

Data Sheet

Type Description : SPS Secondary Supervisor IC

Product Name : EST.7610C/EST.7610CS

Reversion : Rev 1.1

Reversion Date : Nov, 2018

Page : 15 Pages

Description

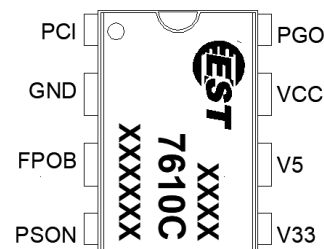
The EST.7610C is a PC switching power supply monitor with minimum external components. It provides protection circuits, power-good output (PGO), fault protection output (FPOB) and on/off control (PSONB).

The over-voltage protection (OVP) monitors 3.3V, 5V and 12V (12V supplies voltage detects via VDD pin). The under-voltage protection (UVP) monitors 3.3V and 5V. When an OV or UV condition is detected, the fault protection output (FPOB) is latched high and the power good output (PGO) go low. PSONB from low to high resets the latch. When OV, UV and PGI are all right, the power good output (PGO) will be issue. A built-in 4ms delay and 38ms debounce for PSONB turn off FPOB.

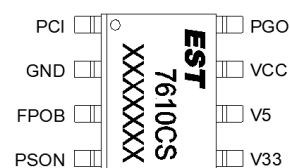
Features

- The Under Voltage Protection for 3.3V/5V and 12V
- The Over 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
- 38ms PSONB input signal de-bounce
- 55us for OVP noise immunity de-bounce.
- 73us for internal noise immunity de-bounce
- 300ms power good delay time for PGO
- 3.5ms time delay between PGO and FPOB when PSONB turn off

Pin Assignments



DIP-8L

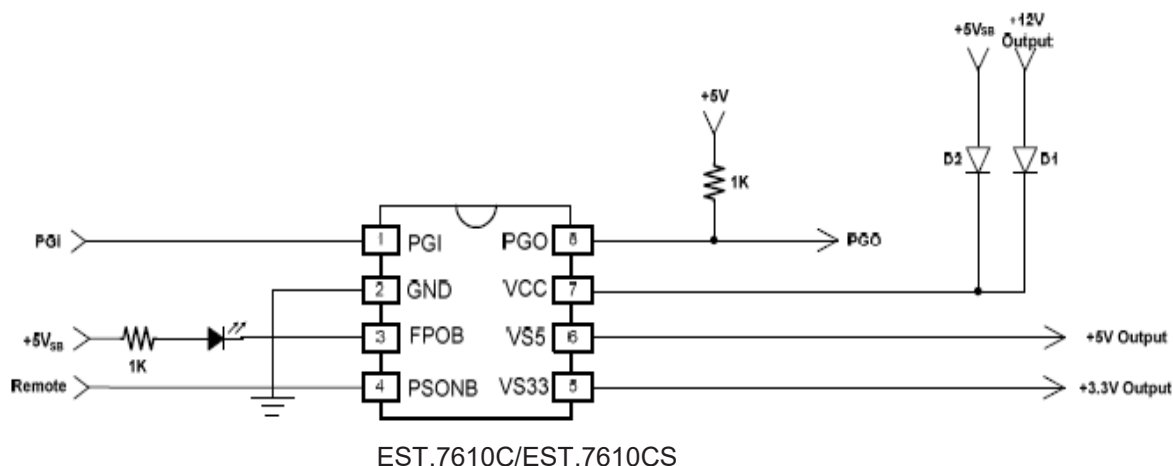


SOP-8L

Ordering Information

Order Number	Package Type	Packing	Top Marking
EST7610C	DIP-8 (RoHS)	Tube	EST.7610C
EST7610CS	SOP-8 (RoHS)	Tube	EST.7610CS
EST7610CSR	SOP-8 (RoHS)	Tape & Reel	EST.7610CS

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	ON/OFF control input pin.
5	V33	3.3V input pin for OVP and UVP.
6	V5	5V input pin for OVP and UVP.
7	VDD	Power supply. 12V input pin for OVP.
8	PGO	Open drain output of power good signal.

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Storage Temperature (Tstg)	---	-40 to 140	°C
Operating Temperature (Topr)	---	-25 to 125	°C
Junction Temperature (Tj)	---	150	°C
Supply Voltage (VCC)	VCC	-0.5 to 18	V
Input Voltage Range (VI)	PGI, PSON, VS5, VS33	-0.5 to 16	V
Output Voltage Range (VO)	FPOB	-0.5 to 16	V
	PGO	-0.5 to 16	V
Power Dissipation	PD	650	mW
Thermal Resistance	θJA	85	°C/W
ESD(HBM)		Class 3A	V

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 _{VS33}	3.7	3.9	4.1	V	
	OVT _{VS5}	5.7	5.85	6.0	V	
	OVT _{VS12}	12.8	13.4	13.9	V	For VCC

Under-Voltage function:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Under-Voltage Threshold	UVT _{VS33}	2.0	2.2	2.4	V	
	UVT _{VS5}	3.3	3.5	3.7	V	
	UVT _{VS12}	8.8	9.3	9.8	V	For VCC

PSONB, Analog Input function:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operation Voltage				8	V	
Threshold Voltage	VIN	1.80			V	LOW→HIGH
Threshold Voltage	VIL			1.0	V	HIGH→LOW
Input pull up current			100		uA	

PGI, Analog Input:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Threshold Voltage of PGI		0.9	0.95	1.0	V	Enable/Disable UVP
		1.16	1.2	1.24	V	Enable/Disable PGO

FPOB, Open Drain Output:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Leakage Current	ILKG			5	uA	VFPOB=5V
Low Level Output Voltage	VOL			0.3	V	ISINK=10mA
				0.8	V	

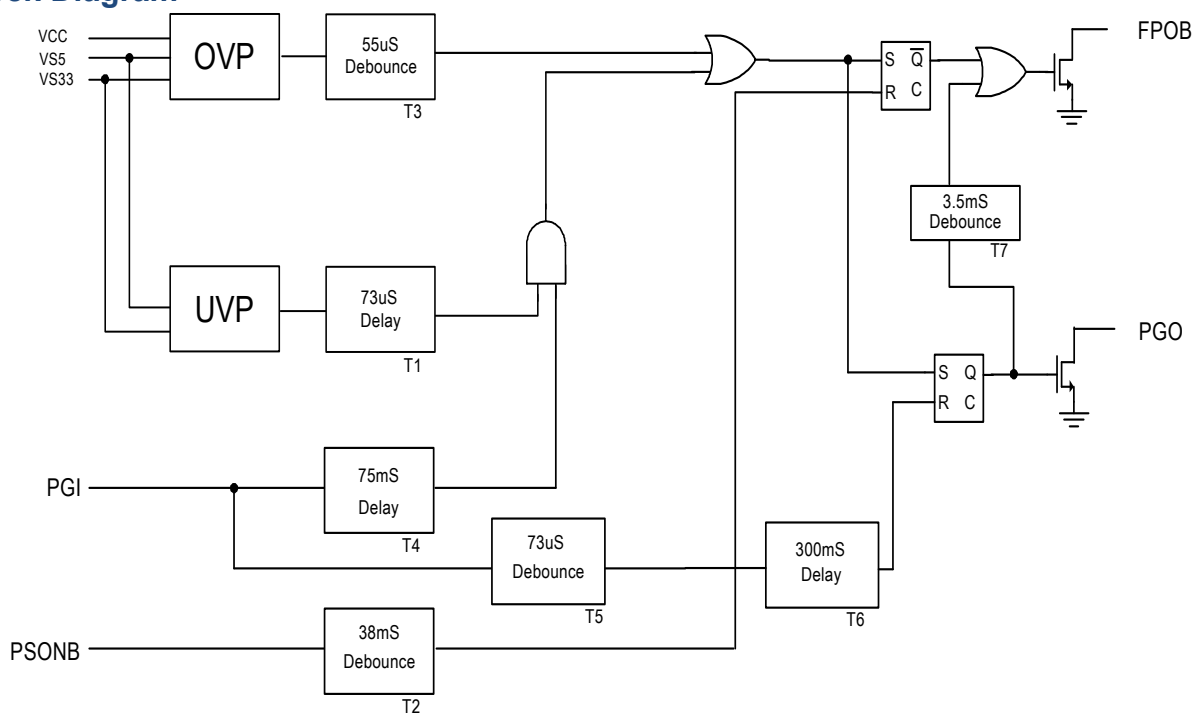
PGO, Open Drain Output:

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Leakage Current	ILKG			5	uA	VPGO=5V
Low Level Output Voltage	VOL			0.3	V	ISINK=10mA
				0.8	V	ISINK=30mA

AC Electrical Characteristics (Vcc=12V, Ta=25°C)

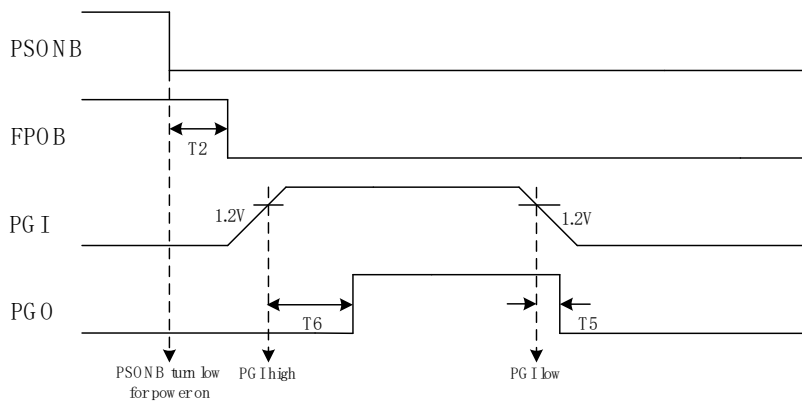
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Under voltage protection delay time	T1	47	73	100	uS	
PSON De-bounce time	T2	24	38	52	mS	
Over voltage protection delay time	T3	35	55	75	uS	
PGI OC/UV mask time	T4	49	75	100	mS	PGI > 0.95V (TYP)
PGO De-bounce time	T5	47	73	100	uS	
PGI to PGO delay time	T6	200	250	300	mS	
PGO to FPOB delay time	T7	2	3.5	5	mS	

Block Diagram

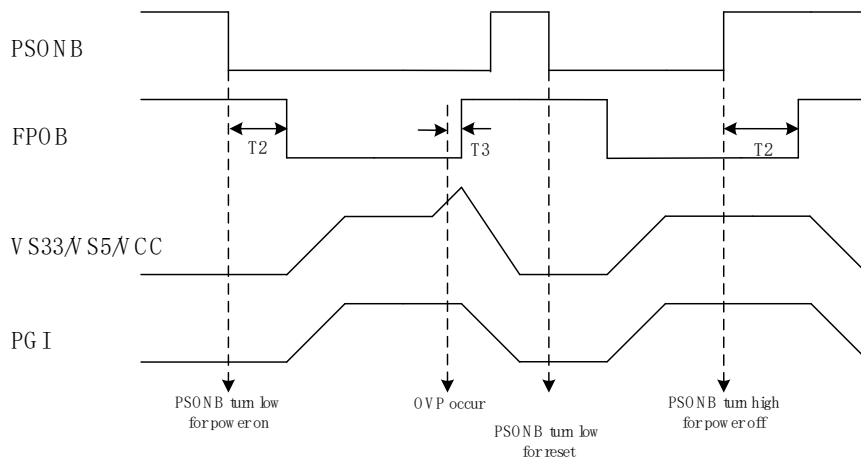


Time Chart

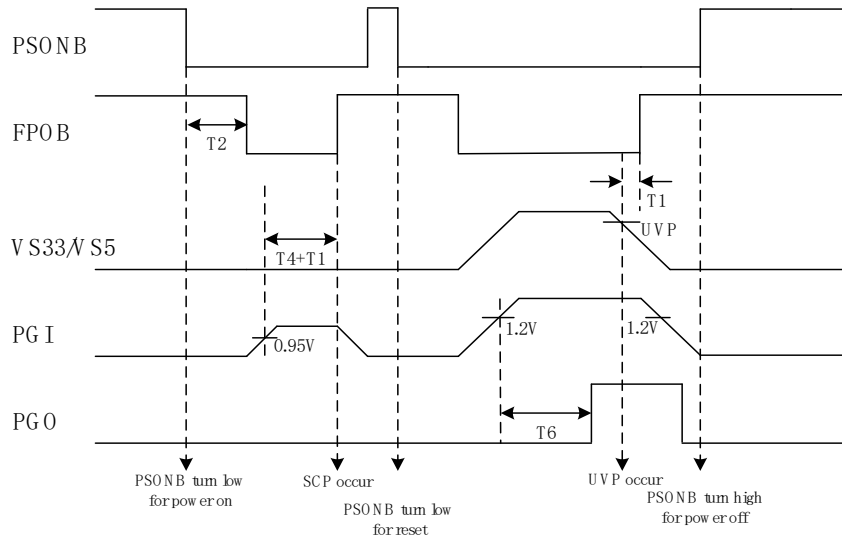
PGI Timing



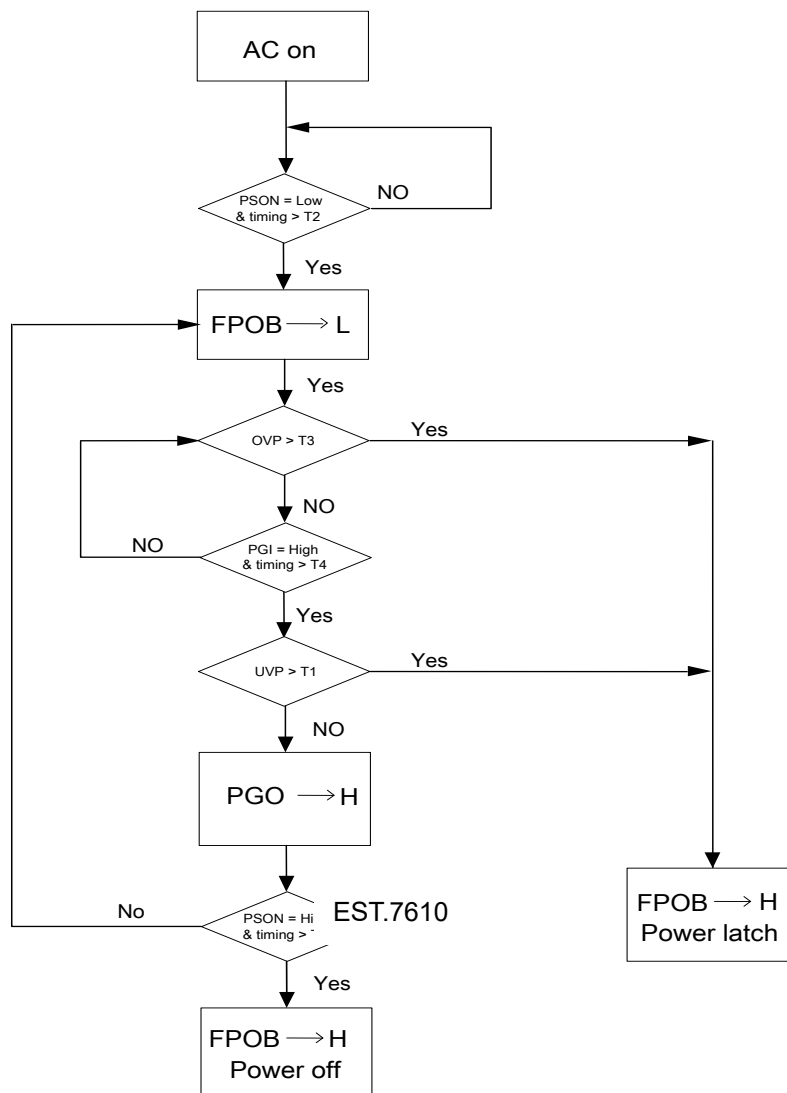
OVP Timing



SCP & UVP Timing

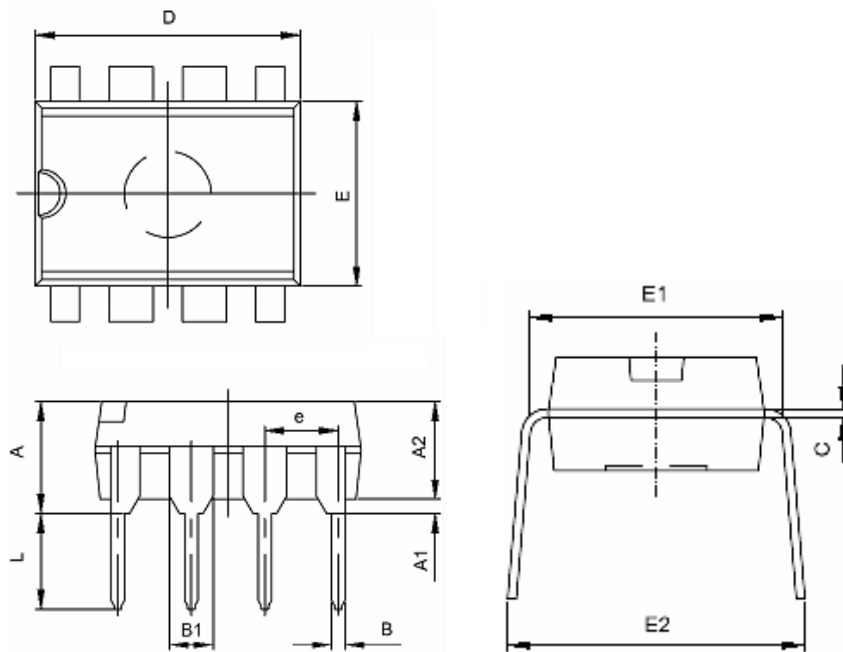


Flow Chart



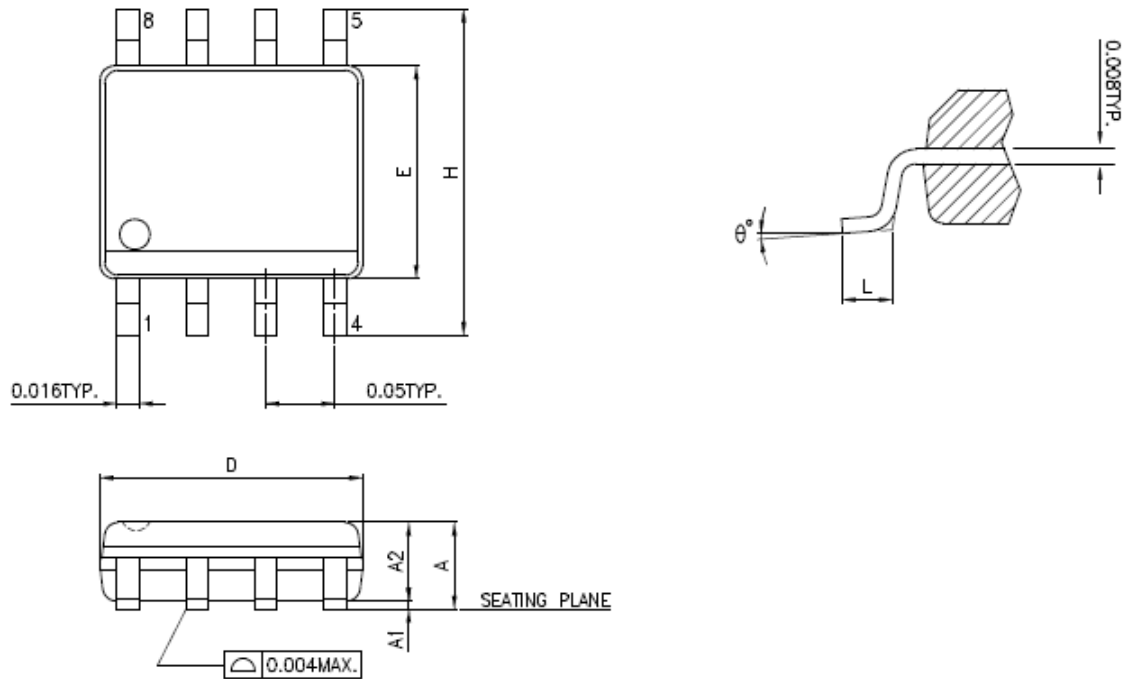
PACKAGING INFORMATION

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

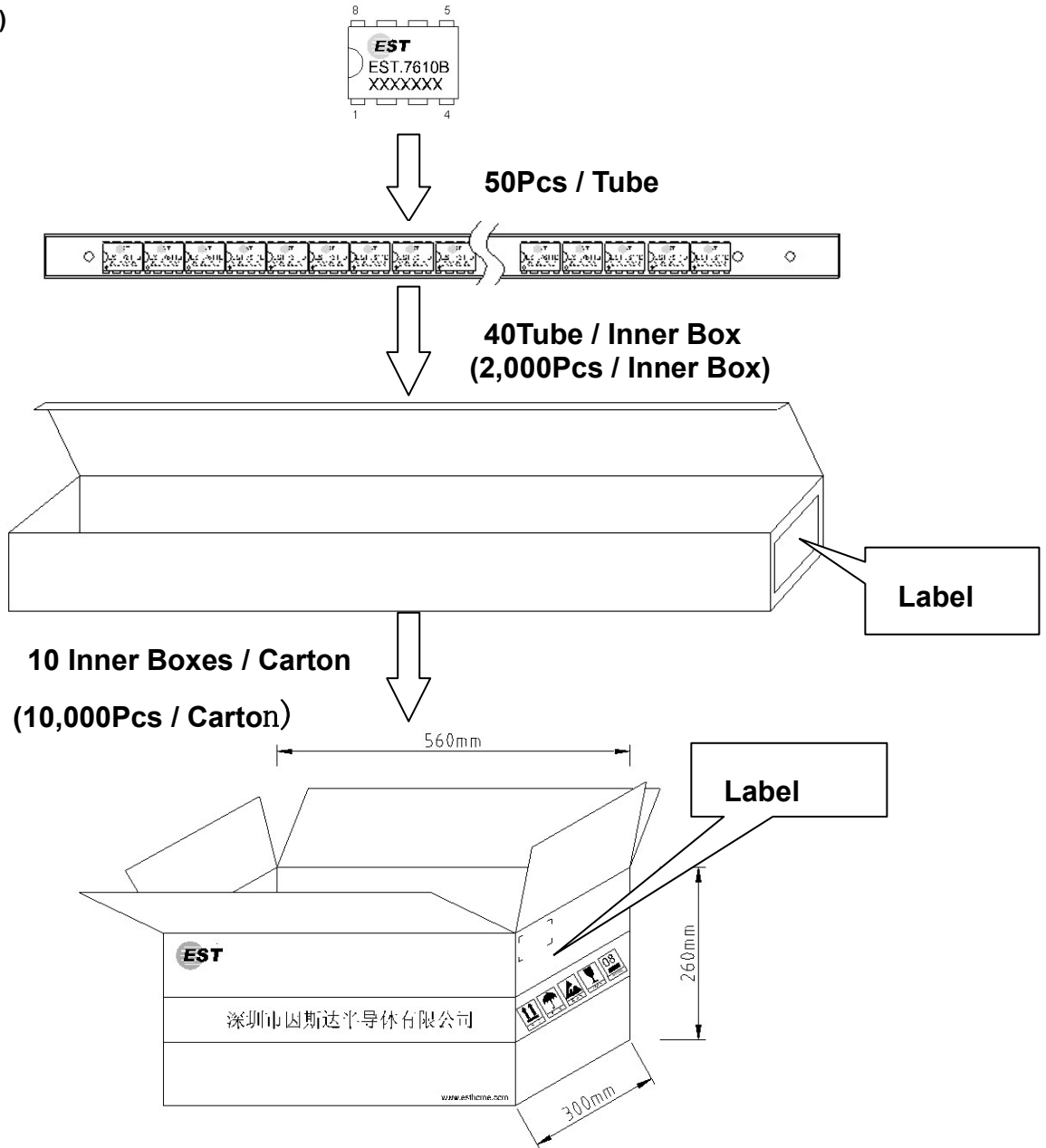
SOP-8 Package (mm)



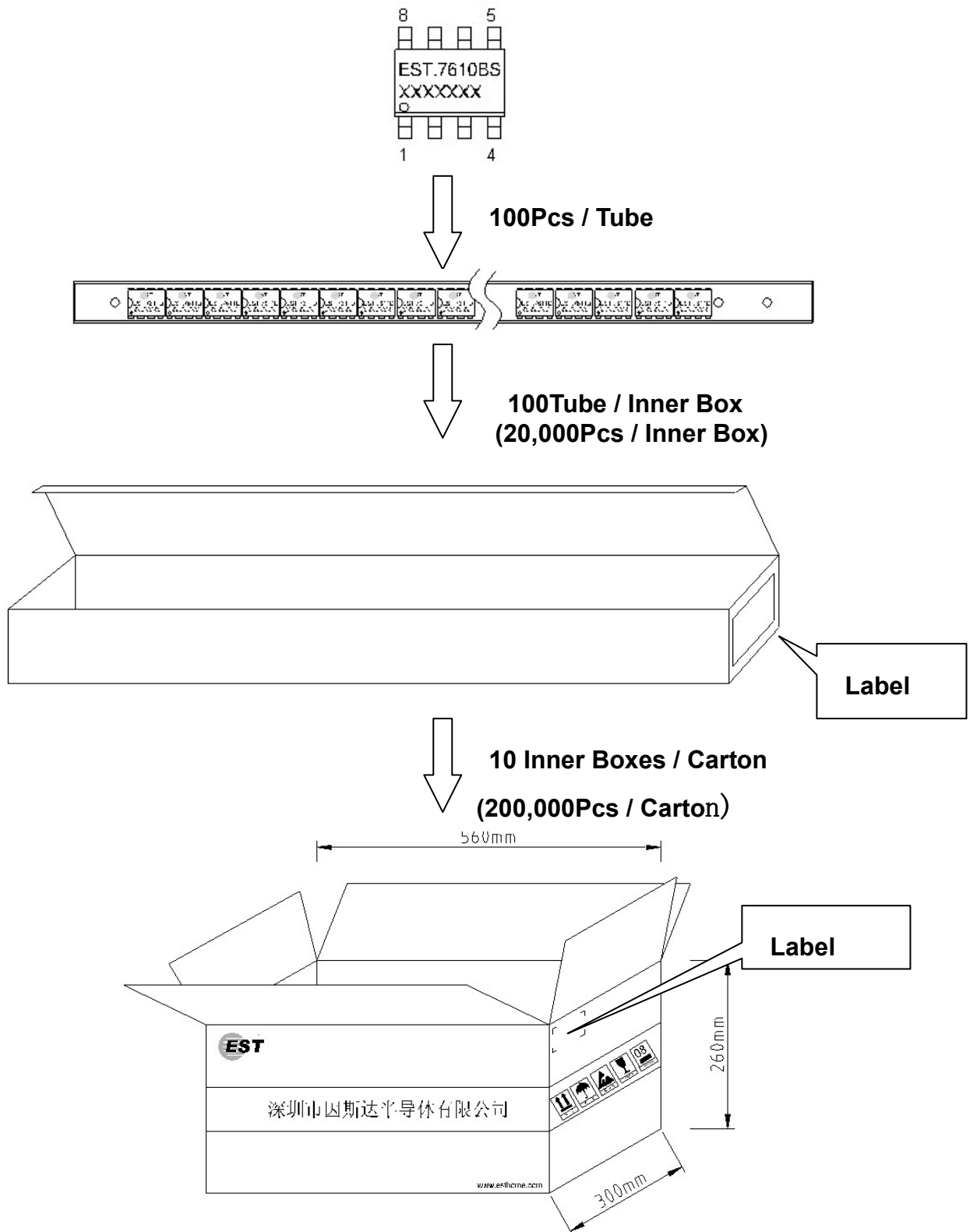
Symbols	Dimensions In Inches			Dimensions In millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	0.050	0.061	0.072	1.270	1.549	1.829
A1	0.000	-----	0.010	0.000	-----	0.254
A2	-----	-----	0.062	-----	-----	1.575
D	0.185	0.193	0.200	4.699	4.902	5.080
E	0.147	0.154	0.160	3.734	3.912	4.064
H	0.225	0.237	0.249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

Packing Information:

★DIP-8: (Tube)

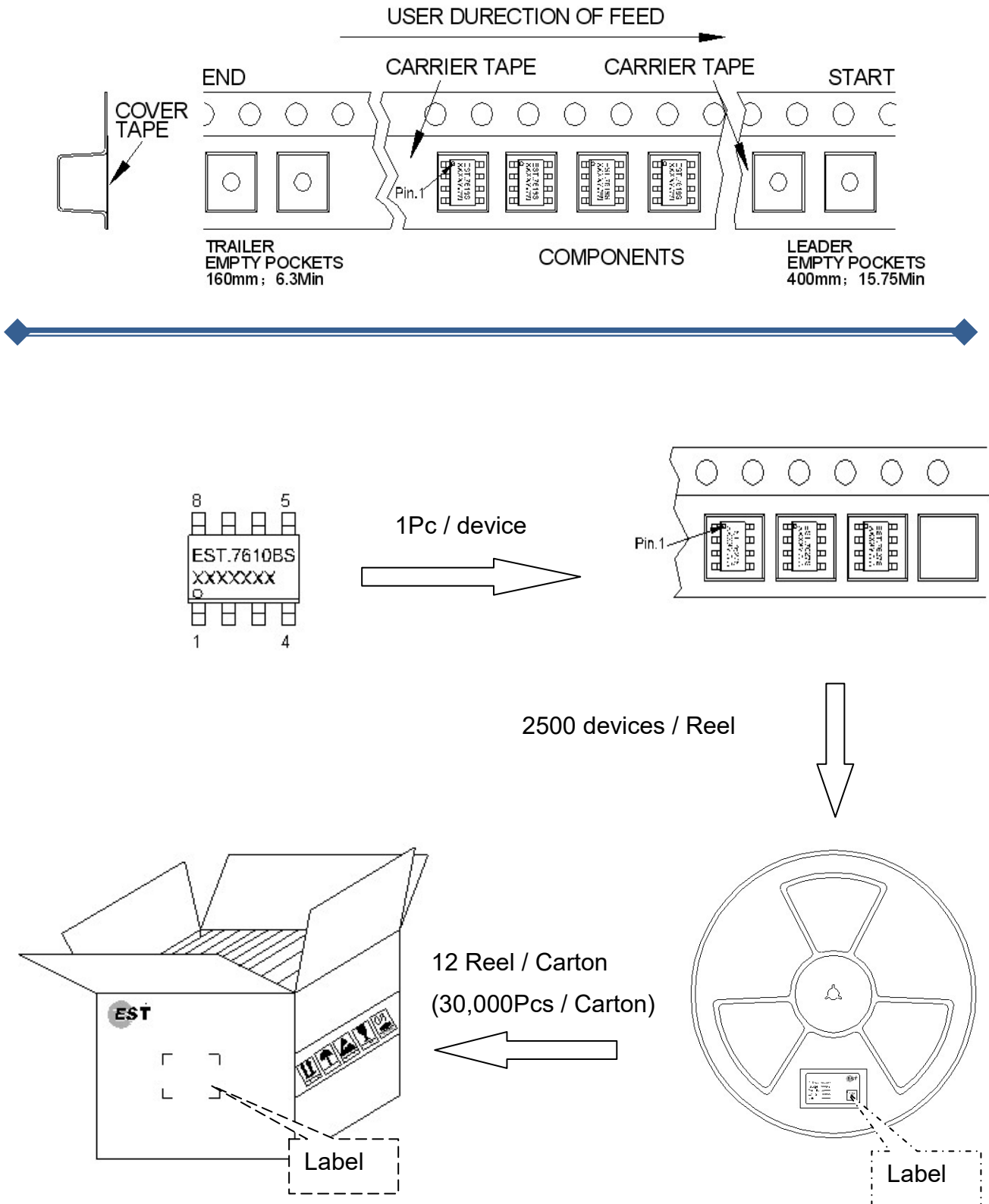


★SOP-8: (Tube)

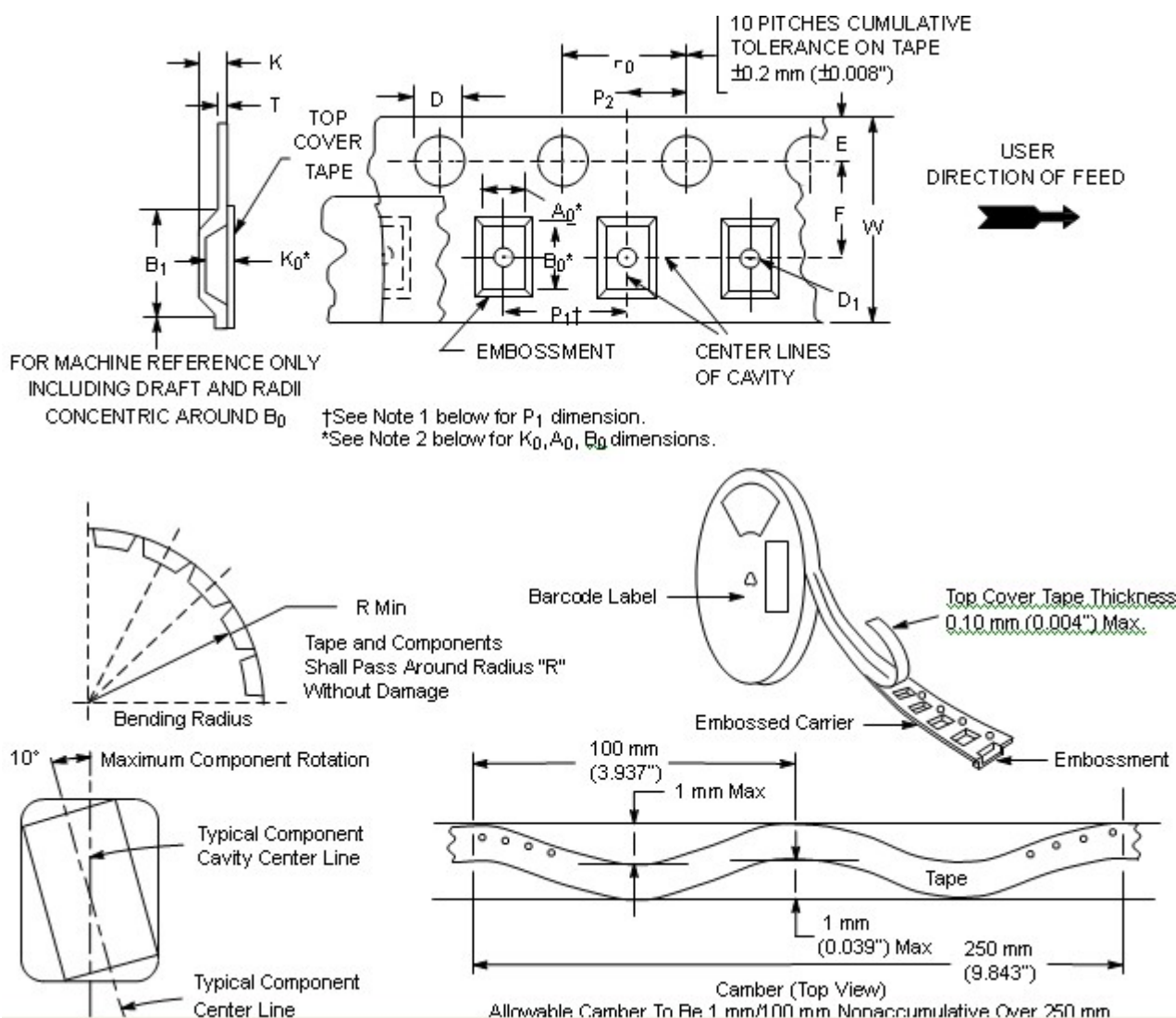


Shipping packing:

★SOP-8:(tape & Reel)



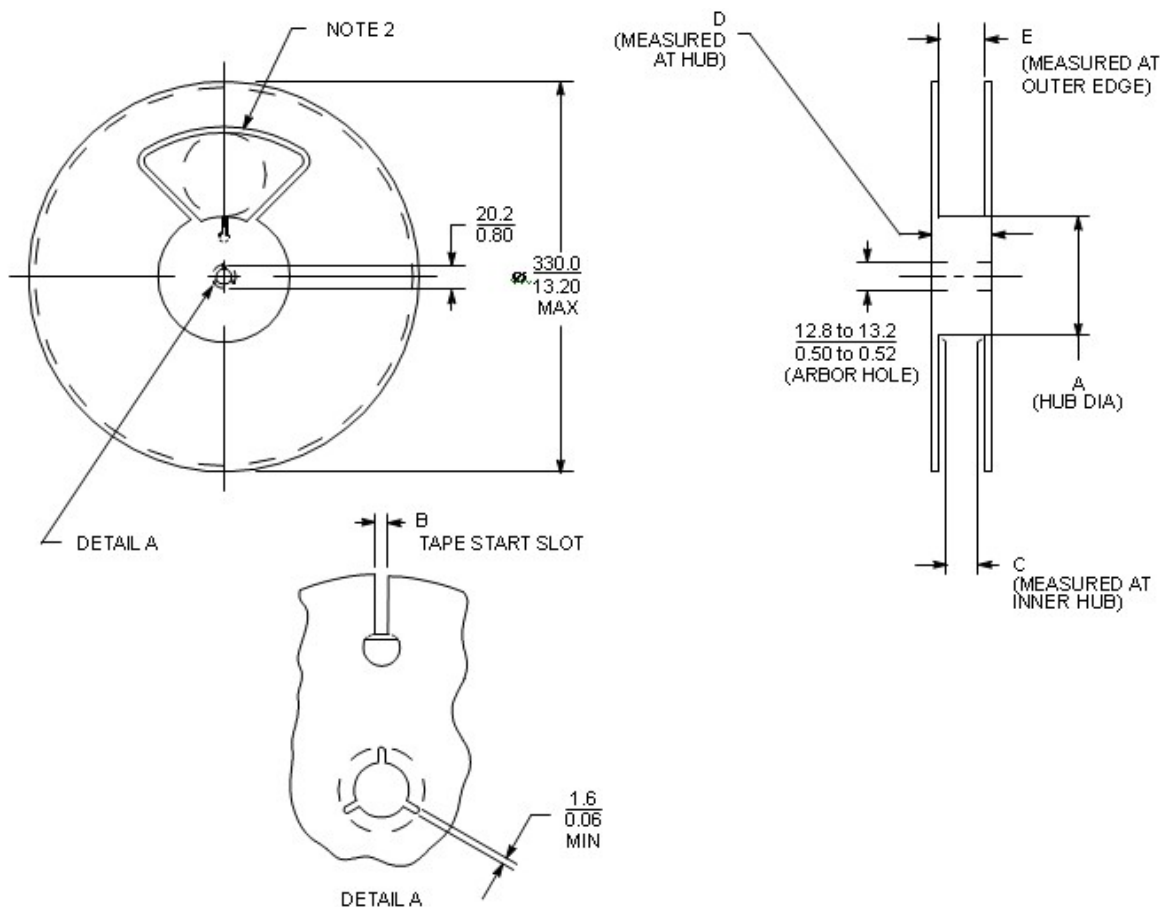
Embossed Tape and Reel Data Carrier Tape Specifications



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

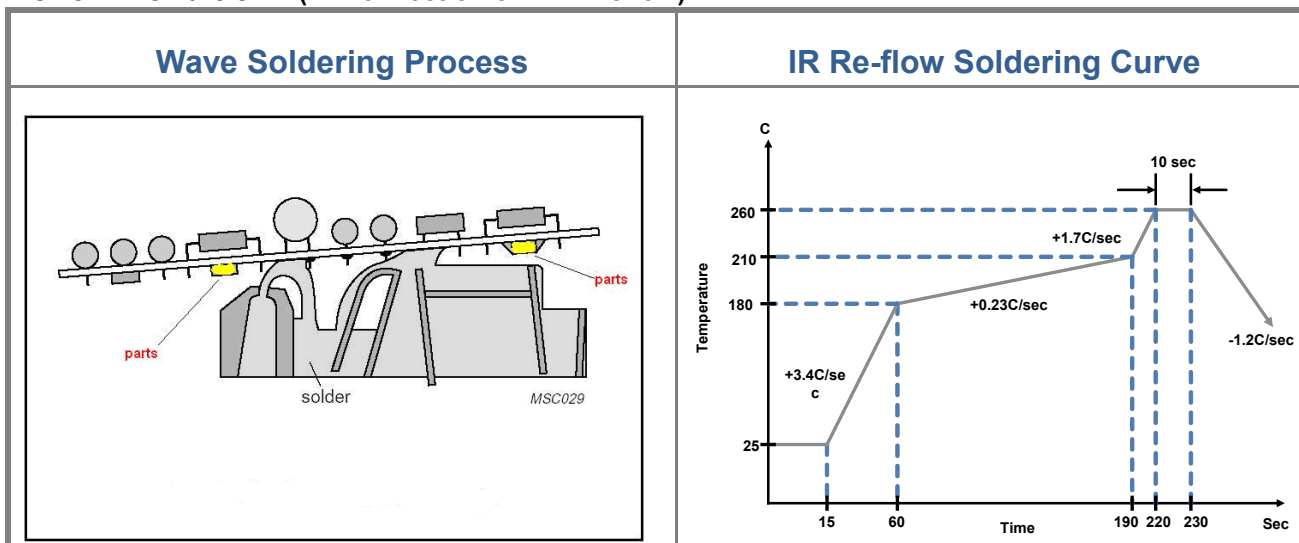


Reel	Tape	A		B		C		D	E
		Min	Max	Min	Max	Min	Max		
178.0 (7.01)	16.0 (0.63)		50.0 (1.97)	6.5 (0.26)	7.5 (0.30)	16.4 (0.65)	18.4 (0.72)	22.4 (0.88)	19.4 (0.76)
330.0 (12.99)	12.0 (0.47)	178.0 (7.01)		4.5 (0.18)	5.5 (0.22)	12.4 (0.49)	14.4 (0.57)	18.4 (0.72)	15.4 (0.61)
330.0 (12.99)	56.0 (2.20)	150.0 (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)

Reliability Test Program

SOP-8/DIP-8

Reflow Condition (IR/Convection or VPR Reflow)



Test Item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C, 5sec
HOLT	MIL-STD-883D-1005.7	1000Hrs Bias@125°C
PCT	JESD-22-B,A102	168Hrs, 100% RH, 121°C
TST	MIL-STD-883D-1011.9	-65°C~150°C, 200 Cycles
ESD	MIL-STD-883D-3015.7	VHMB>2KV, VMM>200V
Latch-Up	JESD 78	10ms, 1tr> 100mA

Revision History

REVISION	DESCRIPTION	PAGE	DATE
Rev 1.1	First release	13	2018/11/18



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