

# THIN FILM PRECISION RESISTORS

## TYPE RN73 SERIES

### INTRODUCTION

The RN73 series is a high stability precision chip resistor range offering various power dissipations relating to chip size, TCR's down to 5ppm/°C and resistance tolerances to 0.01%. The resistor is produced with three sputtered layers giving optimum performance. Values are restricted to the E96 and E24 value grids. The RN73 has accurate and uniform physical dimensions to facilitate placement.



### FEATURES

- High precision - TCR 5ppm/°C and 10ppm/°C
- Tolerance down to 0.01%
- Thin film (nichrome)
- Terminal finish - electroplated 100% matte Sn
- Moisture Sensitive Level - MSL1

### APPLICATIONS

- Communications
- Industrial controls
- Instrumentation
- Medical

**Note:** SMD (Surface mount devices) resistors and inductors should be kept in their original packaging to protect them from ESD (Electrostatic Discharge). The full reels can be broken into smaller quantities, without exposing them to ESD, as long as the components are still in the plastic or paper tape. These resistors and inductors should not be removed from the plastic or paper tape unless they are in an ESD protected environment.

### CHARACTERISTICS - ELECTRICAL

| 0402                                |         |              |      |      |      |      |      |
|-------------------------------------|---------|--------------|------|------|------|------|------|
| Rated power @ 70°C                  |         | 0.063W       |      |      |      |      |      |
| Resistance range Ω                  | Minimum | 49R9         | 49R9 | 49R9 | 49R9 | 49R9 | 49R9 |
|                                     | Maximum | 20K          | 20K  | 20K  | 20K  | 20K  | 100K |
| Tolerance (%)                       |         | 0.01         |      | 0.05 |      | 0.1  |      |
| Code letter                         |         | L            |      | A    |      | B    |      |
| T.C.R. (PPM°C)                      |         | 5            | 10   | 5    | 10   | 5    | 10   |
| Code letter                         |         | A            | C    | A    | C    | A    | C    |
| Selection series                    |         | E24 & E96    |      |      |      |      |      |
| Maximum operating voltage           |         | 25V          |      |      |      |      |      |
| Maximum overload voltage            |         | 50V          |      |      |      |      |      |
| Operating temp. range               |         | -55 ~ +155°C |      |      |      |      |      |
| Insulation resistance (dry minimum) |         | 1000MΩ       |      |      |      |      |      |
| Stability                           |         | 0.5%         |      |      |      |      |      |

# Thin Film Precision Resistors

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| 0603                                |         |              |      |      |      |      |      |
|-------------------------------------|---------|--------------|------|------|------|------|------|
| Rated power @ 70°C                  |         | 0.063W       |      |      |      |      |      |
| Resistance range Ω                  | Minimum | 24R9         | 24R9 | 24R9 | 4R7  | 24R9 | 4R7  |
|                                     | Maximum | 60K          | 100K | 60K  | 332K | 60K  | 511K |
| Tolerance (%)                       |         | 0.01         |      | 0.05 |      | 0.1  |      |
| Code letter                         |         | L            |      | A    |      | B    |      |
| T.C.R. (PPM°C)                      |         | 5            | 10   | 5    | 10   | 5    | 10   |
| Code letter                         |         | A            | C    | A    | C    | A    | C    |
| Selection series                    |         | E24 & E96    |      |      |      |      |      |
| Maximum operating voltage           |         | 50V          |      |      |      |      |      |
| Manimum overload voltage            |         | 100V         |      |      |      |      |      |
| Operating temp. range               |         | -55 ~ +155°C |      |      |      |      |      |
| Insulation resistance (dry minimum) |         | 1000MΩ       |      |      |      |      |      |
| Stability                           |         | 0.5%         |      |      |      |      |      |

| 0805                                |         |              |      |      |      |      |     |
|-------------------------------------|---------|--------------|------|------|------|------|-----|
| Rated power @ 70°C                  |         | 0.1W         |      |      |      |      |     |
| Resistance range Ω                  | Minimum | 24R9         | 24R9 | 4R7  | 24R9 | 4R7  | 4R7 |
|                                     | Maximum | 150K         | 200K | 150K | 1M0  | 150K | 1M0 |
| Tolerance (%)                       |         | 0.01         |      | 0.05 |      | 0.1  |     |
| Code letter                         |         | L            |      | A    |      | B    |     |
| T.C.R. (PPM°C)                      |         | 5            | 10   | 5    | 10   | 5    | 10  |
| Code letter                         |         | A            | C    | A    | C    | A    | C   |
| Selection series                    |         | E24 & E96    |      |      |      |      |     |
| Maximum operating voltage           |         | 100V         |      |      |      |      |     |
| Maximum overload voltage            |         | 200V         |      |      |      |      |     |
| Operating temp. range               |         | -55 ~ +155°C |      |      |      |      |     |
| Insulation resistance (dry minimum) |         | 1000MΩ       |      |      |      |      |     |
| Stability                           |         | 0.5%         |      |      |      |      |     |

| 1206                                |         |              |      |      |       |      |       |
|-------------------------------------|---------|--------------|------|------|-------|------|-------|
| Rated power @ 70°C                  |         | 0.125W       |      |      |       |      |       |
| Resistance range Ω                  | Minimum | 24R9         | 24R9 | 24R9 | 4R7   | 24R9 | 4R7   |
|                                     | Maximum | 300K         | 499K | 300K | 1.5M0 | 300K | 1.5M0 |
| Tolerance (%)                       |         | 0.01         |      | 0.05 |       | 0.1  |       |
| Code letter                         |         | L            |      | A    |       | B    |       |
| T.C.R. (PPM°C)                      |         | 5            | 10   | 5    | 10    | 5    | 10    |
| Code letter                         |         | A            | C    | A    | C     | A    | C     |
| Selection series                    |         | E24 & E96    |      |      |       |      |       |
| Max operating voltage               |         | 150V         |      |      |       |      |       |
| Maximum overload voltage            |         | 300V         |      |      |       |      |       |
| Operating temp. range               |         | -55 ~ +155°C |      |      |       |      |       |
| Insulation resistance (dry minimum) |         | 1000MΩ       |      |      |       |      |       |
| Stability                           |         | 0.5%         |      |      |       |      |       |

# Thin Film Precision Resistors

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| 1210                                |         |                |      |      |     |      |     |
|-------------------------------------|---------|----------------|------|------|-----|------|-----|
| Rated power @ 70°C                  |         | 0.25W          |      |      |     |      |     |
| Resistance range $\Omega$           | Minimum | 24R9           | 24R9 | 24R9 | 4R7 | 24R9 | 4R7 |
|                                     | Maximum | 300K           | 499K | 300K | 1M0 | 300K | 1M0 |
| Tolerance (%)                       |         | 0.01           |      | 0.05 |     | 0.1  |     |
| Code letter                         |         | L              |      | A    |     | B    |     |
| T.C.R. (PPM°C)                      |         | 5              | 10   | 5    | 10  | 5    | 10  |
| Code letter                         |         | A              | C    | A    | C   | A    | C   |
| Selection series                    |         | E24 & E96      |      |      |     |      |     |
| Max operating voltage               |         | 150V           |      |      |     |      |     |
| Maximum overload voltage            |         | 300V           |      |      |     |      |     |
| Operating temp. range               |         | -55 ~ +155°C   |      |      |     |      |     |
| Insulation resistance (dry minimum) |         | 1000M $\Omega$ |      |      |     |      |     |
| Stability                           |         | 0.5%           |      |      |     |      |     |

| 2010                                |         |                |      |      |     |      |     |
|-------------------------------------|---------|----------------|------|------|-----|------|-----|
| Rated power @ 70°C                  |         | 0.25W          |      |      |     |      |     |
| Resistance range $\Omega$           | Minimum | 24R9           | 24R9 | 24R9 | 4R7 | 24R9 | 4R7 |
|                                     | Maximum | 300K           | 499K | 300K | 1M0 | 300K | 1M0 |
| Tolerance (%)                       |         | 0.01           |      | 0.05 |     | 0.1  |     |
| Code letter                         |         | L              |      | A    |     | B    |     |
| T.C.R. (PPM°C)                      |         | 5              | 10   | 5    | 10  | 5    | 10  |
| Code letter                         |         | A              | C    | A    | C   | A    | C   |
| Selection series                    |         | E24 & E96      |      |      |     |      |     |
| Max operating voltage               |         | 150V           |      |      |     |      |     |
| Maximum overload voltage            |         | 300V           |      |      |     |      |     |
| Operating temp. range               |         | -55 ~ +155°C   |      |      |     |      |     |
| Insulation resistance (dry minimum) |         | 1000M $\Omega$ |      |      |     |      |     |
| Stability                           |         | 0.5%           |      |      |     |      |     |

| 2512                                |         |                |      |      |     |      |     |
|-------------------------------------|---------|----------------|------|------|-----|------|-----|
| Rated power @ 70°C                  |         | 0.5W           |      |      |     |      |     |
| Resistance range $\Omega$           | Minimum | 24R9           | 24R9 | 24R9 | 4R7 | 24R9 | 4R7 |
|                                     | Maximum | 300K           | 499K | 300K | 1M0 | 300K | 1M0 |
| Tolerance (%)                       |         | 0.01           |      | 0.05 |     | 0.1  |     |
| Code letter                         |         | L              |      | A    |     | B    |     |
| T.C.R. (PPM°C)                      |         | 5              | 10   | 5    | 10  | 5    | 10  |
| Code letter                         |         | A              | C    | A    | C   | A    | C   |
| Selection series                    |         | E24 & E96      |      |      |     |      |     |
| Max operating voltage               |         | 150V           |      |      |     |      |     |
| Maximum overload voltage            |         | 300V           |      |      |     |      |     |
| Operating temp. range               |         | -55 ~ +155°C   |      |      |     |      |     |
| Insulation resistance (dry minimum) |         | 1000M $\Omega$ |      |      |     |      |     |
| Stability                           |         | 0.5%           |      |      |     |      |     |

# Thin Film Precision Resistors

Type RN73 Series

## CHARACTERISTICS - ENVIRONMENTAL

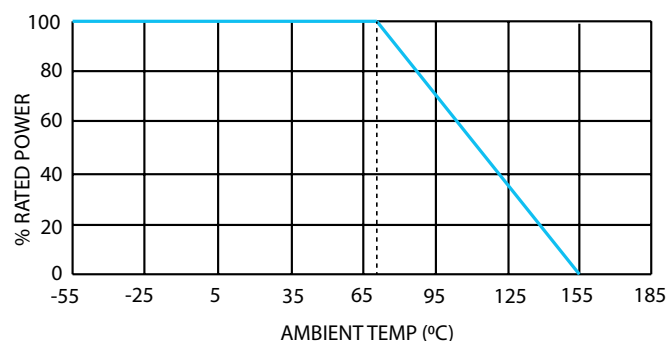
| Item                                        | Requirement                                                |                      | Test Method                                                                                                                    |
|---------------------------------------------|------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                                             | Tol. $\leq 0.05\%$                                         | TOL. $> 0.05\%$      |                                                                                                                                |
| Temperature coefficient of resistance (TCR) | As per TCRs specified in electrical characteristics tables |                      | <b>MIL-STD-202 Method 304</b><br>+25/-55/+25/+125/+25°C                                                                        |
| Short time overload                         | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.2\%$ | <b>JIS-C-5201-1 4.13</b><br>RCWV*2.5 or Maximum overload voltage whichever is lower for 5 seconds                              |
| Insulation resistance                       | $> 9999 \text{ M}\Omega$                                   |                      | <b>MIL-STD-202 Method 302</b><br>Apply 100VDC for 1 minute                                                                     |
| Endurance                                   | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.2\%$ | <b>MIL-STD-202 Method 108A</b><br>70 $\pm 2^\circ\text{C}$ , RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"             |
| Damp heat with load                         | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.3\%$ | <b>MIL-STD-202 Method 103B</b><br>40 $\pm 2^\circ\text{C}$ , 90-95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Bending strength                            | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.1\%$ | <b>JIS-C-5201-1 4.33</b><br>Bending amplitude 3 mm for 10 seconds                                                              |
| Solderability                               | 95% minimum coverage                                       |                      | <b>MIL-STD-202 Method 208H</b><br>245 $\pm 5^\circ\text{C}$ for 3 seconds                                                      |
| Resistance to soldering heat                | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.1\%$ | <b>MIL-STD-202 Method 210E</b><br>260 $\pm 5^\circ\text{C}$ for 10 seconds                                                     |
| Dielectric withstand voltage                | By Type                                                    |                      | <b>MIL-STD-202 Method 301</b><br>Maximum overload voltage for 1 minute                                                         |
| Low temperature operation                   | $\Delta R \pm 0.05\%$                                      | $\Delta R \pm 0.2\%$ | <b>JIS-C-5201-1 4.36</b><br>1 hour, -65°C, followed by 45 minutes of RCWV                                                      |
| High temperature exposure                   | $\Delta R \pm 0.5\%$                                       |                      | <b>MIL-STD-202 Method 108</b><br>At +155°C for 1000 hours                                                                      |

RCWV(Rated continuous working voltage)=  $\sqrt{P \cdot R}$  or Maximum Operating voltage whichever is lower

Storage temperature: 25 $\pm 3^\circ\text{C}$ ; Humidity < 80%RH

Moisture sensitivity level: Level 1

## DERATING CURVE

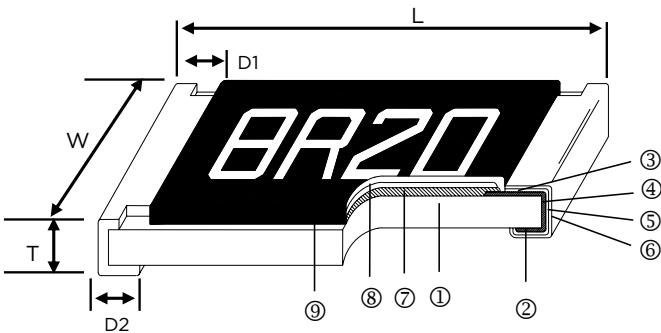


For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.

Thin Film Precision Resistors

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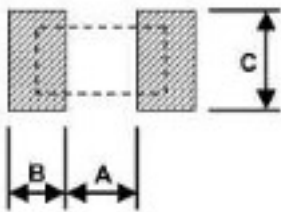
CONSTRUCTION AND DIMENSIONS



|   |                       |   |                         |   |                       |
|---|-----------------------|---|-------------------------|---|-----------------------|
| ① | Alumina Substrate     | ④ | Edge Electrode (NiCr)   | ⑦ | Resistor Layer (NiCr) |
| ② | Bottom Electrode (Ag) | ⑤ | Barrier Layer (Ni)      | ⑧ | Overcoat (Epoxy)      |
| ③ | Top Electrode (Ag)    | ⑥ | External Electrode (Sn) | ⑨ | Marking               |

| Size | L (mm)    | W (mm)    | T (mm)    | D1 (mm)   | D2 (mm)   | Weight (g) (1000 Pcs.) |
|------|-----------|-----------|-----------|-----------|-----------|------------------------|
| 0402 | 1.00±0.05 | 0.50±0.05 | 0.30±0.05 | 0.20±0.10 | 0.20±0.10 | 0.54                   |
| 0603 | 1.55±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 1.83                   |
| 0805 | 2.00±0.15 | 1.25±0.15 | 0.55±0.10 | 0.30±0.20 | 0.40±0.20 | 4.71                   |
| 1206 | 3.05±0.15 | 1.55±0.15 | 0.55±0.10 | 0.42±0.20 | 0.35±0.25 | 9.02                   |
| 1210 | 3.10±0.15 | 2.40±0.15 | 0.55±0.10 | 0.40±0.20 | 0.55±0.25 | 10                     |
| 2010 | 4.90±0.15 | 2.40±0.15 | 0.55±0.10 | 0.60±0.30 | 0.50±0.25 | 23.61                  |
| 2512 | 6.30±0.15 | 3.10±0.15 | 0.55±0.10 | 0.60±0.30 | 0.50±0.25 | 38.06                  |

RECOMMENDED LAND PATTERN



| Size | A    | B    | C        |
|------|------|------|----------|
| 0402 | 0.50 | 0.50 | 0.60±0.2 |
| 0603 | 0.80 | 1.00 | 0.90±0.2 |
| 0805 | 1.00 | 1.00 | 1.35±0.2 |
| 1206 | 2.00 | 1.15 | 1.70±0.2 |
| 1210 | 2.00 | 1.15 | 2.50±0.2 |
| 2010 | 3.60 | 1.40 | 2.50±0.2 |
| 2512 | 4.90 | 1.60 | 3.10±0.2 |

# Thin Film Precision Resistors

Type RN73 Series

## MARKING

Case sizes 0805 to 2512 IEC 4 Digit Marking:

| Resistance | 100R (100Ω) | 2K2 (2.2kΩ) | 10K (10kΩ) | 49.9K (49.9kΩ) | 100K (100kΩ) |
|------------|-------------|-------------|------------|----------------|--------------|
| Code       | 1000        | 2201        | 1002       | 4992           | 1003         |

Case Size 0603 E24 3 digit marking – Example 101 = 100R 102=1K0

| E24 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
|     | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 82 | 91 |

Case size 0603 E96 3 digit marking – Examples 14C = 13K7 68B = 4K99 68X = 49R9

| Code | E96 | Code | E96 | Code | E96 | Code | 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 |

Case Size 0603 E24 3 digit marking – Example 101 = 100R 102=1K0

| Code       | A               | B               | C               | D               | E               | F               | G               | H               | X                | Y                | Z                |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>7</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> | 10 <sup>-3</sup> |

NB For case size 0603 values other than E24 and E96 resistors will be supplied unmarked.

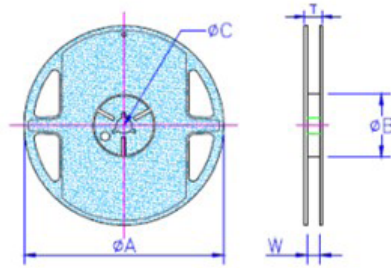
All resistors smaller than 0603 supplied unmarked.

# Thin Film Precision Resistors

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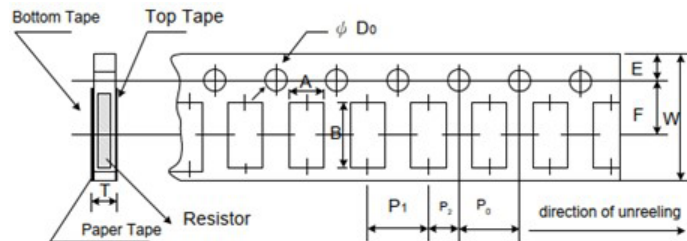
## PACKAGING

Packing Quantity and Reel Specification



| Size | ØA ±1.0 | ØB ±1.0 | ØC ±0.7 | W ±1.0 | T ±1.0 | Paper Tape  | Embossed Plastic Tape |
|------|---------|---------|---------|--------|--------|-------------|-----------------------|
| 0402 | 178.0   | 60.0    | 13.5    | 9.5    | 11.5   | 1000 / 5000 | N/A                   |
| 0603 |         |         |         |        |        |             |                       |
| 0805 |         |         |         |        |        |             |                       |
| 1206 |         |         |         |        |        |             |                       |
| 1210 |         |         |         |        |        |             |                       |
| 2010 | 178.0   | 60.0    | 13.5    | 13.5   | 15.5   | N/A         | 4000                  |
| 2512 |         |         |         |        |        |             |                       |

## PAPER TAPE SPECIFICATION

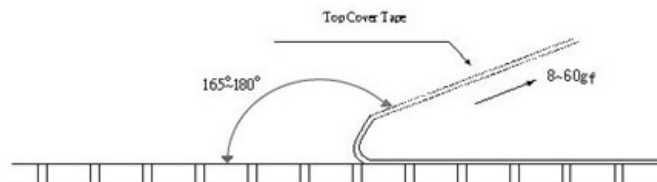


| Size | A ±0.05 | B ±0.05 | W ±0.10 | E ±0.05 | F ±0.05 | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> ±0.05 | ØD <sub>0</sub> | T          |  |
|------|---------|---------|---------|---------|---------|----------------|----------------|----------------------|-----------------|------------|--|
| 0402 | 0.70    | 1.16    | 8.00    | 1.75    | 3.5     | 4.00 ±0.10     | 2.00 ±0.05     | 2.00                 | 1.55 ±0.05      | 0.40 ±0.03 |  |
| 0603 | 1.10    | 1.90    |         |         |         |                | 4.00 ±0.10     |                      |                 | 0.60 ±0.03 |  |
| 0805 | 1.60    | 2.37    |         |         |         |                |                |                      |                 | 0.75 ±0.05 |  |
| 1206 | 2.00    | 3.55    |         |         |         | 4.00 ±0.05     |                |                      | 1.60 ±0.10      |            |  |
| 1210 | 2.75    | 3.40    |         |         |         |                |                |                      |                 |            |  |

## Peel force of top cover tape

The peel speed shall be about 300mm/min±5%

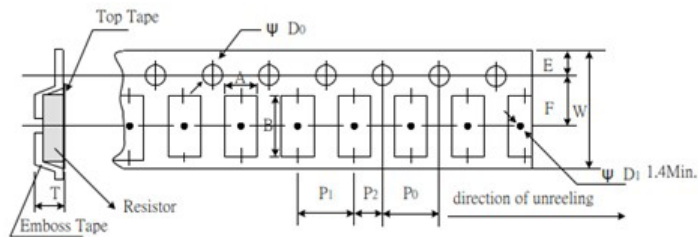
The peel force of top cover tape shall be between 8gf to 60gf



Thin Film Precision Resistors

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EMBOSSED PLASTIC TAPE SPECIFICATIONS

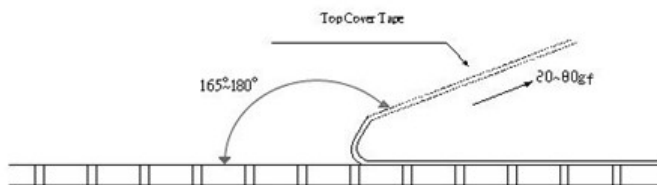


| Type | A         | B         | W         | E         | F        | P0        | P1        | P2        | ØD0       | T         |
|------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| 2010 | 2.85±0.10 | 5.45±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50+0.10 | 1.00±0.20 |
| 2512 | 3.40±0.10 | 6.65±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50+0.10 | 1.00±0.20 |

Peel force of top cover tape

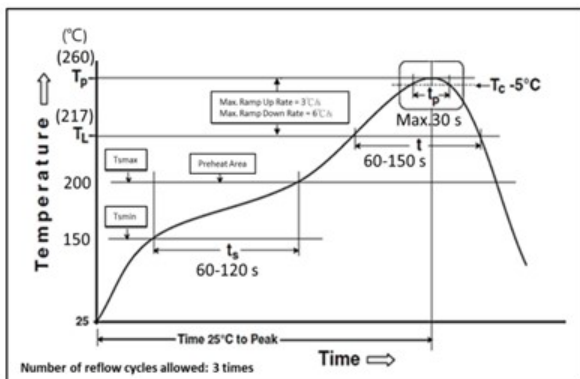
The peel speed shall be about 300mm/min±5%

The peel force of top cover tape shall be between 20gf to 80gf



SOLDERING CONDITION

Reflow Soldering (Ref. IPC/JEDEC J-STD-020 & J-SD-002)



| Reflow Profiles                                                                                 |                     |
|-------------------------------------------------------------------------------------------------|---------------------|
| Profile Feature                                                                                 | Pb-Free Assembly    |
| Preheat                                                                                         |                     |
| Minimum Temperature (T <sub>min</sub> )                                                         | 150°C               |
| Maximum Temperature (T <sub>max</sub> )                                                         | 200°C               |
| Preheating time (t <sub>s</sub> ) from (T <sub>min</sub> to T <sub>max</sub> )                  | 60-120 seconds      |
| Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )                                                | 3°C/second maximum  |
| Liquidous temperature (T <sub>L</sub> )                                                         | 217°C               |
| Time (T <sub>L</sub> ) maintained above T <sub>L</sub>                                          | 60-150 seconds      |
| Minimum Peak temperature (T <sub>p</sub> min)                                                   | 235°C               |
| Maximum Peak temperature (T <sub>p</sub> max)                                                   | 260°C               |
| Time (t <sub>p</sub> ) within 5°C of the specified classification temperature (T <sub>c</sub> ) | 30 seconds maximum  |
| Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )                                              | 6°C/seconds maximum |
| Time 25°C to peak temperature                                                                   | 8 minutes maximum   |

## ORDERING INFORMATION

| Part Number            |                                        | RN73 C 2A 100R B TD |                                      |
|------------------------|----------------------------------------|---------------------|--------------------------------------|
| <b>Common Part</b>     |                                        | <b>Packaging</b>    |                                      |
| <b>RN73</b>            | High precision thin film chip resistor | <b>TG</b>           | 250 cut tape length (1E, 1J, 2A, 2B) |
| <b>TCR</b>             |                                        | <b>TDF</b>          | TDF - 1000 reel (1E, 1J, 2A, 2B)     |
| <b>A</b>               | ±5ppm/°C                               | <b>TD</b>           | 5000 reel (1E, 1J, 2A, 2B, 2E)       |
| <b>*C</b>              | ±10ppm/°C                              | <b>TE</b>           | 4000 reel (2H, 3A only)              |
| * preferred stock item |                                        | <b>Tolerance</b>    |                                      |
| <b>Package Size</b>    |                                        | <b>L</b>            | ±0.01%                               |
| <b>1E</b>              | 0402                                   | <b>A</b>            | ±0.05%                               |
| <b>1J</b>              | 0603                                   | <b>B</b>            | ±0.1%                                |
| <b>2A</b>              | 0805                                   | <b>Value</b>        |                                      |
| <b>2B</b>              | 1206                                   | <b>100R</b>         | 100Ω                                 |
| <b>2E</b>              | 1210                                   | <b>1K0</b>          | 1000Ω                                |
| <b>2H</b>              | 2010                                   | <b>10K</b>          | 10,000Ω                              |
| <b>3A</b>              | 2512                                   | <b>100K</b>         | 100,000 Ω                            |

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