EST7618
2-Channel of OCP PC Power Supply Supervisors

Description

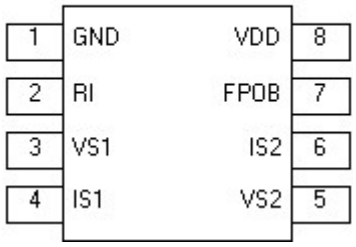
The EST7618 provides over-current protection (OCP) circuits and fault protection output (FPOB).

The over-current protection (OCP) monitors VS1&IS1 and VS2&IS2. When an OC condition is detected, the fault protection output (FPOB) is high.

Features

- Over-current protection (OCP).
- Fault protection output (FPOB) with open drain output
- 75ms OCP delay time
- 160us / 320us OCP debounce time

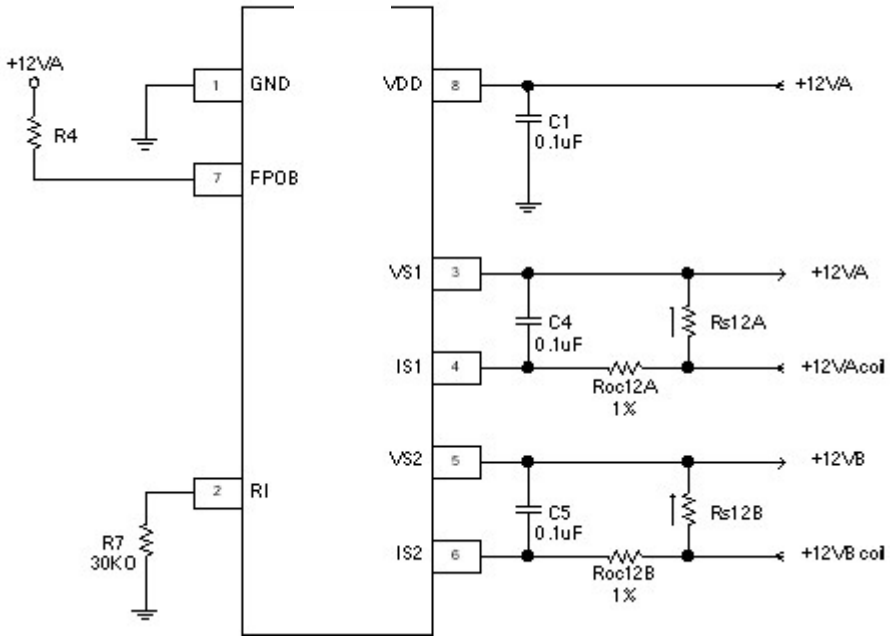
Pin Configuration (Top View)



Ordering Information

Order Number	Package Type	Packing	Top Marking	Note
EST7618	DIP-8 (Pb-free)	Tube	EST.7618	Green Package
EST7618S	SOP-8 (Pb-free)	Tube	EST.7618S	Green Package
EST7618SR	SOP-8 (Pb-free)	Tape & Reel	EST.7618S	Green Package

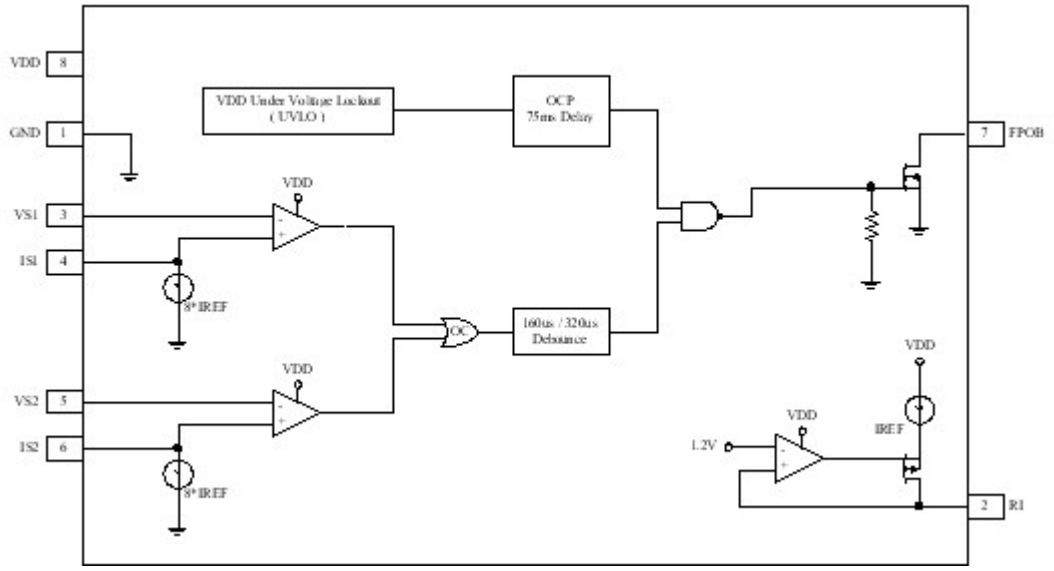
Typical Application Circuit



Pin Description

Pin Number	Pin Name	Function
1	GND	Ground.
2	RI	Current sense adjust input.
3	VS1	1st over current protection sense input.
4	IS1	1st over current protection sense input.
5	VS2	2nd over current protection sense input.
6	IS2	2nd over current protection sense input.
7	FPOB	Open drain output of the fault protection.
8	VDD	Power supply.

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.

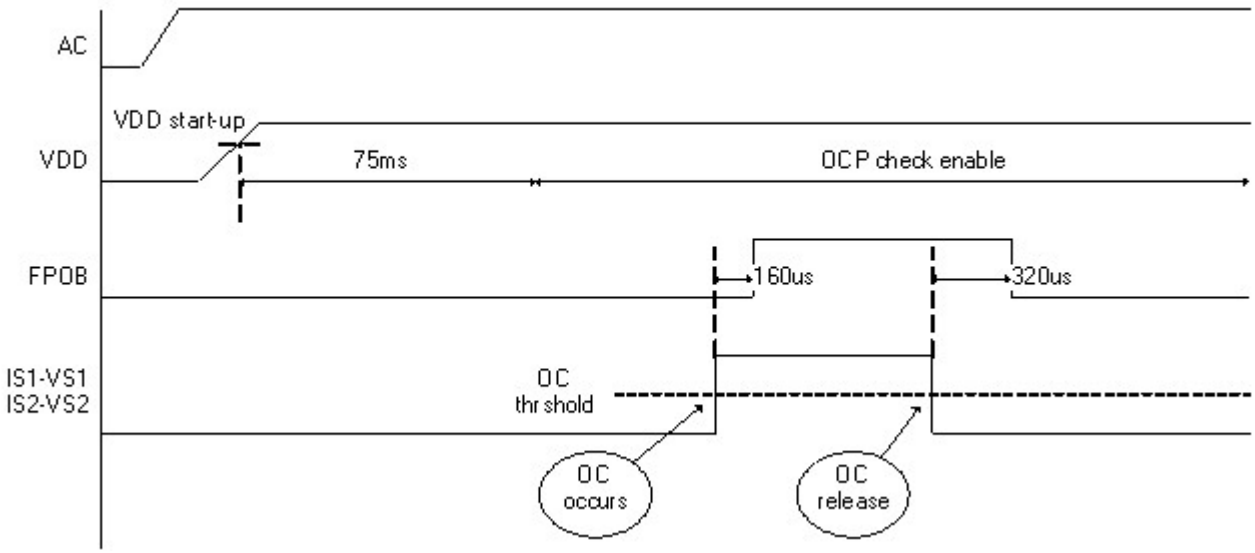
Parameter	Symbol	Min.	Max.	Units
Supply Voltage	V_{DD}	-0.3	16	V
Supply Voltage Rising Time	V_{DD}	1	-	ms
Input Voltage	RI	-0.3	7	V
	VS1,VS2,IS1,IS2	-0.3	V_{DD} +0.6 (Max. 16V)	V
Output Voltage	FPOB	-0.3	16	V
Operating Temperature Range		-40	85	°C
Storage Temperature Range		-65	150	°C
Soldering Temperature		-	260	°C

Electrical Characteristics (T_A=25℃, V_{DD} = 12V, unless otherwise noted.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
VDD Power Supply						
VDD Operating Voltage	V_{DD}		10	12	15	V
IDD Supply Current	I_{DD}	V_{DD} = 5V	-	0.5	1	mA
VDD Start-up Voltage			-	9.0	9.4	V
VDD Under Voltage Lockout after Start-up			7.6	8.0	-	V
Over Current Protection (OCP)						
Input Offset Voltage of OCP Comparators	Vos		-6	0	6	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	IS1,IS2	RI=30KΩ	290	320	350	uA
Output						
Low Level Output Voltage	$V_{OL\ (FPOB)}$	I_{SINK}=20mA	-	-	0.4	V
Leakage Current of FPOB	I_{LKG}		-1	0	1	uA
Timing						
Debounce Time of OCP active	t_{db2}		120	160	200	uS
Debounce Time of OCP release	t_{db3}		240	320	400	uS
OCP Enable Delay Time	$t_{delay3-2}$		49	75	100	mS

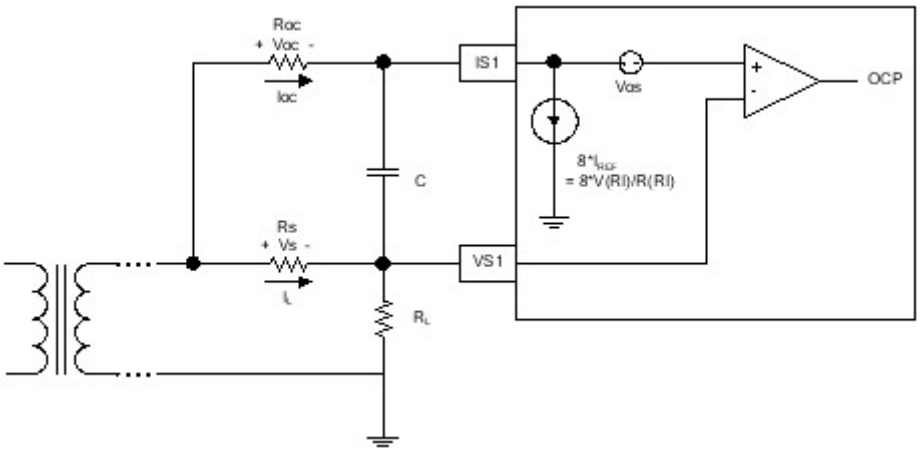
Timing Diagram

Fig.1 Normal ➔ OCP



Application Hints

Over Current Protection（OCP）



The Over-Current Protection（OCP）monitors VS1&IS1 and VS2&IS2. When an over-current condition appears more than 160us, the FPOB output goes high.

The resistor of RI pin connected to ground will provide a precise current IREF for the OCP operation. The input offset voltage Vos of OCP comparators are typical 0mV. We suggest that the OCP sense voltage Vs is large than 100mV. And the capacitor C is used to avoide power on fail or dynamic load fail. We suggest C > 0.1uF.

As shown in above, the over current of IL is determined by Rs, Roc and Ioc.

$$I_{REF} = \frac{V(RI)}{R(RI)} \quad \cdots\cdots\cdots(1)$$

$$I_{L\_ocp} \times Rs = (Ioc \times Roc) + Vos$$

$$\Rightarrow Roc = \frac{\left[(I_{L\_ocp} \times Rs) - Vos\right]}{8 \times I_{REF}} \quad \cdots\cdots\cdots(2)$$

Following is an example on calculating Roc.

Let I_{L_OCP} =20A, Rs=5mΩ, V(RI)=1.2V, R(RI)=30KΩ, V_{OS}=0mv

$$I_{REF} = \frac{V(RI)}{R(RI)} = \frac{1.2}{30K\Omega} = 40uA$$

$$Roc = \frac{\left[(I_{L\_ocp} \times Rs) - Vos\right]}{8 \times I_{REF}} = \frac{20A \times 5m\Omega - 0mv}{8 \times 40uA} = 312.5\Omega$$

The tolerance of parameter K, V(RI), R(RI), Roc and Rs would be proportioned to the tolerance of OCP current.

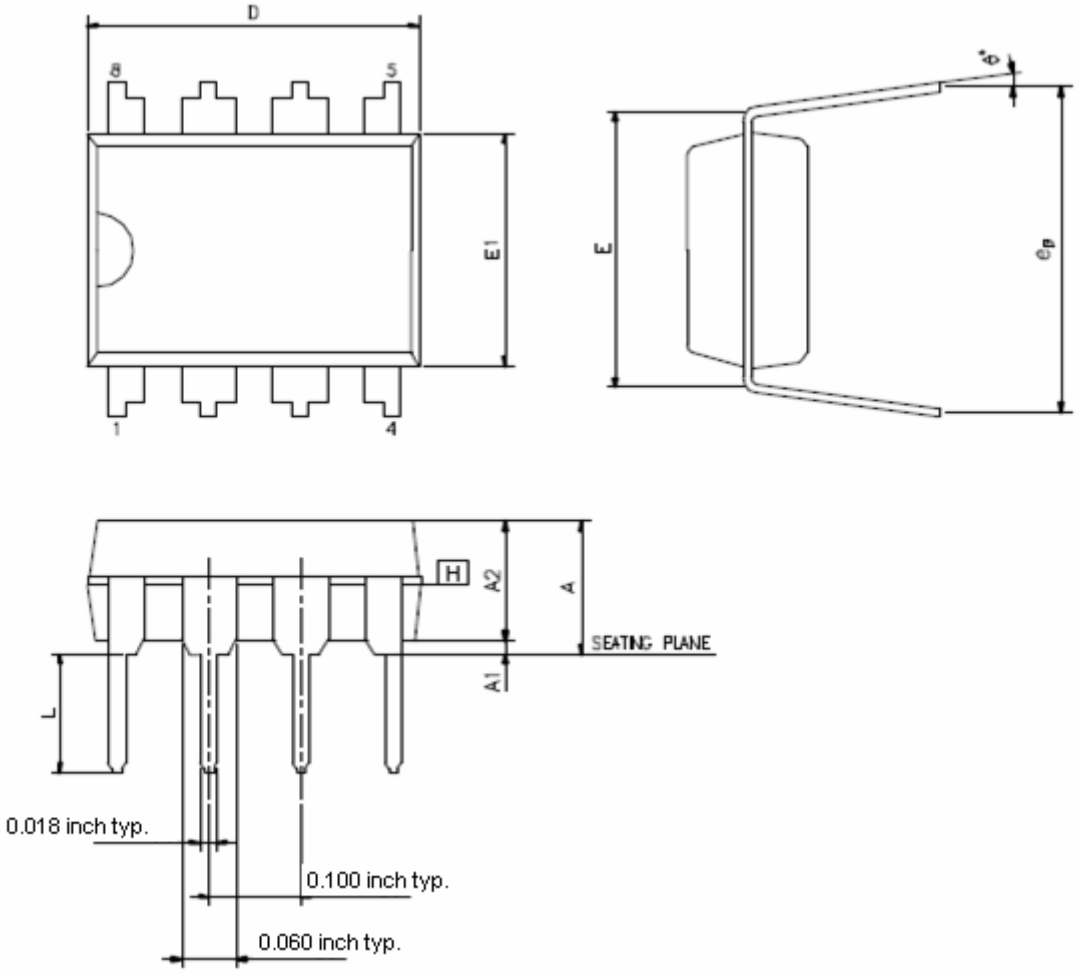
The ratio of $\frac{Vos}{(I_{L\_ocp} \times Rs)}$ would be proportioned to the tolerance of OCP current.

Let V_{OS}=± 6mv, I_{L_OCP} =20A, Rs=5mΩ, then the tolerance of OCP current is ± 6mv / 100mv = ± 6%

Package Outlines

PACKAGE DIMENSIONS
DIP 8

Plastic Dual In-line Package
UNIT : inch

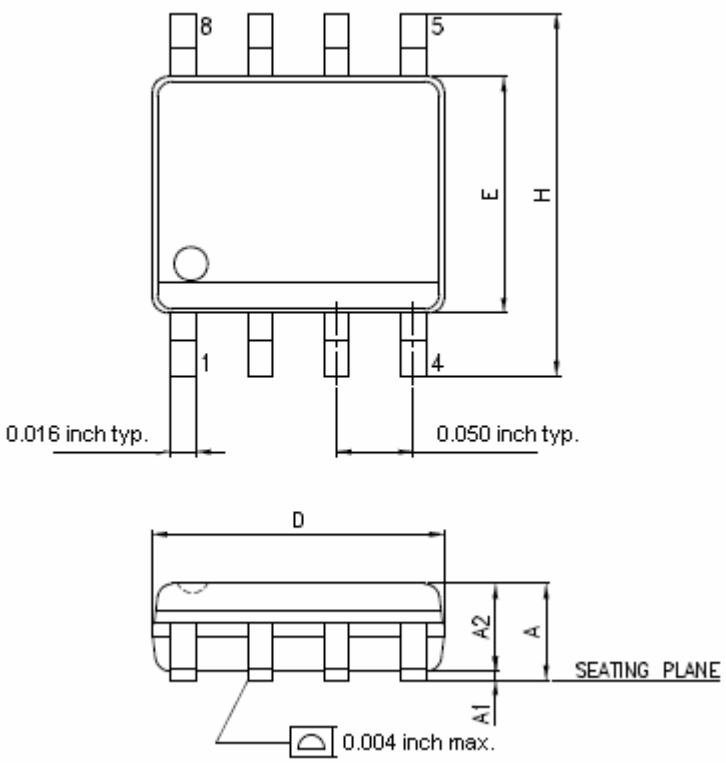


Symbols	Dimensions In Inches			Dimensions In millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	---	---	0.220	---	---	5.588
A1	0.014	---	---	0.356	---	---
A2	0.118	0.130	0.149	2.997	3.302	3.785
D	0.336	0.365	0.420	8.534	9.271	10.668
E	0.300 BSC			7.620 BSC		
E1	0.232	0.250	0.273	5.893	6.350	6.934
L	0.109	0.130	0.157	2.769	3.302	3.988
eB	0.300	0.355	0.430	7.620	9.017	10.922
θ	0°	7°	15°	0°	7°	15°

Package Outlines

PACKAGE DIMENSIONS
SOP 8

Small Outline Package
UNIT : inch

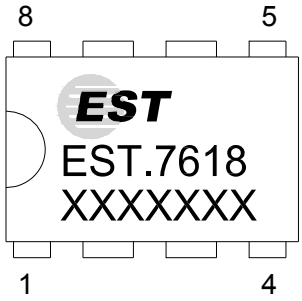


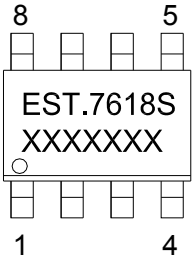
Symbols	Dimensions In Inches			Dimensions In millimeters		
	MIN.	NOR.	MAX.	MIN.	NOR.	MAX.
A	0.050	0.061	0.072	1.270	1.549	1.829
A1	0.000	------	0.010	0.000	------	0.254
A2	------	------	0.062	------	------	1.575
D	0.185	0.193	0.200	4.699	4.902	5.080
E	0.147	0.154	0.160	3.734	3.912	4.064
H	0.225	0.237	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°

Update History

Revision	Date	Update
1.00	August 06, 2010	Preliminary version

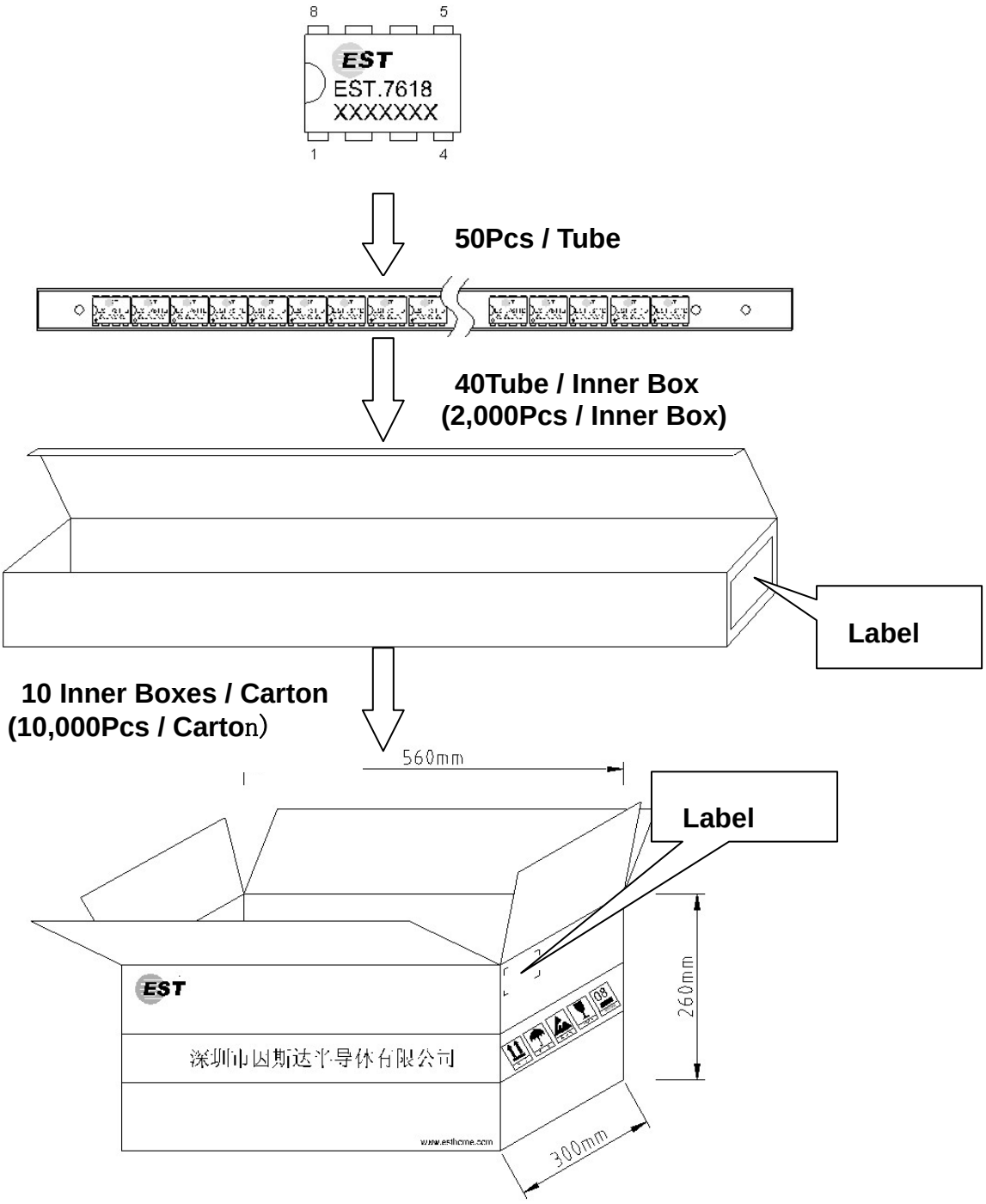
Top Marking:





Packing Information：

★DIP-8:



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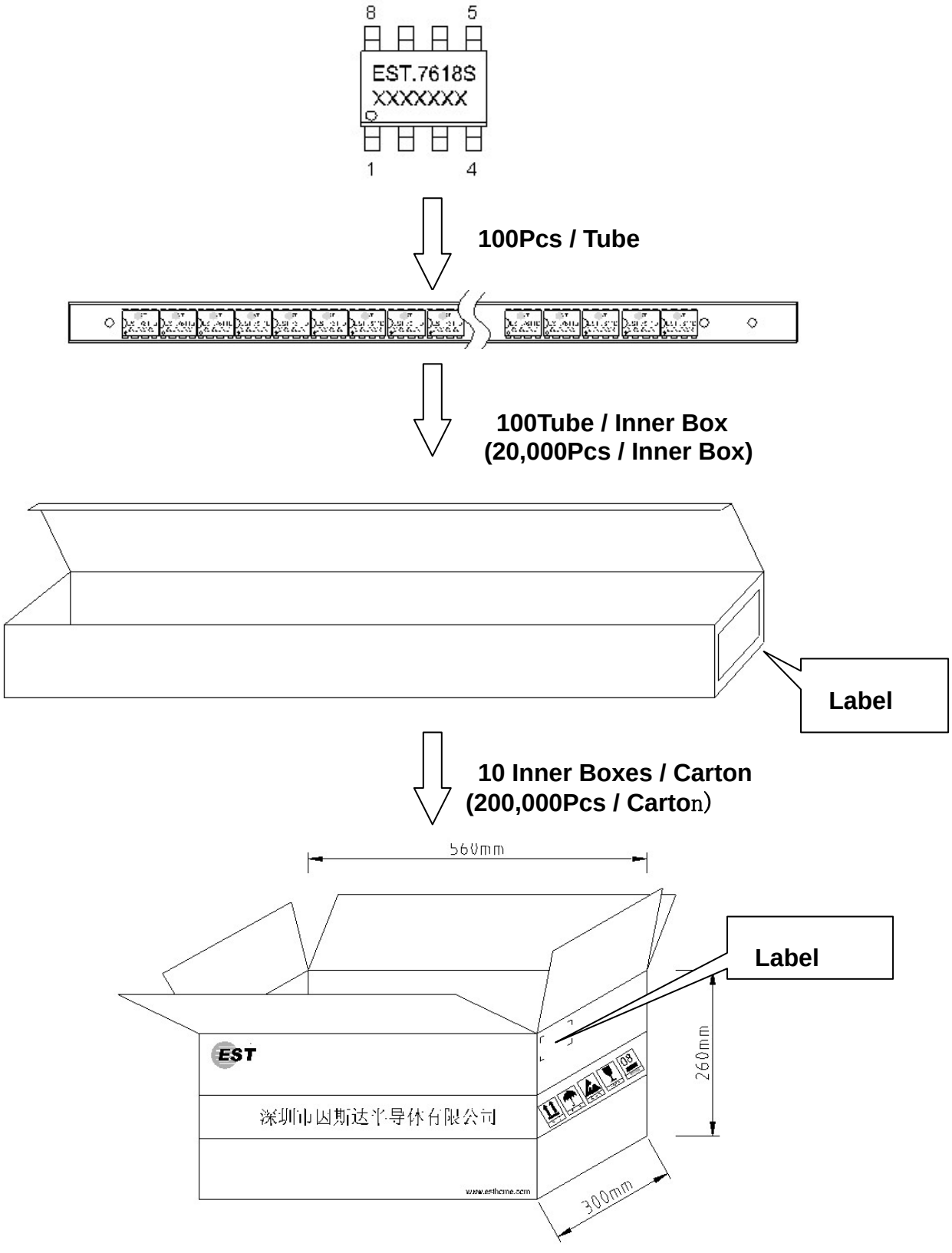
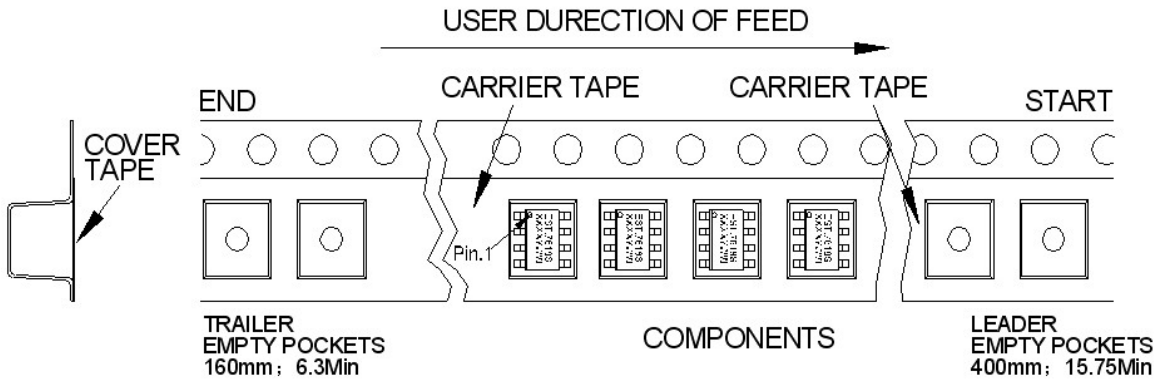
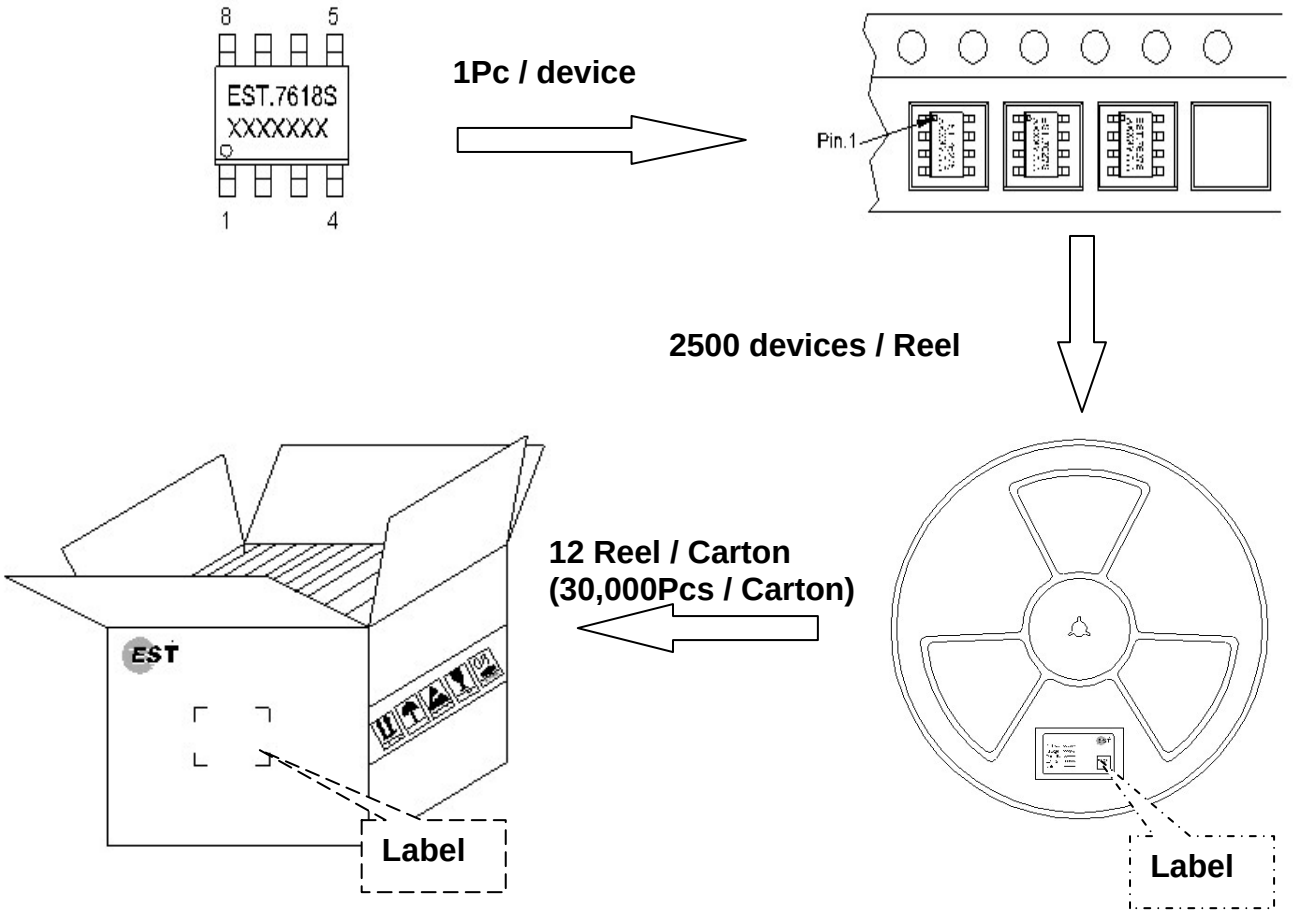

8
5
EST.7618S
XXXXXXX
1
4
100Pcs / Tube
100Tube / Inner Box
(20,000Pcs / Inner Box)
Label
10 Inner Boxes / Carton
(200,000Pcs / Carton)
560mm
Label
EST
深圳市因斯达半导体有限公司
www.esthome.com
260mm
300mm

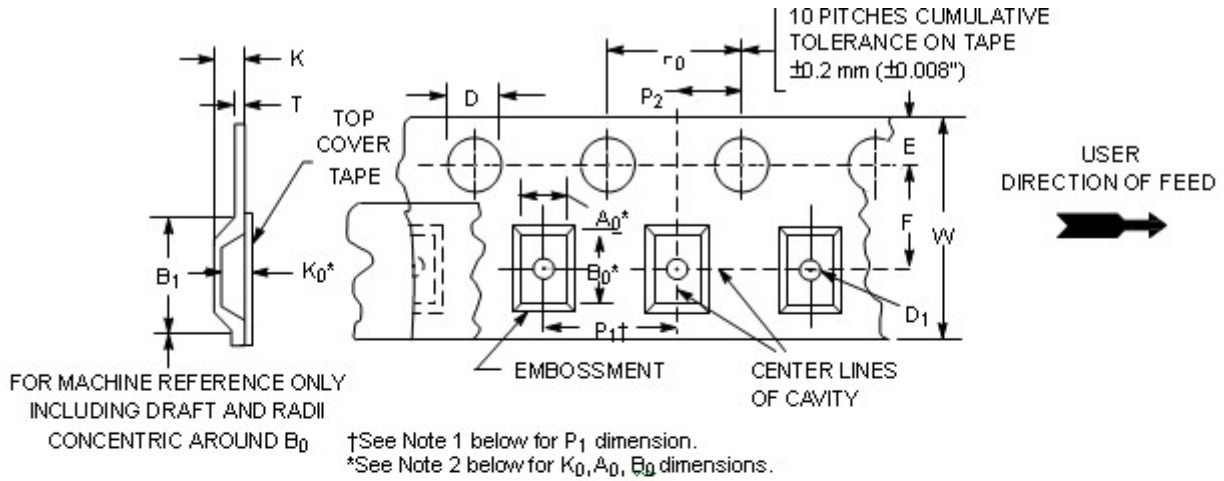
Shipping packing :

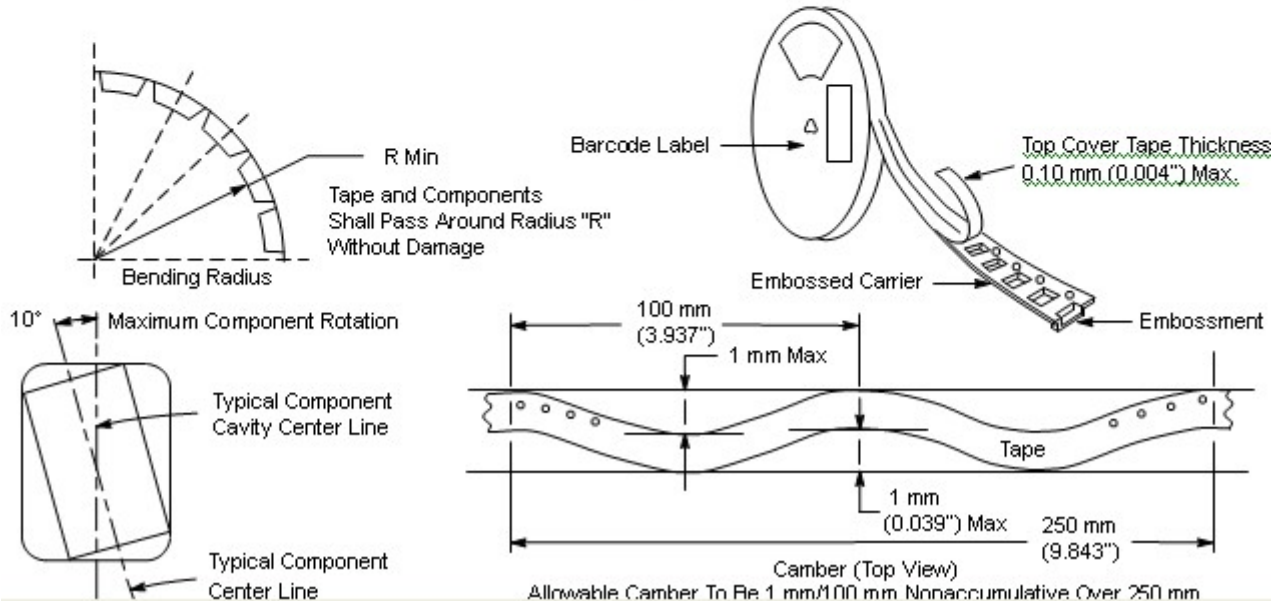
★SOP-8 tape & Reel:





Embossed Tape and Reel Data Carrier Tape Specifications

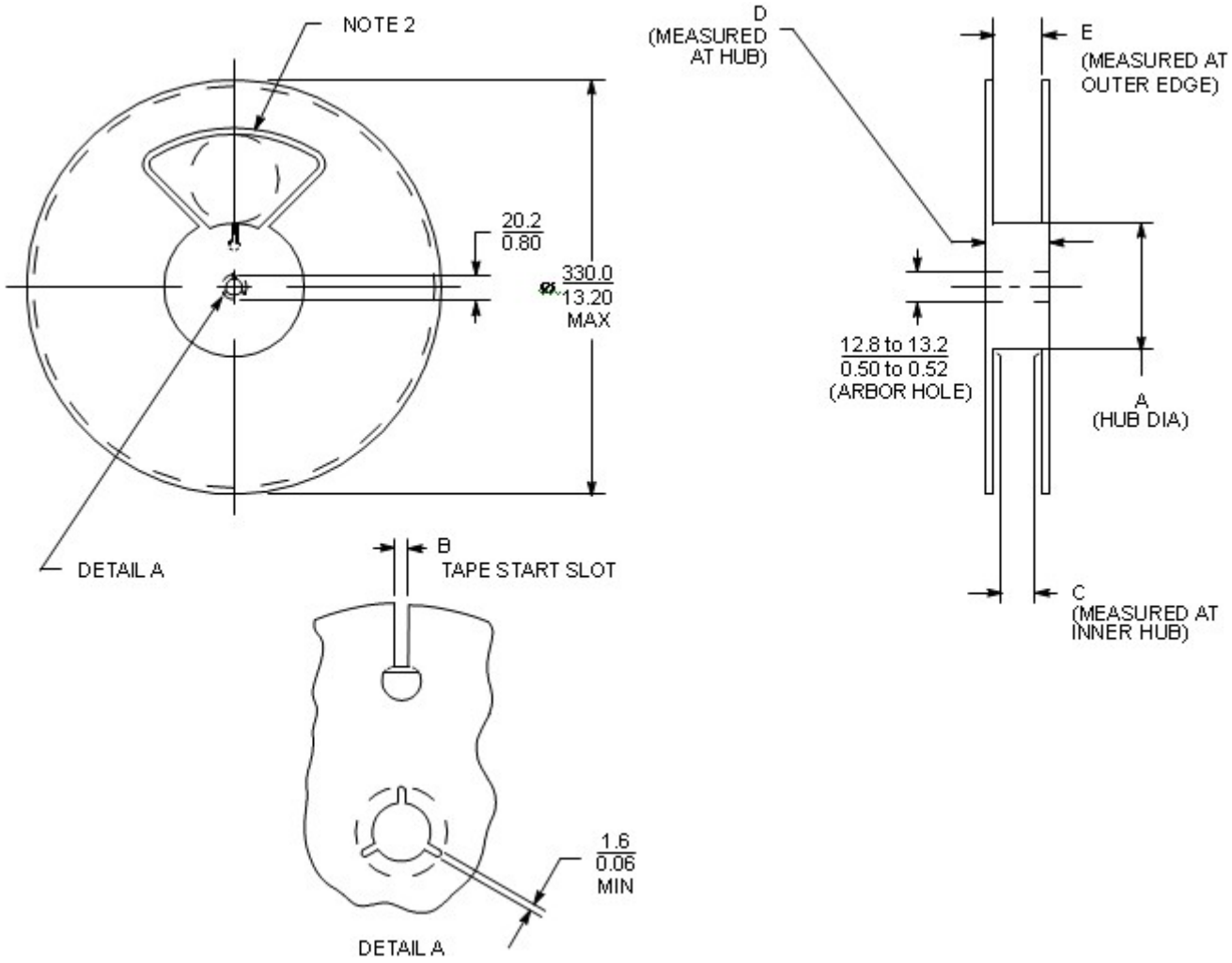




DIMENSIONS

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 (0.179)	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)