



**SYNTON-TECH CORPORATION**  
**CHIP THIN FILM RESISTOR**  
**( RT TYPE )**

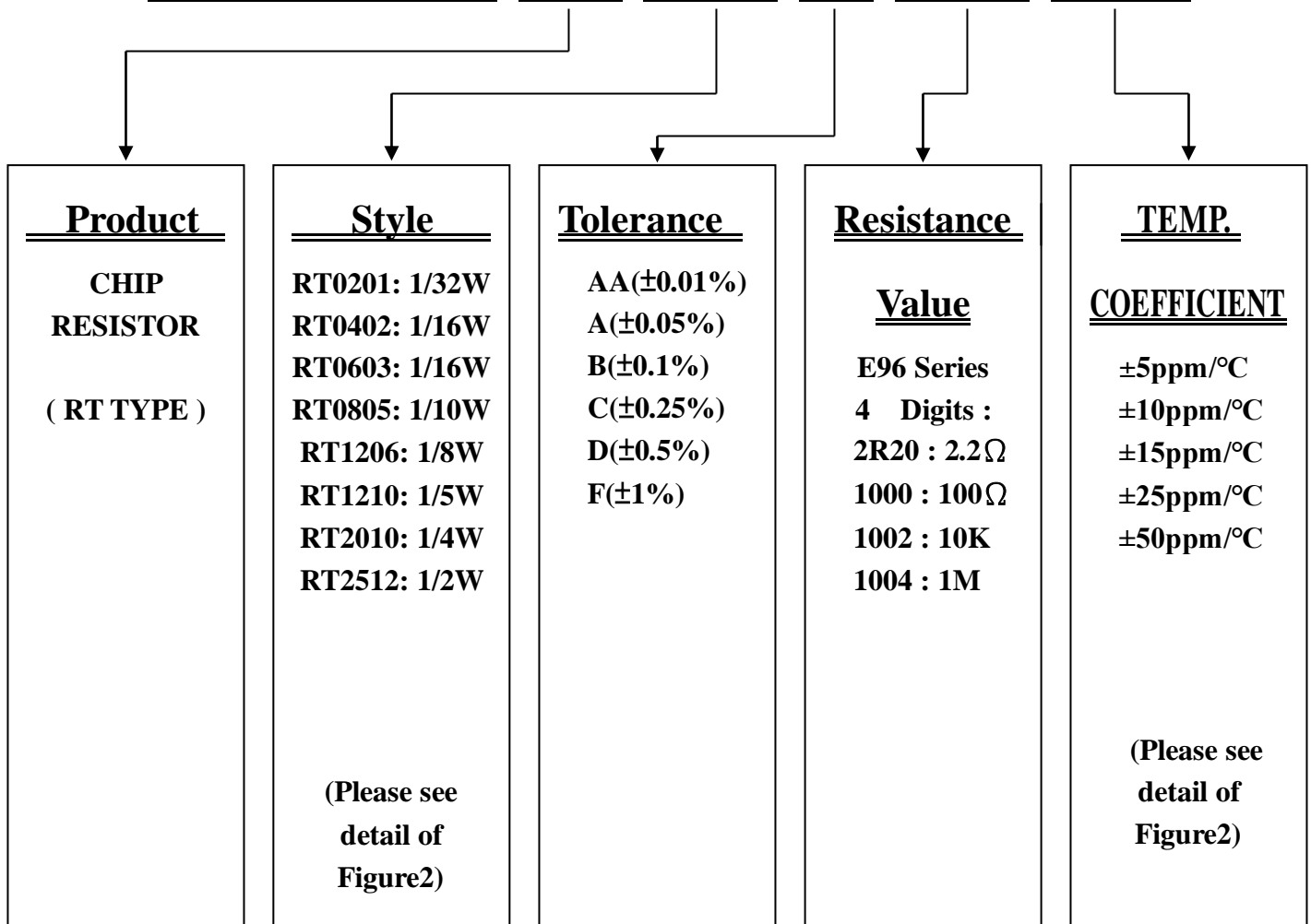
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**1.SUBJECT** : This specification applies on the chip resistors was made by  
**SYNTON-TECH Corporation** .

**2.PART NUMBER** : Part number of the chip resistor is identified by the  
 Style, tolerance, resistance value .

**Example :** **DESCRIPTION : 1206 0.1% 10K 50PPM**

**SYNTON CODE : RT 1206 B 1002 50PPM**



<b>APPROVED</b>	<b>CHECKED</b>	<b>DESIGNED</b>	<b>REMARK</b>	<b>DOCUMENT NO.</b>
Carol	May	Chen		0201010203



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### Marking:

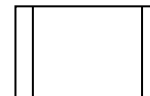
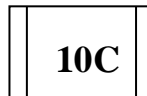
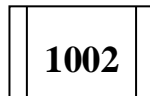
#### (1) Resistance value : 4 digits,

first three digits are significant figures,  
fourth digit is number of zeros. Letter R is decimal point.

**\*\*0603:E-24 marking** first two digits are significant figures,  
third digit is number of zeros. Letter R is decimal point.

**\*\*0603:E-96 marking.** (as the below list)

**\*\*0201 / 0402 no marking.**



Value=10K $\Omega$   
0805/1206/1210  
2010/2512

Value=12.4K $\Omega$   
0603  
**EIA-96 marking**

no marking  
0201/0402

### E-96 MARKING

Code R Value	Code R Value	Code R Value	Code R Value	Code R Value	Code R Value	Code R Value	Code R Value
01 100	13 133	25 178	37 237	49 316	61 422	73 562	85 750
02 102	14 137	26 182	38 243	50 324	62 432	74 576	86 768
03 105	15 140	27 187	39 249	51 332	63 442	75 590	87 787
04 107	16 143	28 191	40 255	52 340	64 453	76 604	88 806
05 110	17 147.	29 196	41 261	53 348	65 464	77 619	89 825
06 113	18 150	30 200	42 267	54 357	66 475	78 634	90 845
07 115	19 154	31 205	43 274	55 365	67 487	79 649	91 866
08 118	20 158	32 210	44 280	56 374	68 499	80 665	92 887
09 121	21 162	33 215	45 287	57 383	69 511	81 681	93 909
10 124	22 165	34 221	46 294	58 392	70 523	82 698	94 931
11 127	23 169	35 226	47 301	59 402	71 536	83 715	95 953
12 130	24 174	36 232	48 309	60 412	72 549	84 732	96 976

This table shows the first two digits for the three-digit EIA-96 part marking scheme.

The third character is a letter multiplier: Y=10<sup>-2</sup> X=10<sup>-1</sup> A=10<sup>0</sup> B=10<sup>1</sup> C=10<sup>2</sup> D=10<sup>3</sup> E=10<sup>4</sup> F=10<sup>5</sup>

Figure 1



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**3.ELECTRICAL CHARACTERISTICS**

STYLE	RT0201	RT0402	RT0603	RT0805	RT1206	RT1210	RT2010	RT2512
POWER	1/32W	1/16W	1/16W	1/10W	1/8W	1/5W	1/4W	1/2W
Maximum Working Voltage	15V	25V	50V	100V	150V	150V	150V	150V
Maximum Overload Voltage	30V	50V	100V	200V	300V	300V	300V	300V
Dielectric Withstand Voltage	30V	50V	100V	200V	300V	300V	300V	300V
Resistance Tolerance	$\pm 0.1\%$ , $\pm 0.25\%$ , $\pm 0.5\%$ , $\pm 1\%$ ( $\pm 0.01\%$ , $\pm 0.05\%$ on Request )							
Temperature Coefficient	$\pm 50$ PPM/ $^{\circ}$ C , $\pm 25$ PPM/ $^{\circ}$ C , $\pm 15$ PPM/ $^{\circ}$ C , $\pm 10$ PPM/ $^{\circ}$ C , $\pm 5$ PPM/ $^{\circ}$ C							
Resistance Range	$100 \Omega \sim 100K \Omega$							
	Special Value On Request Low to $1 \Omega$ High to $3M \Omega$							
Operating Temp. Range	$-55^{\circ}$ C $\sim$ $+155^{\circ}$ C							

Figure 2



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#### 4. POWER RATING

**(1)Power Derating** : The rated power at the temperature in excess of 70°C shall be derated in accordance with figure3

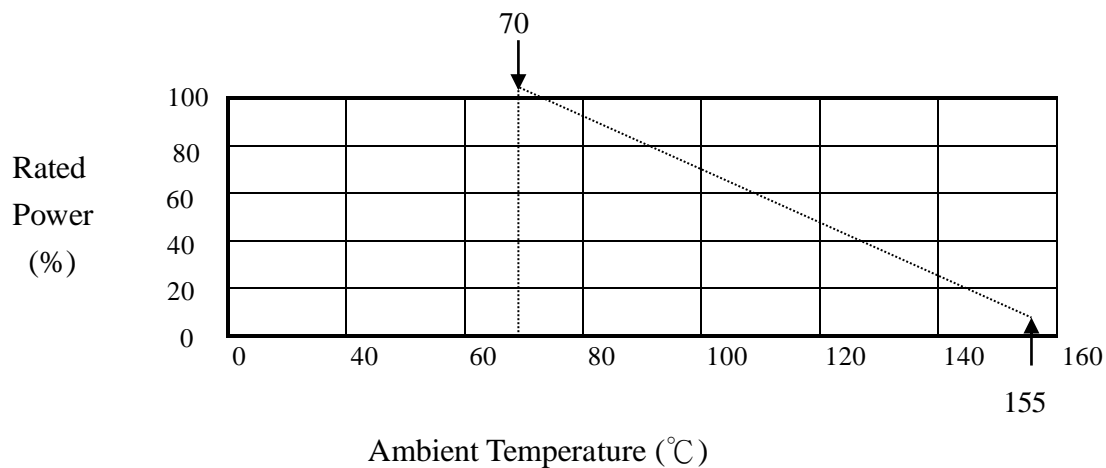


Figure3

**(2)Rated Voltage** : The DC or AC(rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$V = \sqrt{R \times P}$$

Where V : Continuous rated DC or AC (rms) working voltage (v)  
P : Rated power (w)  
R : Resistance value ( $\Omega$ )



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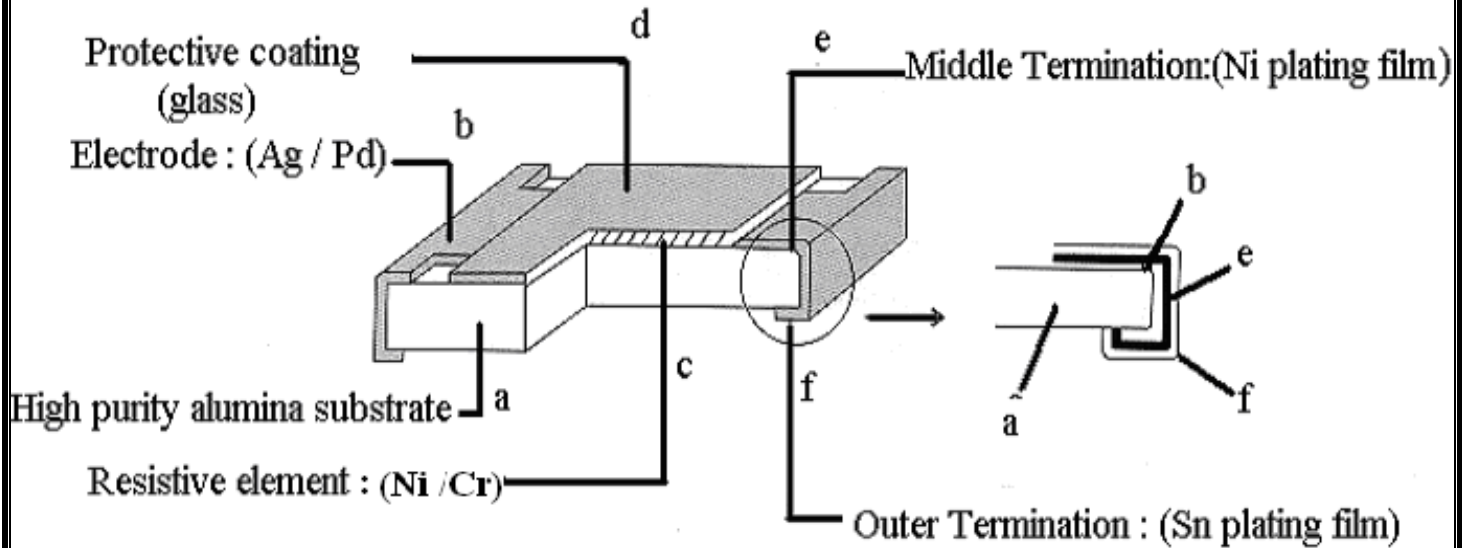
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### 5.CONSTRUCTION AND MATERIALS

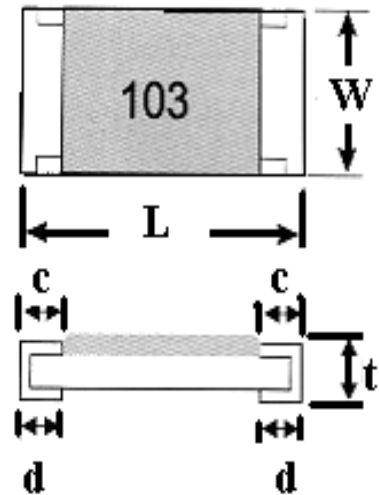
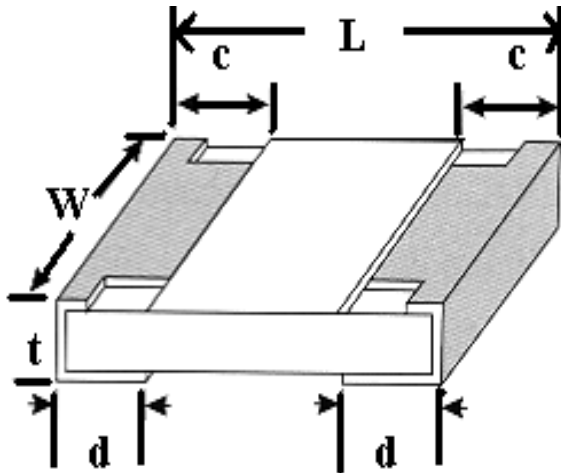




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**6. DIMENSIONS**



Unit:m/m

STYLE	L	W	t	c	d
RT0201	0.58±0.20	0.29±0.05	0.23±0.05	0.12±0.10	0.15±0.10
RT0402	1.00±0.20	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10
RT0603	1.60±0.20	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
RT0805	2.00±0.20	1.25±0.10	0.50±0.10	0.40±0.20	0.40±0.20
RT1206	3.10±0.20	1.60±0.10	0.55±0.10	0.50±0.25	0.50±0.25
RT1210	3.10±0.20	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.25
RT2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.25
RT2512	6.35±0.20	3.20±0.15	0.55±0.10	0.60±0.25	0.50±0.25

Figure4



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## 7. CHARACTERISTICS

### (1) Temperature Coefficient of Resistance(T.C.R.)

Test Method : Measure resistance at +25°C or specified room temperature as R1, then measure at -55°C and +125°C respectively as R2.

Determine the temperature coefficient of Resistance from the following formula.

$$\text{T. C. R.} = \frac{\text{R2} - \text{R1}}{\text{R1} (\text{t2} - \text{t1})} \times 10^6 (\text{ppm} / ^\circ\text{C})$$

Where t1 = +25°C or specified room temperature  
t2 = -55°C or +125°C

### (2) Thermal Shock

Test Method : -55°C for 2 minutes and +155°C for 2 minutes as One cycle, After 5 cycles the specimen shall be Stabilized at room temperature for one hour Minimum and then measure the  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(0.5\%+0.05\Omega)$

### (3) Low Temperature Operation

Test Method :Place the specimen in a test chamber maintained at -55°C. After one hour stabilization at this temperature, full rated working voltage shall be applied for 45 minutes. 15 minutes after remove the voltage, the specimen shall be removed from the chamber and stabilized at room temperature for 24 hours minimum. Measure  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(0.5\%+0.05\Omega)$  No mechanical damage.



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**(4) Short Time Overload**

Test Method : Apply 2.5 times of rated voltage but not exceeding the maximum overload voltage 1 for 5 seconds. Have the specimen stabilized at room temperature for 30 minutes minimum. Measure the  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(1.0\%+0.05\Omega)$  No evidence of mechanical damage.

**(5) Resistance to Soldering Heat**

Test Method : Immerse the specimen in the solder pot at  $260\pm 5^\circ\text{C}$  for  $10\pm 1$  seconds. Have the specimen stabilized at room temperature for 30 minutes minimum. Measure the  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(0.5\%+0.05\Omega)$

**(6) Moisture Resistance**

Test Method : Place the specimen in a test chamber at  $40\pm 2^\circ\text{C}$  and 90~95% relative humidity. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1000 +48/-0 Hrs. After the test, have the specimen stabilized at room temperature for one hour minimum. Measure the  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(1.0\%+0.1\Omega)$

**(7) Load Life**

Test Method : Place the specimen in the oven at  $70\pm 2^\circ\text{C}$ . Apply the rated voltage to the specimen at 1.5 hours on and 0.5 hour off cycle. The total length of test is 1000 +48/-0 hours. After the test have the specimen stabilized at room temperature for one hour minimum and measure the  $\Delta R/R(\%)$ .

Acceptance Standard :  $\pm(1.0\%+0.1\Omega)$





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### (8) Solderability

Test Method : Immerse the specimen in the solder pot at  $245 \pm 5$   
 $^{\circ}\text{C}$  for 3 seconds

Acceptance Standard : At least 95% solder coverage on the termination

### (9) Bending Strength

Test Method : Mount the specimen on a test board . Slowly  
apply the force till the board is bend at 3 mm  
for 10 seconds, and measure the  $\Delta R/R(\%)$   
at this position.

Acceptance Standard :  $\pm(0.5\% + 0.05 \Omega)$

### (10) Insulation Resistance

Test Method : Place the specimen in the jig and apply a 100Vdc  
voltage for one minute. Measure the  
insulation resistance.

Acceptance Standard : 1,000M $\Omega$  minimum.

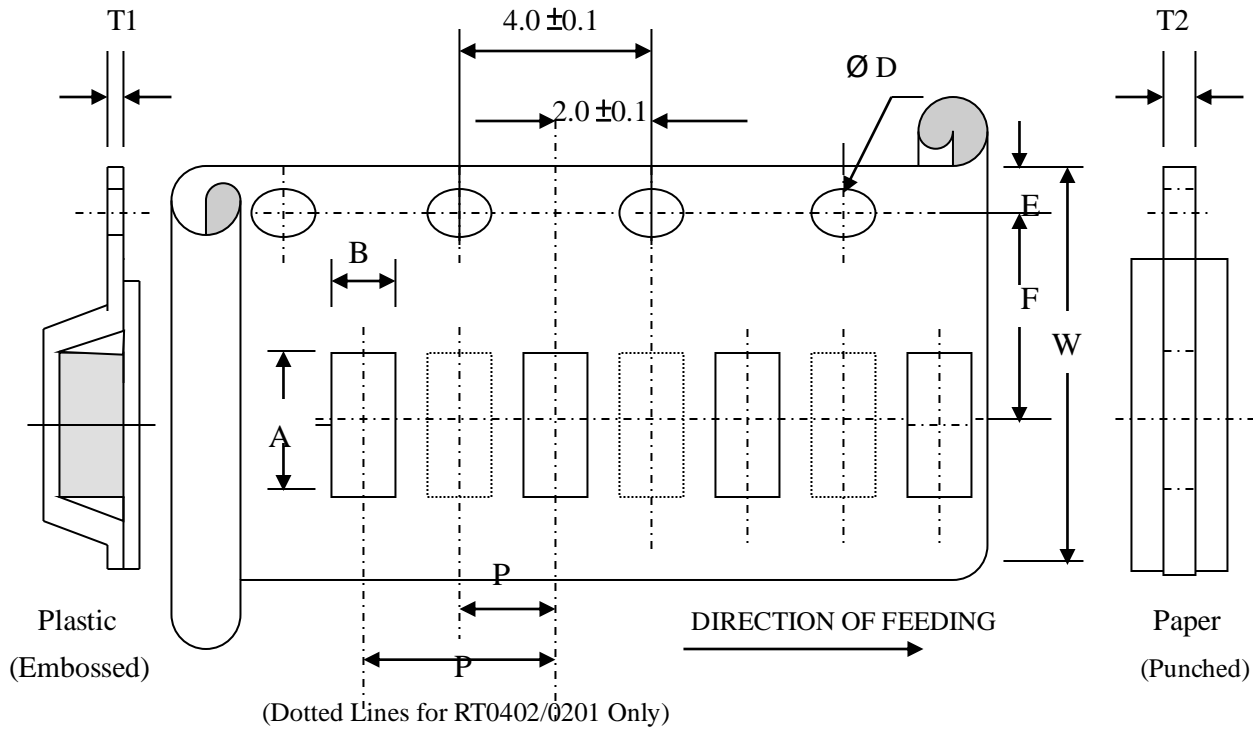


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**8 TAPING SPECIFICATIONS**

**(1) Paper Taping**



Unit: mm

Style	A	B	W	E	F	T1	T2	P	D
<b>RT0201</b>	0.75 ±0.1	0.45 ±0.1	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05		0.45 ±0.1	2.0 ±0.1	1.5 ±0.1/-0
<b>RT0402</b>	1.15 ±0.1	0.65 ±0.1	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05		0.45 ±0.1	2.0 ±0.1	1.5 ±0.1/-0
<b>RT0603</b>	1.90 ±0.1	1.10 ±0.1	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05		0.60 ±0.1	4.0 ±0.1	1.5 ±0.1/-0
<b>RT0805</b>	2.40 ±0.1	1.65 ±0.1	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05		0.75 ±0.1	4.0 ±0.1	1.5 ±0.1/-0
<b>RT1206</b>	3.50 ±0.1	1.90 ±0.1	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05		0.75 ±0.1	4.0 ±0.1	1.5 ±0.1/-0
<b>RT1210</b>	3.50 ±0.1	2.80 ±0.1	8.0 ±0.1	1.75 ±0.1	3.5 ±0.05		0.75 ±0.1	4.0 ±0.1	1.5 ±0.1/-0
<b>RT2010</b>	5.40 ±0.2	2.90 ±0.2	12.0 ±0.1	1.75 ±0.1	5.5 ±0.05	0.23 ±0.15	.	4.0 ±0.1	1.5 ±0.1/-0
<b>RT2512</b>	6.90 ±0.2	3.60 ±0.2	12.0 ±0.1	1.75 ±0.1	5.5 ±0.05	0.23 ±0.15	.	4.0 ±0.1	1.5 ±0.1/-0

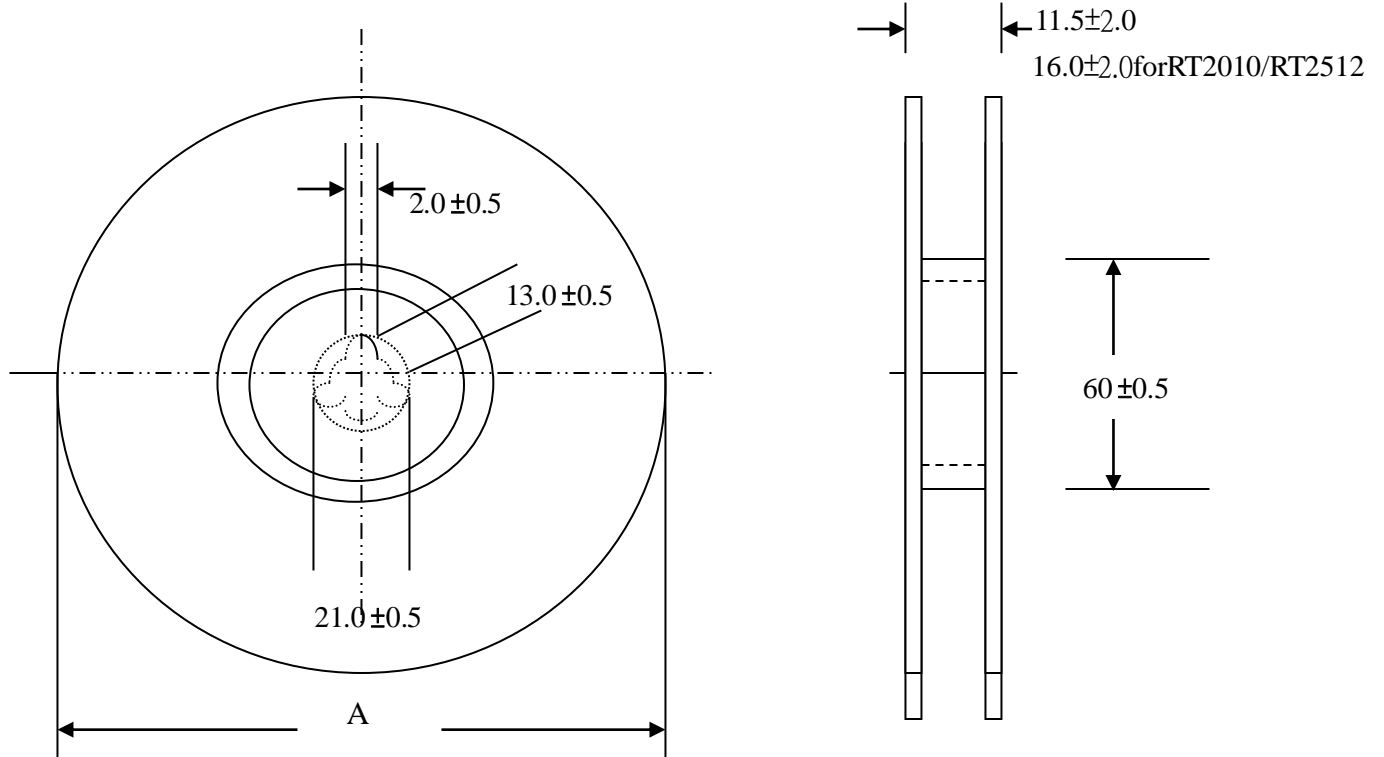
Figure5



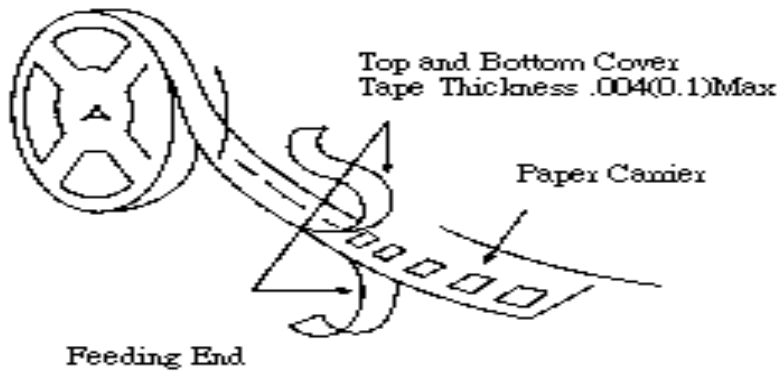
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**(2) Reel Dimensions**



**(3) Paper Carrier**



A (Max.)	REEL QUANTITY			
	RT0201/RT0402	RT0603 / RT0805 / RT1206	RT1210	RT2010 / RT2512
180±2.0mm	10,000PCS	5,000PCS	5,000PCS	4,000PCS
254±2.0mm		10,000PCS		
330±2.0mm		20,000PCS		

Figure6