

## Data Sheet

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**Type Description :** Low Offset Voltage Dual  
Operational Amplifier

**Product Name :** EST.4258A

**Reversion :** V1.0

**Reversion Date :** May, 2016

**Page :** 9 Pages

Please note that all data and specifications are subject to change without notice. All the trade marks of products and companies mentioned in this data sheet belong to their respective owners.

**GENERAL DESCRIPTION**

The EST.4258A integrates a low power, low offset and high performance Independent operational amplifier.  
 Now, it is available in a tiny SOP-8 and TSSOP-8 package

**APPLICATION**

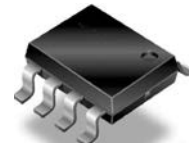
- Switching ac/dc adapter and battery charger
- ATX standby power
- Open frame switching power and CD(R)

**FEATURE**

**Operational Amplifier**

- Power supply range : 6V(+/-3V) to 26V(+/-13V)|
- Low supply current : 300uA/channel (@ VCC+=20V)
- Low input offset voltage : ±150uV
- Low input offset voltage drifting : 7uV/°C
- Unity gain bandwidth : 1MHz
- Wide input common mode range : 0V ~ VCC+

**PIN CONFIGURATION**

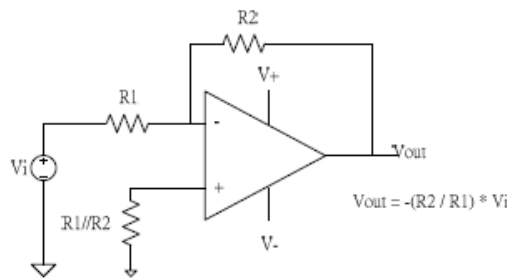


**SOP-8L**

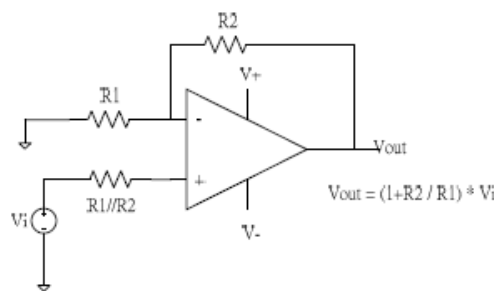


**TSSOP-8L**

**APPLICATION CIRCUIT**



**Inverting amplifier circuit**



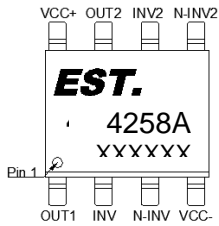
**Non-inverting amplifier circuit**

**ORDERING INFORMATION**

Part Number	Package	Packaging	Note
EST.4258AS	SOP-8	Tape & Reel	Green
EST.4258AR	TSSOP-8	Tape & Reel	Green

Note: EST lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS .EST lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020C for MSL classification at lead-free peak reflow temperature. EST defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

**PIN DESCRIPTION**



SOP-8	NAME Description	Description
1	OUT1	OP1 output
2	INV1	OP1 Inverting Input
3	NINV1	OP1 Non-inverting Input
4	VCC-	Ground for Single supply/ Negative power supply
5	NINV2	OP2 Non-inverting Input
6	INV2	OP2 Inverting Input
7	OUT2	OP2 Outpu
8	VCC+	Positive power supply

**Absolute Maximum Ratings**

Parameter Symbol	Symbol	Limit Values		Unit	Remark
		Min.	Max		
Supply Voltage Vcc	$V_{CC}$	-0.3	26	V	
Differential Input Voltage	$V_{ID}$	6	26	V	
Input Voltage	$V_i$	-0.6	26	V	
OP Output Voltage	$V_o$	-0.3	Vcc	mA	
Operation Junction Temperature	$T_j$	-40	150	°C	
Storage Temperature	$T_{stg}$	-55	150	°C	
Package Thermal Resistance	SOP-8 $\theta_{JA}$	-	180	°C/W	
Power Dissipation @TA<50°C	SOP-8 PD	-	0.42	W	
Package Thermal Resistance	TSSOP-8 $\theta_{JA}$	-	270	°C/W	
Power Dissipation @TA<50°C	TSSOP-8 PD	-	0.28	W	
Lead temperature (Soldering, 10 sec)		-	260	°C	
ESD Voltage Protection	HBM VESD-HBM	-	3.0	KV	
	MM VESD-MM	-	300	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.

\*Free standing with no heatsink; withoud copper clad.(Measurement condition – just before junction temperature  $T_j$  enters into OTP)

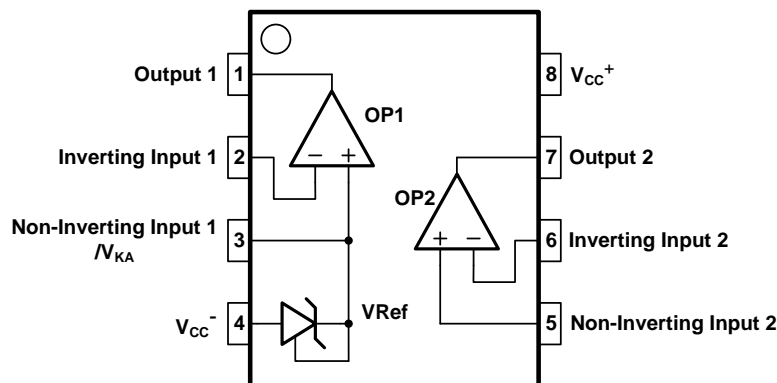
\*\*Measure on the PKG top surface

**DC Electrical Characteristics** ( $V_{CC^+} = 15V, V_{CC^-} = 0V, T_a = 25^{\circ}C$ )

**Operational Amplifier :**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive Supply Voltage	$V_{CC^+}$	6		26	V	
Total Supply Current	$I_{CC}$			300	$\mu A$	1. $V_{CC} = 15V$ 2. no load,
Input Offset Voltage	$V_{IO}$	-150	0	150	$\mu V$	25 $^{\circ}C$
		-250	0	250		-25-85 $^{\circ}C$
Small Signal Gain	$A_{vd}$		80		dB	
Supply Voltage Rejection Ratio	SVR		80		dB	$V_{CC^+} = 9V$ to 20V
Input Common Mode Voltage Range	$V_{icm}$	0		$V_{CC}$	V	
Common Mode Rejection Ratio	$C_{MR}$			80	dB	
Output Current Source	$I_{source}$			20	mA	1. $V_{id} = +1V$ 2. $V_{CC} = 15V$ 3. $V_o = 2V$
Output Current Sink	$I_{sink}$		15		mA	1. $V_{id} = -1V$ 2. $V_{CC} = 15V$ 3. $V_o = 2V$
High Level Output Voltage	$V_{OH}$			$V_{CC}$	V	1. $R_L = 10K$ 2. $V_{CC^+} = 20V$
Low Level Output Voltage	$V_{OL}$		20		mV	$R_L = 10K$
Slew Rate at Unity Gain	SR		0.5		V/us	1. $V_i = 0.5$ to 3V 2. $V_{CC} = 15V$ 3. $R_L = 2K$ 4. $C_L = 100pF$ 5. unity gain connection
Gain Bandwidth Product	GBP		1		MHz	1. $f = 100KHz$ 2. $V_{CC} = 20V$ 3. $R_L = 2K$ 4. $C_L = 100pF$

**BLOCK DIAGRAM**

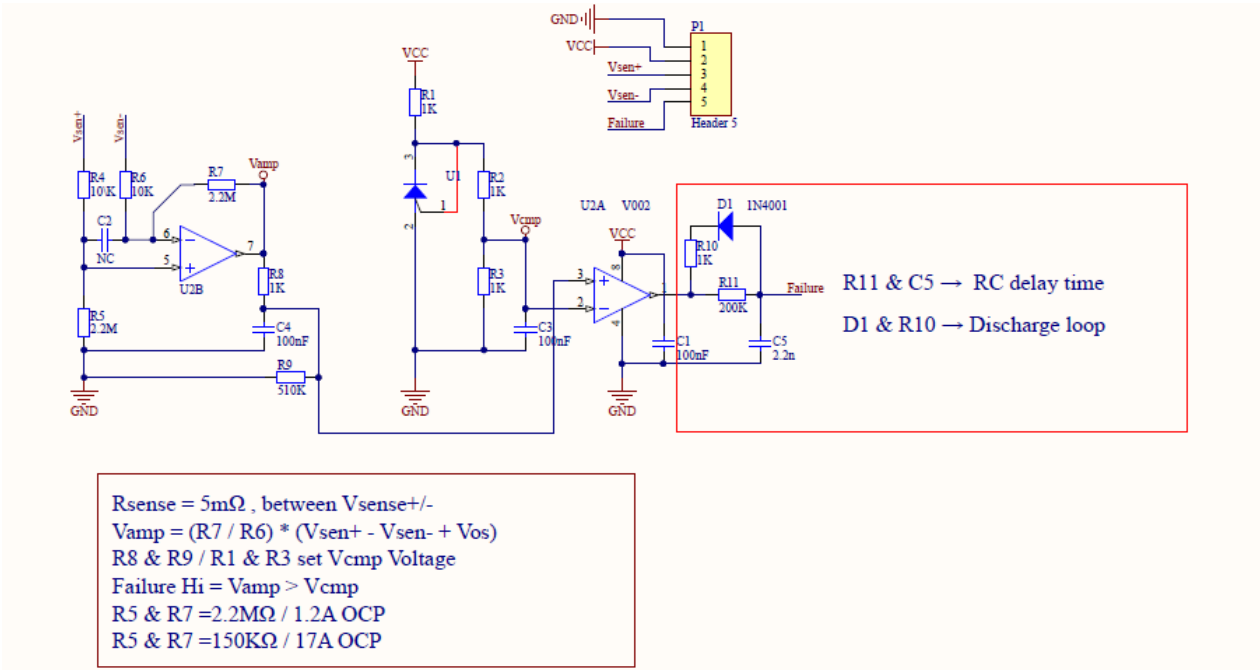


**CAUTION**

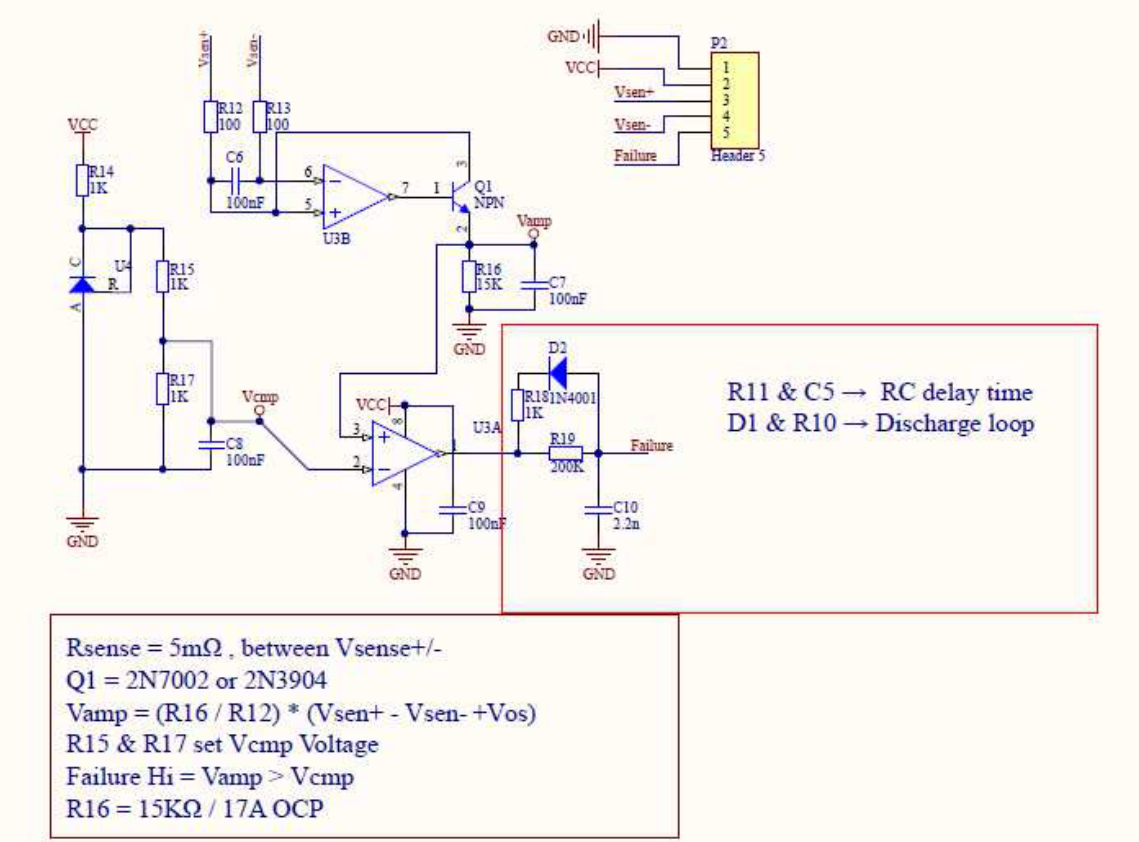
This integrated circuit has been designed carefully in the ESD protection ability. Failure to observe proper handling and installation procedures may cause damage. Recommend that all integrated circuits should be handled with appropriate precautions.

**Application Note**  
**EST.4258A=SAG**

Reference Design 1 : single channel OCP (Over current protection)



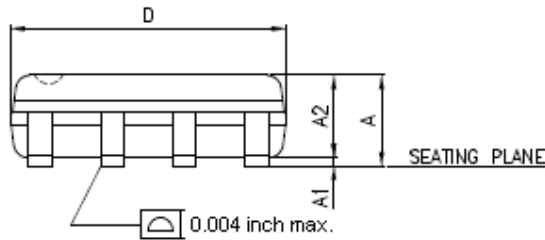
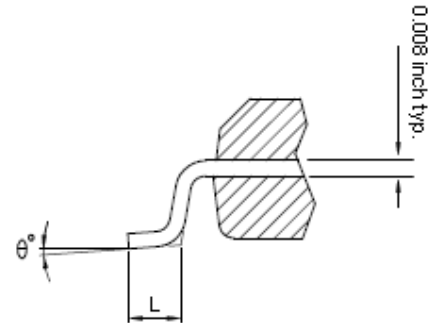
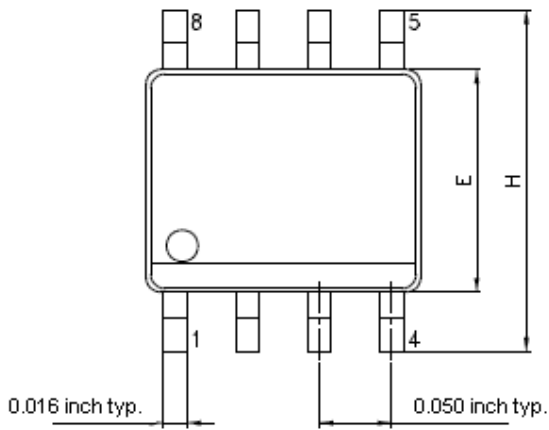
Reference Design 2 : single channel OCP (Over current protection)



**PACKAGE OUTLINES**

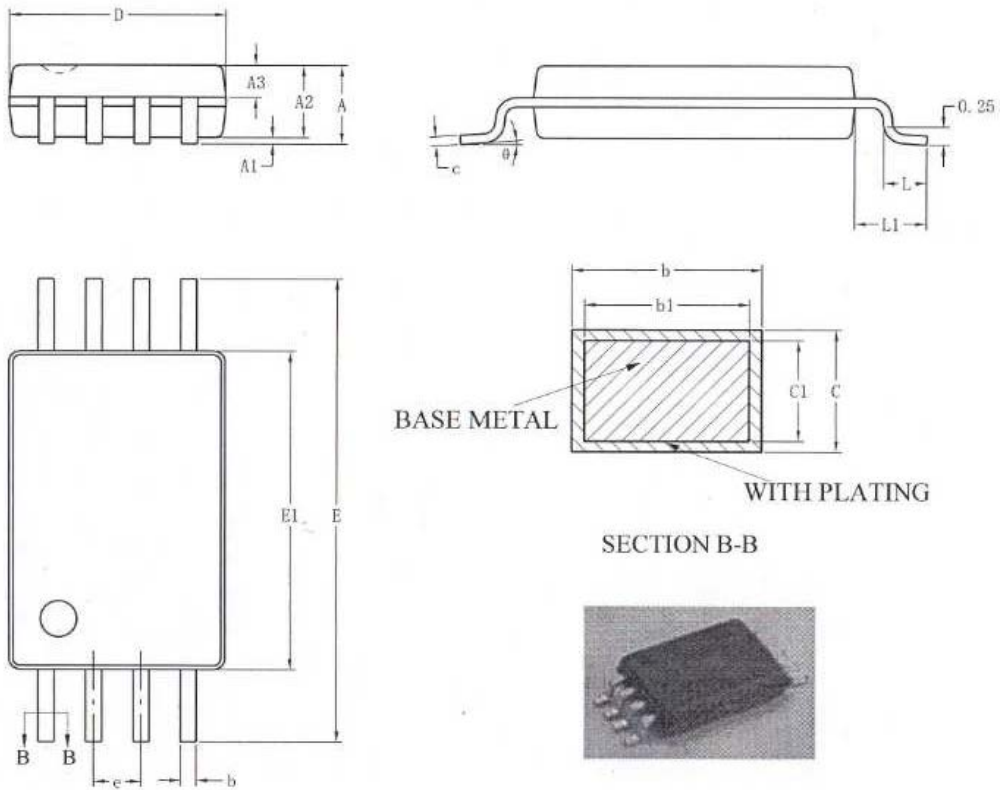
Small Outline Package  
 UNIT : inch

**PACKAGE DIMENSIONS**  
**SOP 8**



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°

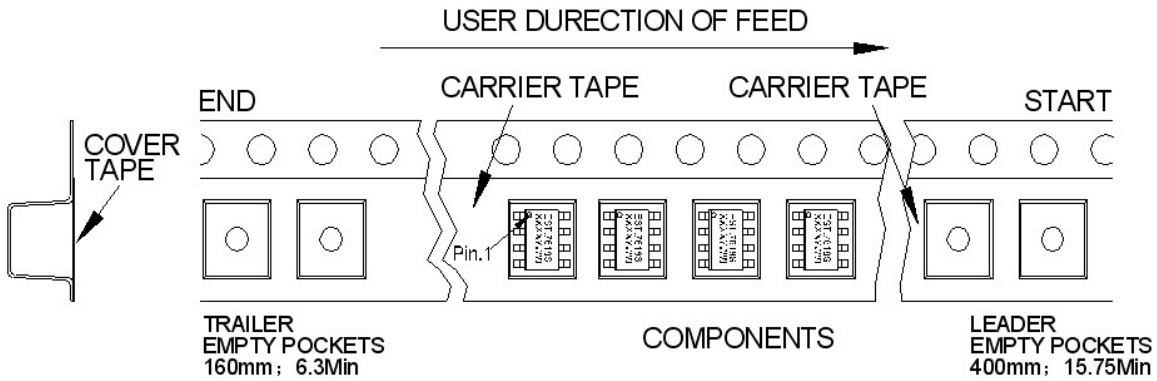
**TSSOP-8**



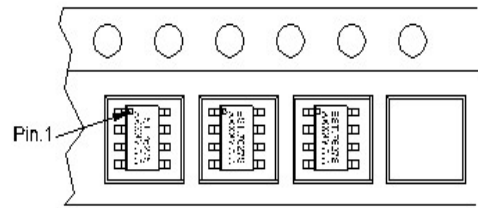
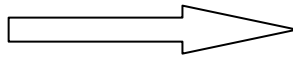
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.39	0.44	0.49
b	0.20	—	0.28
b1	0.19	0.22	0.25
c	0.13	—	0.17
c1	0.12	0.13	0.14
D	2.90	3.00	3.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65BSC		
L	0.45	—	0.75
L1	1.00REF		
θ	0	—	8°

Shipping packing :

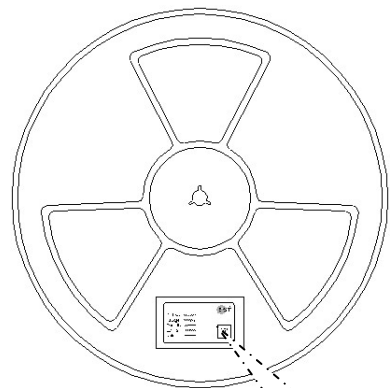
★SOP-8 tape & Reel:



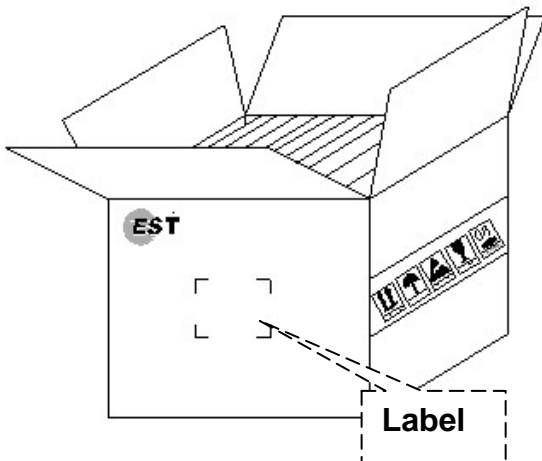
1Pc / device



2500 devices / Reel

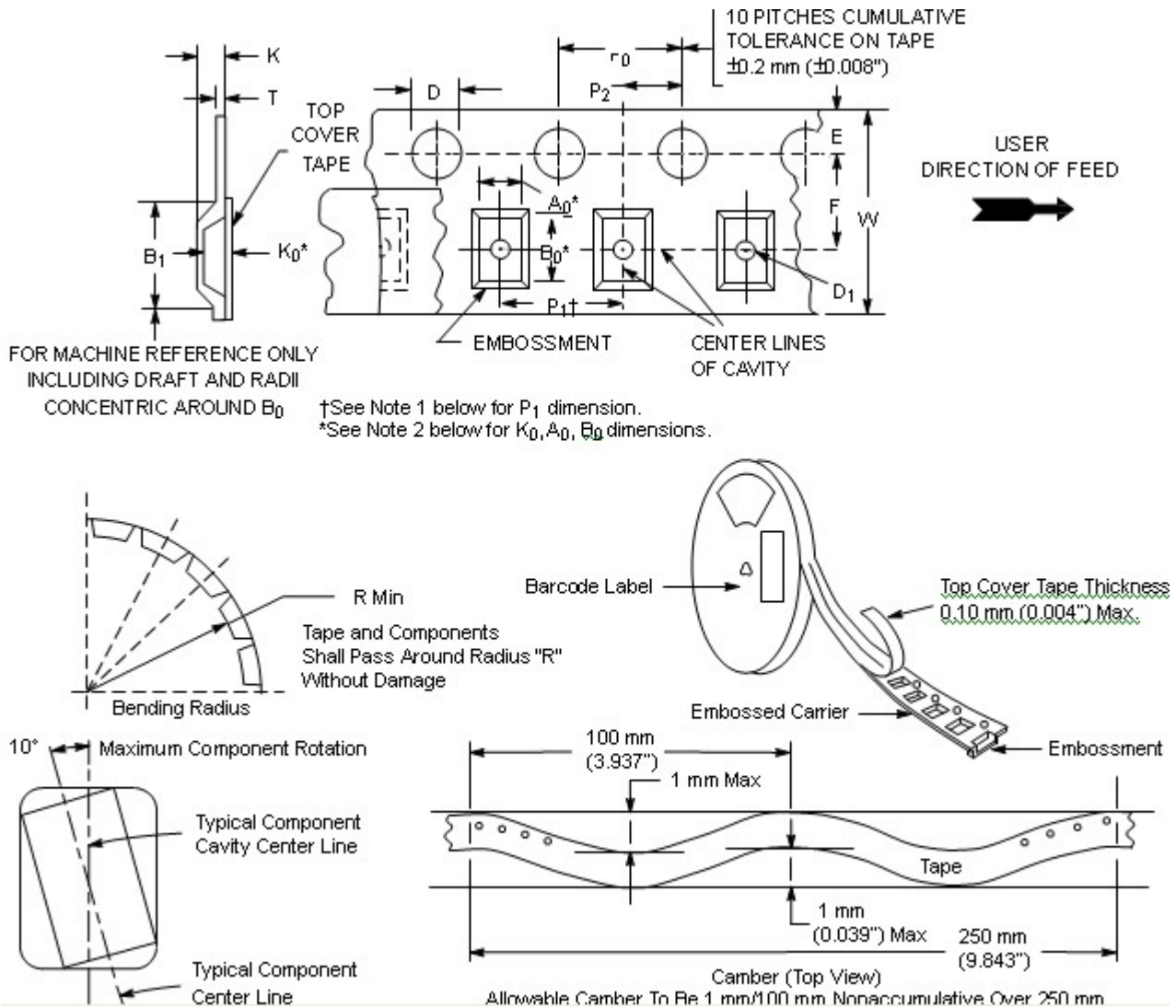


12 Reel / Carton  
 (30,000Pcs / Carton)





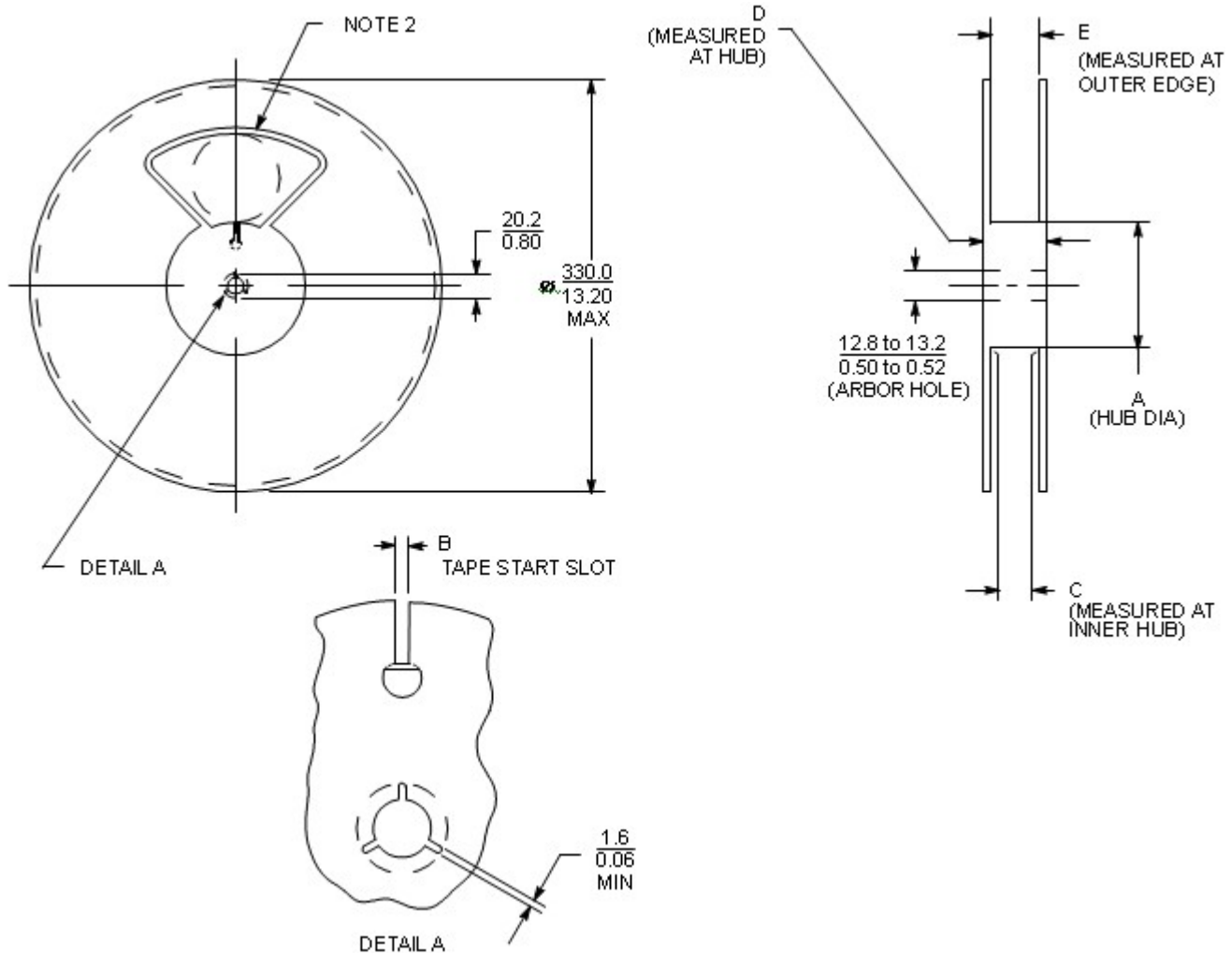
**EMBOSSED TAPE AND REEL DATA CARRIER TAPE SPECIFICATIONS**



**DIMENSIONS**

Tape	B <sub>1</sub> Max (Note 1)	D	D <sub>1</sub>	E	F	K	P <sub>0</sub>	P <sub>2</sub>	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)

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