



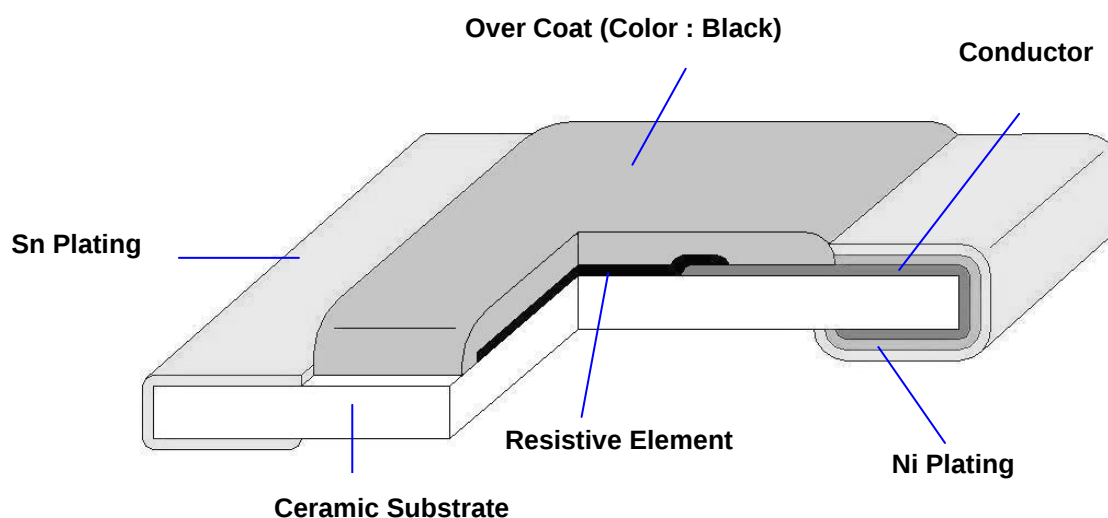
**Totally Lead free Chip Resistors**  
**(RM series standard )**  
**Halogen-Free**

|              |              |
|--------------|--------------|
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### 1. Scope :

This specification applies for the RM series of totally lead free chip resistors made by TA-I.

### 2. Construction :



### 3. Type Designation :

| <u>RM</u>          | <u>10</u>    | <u>J</u>  | <u>TW</u> | <u>103</u>         |
|--------------------|--------------|-----------|-----------|--------------------|
| Product Code       | Size         | Tolerance | Packaging | Nominal Resistance |
| RM : Chip Resistor | Power Rating |           |           |                    |

|                                                                                                                                                                                                        |                                               |                                                                                                                                          |                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 01-01005(0402) 1/32W<br>02-0201(0603) 1/20W<br>04-0402(1005) 1/16W<br>06-0603(1608) 1/10W<br>10-0805(2012) 1/8W<br>12-1206(3216) 1/4W<br>13-1210(3226) 1/2W<br>20-2010(5025) 3/4W<br>25-2512(6432) 1 W | J-±5%<br>G-±2%<br>F-±1%<br>D-±0.5%<br>B-±0.1% | L : 02&04 - 50K / 13" Reel<br>H : 06&10&12 - 20K /13" Reel<br>T : Paper Tape / 7" Reel<br>E : Embossed Tape<br><br>W : Totally Lead free | 3 digits, e.g.,:<br>(E-24) 103 = 10kΩ<br>0 = 0Ω<br><br>4 digits, e.g., :<br>(E-96) 1540 = 154Ω<br>43R2 = 43.2Ω |
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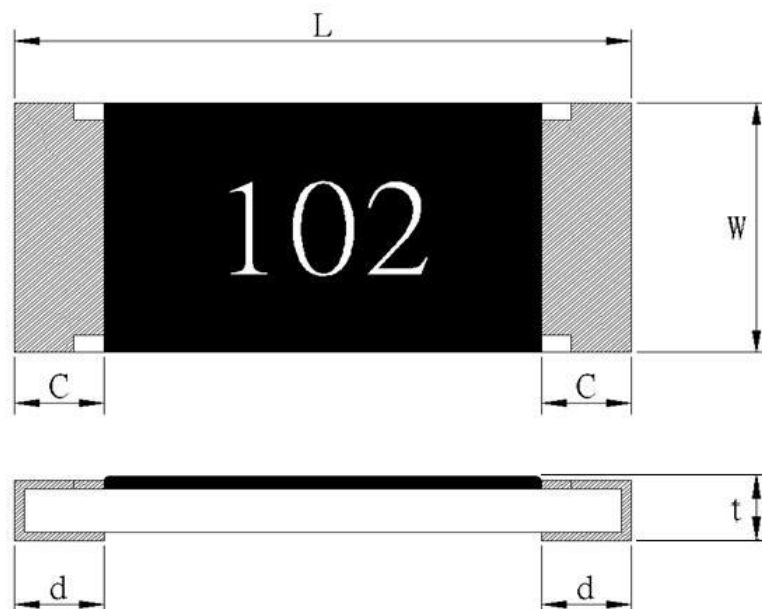
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#### 4. Dimensions :



UNIT: mm

| Type | L                                           | W         | C         | d                                          | t         |
|------|---------------------------------------------|-----------|-----------|--------------------------------------------|-----------|
| RM01 | 0.40±0.02                                   | 0.20±0.02 | 0.10±0.03 | 0.10±0.03                                  | 0.13±0.02 |
| RM02 | 0.60±0.03                                   | 0.30±0.03 | 0.1±0.05  | 0.15±0.05                                  | 0.23±0.03 |
| RM04 | <sup>+0.1</sup><br>1.00<br><sub>-0.05</sub> | 0.50±0.05 | 0.20±0.10 | 0.25±0.10                                  | 0.32±0.05 |
| RM06 | 1.60±0.10                                   | 0.80±0.10 | 0.30±0.20 | <sup>+0.2</sup><br>0.30<br><sub>-0.1</sub> | 0.45±0.10 |
| RM10 | 2.00±0.10                                   | 1.25±0.10 | 0.40±0.20 | 0.40±0.20                                  | 0.50±0.10 |
| RM12 | 3.10±0.10                                   | 1.55±0.10 | 0.50±0.30 | 0.40±0.20                                  | 0.55±0.10 |
| RM13 | 3.10±0.10                                   | 2.55±0.10 | 0.50±0.30 | 0.40±0.20                                  | 0.60±0.10 |
| RM20 | 5.00±0.15                                   | 2.50±0.15 | 0.60±0.30 | 0.50±0.25                                  | 0.60±0.10 |
| RM25 | 6.30±0.20                                   | 3.20±0.20 | 0.60±0.30 | 0.50±0.25                                  | 0.60±0.10 |



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## 5. Ratings & Characteristics :

| Type  | Power Rating at 70°C | Rating Voltage | Max. Working Voltage | Max. Over-Load Voltage | T.C.R (PPM/°C) | Resistance Range(Ω)   |                       |                                  |                 |                                 |
|-------|----------------------|----------------|----------------------|------------------------|----------------|-----------------------|-----------------------|----------------------------------|-----------------|---------------------------------|
|       |                      |                |                      |                        |                | B(±0.1%)<br>E-96&E-24 | D(±0.5%)<br>E-96&E-24 | F(±1%)<br>E-96&E-24              | G(±2%)<br>E-24  | J(±5%)<br>E-24                  |
| RM01  | 1/32W                | Refer 5.2      | 15V                  | 30V                    | ±300           |                       |                       | 10Ω ≤ R < 100Ω                   | 10Ω ≤ R < 100Ω  | 10Ω ≤ R < 100Ω                  |
|       |                      |                |                      |                        | ±200           |                       |                       | 100Ω ≤ R ≤ 1MΩ                   | 100Ω ≤ R ≤ 1MΩ  | 100Ω ≤ R ≤ 1MΩ                  |
|       |                      |                |                      |                        | +600<br>-200   |                       |                       | 1Ω ≤ R < 10Ω                     |                 | 1Ω ≤ R < 10Ω                    |
| RM02  | 1/20W                | Refer 5.2      | 25V                  | 50V                    | ±200           |                       | 100Ω-10KΩ             | 10Ω-3MΩ                          | 10Ω-3MΩ         | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | +600<br>-200   |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω                    |
| RM04* | 1/16W                | Refer 5.2      | 50V                  | 100V                   | ±100           | 7Ω-499KΩ              | 100Ω-1MΩ              | 100Ω-1MΩ                         |                 |                                 |
|       |                      |                |                      |                        | ±200           | 10Ω ≤ R < 100Ω        | 10Ω ≤ R < 100Ω        | 10Ω ≤ R < 100Ω<br>1MΩ < R ≤ 10MΩ | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | +500<br>-200   |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω                    |
|       |                      |                |                      |                        | ±400           |                       |                       |                                  | 10MΩ ≤ R ≤ 20MΩ | 10MΩ ≤ R ≤ 20MΩ                 |
| RM06* | 1/10W                | Refer 5.2      | 75V                  | 150V                   | ±100           | 14Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |
| RM10* | 1/8W                 | Refer 5.2      | 150V                 | 300V                   | ±100           | 24Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |
| RM12* | 1/4W                 | Refer 5.2      | 200V                 | 400V                   | ±100           | 33Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |
| RM13  | 1/2W                 | Refer 5.2      | 200V                 | 400V                   | ±100           | 10Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |
| RM20  | 3/4W                 | Refer 5.2      | 200V                 | 400V                   | ±100           | 10Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |
| RM25  | 1W                   | Refer 5.2      | 200V                 | 400V                   | ±100           | 10Ω-560kΩ             | 10Ω-1MΩ               | 10Ω-1MΩ                          |                 |                                 |
|       |                      |                |                      |                        | ±200           |                       |                       | 1MΩ < R ≤ 10MΩ                   | 10Ω-10MΩ        | 10Ω-10MΩ                        |
|       |                      |                |                      |                        | ±400           |                       |                       | 1Ω ≤ R < 10Ω                     | 1Ω ≤ R < 10Ω    | 1Ω ≤ R < 10Ω<br>10MΩ < R ≤ 20MΩ |

Note1\* : For sizes 04 to 12, some of the resistance values use alloy film, and the resistance range is as follows:

RM04(1Ω~7Ω), RM06(1Ω~14Ω), RM10 (1Ω~24Ω), RM12(1Ω~33Ω)

Note2 : Except for the above standardized products, we also provide the customized products.



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**Ω TOTALLY LEAD FREE CHIP RESISTORS**

| Type | Rated Current | Max Overload Current | Resistance Range |
|------|---------------|----------------------|------------------|
| RM01 | 0.5A          | 1A                   | 50mΩ MAX         |
| RM02 | 0.5A          | 1A                   | 50mΩ MAX         |
| RM04 | 1A            | 2.5A                 | 50mΩ MAX         |
| RM06 | 1A            | 2.5A                 | 50mΩ MAX         |
| RM10 | 2A            | 5A                   | 50mΩ MAX         |
| RM12 | 2A            | 5A                   | 50mΩ MAX         |
| RM13 | 2A            | 5A                   | 50mΩ MAX         |
| RM20 | 2A            | 5A                   | 50mΩ MAX         |
| RM25 | 2A            | 5A                   | 50mΩ MAX         |

Operating Temp (°C) : -55°C ~ +155°C ( RM01 / 02 : -55°C ~ +125°C )

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

### 5.1. Derating Curve :

For resistors operated at ambient temperature over 70°C , power rating shall be derated in accordance with figure 1.

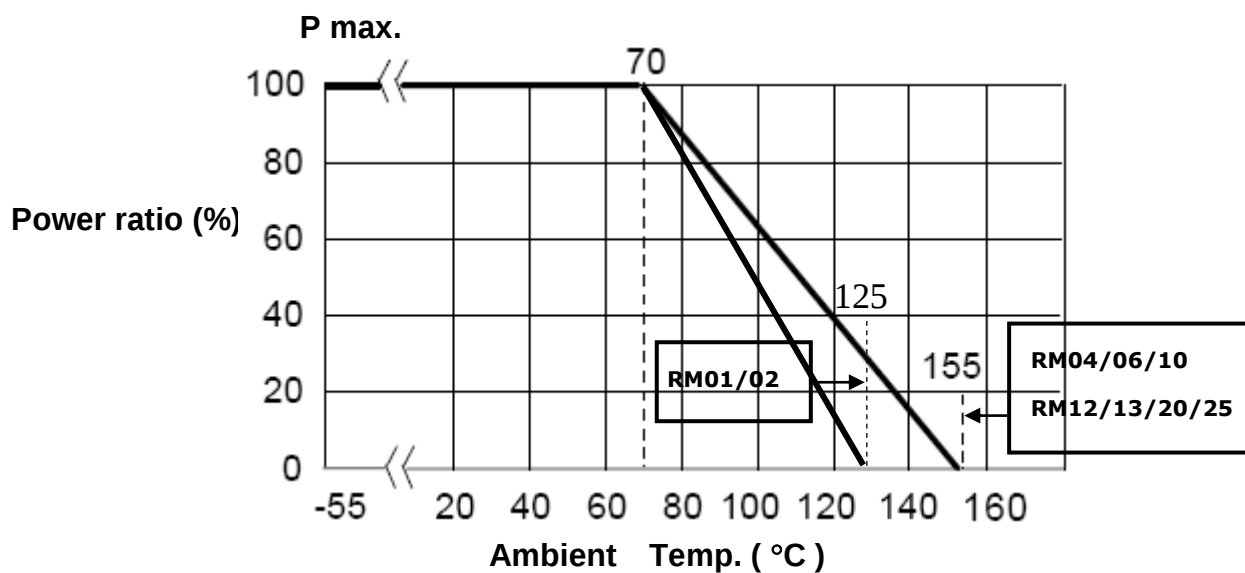


Figure 1



# Totally Lead free Chip Resistors (RM series standard ) Halogen-Free

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## 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)

E.G. : What is RM06JTW102 the rated voltage ?

RM06JTW102 P:1/10W ; R:102 = 1KΩ = 1000Ω

$$E = \sqrt{0.1(W) * 1000(\Omega)} = 10 (V)$$

## 6. Reliability Tests :

| Test Items                            | Reference standard                      | Condition of Test                                                                                                                            | Test Limits ΔR                                                                                                                           |
|---------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient of Resistance | IEC60115-1-4.8<br>JIS-C5201-1-4.8       | -55~ +125 °C                                                                                                                                 | Refer 5.0                                                                                                                                |
| Short Time Overload                   | IEC60115-1-4.13<br>JIS-C5201-1-4.13     | 2.5 X rated voltage for 5 sec                                                                                                                | ±(1.0% + 0.05Ω)<br>Remarks :<br>01005& 0201 : ±(3.0% + 0.1Ω)<br>0402 : ±(2.0% + 0.1Ω)<br>0Ω : 50mΩ or less                               |
| Intermittent Overload                 | IEC60115-1-4.39<br>JIS-C5201-1-4.39     | 3.0 X rated voltage or Max Overloading voltage ,1sec "ON" , 25sec "OFF" ,10000 cycles<br>(Remarks :<br>01005 & 0201-NA , 0402 2.5 X RCWV * ) | ± (5.0% + 0.1Ω)<br>0Ω : 50mΩ or less                                                                                                     |
| Endurance (Load Life)                 | IEC60115-1-4.25.1<br>JIS-C5201-1-4.25.1 | 1000 hours at rated voltage, 70°C , 1.5hours "ON" , 0.5hour "OFF"                                                                            | 0.1%,0.5%,1%:±(1.0%+0.05Ω)<br>2%,5%:±(3.0%+0.1Ω)<br>Remarks :<br>01005& 0201 : ±(5.0%+0.1Ω)<br>0402 : ±(3.0%+0.1Ω)<br>0Ω : 100mΩ or less |
| Load Life with Humidity               | IEC60115-1-4.24<br>JIS-C5201-1-4.24     | 1000 hours at rated voltage , 40±2°C , 90~95% RH 1.5hours "ON" , 0.5hour "OFF"                                                               | 0.1%,0.5%,1%:±(1.0%+0.05Ω)<br>2%, 5%:±(3.0%+0.1Ω)<br>Remarks :<br>01005&0201: ±(5.0%+0.1Ω)<br>0402: ±(3.0%+0.1Ω)<br>0Ω : 100mΩ or less   |
| Rapid Change of Temperature           | IEC60115-1-4.19<br>JIS-C5201-1-4.19     | -55°C (30 min. ) / +155 °C(30 min. ) 5 cycles                                                                                                | 0.1%,0.5%,1%:±(0.5%+0.05Ω)<br>2%, 5%:±(1.0%+0.05Ω)<br>Remarks :<br>01005& 0201: ±(3.0%+0.1Ω)<br>0Ω : 50mΩ or less                        |
| Solderability                         | IEC60115-1-4.17<br>JIS-C5201-1-4.17     | 245±5°C solder, 2±0.5 sec dwell.<br>Solder : Sn96.5 / Ag3.0 / Cu0.5                                                                          | At least 95% of surface area of electrode shall be covered with new solder.                                                              |



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|                                                    |                                         |                                                                                                |                                                                                                                                                                                              |
|----------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Robustness of Termination<br>(Bending)             | IEC60115-1-4.33<br>JIS-C5201-1-4.33     | 3mm deflection<br>2mm deflection (RM20,25)                                                     | 0.1%,0.5%,1%: $\pm(0.5\%+0.05\Omega)$<br>2%,5%: $\pm(1.0\%+0.05\Omega)$<br>Remarks :<br>01005 & 0201 $\pm(1.0\%+0.1\Omega)$<br>0 $\Omega$ : 50m $\Omega$ or less                             |
| Dielectric Withstanding<br>Voltage (Voltage Proof) | IEC60115-1-4.7<br>JIS-C5201-1-4.7       | Applying voltage :<br>01005 & 0201 : 50V , 0402 & 0603 : 300V<br>The other 500V for a minute . | No abnormalities such as<br>flashover, burning dielectric<br>breakdown shall appear.                                                                                                         |
| Insulation Resistance                              | IEC60115-1-4.6<br>JIS-C5201-1-4.6       | Applying voltage 100V for 1 minute.<br>Remark : 01005 & 0201 50V                               | $\geq 1G\Omega$<br>Remarks : 01005 : $\geq 100M\Omega$                                                                                                                                       |
| Resistance to Dry Heat                             | IEC60115-1-4.23.2<br>JIS-C5201-1-4.23.2 | 155 $\pm 5^{\circ}C$ for 96 $\pm 4$ Hrs<br>Remark : 01005 & 0201 125 $\pm 5^{\circ}C$          | 0.1%,0.5%,1%: $\pm(1.0\%+0.05\Omega)$<br>2%,5%: $\pm(2.0\%+0.1\Omega)$<br>Remark :<br>01005 : $\pm(3.0\%+0.1\Omega)$<br>0201 : $\pm(2.0\%+0.1\Omega)$<br>0 $\Omega$ : 50m $\Omega$ or less   |
| Resistance to Solder Heat                          | IEC60115-1-4.18<br>JIS-C5201-1-4.18     | 270 $\pm 5^{\circ}C$ solder , 10 $\pm 1$ sec dwell .                                           | 0.1%,0.5%,1%: $\pm(0.5\%+0.05\Omega)$<br>2%, 5%: $\pm(1.0\%+0.05\Omega)$<br>Remarks :<br>01005 : $\pm(3.0\%+0.05\Omega)$<br>0201 $\pm(3.0\%+0.1\Omega)$<br>0 $\Omega$ : 50m $\Omega$ or less |

Note\* : RCWV : Rated continuous working voltage .

## 7. Marking

### 7.1 $\pm 2\%$ , $\pm 5\%$ (E24) : RM06 / RM10 / RM12 / RM13 / RM20 / RM25

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

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



Notes : RM06 : R represents the 「 $\cdot$ 」

### 7.2 $\pm 0.1\%$ , $\pm 0.5\%$ , $\pm 1\%$ (E96) : RM10 / RM12 / RM13 / RM20 / RM25

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

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





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## 7.3 $\pm 0.1\%$ , $\pm 0.5\%$ , $\pm 1\%$ ( E96): RM06

When the marking space is too small in such small-sized resistors as RM06, 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 | $10^0$ | $10^1$ | $10^2$ | $10^3$ | $10^4$ | $10^5$ | $10^6$ | $10^7$ | $10^{-1}$ | $10^{-2}$ | $10^{-3}$ |

E.G : 01A =  $100 \times 10^0 = 100 \Omega$



### Notes :

When the resistance value is not in the list of E96 , 3 digitals with underline in E-24 series is used as mark .

E.G.: 0603 ,  $120 \Omega$  , 1% Marking is 121





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## 7.4 $\pm 0.1\%$ , $\pm 0.5\%$ , $\pm 1\%$ ( E96/3digitals)

The resistance value by 3 digits is requirement for customer.

## 7.5 RM06 / RM10 / RM12 / RM13 / RM20 / RM25

E.G. : 0 = 0 $\Omega$

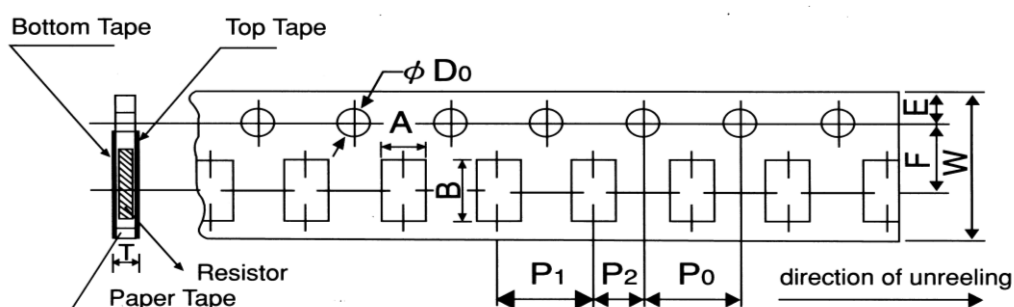


## 7.6 No Marking for RM01 & RM02 & RM04

## 8. Taping & Reel :

### 8.1 Taping Dimensions

#### 8.1.1 4 mm pitch paper:



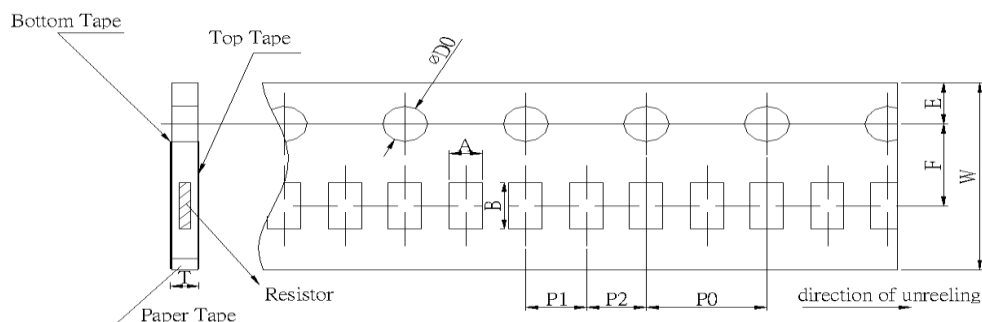
| Packing | Type | A              | B             | W             | F              | E              | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub>                           | T              |
|---------|------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|------------------------------------------|----------------|
| Paper   | RM06 | 1.1 $\pm$ 0.1  | 1.9 $\pm$ 0.1 | 8.0 $\pm$ 0.2 | 3.5 $\pm$ 0.05 | 1.75 $\pm$ 0.1 | 4.0 $\pm$ 0.1  | 2.0 $\pm$ 0.05 | 4.0 $\pm$ 0.1  | $\phi$ 1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.64 $\pm$ 0.1 |
|         | RM10 | 1.6 $\pm$ 0.15 | 2.4 $\pm$ 0.2 |               |                |                |                |                |                |                                          | 0.84 $\pm$ 0.1 |
|         | RM12 | 2.0 $\pm$ 0.15 | 3.6 $\pm$ 0.2 |               |                |                |                |                |                |                                          |                |
|         | RM13 | 2.8 $\pm$ 0.2  | 3.6 $\pm$ 0.2 |               |                |                |                |                |                |                                          |                |



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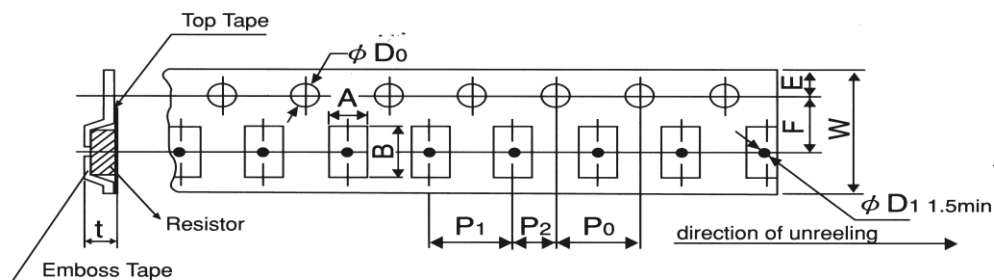
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## 8.1.2 2 mm pitch paper :



| Packing | Type | A         | B        | W       | F        | E        | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub>                      | T        |
|---------|------|-----------|----------|---------|----------|----------|----------------|----------------|----------------|-------------------------------------|----------|
| Paper   | RM01 | 0.24±0.05 | 0.45±0.1 | 8.0±0.2 | 3.5±0.05 | 1.75±0.1 | 2.0±0.05       | 2.0±0.05       | 4.0±0.1        | φ 1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.40±0.1 |
|         | RM02 | 0.37±0.05 | 0.67±0.1 |         |          |          | 2.0±0.05       | 2.0±0.05       |                |                                     | 0.37±0.1 |
|         | RM04 | 0.7±0.05  | 1.2±0.05 |         |          |          | 2.0±0.1        | 2.0±0.1        |                |                                     | 0.45±0.1 |

## 8.1.3 4 mm pitch Emboss :



UNIT: mm

| Packing | Type | A       | B       | W        | F        | E        | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub>                      | T         |
|---------|------|---------|---------|----------|----------|----------|----------------|----------------|----------------|-------------------------------------|-----------|
| Emboss  | RM20 | 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 <sup>+0.1</sup> <sub>-0</sub> | 0.85±0.15 |
|         | RM25 | 3.6±0.2 | 6.9±0.2 |          |          |          |                |                |                |                                     |           |



# Totally Lead free Chip Resistors (RM series standard ) Halogen-Free

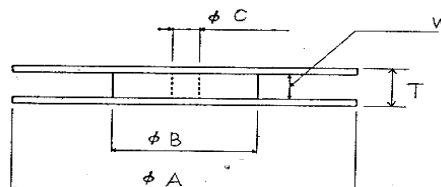
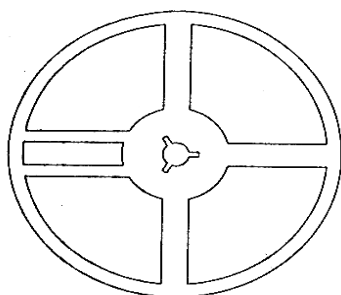
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UNIT: pcs

| Package<br><br>Type      Size |    | Paper Tape |         |            |         | Emboss Plastic Tape<br>4 mm pitch |
|-------------------------------|----|------------|---------|------------|---------|-----------------------------------|
|                               |    | 4 mm pitch |         | 2 mm pitch |         |                                   |
|                               |    | 178mm/R    | 330mm/R | 178mm/R    | 330mm/R |                                   |
| RM                            | 01 |            |         | 10000      |         |                                   |
| RM                            | 02 |            |         | 10000      | 50000   |                                   |
| RM                            | 04 |            |         | 10000      | 50000   |                                   |
| RM                            | 06 | 5000       | 20000   |            |         |                                   |
| RM                            | 10 | 5000       | 20000   |            |         |                                   |
| RM                            | 12 | 5000       | 20000   |            |         |                                   |
| RM                            | 13 | 5000       |         |            |         |                                   |
| RM                            | 20 |            |         |            |         | 4000                              |
| RM                            | 25 |            |         |            |         | 4000                              |

## 8.2 Reel Specifications:

### 8.2.1 7" Reel



UNIT: mm

| Type                                  | $\phi A$        | $\phi B$       | $\phi C$       | W              | T              |
|---------------------------------------|-----------------|----------------|----------------|----------------|----------------|
| RM01 / 02 / 04 / 06<br>RM10 / 12 / 13 | $178.0 \pm 2.0$ | $60.0 \pm 1.0$ | $13.0 \pm 1.0$ | $9.0 \pm 1.0$  | $11.5 \pm 1.0$ |
| RM20 / 25                             |                 |                |                | $13.0 \pm 1.0$ | $15.5 \pm 1.0$ |

### 8.2.2 13" Reel

| Type                        | $\phi A$        | $\phi B$        | $\phi C$       | W             | T              |
|-----------------------------|-----------------|-----------------|----------------|---------------|----------------|
| RM02 / 04 / 06<br>RM10 / 12 | $330.0 \pm 2.0$ | $100.0 \pm 1.0$ | $13.5 \pm 1.0$ | $9.0 \pm 1.0$ | $14.0 \pm 1.0$ |



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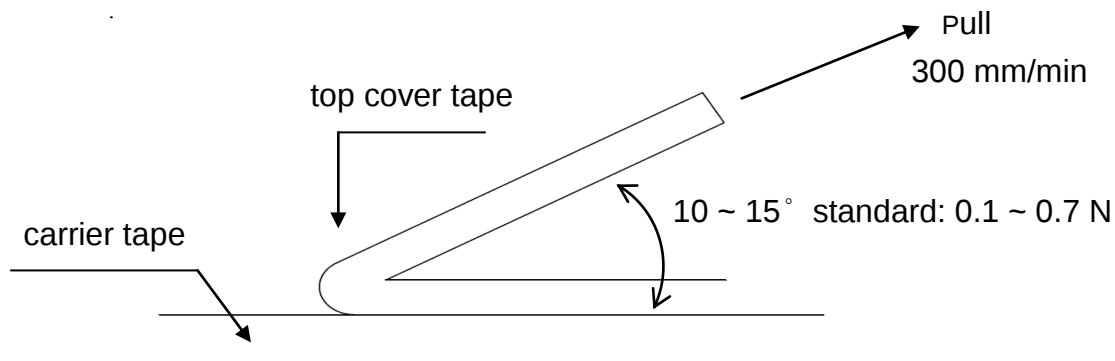
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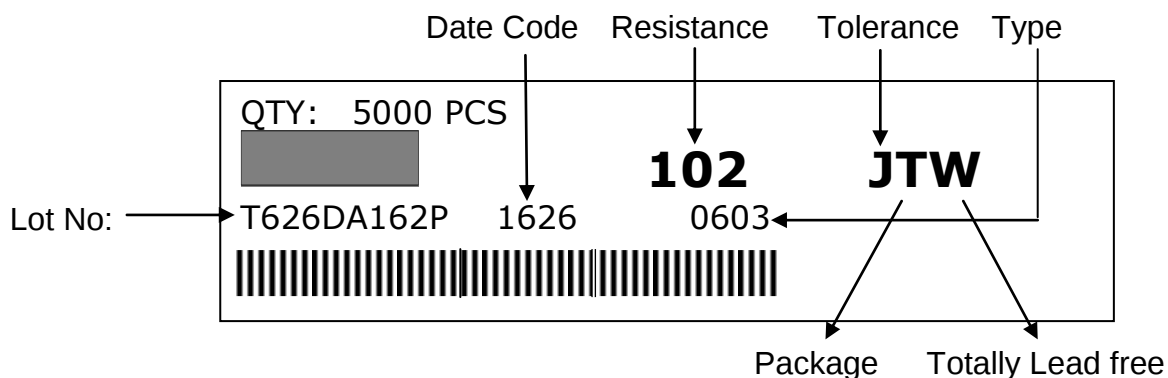
**8.3. Peel –off force :**

Peel –off force of paper and blister tape is in accordance with “JIS-C5202 ”  
that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



**9. Label :**

**9.1 Manufacture Label : Totally Lead free**



**9.2 Customer Label ( By customer request ):**

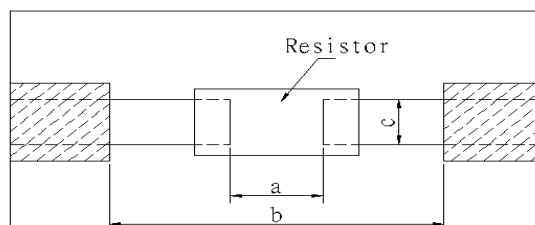




# Totally Lead free Chip Resistors (RM series standard ) Halogen-Free

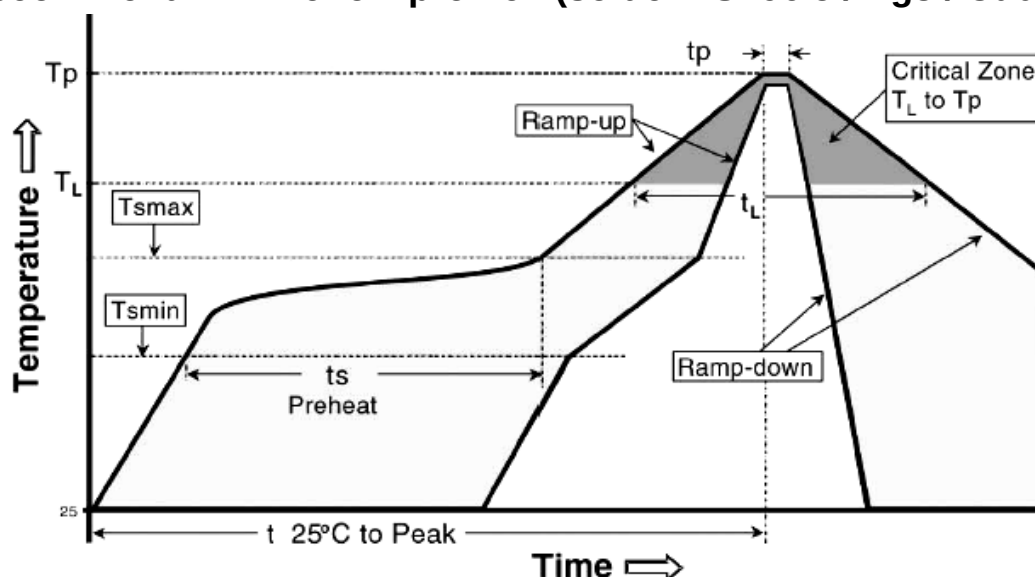
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## 10. Recommended land patterns :



| Type | Size        | Land pattern |  |  | Dimension ( mm ) |         |           |
|------|-------------|--------------|--|--|------------------|---------|-----------|
|      |             |              |  |  | a                | b       | c         |
| RM   | 01 (01005 ) |              |  |  | 0.15~0.20        | 0.5~0.7 | 0.20~0.25 |
| RM   | 02 (0201 )  |              |  |  | 0.25~0.3         | 0.7~0.9 | 0.3~0.4   |
| RM   | 04 (0402 )  |              |  |  | 0.50~0.6         | 1.4~1.6 | 0.4~0.6   |
| RM   | 06 (0603 )  |              |  |  | 0.7~0.9          | 2.0~2.2 | 0.8~1.0   |
| RM   | 10 (0805 )  |              |  |  | 1.0~1.4          | 3.2~3.8 | 0.9~1.4   |
| RM   | 12 (1206 )  |              |  |  | 2.0~2.4          | 4.4~5.0 | 1.2~1.8   |
| RM   | 13 (1210 )  |              |  |  | 2.0~2.4          | 4.4~5.0 | 2.3~3.5   |
| RM   | 20 (2010 )  |              |  |  | 3.3~3.7          | 5.7~6.5 | 2.3~3.5   |
| RM   | 25 (2512 )  |              |  |  | 3.6~4.0          | 7.6~8.6 | 2.3~3.5   |

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



| Profile Feature                                                                                    | Lead (Pb )-Free Assembly          |
|----------------------------------------------------------------------------------------------------|-----------------------------------|
| Average ramp-up rate<br>(Tsmax to Tp)                                                              | 3°C / second max.                 |
| Preheat<br>- Temperature Min (Tsmin)<br>- Temperature Max (Tsmax)<br>- Time (Tsmin to Tsmax ) (ts) | 150°C<br>200°C<br>60 -120 seconds |



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|                                                                                  |                         |
|----------------------------------------------------------------------------------|-------------------------|
| Time maintained above :<br>- Temperature ( $T_L$ )<br>- Time ( $T_L$ )           | 217°C<br>60-150 seconds |
| Peak Temperature ( $T_p$ )                                                       | 260°C                   |
| Time within $+0$<br>$-5$ °C of actual Peak<br>Temperature ( $t_p$ ) <sup>2</sup> | 10 seconds              |
| Ramp-down Rate                                                                   | 6°C/second max.         |
| Time 25°C to Peak Temperature                                                    | 8minutes max.           |

Allowed Re-flow times : 3 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes,  
please use N2 Re-flow furnace.

## **12. Storage Conditions:**

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

## **13. Shelf Life:**

2 years from manufacturing date.

## **14. 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.



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**15. Manufacturing Country & City :**

TA-I TECHNOLOGY CO., LTD. ( Taiwan– Tao Yuan )  
Tel: 886-3-3246169 Fax : 886-3-3246167

TA-I TECHNOLOGY ( SU ZHOU ) CO., LTD. ( China – Su Zhou)  
Tel :86- 512-63457879 Fax : 86-512-63457869

**Associated companies :**

(1) FORTUNE TASK RESISTOR FACTORY ( China – Dongguan )  
Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794

(2) TA-I TECHNOLOGY ELECTRONIC (DONGGUAN ) CO., LTD. ( China –Dongguan )  
Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794

(3) TAI OHM ELECTRONICS ( M ) SDN. BHD. ( Malaysia – Penang)  
Tel :604- 3900480 Fax : 604-3901481

(4) P.T.TAI ELECTRONICS Indonesia ( Indonesia – Jakarta )  
Tel :62-21-89830123 Fax : 62-21-89830703