

**Description**

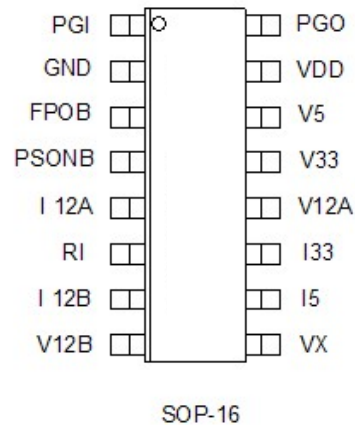
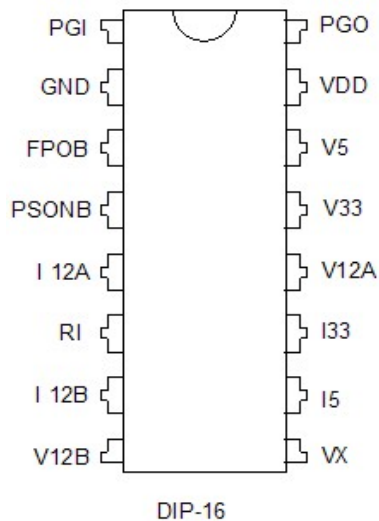
The EST7627A is a PC switching power supply monitor with minimum external components. It provides protection circuits, power-good output (PGO), fault protection output (FPOB) and on/off control (PSONB).

The over-voltage protection (OVP) and under-voltage protection (UVP) monitors V33, V5, V12A and V12B. The over-current protection (OCP) monitors V33&I33, V5&I5, V12A&I12A and V12B&I12B. The VX pin provides an extra protection function. When an OV, UV, OC or VX 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, OC, VX 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**

- Over-voltage protection (OVP) for +3.3V, +5V, +12VA and +12VB supplies
- Under-voltage protection (UVP) for +3.3V, +5V, +12VA and +12VB supplies
- Over-current protection (OCP) for +3.3V, +5V, +12VA and +12VB supplies
- The VX pin provides an extra protection function.
- Fault protection output (FPOB) with open drain output
- Power good output (PGO) with open drain output
- 75ms UVP/OCP/VX delay time
- 300ms PGO delay time
- 38ms PSONB debounce time
- 14us OVP debounce time
- 60us UVP/VX debounce time
- 20ms OCP debounce time
- 73us PGI debounce time
- 4ms FPOB turn off delay time

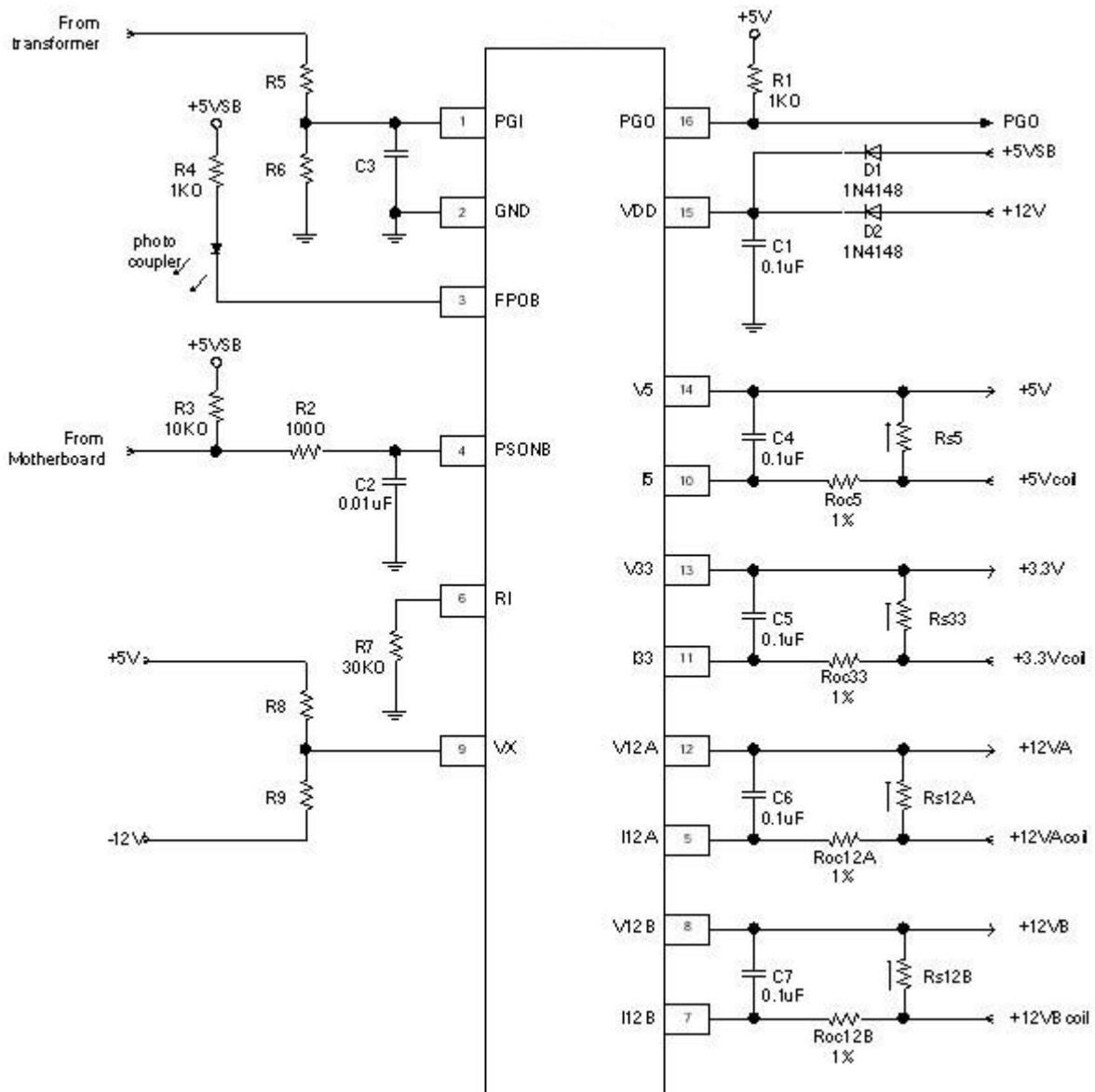
**Pin Configuration (Top View)**



**Ordering Information**

Order Number	Package Type	Packing	Top Marking	Note
EST7627A	PDIP-16 (Pb-free)	Tube	EST.7627A	Green Package
EST7627AS	SOP-16 (Pb-free)	Tube	EST.7627AS	Green Package
EST7627ASR	SOP-16 (Pb-free)	Tape & Reel	EST.7627AS	Green Package

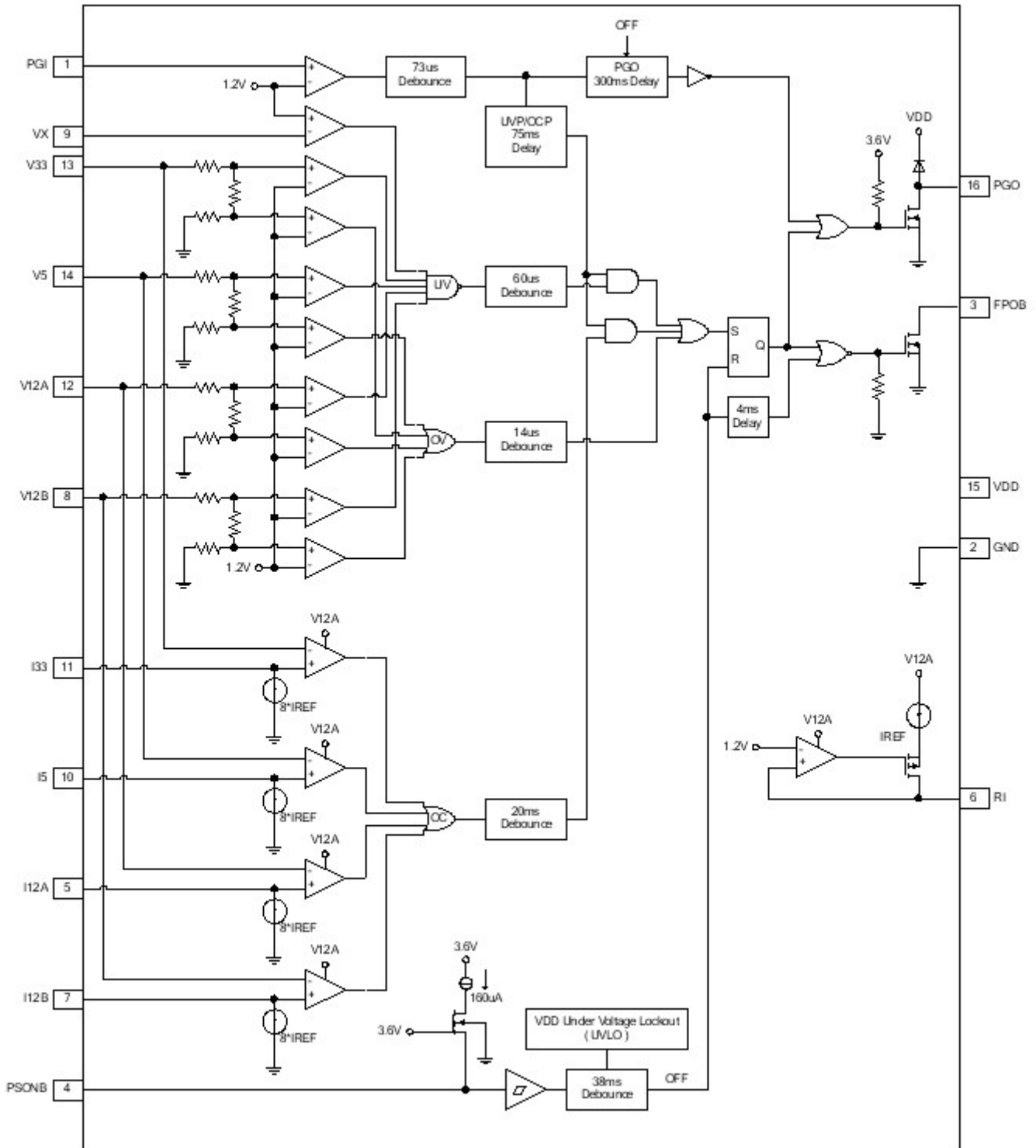
**Typical Application Circuit**



**Pin Description**

Pin Number	Pin Name	Function
1	PGI	AC power good input pin.
2	GND	Ground.
3	FPOB	Open drain output of the fault protection.
4	PSONB	ON/OFF control input pin.
5	I12A	+12VA over current protection sense input.
6	RI	Current sense adjustment input.
7	I12B	+12VB over current protection sense input.
8	V12B	+12VB input pin for OVP, UVP and OCP.
9	VX	Extra protection sense pin.
10	I5	+5V over current protection sense input.
11	I33	+3.3V over current protection sense input.
12	V12A	+12VA input pin for OVP, UVP and OCP.
13	V33	+3.3V input pin for OVP, UVP and OCP.
14	V5	+5V input pin for OVP, UVP and OCP.
15	VDD	Power supply.
16	PGO	Open drain output of power good signal.

**Block Diagram**



### Absolute Maximum Ratings

Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter	Symbol	Min.	Max.	Units
Supply Voltage	V <sub>DD</sub> ,V12A	-0.3	16	V
Supply Voltage Rising Time	V <sub>DD</sub>	1	-	ms
Input Voltage	PGI,PSONB,V5,V33,VX	-0.3	7	V
	V12B	-0.3	16	V
	I5,I33,RI	-0.3	V12A + 0.3 (Max. 16V)	V
	I12A,I12B	-0.3	V12A + 0.6 (Max. 16V)	V
Output Voltage	FPOB	-0.3	16	V
	PGO	-0.3	V <sub>DD</sub> + 0.3 (Max. 16V)	V
Operating Temperature Range		-40	85	°C
Storage Temperature Range		-65	150	°C
Soldering Temperature		-	260	°C

### Electrical Characteristics (T<sub>A</sub>=25°C, V<sub>DD</sub> = 5V, unless otherwise noted.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
<b>VDD Power Supply</b>						
VDD Operating Voltage	V <sub>DD</sub>		4	5	15	V
IDD Supply Current	I <sub>DD</sub>	PSONB=5V	-	0.5	1	mA
VDD Start-up Voltage			-	3.4	3.6	V
VDD Under Voltage Lockout after Start-up			2.8	3.0	-	V
<b>Over Voltage and Under Voltage Detection</b>						
PGI Threshold Voltage	PGI		1.16	1.20	1.24	V
Over Voltage Threshold	V33		3.9	4.0	4.1	V
	V5		5.8	6.0	6.2	V
	V12A,V12B		13.5	13.85	14.2	V
	VX	Use UVP timing	1.16	1.20	1.24	V
Under Voltage Threshold	V33		2.65	2.8	2.95	V
	V5		4.1	4.3	4.47	V
	V12A,V12B		9.18	9.5	9.82	V
Temperature Coefficient of Voltage	TCV1		-0.02	-	0.02	%/°C
<b>Over Current Protection (OCP)</b>						
Input Offset Voltage of OCP Comparators	Vos		-3	0	3	mV
Output Voltage of RI pin	RI		1.16	1.20	1.24	V
Ratio of Pull-down Current to RI pin Sink Current	K		7.5	8	8.5	
Pull-down Current	I33,I5, I12A,I12B	RI=30KΩ	290	320	350	uA

**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$ ,  $V_{DD} = 5\text{V}$ , unless otherwise noted.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
<b>Output</b>						
Low Level Output Voltage	$V_{OL (FPOB)}$	$I_{SINK}=20\text{mA}$	-	-	0.4	V
	$V_{OL (PGO)}$	$I_{SINK}=20\text{mA}$	-	-	0.4	V
Leakage Current of FPOB and PGO	$I_{LKG}$		-1	0	1	$\mu\text{A}$
<b>PSOVB Control</b>						
High Level Input Voltage	$V_{IH}$		1.8	1.55	-	V
Low Level Input Voltage	$V_{IL}$		-	1.25	1.0	V
Pull-up Current			60	160	260	$\mu\text{A}$
<b>Timing</b>						
PSOVB Debounce Time	$t_{db1}$		24	38	52	mS
OVP Debounce Time	$t_{db2}$		20	14	50	$\mu\text{S}$
UVP/VX Debounce Time	$t_{db3}$		47	60	100	$\mu\text{S}$
OCP Debounce Time	$t_{db4}$		15	20	25	mS
PGI Debounce Time	$t_{db5}$		47	73	100	$\mu\text{S}$
PGO Delay Time	$t_{delay1}$		200	300	400	mS
FPOB Turn-off Time (PGO to FPOB)	$t_{delay2}$		2	4	6	mS
UVP/OCP/VX Enable Delay Time	$t_{delay3-1}$	PGI < 1.2V typ.	Disable UVP/OCP check			
	$t_{delay3-2}$	PGI > 1.2V typ.	49	75	100	mS

**Timing Diagram**

Fig.1 Normal → Short Circuit → OVP

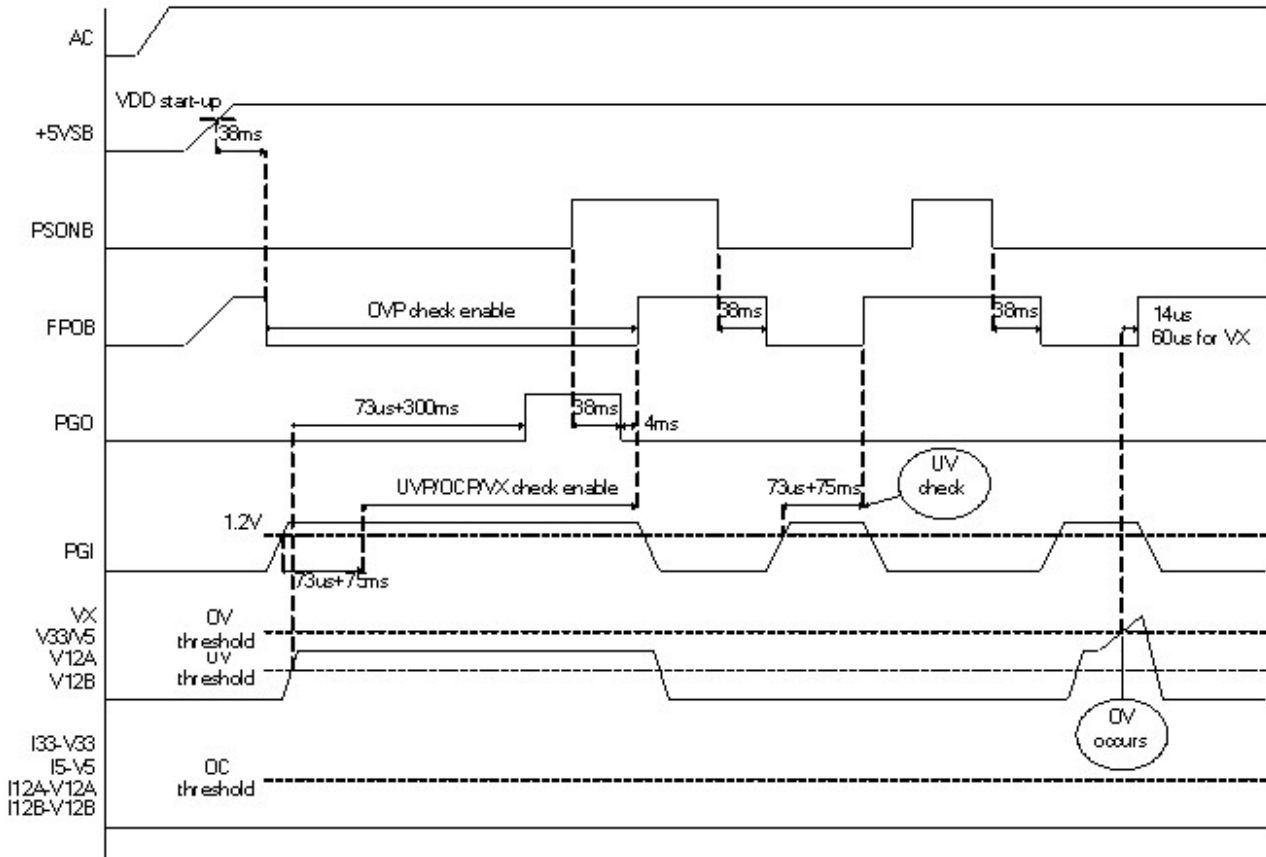
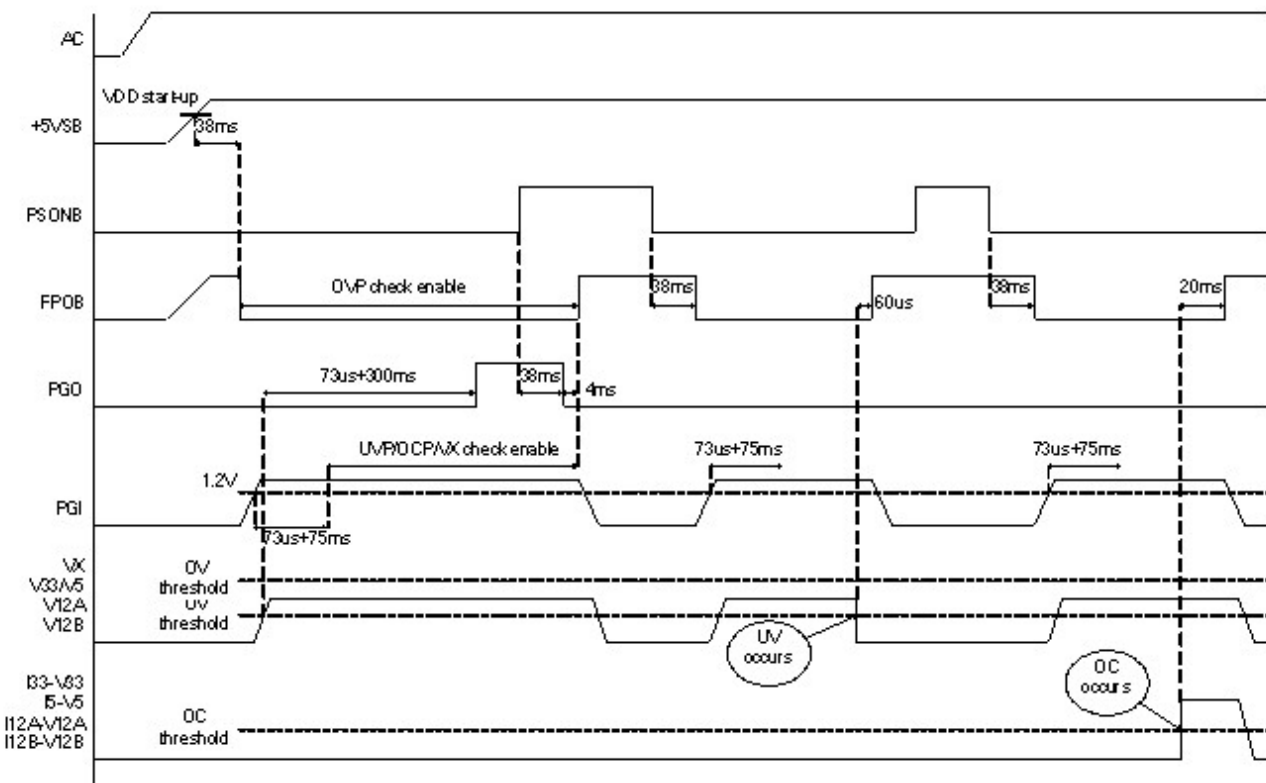


Fig.2 Normal → UVP → OCP

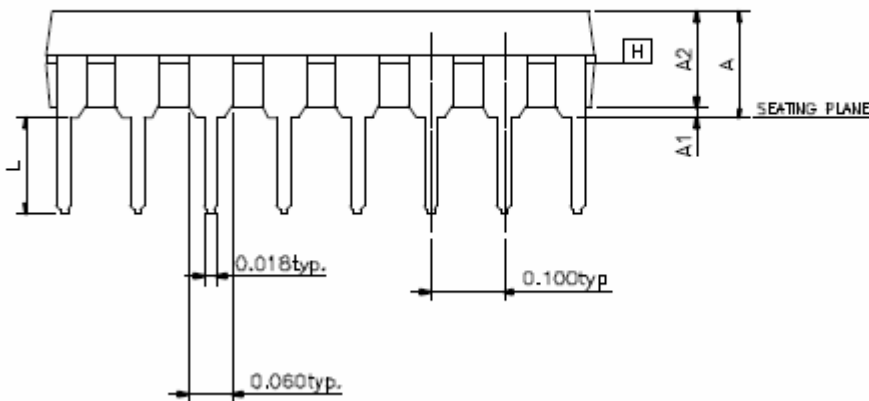
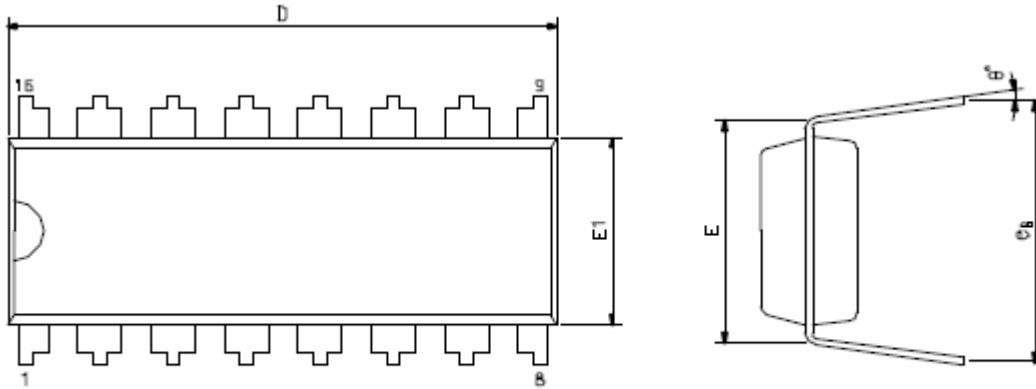




**Package Outlines**

Package Dimensions  
 PDIP-16 (300mil)

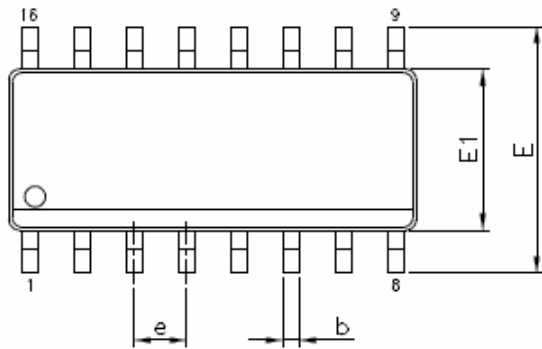
Plastic Dual In-line Package  
 UNIT : inch / mm



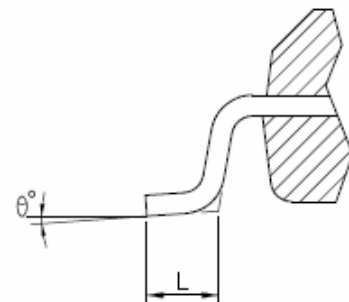
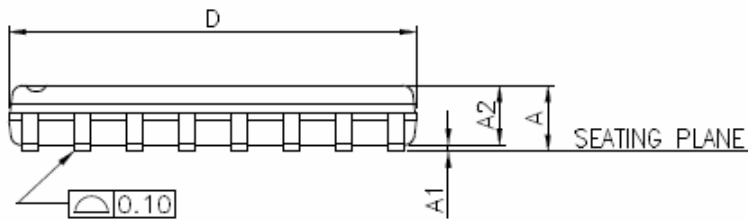
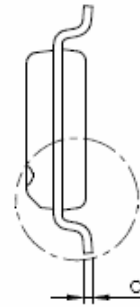
Symbols	Dimensions in inches			Dimensions in millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	---	---	0.215	---	---	5.461
A1	0.010	---	---	0.254	---	---
A2	0.120	0.133	0.145	3.048	3.378	3.683
D	0.730	0.755	0.780	18.542	19.177	19.812
E	0.300 BSC			7.620 BSC		
E1	0.240	0.253	0.265	6.096	6.426	6.731
L	0.110	0.133	0.155	2.794	3.378	3.937
eB	0.300	0.350	0.430	7.620	8.890	10.922
θ	0°	7°	15°	0°	7°	15°



Package Dimensions  
 SOP-16 (Standard)



Small Outline Package  
 UNIT : inch / mm



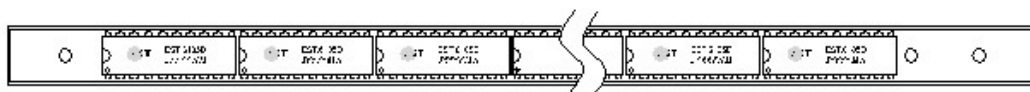
Symbols	Dimensions In inch		Dimensions In millimeters	
	Min.	Max.	Min.	Max.
A	-----	0.072	-----	1.837
A1	0.004	0.010	0.095	0.263
A2	0.047	-----	1.187	-----
b	0.012	0.021	0.294	0.535
c	0.004	0.010	0.095	0.263
D	0.390 BSC		9.900 BSC	
E	0.236 BSC		6.000 BSC	
E1	0.154 BSC		3.900 BSC	
e	0.050 BSC		1.270 BSC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

**Packing Information:**

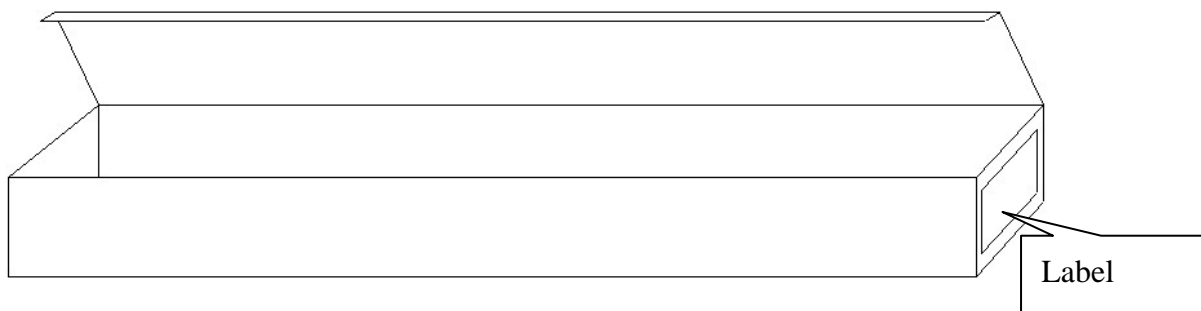
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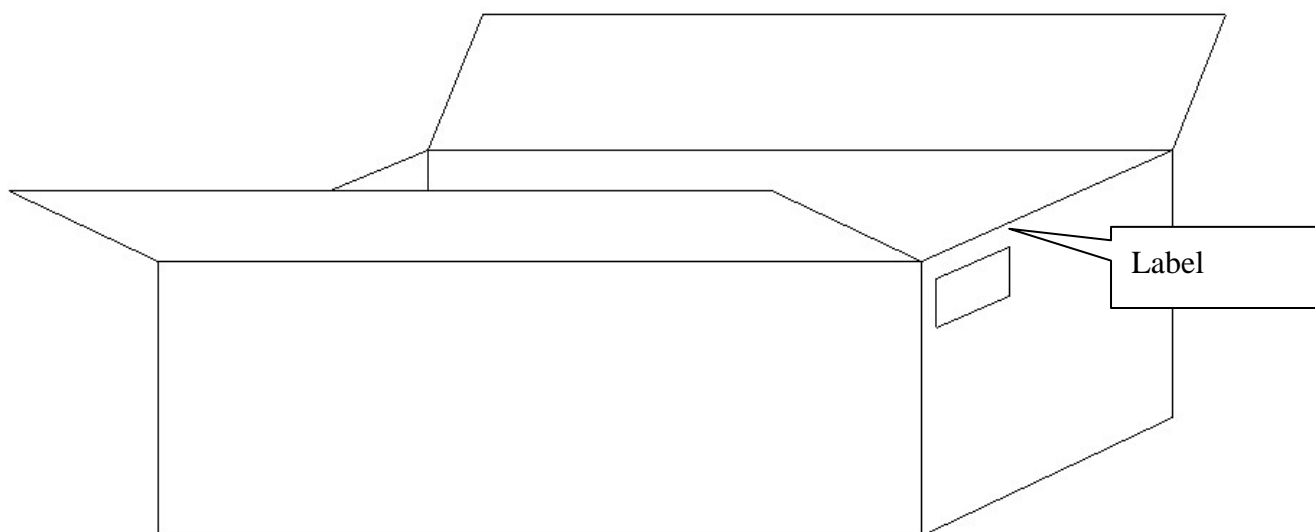
↓ 25Pcs / Tube



↓ 40Tube / Inner Box  
(1,000Pcs / Inner Box)



↓ 10 Inner Boxes / Carton  
(10,000Pcs / Carton)



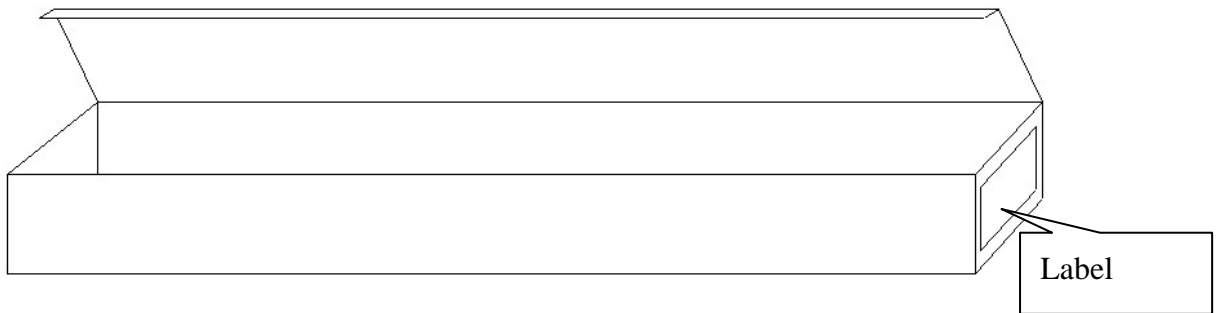
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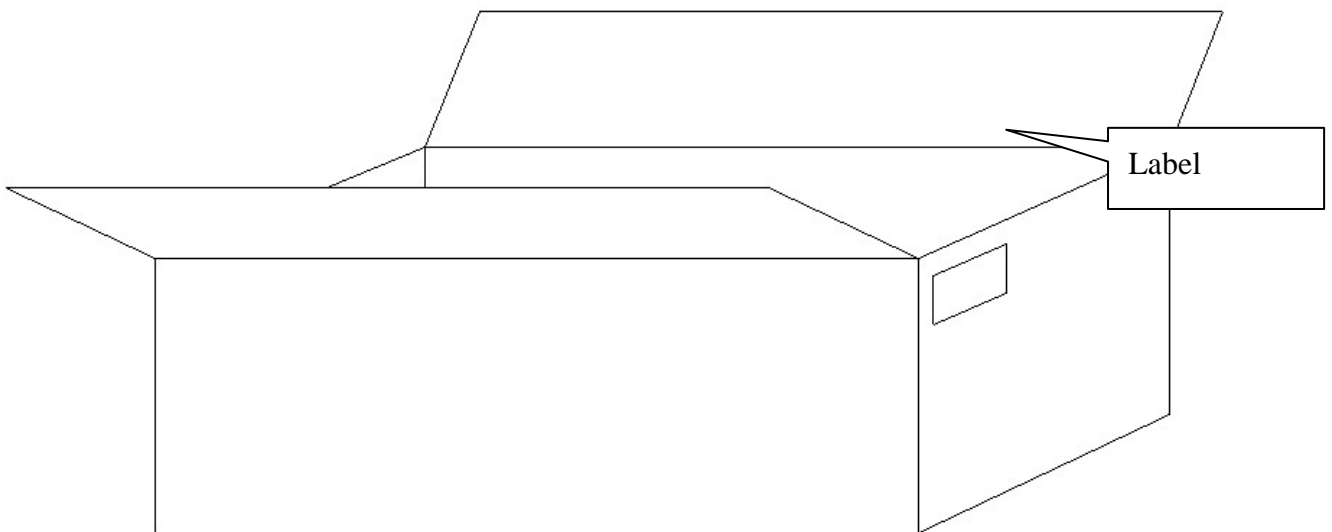
↓ 25Pcs / Tube



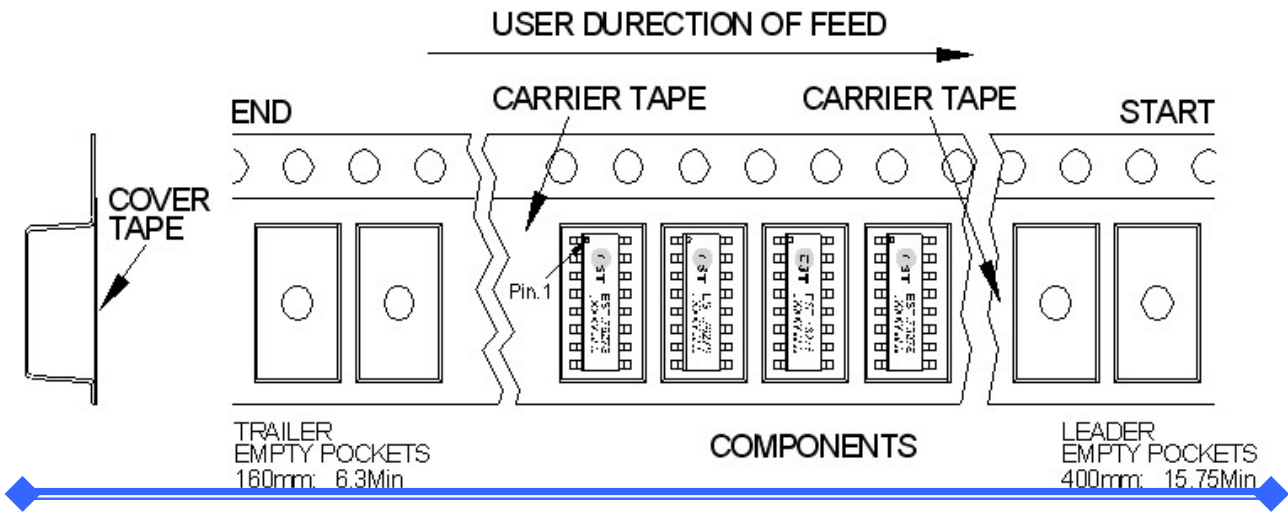
↓ 40Tube / Inner Box  
(1,000Pcs / Inner Box)



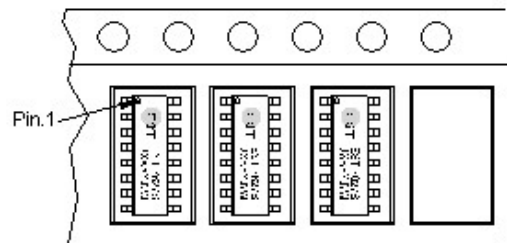
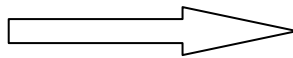
↓ 10 Inner Boxes / Carton  
(10,000Pcs / Carton)



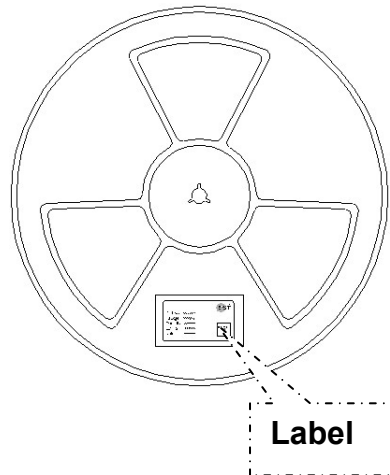
★SOP-16 tape & Reel:



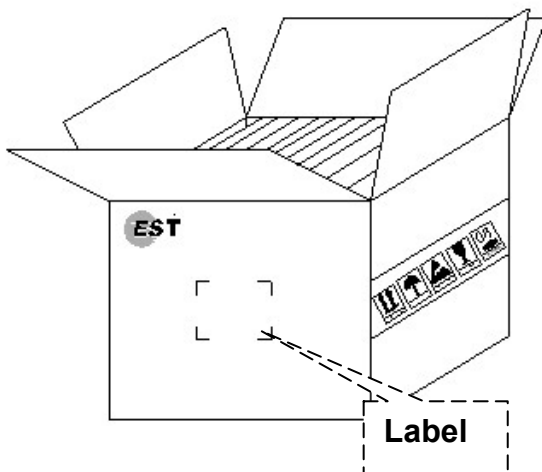
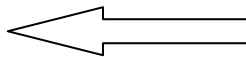
1Pc / device



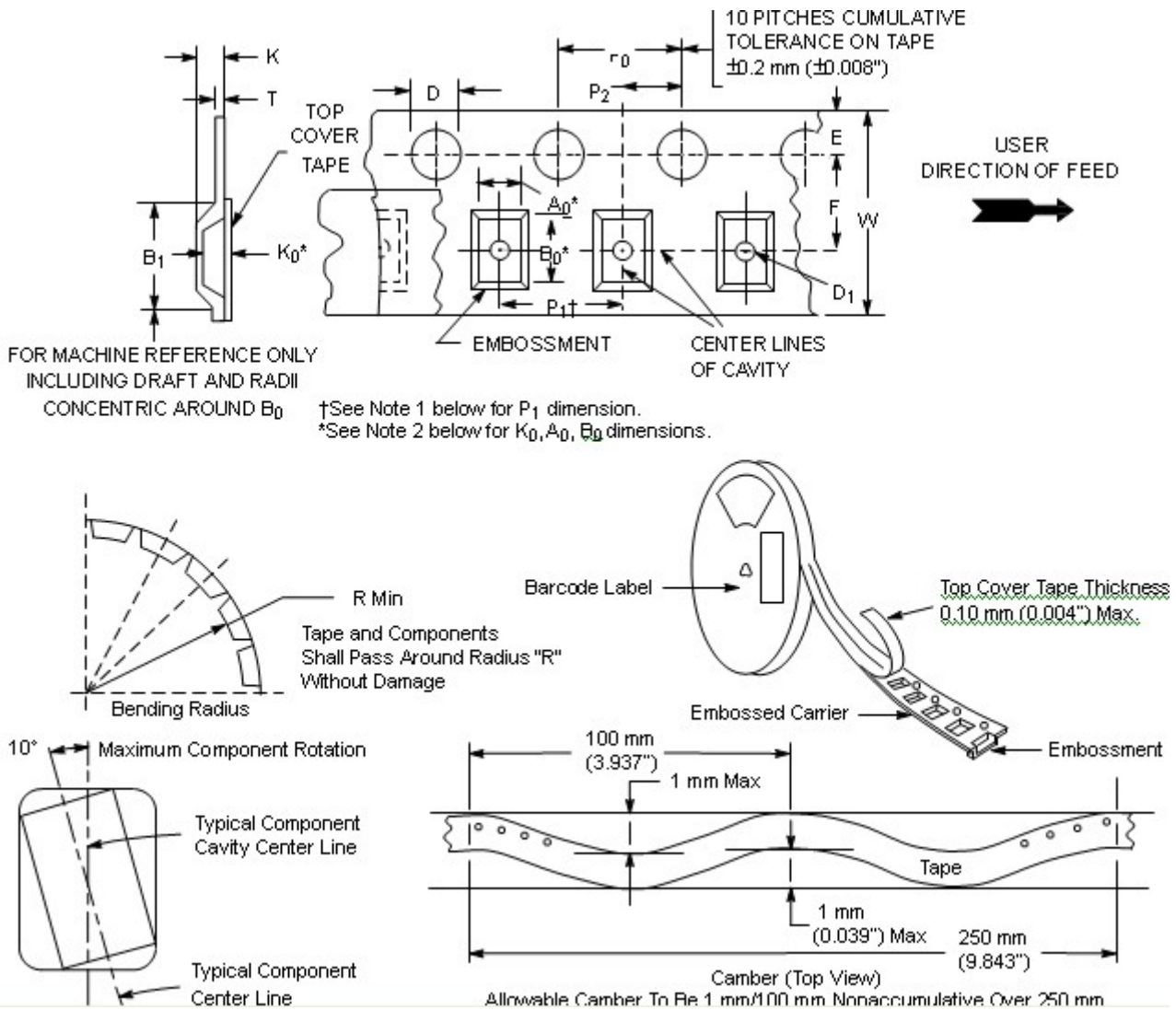
2,500 devices / Reel



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



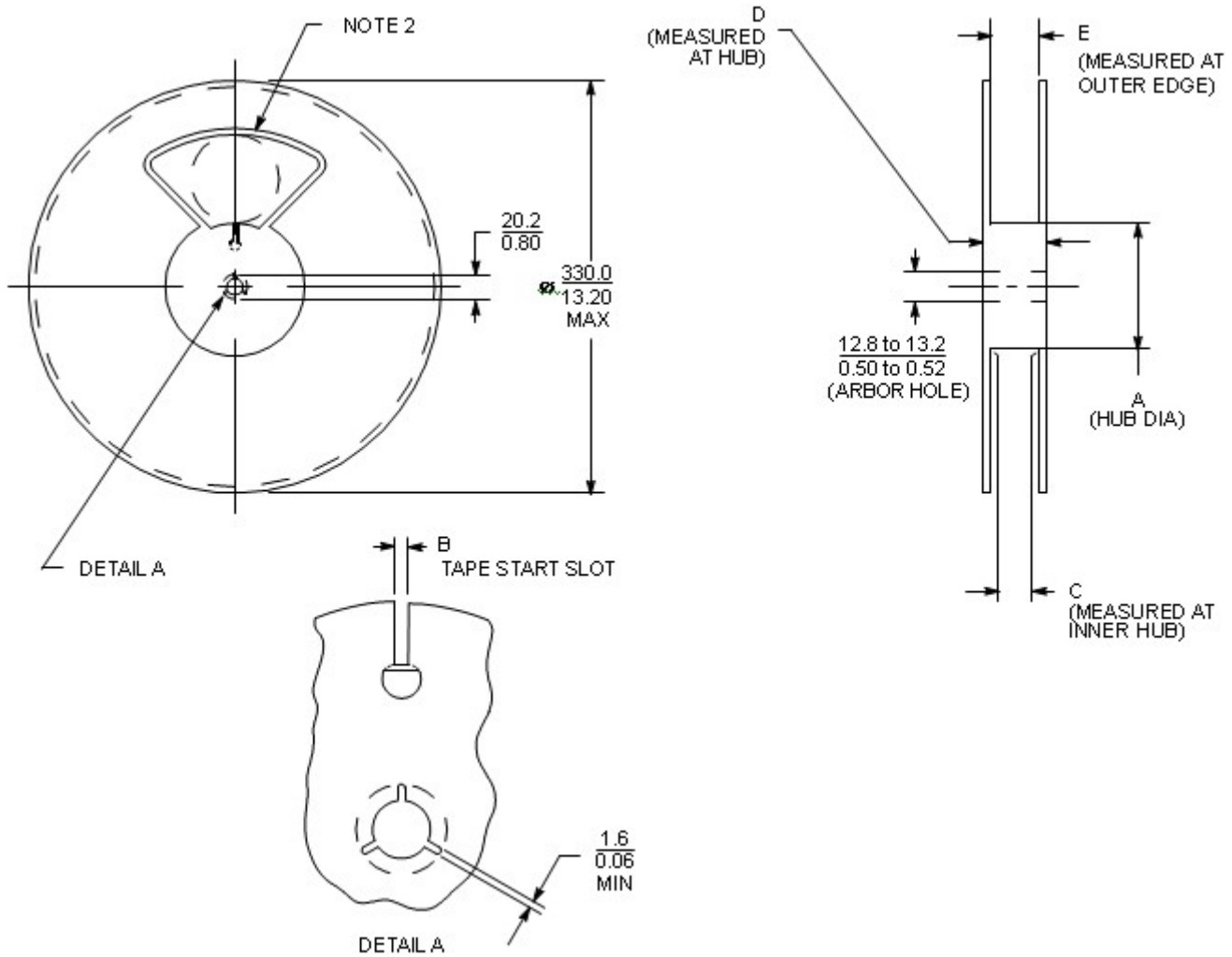
**Embossed Tape and Reel Data Carrier Tape Specifications**



**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 (0.059 +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)					
16 mm	12.1 mm (0.476")		7.5 ± 0.10 mm (0.295 ± 0.0043)		7.9 mm Max(0.3113)	24.3 mm (0.9573)					
24 mm	20.1 mm (0.791)		11.5 ± 0.1 mm (0.453 ± 0.0043)		11.9 mm Max (0.4683)						

**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)
<b>330.0 (12.99)</b>	<b>16.0 (0.63)</b>			<b>6.5 (0.26)</b>	<b>7.5 (0.30)</b>	<b>16.4 (0.65)</b>	<b>18.4 (0.72)</b>	<b>22.4 (0.88)</b>	<b>19.4 (0.76)</b>
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)