



**Metal Thin Film Chip Resistors
(RBP series Standard)**

Document No

TRBP-XXOS002D

Issued date

2011/3/14

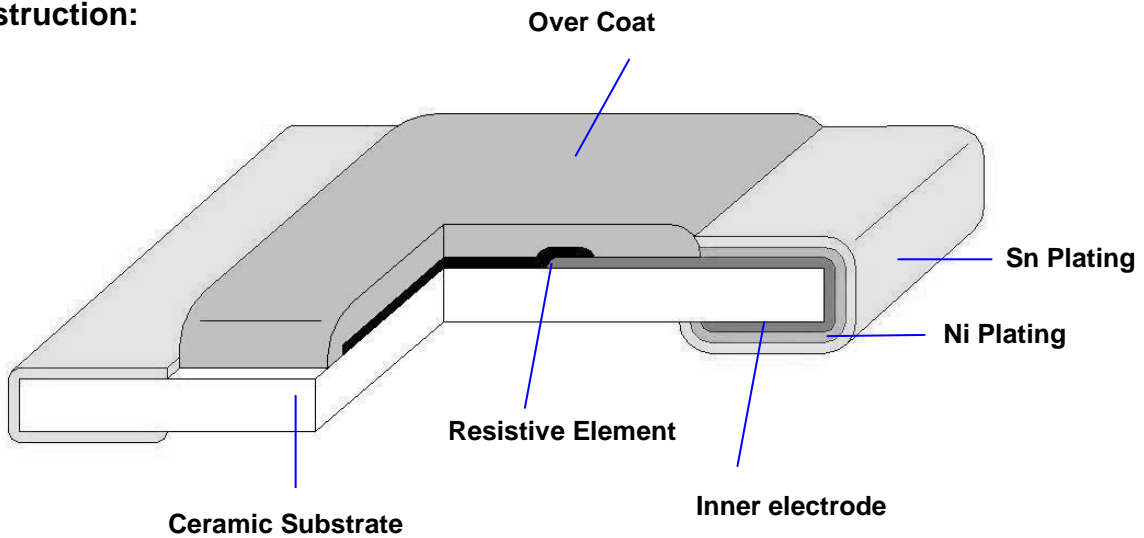
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1. Scope :

This specification applies for the RBP series of metal thin film chip resistors made by TA-I.

2. Construction:



Datasheet.Directory

3. Type Designation:

RBP

10

B

I

P

1001

Product Code

Size

Tolerance

Packaging

TCR

Nominal Resistance

RBP : Metal Thin Film

Power Rating

Resistance

06-0603(1608) 1/8W
10-0805(2012) 1/4W
12-1206(3216) 1/2W
13-1210(3226) 1/2W
20-2010(2025) 1W
25-2512(6432) 2W

B- ±0.10%
C- ±0.25%
D- ±0.50%
F- ±1.00%
G-±2.00%
J- ±5.00%

T- Paper
Tape
B- Bulk
Cassette

J- ±5 ppm
k- ±10 ppm
M- ±15 ppm
P- ±25 ppm
S- ±50 ppm
T- ±100 ppm

e.g.,
1001=1kΩ



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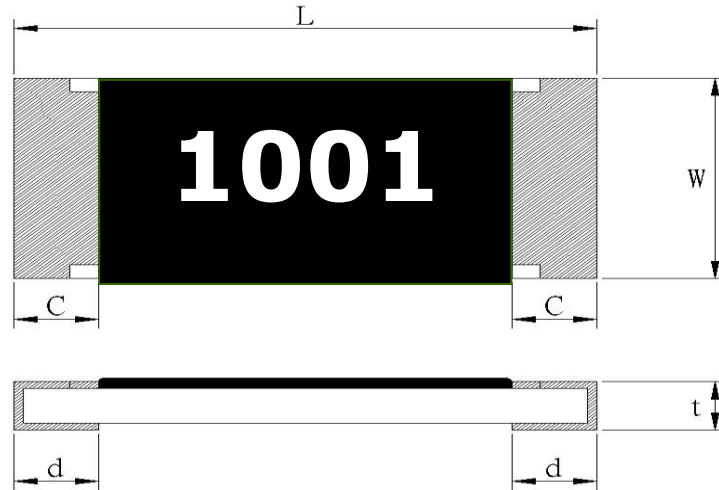
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4. Dimensions:



UNIT: mm

Type	L	W	C	d	t
RBP06	1.60 ±0.10	0.80 ±0.10	0.30 ±0.20	0.40 + 0.20 - 0.10	0.45 ±0.10
RBP10	2.00 ±0.10	1.25 ±0.10	0.40 ±0.20	0.45 ±0.20	0.50 ±0.10
RBP12	3.10 ±0.10	1.55 ±0.10	0.50 ±0.30	0.5 ±0.20	0.55 ±0.10
RBP13	3.10 ±0.10	2.55 ±0.10	0.50 ±0.30	0.5 ±0.20	0.60 ±0.10
RBP20	5.10 ±0.15	2.50 ±0.15	0.60 ±0.30	1.4 ±0.25	0.60 ±0.10
RBP25	6.30 ±0.20	3.20 ±0.20	0.60 ±0.30	1.85 ±0.25	0.60 ±0.10



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5. Ratings & Characteristics

Type	Power Rating at 70°C	Rated Voltage	Max. Working Voltage	Max. Over- Load Voltage	T.C.R (PPM/°C)	Resistance Range	Resistance tolerance(%)
RBP06	1/8 W	Refer 5.2	75V	150V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP06	1/8W	Refer 5.2	75V	150V	±10 ±25 ±50 ±100	10Ω~390KΩ	± 0.1 ~ ±5
RBP10	1/4 W	Refer 5.2	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP10	1/4 W	Refer 5.2	150V	300V	±10 ±25 ±50 ±100	10Ω~800KΩ	± 0.1 ~ ±5
RBP12	1/2 W	Refer 5.2	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP12	1/2 W	Refer 5.2	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	± 0.1 ~ ±5
RBP13	1/2 W	Refer 5.2	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP13	1/2 W	Refer 5.2	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	± 0.1 ~ ±5
RBP20	1W	Refer 5.2	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP20	1W	Refer 5.2	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	± 0.1 ~ ±5
RBP25	2W	Refer 5.2	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~5
RBP25	2W	Refer 5.2	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	± 0.1 ~ ±5

Operating Temp(°C): -55°C ~ +155°C

Note : Except for the above standardized products, we also provide the customized products.



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5.1 Derating Curve :

For resistors operated at ambient temperature over 70°C , power rating shall be derated according to figure 1.

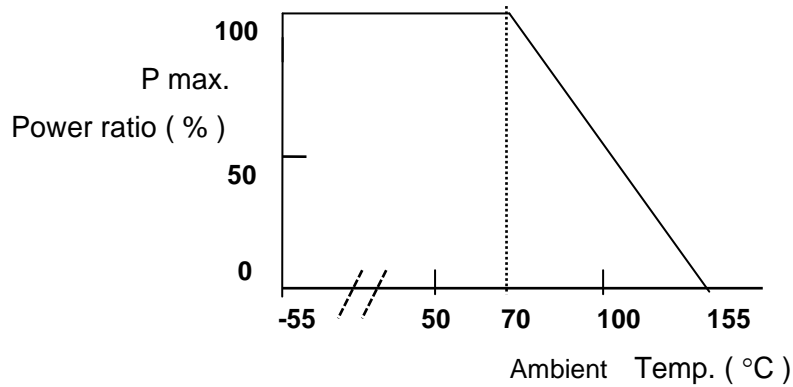


Figure 1

5.2 Rated Voltage:

The rated voltage is calculated by the following formula:

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

E=Rated Voltage(V)

P=Rated Power(W)

R=Resistance Value(Ω)



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6. Reliability Tests:(As specified in JIS C 5201-1 or IEC60115-1)

Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS C5201-1-4.8	+25 ~ +125 °C	Refer 5.0
Rapid Change of Temp.	IEC60115-1-4.19 JIS C 5201-1-4.19	-55°C(30 min.) / +155°C(30 min.), 300 cycles	±(0.5%+0.05Ω)
Short Time Overload	IEC60115-1-4.13 JIS C5201-1-4.13	2.5 X rated voltage for 5sec	±(0.5% + 0.05Ω)
Resistance to Dry Heat	IEC60115-1-4.23.2 JIS C5201-1-4.23.2	155±5°C for 96±4Hrs	±(0.5% +0.05Ω)
Load Life	IEC60115-1-4.25.1 JIS C5201-1-4.25.1	1000 hours at rated power , 70°C , 1.5hours "ON " , 0.5hour "OFF"	±(0.5% +0.05Ω)
Resistance to Solder Heat	IEC60115-1-4.18 JIS C5201-1-4.18	260 ±5°C solder , 10 ±1 sec dwell .	±(0.1% +0.05Ω)
Bending	IEC60115-1-4.33 JIS C5201-1-4.33	3mm deflection	±(0.5% +0.05Ω)
Dielectric Withstanding Voltage (Voltage Proof)	IEC60115-1-4.7 JIS C5201-1-4.7	Applying voltage : 0402 & 0603 : 300V The other 500V for a minute .	No abnormalities such as flashover, burning dielectric breakdown shall appear.
Load Life with Humidity	IEC60115-1-4.24 JIS C5201-1-4.24	1000 hours 85°C/85%RH. Note: Specified conditions: 10% of operating power(not exceeding max working voltage). Measurement at 24±2 hours after test conclusion.	±(0.5% +0.05Ω)
Insulation Resistance	IEC60115-1-4.6 JIS C5201-1-4.6	Applying voltage 100V for 1 minute.	≥ 1GΩ
Solderability	IEC60115-1-4.17 JIS C5201-1-4.17	245 ±5°C solder, 2 ±0.5 sec dwell. Solder : Sn96.5 / Ag3.0 / Cu0.5	At least 95% of surface area of electrode shall be covered with new solder.

Note* :RCWV : Rated continuous working voltage .



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7. Marking

7.1 $\pm 2\%$ & $\pm 5\%$ (E24) : RBP06 / RBP 10 / RBP 12 / RBP 13 / RBP 20 / RBP 25

Resistance value is expressed by 3 digits, the first two digits represent the significant figures of nominal resistance value in Ω , and the third digit represents exponent for base of 10.

Symbol	E24	Marking	Symbol	E24	Marking	Symbol	E24	Marking
1	12R	<u>120</u>	31	510R	<u>511</u>	61	30K	<u>303</u>
2	16R	<u>160</u>	32	560R	<u>561</u>	62	33K	<u>333</u>
3	18R	<u>180</u>	33	620R	<u>621</u>	63	36K	<u>363</u>
4	22R	<u>220</u>	34	680R	<u>681</u>	64	39K	<u>393</u>
5	24R	<u>240</u>	35	820R	<u>821</u>	65	43K	<u>433</u>
6	27R	<u>270</u>	36	910R	<u>911</u>	66	47K	<u>473</u>
7	30R	<u>300</u>	37	1K2	<u>122</u>	67	51K	<u>513</u>
8	33R	<u>330</u>	38	1K6	<u>162</u>	68	56K	<u>563</u>
9	36R	<u>360</u>	39	1K8	<u>182</u>	69	62K	<u>623</u>
10	39R	<u>390</u>	40	2K2	<u>222</u>	70	68K	<u>683</u>
11	43R	<u>430</u>	41	2K4	<u>242</u>	71	82K	<u>823</u>
12	47R	<u>470</u>	42	2K7	<u>272</u>	72	91K	<u>913</u>
13	51R	<u>510</u>	43	3K0	<u>302</u>	73	120K	<u>124</u>
14	56R	<u>560</u>	44	3K3	<u>332</u>	74	160K	<u>164</u>
15	62R	<u>620</u>	45	3K6	<u>362</u>	75	180K	<u>184</u>
16	68R	<u>680</u>	46	3K9	<u>392</u>	76	220K	<u>224</u>
17	82R	<u>820</u>	47	4K3	<u>432</u>	77	240K	<u>244</u>
18	91R	<u>910</u>	48	4K7	<u>472</u>	78	270K	<u>274</u>
19	120R	<u>121</u>	49	5K1	<u>512</u>	79	300K	<u>304</u>
20	160R	<u>161</u>	50	5K6	<u>562</u>	80	330K	<u>334</u>
21	180R	<u>181</u>	51	6K2	<u>622</u>	81	360K	<u>364</u>
22	220R	<u>221</u>	52	6K8	<u>682</u>	82	390K	<u>394</u>
23	240R	<u>241</u>	53	8K2	<u>822</u>	83	430K	<u>434</u>
24	270R	<u>271</u>	54	9K1	<u>912</u>	84	470K	<u>474</u>
25	300R	<u>301</u>	55	12K	<u>123</u>	85	510K	<u>514</u>
26	330R	<u>331</u>	56	16K	<u>163</u>	86	560K	<u>564</u>
27	360R	<u>361</u>	57	18K	<u>183</u>	87	620K	<u>624</u>
28	390R	<u>391</u>	58	22K	<u>223</u>	88	680K	<u>684</u>
29	430R	<u>431</u>	59	24K	<u>243</u>	89	820K	<u>824</u>
30	470R	<u>471</u>	60	27K	<u>273</u>	90	910K	<u>914</u>



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E.G. :, $102 = 10 \times 10^2 = 1000 \Omega = 1K \Omega$



7.2 $\pm 0.1\%$, $\pm 0.5\%$, $\pm 1\%$ (E96) : RBP 10 / RBP 12 / RBP 13 / RBP 20 / RBP 25

Resistance value is expressed by 4 digits or 3digits , the first three digits represent the significant figures of nominal resistance value in Ω , and the fourth digit represents exponent for base of 10.

E.G. : $1000 = 100 \times 10^0 = 100 \Omega$



7.3 $\pm 0.1\%$, $\pm 0.5\%$, $\pm 1\%$ (E96): RBP06

When the marking space is too small in such small-sized resistors as RBP06, the marking can not made by 4 digits and may be made by two digits combined with one English capital.

Symbol for E96 series nominal resistance value

Symbol	E96	Symbol	E96	Symbol	E96	Symbol	E96
01	100	25	178	49	316	73	562
02	102	26	182	50	324	74	576
03	105	27	187	51	332	75	590
04	107	28	191	52	340	76	604
05	110	29	196	53	348	77	619
06	113	30	200	54	357	78	634
07	115	31	205	55	365	79	649
08	118	32	210	56	374	80	665
09	121	33	215	57	383	81	681
10	124	34	221	58	392	82	698
11	127	35	226	59	402	83	715
12	130	36	232	60	412	84	732
13	133	37	237	61	422	85	750
14	137	38	243	62	432	86	768
15	140	39	249	63	442	87	787
16	143	40	255	64	453	88	806
17	147	41	261	65	464	89	825
18	150	42	267	66	475	90	845
19	154	43	274	67	487	91	866
20	158	44	280	68	499	92	887
21	162	45	287	69	511	93	909
22	165	46	294	70	523	94	931
23	169	47	301	71	536	95	953
24	174	48	309	72	549	96	976

Symbol for multipliers

Symbol	A	B	C	D	E	F	G	H	X	Y	Z
multipliers	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^{-1}	10^{-2}	10^{-3}

Ex: 02c=102 $\times 10^2=10.2k\Omega$



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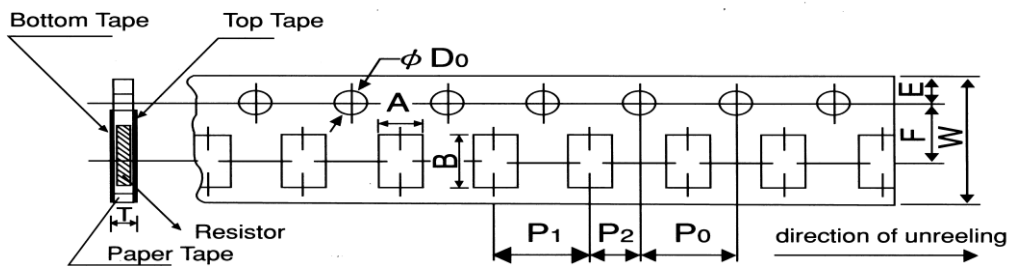
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8. Taping & Reel

8.1 Taping Dimensions

8.1.1 4 mm pitch paper



Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Paper Tape	RBP06	1.1±0.1	1.9±0.1	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.1	4.0±0.1	φ 1.5	0.64±0.1
	RBP10	1.6±0.15	2.4±0.2								0.84±0.1
	RBP12	2.0±0.15	3.6±0.2								0.84±0.1
	RBP13	2.8±0.2	3.6±0.2								0.84±0.1

UNIT: mm



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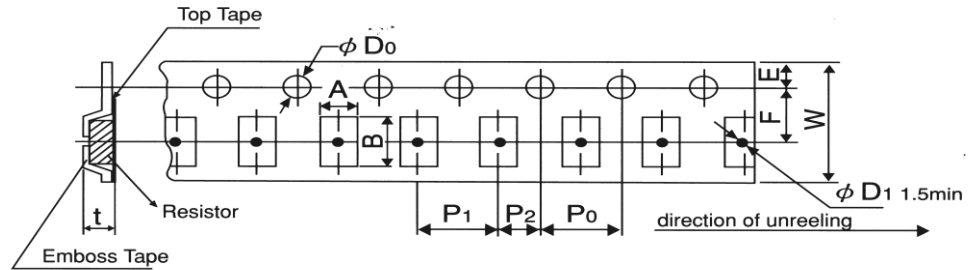
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8.1.2 4 mm pitch Emboss :



Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Emboss	RBP20	2.8±0.2	5.3±0.2	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.05	φ 1.5 ^{+0.1} ₋₀	0.85±0.15
	RBP25	3.6±0.2	6.9±0.2								

Type Size		Paper Tape	Emboss Plastic Tape 4 mm pitch
		4 mm pitch	
		180mm/R	
RBP	06	5000	
RBP	10	5000	
RBP	12	5000	
RBP	13	5000	
RBP	20		4000
RBP	25		4000



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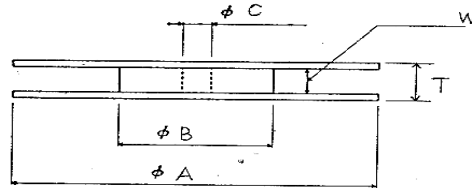
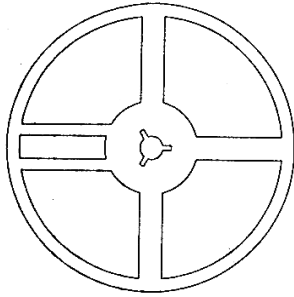
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8.2 Reel Specifications

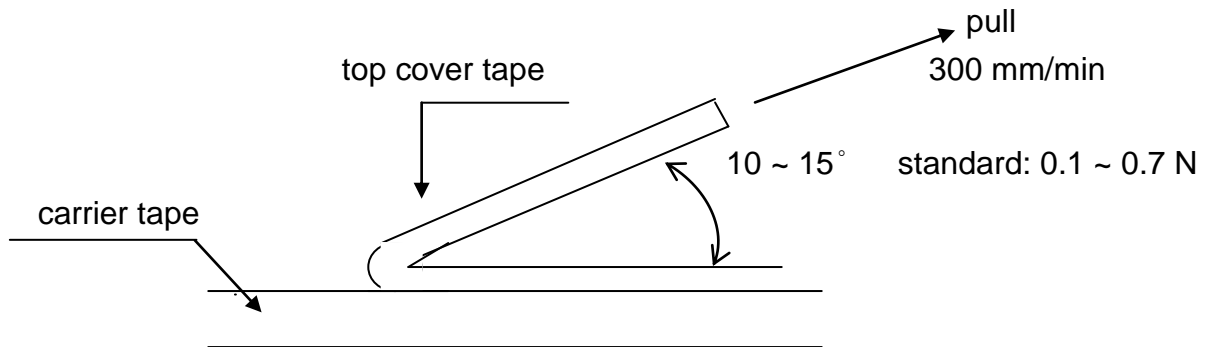


Type	ϕA	ϕB	ϕC	W	T
RBP /06 RBP10 / 12/13	178.0 ± 2.0	60.0 ± 1.0	13.0 ± 1.0	9.0 ± 1.0	11.4 ± 2.0
RBP20 / 25				13.0 ± 1.0	15.5 ± 1.0

UNIT: mm

8.3 Peel – off force :

Peel – off force of paper and blister tape is in accordance with “JIS ”
that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



UNIT: mm



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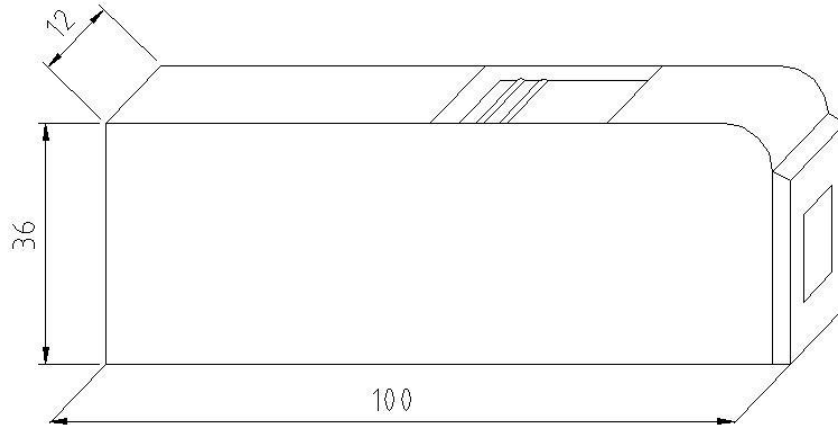
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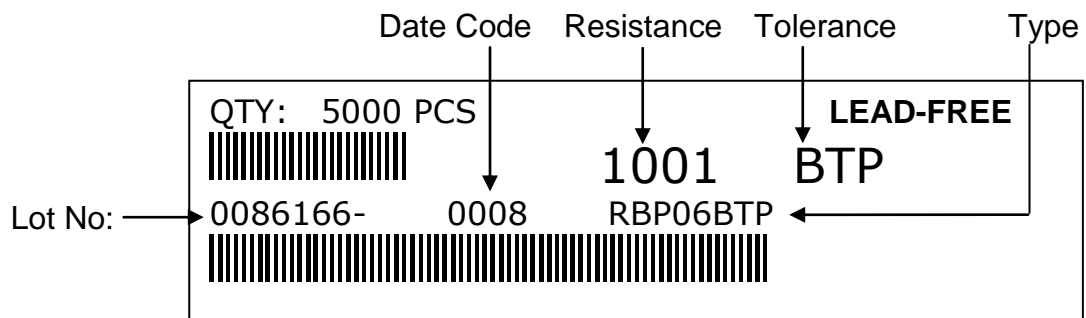
9. Bulk Case Specifications:



UNIT:mm

10. Label

10.1 Normal Products :



Manufacture Label



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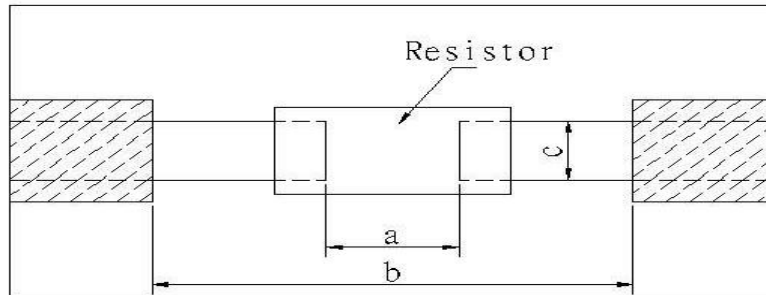
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11. Recommended land patterns



Land pattern		Dimension (mm)		
Type	Size	a	b	c
RBP	06 (0603)	0.7 ~ 0.9	2.0 ~ 2.2	0.8 ~1.0
RBP	10 (0805)	1.0 ~ 1.4	3.2 ~ 3.8	0.9 ~ 1.4
RBP	12 (1206)	2.0 ~ 2.4	4.4 ~ 5.0	1.2 ~ 1.8
RBP	13 (1210)	2.0~2.4	4.4~5.0	2.4~3.5
RBP	20 (2010)	3.3~3.7	5.7~6.5	2.4~3.5
RBP	25 (2512)	3.6~4.0	7.6~8.6	3.0~3.5

12. ECN

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

13. Storage Conditions:

Temperature: 5°C ~35°C, Humidity:40%~75%

14. Shelf Life:

2 years from manufacturing date.



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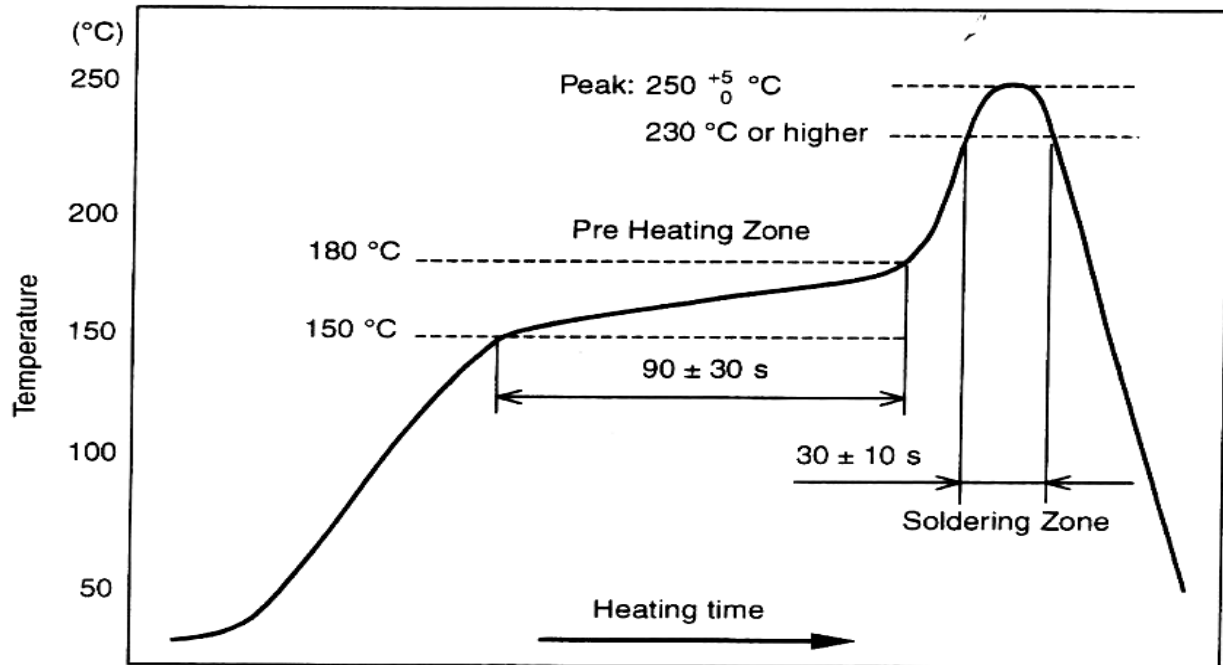
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15. Recommend IR – Reflow profile : (solder : Sn96.5 / Ag3 / Cu0.5)



Peak : $250 \begin{matrix} +5 \\ -0 \end{matrix} \text{ } ^\circ\text{C}$, 5 sec

Pre – heat Zone : 150 to 180 °C , 90±30 sec

Soldering Zone : 230°C or higher , 30±10 sec



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16. Manufacturing Country & City:

TA-I TECHNOLOGY CO., LTD. (Taiwan– Tao Yuan)

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Revise record

Date	Content	Owner																		
Feb 04,2009	<p>4. Dimensions:</p> <p>Before :</p> <table border="1" data-bbox="593 577 1011 860"> <thead> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>RBP04</td> <td>0.25 ±0.10</td> </tr> <tr> <td>RBP06</td> <td>0.30 + 0.20 - 0.10</td> </tr> <tr> <td>RBP10</td> <td>0.40 ±0.20</td> </tr> <tr> <td>RBP12</td> <td>0.40 ±0.20</td> </tr> </tbody> </table> <p>After :</p> <table border="1" data-bbox="593 900 1011 1146"> <thead> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>RBP06</td> <td>0.40 + 0.20 - 0.10</td> </tr> <tr> <td>RBP10</td> <td>0.45 ±0.20</td> </tr> <tr> <td>RBP12</td> <td>0.5 ±0.20</td> </tr> </tbody> </table>	Type	d	RBP04	0.25 ±0.10	RBP06	0.30 + 0.20 - 0.10	RBP10	0.40 ±0.20	RBP12	0.40 ±0.20	Type	d	RBP06	0.40 + 0.20 - 0.10	RBP10	0.45 ±0.20	RBP12	0.5 ±0.20	Ray
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2009/6/5	新增 1213、2010、2510 規格	ray																		
2011/03/14	<p>Reference standard of Reliability Tests:</p> <p>Before: JIS C 5202</p> <p>After: JIS C 5201-1 or IEC60115-1</p>	Cash																		