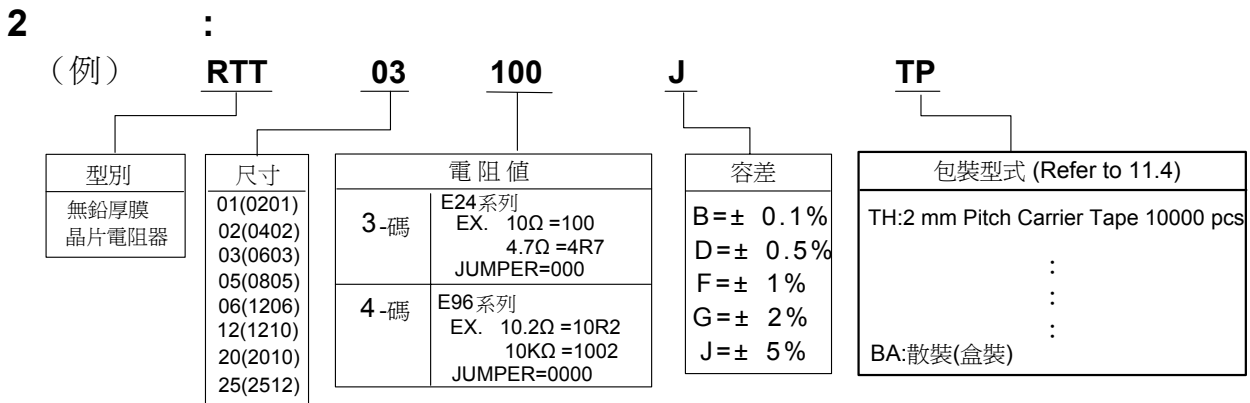


1 :  
 1.1  
 1.2

RoHS                      RoHS                      RTT



3 :  
 3.1 : 1 & 0

RTT25 (2512)	1 W	200V	400V	± 100	100	R	1M	10	R	1M	10Ω ≤ R ≤ 20MΩ	10	R	20M	2A	5A	50m MAX.	20m MAX.		
				± 200	-----	-----	-----	1	R	10	1	R	10							
				± 100	100	R		10	R	1M	10Ω ≤ R ≤ 20MΩ	10	R	20M	2A	7A	50m MAX.	20m MAX.		
				± 200	-----	-----	-----	1	R	10	1	R	10							

55 ~ 155 (0201: 55 ~ 125 )

**3.2 : 1**

				T.C.R ( ppm / °C )	F(± 1%) G(± 2%) J((± 5%) E-24 E-96		
<b>RTT02 (0402)</b>	1/16W	1.58A	3.95A	± 1500	25 m	R	37 m
				± 1200	37 m	R	60 m
				± 600	60 m	R	200 m
				± 300	200 m	R	400 m
				± 250	400 m	R	600 m
				± 200	600 m	R	1000 m
<b>RTT03 (0603)</b>	1/10W	3.16A	7.91A	± 1500	10 m	R	37 m
				± 1200	37 m	R	60 m
				± 600	60 m	R	100 m
				± 300	100 m	R	200 m
				± 600	200 m	R	500 m
				± 400	500 m	R	1000 m
<b>RTT05 (0805)</b>	1/8W	3.53A	8.82A	± 1500	10 m	R	19 m
				± 1200	19 m	R	33 m
				± 800	33 m	R	50 m
				± 600	50 m	R	100 m
				± 200	100 m	R	1000 m
<b>RTT06 (1206)</b>	1/3W	5.77A	14.42A	± 1500	10 m	R	19 m
				± 1200	19 m	R	25 m
				± 1000	25 m	R	50 m
				± 600	50 m	R	100 m
				± 200	100 m	R	1000 m
<b>RTT12 (1210)</b>	1/2W	7.07A	17.67A	± 1500	10 m	R	19 m
				± 1000	19 m	R	25 m
				± 700	25 m	R	50 m
				± 400	50 m	R	100 m
				± 200	100 m	R	1000 m
<b>RTT20 (2010)</b>	3/4W	8.66A	21.65A	± 1500	10 m	R	19 m
				± 1200	19 m	R	25 m
				± 900	25 m	R	50 m
				± 500	50 m	R	100 m
				± 200	100 m	R	1000 m
<b>RTT25 (2512)</b>	1 W	10A	25A	± 1500	10 m	R	19 m
				± 1200	19 m	R	25 m
				± 900	25 m	R	50 m
				± 500	50 m	R	100 m
				± 200	100 m	R	1000 m
<b>55 ~ 155</b>							

3.3

:

	RTT01 (0201)	
	55 ~ 125	55 ~ 155
	70 125	70 155

3.4

:

3.4.1

: 1

:

( rms.)

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

E= (V)

P= (W)

R= ( )

3.4.2

: 1

:

( rms.)

$$I = \sqrt{P/R}$$

I= 流(A)

P= (W)

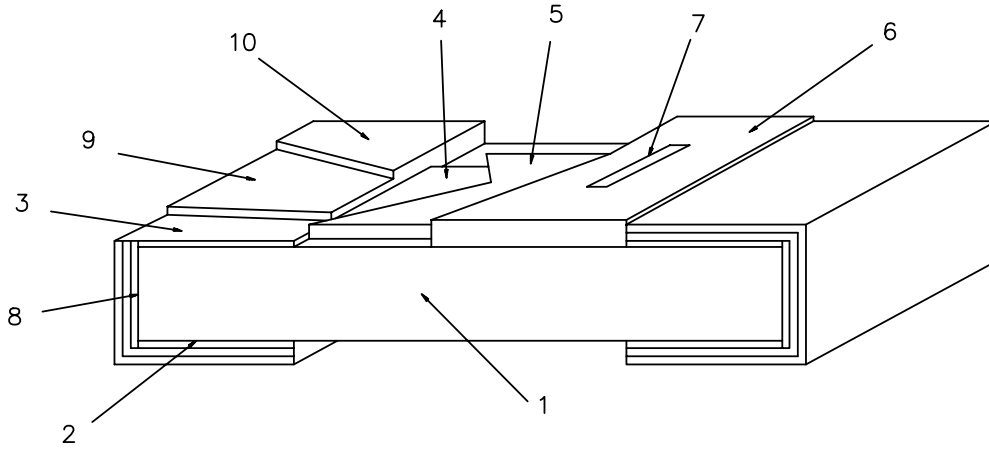
R= ( )

Dimension		L	W	H	L1	L2
TYPE	Size Code					
<b>RTT01</b>	<b>0201</b>	0.60± 0.03	0.30± 0.03	0.23± 0.03	0.15± 0.05	0.15± 0.05
<b>RTT02</b>	<b>0402</b>	1.00± 0.10	0.50± 0.05	0.30± 0.05	0.20± 0.10	0.25± 0.10
<b>RTT03</b>	<b>0603</b>	1.60± 0.10	0.80± 0.10	0.45± 0.10	0.30± 0.15	0.30± 0.15
<b>RTT05</b>	<b>0805</b>	2.00± 0.10	1.25± 0.10	0.50± 0.10	0.35± 0.20	0.35± 0.15
<b>RTT06</b>	<b>1206</b>	3.05± 0.10	1.55± 0.10	0.50± 0.10	0.45± 0.20	0.35± 0.15
<b>RTT12</b>	<b>1210</b>	3.05± 0.10	2.55± 0.10	0.55± 0.10	0.50± 0.20	0.50± 0.20
<b>RTT20</b>	<b>2010</b>	5.00± 0.20	2.50± 0.20	0.55± 0.10	0.60± 0.20	0.60± 0.20
<b>RTT25</b>	<b>2512</b>	6.30± 0.20	3.20± 0.20	0.55± 0.10	0.60± 0.20	0.60± 0.20

Dimensions		L	W	H	L1	L2
TYPE	Size Code					
<b>RTT02</b>	<b>0402</b>	1.00± 0.10	0.50± 0.05	0.35± 0.10	0.25± 0.10	0.25± 0.10
<b>RTT03</b>	<b>0603</b>	1.60± 0.10	0.80± 0.10	0.45± 0.10	0.25± 0.10	0.25± 0.10
<b>RTT05</b>	<b>0805</b>	2.00± 0.10	1.25± 0.10	0.50± 0.10	0.35± 0.10	0.35± 0.10
<b>RTT06</b>	<b>1206</b>	3.05± 0.10	1.55± 0.10	0.50± 0.10	0.45± 0.10	0.35± 0.10
<b>RTT12</b>	<b>1210</b>	3.05± 0.10	2.55± 0.10	0.55± 0.10	0.50± 0.10	0.50± 0.10
<b>RTT20</b>	<b>2010</b>	5.00± 0.20	2.50± 0.20	0.55± 0.10	0.60± 0.10	0.60± 0.10
<b>RTT25</b>	<b>2512</b>	6.30± 0.20	3.20± 0.20	0.55± 0.10	0.60± 0.10	0.60± 0.10

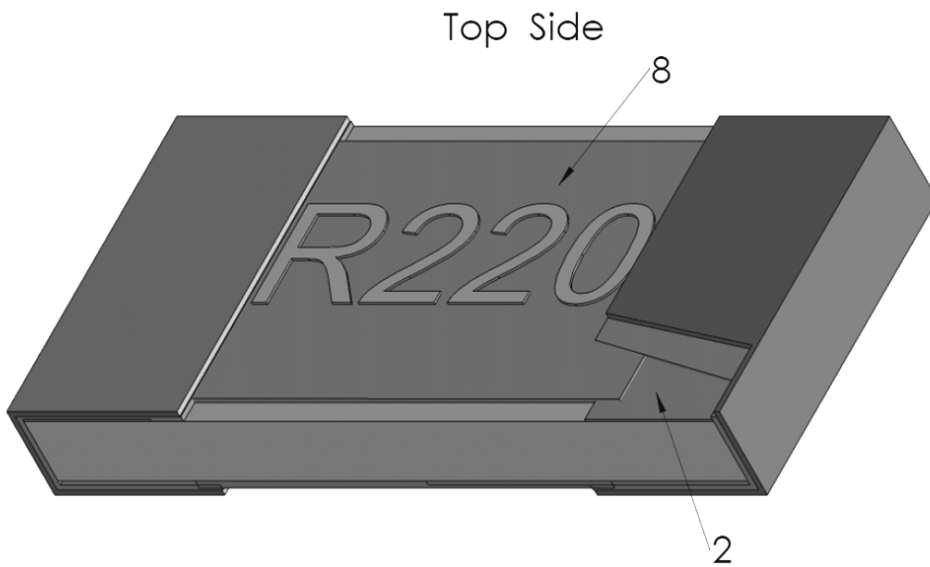
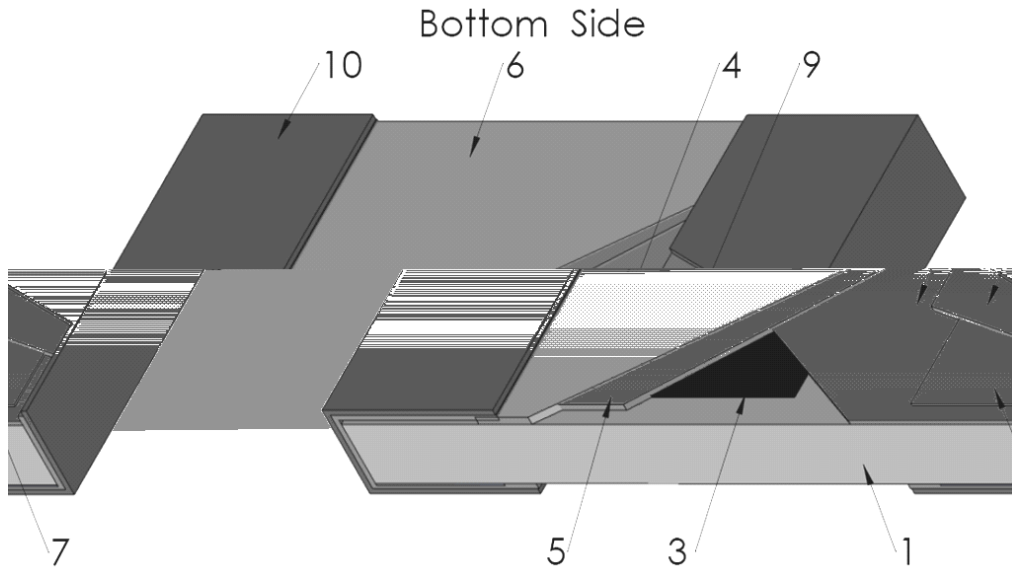


5 :  
5.1 : 1 &0



1		Ceramic substrate	6	2nd	2nd Protective coating
2		Bottom inner electrode	7		Marking
3		Top inner electrode	8		Terminal inner electrode
4		Resistive layer	9	Ni	Ni plating
5	1st	1st Protective coating	10	Sn	Sn plating

5.2 : 1



1		Ceramic substrate	6	2nd	2nd Protective coating
2		Top inner electrode	7	C3	C3 layer
3		Resistive layer	8	G2+MK	G2 layer+Marking
4		Bottom inner electrode	9	Ni	Ni plating
5	1st	1st Protective coating	10	Sn	Sn plating



**6.2** (Mechanical Performance Test)

ITEM	Conditions	Specifications	
		Resistors	Jumper
Core body strength	R0.5 10N 1.02 kgf 10 sec. 1.RTT02 RTT03 R0.2 2.RTT05 06 12 20 25 R0.5 JIS-C5201-1 4.15	1. : 1 ± (1.0%+0.05 ) 2. : 1 ± (1.0%+0.001 )	3.
Terminal Strength	: 5N 10 sec (RTT01:3N) : JIS-C5201-1 4.16	: :RTT01 3N 5N	
Resistance to Solvent	20~25 5± 0.5 48 hr JIS-C5201-1 4.29	1. : 1 RTT01 R% ± (1.0%+0.05 ) ± (0.5%+0.05 ) 2. : 1 ± (1.0%+0.001 ) G2 Leaching	3.
Solderability	PCT 105 100% 1.22× 10 <sup>5</sup> pa 4 2 235± 3 2± 0.5 JIS-C5201-1 4.17	95%	
Resistance to soldering heat	( ): 260+5/-0 10 +1/-0 60 ( ) 260+5/-0 30+1/-0 ( ): :350± 10 :3+1/-0 sec. 60 JIS-C5201-1 4.18	( ). : 1. : 1 R%=± (1.0%+0.05 ) 2. : 1 R%=± (1.0%+0.001 ) ( ). : ( ). : 95% ( ). : ( ) : ( ). : 1 R%=± (1.0%+0.05 ) 2. : 1 R%=± (1.0%+0.001 ) ( ).	3.



100%

PCT  
 $1.22 \times 10^5$  pa

105

( )

3.

2

4

1. : 1

R% = ± (1.0% + 0.05 )

2. : 1

R% = ± (1.0% + 0.001 )

( )

R0.5 (0201:R0.1)

10 sec

- 1. RTT02=10N
- 2. =20N
- 3. RTT01:5N

( )

1. : 1

R% = ± (1.0% + 0.05 )

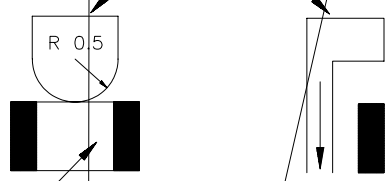
2. : 1

R% = ± (1.0% + 0.001 )

( )

Cross-sectional view

Scratching jig

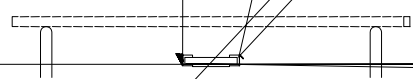


Specimen

JIS-C5201-1 4.32

( ):

- (D): RTT02 03 05=5mm
- RTT01 06 12=3mm
- RTT20 25=2mm



JIS-C5201-1 4.33

Vibration

- : 10 Hz ~ 55 Hz ~ 10 Hz/
- : 1.5 mm
- : 6 hr (X.Y.Z3 2 hr)
- JIS-C5201-1 4.22

1. : 1

0.1% 0.5% 1%:± (0.5%+0.05 )

2% 5%:± (1.0% 0.05 )

2. : <1

1% 2% 5%:± (1.0% 0.001 )

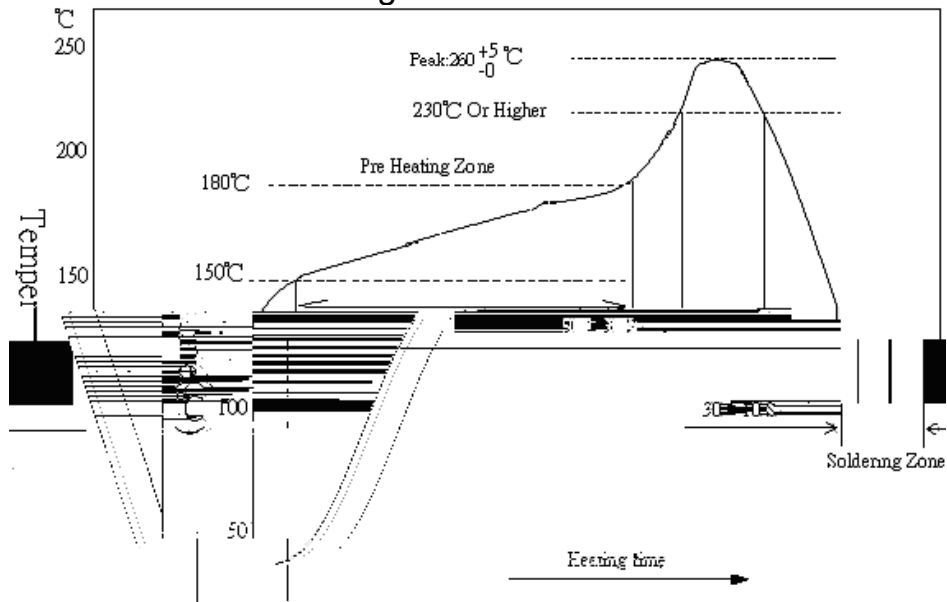
3.

**6.3 (Environmental Test)**

ITEM	Conditions	Specifications	
		Resistors	Jumper
Resistance to Dry Heat	155± 5 1000+48/-0 hr 1 PS:RTT01 125± 3 JIS-C5201-1 4.25	1. : 1 0.1% 0.5% 1%:± (1.0% 0.05 ) 2% 5%:± (2.0% 0.10 ) 2. : 1 1% 2% 5% :± (1.0% 0.001 )	3.
Thermal Shock	+125 15 300 -55 15 60 MIL-STD 202 Method 107	1. : 1 0.1% 0.5% 1%:± (0.5% 0.05 ) 2% 5%:± (1.0% 0.05 ) 2. : 1 1% 2% 5% :± (1.0% 0.001 )	3.
Loading Life in Moisture	40± 2 90~95% 90 ON 30 OFF 1,000 hr 60 JIS-C5201-1 4.24	1. : 1 RTT01 1%:± (1.0%+0.05 ) 0.1% 0.5% 1%: 5%:± (3.0%+0.1 ) ± (0.5%+0.05 ) 2% 5%: ± (2.0%+0.10 ) 2. : 1 1% 2% 5% :± (2.0% 0.001 )	3.
Load Life	70± 2 90 ON%: 30 OFF 1,000 hr 60 5%: JIS-C5201-1 4.25	1. (1.0%+0.05 ) ± 0.1% 0.5% 1%: (3.0%+0.1 ) ± (0.5%+0.05 ) 2% 5%: ± (2.0%+0.10 ) 2. : 1 1% 2% 5% :± (2.0% 0.001 )	3.
Low Temperature Operation	-55 60 45 15 8± 1 hr MIL-R-55342D 4.7.4	1. : 1 0.1% 0.5% 1%:± (0.5% 0.05 ) 2% 5%:± (1.0% 0.05 ) 2. : 1 1% 2% 5% :± (1.0% 0.001 )	3.
Whisker	( ): 2 Table 1 -55+0/-10 85+10/-0 10 1,500 40 40 (SEM) 1000 JEDEC Standard NO.22A121 class2.	Whisker 50µ m	

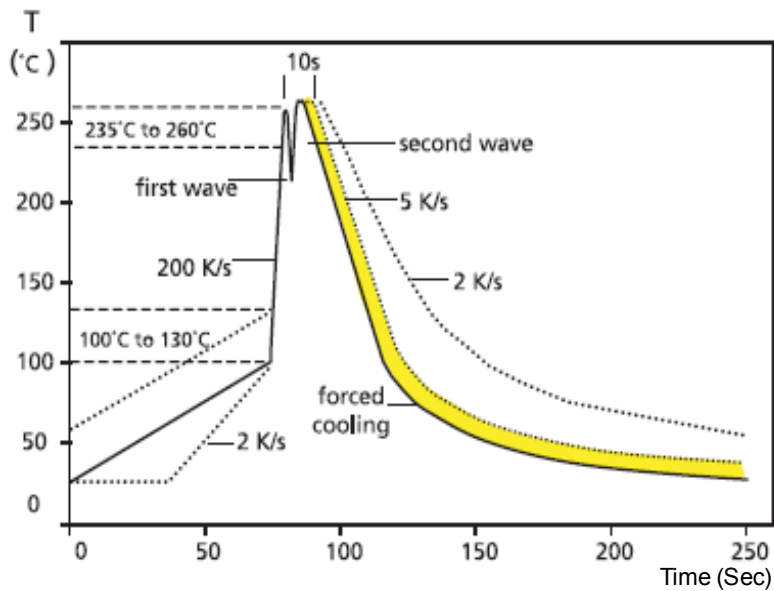
7

7.1 Free IR Reflow Soldering Profile



: 260 +5/-0 , 10

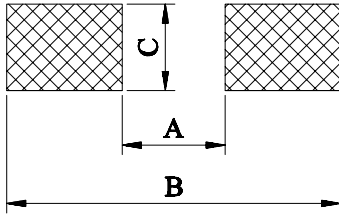
7.2 Lead Free Double-Wave Soldering Profile( 0603( ) )



7.3 :350± 10 3

### 8 Land Pattern Design (For Reflow Soldering)

Unit : mm



DIM TYPE	A	B	C
RTT01	0.3	1.0	0.4
RTT02	0.5	1.5	0.6
RTT03	0.8	2.1	0.9
RTT05	1.2	3.0	1.3
RTT06	2.2	4.2	1.6
RTT12	2.2	4.2	2.8
RTT20	3.5	6.1	2.8
RTT25	3.8	8.0	3.5

### 9 :

9.1 : 1

9.1.1 RTT03 05 06 12 20 25 ± 2% ± 5% :

9.1.1.1 10 : E-24

(10<sup>x</sup>)

$$100$$

$$100 = 10 \times 10^0 = 10$$

9.1.1.2 10 : E-24

(10<sup>-1</sup>)

$$4R7$$

$$4R7 = 47 \times 10^{-1} = 4.7$$

9.1.2 RTT05 06 12 20 25 ± 0.1% ± 0.5%、± 1% :

9.1.2.1 100 : E-24 E-96

(10<sup>x</sup>)

$$1002$$

$$1002 = 100 \times 10^2 = 10000 = 10K$$

9.1.2.2 100 : E-24 E-96

R (10<sup>x</sup>)

$$10R2 \quad R \quad (10^{-1})$$

$$10R2 = 102 \times 10^{-1} = 10.2$$

$$1R02 \quad R \quad (10^{-2})$$

$$1R02 = 102 \times 10^{-2} = 1.02$$

9.1.3 RTT03 ± 0.1% ± 0.5%、± 1% ( ):  
 E-96 EIAJ  
 (10<sup>x</sup>)

47B			
47B	301 × 10 <sup>1</sup>	3010	3.01K
E-96	E24	,	E-24

100	:	391	391=39 × 10 <sup>1</sup> =390
100	:	390	390=39 × 10 <sup>0</sup> =39

9.2 : 1

9.2.1 RTT03 05 06 12 20 25 ± 1% ± 2% ± 5% :

9.2.1.1 100 m : E-24 E-96  
 (10<sup>-3</sup>)

R220 (E-24 )			
R220	220 × 10 <sup>-3</sup>	0.22	220 m
R102 (E-96 )			
R102	102 × 10 <sup>-3</sup>	0.102	102 m

9.2.1.2 100 m : E-24  
 (10<sup>-3</sup>)

R022			
R022	22 × 10 <sup>-3</sup>	0.022	22 m

9.3 RTT 0R:

9.3.1 RTT03 05 06 12 20 25± 1% " 000 "

9.3.2 RTT03 05 06 12 20 25± 5% " 0 "

9.4 RTT01 RTT02

**9.5**

**9.5.1 E-24**

10	11	12	13	15	16	18	20	22	24	27	30
33	36	39	43	47	51	56	62	68	75	82	91

**9.5.2 E-96**

100	102	105	107	110	113	115	118	121	124	127	130
133	137	140	143	147	150	154	158	162	165	169	174
178	182	187	191	196	200	205	210	215	221	226	232
237	243	249	255	261	267	274	280	287	294	301	309
316	324	332	340	348	357	365	374	383	392	402	412
422	432	442	453	464	475	487	499	511	523	536	549
562	576	590	604	619	634	649	665	681	698	715	732
750	768	787	806	825	845	866	887	909	931	953	976

**9.5.3 EIAJ :**

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

**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>**

9.6

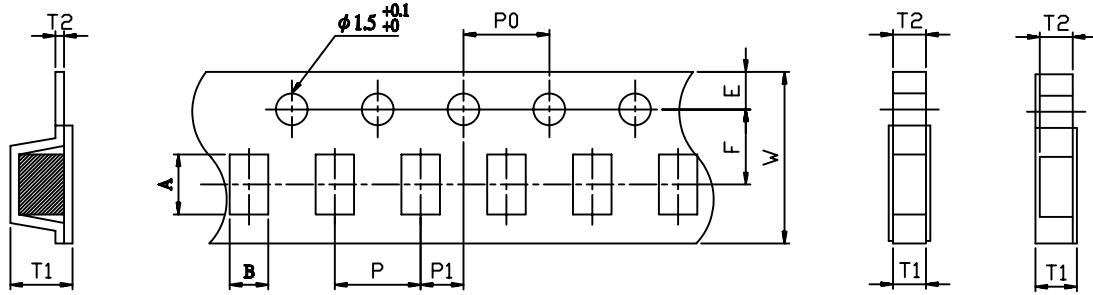
Making Type	A	B	C	D	E	F	X	Y			
0603											
Making Type	1	2	3	4	5	6	7	8	9	0	R
0603											
0805											
1206											
1210											
2010 2512											

- 10 :
- 10.1 : 1μ
- 10.2 : 3μ
- 10.3

11 :

11.1

(Tape Dimensions):



TE  
CARRIER  
TAPE

DIRECTION OF FEED

TH/TP  
CARRIER  
TAPE

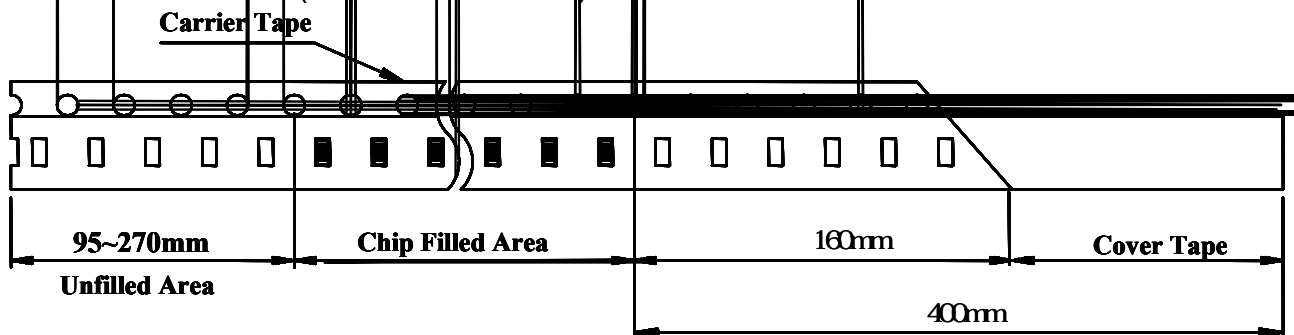
PAPER  
CARRIER  
TAPE

Unit : mm

Packaging	DIM TYPE	A	E	W	E	F	T1	T2	P	P0	10x P0	P1
TH Carrier Tape	RTT01	0.68± 0.03	0.38± 0.03	8.0± 0.1	1.75± 0.1	3.5± 0.05	0.45+0.1/-0	0.28± 0.02	2.0± 0.05	4.0± 0.05	40.0± 0.20	2.0± 0.05
	RTT02	1.15± 0.05	0.65± 0.05	8.0± 0.2	1.75± 0.1	3.5± 0.05	0.45+0.2/-0	0.45± 0.05	2.0± 0.1	4.0± 0.05	40.0± 0.2	2.0± 0.05
TP Carrier Tape	RTT03	1.80± 0.1	1.00± 0.1	8.0± 0.2	1.75± 0.1	3.5± 0.05	0.60+0.2/-0	0.60± 0.1	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05
	RTT05	2.30± 0.1	1.55± 0.1	8.0± 0.2	1.75± 0.1	3.5± 0.05	0.75+0.2/-0	0.75± 0.1	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05
	RTT06	3.50± 0.2	1.90± 0.2	8.0± 0.2	1.75± 0.1	3.5± 0.05	0.75+0.2/-0	0.75± 0.1	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05
TE Carrier Tape	RTT12	3.50± 0.2	2.80± 0.2	8.0± 0.2	1.75± 0.1	3.5± 0.05	0.75+0.2/-0	0.75± 0.1	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05
	RTT20	5.50± 0.2	2.80± 0.2	12.0± 0.2	1.75± 0.1	5.5± 0.05	0.85± 0.15	0.23± 0.15	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05
	RTT25	6.70± 0.2	3.40± 0.2	12.0± 0.2	1.75± 0.1	5.5± 0.05	0.85± 0.15	0.23± 0.15	4.0± 0.1	4.0± 0.05	40.0± 0.20	2.0± 0.05

11.2

(Lead Dimensions)



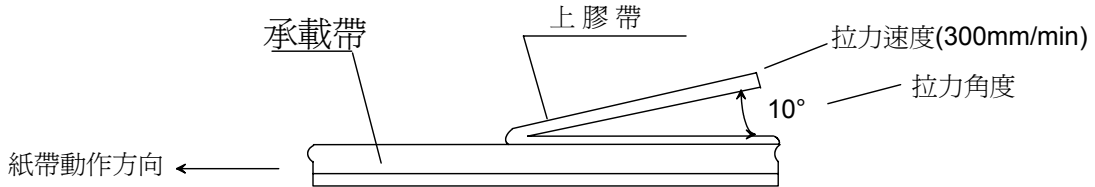


**11.3**

(Peel off Strength):

: 0201 0402 => 0.07 ~ 0.5N ( 7.1 ~ 51 gf )

0603 0805 1206 1210 2010 2512 => 0.07 ~ 0.7 N ( 7.1 ~ 71.4 gf )



**11.4**

(Packaging Model):

TYPE	Tape Width	Packaging QTY (pcs / reel)															
		TH								TP				TE			
		2 mm Pitch								4 mm Pitch				4 mm Pitch			
		TH	H0	H1	H2	H3	H4	H5	H6	TP	P2	P3	P4	TE	E2	E3	E4
RTT01	8 mm	10,000	15,000	20,000	20,000	30,000	40,000	50,000	60,000	--	--	--	--	--	--	--	--
RTT02	8 mm	10,000	--	20,000	20,000	30,000	40,000	50,000	60,000	--	--	--	--	--	--	--	--
RTT03	8 mm	--	--	--	--	--	--	--	--	5,000	10,000	15,000	20,000	--	--	--	--
RTT05	8 mm																
RTT06	8 mm																
RTT12	8 mm																
RTT20	12 mm	--	--	--	--	--	--	--	--	--	--	--	4,000	8,000	12,000	16,000	
RTT25	12 mm																
Reel Type		7"	7"	7"	10"	13"	13"	13"	13"	7"	10"	13"	13"	7"	10"	13"	13"

TYPE	Tape Width	Bulk Case (pcs / case)	
RTT02	8 mm		50,000
RTT03	8 mm		25,000
RTT05	8 mm		10,000
RTT06	8 mm		5,000
RTT12	8 mm		--
RTT20	12 mm		--
RTT25	12 mm	--	

11.4.1

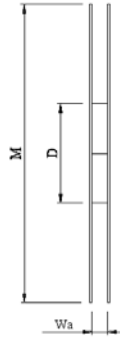
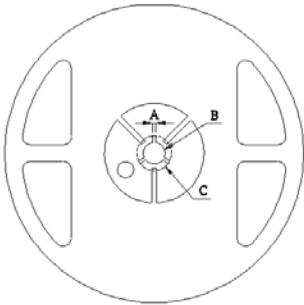
TH TP & PE  
TE

11.4.2

11.5

(Reel Dimensions):

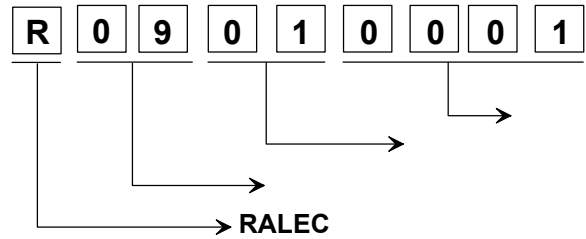
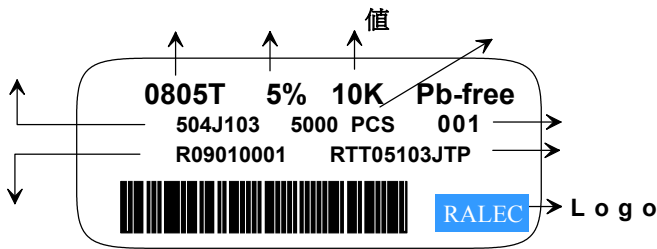
Unit : mm



Reel Type/ Tape	Wa	M	A	B	C	D
7" reel for 8 mm tape	9.0 ± 0.5	178 ± 2.0	2.0 ± 0.5	13.5 ± 0.5	21.0 ± 0.5	60.0 ± 1.0
7" reel for 12 mm tape	13.8 ± 0.5	178 ± 2.0				80.0 ± 1.0
10" reel for 8 mm tape	10.0 ± 0.5	254 ± 2.0				100.0 ± 1.0
13" reel for 8 mm tape	10.0 ± 0.5	330 ± 2.0				100.0 ± 1.0

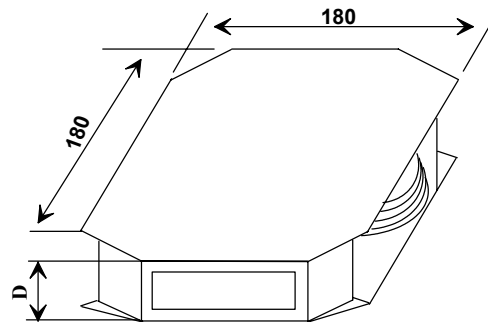
11.6

(Label):

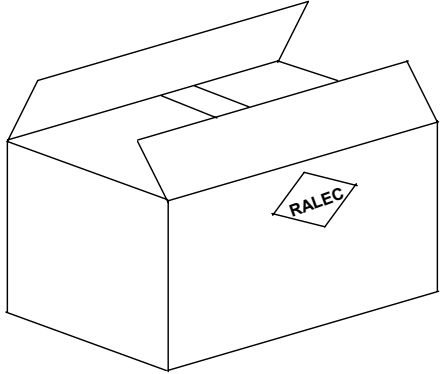


11.7

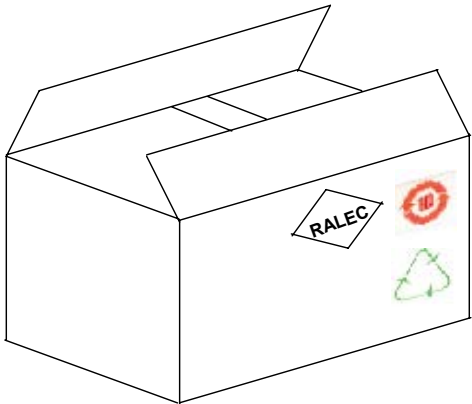
	D (mm)
1	12
2	24
3	36
4	48
5	60
6	72
7	84
8	96
9	108
10	120



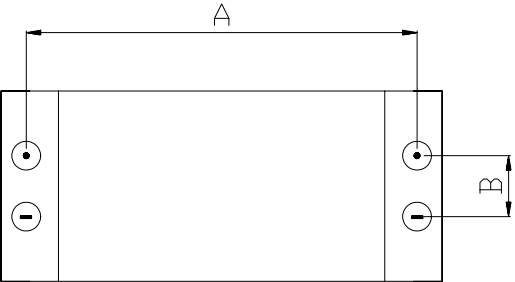
**11.8**

10R	(mm)	(mm)	(mm)	
2	272	205	210	
4	375	280	210	
8	544	380	210	

**11.9**

10R	(mm)	(mm)	(mm)	
2	272	205	210	
4	375	280	210	
8	544	380	210	

**12**

 <p>             ● Current Terminal              ○ Voltage Terminal         </p>	Unit : mm		
	DIM		
	TYPE	A	B
	RTT01	0.44± 0.05	0.22 ± 0.05
	RTT02	0.80± 0.05	0.24 ± 0.05
	RTT03	1.35± 0.05	0.35 ± 0.05
	RTT05	1.80 ± 0.05	0.35 ± 0.05
	RTT06	2.90 ± 0.05	0.35 ± 0.05
	RTT12	2.90 ± 0.05	0.35 ± 0.05
	RTT20	4.50 ± 0.05	1.15 ± 0.05
RTT25	5.90 ± 0.05	1.60 ± 0.05	

