

**Description**

EST.7610F is higher integrated circuit incorporates a advanced sensing function to protect from over and unde voltage a three-channels protection supervisor (3.3V/5V/ an 12V).

EST.7610F provide the fault protection latch (FPOB), a powe good output (PGO), the PSONB control and the power goo input control (PGI).

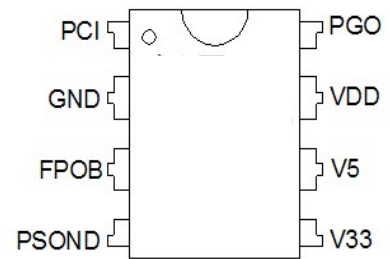
**Features**

- The Over/Under Voltage Protection for 3.3V/5V and 12V
- Both of fault protection output and power good output are open drain output stage
- 75mS delay for SPS short circuit protect
- 2mS PSONB input signal de-bounce
- 25uS for OVP noise immunity de-bounce.
- 73uS for internal noise immunity de-bounce
- 125mS power good delay time for PGO
- 4mS time delay between PGO and FPOB when

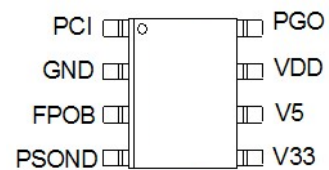
**Application**

- PC SPS line housekeeping IC (3.3V, 5V, and 12V)
- Industry Computer
- Mining Pool Power

**Pin Assignments**



**DIP-8L**

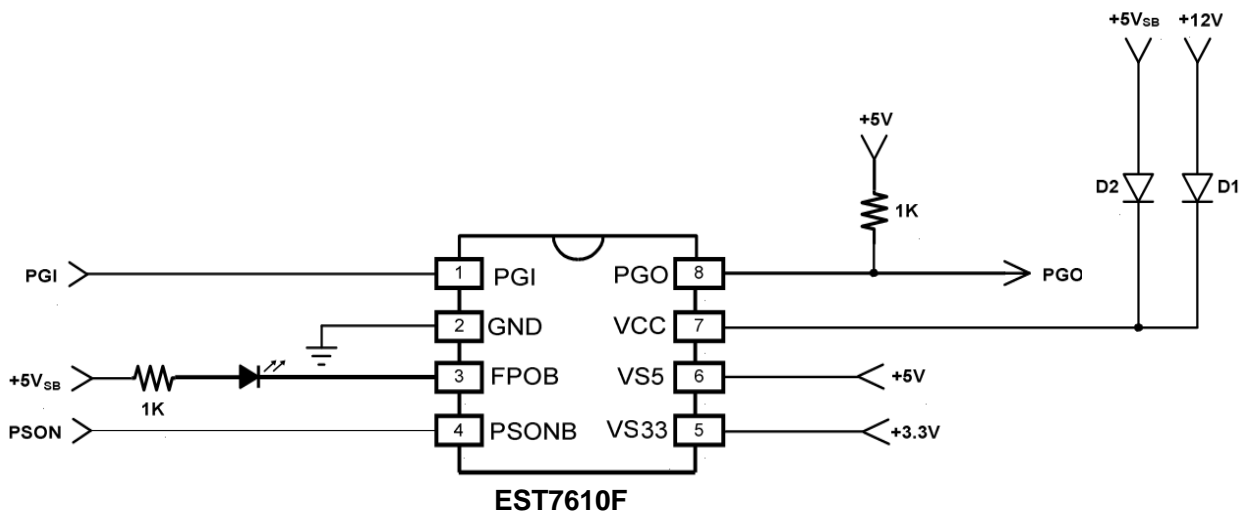


**SOP-8L**

**Ordering Information**

Order Number	Package Type	Packing	Top Marking
EST7610F	DIP-8 (RoHS)	Tube	EST.7610F
EST7610FS	SOP-8 (RoHS)	Tube	EST.7610FS
EST7610FSR	SOP-8 (RoHS)	Tape & Reel	EST.7610FS

**Typical Application Circuit**



### Pin Description

Pin	Symbol	Function
1	PGI	AC power good input pin.
2	GND	Power supply ground.
3	FPOB	Open drain output of the fault protection.
4	PSONB	Remote ON/OFF control input pin.
5	VS33	3.3V input pin for OVP and UVP.
6	VS5	5.0V input pin for OVP and UVP.
7	VCC	Power supply. 12V input pin for OVP.
8	PGO	Open drain output of power good signal.

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Remark
Storage Temperature (Tstg)	---	-40 to 140	°C	
Operating Temperature (Topr)	---	-25 to 85	°C	
Junction Temperature (Tj)	---	150	°C	
Supply Voltage (VCC)	VCC	-0.5 to 18		
Output Voltage Range (VO)	VS5, VS33	-0.5 to 8	V	
	PGI	-0.5 to 8		
	PSONB,	-0.5 to 8		
Output Voltage Range (VO)	FPOB	-0.5 to 16	V	
	PGO	-0.5 to 8		
	RI	-0.5 to 8		
Junction-to-Ambient Thermal Resistance*	$\theta_{JA}$	180	°C/W	SOP-8
Junction-to-Case Thermal Resistance**	$\theta_{JC}$	39	°C/W	
Junction-to-Ambient Thermal Resistance*	$\theta_{JA}$	110	°C/W	DIP-8
Junction-to-Case Thermal Resistance**	$\theta_{JC}$	30	°C/W	
Power Dissipation (@TA<50°C)	PD	420	mW	SOP-8
		680	mW	DIP-8

Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### DC Electrical Characteristics (VCC =12V, Ta=25)

#### Input Power Supply:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VCC	3.6	12	16	V	
Supply Current	Icc			1.0	mA	VPSON = 0V
Reset Threshold Voltage	VIH	2.8	3.0	3.2	V	HIGH→LOW *1

\*1 Hysteresis voltage included

#### Over-Voltage function:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Over-Voltage Threshold	OVT <sub>VS33</sub>	3.70	3.80	3.90	V	
	OVT <sub>VS5</sub>	5.70	5.55	6.00	V	
	OVT <sub>VS12</sub>	12.80	13.20	13.60	V	For VCC

#### Under-Voltage function:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Under-Voltage Threshold	UVT <sub>VS33</sub>	2.55	2.69	2.83	V	
	UVT <sub>VS5</sub>	4.10	4.30	4.47	V	
	UVT <sub>VS12</sub>	8.80	9.20	9.60	V	For VCC

**PSONB, Analog Input function:**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Threshold Voltage		1.80			V	LOW→HIGH
Threshold Voltage				1.0	V	HIGH→LOW

**PGI, Analog Input:**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Threshold Voltage of PGI		0.60	0.65	0.70	V	Enable UVP
		1.16	1.2	1.24	V	Enable PGO
		1.16	1.2	1.24	V	PGO/UVP Disable

**FPOB, Open Drain Output:**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Leakage Current	I <sub>leak</sub>			+/- 5	uA	VFPOB=5V
Low Level Output Voltage	V <sub>OL</sub>			0.3	V	ISINK=10mA

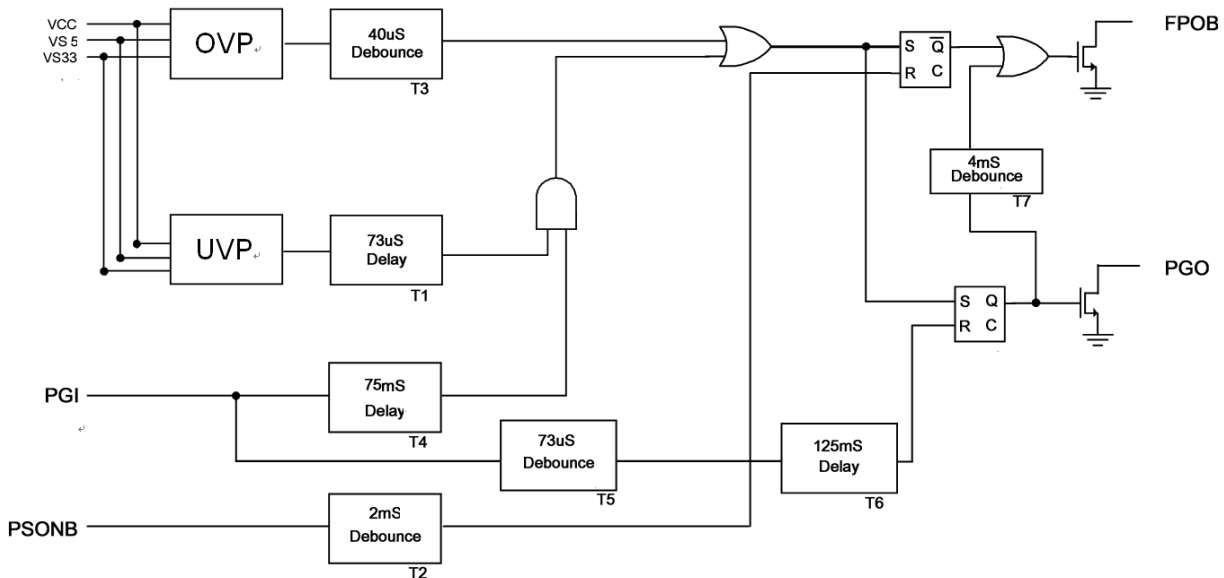
**PGO, Open Drain Output:**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Leakage Current	I <sub>leak</sub>			+/- 5	uA	V <sub>PGO</sub> =5V
Low Level Output Voltage	V <sub>OL</sub>			0.3	V	ISINK=10mA

**AC Electrical Characteristics (V<sub>cc</sub>=12V, T<sub>a</sub>=25°C)**

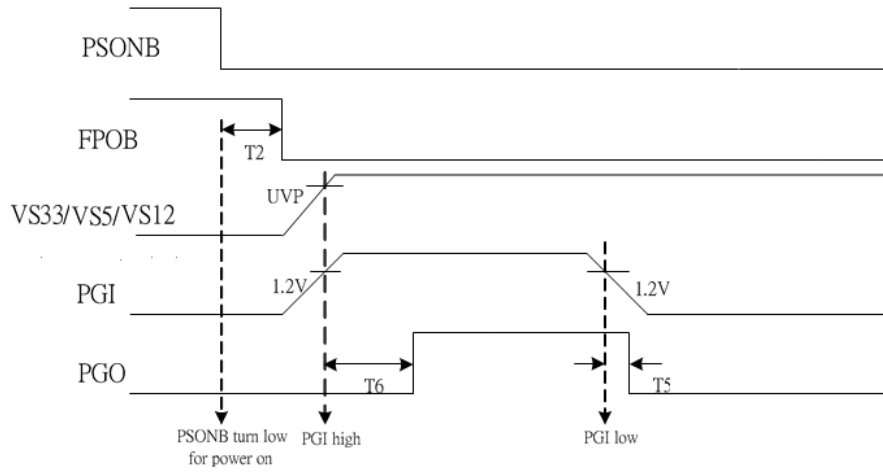
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Under voltage protection delay time	T1	47	73	100	uS	
PSON De-bounce time	T2	1	2	3	mS	
Over voltage protection delay time	T3	30	40	50	uS	
PGI OC/UV mask time	T4	47	75	100	mS	PGI > 0.65V (TYP)
PGO De-bounce time	T5	47	73	100	uS	
PGI to PGO delay time	T6	110	125	140	mS	
PGO to FPOB delay time	T7	2	4	6	mS	

**Block Diagram**

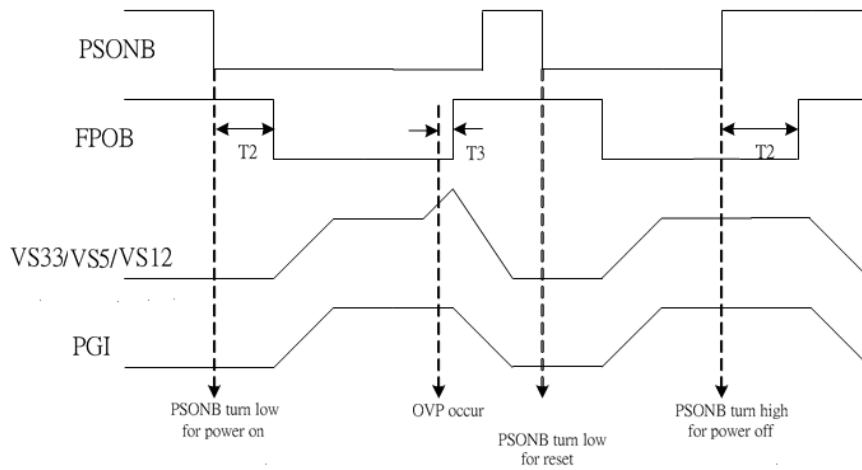


Time Chart

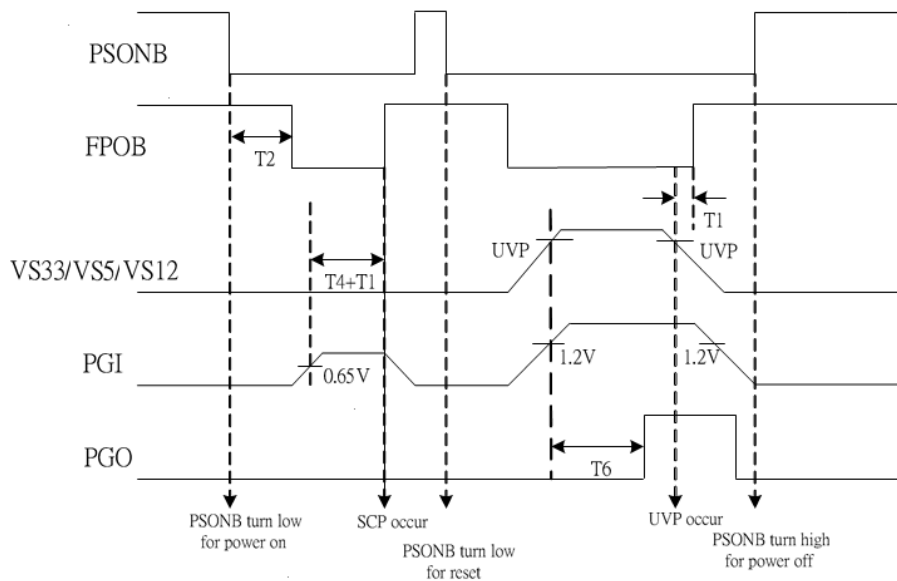
PGI Timing



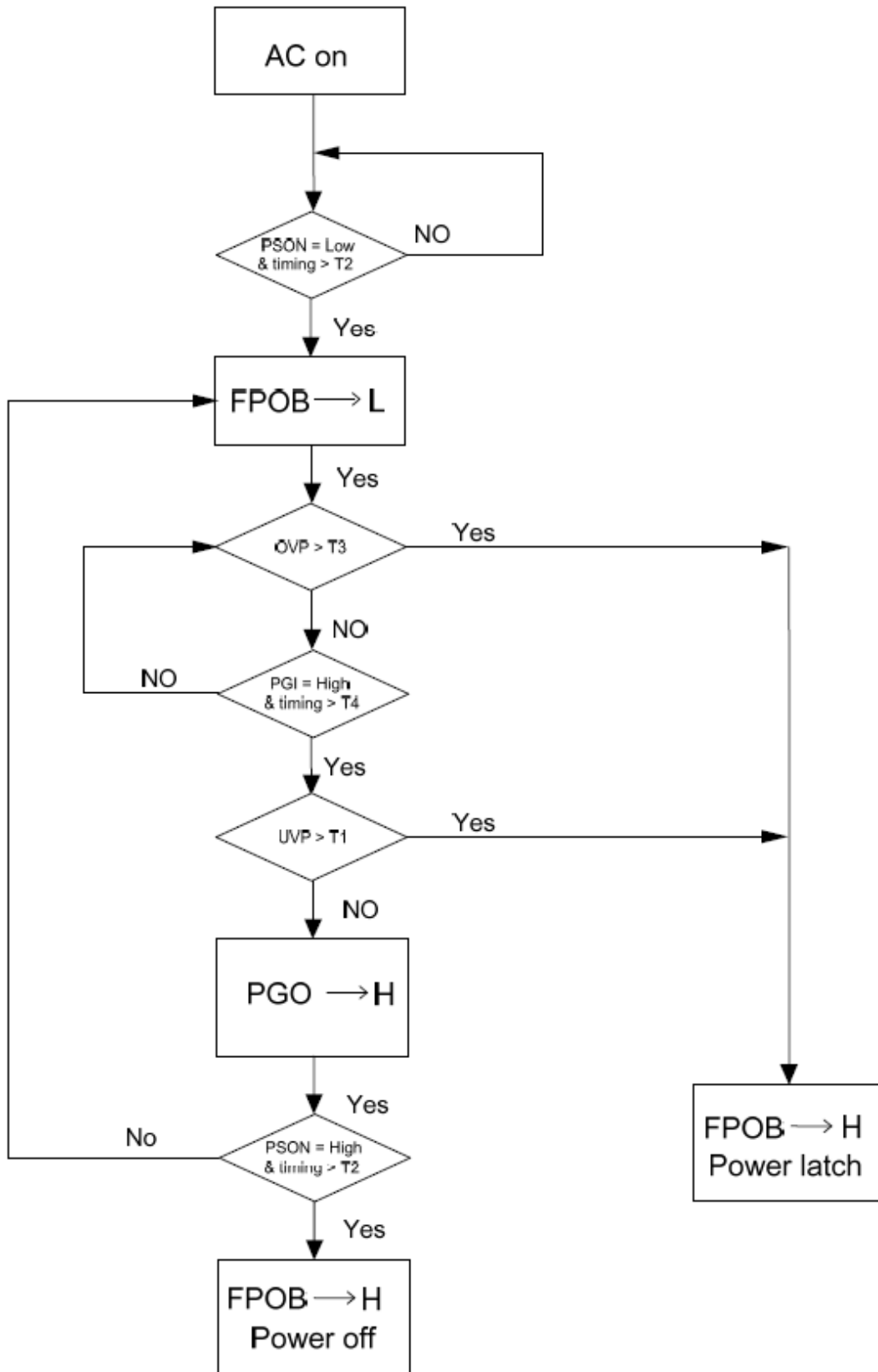
OVP Timing



SCP & UVP Timing

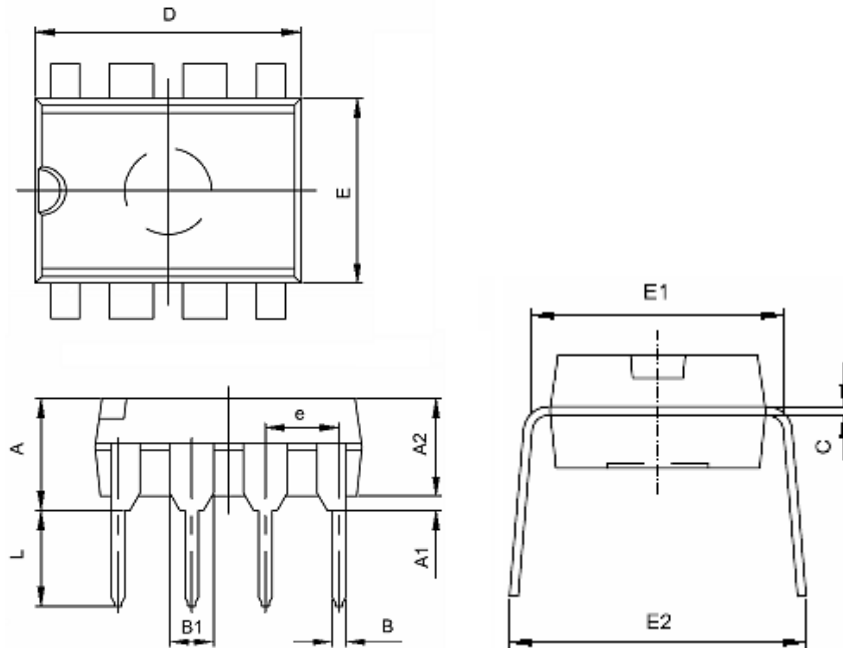


Flow Chart



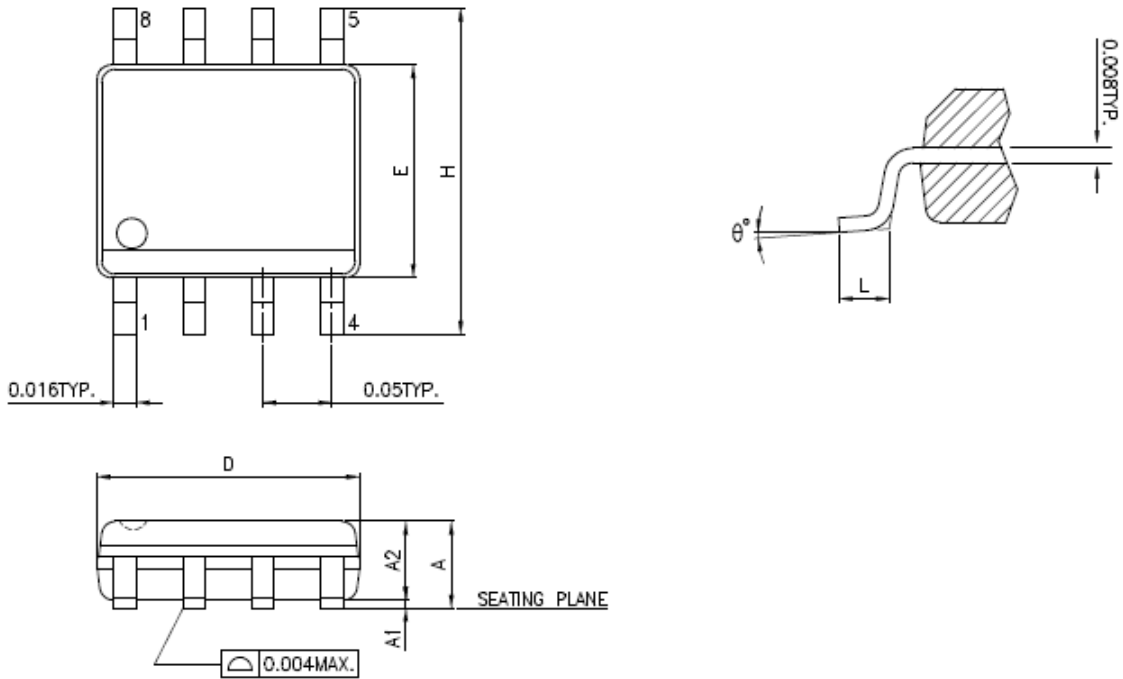
**PACKAGING INFORMATION**

**DIP-8 Package**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.360	0.560	0.014	0.022
B1	1.524(TYP)		0.060(TYP)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.620(TYP)		0.300(TYP)	
e	2.540(TYP)		0.100(TYP)	
L	3.000	3.600	0.118	0.142
E2	8.200	9.400	0.323	0.370

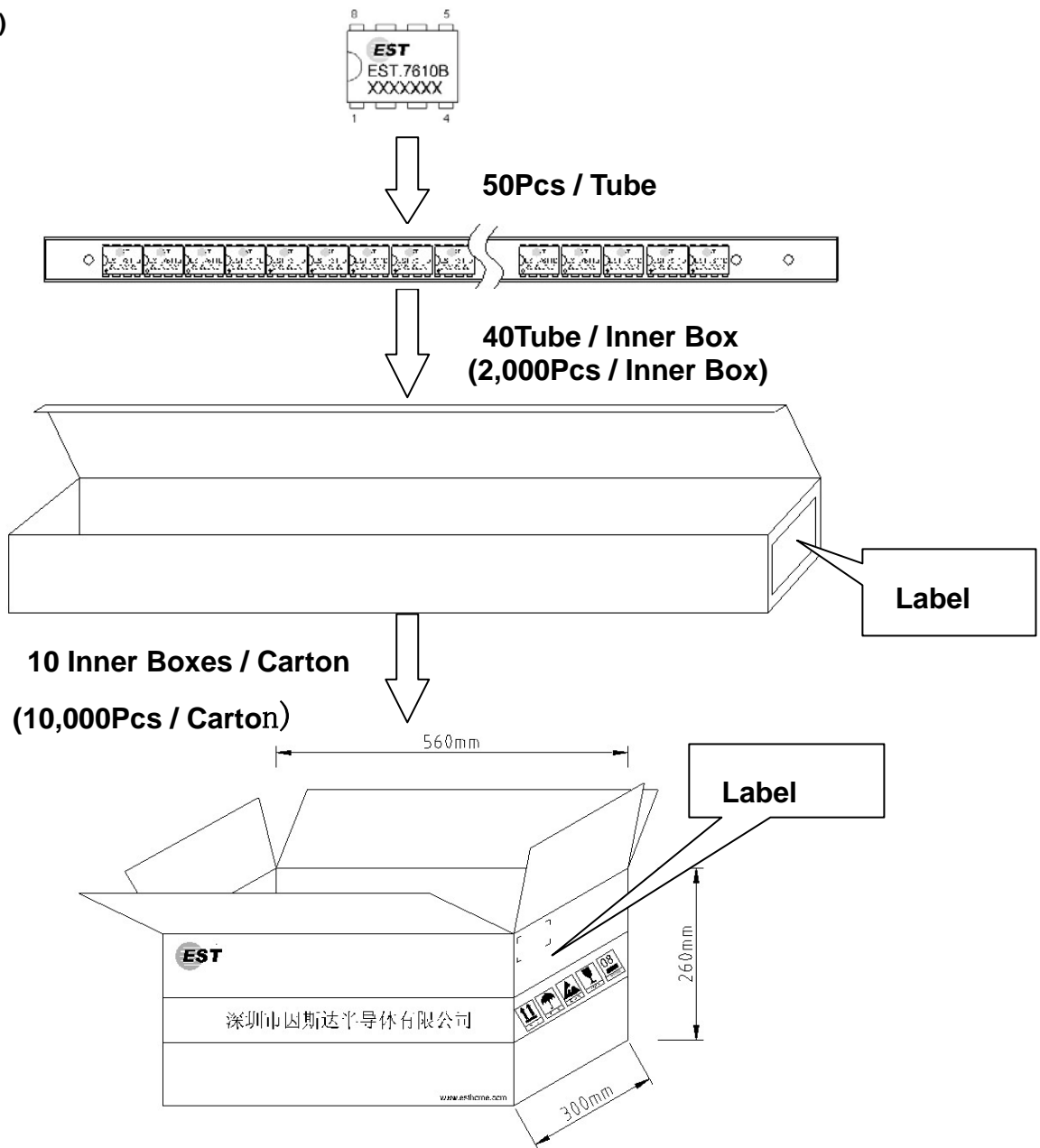
SOP-8 Package (mm)



Symbols	Dimensions In Inches			Dimensions In millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	0.050	0.061	0.072	1.270	1.549	1.829
A1	0.000	-----	0.010	0.000	-----	0.254
A2	-----	-----	0.062	-----	-----	1.575
D	0.185	0.193	0.200	4.699	4.902	5.080
E	0.147	0.154	0.160	3.734	3.912	4.064
H	0.225	0.237	0.249	5.715	6.020	6.325
L	0.013	0.033	0.053	0.330	0.838	1.346
$\theta$	0°	4°	8°	0°	4°	8°

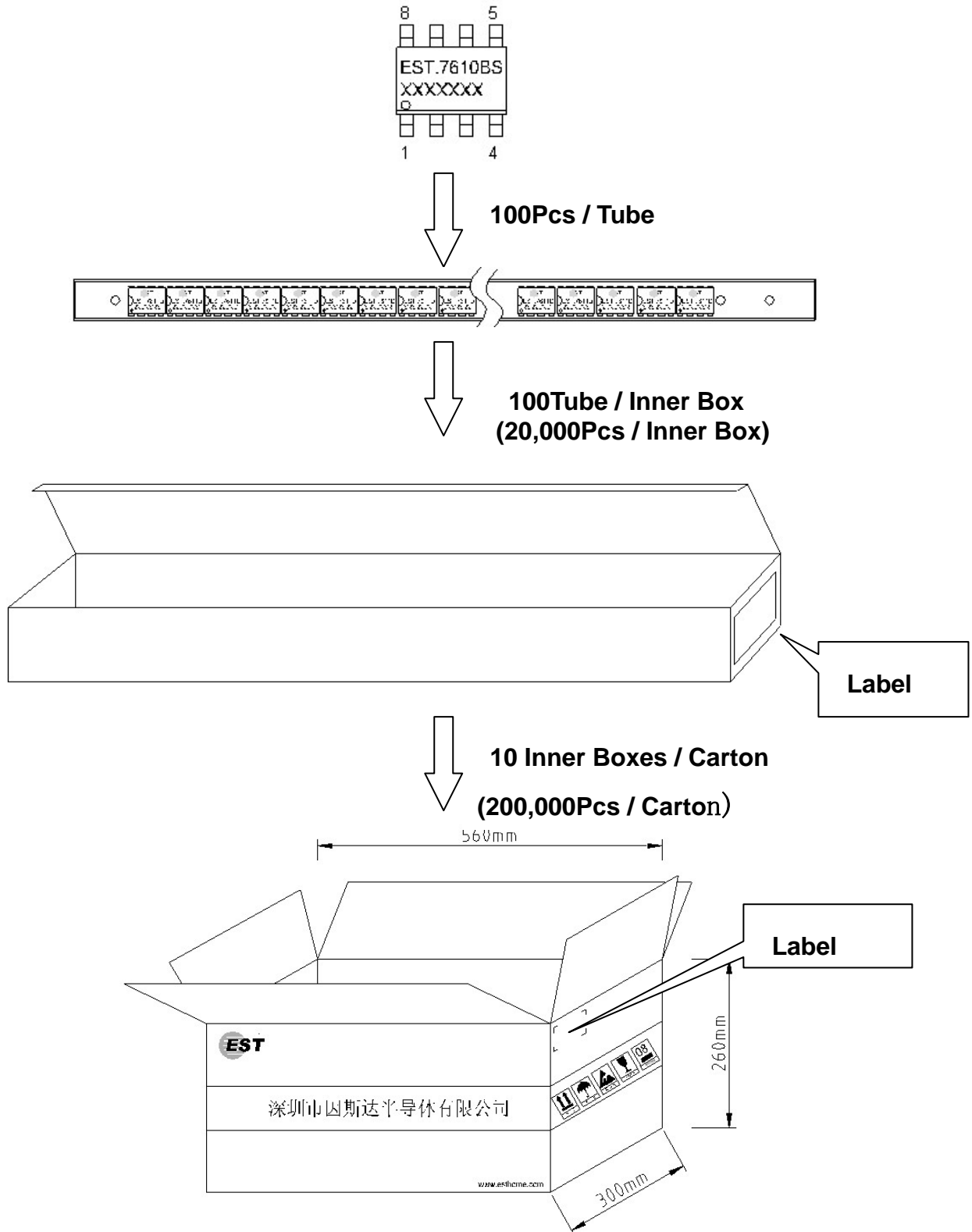
**Packing Information:**

★DIP-8: (Tube)



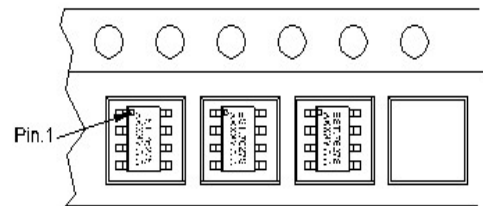
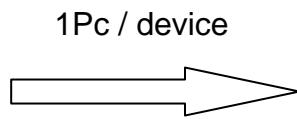
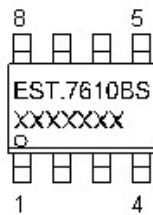
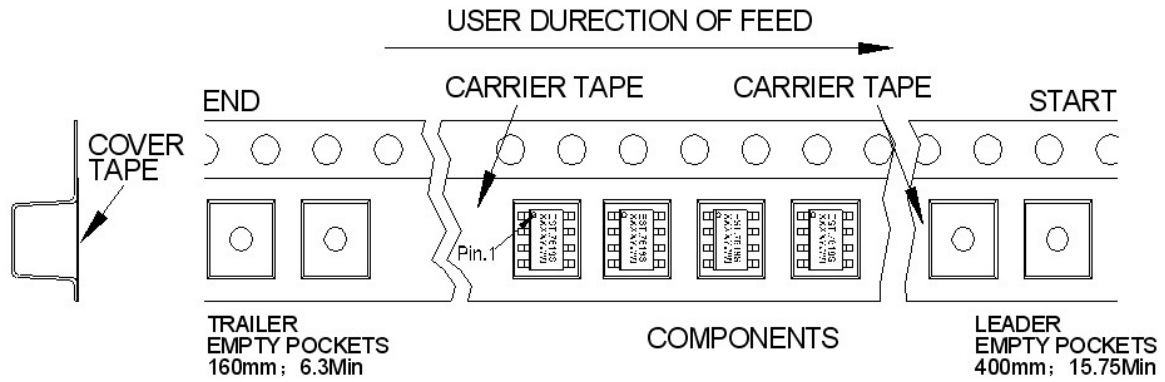


★SOP-8: (Tube)

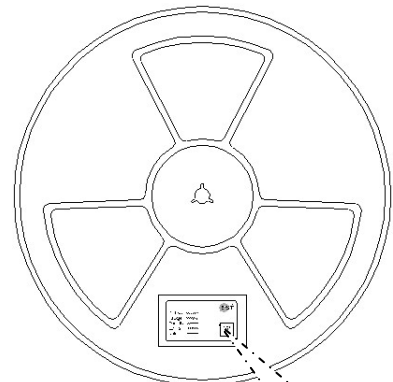
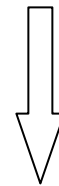


Shipping packing:

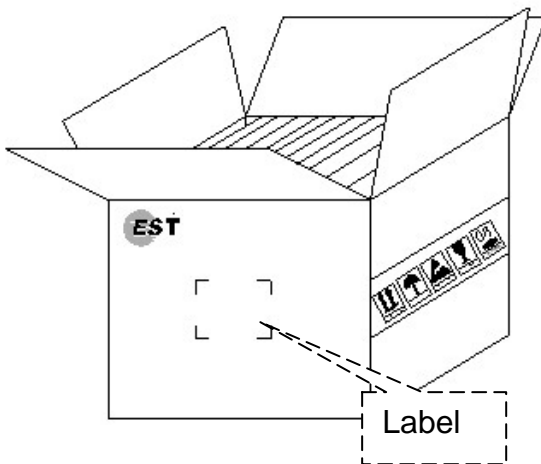
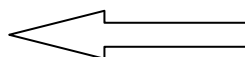
★SOP-8:(tape & Reel)



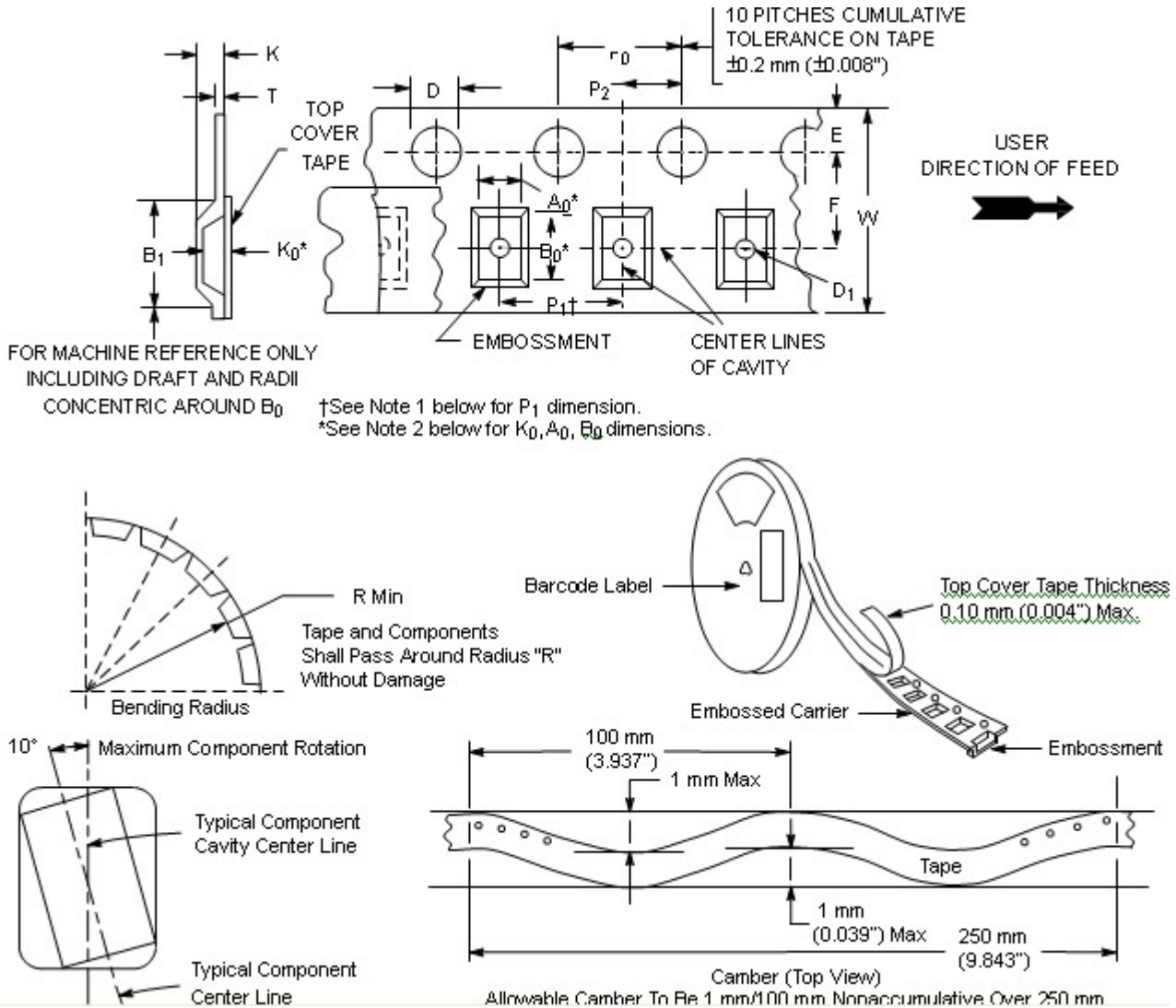
2500 devices / Reel



12 Reel / Carton  
(30,000Pcs / Carton)



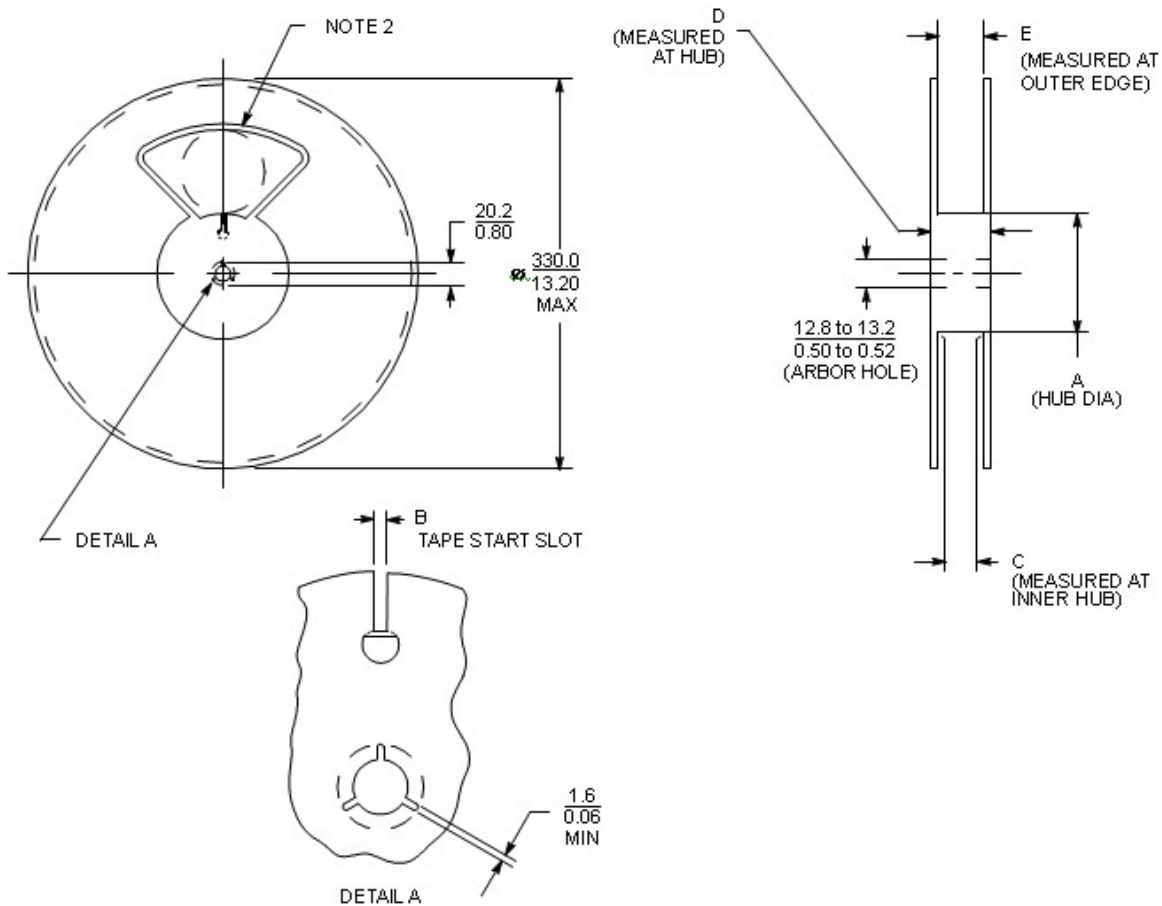
### Embossed Tape and Reel Data Carrier Tape Specifications



**DIMENSIONS**

Tape	$B_1$ Max (Note 1)	D	$D_1$	E	F	K	$P_0$	$P_2$	R Min	T Max	W Max
8 mm	4.55 mm (0.1793)	1.5 + 0.1 mm - 0.0 (0.059 + 0.0043 - 0.0)	1.0 Min (0.0393) or 0.5 mm Min (0.0203)	1.75 ± 0.1 mm (0.069 ± 0.0043)	3.5 ± 0.05 mm (0.138 ± 0.0023)	2.4 mm Max (0.0943)	4.0 ± 0.1 mm (0.157 ± 0.0043)	2.0 ± 0.1 mm (0.079 ± 0.0023)	25 mm (0.983)	0.6 mm (0.0243)	8.3 mm (0.3273)
12 mm	8.2 mm (0.3233)		1.5 mm Min (0.0603)		5.5 ± 0.05 mm (0.217 ± 0.0023)	6.4 mm Max (0.2523)					12 ± 0.30 mm (0.470 ± 0.0123)
16 mm	12.1 mm (0.4763)		7.5 ± 0.10 mm (0.295 ± 0.0043)		7.9 mm Max (0.3113)	16.3 mm (0.6423)					
			11.5 ± 0.1 mm (0.453 ± 0.0043)		11.9 mm Max (0.4683)	24.3 mm (0.9573)					

### Reel Dimensions



Reel	Tape	A		B		C		D	E
		Min	Max	Min	Max	Min	Max		
178.0 (7.01)	16.0 (0.63)		50.0 (1.97)	6.5 (0.26)	7.5 (0.30)	16.4 (0.65)	18.4 (0.72)	22.4 (0.88)	19.4 (0.76)
<b>330.0 (12.99)</b>	<b>12.0 (0.47)</b>	<b>178.0 (7.01)</b>		<b>4.5 (0.18)</b>	<b>5.5 (0.22)</b>	<b>12.4 (0.49)</b>	<b>14.4 (0.57)</b>	<b>18.4 (0.72)</b>	<b>15.4 (0.61)</b>
330.0 (12.99)	56.0 (2.20)	150.0 (5.91)		10.0 (0.39)	11.0 (0.43)	56.4 (2.22)	58.4 (2.30)	62.4 (2.46)	59.4 (2.34)
330.0 (12.99)	44.0 (1.73)	100.0 (3.94)		10.0 (0.39)	11.0 (0.43)	44.4 (1.75)	46.4 (1.83)	62.4 (2.46)	47.4 (1.87)
330.0 (12.99)	32.0 (1.26)	100.0 (3.94)		10.0 (0.39)	11.0 (0.43)	32.4 (1.28)	34.4 (1.35)	38.4 (1.51)	35.4 (1.39)
330.0 (12.99)	24.0 (0.94)	60.0 (2.36)		9.5 (0.37)	10.5 (0.41)	24.4 (0.96)	26.4 (1.04)	30.4 (1.51)	27.4 (1.08)
330.0 (12.99)	16.0 (0.63)			6.5 (0.26)	7.5 (0.30)	16.4 (0.65)	18.4 (0.72)	22.4 (0.88)	19.4 (0.76)
330.0 (12.99)	12.0 (0.47)			4.5 (0.18)	5.5 (0.22)	12.4 (0.49)	14.4 (0.57)	18.4 (0.72)	15.4 (0.61)
330.0 (12.99)	8.0 (0.31)	50.0 (1.97)		2.5 (0.10)	3.5 (0.14)	8.4 (0.33)	9.9 (0.39)	14.4 (0.57)	10.9 (0.43)
178.0 (7.01)	12.0 (0.47)	50.0 (1.97)		4.5 (0.18)	5.5 (0.22)	12.4 (0.49)	14.4 (0.57)	18.4 (0.72)	15.4 (0.61)
178.0 (7.00)	8.0 (0.31)	50.0 (1.97)		2.5 (0.10)	3.5 (0.14)	8.4 (0.33)	9.9 (0.39)	14.4 (0.47)	10.9 (0.43)
330.0 (12.99)	8.0 (0.31)	50.0 (1.97)		4.0 (0.16)	5.0 (0.20)	8.4 (0.33)	9.9 (0.39)	14.4 (0.57)	10.9 (0.43)
178.0 (7.00)	8.0 (0.31)	50.0 (1.97)		4.0 (0.16)	5.0 (0.20)	8.4 (0.33)	9.9 (0.39)	14.4 (0.57)	10.9 (0.43)