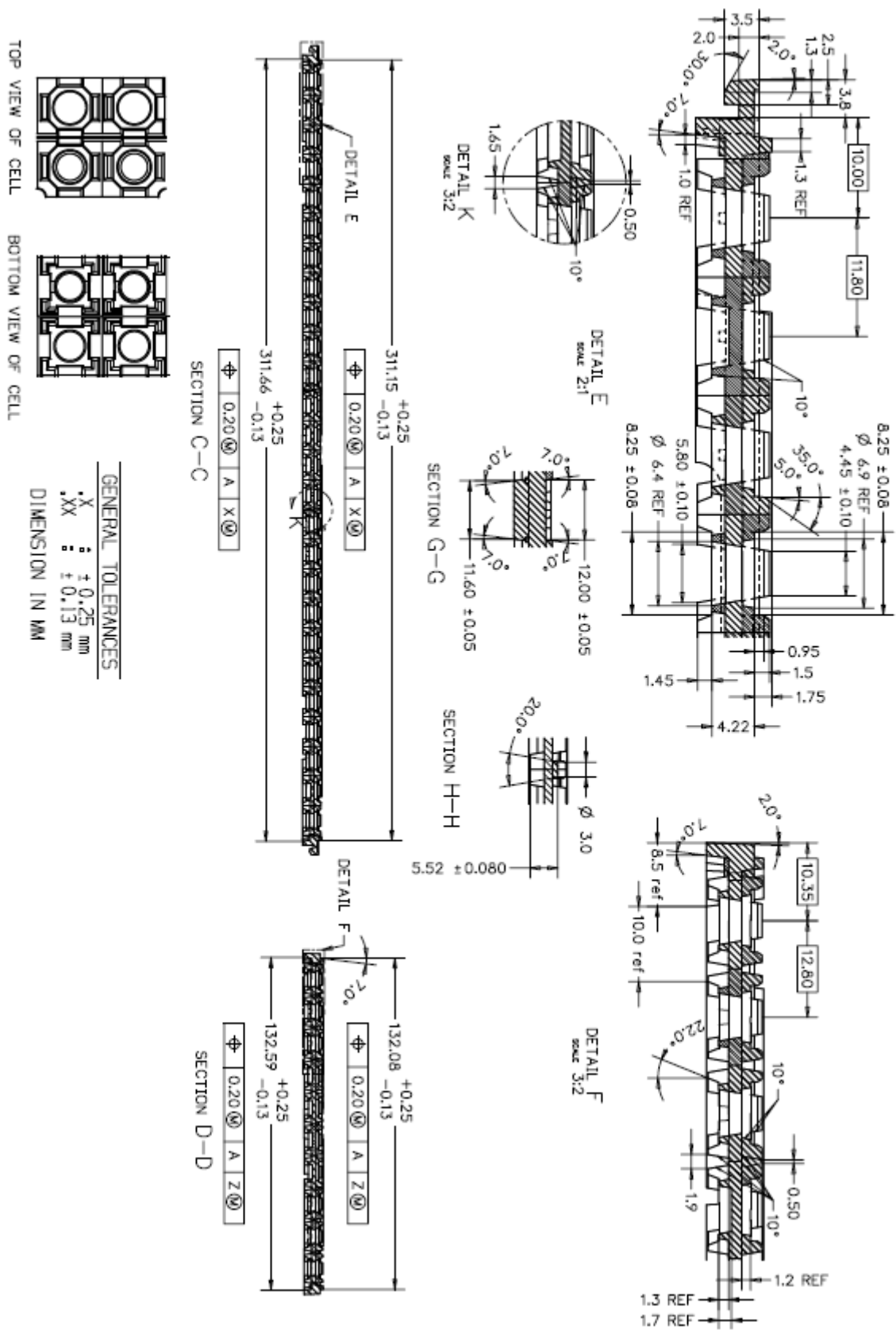
TYPICAL CONDITION  
 TRAY - NOMINAL  
 PKG - NOMINAL

GENERAL TOLERANCES

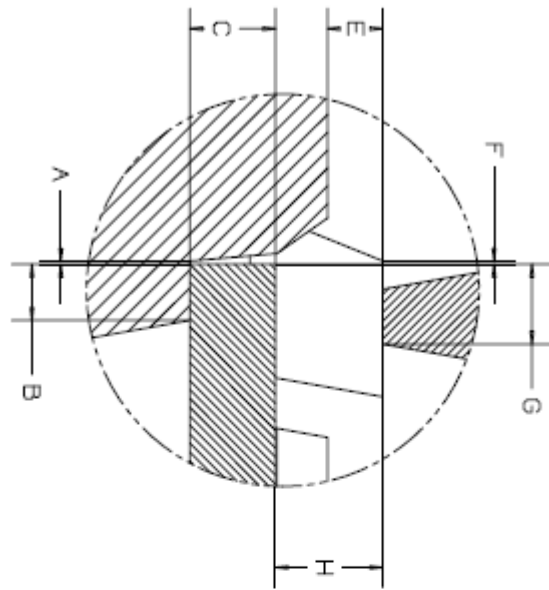
.X ± 0.25 mm  
 .XX ± 0.13 mm

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

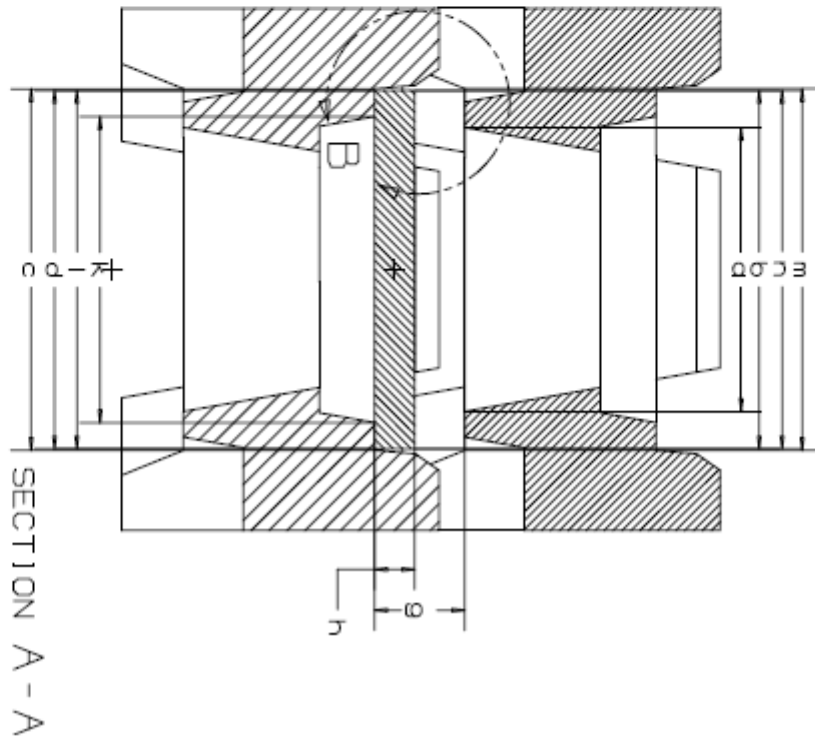
	c	h	i	m	e	g
TRAY	8.168	8.918		8.172	8.418	2.030
	d	i	j	n	b	h
PKG	8.100	8.100		8.100	8.100	0.900
	A	B	C	D	E	F
GAP	0.034	0.591	0.900	-	0.580	0.036
RESULT	PASS	PASS	PASS	-	PASS	PASS

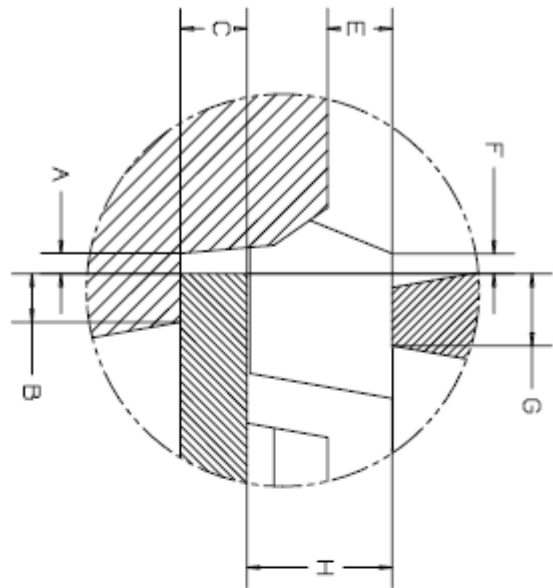
**WORST CONDITION (A)**  
 TRAY - MINIMUM  
 PKG - MAXIMUM

**GENERAL TOLERANCES**

.X ± 0.25 mm  
 .XX ± 0.13 mm

DIMENSION IN MM





**DETAIL B**  
 SCALE 15:1

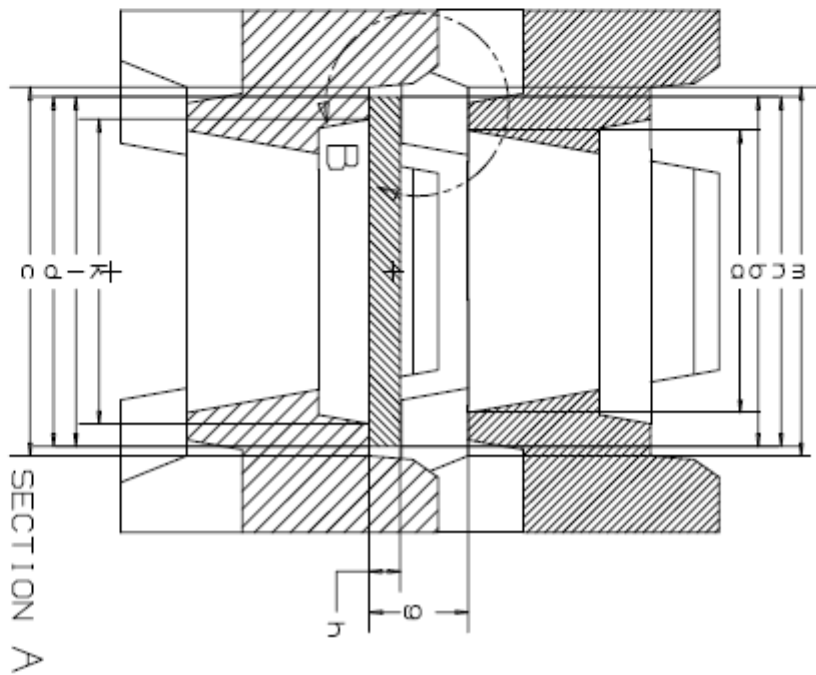
**CRITERION FOR PACKAGE & TRAY COMPATIBILITY**

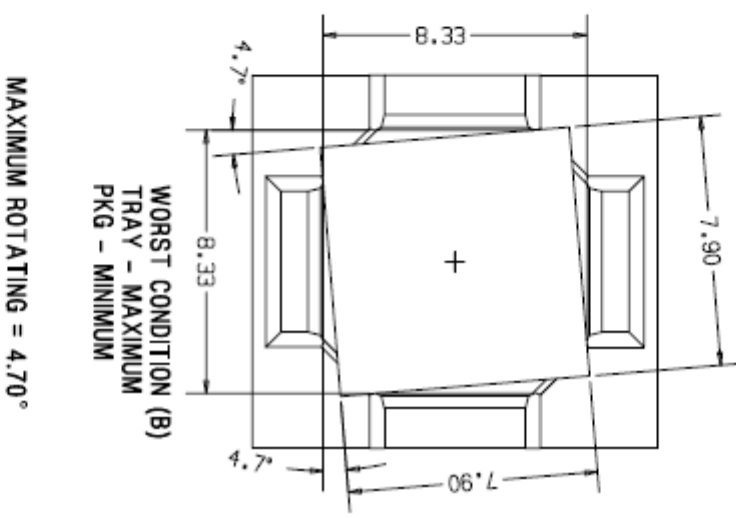
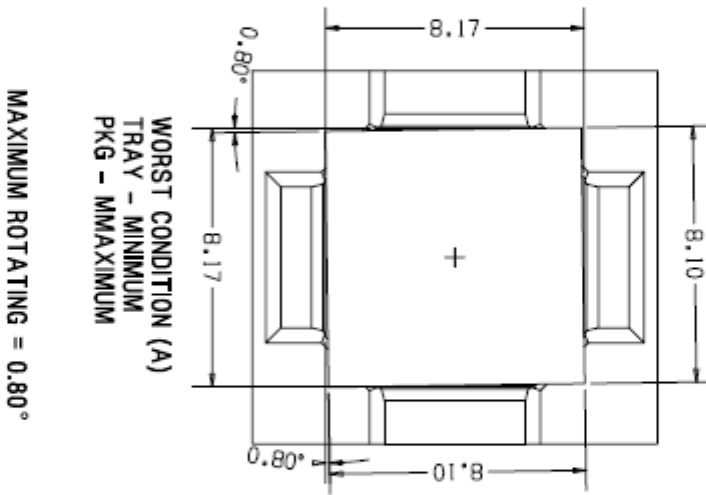
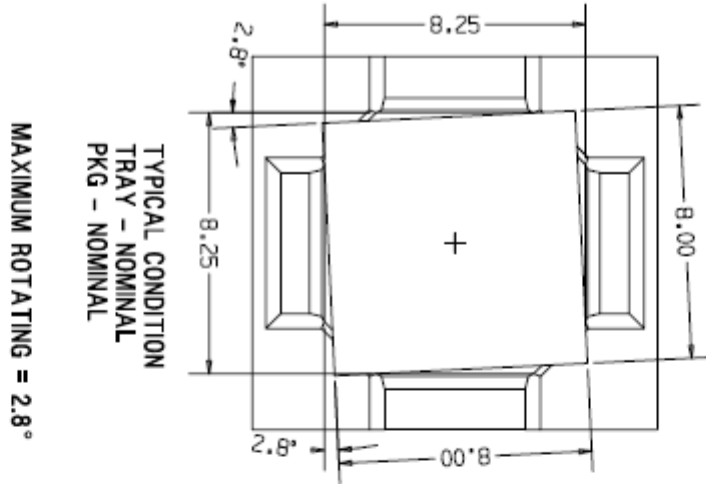
1. A, F > ZERO ACCEPT
2. B > A ACCEPT
3. G > F ACCEPT
4. C > E ACCEPT
5. H > ZERO ACCEPT

TRAY	g		h		i		m		o		q	
	d	i					j		n	b	h	
PKG	7.900	7.900						7.900	7.900	7.900	0.700	
GAP	0.216	0.509	0.700				0.680	0.214	0.759	1.530		
RESULT	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	

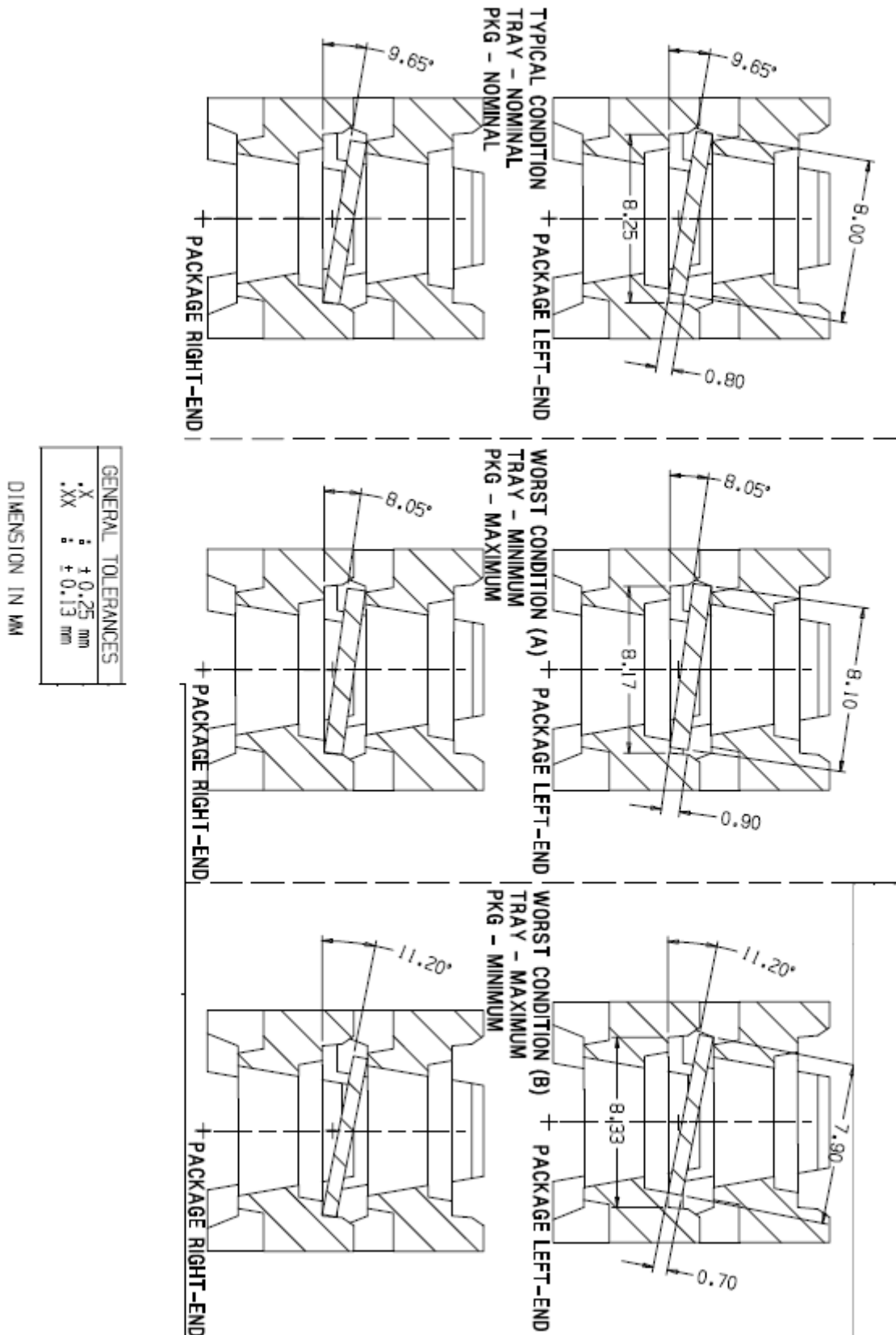


Figure 23.1 - FT232HQ Tray Dimensions Side View

## 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

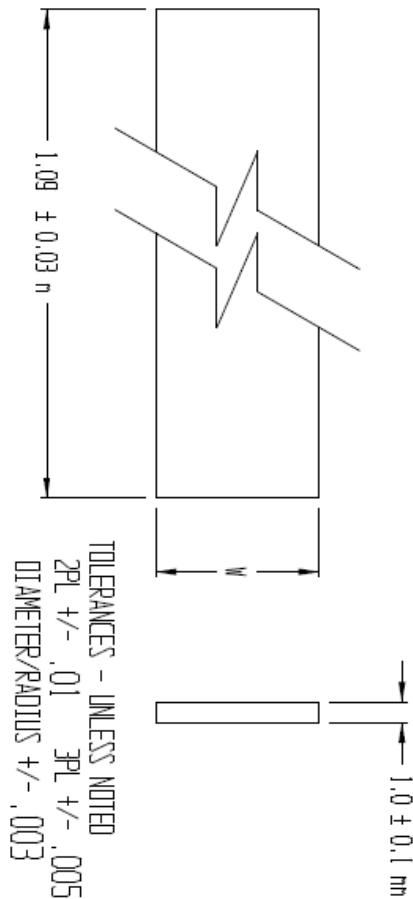


Figure 24.1 – FT232HL and FT232HQ Protective Belt

## 25 VNC1L – A – Reel Vendor Part No. RD33008SW

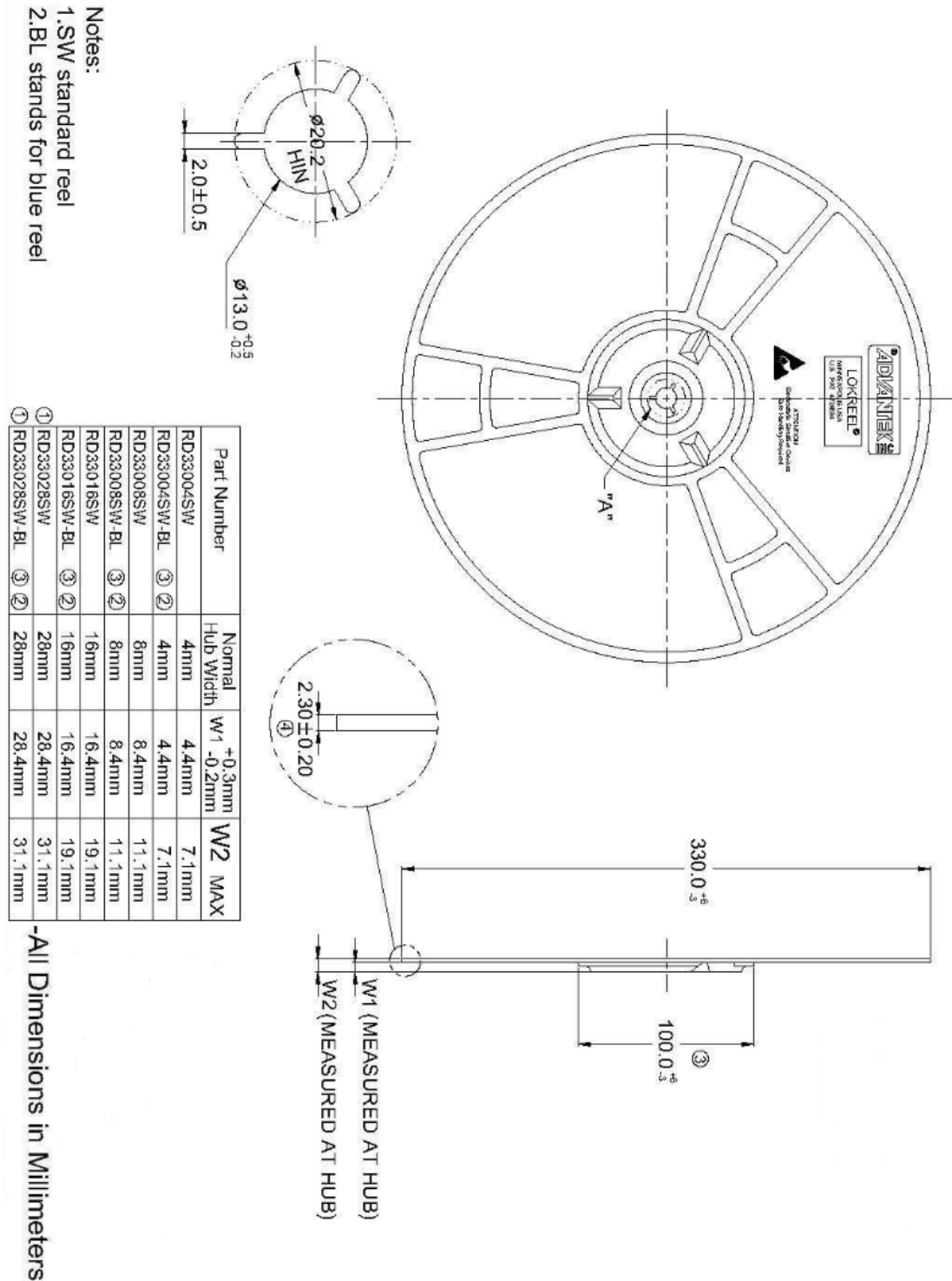
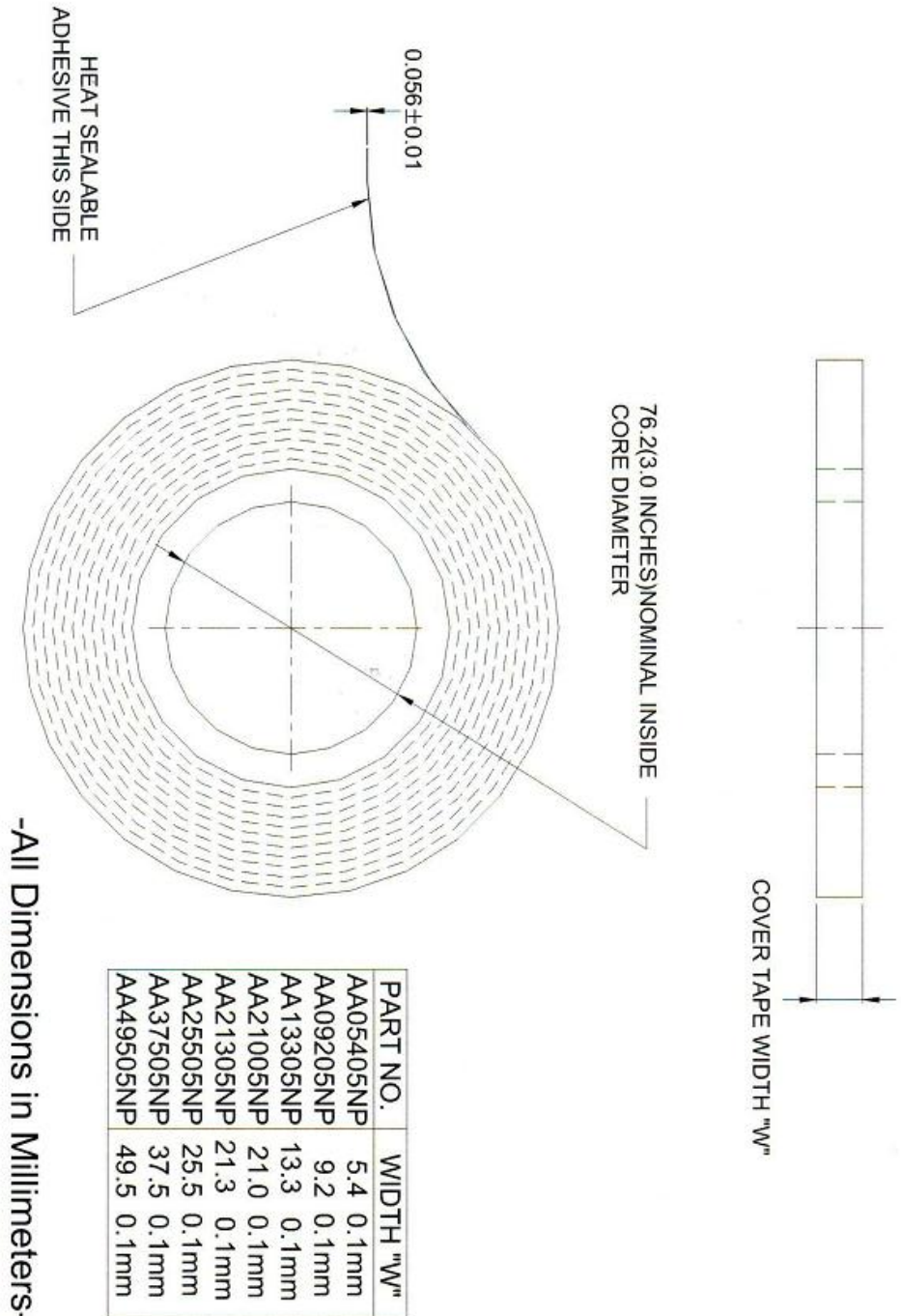


Figure 25.1 – VNC1L – A – Reel Vendor Part No. RD33008SW

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

- NOTE:**
1. REEL TO CONTAIN 300 METERS OF SPLICE 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

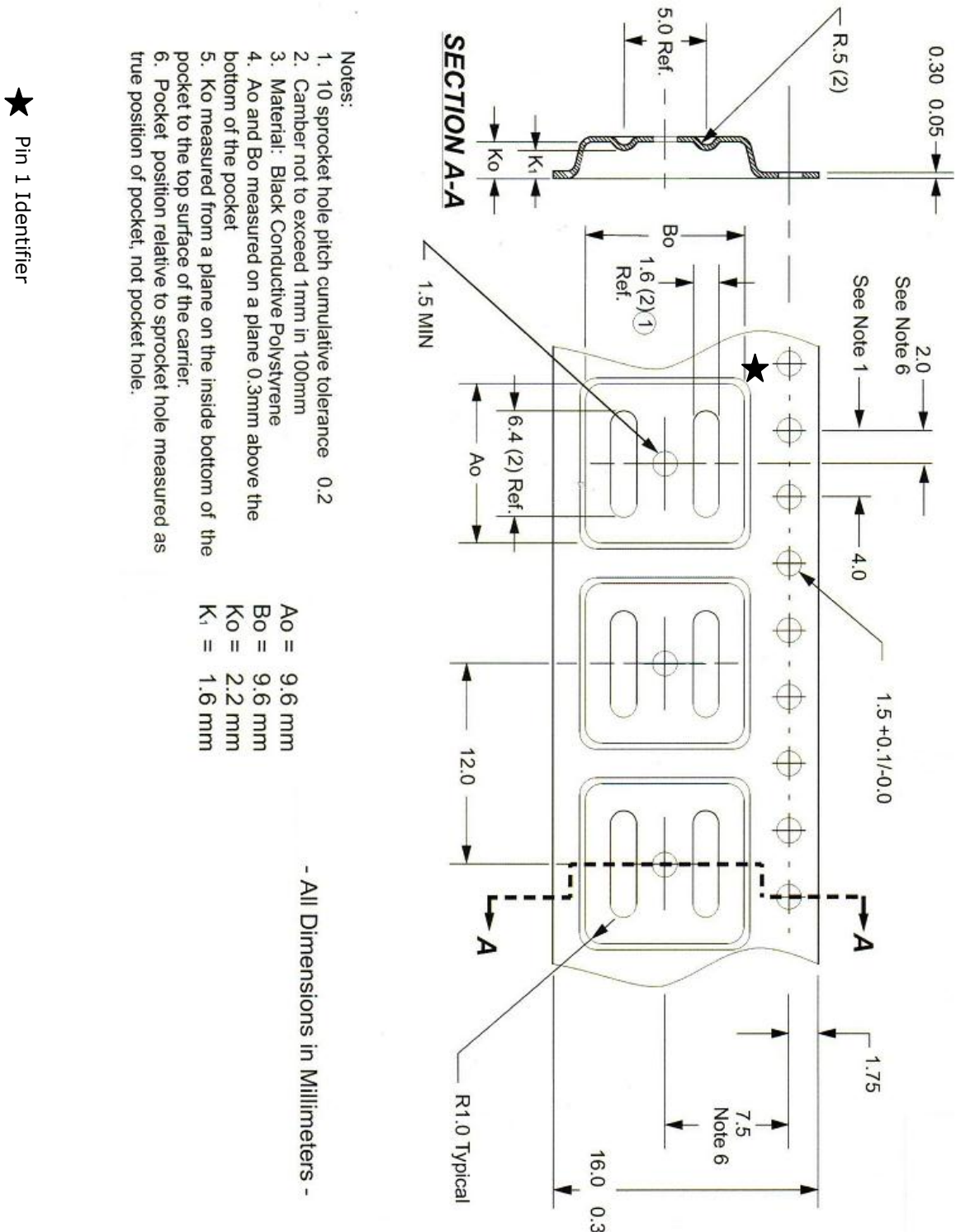


Figure 27.1 – VNC1L – A – Carrier Tape Vendor Part No. Q07X07-A



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

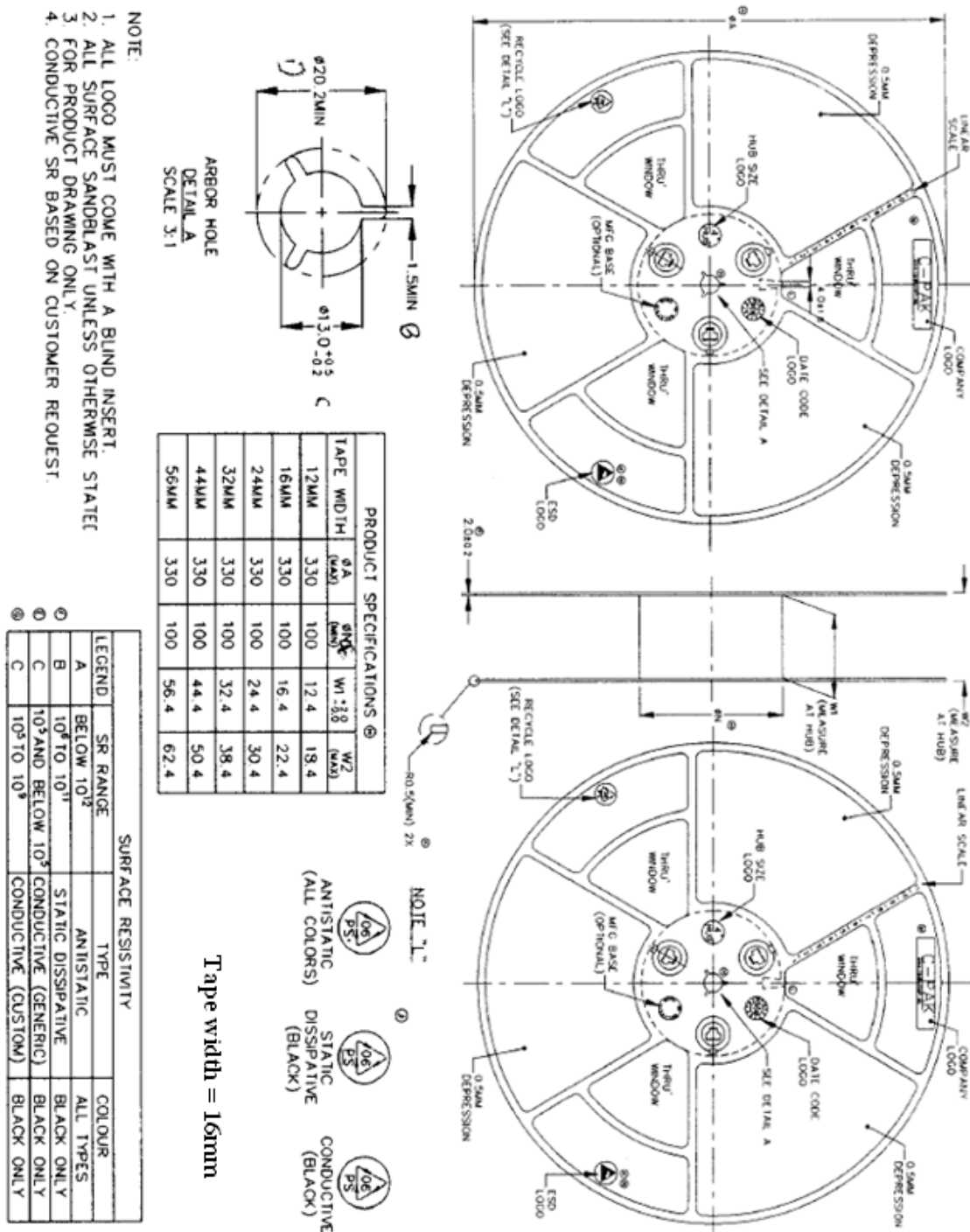


Figure 28.1 – VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48 and QFN-64 , FT311D–LQFP Reel Dimensions

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

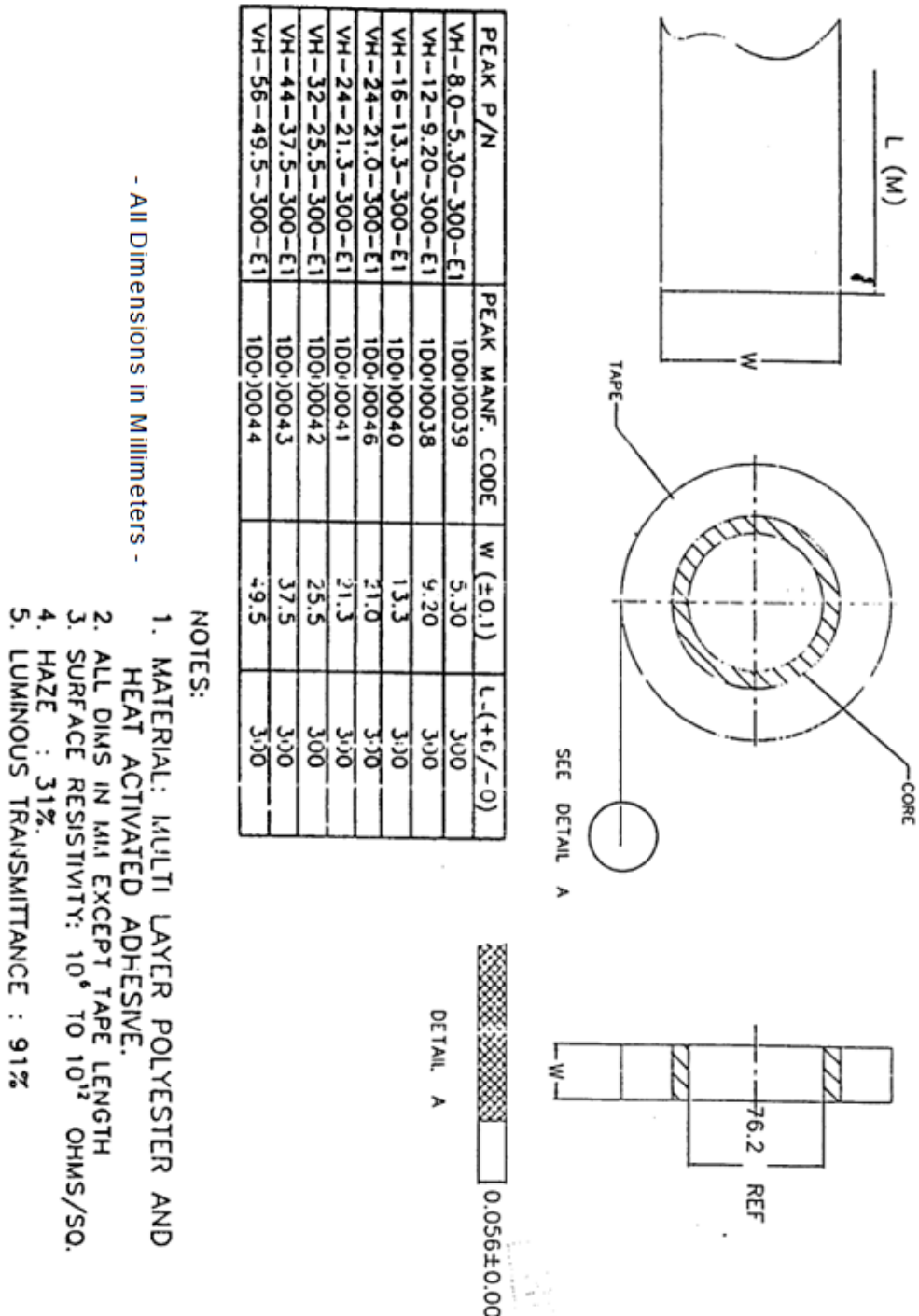


Figure 29.1 VNC2 – LQFP-32 VNC2 – LQFP-48, FT311D – LQFP Cover Tape Dimensions

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

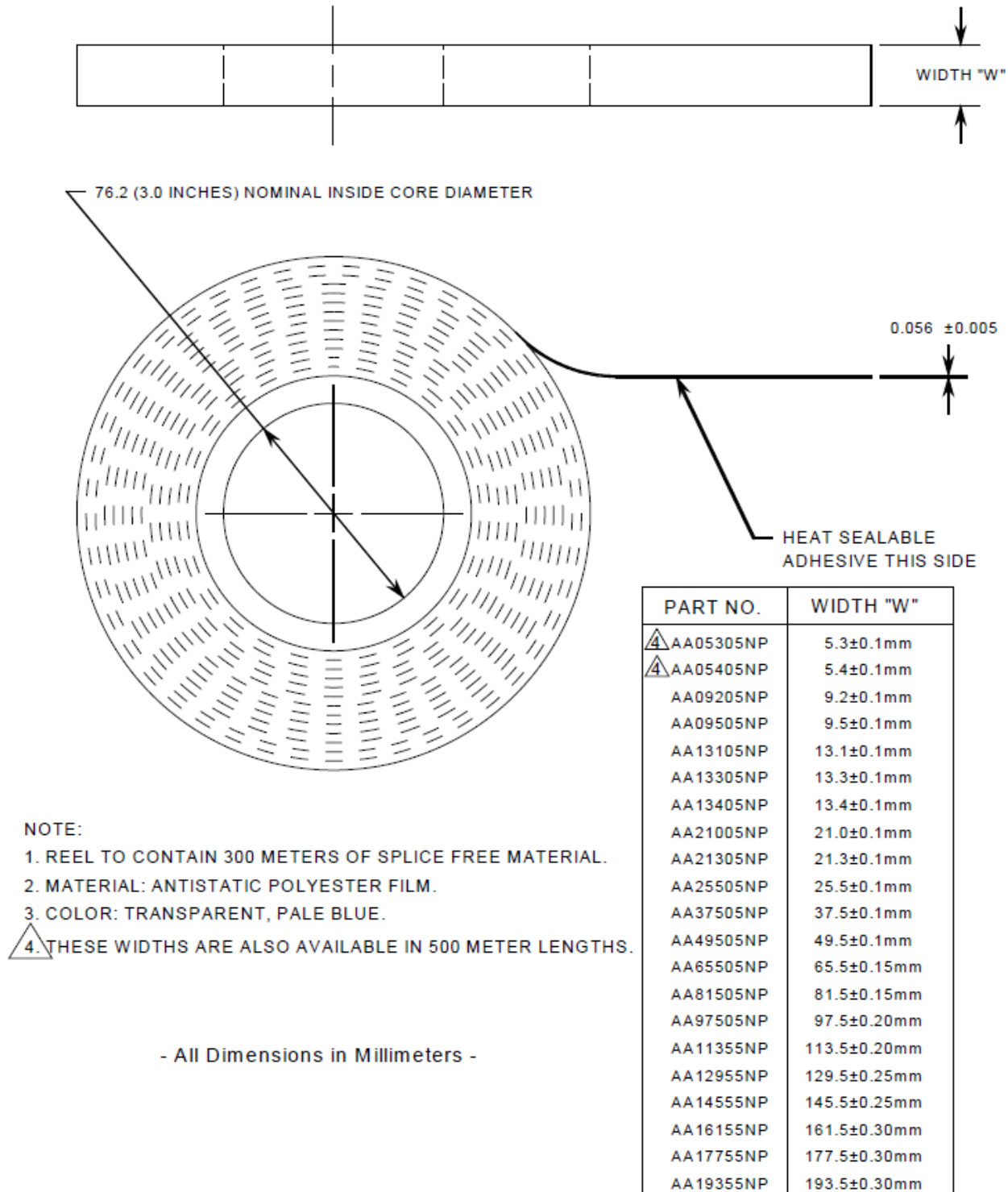


Figure 30.1 VNC2 –LQFP-64, QFN-32, QFN-48, QFN-64, FT311D-QFN Cover Tape Dimensions

### 31 VNC2 – LQFP-32, VNC2 – LQFP-48, FT311D – LQFP Carrier Tape

#### Dimensions

★ Pin 1 Identifier

- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  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  
 K<sub>1</sub> = 1.6 mm

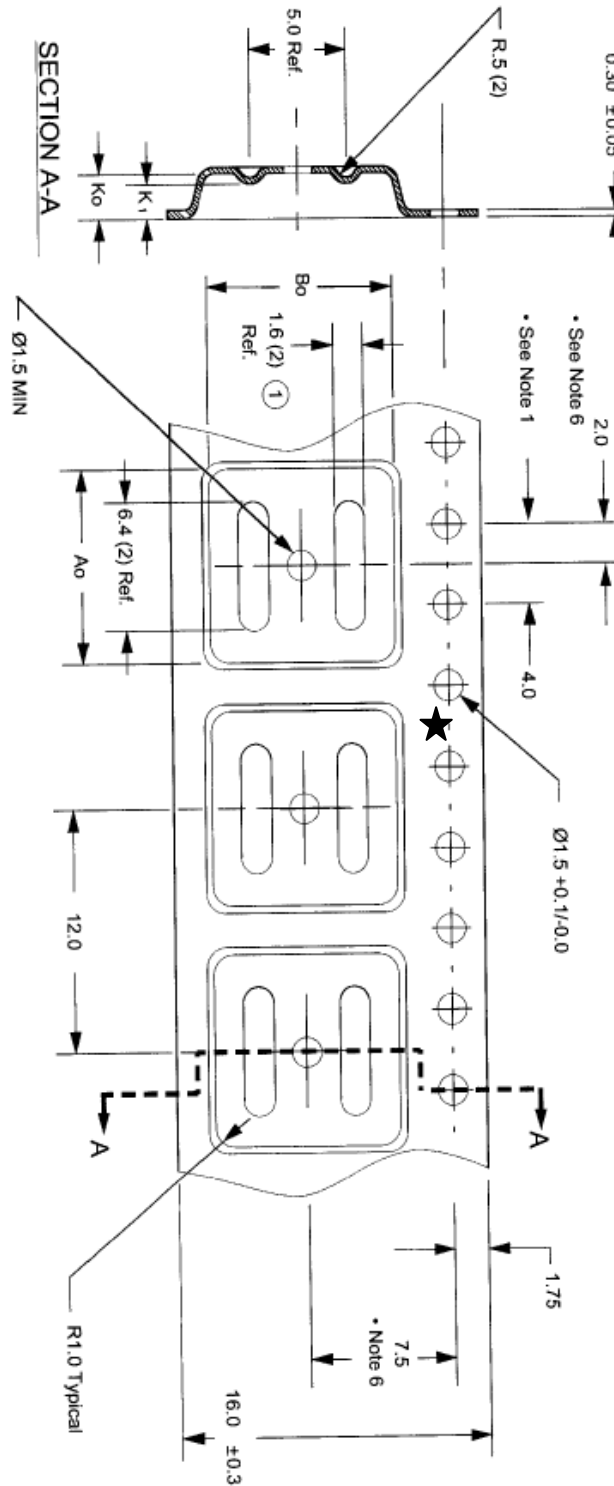
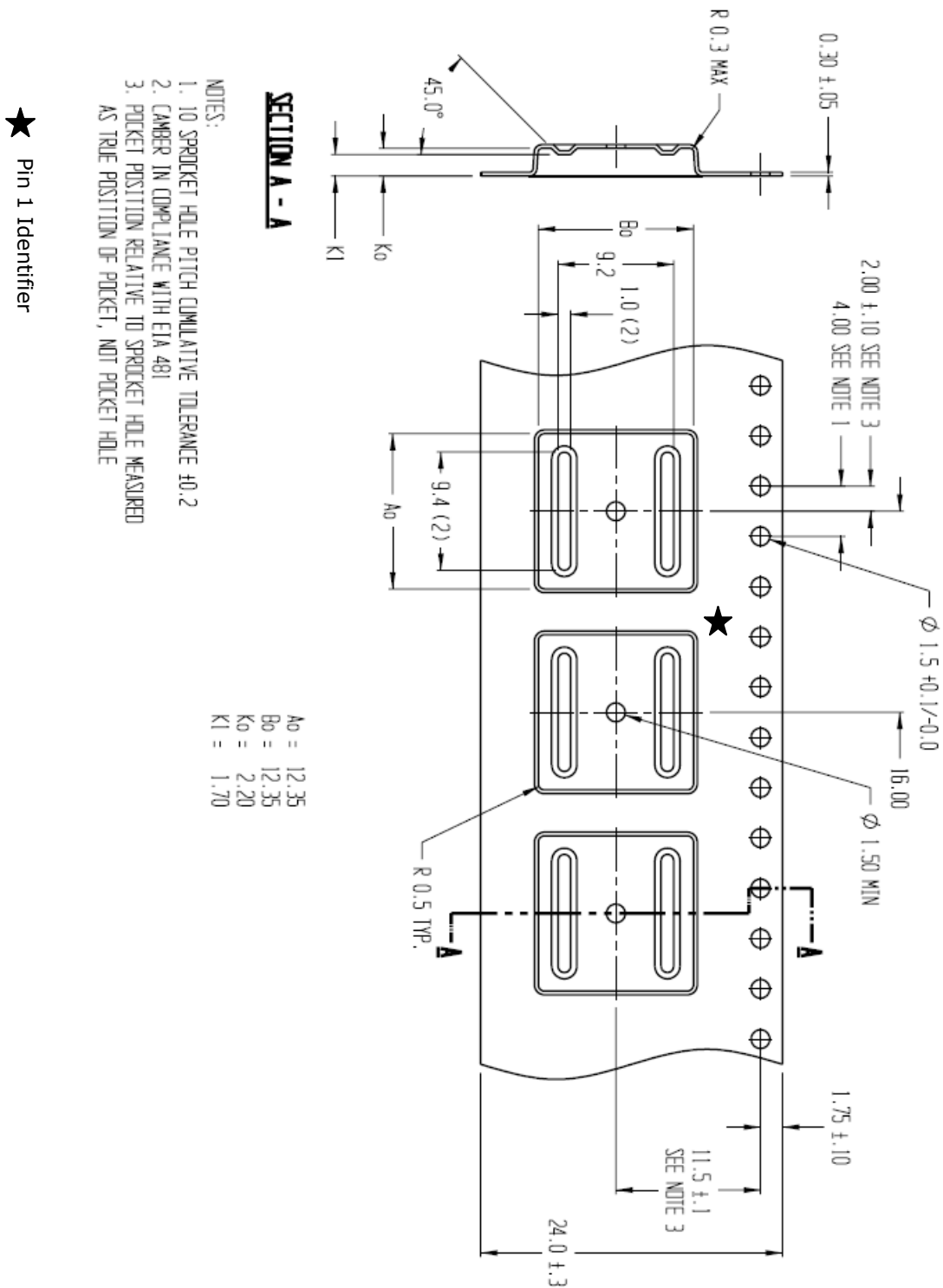


Figure 31.1 VNC2 – LQFP-32, VNC2 – LQFP-48, FT311D – LQFP Carrier Tape Dimensions

### 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

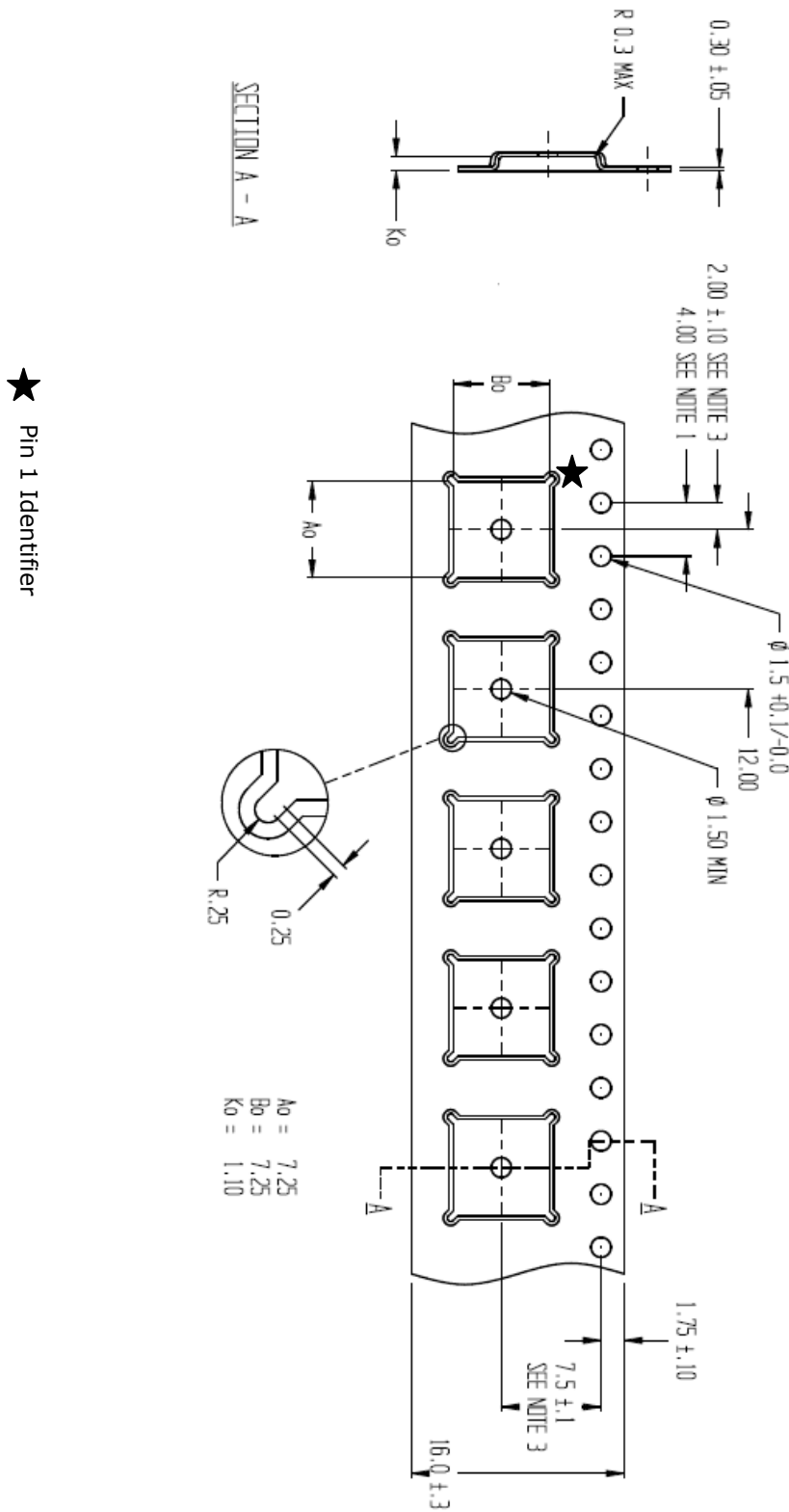


Figure 33.1 VNC2 – QFN-32, FT311D-QFN Carrier Tape Dimensions

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

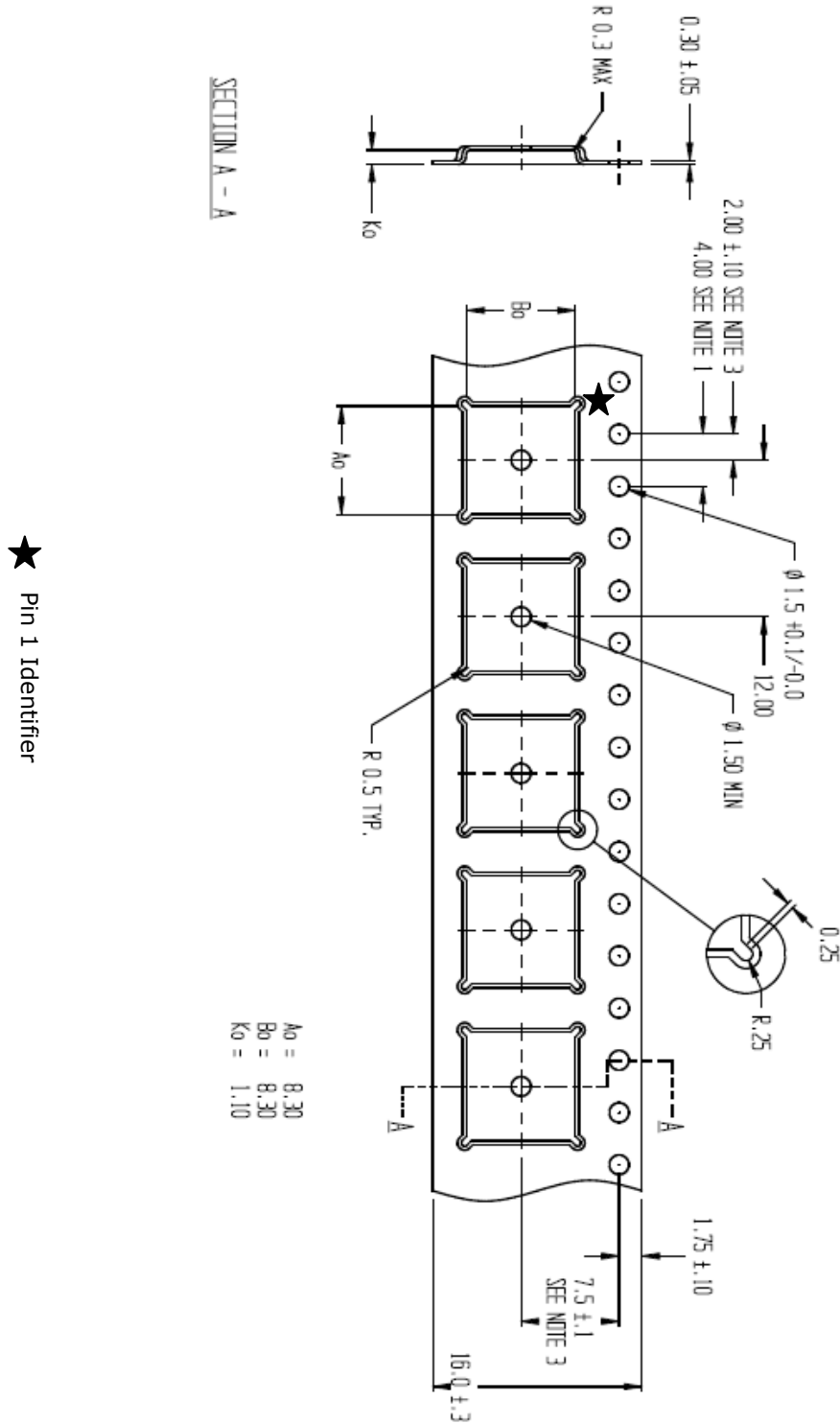


Figure 34.1 VNC2 – QFN-48 and QFN-64 Carrier Tape Dimensions

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

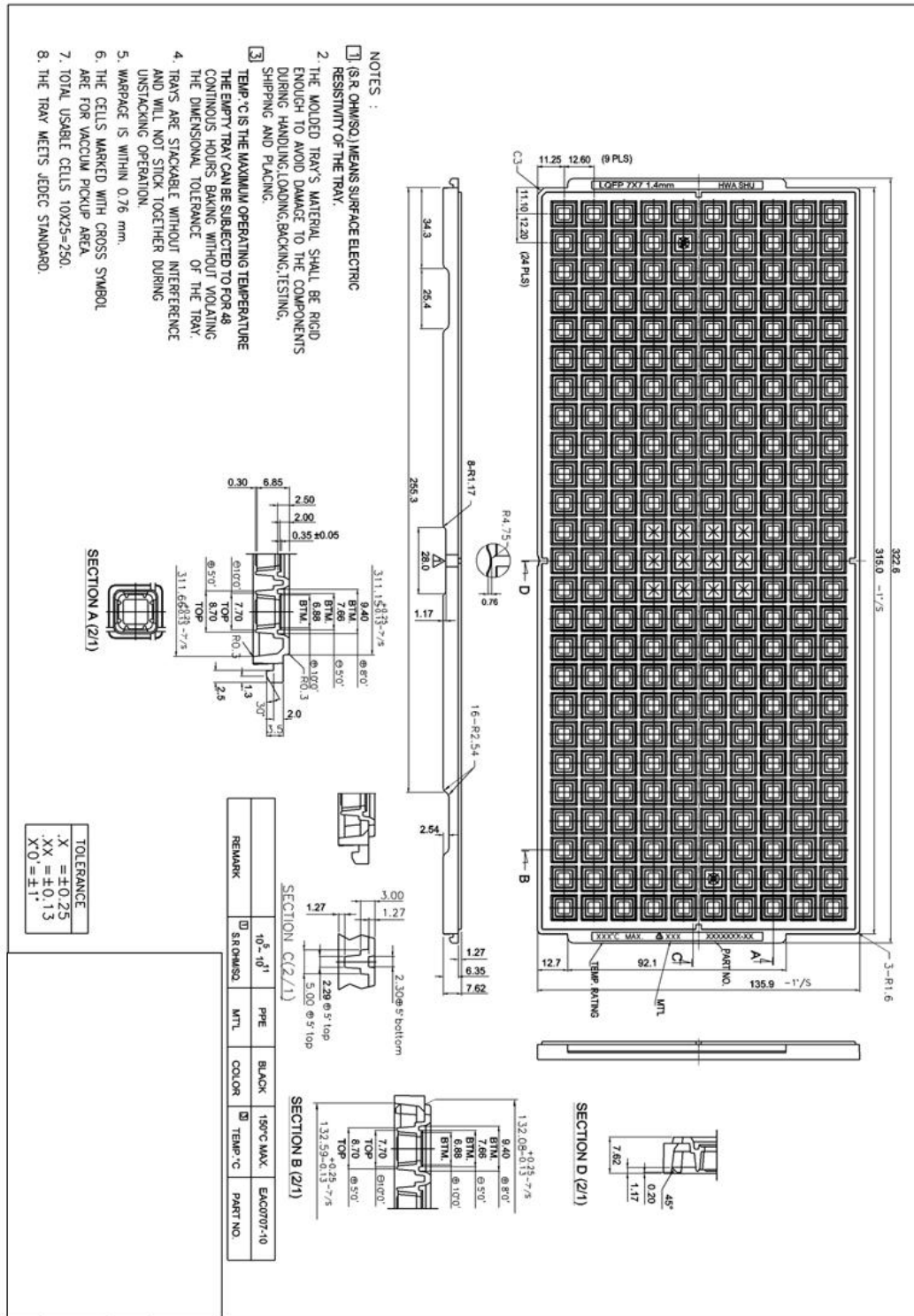


Figure 35.1 VNC2 – LQFP-32 VNC2 – LQFP-48 and FT311D QFN Tray Dimensions



### 36 VNC2 – LQFP-32, VNC2 – LQFP-48 and FT311D LQFP Tray

#### Dimensions – Side View

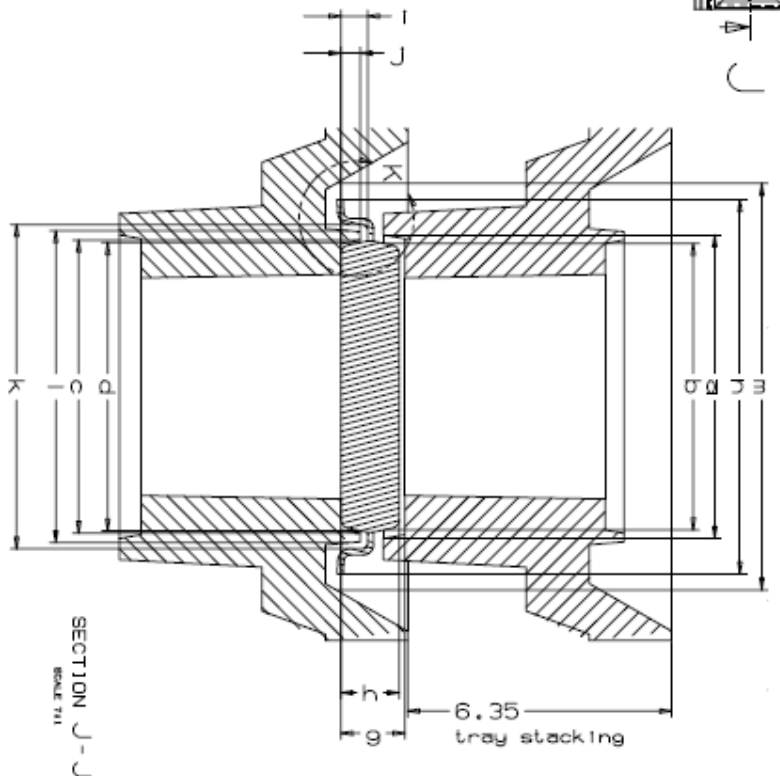
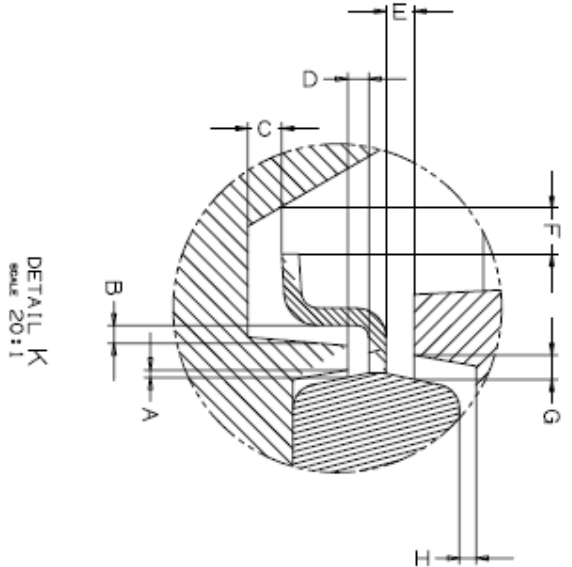
TRAY	a	i	j	m	n	o	q
T.090	T.500		0.460	9.771	T.300	T.300	1.540
PKG	d	k	l	n	b	h	
5.325	7.800		0.638	9.000	8.891	1.400	
QAP	A	B	C	D	E	F	G
0.063	0.120	0.284	0.178	0.238	0.385	0.205	0.140
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS

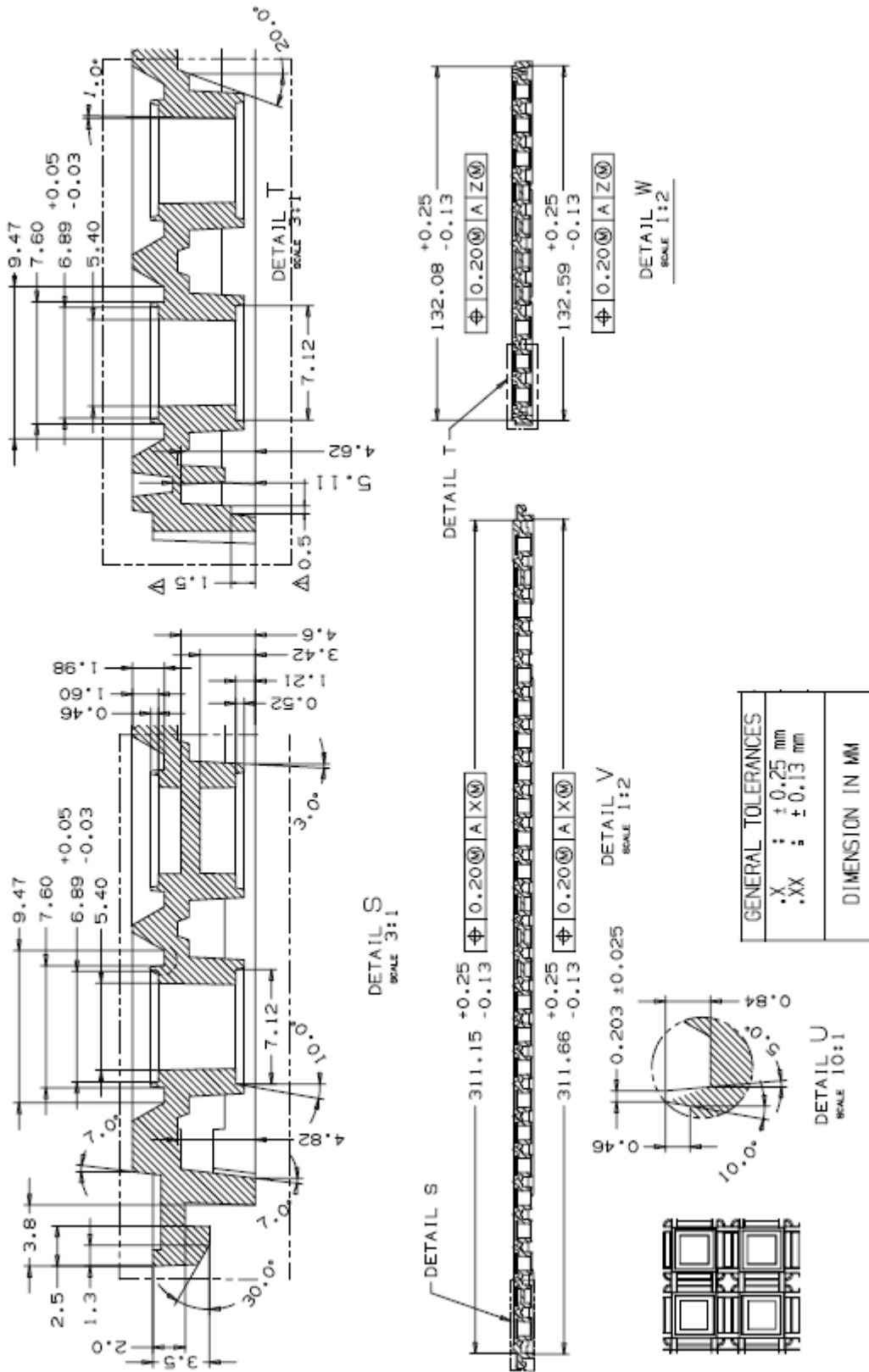
GENERAL TOLERANCES  
 \*X ± 0.25 mm  
 \*XX ± 0.13 mm

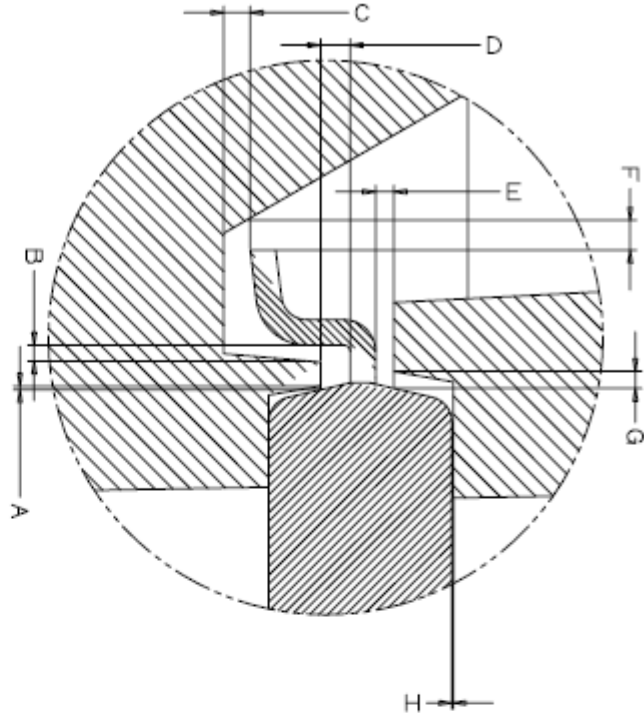
DIMENSION IN MM

- 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**

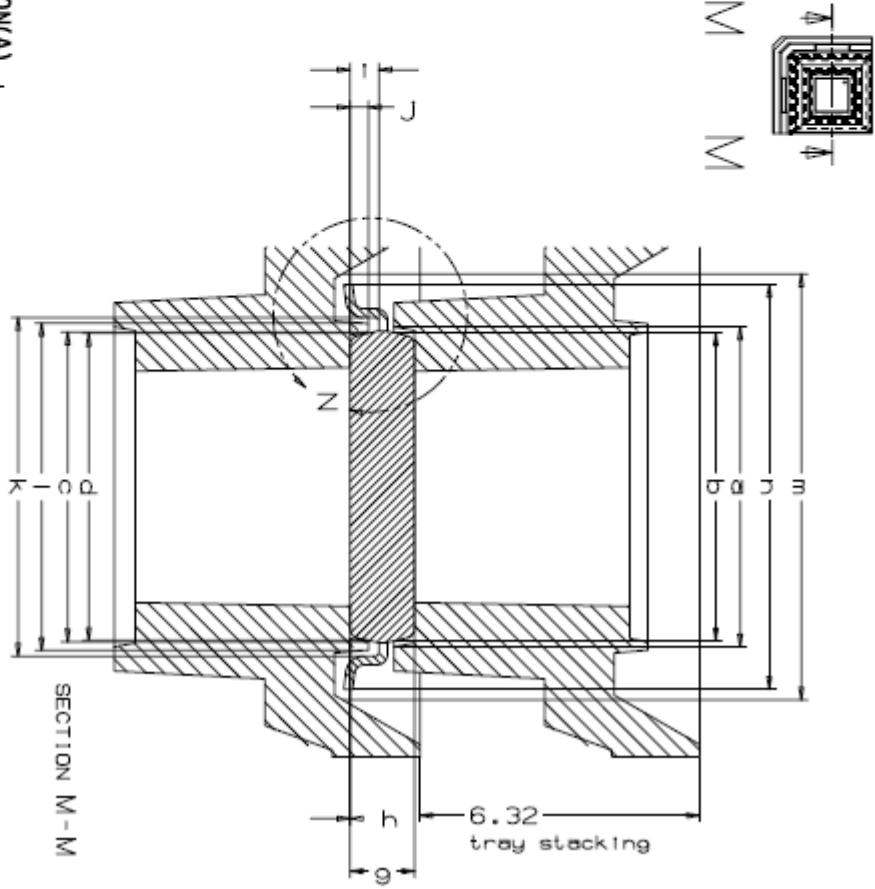
1. A > ZERO ACCEPT
2. B, F > A ACCEPT
3. C, D, E > ZERO ACCEPT
4. G > A ACCEPT
5. H > ZERO ACCEPT
6. E > H ACCEPT

**WORST CONDITION(A)**  
 TRAY - MINIMUM  
 PKG - MAXIMUM

	c	i	j	n	m	g	g
TRAY	7.002	7.398	0.410	9.828	7.232	1.480	
	d	k	l	n	b	h	
PKG	6.941	7.650	0.845	9.150	6.985	1.450	
	a	b	c	d	e	f	
GMP	0.030	0.125	0.209	0.235	0.145	0.239	0.134
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS

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

DIMENSION IN MM



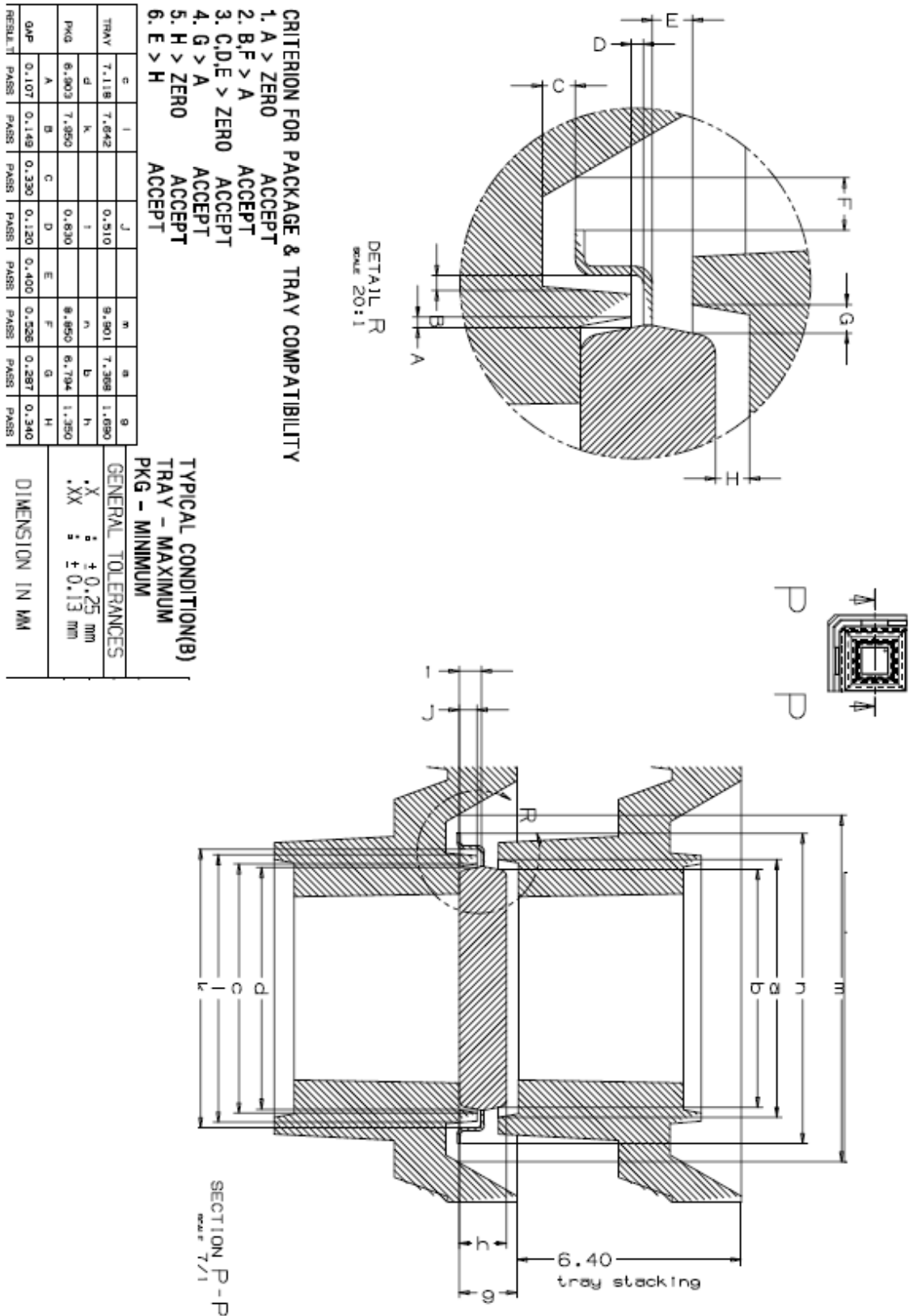
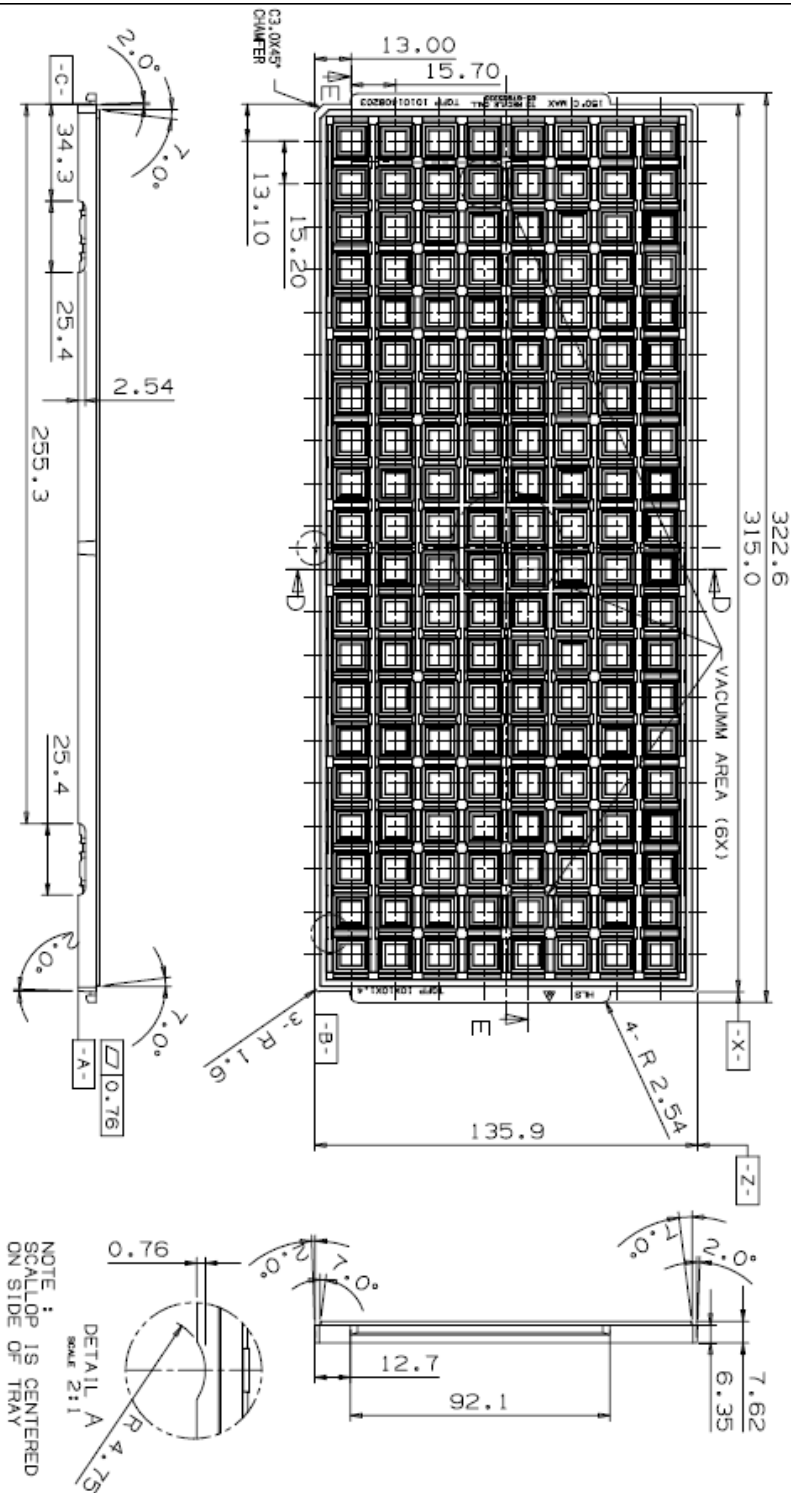


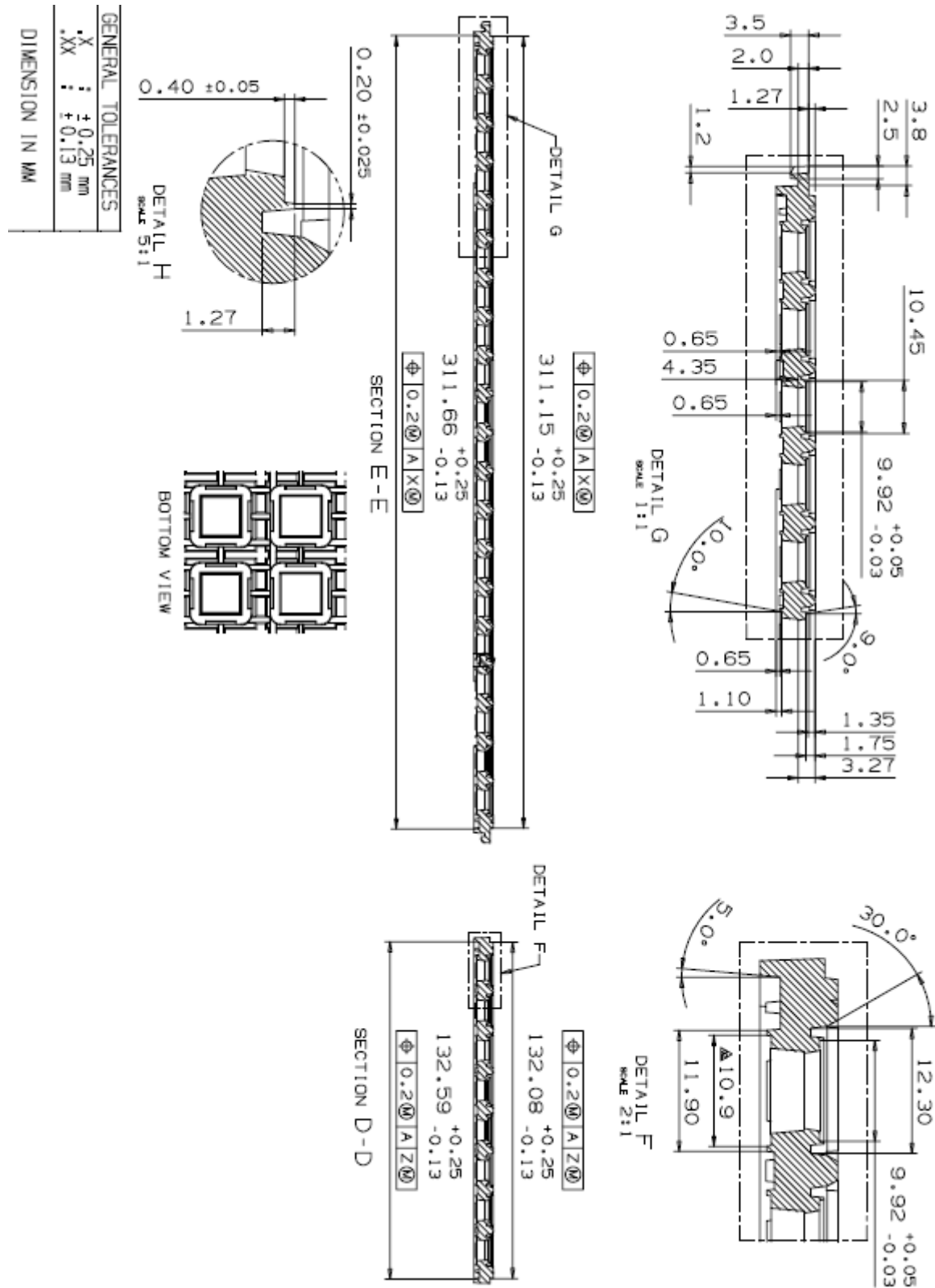
Figure 36.1 VNC2 – LQFP-32, VNC2 – LQFP-48 and FT311D LQFP Tray Dimensions – Side View

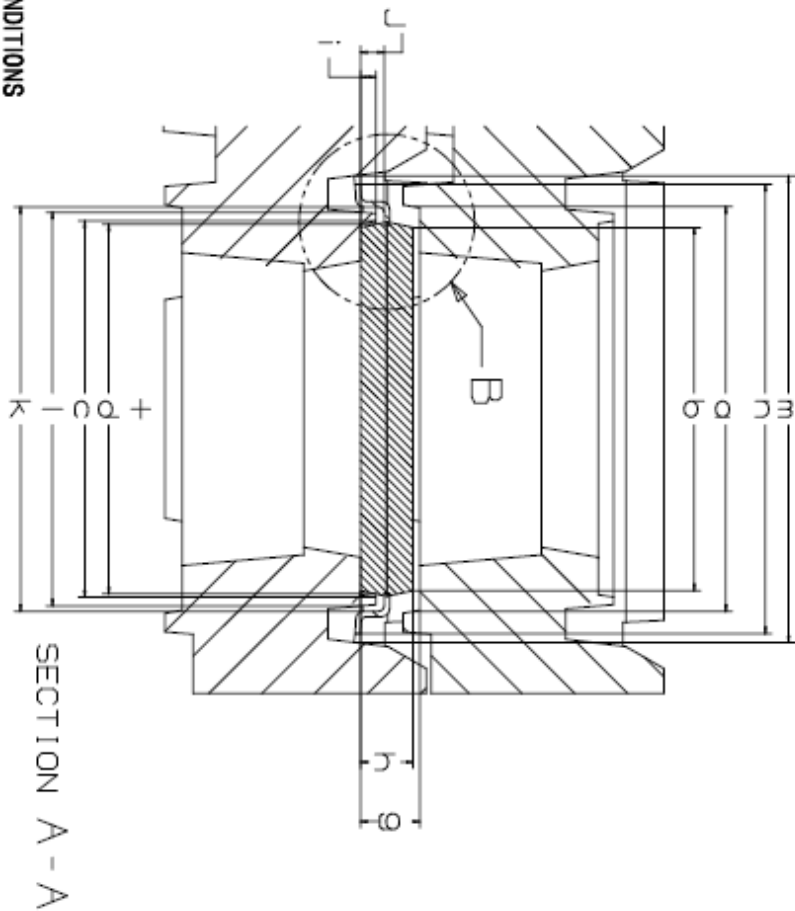
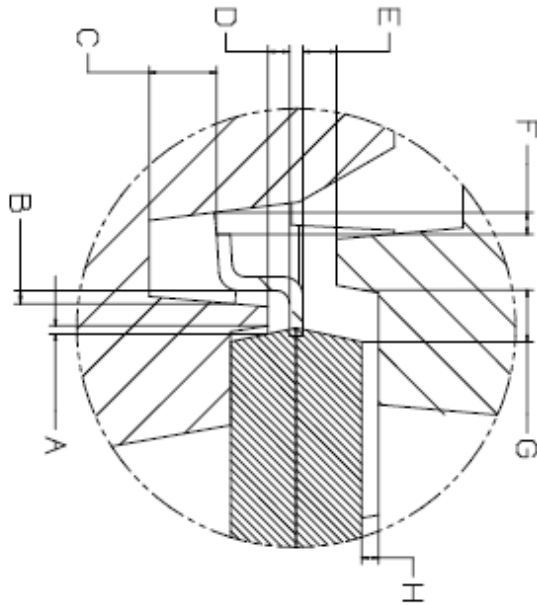
### 37 VNC2 – LQFP-64 Tray Dimensions



**Figure 37.1 VNC2 – LQFP-64 Tray Dimensions**

### 38 VNC2 – LQFP-64 Tray Dimensions – Side View

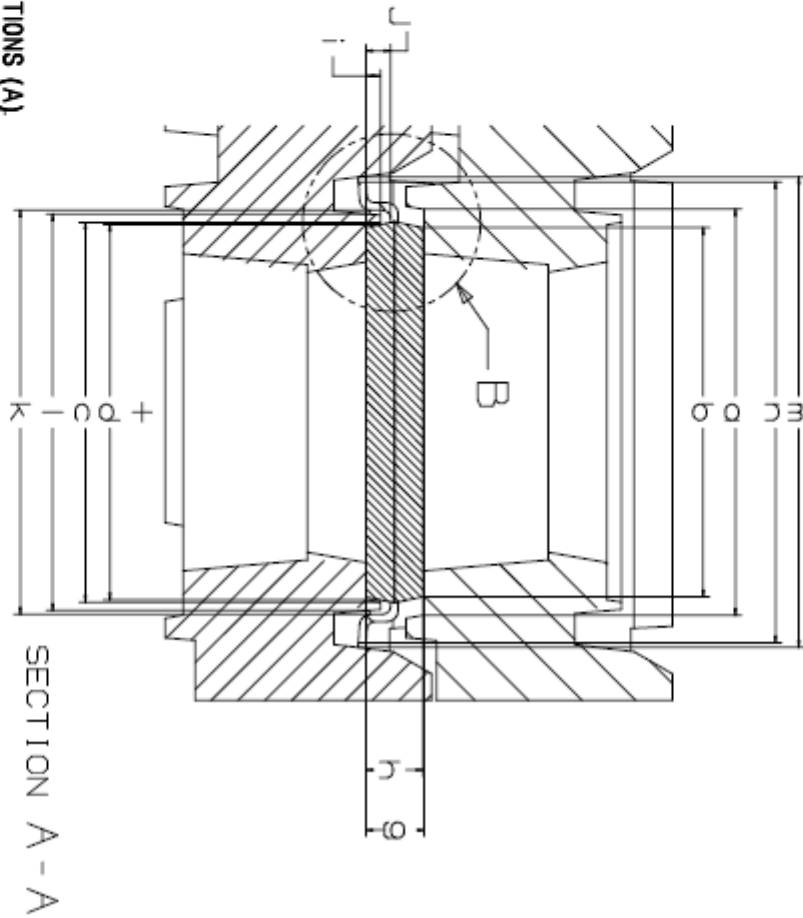
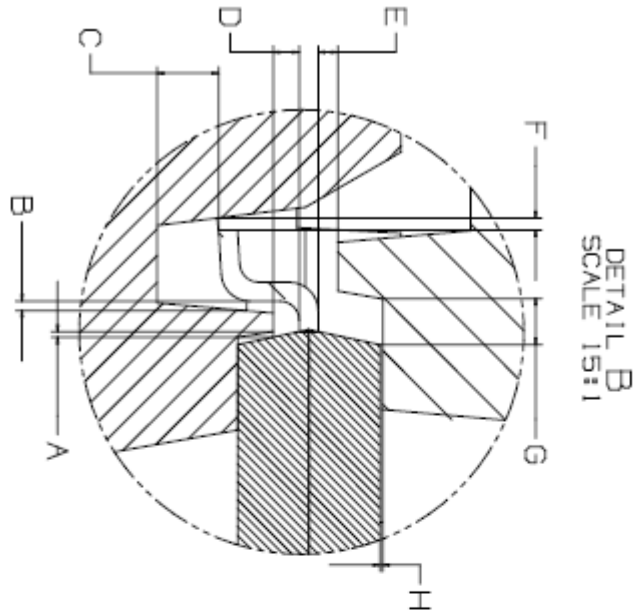


DETAIL B  
 SCALE 15:1

**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	h	i	m	n	o	p	q	r	s	t	u	v	w	x	y	z
TRAY	10.046	10.512	0.400	12.467	10.813	1.580											
PKG	9.872	10.802	0.628				12.000	9.702	1.400								
GAP	0.087	0.145	0.173	0.228	0.368	0.233	0.056	0.180									
RESULT	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	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



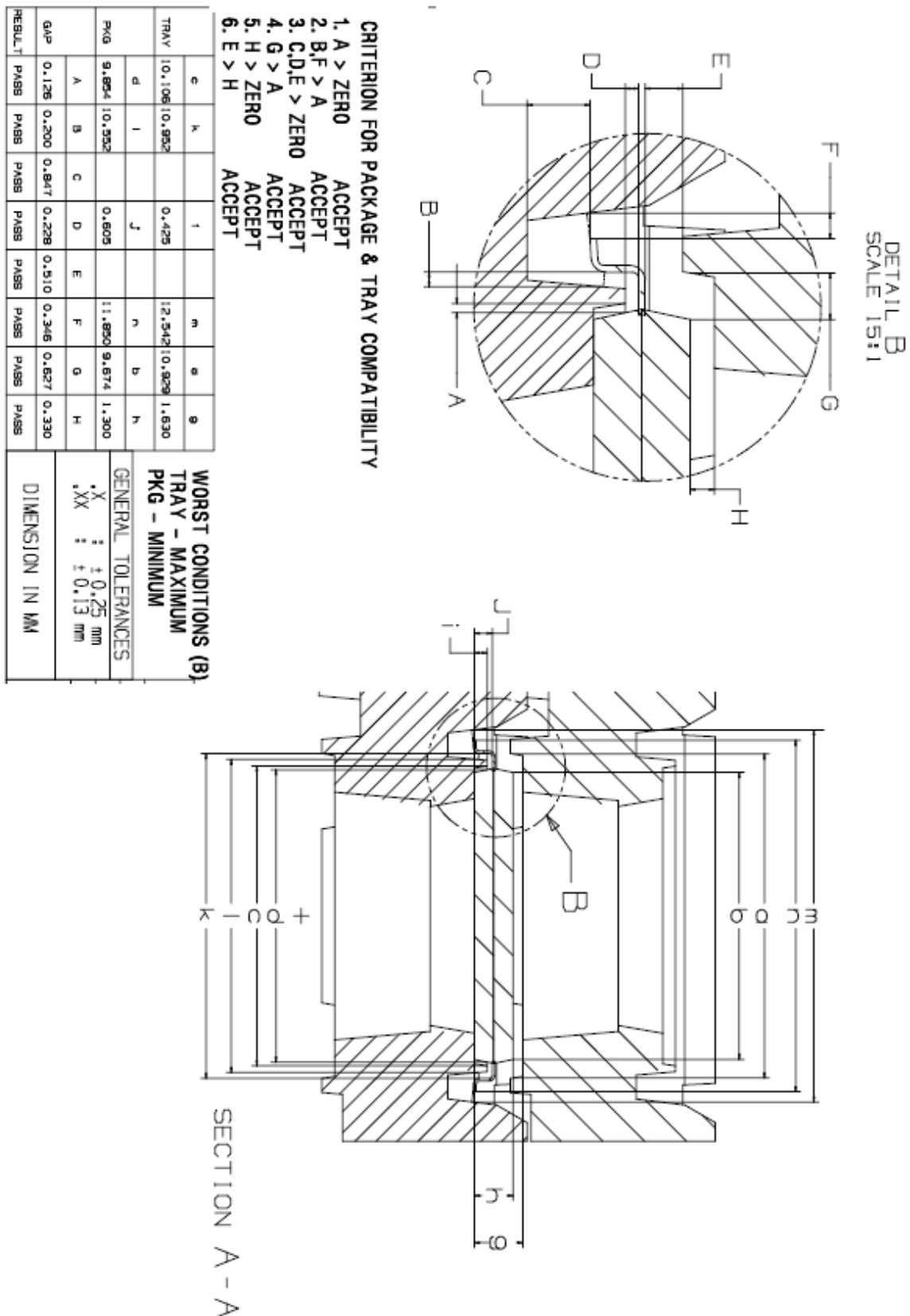
**CRITERION FOR PACKAGE & TRAY COMPATIBILITY**

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	10.009	10.449		0.375		12.403	10.708	1.530
	d	l		j		n	b	h
PKG	9.891	10.652		0.690		12.190	9.731	1.500
	A	B		C		D	E	H
GAP	0.099	0.102		0.647		0.278	0.208	0.127
	A	B		C		D	E	F
RESULT	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

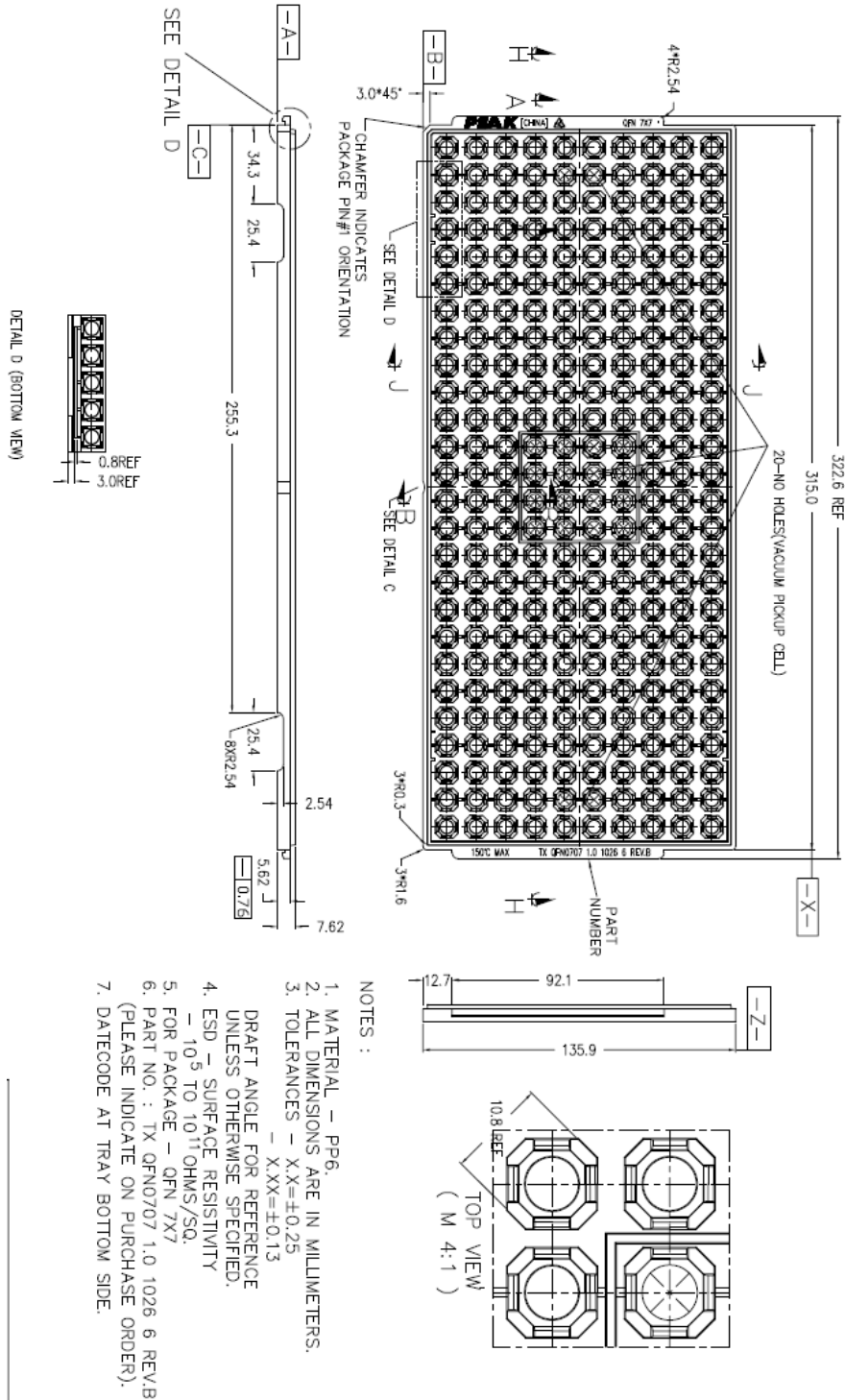


Figure 39.1 VNC2 – QFN-32 and FT311D QFN Tray Dimensions

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

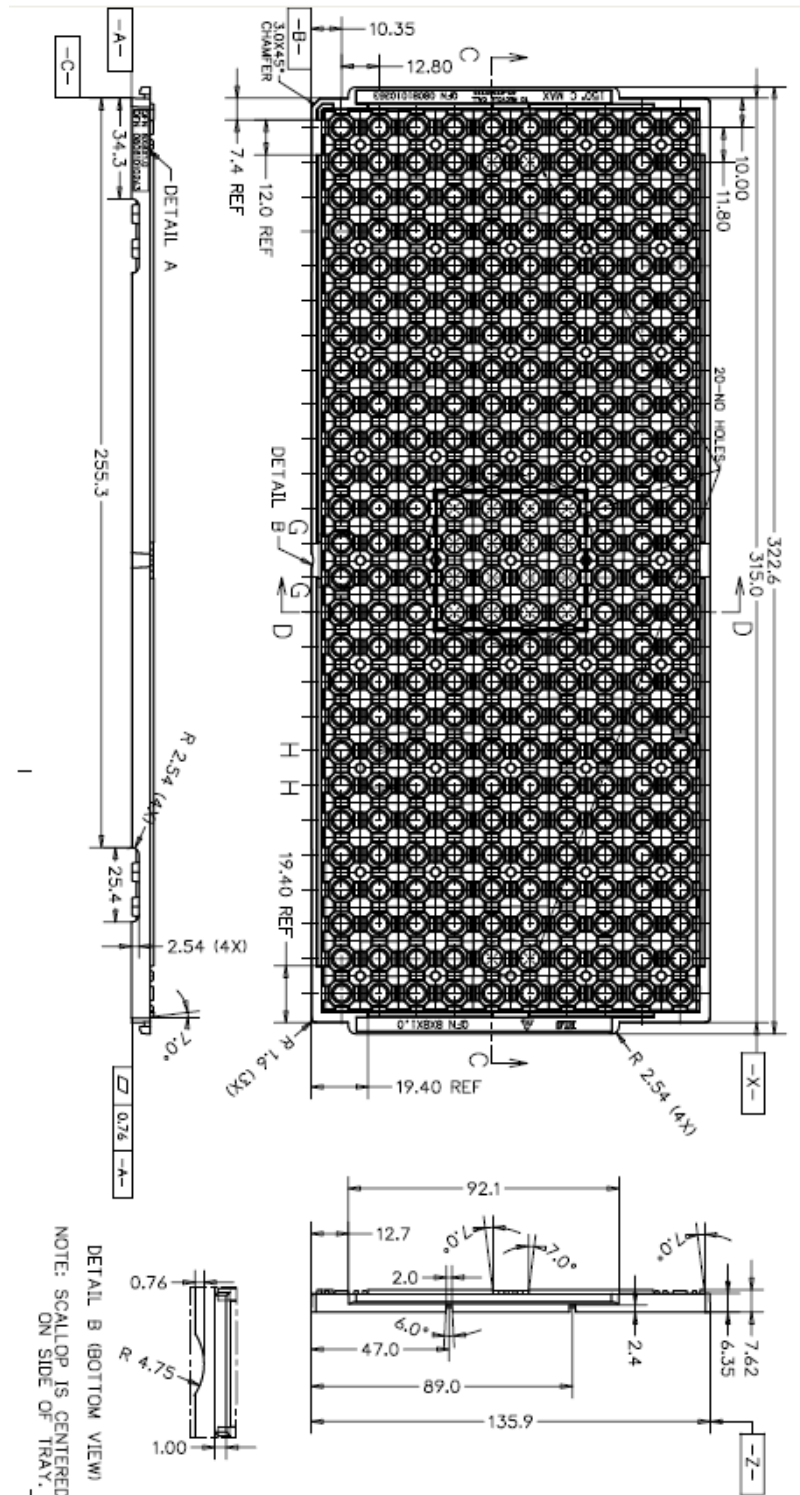
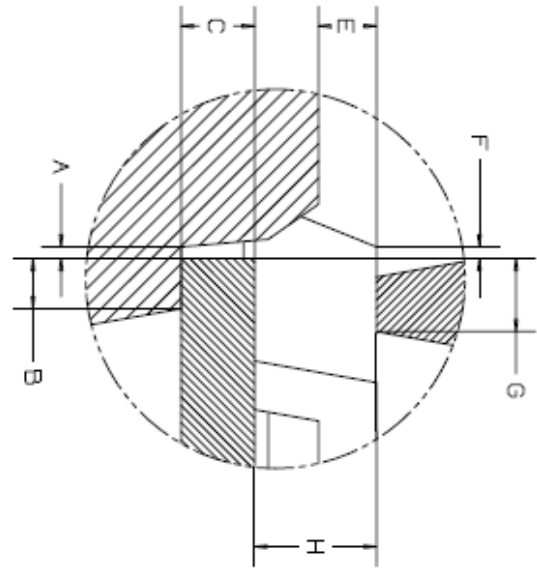


Figure 40.1 VNC2 - QFN-48 and QFN-64 Tray Dimensions

### 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

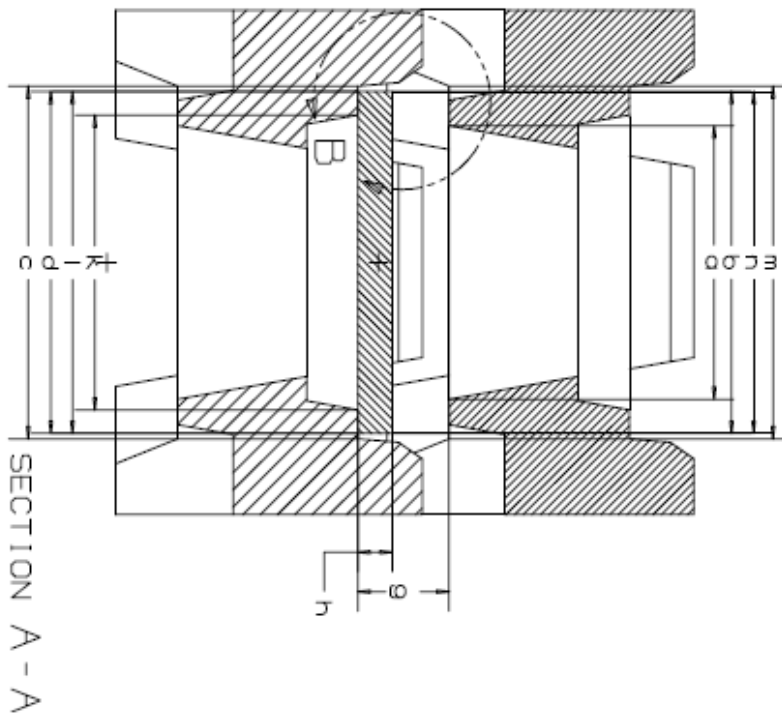
	c	k	i	m	a	g
TRAY	8,250	6,900		8,250	6,400	2,130
	d	l	j	n	b	h
PKG	8,000	8,000	-	8,000	8,000	0,800
	A	B	C	D	E	F
GAP	0,125	0,350	0,800	-	0,630	0,125
RESULT	PASS	PASS	PASS	-	PASS	PASS

TYPICAL CONDITION  
 TRAY - NOMINAL  
 PKG - NOMINAL

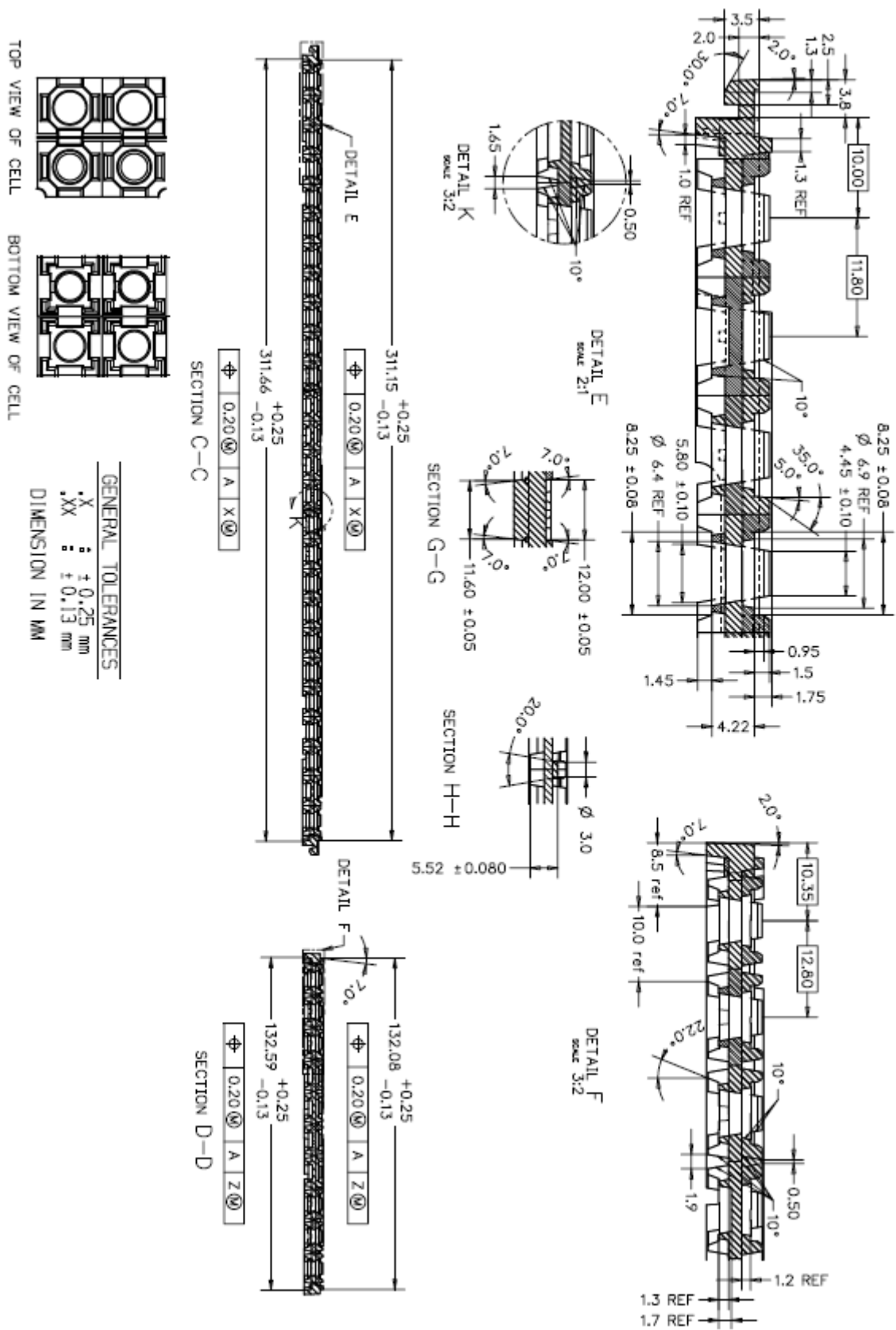
GENERAL TOLERANCES

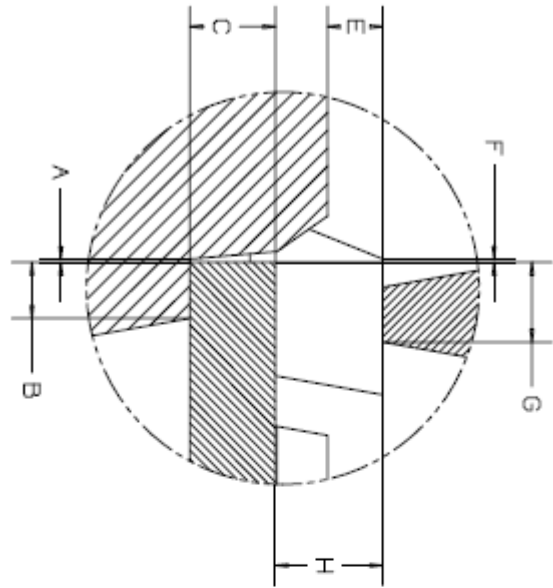
.X ± 0.25 mm  
 .XX ± 0.13 mm

DIMENSION IN MM



SECTION A - A




**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

**WORST CONDITION (A)**

TRAY - MINIMUM

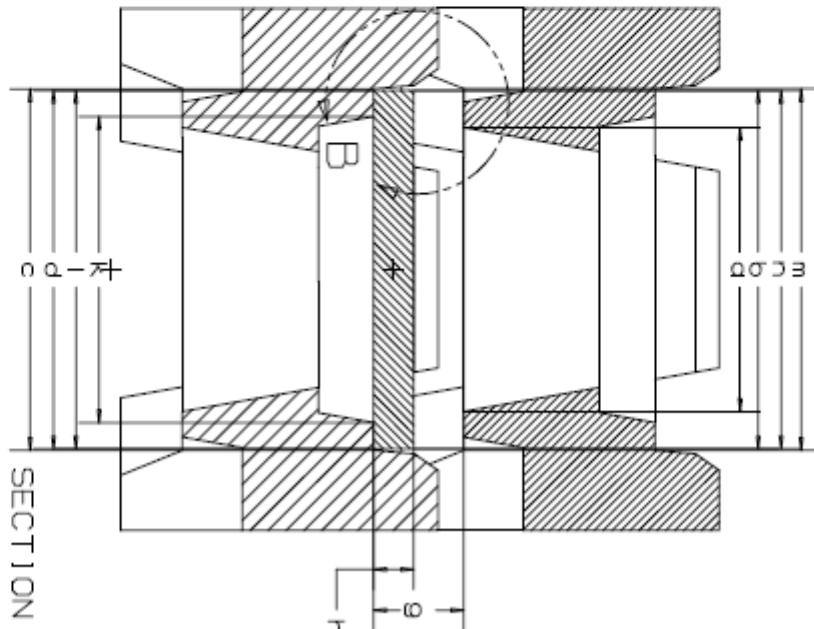
PKG - MAXIMUM

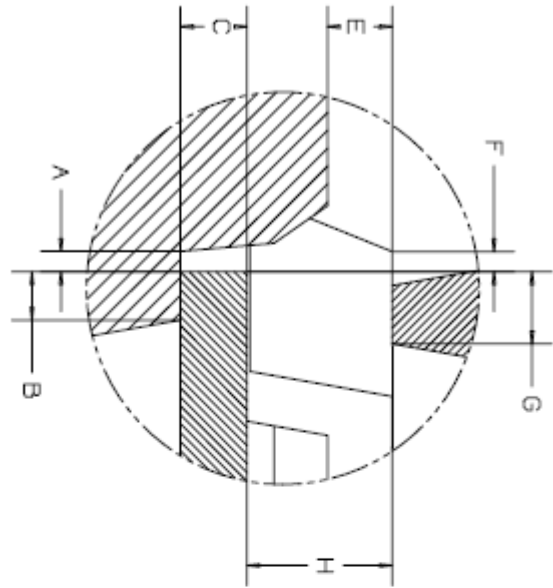
**GENERAL TOLERANCES**

 .X ± 0.25 mm  
 .XX ± 0.13 mm

**DIMENSION IN MM**

TRAY	e	h	i	m	a	g		
8.168	8.918			8.172	8.418	2.030		
PKG	d	l	j	n	b	h		
8.100	8.100			8.100	8.100	0.900		
GAP	A	B	C	D	E	F	G	H
0.034	0.593	0.900	-	0.580	0.036	0.841	1.130	
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS


**SECTION A - A**

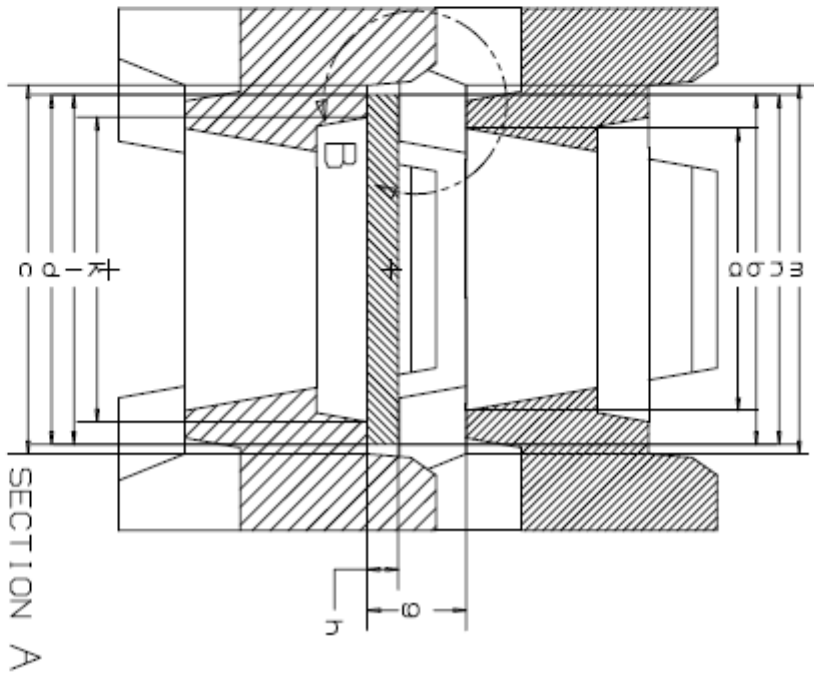


### DETAIL B

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



### SECTION A

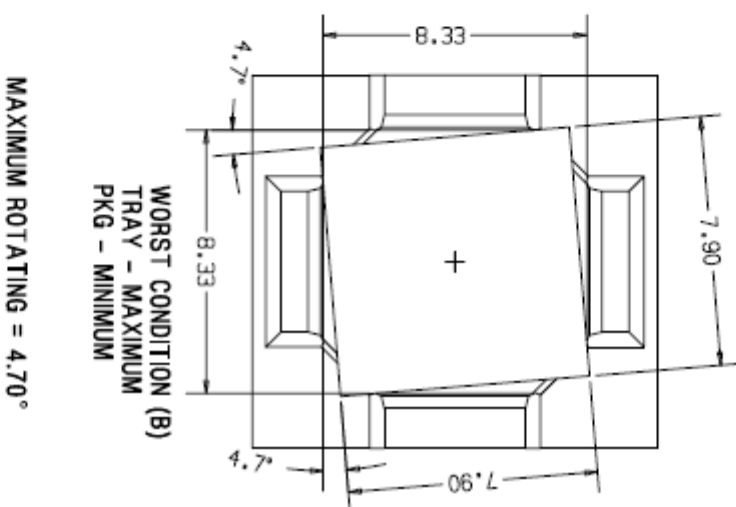
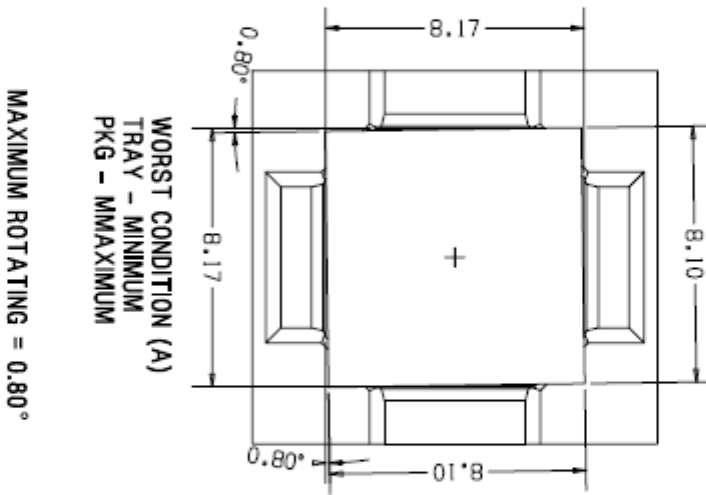
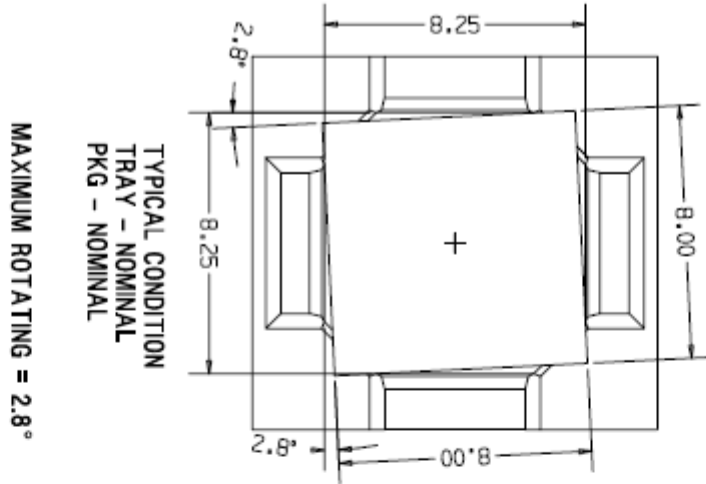
TRAY	g		h		i		m		n		o		p	
	d	i												
PKG	7.900	7.900					7.900	7.900	7.900	7.900	0.700			
GAP	A	B	C	D	E	F	G	H						
RESULT	PASS	PASS	PASS	-	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	

WORST CONDITION (B)	
TRAY - MAXIMUM	PKG - MINIMUM
.X	± 0.25 mm
.XX	± 0.13 mm

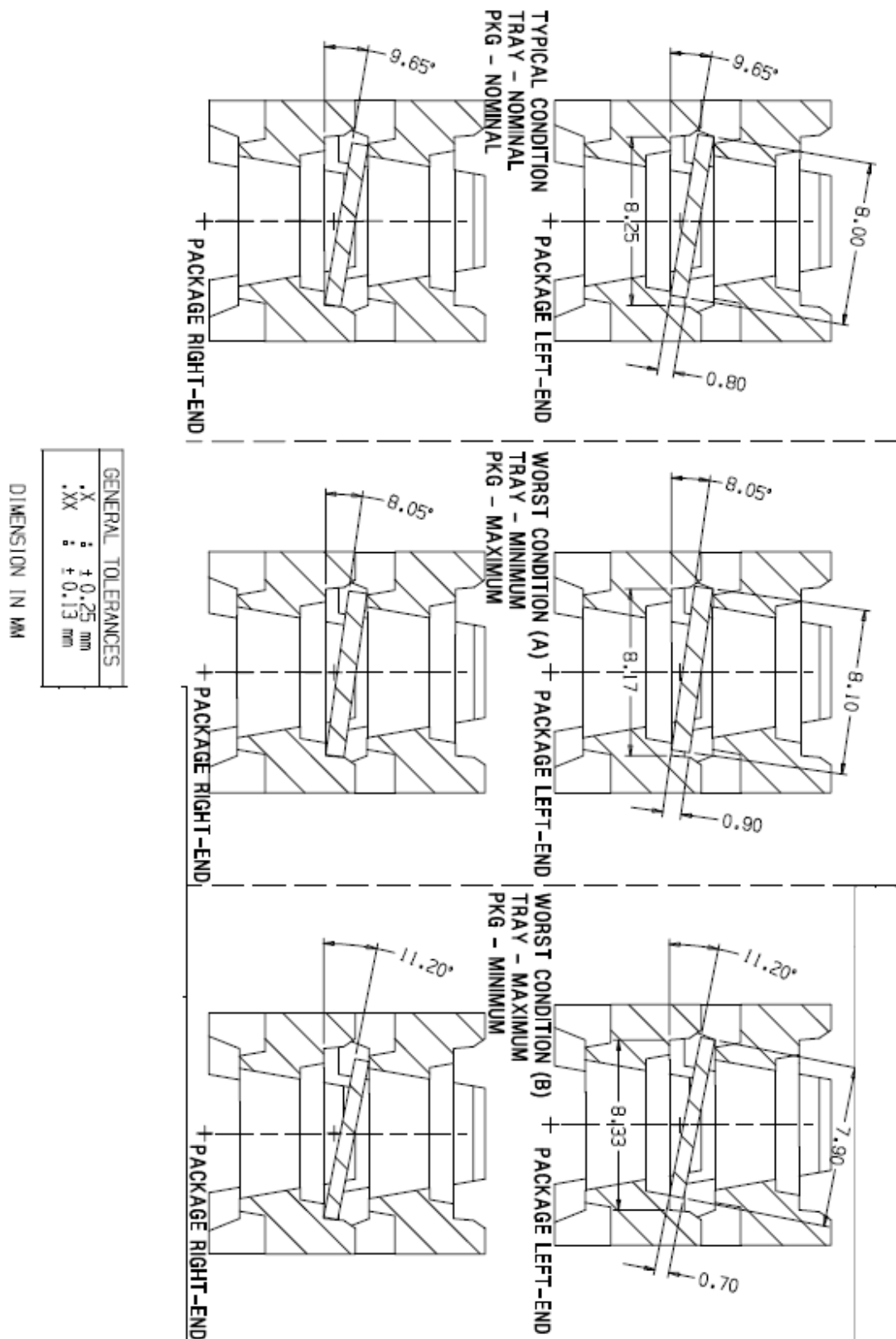
GENERAL TOLERANCES

DIMENSION IN MM



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

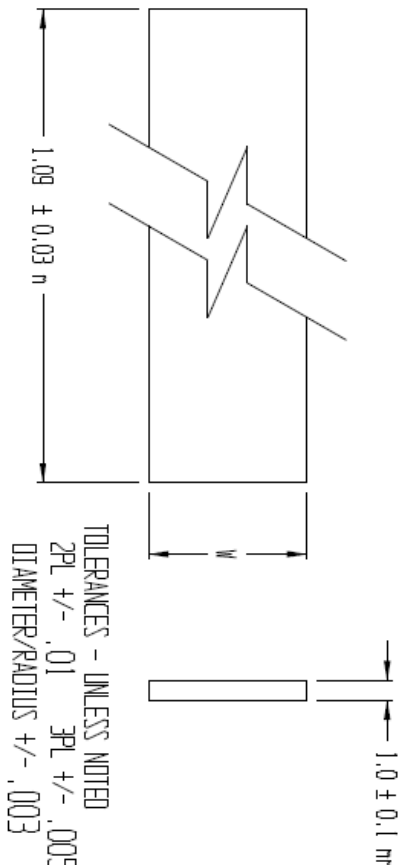




**Figure 41.1 VNC2 - QFN-48 and QFN-64 Tray Dimensions - Side View**

## 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*
PB109080JC	8	8.3 +0.7/-0.0 mm
PB109120JC	12	12.3 +0.7/-0.0 mm
PB109160JC	16	16.3 +0.7/-0.0 mm
PB109240JC	24	24.3 +0.7/-0.0 mm
PB109320JC	32	32.3 +0.7/-0.0 mm
PB109440JC	44	44.3 +0.7/-0.0 mm
PB109560JC	56	56.3 +0.7/-0.0 mm
PB109720JC	72	72.3 +0.7/-0.0 mm
PB109880JC	88	88.3 +0.7/-0.0 mm
PB1091040JC	104	104.3 +0.7/-0.0 mm
PB1091200JC	120	120.3 +0.7/-0.0 mm
PB1091360JC	136	136.3 +0.7/-0.0 mm
PB1091520JC	152	152.3 +0.7/-0.0 mm
PB1091680JC	168	168.3 +0.7/-0.0 mm
PB1091840JC	184	184.3 +0.7/-0.0 mm
PB1092000JC	200	200.3 +0.7/-0.0 mm

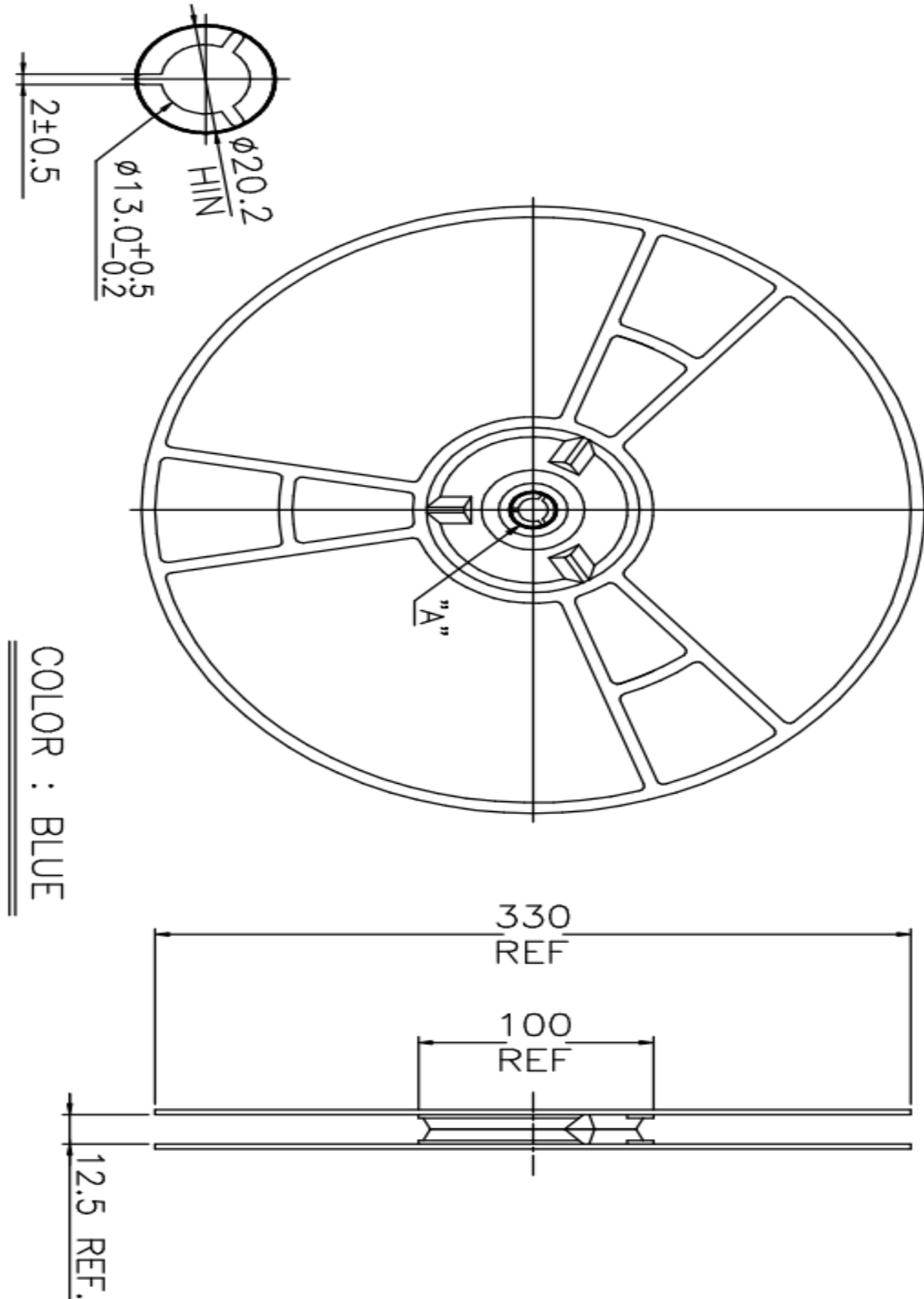
NOTES

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

TOLERANCES - UNLESS NOTED  
 2PL +/- .01 3PL +/- .005  
 DIAMETER/RADIUS +/- .003

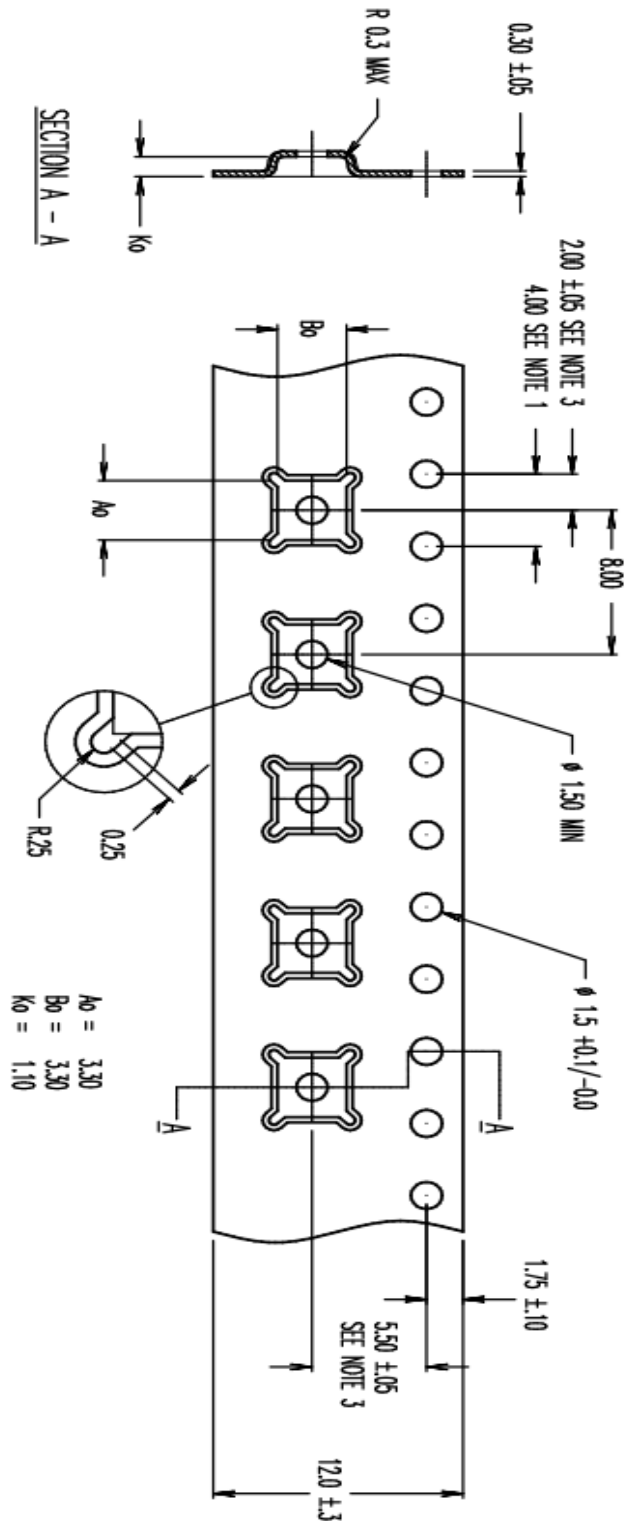
Figure 42.1 VNC2 – LQFP-32, LQFP-48, LQFP-64, QFN-32, QFN-48, QFN-64 and FT311D-LQFP, FT311D-QFN Protective Belt

### 43 FT200XD Reel Dimensions



**Figure 43.1 FT200XD Reel Dimensions**

## 44 FT200XD Tape Dimensions



### Notes:

1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
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.
7. Cover Tape width  $9.3 \pm 0.1$ mm.

Figure 44.1 FT200XD Tape Dimensions

### 45 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN

#### Reel Dimensions

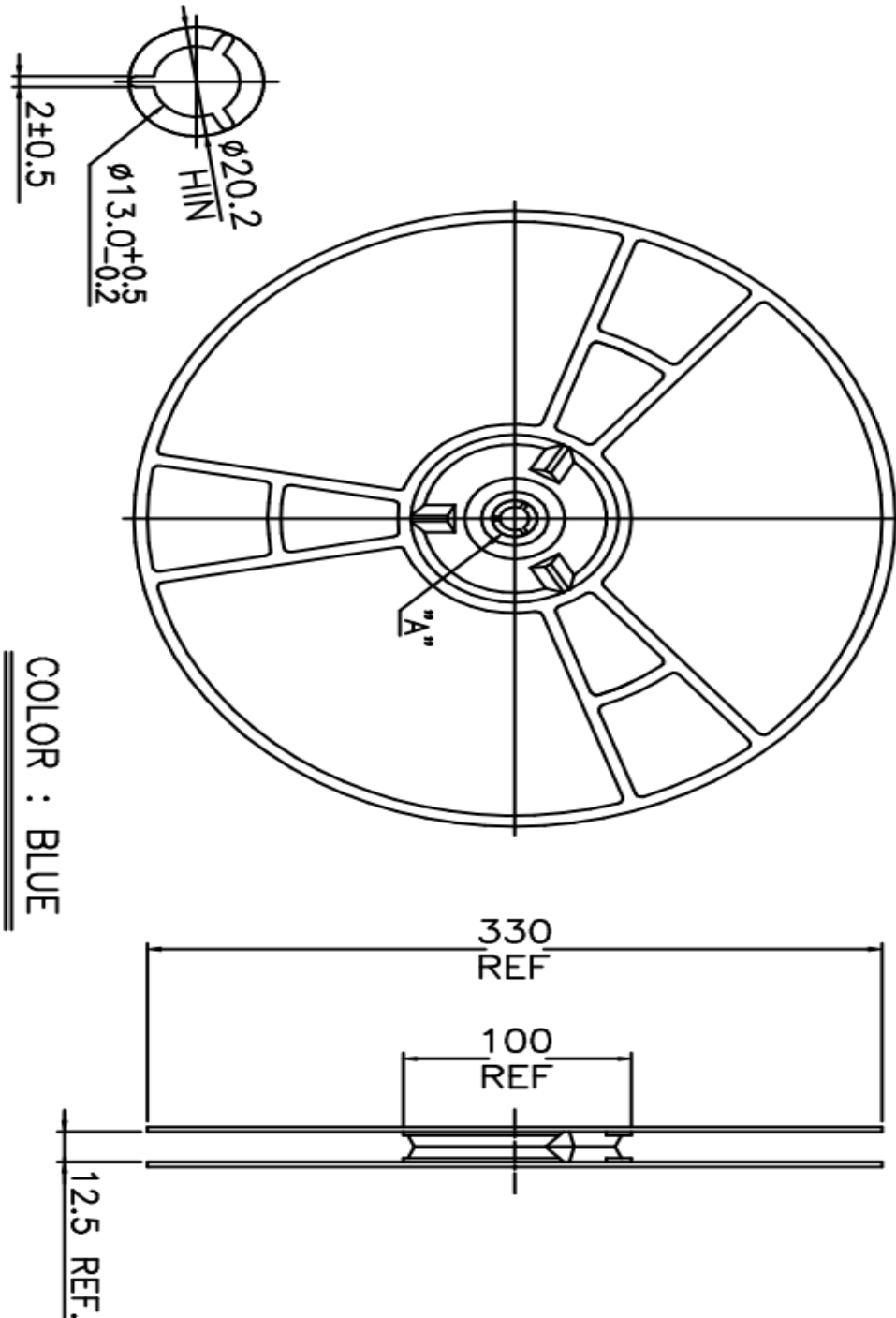


Figure 45.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Reel Dimensions

## 46 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN

### Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  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.

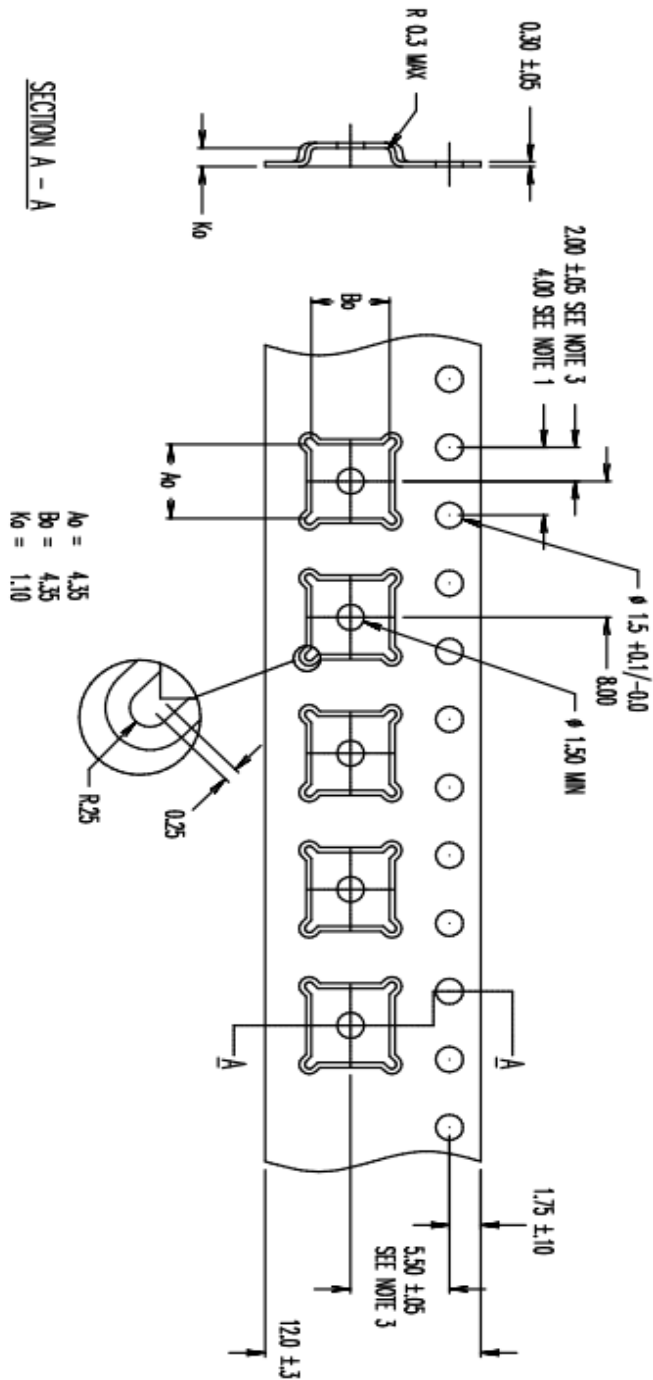
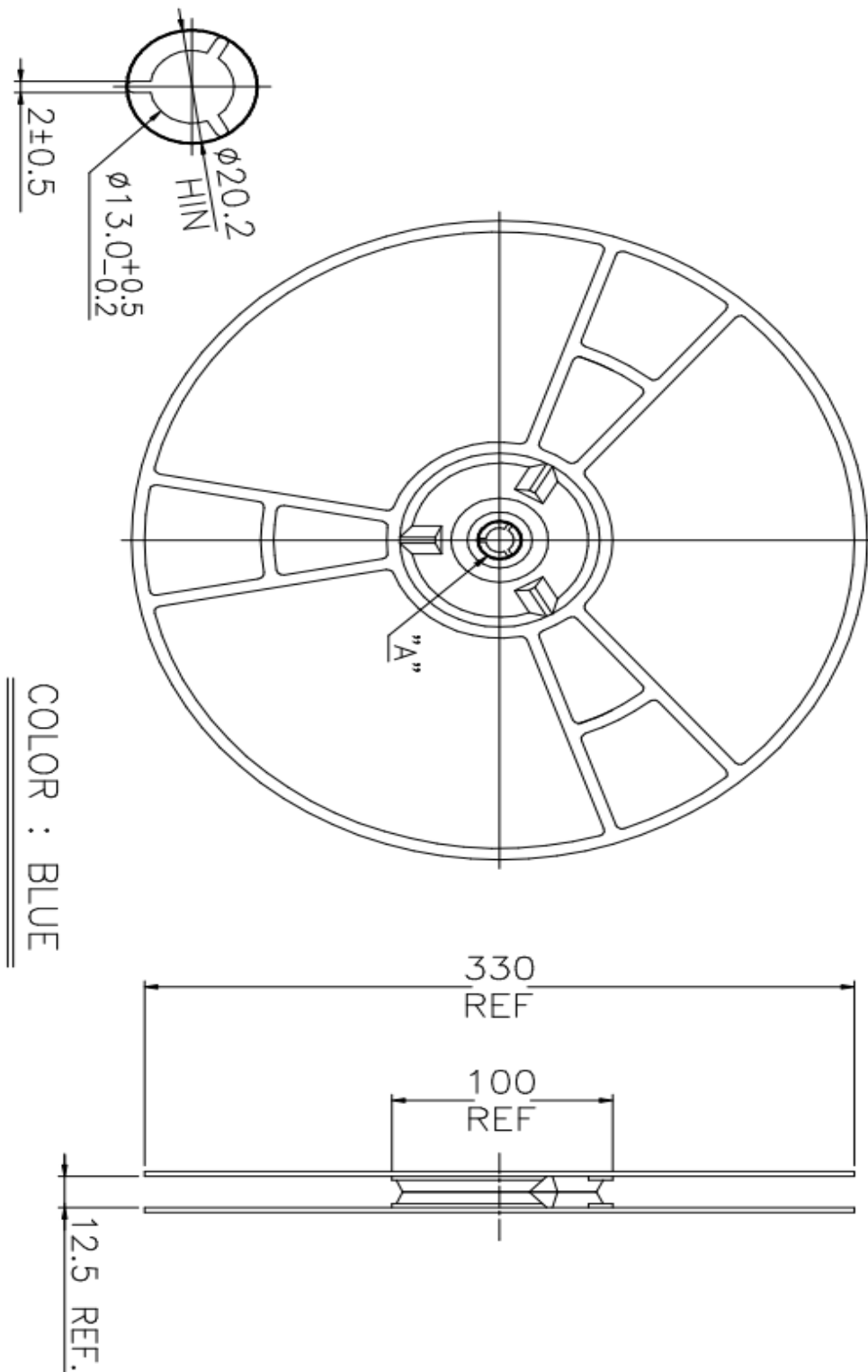


Figure 46.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Tape Dimensions

### 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 0.5mm 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.

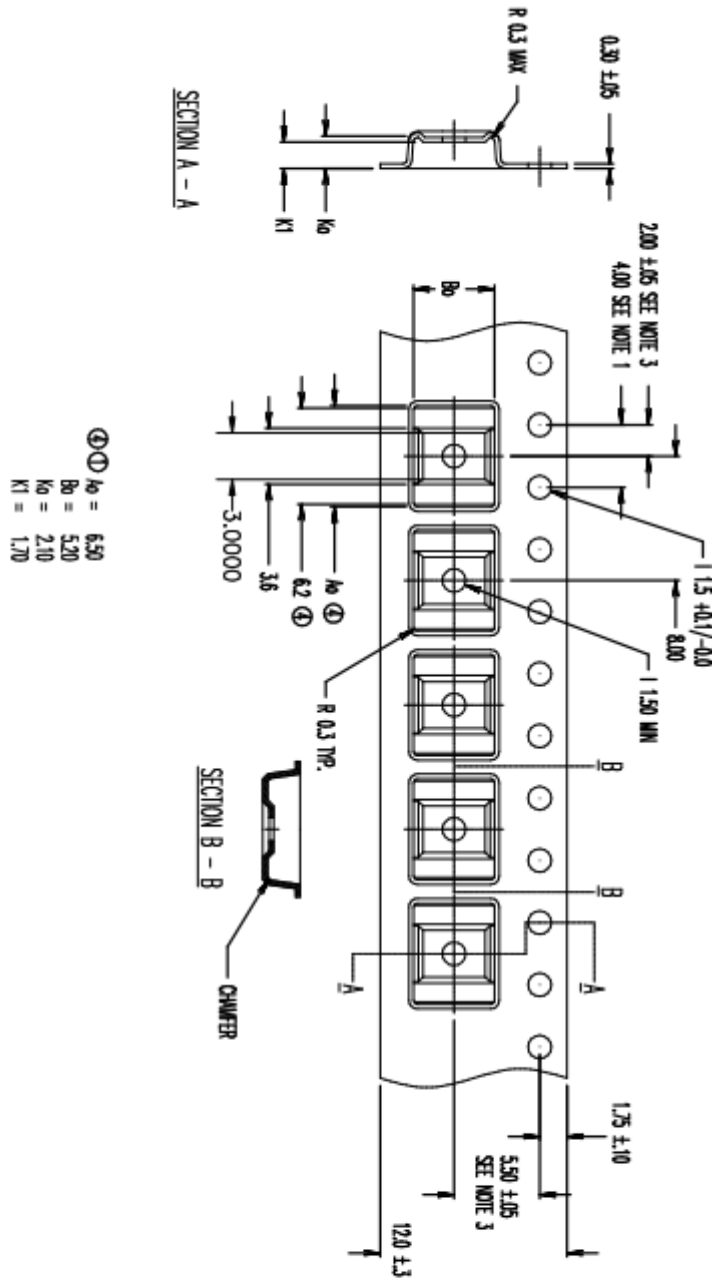
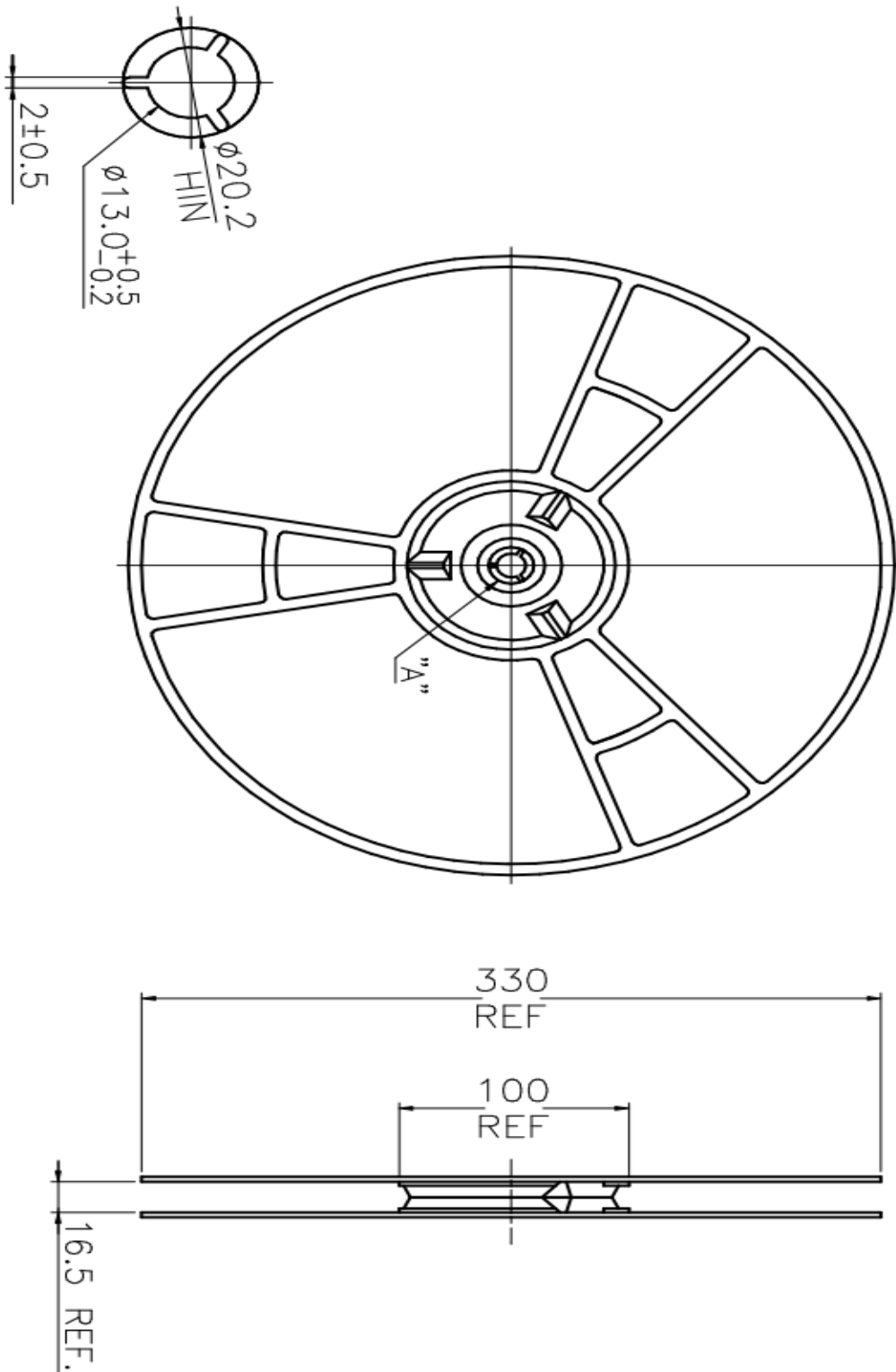


Figure 48.1 FT201XQ, FT220XQ, FT230XQ SSOP Tape Dimensions



### 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  $\pm 0.2$
  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.

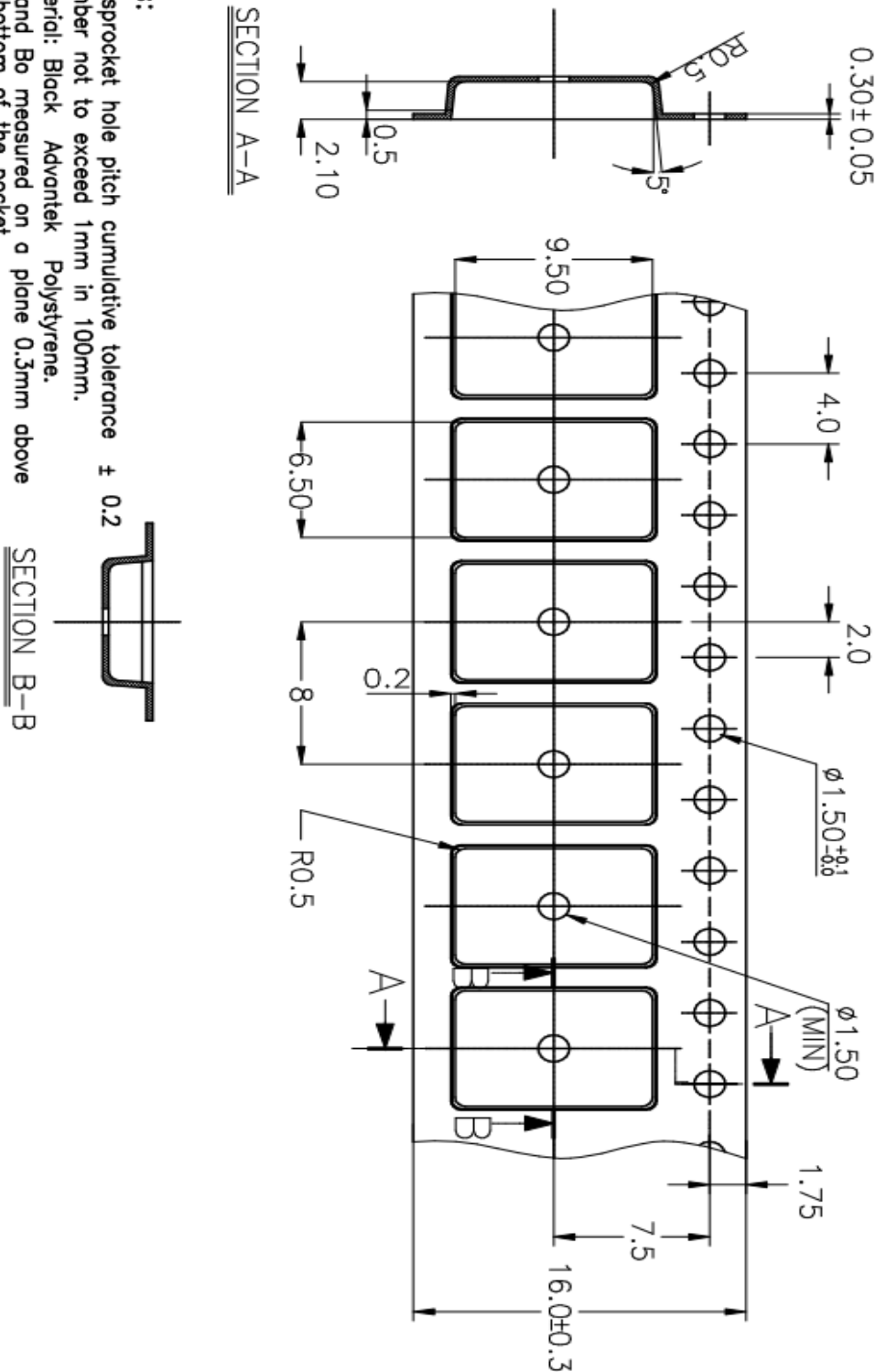


Figure 50.1 FT221XQ, FT231XQ, FT240XQ SSOP Tape Dimensions

## 51 FT120T, FT122T TSSOP Reel Dimensions

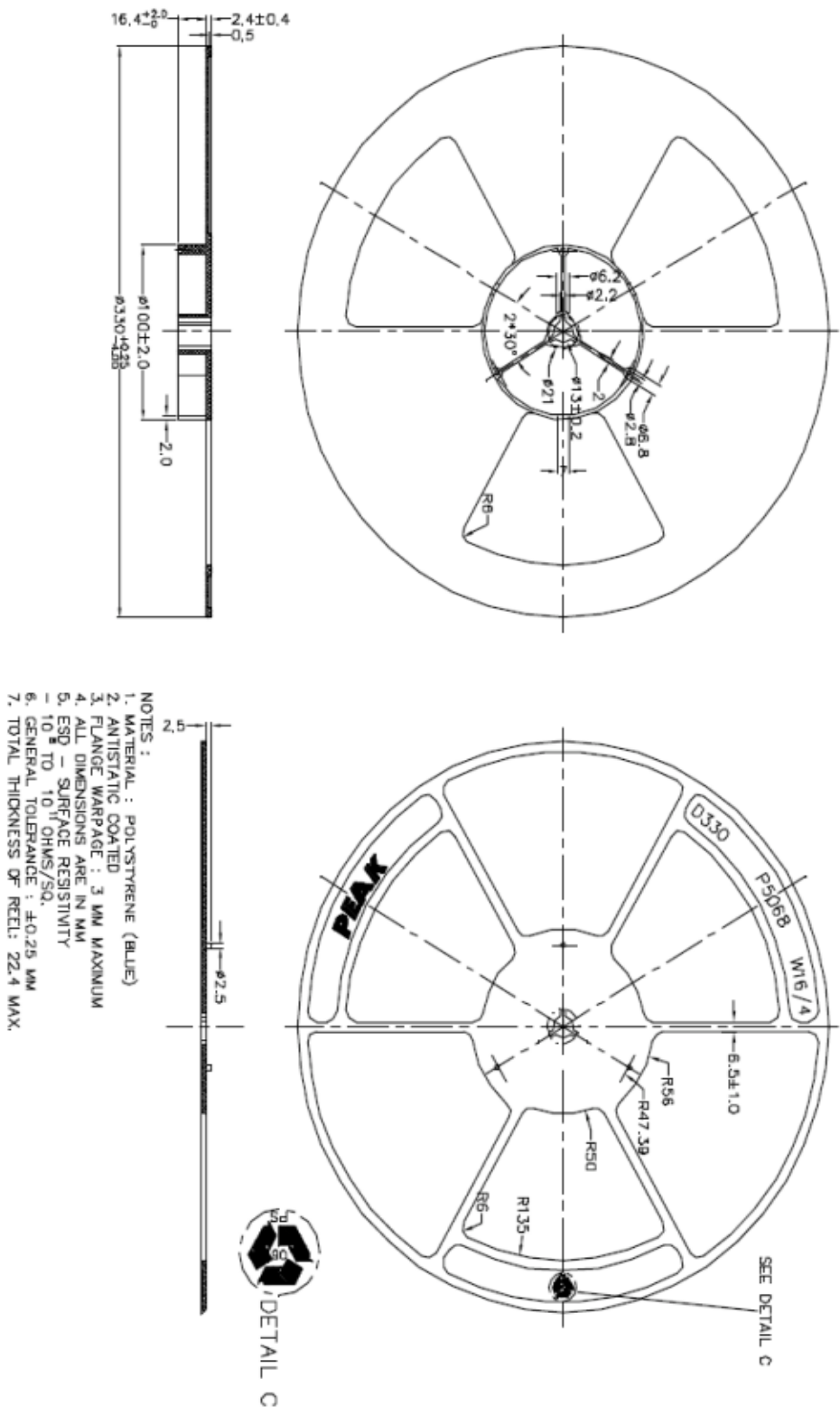
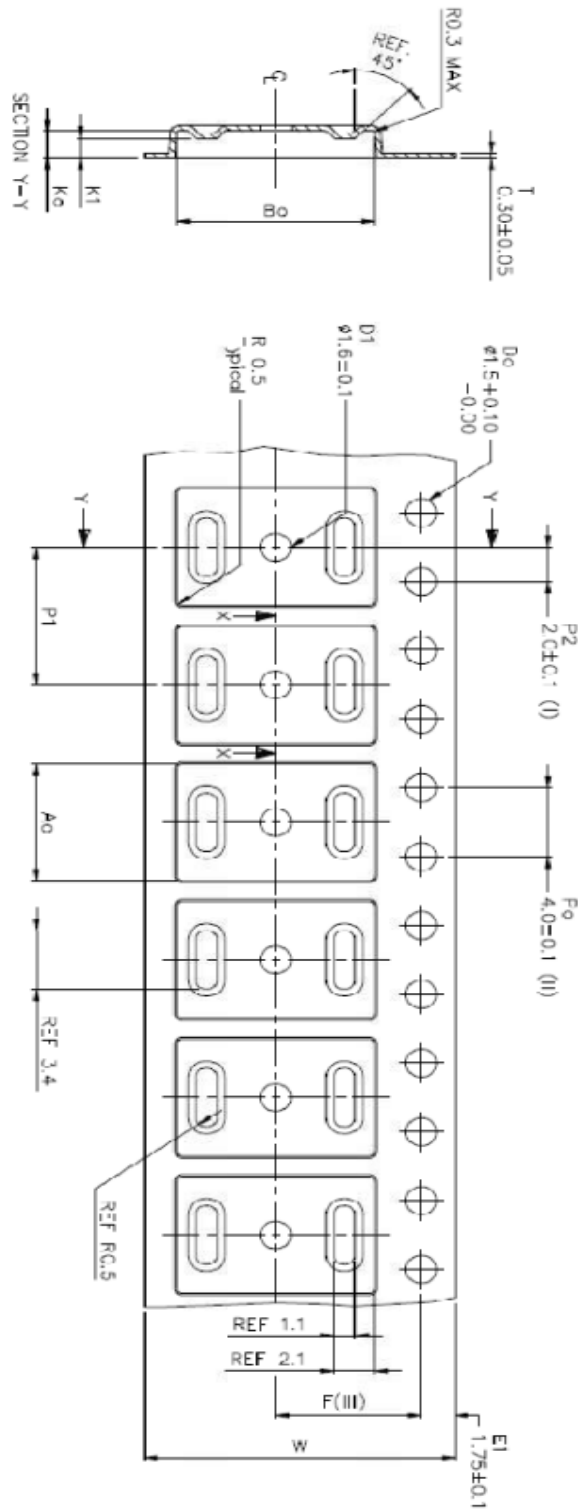


Figure 51.1 FT120T, FT122T TSSOP Reel Dimensions

## 52 FT120T, FT122T TSSOP Tape Dimensions

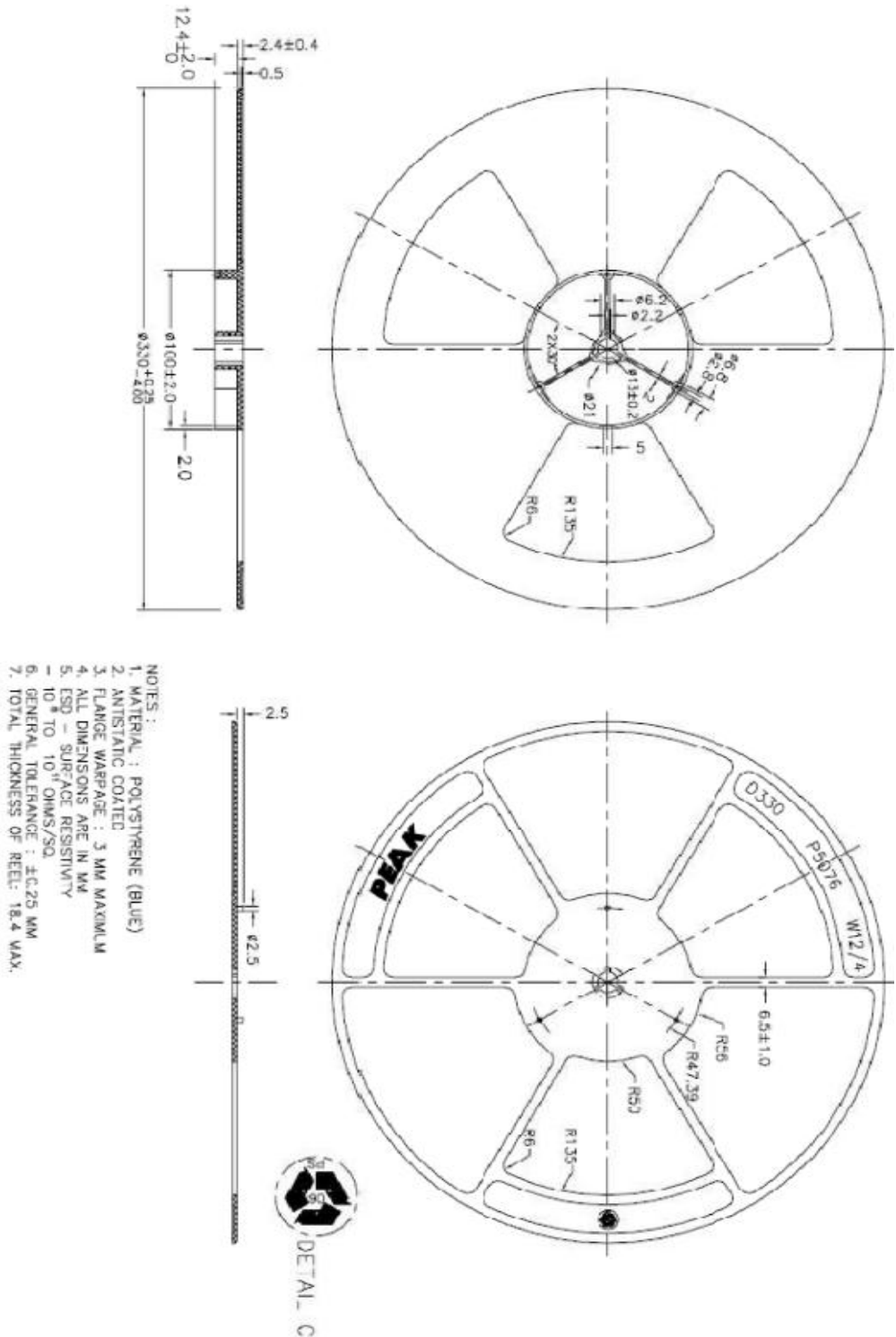
A <sub>0</sub>	6.80 +/−0.1
B <sub>0</sub>	10.20 +/−0.1
K <sub>0</sub>	1.60 +/−0.1
K <sub>1</sub>	1.20 +/−0.1
F	7.50 +/−0.1
P <sub>1</sub>	8.00 +/−0.1
W	16.00 ± 0.3



SECTION X-X

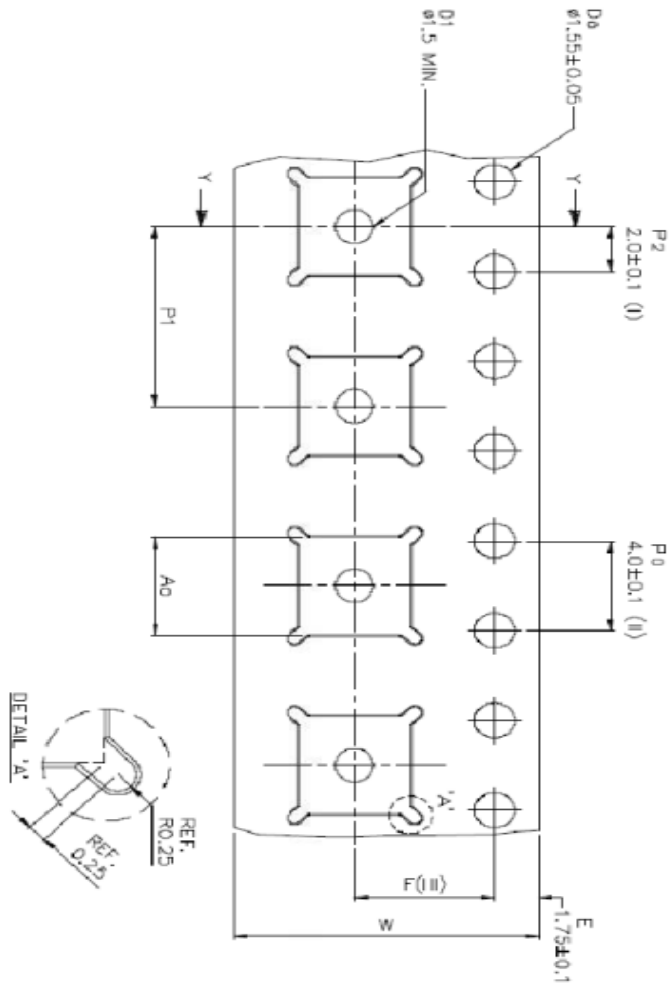
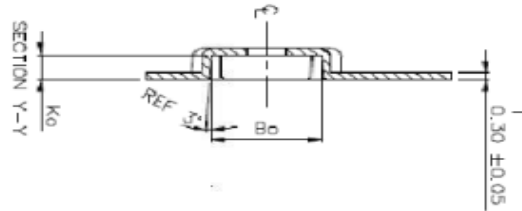
- ( ) Measured from centreline of sprocket hole to centreline of pocket.
  - (I) Cumulative tolerance of 10 sprocket holes is ± 0.20.
  - (II) Measured from centreline of sprocket hole to centreline of pocket.
  - (V) Other metric available.
  - (V) Typical SR of form tape Max 10<sup>9</sup> QHM/SQ
- ALL DIMENSIONS IN MILLIMETRES 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

A0	4.35 +/- 0.1
B0	4.35 +/- 0.1
K0	1.10 +/- 0.1
F	5.50 +/- 0.1
P1	8.00 +/- 0.1
W	12.00 +/- 0.3

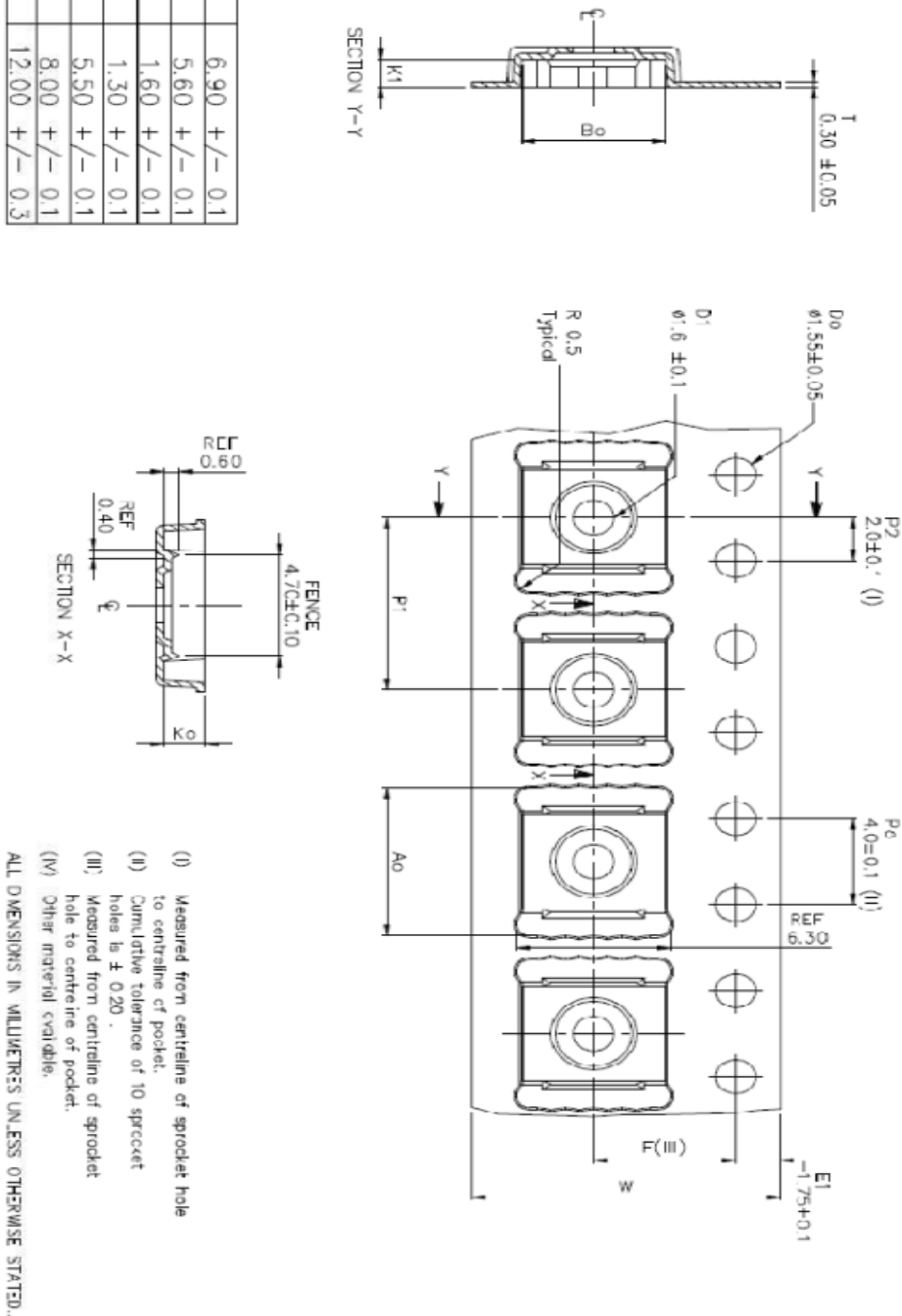


- (i) Measured from centreline of sprocket hole to centreline of pocket.
  - (ii) Cumulative tolerance of 10 sprocket holes is ± 0.20.
  - (iii) Measured from centreline of sprocket hole to centreline of pocket.
  - (iv) Other material available.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Figure 54.1 FT120Q, FT122Q QFN Tape Dimensions

## 55 FT121T TSSOP Tape Dimensions

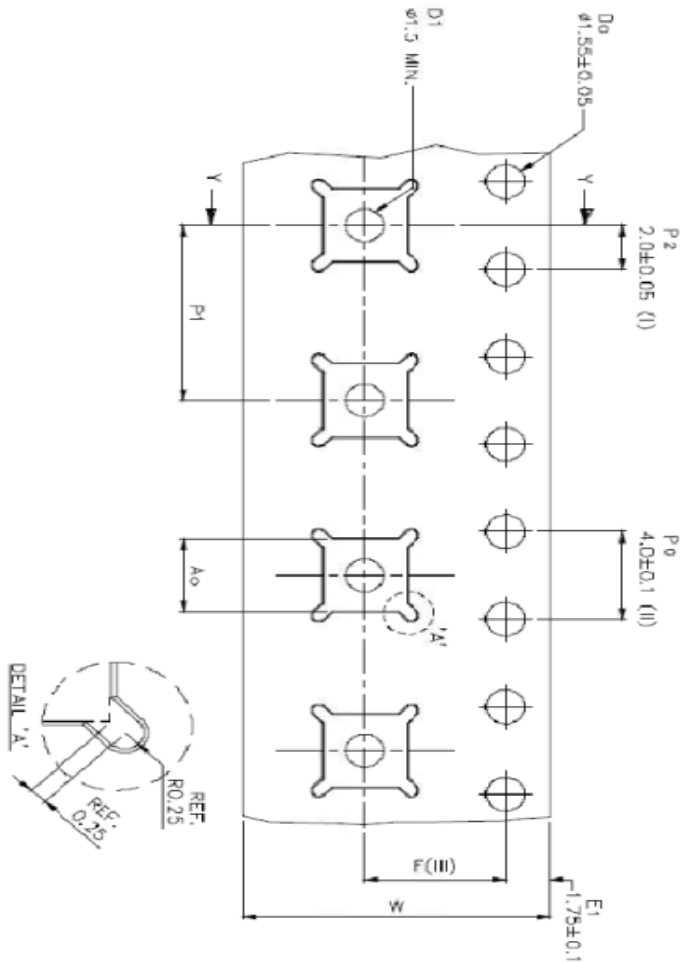
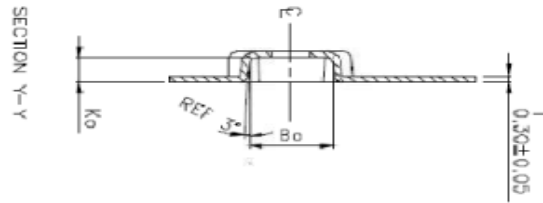
A <sub>0</sub>	6.90	+/- 0.1
B <sub>0</sub>	5.60	+/- 0.1
K <sub>C</sub>	1.60	+/- 0.1
K <sub>1</sub>	1.30	+/- 0.1
F	5.50	+/- 0.1
F <sub>1</sub>	8.00	+/- 0.1
W	12.00	+/- 0.3



**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



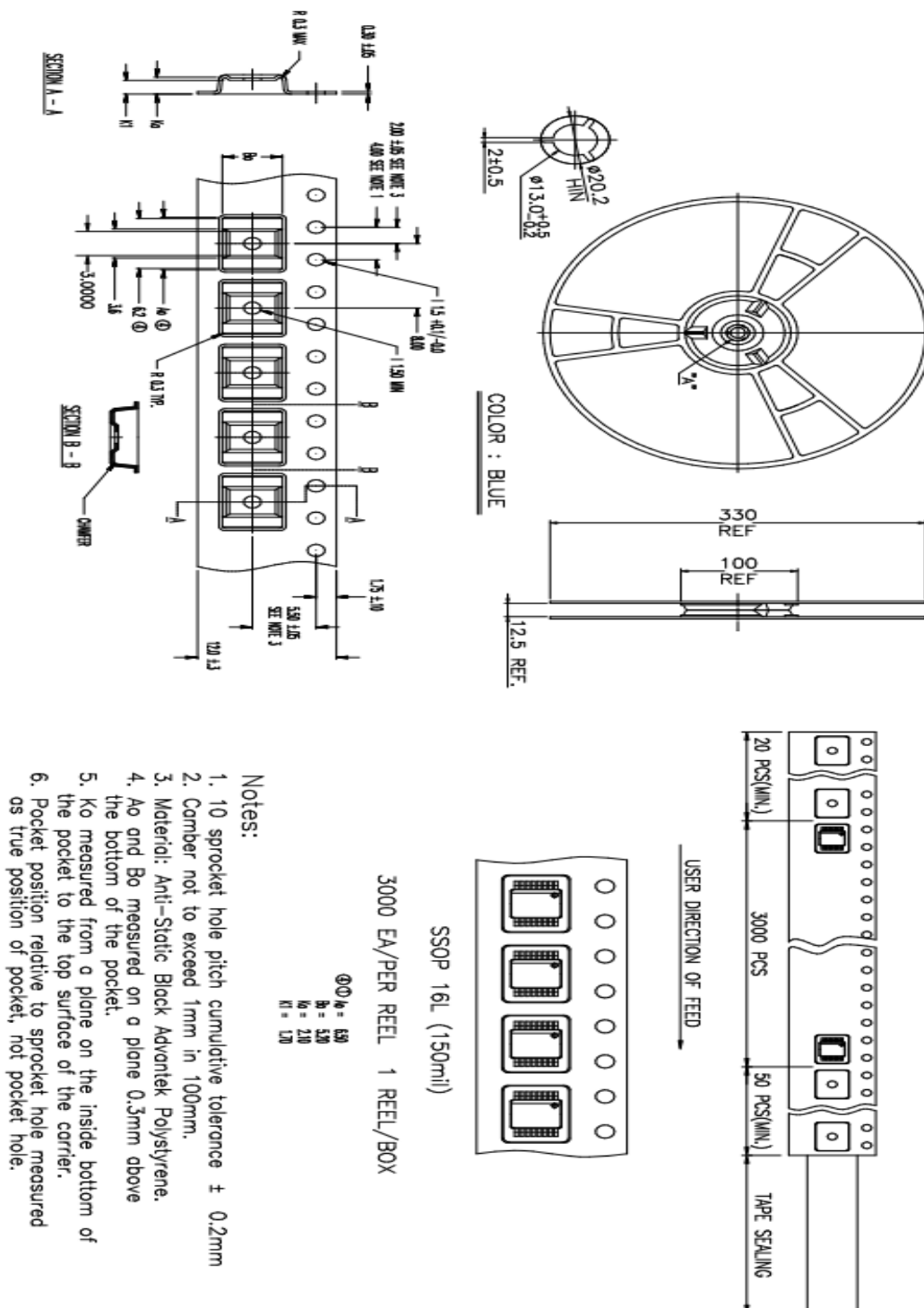
- (I) Measured from centreline of sprocket hole to centreline of pocket.
- (II) Cumulative tolerance of 10 sprocket holes is  $\pm 0.20$ .
- (III) Measured from centreline of sprocket hole to centreline of pocket.
- (IV) Other material available.

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

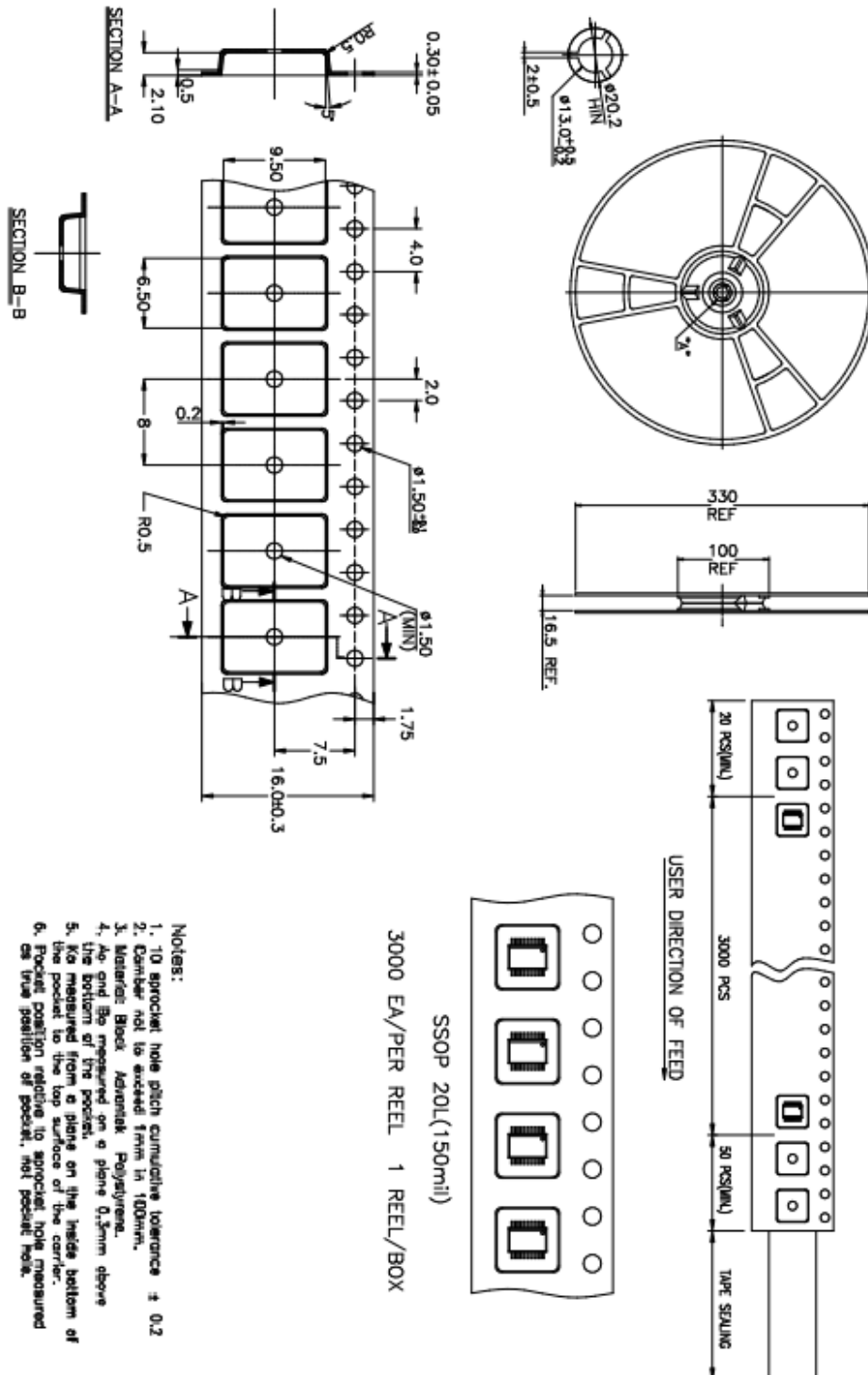
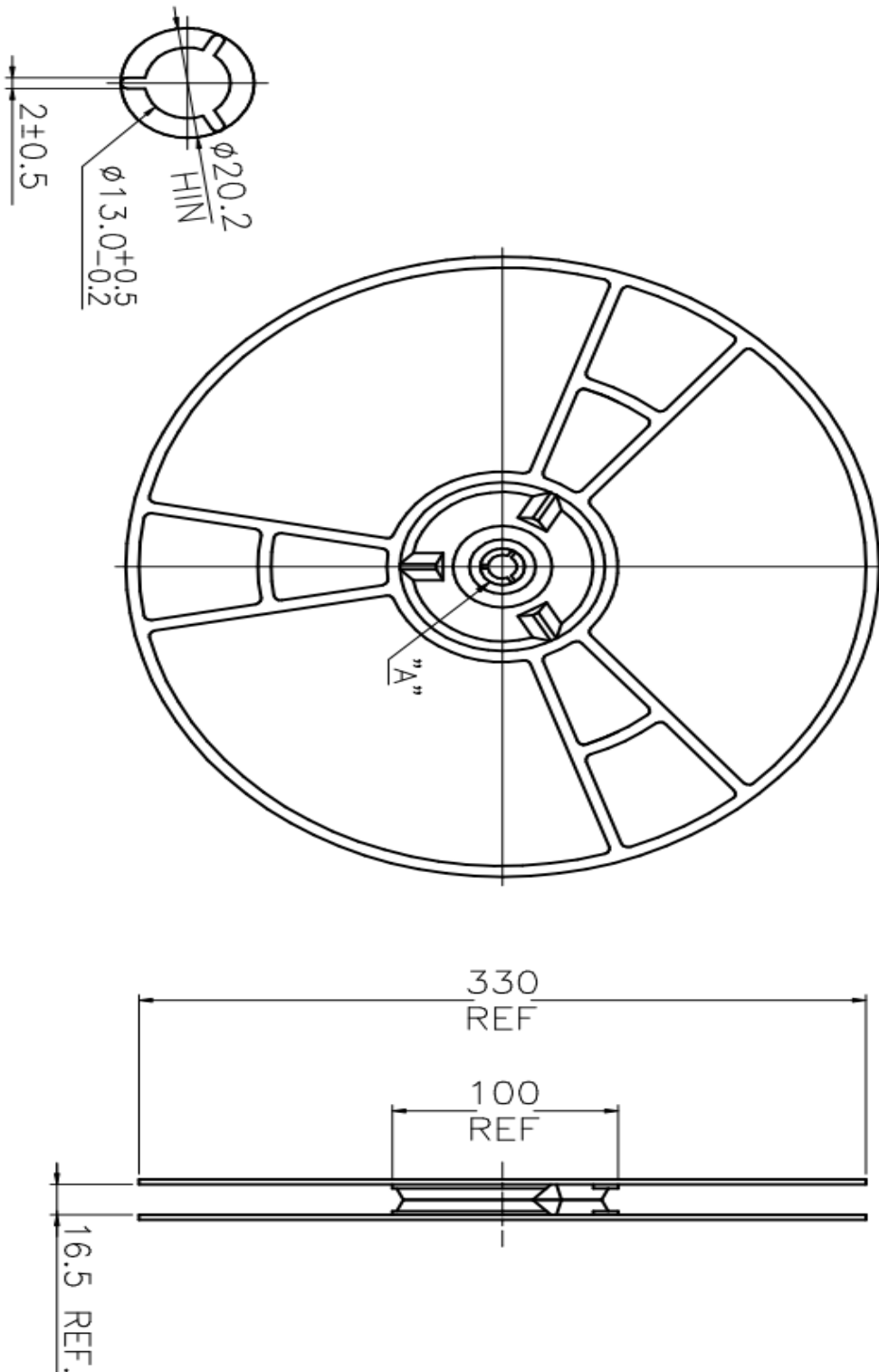


Figure 58.1 FT221XS, FT231XS Reel Dimensions

### 59 FT313H-QFN Reel Dimensions



**Figure 59.1 FT313H-QFN Reel Dimensions**

## 60 FT313H-QFN Tape Dimensions

- Notes:
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
  2. Carrier not to exceed 1mm in 100mm.
  3. Material: Block 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.

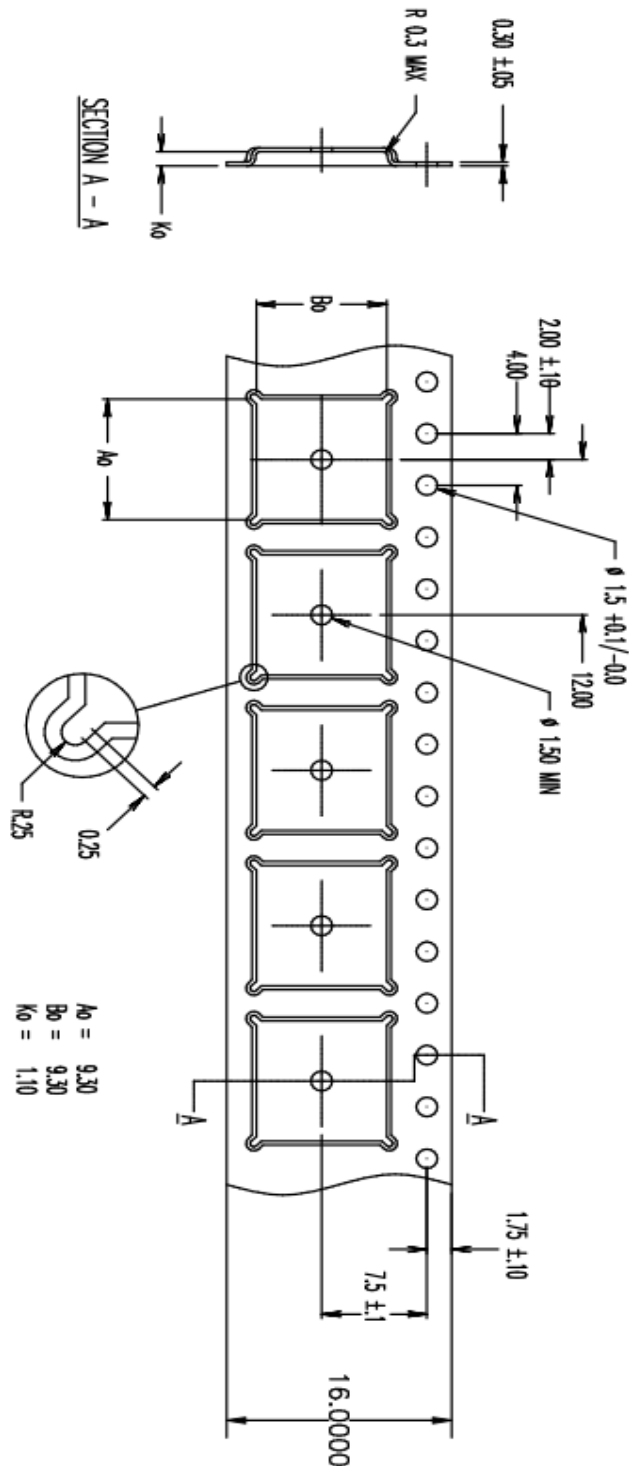
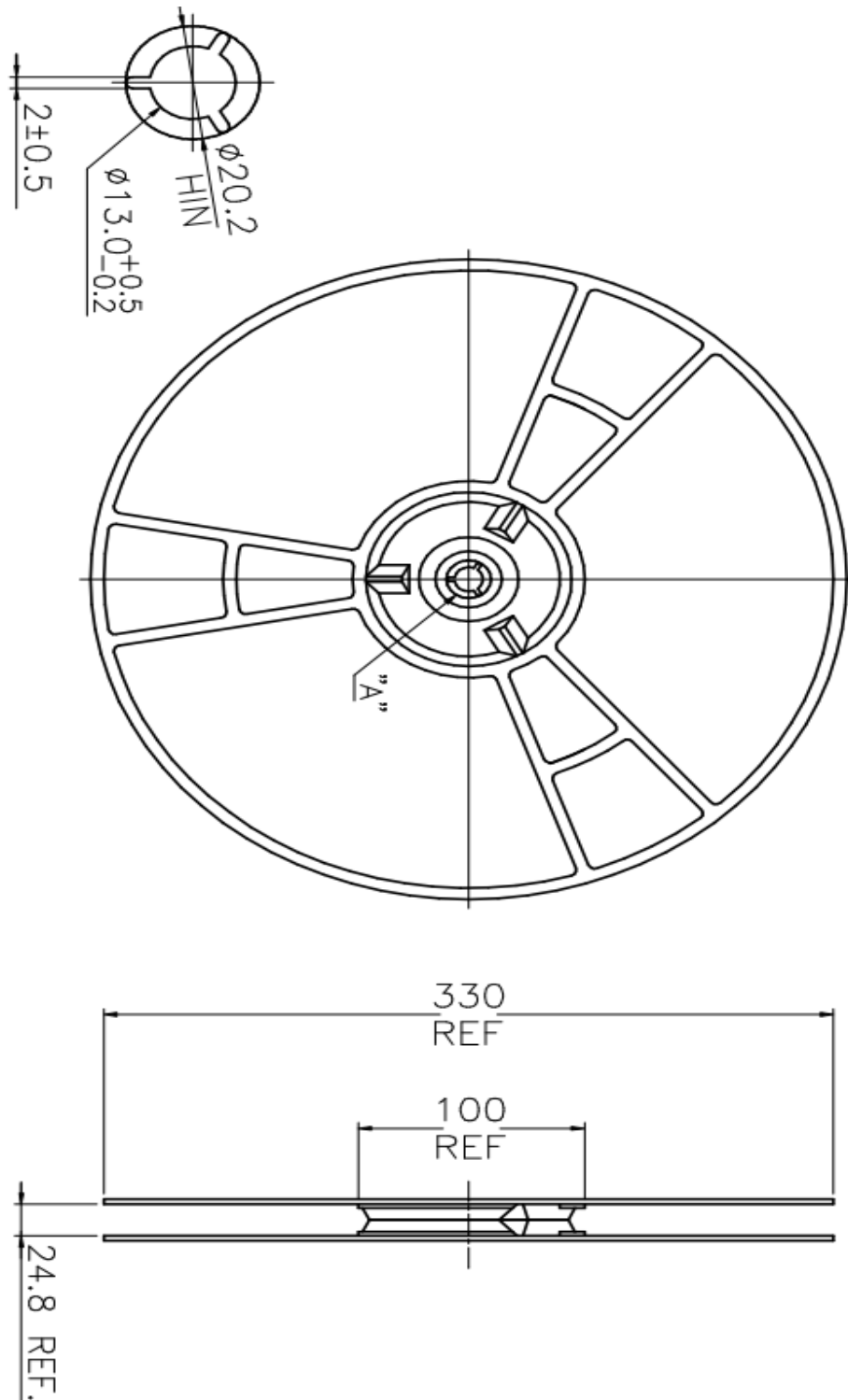


Figure 60.1 FT313H-QFN Tape Dimensions

### 61 FT313H-LQFP Reel Dimensions



**Figure 61.1 FT313H-LQFP Reel Dimensions**

## 62 FT313H-LQFP Tape Dimensions

- NOTES:
1. TO SPROCKET HOLE PITCH CUMULATIVE TOLERANCE  $\pm 0.2$
  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 : 21.340.1

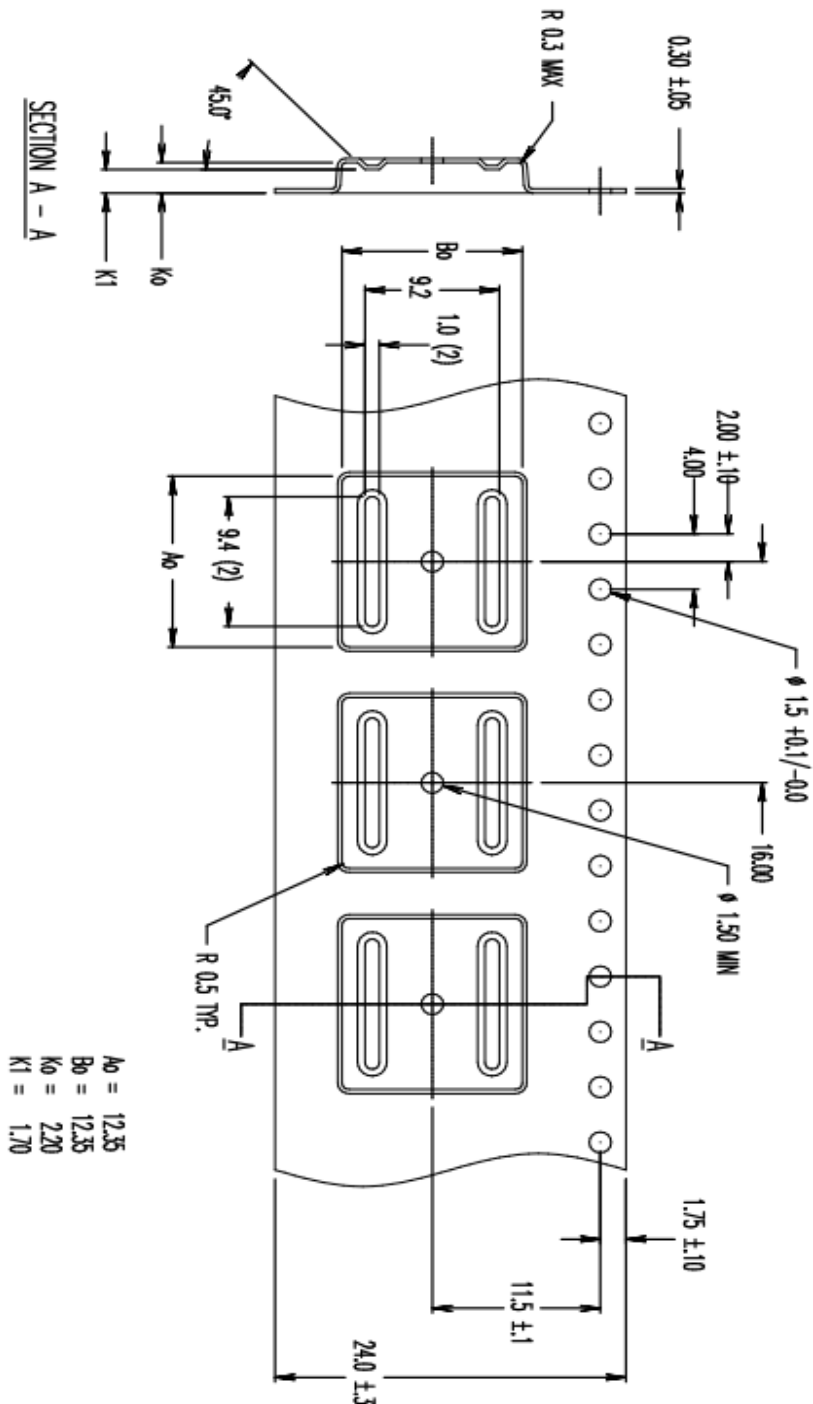
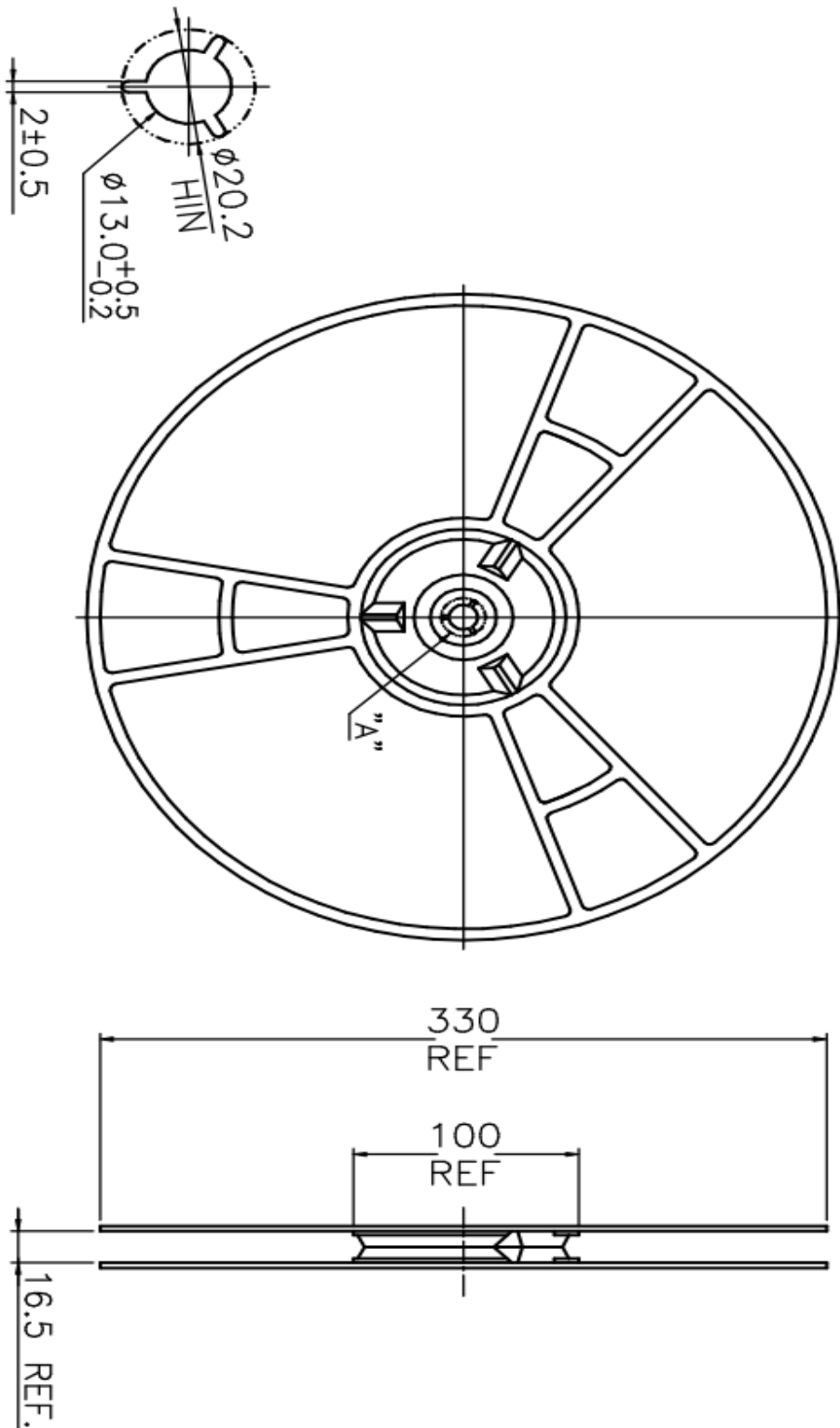


Figure 62.1 FT313H-LQFP Tape Dimensions

### 63 FT313H-TQFP Reel Dimensions



**Figure 63.1 FT313H-TQFP Reel Dimensions**

## 64 FT313H-TQFP Tape Dimensions

- NOTES:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE  $\pm 0.2$
  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 :  $13.3 \pm 0.1$

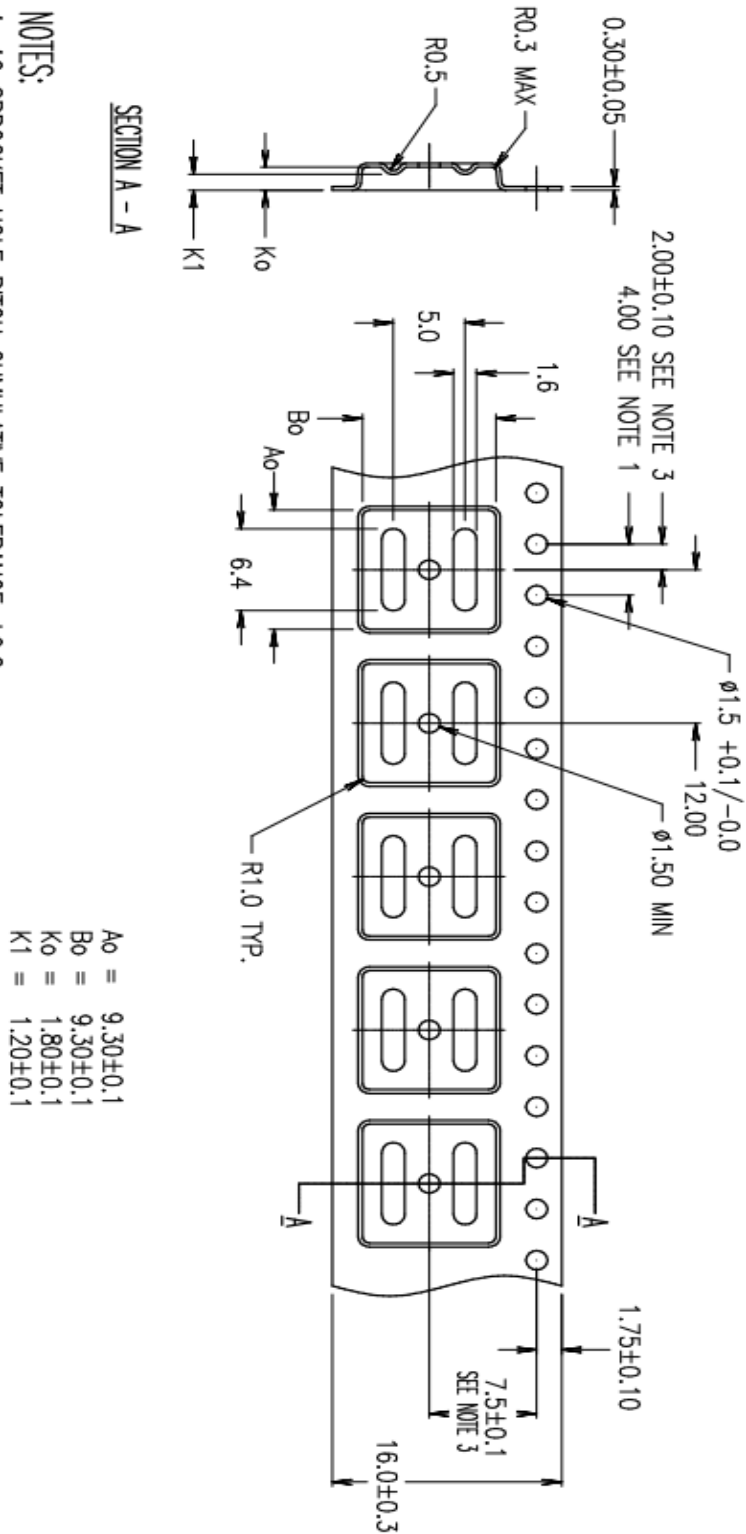


Figure 64.1 FT313H-TQFP Tape Dimensions



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## Appendix B – Revision History

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<b>Version 1.0</b>	First Release – based on and supersedes AN232B-11	11/08/09
<b>Version 1.1</b>	Added the VNC2 tray and T&R dimensions drawings	24/05/10
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