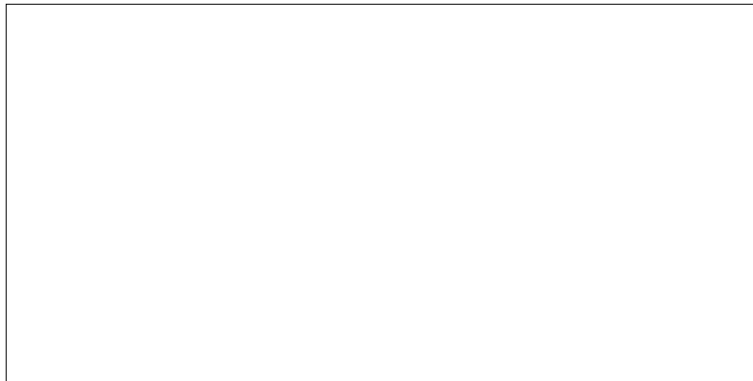


# SPECIFICATION FOR APPROVAL

ITEM : FIXED CHIP RESISTOR

**APPROVAL CHECK**



**CUSTOMER :** \_\_\_\_\_



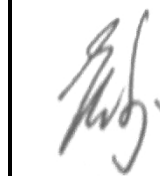
**DATE :** 18 December, 2001

# SPECIFICATION

**ITEM :** FIXED CHIP RESISTOR

**MODEL :** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

WRITTEN	CHECKED	APPROVED
		

**Samsung Electro-Mechanics (SEM)**

314, MAETAN-DONG, PALDAL-KU, SUWON, GYEONGGI-DO, KOREA

**SEMPHIL**

BLK. 5 CALAMBA PREMIER INTERNATIONAL PARK,  
PRINZA, BARANDAL, BARANGRY, CALAMBA LAGUNA, PHILIPPINE

**STEM**

WEISAN ROAD, MICRO-ELECTRONICS INDUSTRIAL PARK, TIANJIN, P.R CHINA

## Updating history of RC series specification

No.	DATE	CONTENTS	PAGE
-	-	First establishment	-
△1			
△2			
△3			
△4			
△5			
△6			
△7			
△8			
△9			

### 1. Scope

This specification applies to the Fixed Chip Resistor :

RC1005(1/16W), RC1608(1/10W), RC2012(1/8W), RC3216(1/4W), RC3225(1/4W), RC5025(1/2W), RC6432(1W).

### 2. Related Specifications

EIAJ RC 2690 A      JIS C 5201      JIS C 5202      JIS C 5223

### 3. Quality

The resistor is produced with both QS-9000 and ISO-9001, and we guarantee its quality.

### 4. Part Number System

The part number system format is as follows.

EX)  $\frac{RC}{(4.1)} \frac{2012}{(4.2)} \frac{J}{(4.3)} \frac{101}{(4.4)} \frac{CS}{(4.5)}$

#### 4. 1 Code Designation

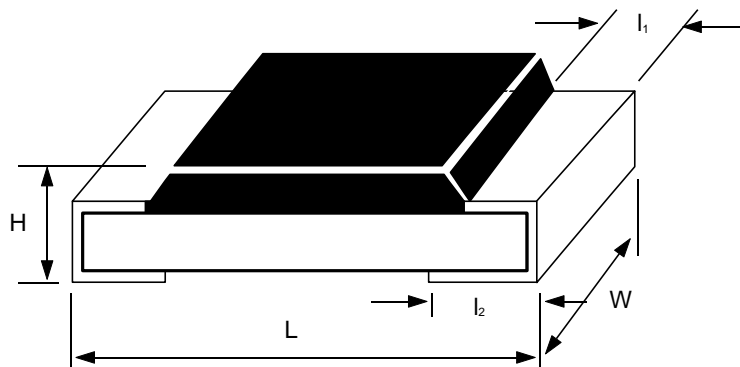
RC : This code expresses the Resistor that is produced by Samsung Electro-Mechanics CO.,LTD.

#### 4. 2 Dimension

The dimension is expressed as 4 digits number by SI unit (mm). <Table 1>

Left 2 digits are length of resistor, and the other 2 digits are width. <Fig 1>

< Fig 1 >



< Table 1 >

[ Unit : mm ]

Dimension	1005	1608	2012	3216	3225	5025	6432
in INCH	0402	0603	0805	1206	1210	2010	2510
L	1.00±0.05	1.60 ± 0.10	2.00 ± 0.20	3.20 ± 0.20	3.20 ± 0.20	5.00 ± 0.15	6.30 ± 0.15
W	0.50±0.05	0.80 ± 0.15	1.25 ± 0.15	1.60 ± 0.15	2.55 ± 0.20	2.50 ± 0.15	3.20 ± 0.15
H	0.35±0.05	0.45 ± 0.10	0.50 ± 0.10	0.55 ± 0.10	0.55 ± 0.10	0.55 ± 0.10	0.55 ± 0.10
l <sub>1</sub>	0.20±0.10	0.30 ± 0.20	0.40 ± 0.20	0.45 ± 0.20	0.45 ± 0.20	0.60 ± 0.20	0.60 ± 0.20
l <sub>2</sub>	0.25±0.10	0.35 ± 0.10	0.35 ± 0.20	0.40 ± 0.20	0.40 ± 0.20	0.60 ± 0.20	0.60 ± 0.20

ITEM	CHIP RESISTOR	Specification No.	Page
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#### 4. 3 Resistance Tolerance

The Resistance Tolerance is expressed as 1 digit alphabet by EIAJ standard. <Table 2>

< Table 2 >

item	D	F	G	J	K
Tolerance (%)	± 0.5	± 1	± 2	± 5	± 10

#### 4. 4 Nominal Resistance Value

The Nominal Resistance Value is expressed as 3 or 4 digits by EIAJ standard. <Table 3>

< Table 3 >

item	3 digits mark	4 digits mark
Resistance Tolerance	G, J, K	D, F, G
Only number	Left 2 digits : Resistance value Right 1 digit : Exponential number of 10.	Left 3 digits : Resistance value Right 1 digit : Exponential number of 10.
Number & alphabet "R"	Read alphabet "R" as decimal point.	Read alphabet "R" as decimal point.
Example	1) 101 : $10 \times 10^1 = 10 \times 10 = 100\Omega$ 2) 7R5 : $7.5 = 7.5\Omega$	1) 1001 : $100 \times 10^1 = 100 \times 10 = 1 \text{ k}\Omega$ 2) 47R5 : $47.5 = 47.5\Omega$

If resistance value in tolerance D, F and G, is same resistance value in tolerance J,  
We mark 3 digits on the resistor.

#### 4. 5 Packaging Code

The Packaging Code is expressed as 2 digits alphabet. <Table 4>

※ For more information, please refer to "PACKAGING" section.(page 11 through 16)

< Table 4 >

Packaging Code	Description	Dimension	Packaging Q'ty
C S	7" REEL PACKAGING	1005	10,000 PCS
		1608, 2012, 3216, 3225	5,000 PCS
		5025, 6432	4,000 PCS
E S	10" REEL PACKAGING	1608, 2012, 3216	10,000 PCS
A S	13" REEL PACKAGING	1005	40,000 PCS
		1608, 2012, 3216, 3225	20,000 PCS
		5025, 6432	15,000 PCS
G S	BULK CASE PACKAGING	1608	25,000 PCS
		2012	10,000 PCS
		3216	5,000 PCS

ITEM	CHIP RESISTOR	Specification No.	Page
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## 5. Resistance Range

The Resistance Range that we produce depends on the Dimension and the Resistance Tolerance of the resistor. <Table 5>

< Table 5 >

Dimension \ Tolerance	1005	1608	2012	3216	3225	5025	6432
	0402	0603	0805	1206	1210	2010	2510
D, F, G	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ
J, K	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ
JUMPER	50 mΩ MAX						

## 6. Rated Power

### 6. 1 Rated Power

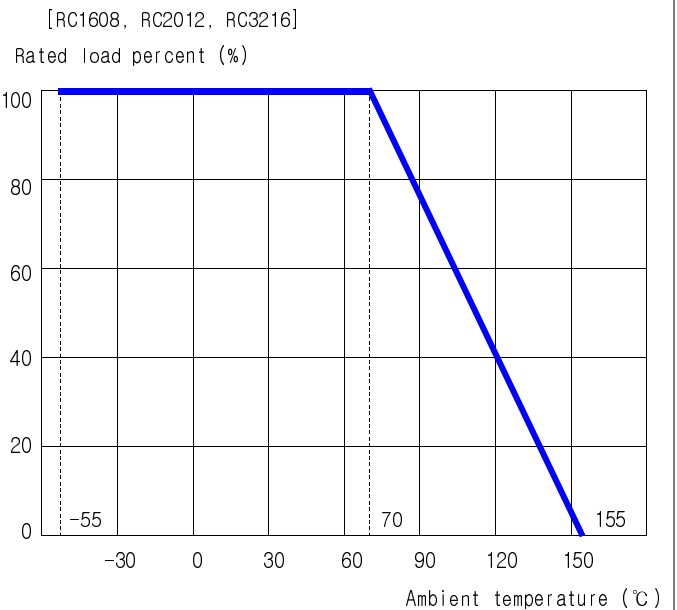
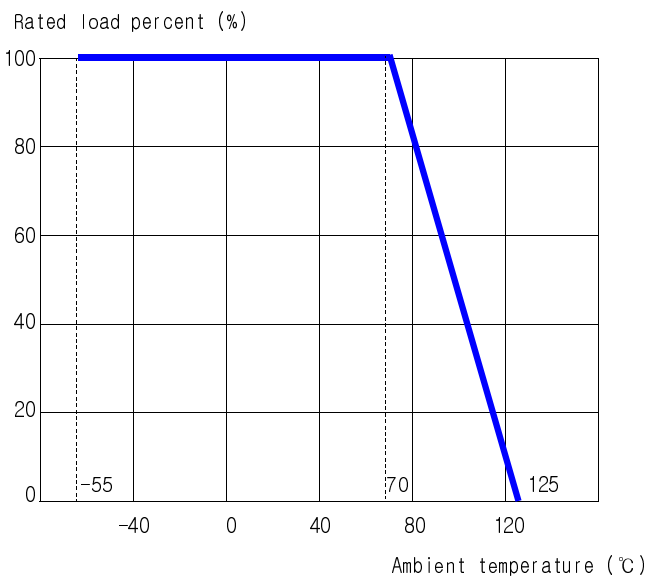
The Rated Power is classified by the dimension of the resistor. <Table 6>

< Table 6 >

item \ Dimension	1005	1608	2012	3216	3225	5025	6432
	0402	0603	0805	1206	1210	2010	2510
Rated Power	1/16 W (0.063 W)	1/10 W (0.100 W)	1/8 W (0.125 W)	1/4 W (0.25 W)	1/4 W (0.25 W)	1/2 W (0.5 W)	1.0 W
WORKING VOLT. (MAX)	50 V	50 V	150 V	200 V	200 V	200 V	200 V
STOL. VOLT. (MAX)	100 V	100 V	300 V	400 V	400 V	400 V	400 V

※ The rated power is specified as continuous full loading power at the ambient temperature of 70±2°C.  
In case of the temperature exceeding 70±2°C, the power should be derated in accordance to <Fig 2>.

< Fig 2 >



### 6. 2 Working Temperature

- 55 °C ~ + 125 °C : RC1608, RC2012, RC3216
- 55 °C ~ + 155 °C : RC1005, RC3225, RC5025, RC6432

### 6. 3 Rated Voltage

The Rated Voltage should follow the equation below.

When the rated voltage exceeds the maximum working voltage shown <Table 6>, the rated voltage should be the maximum working voltage.

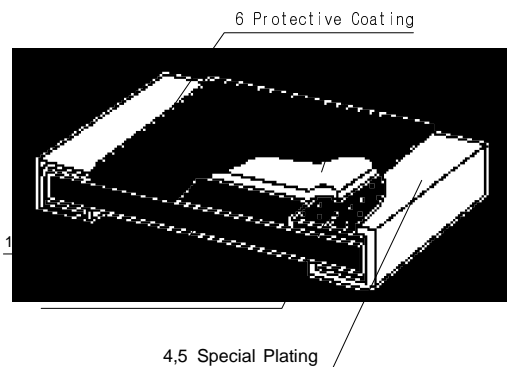
$$E = \sqrt{P \times R} \text{ (DCV or Root Mean-Square)}$$

- E : Rated Voltage (V)
- P : Rated Power (W)
- R : Resistance Value ( $\Omega$ )

### 7. Structure

The Structure of the resistor is shown as <Fig 3>, and <Table 7> is its components.

< Fig 3 >



< Table 7 >

item	Component	Material	Color	Property
1	Substrate	High purity alumina( $Al_2O_3$ )	white	insulator
2	Resistor	Thick film of $RuO_2$	black	resistor
3	Electrode	Mainly Ag, etc	white gloss	conductor
4	Plating 1	Ni	gray gloss	conductor
5	Plating 2	Sn-Pb	gray gloss	conductor
6	Coating	Special Glass	black gloss	insulator

### 8. Characteristic Performance

The resistor should be tested on the following items, based on the JIS.

All the test results should satisfy the specifications of the items.

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### 8. 1 Electrical Characteristic

The electrical characteristic test should satisfy the test method, procedure, and standard.  
 If there is no special comment, Each test performs in standard state.  
 (temperature 20℃, humidity 65%RH, pressure 1023mbar)

item	Permissible deviation		Test method																
	Resistor	Jumper																	
DC resistance	DC resistance value should be within the specified resistance tolerance.	50mΩ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (5.1)</li> <li>Test voltage : &lt;Tabel 8&gt;</li> <li>Applying time : within 5 seconds.</li> <li>Test board : &lt;Fig 5&gt;</li> </ul> < Table 8 > <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Range (Ω)</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>R &lt; 10</td> <td>0.1</td> </tr> <tr> <td>10 ≤ R &lt; 100</td> <td>0.3</td> </tr> <tr> <td>100 ≤ R &lt; 1K</td> <td>1.0</td> </tr> <tr> <td>1K ≤ R &lt; 10K</td> <td>3.0</td> </tr> <tr> <td>10K ≤ R &lt; 100K</td> <td>10</td> </tr> <tr> <td>100K ≤ R &lt; 1M</td> <td>25</td> </tr> <tr> <td>1M ≤ R</td> <td>50</td> </tr> </tbody> </table>	Range (Ω)	Voltage (V)	R < 10	0.1	10 ≤ R < 100	0.3	100 ≤ R < 1K	1.0	1K ≤ R < 10K	3.0	10K ≤ R < 100K	10	100K ≤ R < 1M	25	1M ≤ R	50
Range (Ω)	Voltage (V)																		
R < 10	0.1																		
10 ≤ R < 100	0.3																		
100 ≤ R < 1K	1.0																		
1K ≤ R < 10K	3.0																		
10K ≤ R < 100K	10																		
100K ≤ R < 1M	25																		
1M ≤ R	50																		
Temperature Coefficient of Resistance	1. Tolerance D, F ± 100ppm/℃  2. Tolerance G, J, K  < Table 9 > <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Range(Ω)</th> <th>ppm/℃</th> </tr> </thead> <tbody> <tr> <td>1 ≤ R &lt; 10</td> <td>+300 -200</td> </tr> <tr> <td>10 ≤ R &lt; 1M</td> <td>±200</td> </tr> <tr> <td>1M ≤ R &lt; 10M</td> <td>±300</td> </tr> </tbody> </table>	Range(Ω)	ppm/℃	1 ≤ R < 10	+300 -200	10 ≤ R < 1M	±200	1M ≤ R < 10M	±300	-	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (5.2)</li> <li>Temp. : 20℃ → -55℃ → 20℃ → 125℃ → 20℃</li> <li>Test board : &lt;Fig 5&gt;</li> <li>Calculation :  <math display="block">TCR(ppm/℃) = \frac{R - R_0}{R_0} \times \frac{1}{T - T_0} \times 10^6</math> <ul style="list-style-type: none"> <li>T<sub>0</sub> : 20 ± 2℃</li> <li>R<sub>0</sub> : Resistance at T<sub>0</sub> (Ω)</li> <li>T : Test temperature ( -55, 125℃)</li> <li>R : Resistance at T (Ω)</li> </ul> </li> </ul>								
Range(Ω)	ppm/℃																		
1 ≤ R < 10	+300 -200																		
10 ≤ R < 1M	±200																		
1M ≤ R < 10M	±300																		
Short time overload (STOL)	1. No mechanical damage 2. ΔR should be within ±(1%+0.1Ω)	50mΩ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (5.5)</li> <li>Test voltage : 2.5 times of rated voltage</li> <li>Applying time : 5 seconds</li> <li>Test board : &lt;Fig 5&gt;</li> </ul>																
Intermittent overload (IOL)	1. No mechanical damage 2. ΔR should be within ±(3%+0.1Ω)	50mΩ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (5.8)</li> <li>Test voltage : 2.5 times of rated voltage</li> <li>Test method : 1 sec ON, 25 sec OFF                              10,000<sup>+400</sup>cycles</li> <li>Test board : &lt;Fig 5&gt;</li> </ul>																



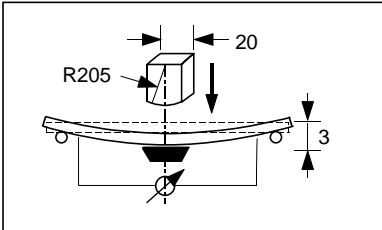
item	Permissible deviation		Test method												
	Resistor	Jumper													
Withstanding voltage	<ul style="list-style-type: none"> <li>No mechanical damage, short circuit, or disconnection.</li> </ul>	Same as left	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (5.7)</li> <li>Test voltage : 1005 1608 AC 100V, others AC 500V</li> <li>Applying time : 60 +10/-0 seconds</li> <li>Test board : &lt;Fig 7&gt;</li> </ul>												
Insulation resistance	<ul style="list-style-type: none"> <li>Should have more than 1,000MΩ</li> </ul>	Same as left	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (5.6)</li> <li>Test voltage : 1005 1608 DC 100V, others DC 500V</li> <li>Applying time : 60 seconds</li> <li>Test pressure : 1.0±0.2 N</li> <li>Test board : &lt;Fig 7&gt;</li> </ul>												
Noise	<ul style="list-style-type: none"> <li>Noise standard &lt;Table 10&gt;</li> </ul> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Range (Ω)</th> <th>dB Max.</th> </tr> </thead> <tbody> <tr> <td>1 ≤ R &lt; 100</td> <td>-10</td> </tr> <tr> <td>100 ≤ R &lt; 1K</td> <td>0</td> </tr> <tr> <td>1K ≤ R &lt; 100K</td> <td>15</td> </tr> <tr> <td>100K ≤ R &lt; 1M</td> <td>20</td> </tr> <tr> <td>1M ≤ R &lt; 10M</td> <td>30</td> </tr> </tbody> </table>	Range (Ω)	dB Max.	1 ≤ R < 100	-10	100 ≤ R < 1K	0	1K ≤ R < 100K	15	100K ≤ R < 1M	20	1M ≤ R < 10M	30	-	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (5.9)</li> <li>JIS appendix1 "Noise measure in resistor"</li> <li>Measure equipment : QUAN-TECH NOISE METER (MODEL 315C)</li> </ul>
Range (Ω)	dB Max.														
1 ≤ R < 100	-10														
100 ≤ R < 1K	0														
1K ≤ R < 100K	15														
100K ≤ R < 1M	20														
1M ≤ R < 10M	30														

**8. 2 Mechanical Characteristic**

The mechanical characteristic test should satisfy the test method, procedure, and standard.

If there is no special comment, Each test performs in standard state.

(temperature 20℃, humidity 65%RH, pressure 1023mbar)

item	Permissible deviation		Test method
	Resistor	Jumper	
Solderability	<ul style="list-style-type: none"> <li>New solder coated more than 95% of termination</li> </ul>	Same as left	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (6.5)</li> <li>Test temperature : 235 ± 5℃</li> <li>Test time : 2 ± 0.5 sec (dipping both side)</li> </ul>
Bending strength	<ol style="list-style-type: none"> <li>No mechanical damage</li> <li>ΔR should be within ±(0.5%+0.05Ω)</li> </ol>	Same as left	<ul style="list-style-type: none"> <li>Standard : JIS C 5202. (6.1)</li> <li>Test board : &lt;Fig 6&gt;</li> <li>Test speed : 100mm/min</li> <li>Test procedure : press until 3mm, then keep 5 seconds &lt;Fig 4&gt;</li> </ul> <p style="text-align: center;">&lt; Fig 4 &gt;</p> 

item	Permissible deviation		Test method
	Resistor	Jumper	
Termination strength	<ul style="list-style-type: none"> <li>No mechanical damage, or sign of disconnection</li> </ul>	Same as left	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (6.1)</li> <li>Test time : applying pressure for 10 seconds</li> <li>Test tension : 5 N (500g · f) 1005, 1608 - 3 N (300g · f)</li> </ul>
Withstanding soldering heat	<ol style="list-style-type: none"> <li>No mechanical damage</li> <li><math>\Delta R</math> should be within <math>\pm(1\%+0.05\Omega)</math></li> </ol>	50m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (6.4)</li> <li>Temperature : <math>260 \pm 5^\circ\text{C}</math></li> <li>Test time : <math>10 \pm 1</math>second (both side dipping)</li> <li>Test procedure : measures after 24 hours</li> </ul>
Vibration	<ol style="list-style-type: none"> <li>No mechanical damage</li> <li><math>\Delta R</math> should be within <math>\pm(1\%+0.05\Omega)</math></li> </ol>	50m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (6.3)</li> <li>Test amplitude : 1.5mm</li> <li>Test procedure : frequency 10Hz - 55Hz - 10Hz each 2 hours in x, y, z direction.</li> </ul>

### 8. 3 Environmental Characteristic

The Environmental characteristic test should satisfy the test method, procedure, and standard.

If there is no special comment, Each test performs in standard state.

(temperature 20 $^\circ\text{C}$ , humidity 65%RH, pressure 1023mbar)

item	Permissible deviation		Test method															
	Resistor	Jumper																
Temperature cycle	<ol style="list-style-type: none"> <li>No mechanical damage</li> <li><math>\Delta R</math> should be within <math>\pm(1\%+0.1\Omega)</math></li> </ol>	50m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (7.4)</li> <li>Test procedure : &lt;Table 11&gt;</li> <li>Measure : after 5 cycles of procedure</li> <li>Test board : &lt;Fig 5&gt;</li> </ul> <p style="text-align: center;">&lt; Table 11 &gt;</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>item</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>temp(<math>^\circ\text{C}</math>)</td> <td>-55<math>\pm</math>2</td> <td>5~35</td> <td>125<math>\pm</math>2</td> <td>5~35</td> </tr> <tr> <td>time(min)</td> <td>30</td> <td>15</td> <td>30</td> <td>15</td> </tr> </tbody> </table>	item	1	2	3	4	temp( $^\circ\text{C}$ )	-55 $\pm$ 2	5~35	125 $\pm$ 2	5~35	time(min)	30	15	30	15
item	1	2	3	4														
temp( $^\circ\text{C}$ )	-55 $\pm$ 2	5~35	125 $\pm$ 2	5~35														
time(min)	30	15	30	15														
Moisture resistance life	<ol style="list-style-type: none"> <li>No mechanical damage</li> <li><math>\Delta R</math> should be within &lt;Table 12&gt;</li> </ol> <p style="text-align: center;">&lt; Table 12 &gt;</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Range(<math>\Omega</math>)</th> <th><math>\Delta R</math> MAX</th> </tr> </thead> <tbody> <tr> <td><math>1 \leq R &lt; 10</math></td> <td><math>\pm 5\%</math></td> </tr> <tr> <td><math>10 \leq R &lt; 1M</math></td> <td><math>\pm(3\%+0.1\Omega)</math></td> </tr> <tr> <td><math>1M \leq R &lt; 10M</math></td> <td><math>\pm 5\%</math></td> </tr> </tbody> </table>	Range( $\Omega$ )	$\Delta R$ MAX	$1 \leq R < 10$	$\pm 5\%$	$10 \leq R < 1M$	$\pm(3\%+0.1\Omega)$	$1M \leq R < 10M$	$\pm 5\%$	100m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (7.9)</li> <li>Test condition : temp <math>40 \pm 3^\circ\text{C}</math>, humid 90 ~ 95%RH</li> <li>Test voltage : rated voltage</li> <li>Test time : repeat 90min ON, 30min OFF during 1000<sup>±48</sup> hours</li> <li>Test board : &lt;Fig 5&gt;</li> </ul>							
Range( $\Omega$ )	$\Delta R$ MAX																	
$1 \leq R < 10$	$\pm 5\%$																	
$10 \leq R < 1M$	$\pm(3\%+0.1\Omega)$																	
$1M \leq R < 10M$	$\pm 5\%$																	

ITEM	CHIP RESISTOR	Specification No.	Page
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item	Permissible deviation		Test method
	Resistor	Jumper	
Low temperature exposure	1. No mechanical damage 2. $\Delta R$ should be within $\pm(3\%+0.1\Omega)$	50m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (7.1)</li> <li>Test temperature : <math>-55 \pm 2^\circ\text{C}</math></li> <li>Test time : 1000<sup>+48</sup> hours (without load)</li> <li>Measure : after 1 hour</li> <li>Test board : &lt;Fig 5&gt;</li> </ul>
High temperature exposure	1. No mechanical damage 2. $\Delta R$ should be within $\pm(3\%+0.1\Omega)$	50m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (7.2)</li> <li>Test temperature : 1608,2012,3216 : <math>155 \pm 2^\circ\text{C}</math> others : <math>125 \pm 2^\circ\text{C}</math></li> <li>Test time : 1000<sup>+48</sup> hours (without load)</li> <li>Measure : after 1 hour</li> <li>Test board : &lt;Fig 5&gt;</li> </ul>
Load life	1. No mechanical damage 2. $\Delta R$ should be within <Table 13> < Table 13 >	100m $\Omega$ Maximum	<ul style="list-style-type: none"> <li>Standard : JIS C 5202 (7.10)</li> <li>Test temperature : <math>70 \pm 2^\circ\text{C}</math></li> <li>Test voltage : rated voltage</li> <li>Test time : repeat 90min ON, 30min OFF during 1000<sup>+48</sup> hours</li> <li>Test board : &lt;Fig 5&gt;.</li> </ul>

Range( $\Omega$ )	$\Delta R$ MAX
$1 \leq R < 10$	$\pm 5\%$
$10 \leq R < 1M$	$\pm(3\%+0.1\Omega)$
$1M \leq R < 10M$	$\pm 5\%$

## 9. Test board and Specification

### 9.1 Soldering

The resistor should be fixed on PCB(printed circuit board) for testing.

9.1-1 Soldering specification : JIS C 5202 (6.2)

- \* Solder : H63A (JIS Z 3282)
- \* FLUX : ROSIN 25WT% (JIS K 5902), IPA 75WT% (JIS K 5901)
- \* Soldering method : Dipping type (Flow type), Reflow type

9.1-2 Soldering condition

- \* FLUX dipping time : 5~10 sec
- \* Soldering temperature :  $235^\circ\text{C} \pm 5^\circ\text{C}$
- \* Pre treatment : None
- \* Soldering time :  $5 \pm 0.5$  sec

### 9.2 Test board

9.2-1 Test board

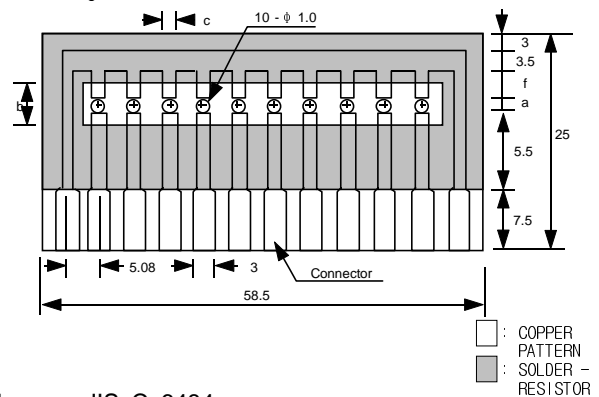
<Table 14>, <Fig 5> are dimensions of test board.

< Table 14 >

item		Dimension (mm)			
Type	Power	a	b	c	f
1005	1/16W	0.6	1.9	0.7	4.9
1608	1/10W	1.0	3.0	1.2	4.5
2012	1/8W	1.2	4.0	1.65	4.3
3216	1/4W	2.2	5.0	2.0	3.3
3225	1/4W	2.2	5.0	2.9	3.3
5025	1/2W	3.6	7.0	3.0	3.0
6432	1W	5.2	8.0	3.5	2.5

- \* Board material : epoxy JIS C 6484
- \* pattern material : pure copper 99.5% or above JIS C 6484

< Fig 5 >



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9.2-2 Bending Test Board

<Table 15>, <Fig 6> are dimensions of bending test board

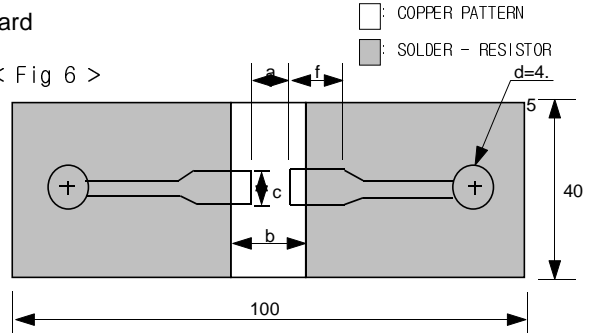
< Table 15 >

item		Dimension (mm)			
Type	Power	a	b	c	f
1005	1/16W	0.6	1.9	0.7	4.9
1608	1/10W	1.0	3.0	1.2	4.5
2012	1/8W	1.2	4.0	1.65	4.3
3216	1/4W	2.2	5.0	2.0	3.3
3225	1/4W	2.2	5.0	2.9	3.3
5025	1/2W	3.6	7.0	3.0	3.0
6432	1W	5.2	8.0	3.5	2.5

\* Board material : epoxy JIS C 6484

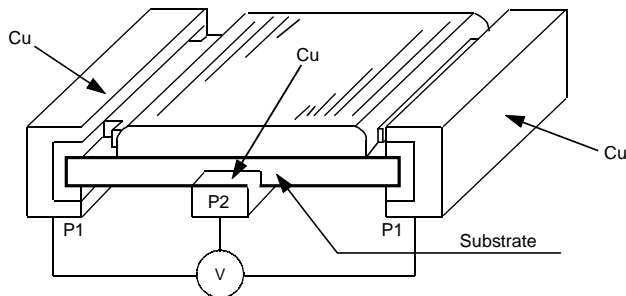
\* pattern material : pure copper 99.5% or above JIS C 6484

< Fig 6 >



9.3 Sketch of Withstanding voltage and Insulation resistance

< Fig 7 >



10. Notice

10.1. Usage of the resistor

10.1-1 Flow Soldering

After sticking the resistor to PCB with paste, dip the PCB into solder bath.

10.1-2 Reflow Soldering

After printing solder creams on PCB, place the resistor on the solder cream.  
Then heat the PCB.

10.2. Caution

10.2-1 Please make sure that keep the storage conditions.

( Temperature : 5°C ~ 35°C, Humidity : 45%RH ~ 85%RH )

10.2-2 Please handle with care, to prevent damaging the resistor.

10.2-3 It is important to keep the soldering conditions for prevent Ag leaching in Flow soldering.

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### 10.3 LOT number designation

EX)   R     L     B     I     5    1 5 2    0    
       (1) (2) (3) (4) (5) (6) (7)

(1) Product name : "R" means "Resistor".

(2) Production year : The production year is expressed as a number or an alphabet. <Table 16>

< Table 16 >

Year	1980	1981	...	1989	1990	1991	...	2000	2001	2002	...	2015	2016	2017	...
Code	0	1	...	9	A	B	...	K	L	M	...	Z	0	1	...

(3) Production line

(4) Production month : The production month is expressed as an alphabet. <Table 17>

< Table 17 >

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	A	B	C	D	E	F	G	H	I	J	K	L

(5) Production date : The production date is expressed as a number or an alphabet. <Table 18>

< Table 18 >

Date	1	2	...	9	10	11	...	19	20	21	...	28	29	30	31
Code	1	2	...	9	A	B	...	J	K	L	...	S	T	U	V

(6) Serial Number : The serial number is expressed as 3 digits number or alphabet.

001, 002, ..., 999, A00, A01, ..., A99, B00, B01, ...

(7) Derived LOT : Base LOT is "0".

The number increases when the LOT is derived.

※ If you need other specifications, please contact us.

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# PACKAGING

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## 1. Scope

This specification applies to the Fixed Chip Resistor :

RC1005(1/16W), RC1608(1/10W), RC2012(1/8W), RC3216(1/4W), RC3225(1/4W), RC5025(1/2W), RC6432(1W)

## 2. Packaging Method

Packaging protects the resistor from damage during the shipping or storage.

There are two types of packaging method ; one is "Reel" type, and the other is "Bulk" type.

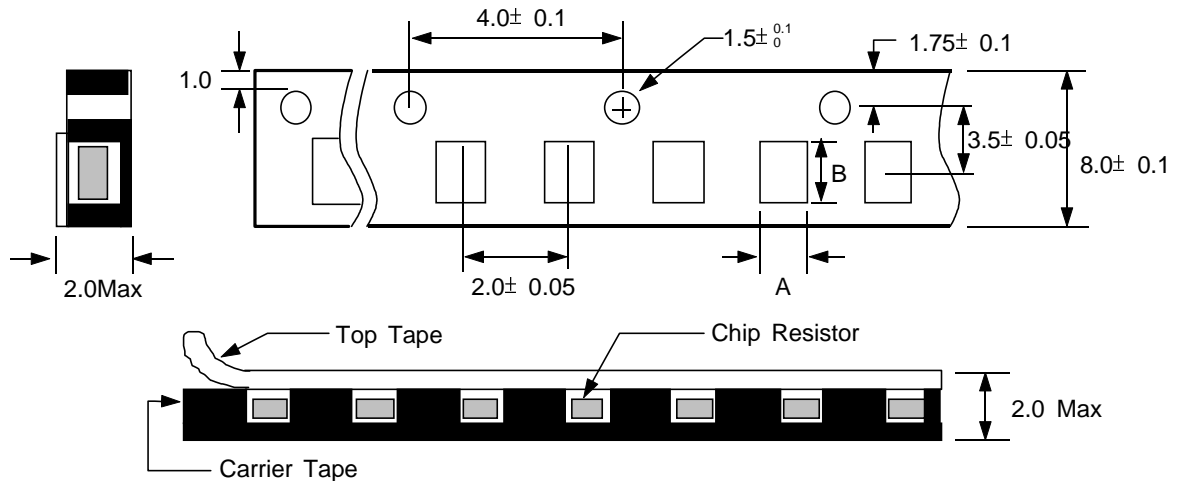
### 2.1 Reel Type Packaging

The packaging specification is based on the EIAJ RC-1009.

#### 2.1.1 Packaging Specification

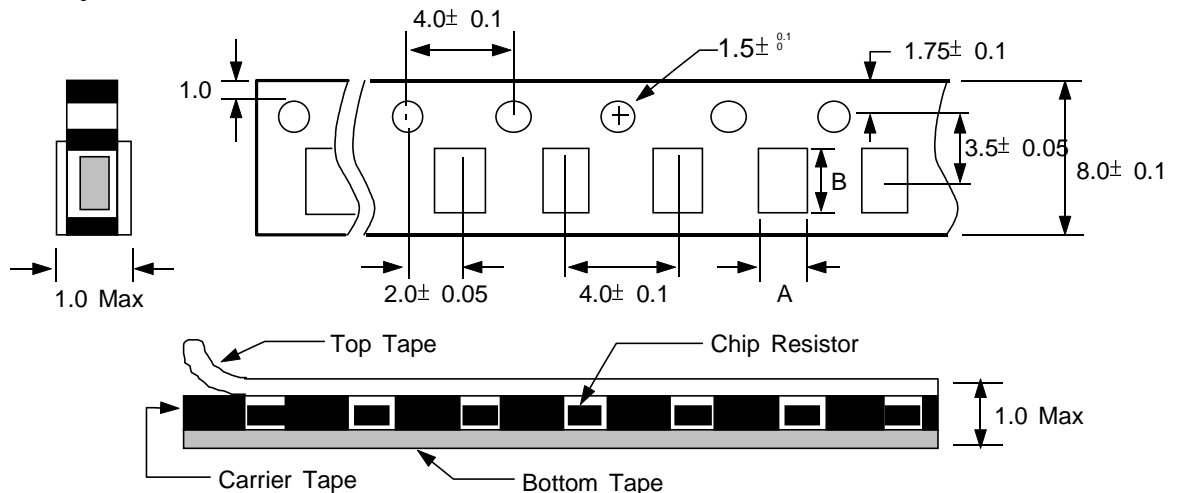
① <Fig 8> is tape dimension For 1005 type. <Table 19> is for pocket sizes, A and B.

< Fig 8 >



② <Fig 9> is tape dimension For 1608, 2012, 3216, 3225 type. <Table 19> is for pocket sizes, A and B.

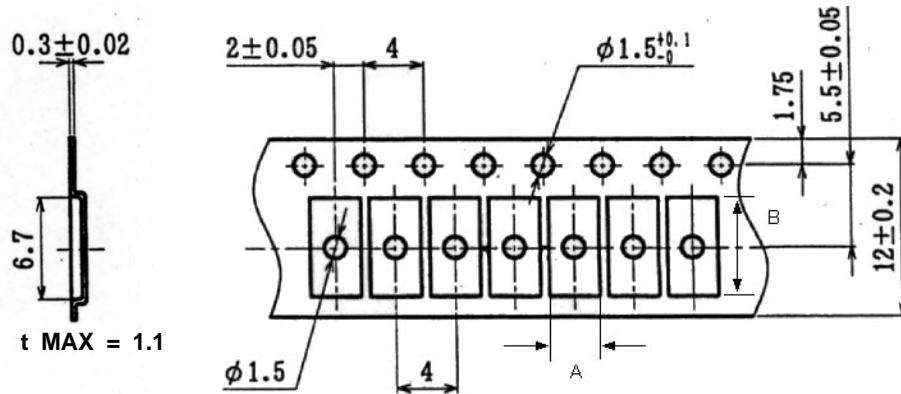
< Fig 9 >



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③ <Fig 10> is tape dimension For 5025, 6432 type. <Table 19> is for pocket sizes, A and B.

< Fig 10 >



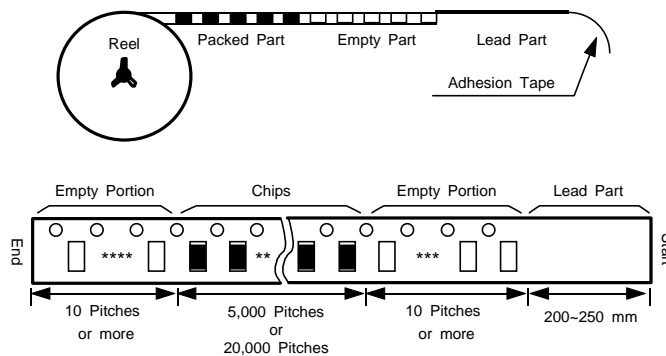
< Table 19 >

Dimension	1005	1608	2012	3216	3225	5025	6432
Symbol	0402	0603	0805	1206	1210	2010	2510
A	0.70 ± 0.10	1.10 ± 0.20	1.65 ± 0.20	2.00 ± 0.20	2.90 ± 0.20	2.80 ± 0.10	3.50 ± 0.10
B	1.20 ± 0.10	1.90 ± 0.20	2.40 ± 0.20	3.60 ± 0.20	3.60 ± 0.20	5.30 ± 0.20	6.75 ± 0.10

### 2.1.2 Taping Method

There are empty holes at both start part and end part of carrier tape. <Fig 11>

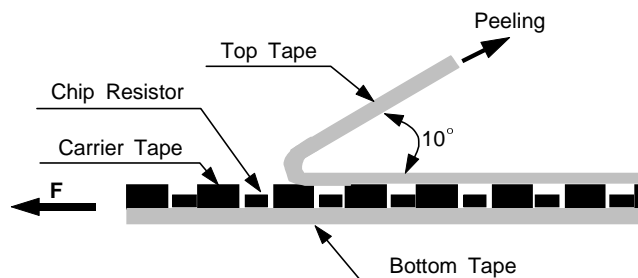
< Fig 11 >



### 2.1.3 Note

- ① The resistor should move in the pocket freely.
- ② The resistor should not adhere to the top or bottom tape.
- ③ There should be no vacant pocket.
- ④ Peeling strength of the top tape should be within 5g and 80g. <Fig 12>

< Fig 12 >

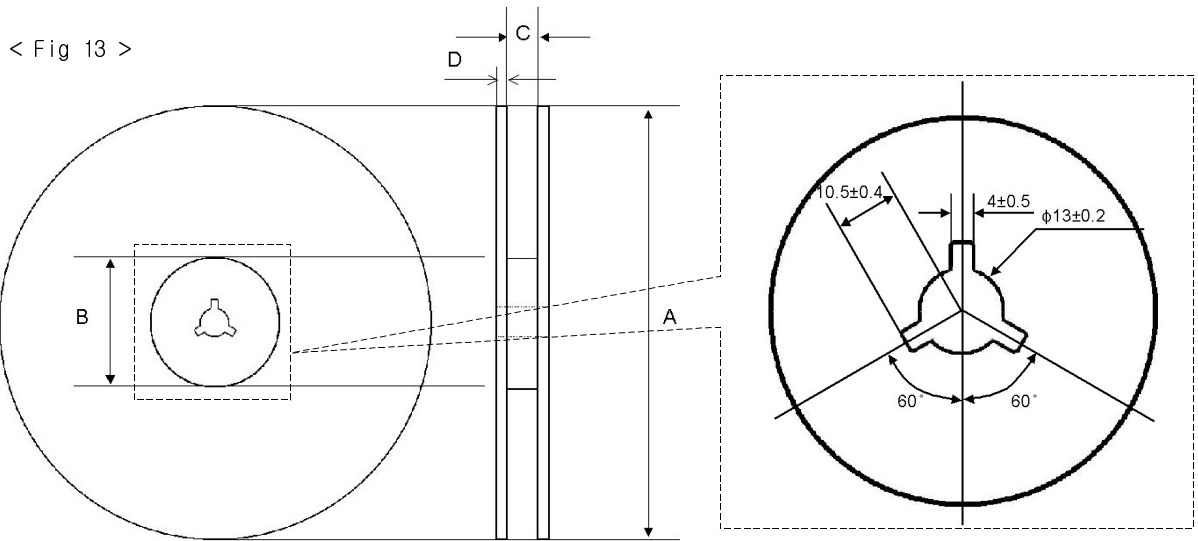


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### 2.1.4 Reel Dimension

The Reel Dimension is classified by the diameter of Reel. <Fig 13>, <Table 20>



< Table 20 >

[ Unit : mm ]

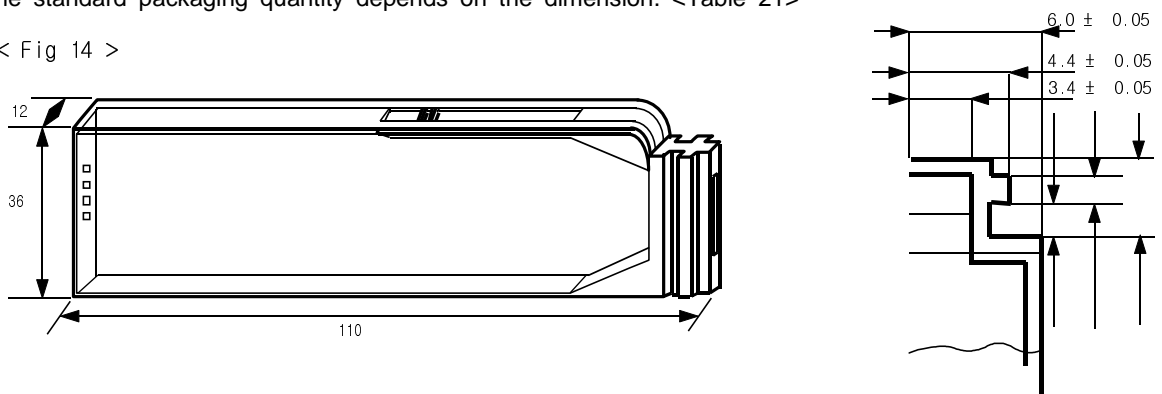
Packaging Code	Diameter	A	B	C	D
C S	7"	178	$\phi 70$	$9.5(13.0) \pm 0.1$	$1.2 \pm 0.1$
E S	10"	258	$\phi 80$	$9.5 \pm 0.1$	$2.0 \pm 0.1$
F S, A S	13"	330	$\phi 80$	$9.5 \pm 0.1$	$2.0 \pm 0.1$

### 2.2 Bulk Type Packaging

Bulk cassette specification is based on the EIAJ ET-7201. <Fig 14>

The standard packaging quantity depends on the dimension. <Table 21>

< Fig 14 >



< Table 21 >

Dimension	Inch	Standard packaging quantity	Weight (g, avg.)
1608	0603	25,000 PCS	70
2012	0805	10,000 PCS	65
3216	1206	5,000 PCS	67

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### 3. Label

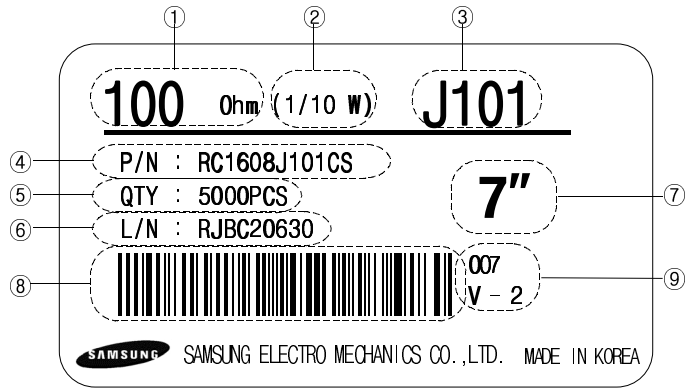
#### 3.1 Reel type Label

The reel type label includes following contents as <Fig 15>.

< Fig 15 >

- Following -

- ① Resistance Value
- ② Rated Voltage
- ③ Tolerance, Marking
- ④ Part Number
- ⑤ Quantity
- ⑥ LOT Number
- ⑦ Reel Size
- ⑧ Bar - Code
- ⑨ Serial Number



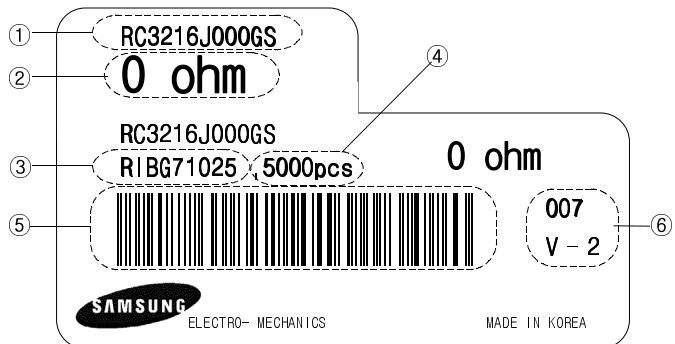
#### 3.2 Bulk type Label

The bulk type label includes following contents as <Fig 16>.

< Fig 16 >

- Following -

- ① Part Number
- ② Resistance Value
- ③ LOT Number
- ④ Quantity
- ⑤ Bar - Code
- ⑥ Serial Number



### 4. Box Packaging method

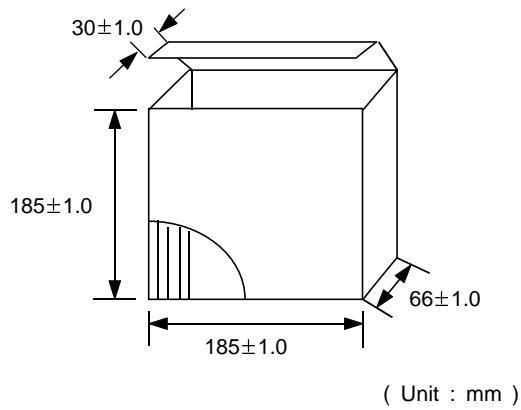
- ① The bulk or reel type packaging is packaged twice by paper box, inner box and outer box.
- ② The packaging should protect the resistor from damaging during shipping by vehicle, ship, airplane and etc.
- ③ The information of contents is marked on both inner and outer box.

※ For other packaging methods, please contact us.

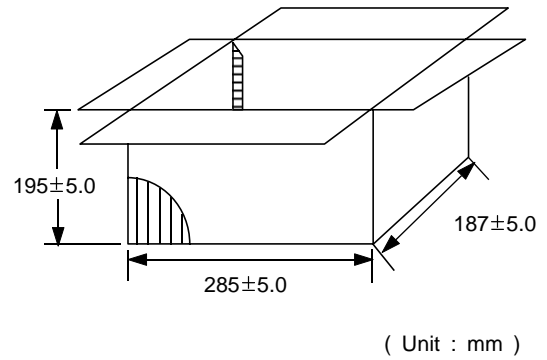
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#### 4.1 Box Dimension for Reel type

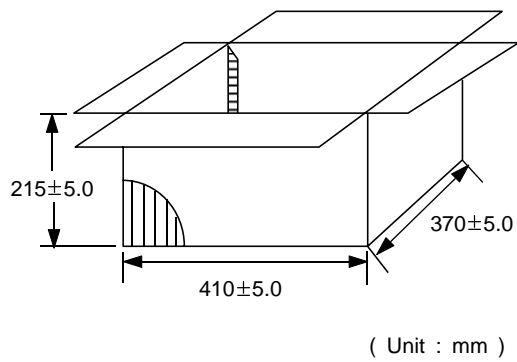
① Max 25,000 pcs ( 5 EA × 7" )



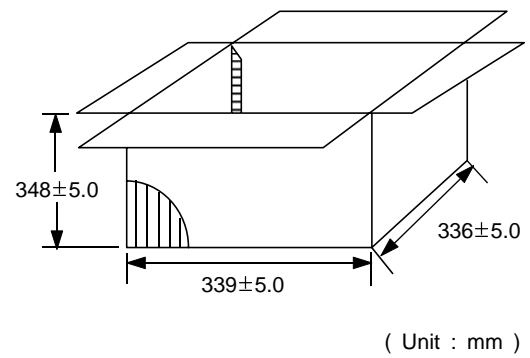
② Max 100,000 pcs ( 20 EA × 7" )



③ Max 300,000 pcs ( 60 EA × 7" )

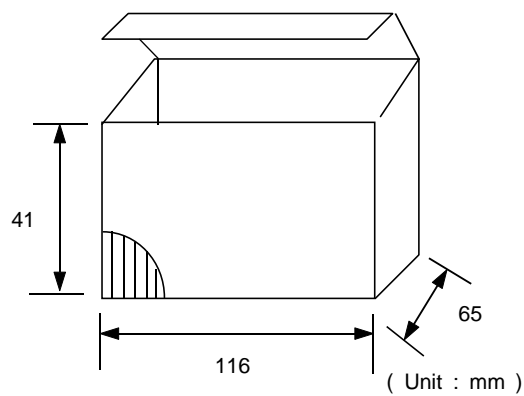


④ Max 400,000 pcs ( 20 EA × 13" )

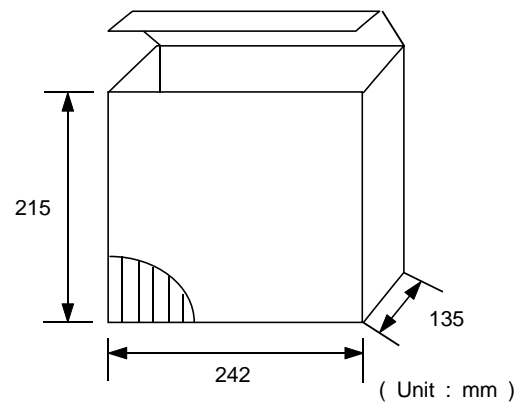


#### 4.2 Box Dimension for Bulk type

① Inner box ( Cassette × 5 EA )



② Outer box ( Inner box × 20 EA )



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