Description

The EST7590C is designed with a pulse-width-modulation control circuit and a complete power supervisor for use in the switched mode power supply .

It contains various functions, like under voltage protection (UVP), over voltage protection (OVP), power good output (PG) and ON/OFF control (REM).

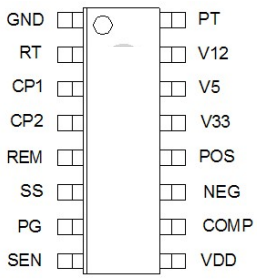
UVP(Under voltage protection) function is for +3.3V, +5V, +12V outputs.

OVP(Over voltage protection) function is for +3.3V, +5V, +12V and PT is for extra protection input.

PG(Power good signal) is a safe operation signal to inform the external parts.

REM(Remote on/off) is used to control the SMPS on/off. The REM control signal has the on/off transferred debounce–time.

PIN CONFIGURATION (Top View)



SOP-16

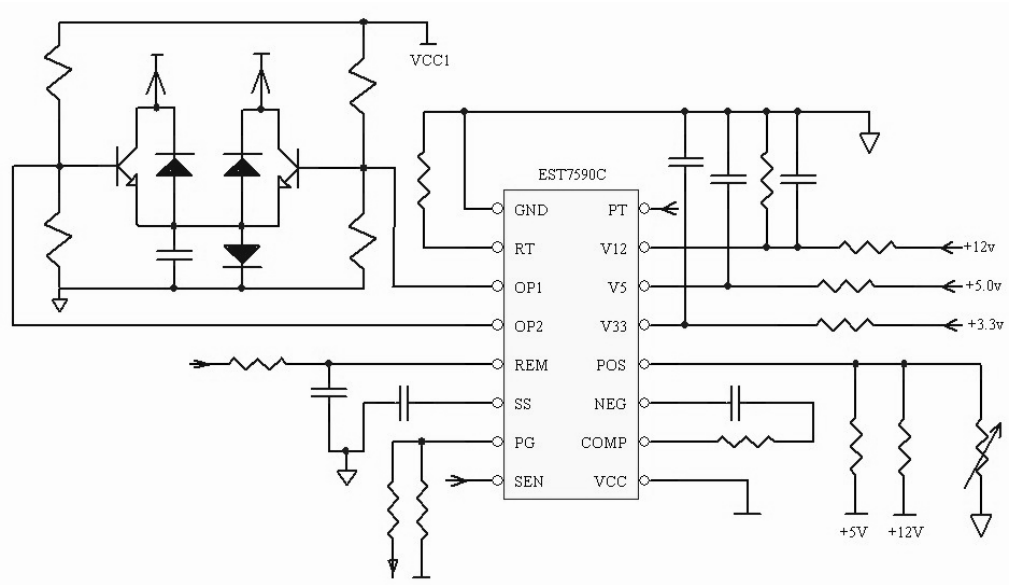
FEATURE

- 3-channel under voltage protection (UVP)
- 3-channel over voltage protection (OVP)
- 1-channel extra protection (PT)
- 1-channel sense input to control the PG (SEN)
- Remote on/off control function (REM)
- Dual output for push-pull operation (OP1/OP2)
- Soft start capability by external capacitor (SS)
- VCC under voltage lockout
- 16-Pin dual in-line package
- Pb-free Package are available

ORDERING INFORMATION

ORDER NUMBER	Package	Shipping	Top Marking
EST7590C	SOP-16(Pb-free)	Tape & Reel	EST7590C

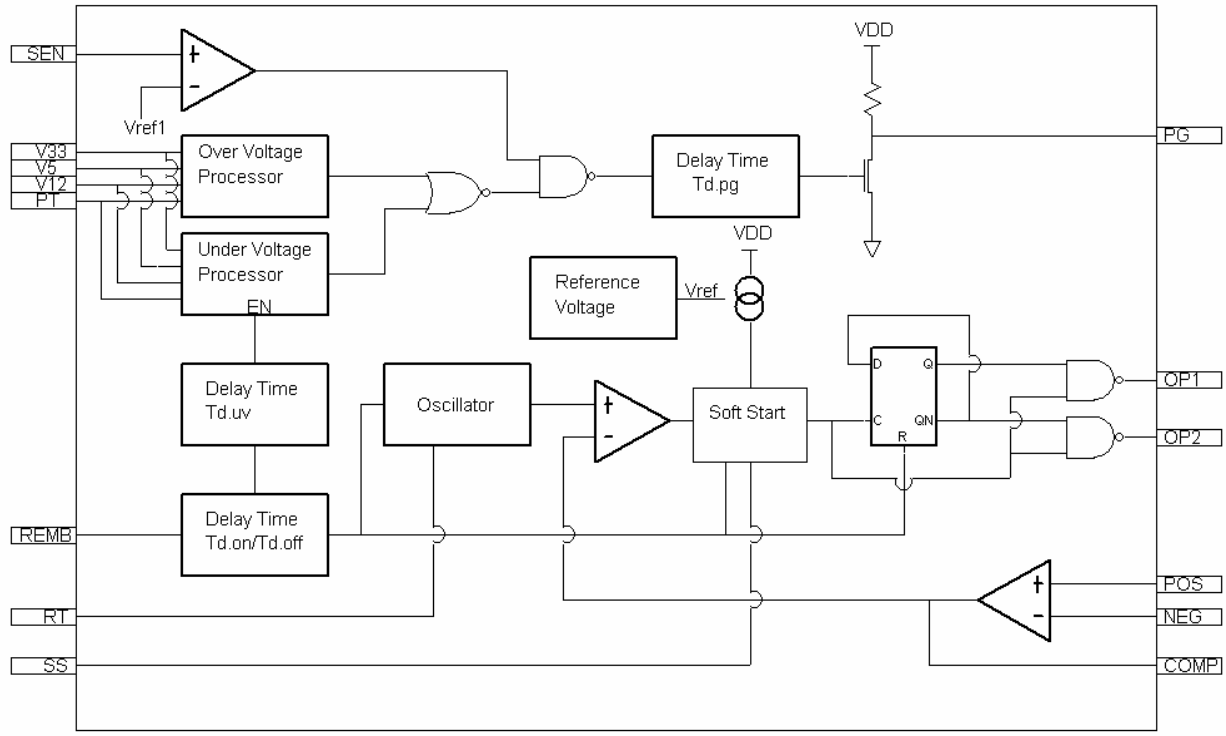
REFERENCE APPLICATION CIRCUIT



PIN DESCRIPTION

Pin	Symbol	Type	Function
1	GND	-	Ground
2	RT	-	Oscillation frequency setting resistor
3	OP1	O	PWM output1
4	OP2	O	PWM output2
5	REM	I	Remote ON/OFF control input
6	SS	-	Soft start function setting capacitor
7	PG	O	Power good signal
8	SEN	I	Sense signal input
9	VCC	I	Supply voltage
10	COMP	O	Error amplifier output
11	NEG	I	Error amplifier (-) input
12	POS	I	Error amplifier (+) input
13	V33	I	OVP, UVP for +3.3V
14	V5	I	OVP, UVP for +5V
15	V12	I	OVP, UVP for +12V
16	PT	I	Extra protection input

FUNCTION BLOCK DIAGRAM



ABSOLUTE MAXIMUN RATINGS

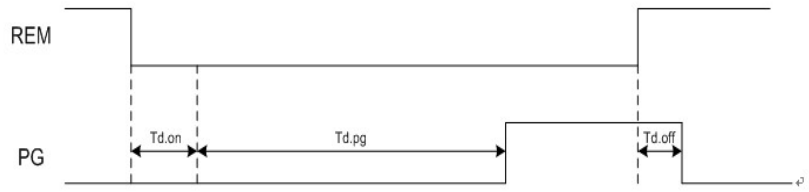
PARAMETER		MIN	MAX	UNITS
Supply Voltage	VCC	-0.3	7	V
Input Voltage	V33,V5,V12,PT,REMB,SEN,POS,NEG	-0.3	7	V
Output Voltage	OP1,OP2,PG,COMP	-0.3	7	V
Operating Temperature Range	T_O	-20	+85	°C
Storage Temperature Range	T_S	-65	150	°C

ELECTRICAL CHARACTERISTICS (For VCC=5V and Tj=25 °C)

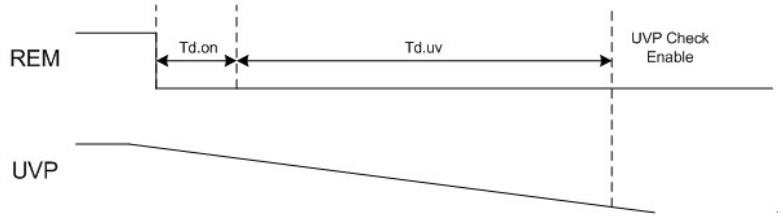
PARAMETER		CONDITIONS	MIN	TYP	MAX	UNITS
Over Voltage Protection (OVP- V33,V5,V12,PT)						
Over voltage threshold	OV33		3.8	4.1	4.4	V
	OV5		5.8	6.2	6.6	V
	OV12		4.4	4.6	4.9	V
	PT		1.23	1.28	1.33	V
Noise debounce time	Tg.ov			510		us
Under Volatge Protection (UVP- V33,V5,V12)						
Under voltage threshold	UV33		1.7	1.9	2.2	V
	UV5		2.7	3.0	3.3	V
	UV12		2.1	2.4	2.7	V
Noise debounce time	Tg.uv			120		us
PG check under voltage delay time	Td.uv		180	280	380	ms
Soft Start (SS)						
Sink current	Isink	RT=100 KΩ		15		uA
Source current	Isource			310		uA
VCC Under Voltage Lockout (UVLO)						
Start-up voltage				4.2		V
REM Input Pin (REM)						
High level input voltage	V_{IH}		1.8			V
Low level input voltage	V_{IL}				0.7	V
REM delay time	Td.on/off			40		ms
Power Good (PG)						
PG delay time	Td.pg		180	280	380	ms
SEN voltage threshold				0.68		V
Sink current	Ipg.sink	VPG=0.2V		10		mA
Output load resistor	Rload		0.5	1	2	KΩ
PG internal pull high resistor	Rpull.up			5		KΩ
Oscillation Frequency						
PWM frequency	Fosc	RT=100 KΩ	70	75	80	KHz
Error Amplifier (POS,NEG,COMP)						
Reference voltage	Vref	Vneg	2.40	2.45	2.50	V
Open loop gain	Avo		75	85		dB
Unity gain bandwidth	BW	0dB		1		MHz
Power supply rejection ratio	PSRR		45			dB
Total Device						
Supply current	I_{CC}	REM = 5V		6		mA

TIMING DIAGRAM

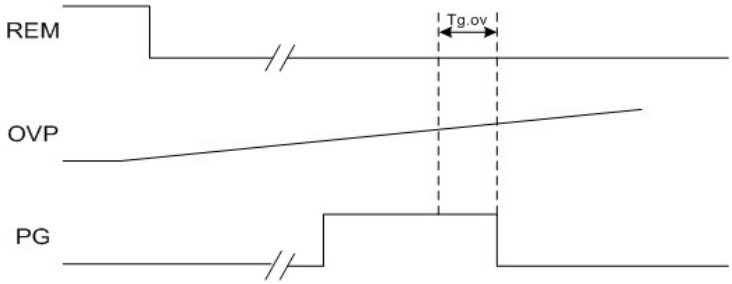
1. REM Turn ON(REM=0) , Turn OFF(REM=1) and PG



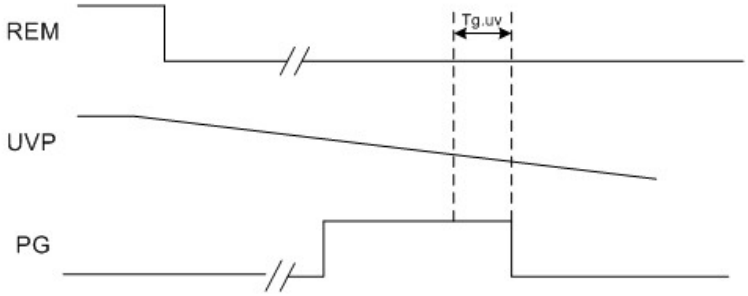
2. REM vs. Under Voltage Protection Delay time



3. Over Voltage Protection



4. Under Voltage Protection

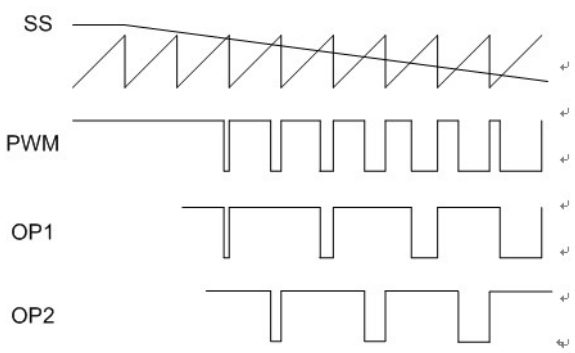


APPLICATION HINTS

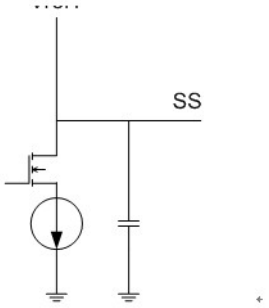
1. Input Impedence

Pin Name	Input Impedence
V33	58KΩ
V5	89KΩ
V12	58KΩ
PT	Pull-high to VCC= 33 KΩ Pull-low to GND= 5.4 KΩ

2. Soft Start



Iss = 15uA (RT=100KΩ)



3. PWM Frequency

Tpwm= K2 · RT

$K2 = 1.3 \cdot 10^{-10}$

Example.

RT = 100KΩ

$Tpwm = (1.33 \cdot 10^{-10}) \cdot (100 \cdot 10^{3}) = 13.3us$

Fpwm = 75KHz

4.PT

PT Voltage Level	Function
PT>1.25V	Over voltage protection
PT<0.57V	Disable under voltage check function

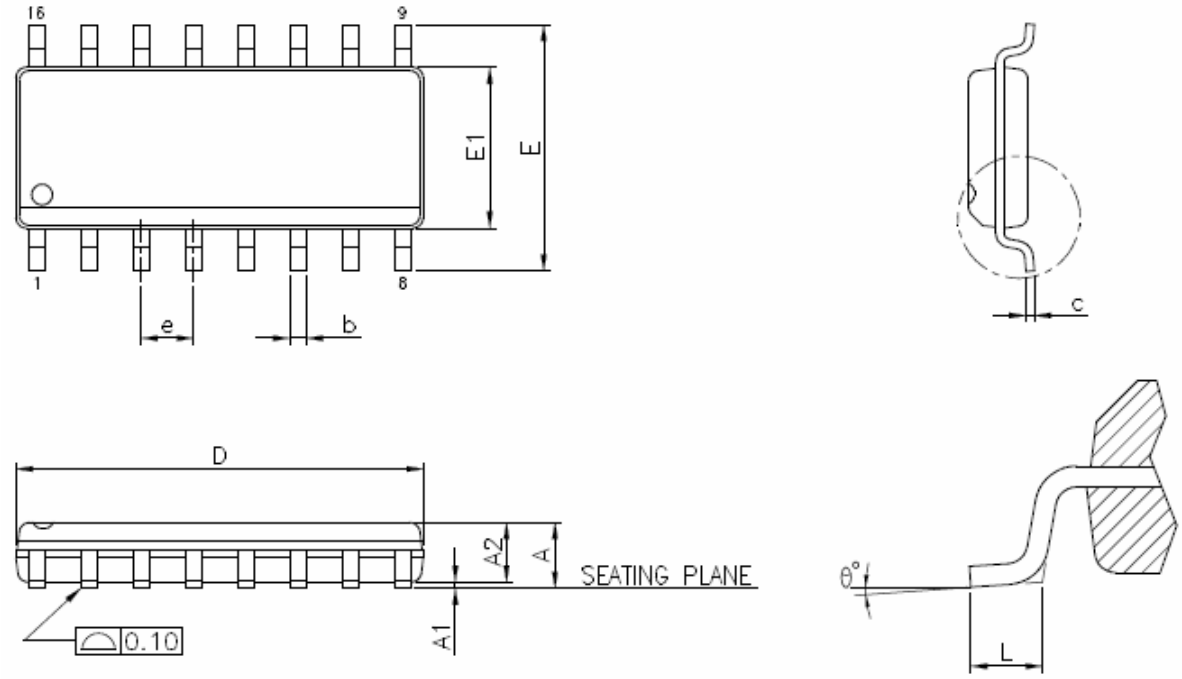
5.REM

In some application circuits, adding a resistor in series with the REM pin could reduce the noise spike and avoid the pin from damage.

PACKAGE DIMENSIONS **PLASTIC DUAL IN LINE PACKAGE**

Package Dimensions
SOP-16 (Standard)

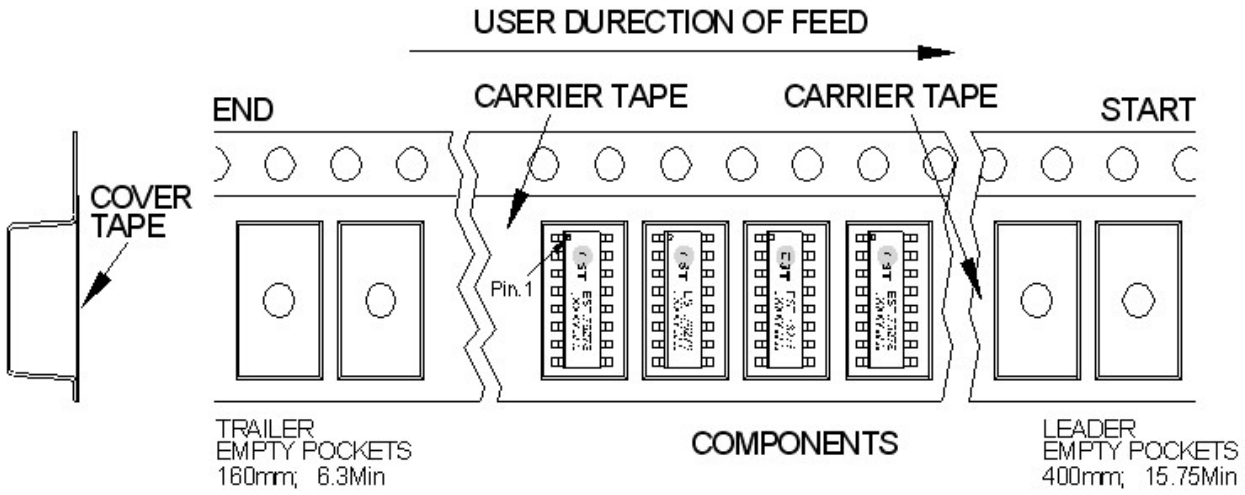
Small Outline Package
UNIT : inch / mm

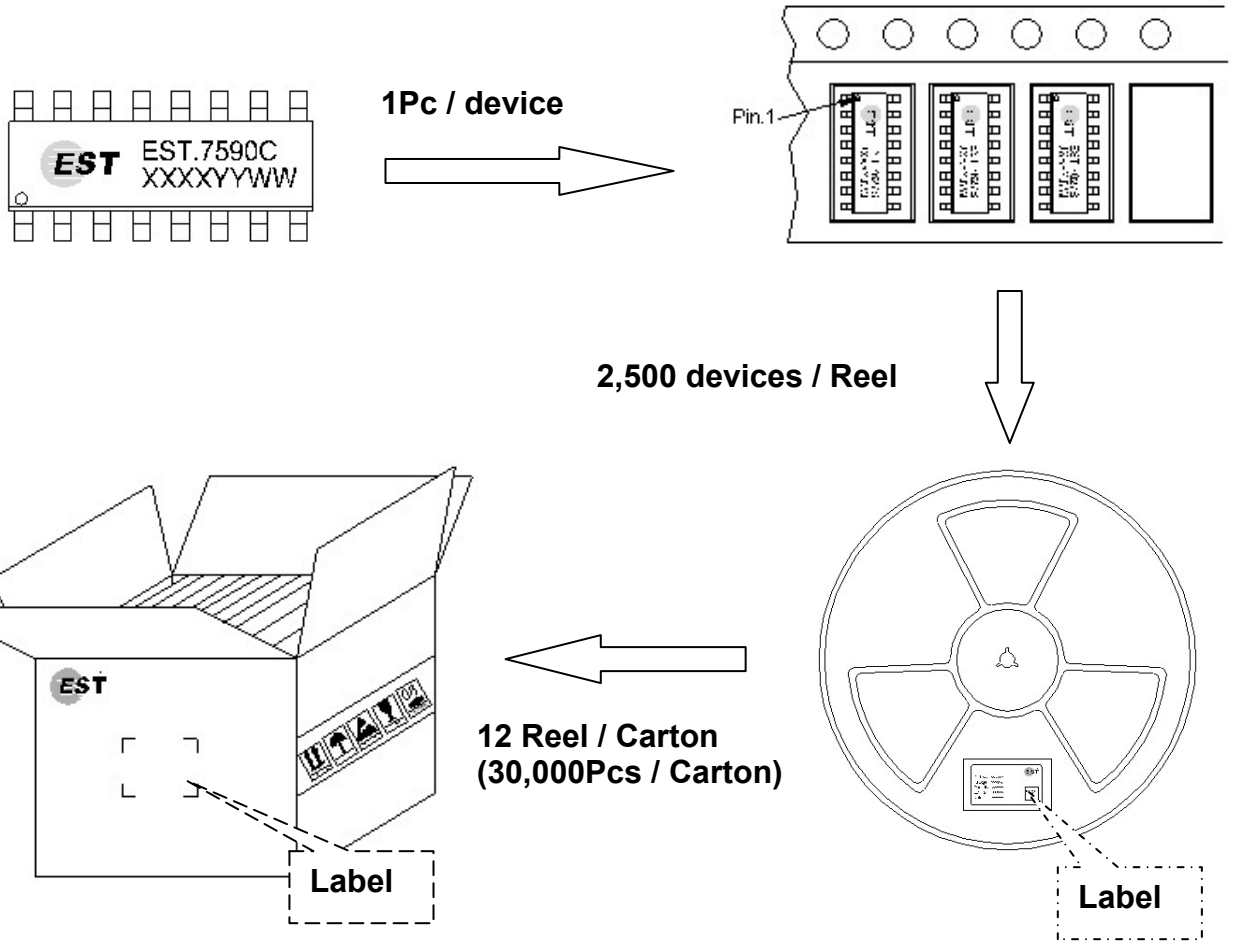


Symbols	Dimensions In inch		Dimensions In millimeters	
	Min.	Max.	Min.	Max.
A	------	0.072	------	1.837
A1	0.004	0.010	0.095	0.263
A2	0.047	------	1.187	------
b	0.012	0.021	0.294	0.535
c	0.004	0.010	0.095	0.263
D	0.390 BSC		9.900 BSC	
E	0.236 BSC		6.000 BSC	
E1	0.154 BSC		3.900 BSC	
e	0.050 BSC		1.270 BSC	
L	0.015	0.052	0.380	1.333
θ	0°	8°	0°	8°

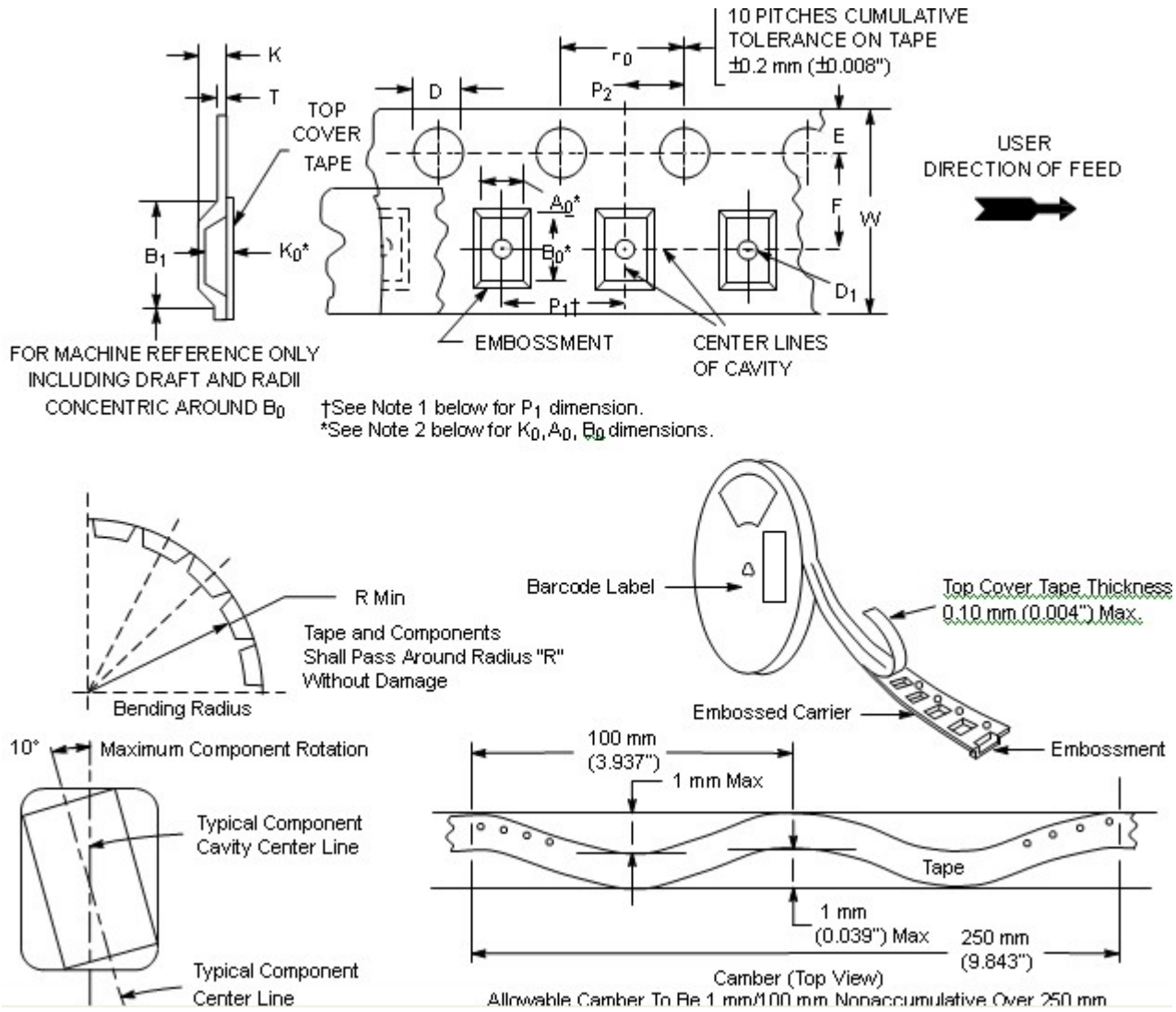
Shipping packing :

★SOP-16 tape & Reel:





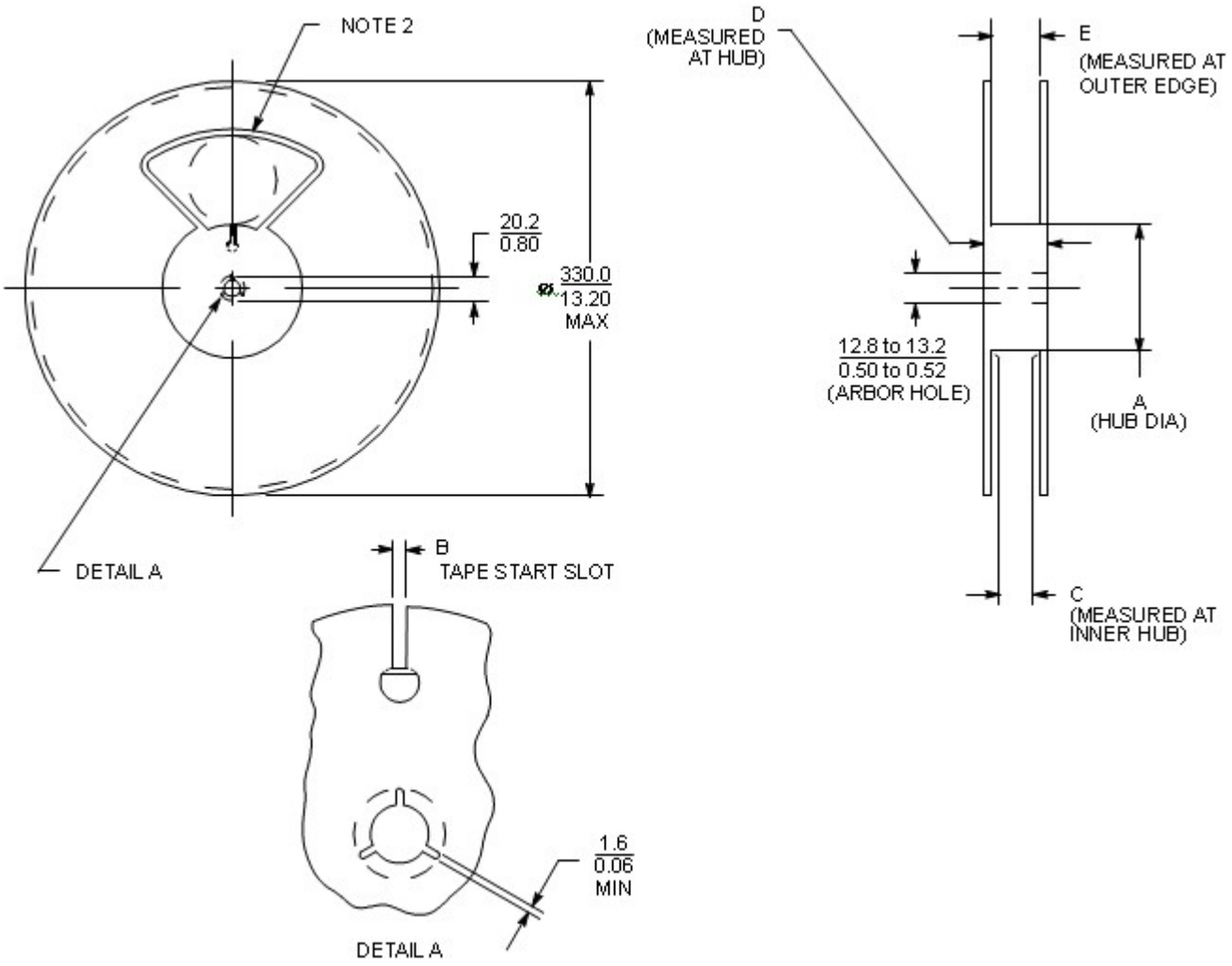
Embossed Tape and Reel Data Carrier Tape Specifications



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 (0.179)	1.5 + 0.1 mm − 0.0 (0.059 +0.004 − 0.0)	1.0 Min (0.039) or 0.5 mm Min (0.020)	1.75 ± 0.1 mm (0.069 ± 0.004)	3.5 ± 0.05 mm (0.138 ± 0.002)	2.4 mm Max (0.094)	4.0 ± 0.1 mm (0.157 ± 0.004)	2.0 ± 0.1 mm (0.079 ± 0.002)	25 mm (0.98)	0.6 mm (0.024)	8.3 mm (0.327)
12 mm	8.2 mm (0.323)		1.5 mm Min (0.060)		5.5 ± 0.05 mm (0.217 ± 0.002)	6.4 mm Max (0.252)			30 mm (1.18)		12 ± 0.30 mm (0.470 ± 0.012)
16 mm	**12.1 mm (0.476")**				**7.5 ± 0.10 mm (0.295 ±0.004)**	**7.9 mm Max(0.311)**					**16.3 mm (0.642)**
24 mm	20.1 mm (0.791)				11.5 ± 0.1 mm (0.453 ± 0.004)	11.9 mm Max (0.468)					24.3 mm (0.957)

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)