

ASJ

DATA SHEET

Thick Film Chip Resistor Array YCN Series (Reverse Concave Type)

1% TO 5%, TCR ± 200 TO ± 650

SIZE: 102R/104R

RoHS-Compliant

THICK FILM CHIP RESISTOR ARRAY

YCN Series (Reverse Concave Type)

DS-ENG-100

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1. SCOPE

- 1.1 This specification is applicable to Lead-free and Halogen-free of RoHS directive for YCN series reverse concave type thick film chip resistors array.
- 1.2 The product is for general electronic purpose.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

| | | | | | | | |
|---------------------------------|----------------------------------|----------------------------|--------------------|---|------------------------------------|--|-----------|
| YCN | 102 | R | - | XXX | - | J | K |
| Type | Size | Terminal Type | Nominal Resistance | | | Resistance Tolerance | Packaging |
| Thick Film Chip Resistors Array | 102 - 0402 x 2 104 - 0402 x 4 | R: Reverse Concave Type | 5% (3-Digit) | EX. 10Ω = 100 4.7Ω = 4R7 JUMPER = 000 | F = ±1% J = ±5% Z = Zero ohm | K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free N = 50,000 pcs Lead Free | |
| | | | 1% (4-Digit) | EX. 10.2Ω = 10R2 10KΩ = 1002 | | | |

3. RATING

- 3.1 Rated Power
 - 3.1.1 Resistor Rated Power

| Type | Rated Power at 70°C | Max. Working Voltage | Max. Overload Voltage | JUMPER (0Ω) Rated Current | JUMPER (0Ω) Resistance Value |
|------------------|---------------------|----------------------|-----------------------|---------------------------|------------------------------|
| | | | | | Z (±5%) |
| YCN102R (0402x2) | $\frac{1}{16}$ W | 25V | 50V | 1A | 50mΩ MAX. |
| YCN104R (0402x4) | $\frac{1}{16}$ W | 25V | 50V | 1A | 50mΩ MAX. |



3.2 Power Derating Characteristics

Rated Power shall be the load power corresponding to nominal wattage suitable for continuous use at 70°C ambient temperatures. In case the ambient temperature exceeds 70°C, reduce the load power in accordance with Derating curve in Fig. 1.

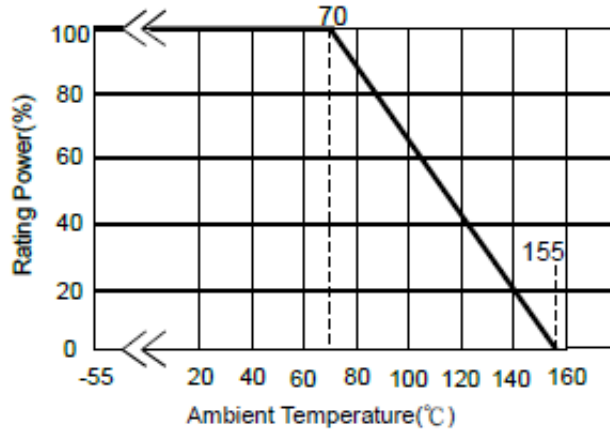


Fig.1 Power Derating Characteristics

3.3 Standard Atmospheric Condition

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = + 5°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 kPa to 106kPa

If there may be any doubt about the results, measurement shall be made within the following limits:

Ambient Temperature = 20 ± 2°C

Relative Humidity = 60 to 70% RH

Air Pressure = 86 kPa to 106kPa

3.4 Operating Temperature Range -55°C to +155°C

3.5 Storage Temperature Range -5°C to + 40°C / < 85% RH

3.6 Flammability Rating Tested in accordance to UL-94, V-0

3.7 Moisture Sensitivity Level Rating: Level 1

3.8 Product Assurance

ASJ resistors shall warranty 24 months from manufacturing date with control condition.

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3.9 ASJ resistors are RoHS-compliant in accordance to RoHS Directive.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

| Type | Rated Power at 70°C | Max. Working Voltage | Max. Overload Voltage | T.C.R. (ppm/°C) | Resistance Range | | Number of Terminals | Number of Resistors | JUMPER (0Ω) Rated Current | JUMPER (0Ω) Resistance Value |
|-----------------------------|---------------------|----------------------|-----------------------|-----------------|---------------------|----------------|---------------------|---------------------|---------------------------|------------------------------|
| | | | | | F(±1%) E-24、E-96 | J(±5%) E-24 | | | | |
| YCN102R (0402x2) | 1/16 W | 25V | 50V | ±650 | 3Ω ≤ R < 10Ω | 3Ω ≤ R < 10Ω | 4 | 2 | 1A | 50mΩ MAX. |
| | | | | ±250 | 10Ω ≤ R ≤ 1MΩ | 10Ω ≤ R ≤ 1MΩ | | | | |
| YCN104R (0402x4) | 1/16 W | 25V | 50V | ±400 | 1Ω ≤ R < 10Ω | 1Ω ≤ R < 10Ω | 8 | 4 | 1A | 50mΩ MAX. |
| | | | | ±200 | 10Ω ≤ R ≤ 1MΩ | 10Ω ≤ R ≤ 1MΩ | | | | |
| Operating Temperature Range | | | | -55°C ~ +155°C | | | | | | |

3.11 Voltage Rating

Rated Voltage : The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

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

E= Rated voltage (V)

P= power rating (W)

R= Nominal resistance(Ω)

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4. MARKING ON PRODUCT

The nominal resistance shall be marked on the surface of each resistor.

| Type | Resistance Range | Tolerance $\leq 1\%$ | Tolerance $> 1\%$ |
|---------|-------------------|----------------------|-------------------|
| YCN102R | ALL | No Marking | |
| | Jumper=0 Ω | | |
| YCN104R | ALL | 4-digits Marking | 3-digits Marking |
| | Jumper=0 Ω | -- | 1-digit Marking |

THICK FILM CHIP RESISTOR ARRAY

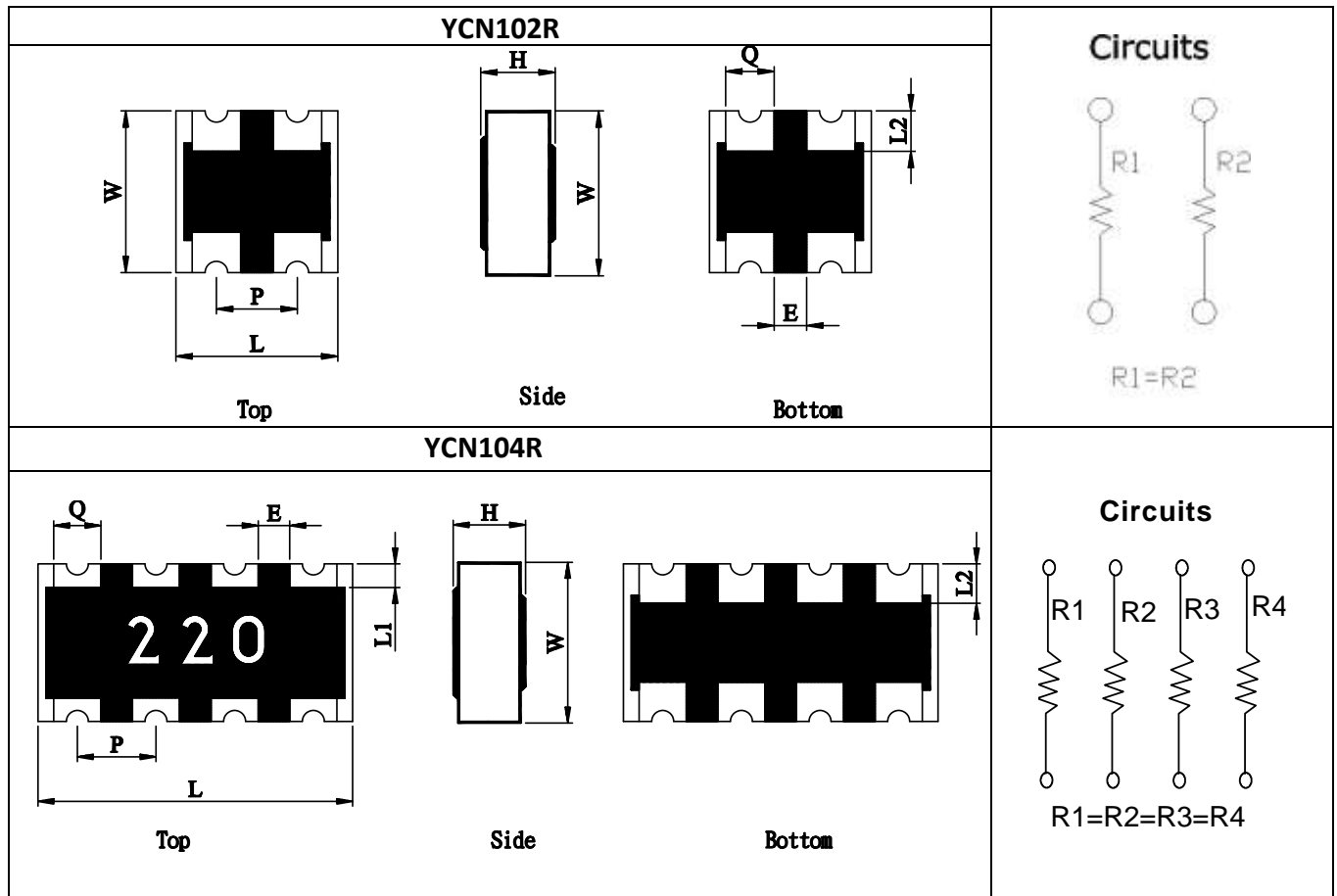
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5. DIMENSION, CONSTRUCTION AND MATERIAL

5.1 Dimension



Unit : mm

| TYPE / DIM | L | W | H | L1 | L2 | P | Q | E |
|---------------------|-----------|-----------|-----------|-----------|-----------|--------|-----------|-----------|
| YCN102R (0402x2) | 1.00±0.10 | 1.00±0.10 | 0.30±0.10 | 0.15±0.10 | 0.25±0.10 | (0.50) | 0.30±0.10 | 0.15±0.10 |
| YCN104R (0402x4) | 2.00±0.10 | 1.00±0.10 | 0.45±0.10 | 0.15±0.10 | 0.25±0.10 | (0.50) | 0.30±0.10 | 0.15±0.10 |

- 5.2 Plating Thickness:
 Ni : $\geq 2 \mu\text{m}$
 Sn (Tin) : $\geq 3 \mu\text{m}$
 Sn (Tin) : Matte Sn



Product Specification

Towards Excellence in Quality, Service & Innovation

THICK FILM CHIP RESISTOR ARRAY

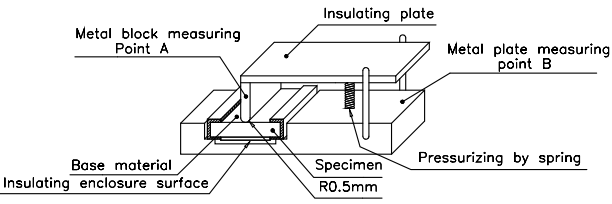
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6. RELIABILITY TEST

6.1 Electrical Performance Test

| ITEM | Conditions | Specifications | |
|---------------------------------------|---|---|---------------|
| | | Resistors | Jumper |
| Temperature Coefficient of Resistance | $TCR(ppm/^{\circ}C) = \frac{(R2 - R1)}{R1(T2 - T1)} \times 10^6$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C Refer to JIS-C5201-1 4.8 | Refer item 3.10 table. | NA |
| Short Time Overload | Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3. general specifications) Refer to JIS-C5201-1 4.13 | 1%: $\Delta R = \pm 1.0\%$ 5% : $\Delta R = \pm 2.0\%$ | 50mΩ Lower |
| Insulation Resistance | Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6  | $\geq 10^9 \Omega$ | |
| Dielectric Withstand Voltage | Put the resistor in the fixture, add 300 VAC in +, - terminal for 60 sec. Refer to JIS-C5201-1 4.7 | No short or burned on the appearance. | |
| Intermittent Overload | Put the tested resistor in chamber under temperature $25 \pm 2^{\circ}C$ and load 2.5 times rated DC voltage for 1 sec on , 25 sec off , 10000 $_{-0}^{+400}$ test cycles, then it be left at no-load for 1 hour , then measure its resistance variance rate. Refer to JIS-C5201-1 4.13 | $\Delta R = \pm 5.0\%$ | 50mΩ Lower |

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6.2 Mechanical Performance Test

| ITEM | Conditions | Specifications | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|---------------|------------------------------|---|----------------------|------------------|---|--------|------------------|---|----------------|------------------------|---|------------|--|---|----------------|-----------------------|---|------------|--|---|----------------------|------------------|---|------------------|--|------------|-------|---------------|------------------------|---------------|
| | | Resistors | Jumper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Solvent | The tested resistor be immersed into isopropyl alcohol of 20~25°C for 5 minutes, then the resistor is left in the room for 48 hr , then measure its resistance variance rate. Refer to JIS-C5201-1 4.29 | $\Delta R = \pm 0.5\%$ | 50mΩ Lower | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | <p>©Test method 1 (Reflow test): The tested resistor should be subject in the following procedure, and after finish each step, it should be left for a duration of 2 hours or longer at a temperature of 30°C or lower and a humidity of 70% RH or lower.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Procedure</th> <th>Environmental test condition</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Resistance measuring</td> <td>Room temperature</td> </tr> <tr> <td>2</td> <td>Baking</td> <td>125°C , 24 hours</td> </tr> <tr> <td>3</td> <td>Humidification</td> <td>85°C , 85% , 168 hours</td> </tr> <tr> <td>4</td> <td>Reflow (1)</td> <td>Reflow temperature curve and component surface temperature Table 1</td> </tr> <tr> <td>5</td> <td>Humidification</td> <td>85°C , 65% , 24 hours</td> </tr> <tr> <td>6</td> <td>Reflow (2)</td> <td>Reflow temperature curve and component surface temperature Table 2</td> </tr> <tr> <td>7</td> <td>Resistance measuring</td> <td>Room temperature</td> </tr> </tbody> </table> <p>©Reflow temperature curve</p> <p>©Component surface temperature</p> <table border="1"> <caption>Table 1 Description example in specification document(1)</caption> <thead> <tr> <th>Temperature-retaining time: 230°C or higher</th> <th>Peak temperature</th> <th>Temperature measured at the component body surface during preheating</th> </tr> </thead> <tbody> <tr> <td>30 seconds</td> <td>240°C</td> <td>150 to 160 °C</td> </tr> </tbody> </table> | Step | Procedure | Environmental test condition | 1 | Resistance measuring | Room temperature | 2 | Baking | 125°C , 24 hours | 3 | Humidification | 85°C , 85% , 168 hours | 4 | Reflow (1) | Reflow temperature curve and component surface temperature Table 1 | 5 | Humidification | 85°C , 65% , 24 hours | 6 | Reflow (2) | Reflow temperature curve and component surface temperature Table 2 | 7 | Resistance measuring | Room temperature | Temperature-retaining time: 230°C or higher | Peak temperature | Temperature measured at the component body surface during preheating | 30 seconds | 240°C | 150 to 160 °C | $\Delta R = \pm 1.0\%$ | 50mΩ Lower |
| Step | Procedure | Environmental test condition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Resistance measuring | Room temperature | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Baking | 125°C , 24 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Humidification | 85°C , 85% , 168 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Reflow (1) | Reflow temperature curve and component surface temperature Table 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Humidification | 85°C , 65% , 24 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Reflow (2) | Reflow temperature curve and component surface temperature Table 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Resistance measuring | Room temperature | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature-retaining time: 230°C or higher | Peak temperature | Temperature measured at the component body surface during preheating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 seconds | 240°C | 150 to 160 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ITEM | Conditions | Specifications | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|--|----------------------------|--|-----------------|------------|--------------|-----------------|------------|--|-----------------|-----------|--|------|-------|--|------|-----------|------------------------------|---|----------------------|------------------|---|--------|------------------|---|----------------|------------------------|---|-----------------|------------------|---|--------|-----------------------|---|-----------------|------------------|---|----------------------|------------------|--|--|
| | | Resistors | Jumper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Table 2 Description example in specification document(2)</p> <table border="1"> <thead> <tr> <th>Temperature</th> <th>Temperature-retaining time</th> <th>Temperature measured at the component body surface during preheating</th> </tr> </thead> <tbody> <tr> <td>220°C or higher</td> <td>90 seconds</td> <td>150 to 160°C</td> </tr> <tr> <td>230°C or higher</td> <td>60 seconds</td> <td></td> </tr> <tr> <td>240°C or higher</td> <td>5 seconds</td> <td></td> </tr> <tr> <td>Peak</td> <td>245°C</td> <td></td> </tr> </tbody> </table> <p>©Test method 2 (solder pot test): The tested resistor should be subject in the following procedure, and after finish each step, it should be left for a duration of 2 hours or lower at a temperature of 30°C or lower and a humidity of 70% RH or lower.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Procedure</th> <th>Environmental test condition</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Resistance measuring</td> <td>Room temperature</td> </tr> <tr> <td>2</td> <td>Baking</td> <td>125°C , 24 hours</td> </tr> <tr> <td>3</td> <td>Humidification</td> <td>85°C , 85% , 168 hours</td> </tr> <tr> <td>4</td> <td>Solder pot test</td> <td>260±3°C , 10 sec</td> </tr> <tr> <td>5</td> <td>Placed</td> <td>85°C , 65% , 24 hours</td> </tr> <tr> <td>6</td> <td>Solder pot test</td> <td>260±3°C , 10 sec</td> </tr> <tr> <td>7</td> <td>Resistance measuring</td> <td>Room temperature</td> </tr> </tbody> </table> <p>By Sony (SS-00254-5) Refer to JIS-C5201-1 4.18</p> | Temperature | Temperature-retaining time | Temperature measured at the component body surface during preheating | 220°C or higher | 90 seconds | 150 to 160°C | 230°C or higher | 60 seconds | | 240°C or higher | 5 seconds | | Peak | 245°C | | Step | Procedure | Environmental test condition | 1 | Resistance measuring | Room temperature | 2 | Baking | 125°C , 24 hours | 3 | Humidification | 85°C , 85% , 168 hours | 4 | Solder pot test | 260±3°C , 10 sec | 5 | Placed | 85°C , 65% , 24 hours | 6 | Solder pot test | 260±3°C , 10 sec | 7 | Resistance measuring | Room temperature | <p>No evidence of electrode damage. No side conductive peel off.</p> | |
| Temperature | Temperature-retaining time | Temperature measured at the component body surface during preheating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220°C or higher | 90 seconds | 150 to 160°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 230°C or higher | 60 seconds | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 240°C or higher | 5 seconds | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak | 245°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step | Procedure | Environmental test condition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Resistance measuring | Room temperature | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Baking | 125°C , 24 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Humidification | 85°C , 85% , 168 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Solder pot test | 260±3°C , 10 sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Placed | 85°C , 65% , 24 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Solder pot test | 260±3°C , 10 sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Resistance measuring | Room temperature | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solderability | <p>Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105°C, humidity of 100% RH, and pressure of 1.22×10⁵ Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more.</p> <p>Test method: © solder pot test: The resistor be immersed into solder pot in temperature 235±5°C for 2 sec, then the resistor is left as placed under microscope to observed its solder area. Refer to JIS-C5201-1 4.17</p> | <p>1.Test item 1: Solder coverage over 95%</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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| ITEM | Conditions | Specifications | | | | | | | | | | |
|--|---|---|---------------|--|-------------------|--------------------|---------------------------|---------------------|---------------------------|----------------------------|-----------------|--|
| | | Resistors | Jumper | | | | | | | | | |
| Joint Strength of Solder | <p>Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105°C, humidity of 100% RH, and pressure of 1.22×10^5 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more.</p> <p>Test method: ©Test item 1 (Adhesion): A static load using a R0.5 scratch tool shall be applied on the core of the component and in the direction of the arrow and held for 10 seconds and under load measure its resistance variance rate. Load = 20N</p> <p>Refer to JIS-C5201-1 4.32</p> <p>©Test item 2 (Bending Strength): Solder tested resistor on the PC board, add force in the middle down, and under load measure its resistance variance rate . D = 5 mm</p> <p>Refer to JIS-C5201-1 4.33</p> | <p>Test item 1 : 1. $\Delta R\% = \pm 1.0\%$</p> <p>Test item 2 : 1. $\Delta R\% = \pm 1.0\%$</p> <p>Test item3: (1).Adhesion After application of temperature cycle, adhesion should be 50% or more of initial strength. (2).Bending Strength: After application of temperature cycle, bending load should be 50% or more of initial strength.</p> | 50mΩ Lower | | | | | | | | | |
| | <p>©Test item 3 (Endurance measurement): Put the tested resistor in the chamber under the temperature cycle which shown in table 1 shall be repeated 1000 ± 4 times consecutively. Then separate follow test item 1 and test item 2 50% condition to test, measured its resistance variance rate.</p> <table border="1"> <thead> <tr> <th colspan="2">Table 1 Temperature cycle test condition</th> </tr> <tr> <th></th> <th>Testing condition</th> </tr> </thead> <tbody> <tr> <td>Lowest temperature</td> <td>$-35 \pm 5^\circ\text{C}$</td> </tr> <tr> <td>Highest temperature</td> <td>$105 \pm 5^\circ\text{C}$</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> <p>By SONY (SS-00254-9)</p> | Table 1 Temperature cycle test condition | | | Testing condition | Lowest temperature | $-35 \pm 5^\circ\text{C}$ | Highest temperature | $105 \pm 5^\circ\text{C}$ | Temperature-retaining time | 15 minutes each | |
| Table 1 Temperature cycle test condition | | | | | | | | | | | | |
| | Testing condition | | | | | | | | | | | |
| Lowest temperature | $-35 \pm 5^\circ\text{C}$ | | | | | | | | | | | |
| Highest temperature | $105 \pm 5^\circ\text{C}$ | | | | | | | | | | | |
| Temperature-retaining time | 15 minutes each | | | | | | | | | | | |

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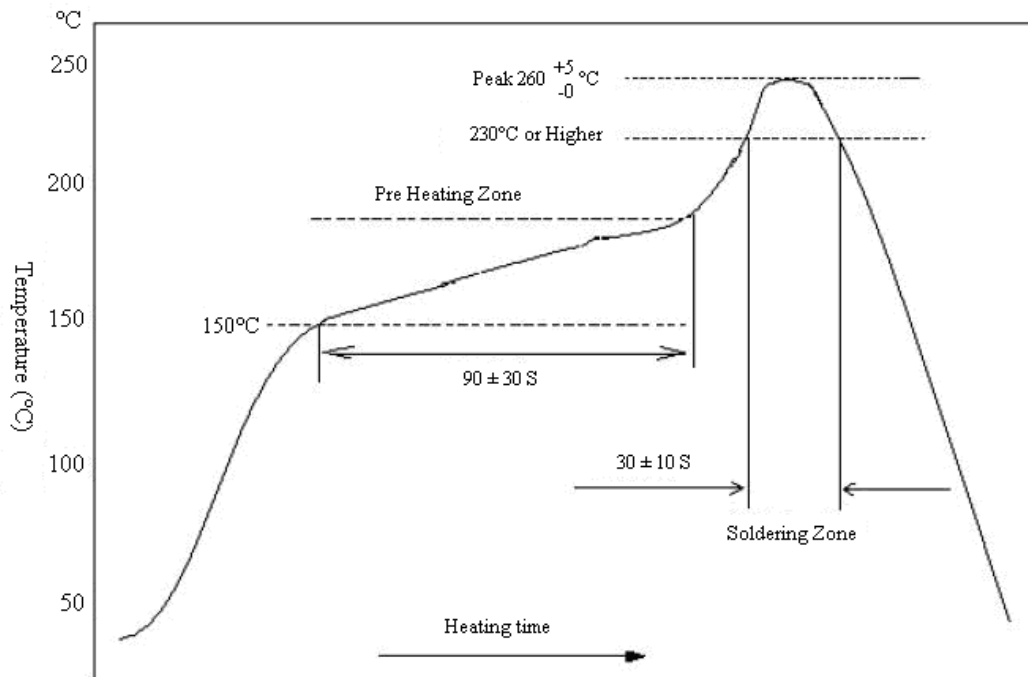
| ITEM | Conditions | Specifications | |
|---------------|---|--|--------|
| | | Resistors | Jumper |
| Leaching Test | The tested resistor be immersed into molten solder of 260±5°C for 30 seconds. Then the resistor is left as placed under microscope to observed its solder area. By SONY (SS-00254-9) | 1.Solder coverage over 95%. 2.The underlying material (such as ceramic) shall not be visible at the crest corner area of the electrode. | |

6.3 Environmental Test

| ITEM | Conditions | Specifications | | | | | | | | | |
|----------------------------|--|------------------------------|-------------------|--------------------|---------|---------------------|---------|----------------------------|-----------------|----------|---------------|
| | | Resistors | Jumper | | | | | | | | |
| Resistance to Dry Heat | Put tested resistors in chamber under temperature 155±5°C for 1000±4 hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25 | 1%:ΔR=±1.0% 5% : ΔR=±2.0% | 50mΩ Lower | | | | | | | | |
| Thermal Shock | Put the tested resistor in the thermal shock chamber under the temperature cycle which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate. <table border="1" data-bbox="306 958 956 1111"> <thead> <tr> <th></th> <th>Testing Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>-55±5°C</td> </tr> <tr> <td>Highest Temperature</td> <td>125±5°C</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> Refer to MIL-STD 202 Method 107 | | Testing Condition | Lowest Temperature | -55±5°C | Highest Temperature | 125±5°C | Temperature-retaining time | 15 minutes each | ΔR=±1.0% | 50mΩ Lower |
| | Testing Condition | | | | | | | | | | |
| Lowest Temperature | -55±5°C | | | | | | | | | | |
| Highest Temperature | 125±5°C | | | | | | | | | | |
| Temperature-retaining time | 15 minutes each | | | | | | | | | | |
| Loading Life in Moisture | Put the tested resistor in the chamber under temperature 40±2°C, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24 | 1%:ΔR=±2.0% 5% : ΔR=±3.0% | 50mΩ Lower | | | | | | | | |
| Load Life | Put the tested resistor in chamber under temperature 70±2°C and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25 | 1%:ΔR=±2.0% 5% : ΔR=±3.0% | 50mΩ Lower | | | | | | | | |

6.4 Soldering Profile (Technical application notes : This is for recommendation, customer please perform adjustment according to actual application.)

6.4.1 Lead Free IR Reflow Soldering Profile



6.4.2 Soldering Iron: temperature $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$, dwell time shall be less than 3 sec.

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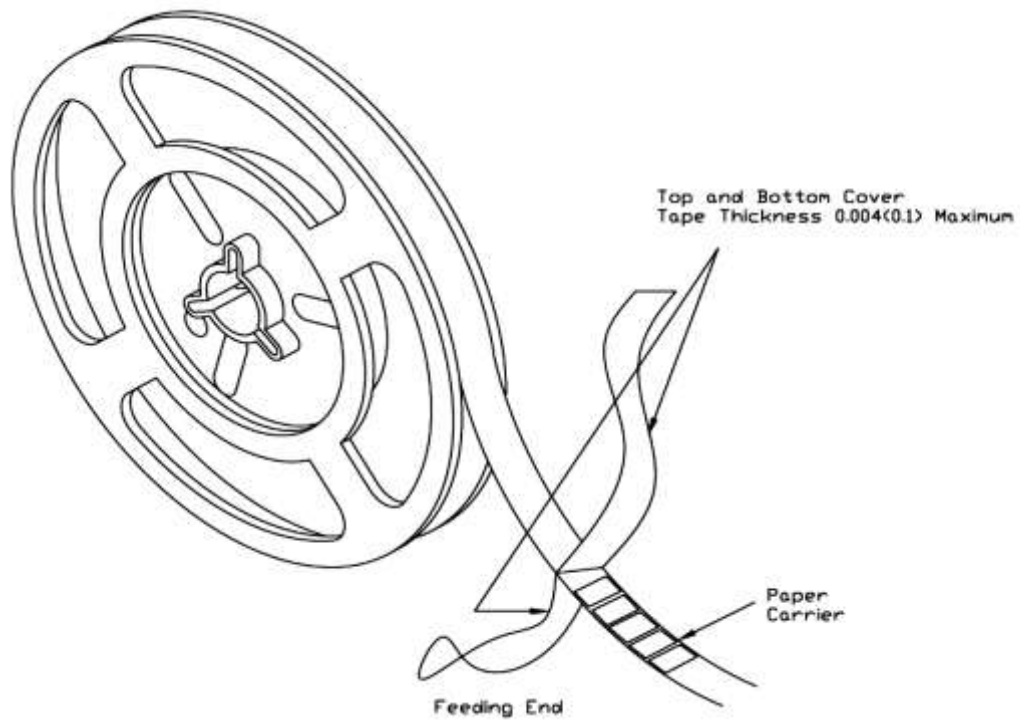
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7. TAPING

7.1 Structure of Taping

Paper Carrier



THICK FILM CHIP RESISTOR ARRAY

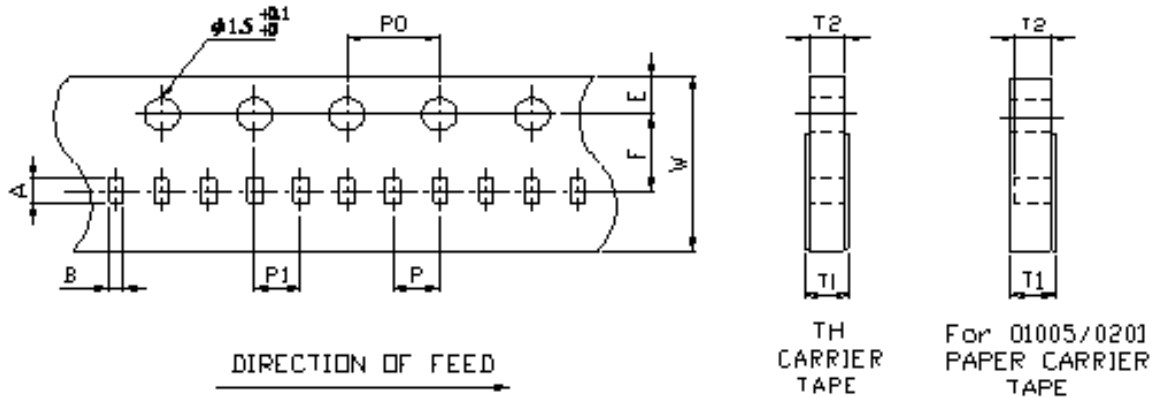
YCN Series (Reverse Concave Type)

DS-ENG-100

Page: 14 of 18

7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System



Remark : Pitch tolerance over any 10 pitches of Po is ± 0.2 mm

| Packaging | Array/Network | Dimensions (mm) | | | | | | | | | | |
|-----------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------|-----------------|-----------------|-----------------|------------------|-----------------|
| | Type | A | B | W | E | F | T1 | T2 | P | P0 | 10xP0 | P1 |
| | YCN102R | 1.20 \pm 0.10 | 1.20 \pm 0.10 | 8.00 \pm 0.20 | 1.75 \pm 0.10 | 3.50 \pm 0.05 | 0.40 $^{+0.2}$ ₀ | 0.40 \pm 0.10 | 2.00 \pm 0.10 | 4.00 \pm 0.05 | 40.00 \pm 0.20 | 2.00 \pm 0.05 |
| | YCN104R | 2.20 \pm 0.10 | 1.20 \pm 0.10 | 8.00 \pm 0.20 | 1.75 \pm 0.10 | 3.50 \pm 0.05 | 0.60 $^{+0.2}$ ₀ | 0.60 \pm 0.10 | 2.00 \pm 0.10 | 4.00 \pm 0.05 | 40.00 \pm 0.20 | 2.00 \pm 0.05 |

7.3 Packaging

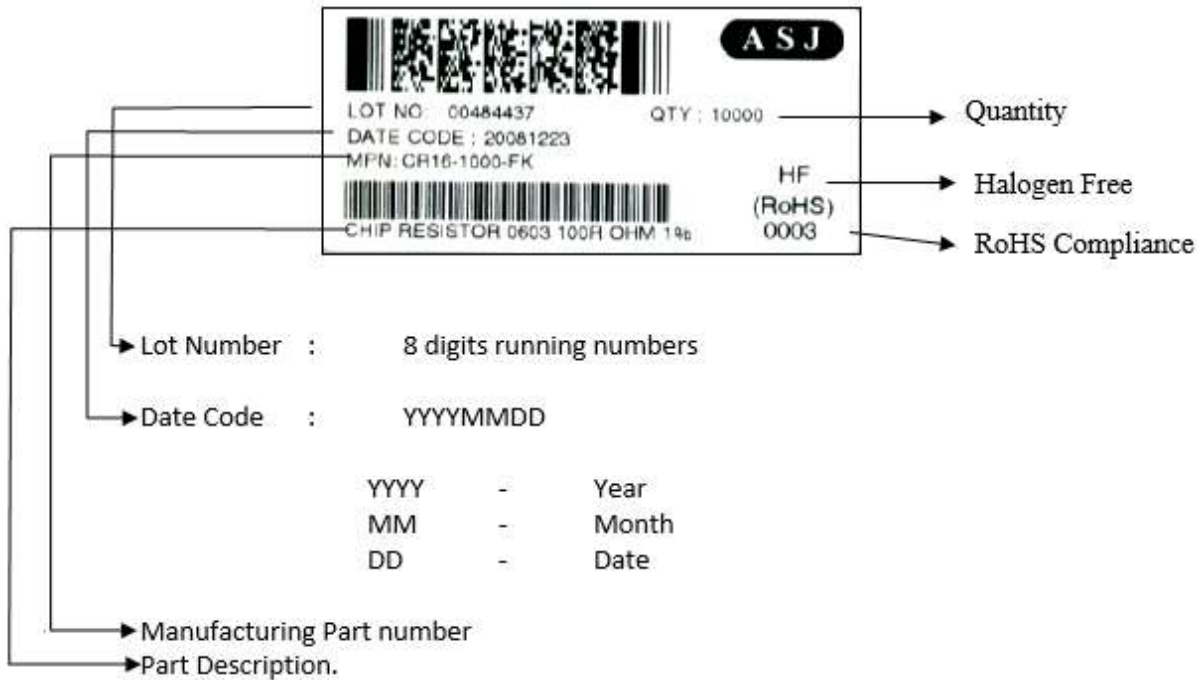
7.3.1 Taping

Quantity – Tape and Reels

| Packaging Qty(pcs/reel) | | | |
|-------------------------|-----------|-----------|----------|
| Size/Type(Array) | 2mm pitch | 4mm pitch | Reel |
| YCN102R | 10,000 | --- | 7" Reel |
| YCN104R | 20,000 | --- | 10" Reel |
| | 50,000 | --- | 13" Reel |

7.3.2 Identification

Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



7.3.3 Packaging Reel Box

| Dimension | Reel Box | Number of Reels |
|--------------------|----------|-----------------|
| 185 × 60 × 186 mm | 25K Box | 5 |
| 185 × 120 × 186 mm | 50K Box | 10 |

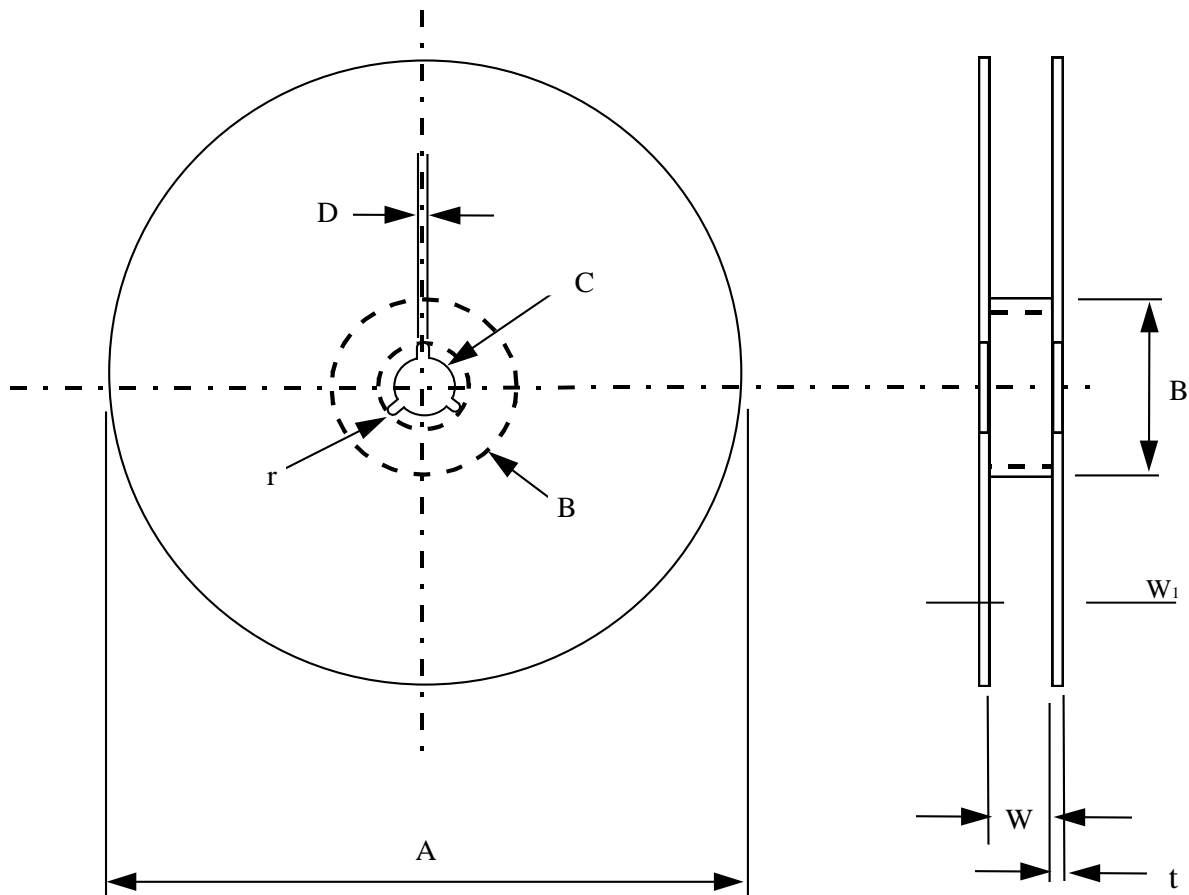
THICK FILM CHIP RESISTOR ARRAY

YCN Series (Reverse Concave Type)

DS-ENG-100

Page: 16 of 18

7.3.4 Reel Dimensions



| Model | A | B | C | D | W | W ₁ | t | r |
|-----------------------------------|--------------------|----------------------|----------------|--------------------|--------------|----------------|---------------|-----|
| 7" Reel (5K) (except 0402 10K) | $\phi 178 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 0.1 | 14.4 max | 1.0 ± 0.1 | 1.0 |
| 7" Reel (4K) | $\phi 178 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 13 ± 1.0 | 14.4 max | 1.2 ± 0.1 | 1.0 |
| 10" Reel (10K) | $\phi 254 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 1.0 | 14.4 max | 1.5 ± 0.1 | 1.0 |
| 13" Reel (20K, 50K) | $\phi 330 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 1.0 | 14.4 max | 2.1 ± 0.1 | - |
| 13" Reel (20K) | $\phi 330 \pm 1.0$ | $\phi 100 \pm 1$ | 13.5 ± 0.5 | $2 \sim 3 \pm 0.5$ | 10 ± 0.5 | - | - | - |

THICK FILM CHIP RESISTOR ARRAY

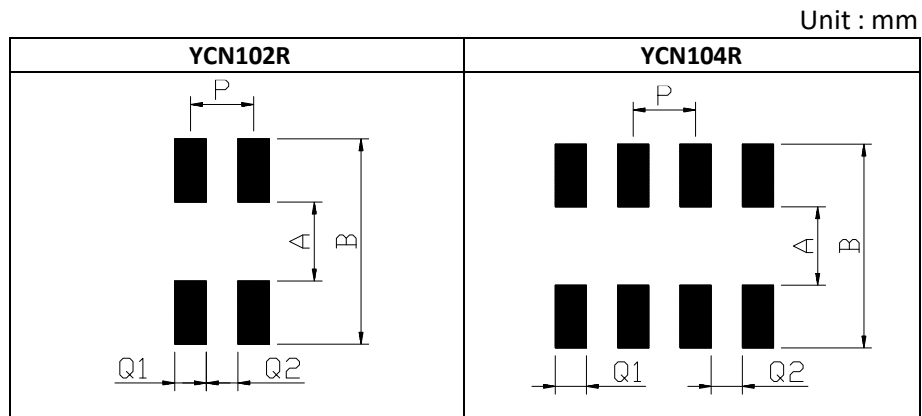
YCN Series (Reverse Concave Type)

DS-ENG-100

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8. SURFACE MOUNT LAND PATTERNS DESIGN (FOR REFLOW SOLDERING)

When a component is soldered, the resistance after soldering changes slightly depending on the size of the soldering area and the amount of soldering. When designing a circuit, it is necessary to consider the effect of a decrease or increase in its resistance.



| TYPE \ DIM | A | B | P | Q1 | Q2 |
|------------|------|------|------|------|------|
| YCN102R | 0.50 | 2.00 | 0.50 | 0.28 | 0.22 |
| YCN104R | 0.50 | 2.00 | 0.50 | 0.28 | 0.22 |

THICK FILM CHIP RESISTOR ARRAY

YCN Series (Reverse Concave Type)

DS-ENG-100

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9. REVISION HISTORY

| Revision | Date | Change Notification | Description |
|-----------|------------|---------------------|-----------------|
| Version 1 | 24.07.2023 | | Initial Release |
| | | | |



Product Specification

Towards Excellence in Quality, Service & Innovation



DATA SHEET

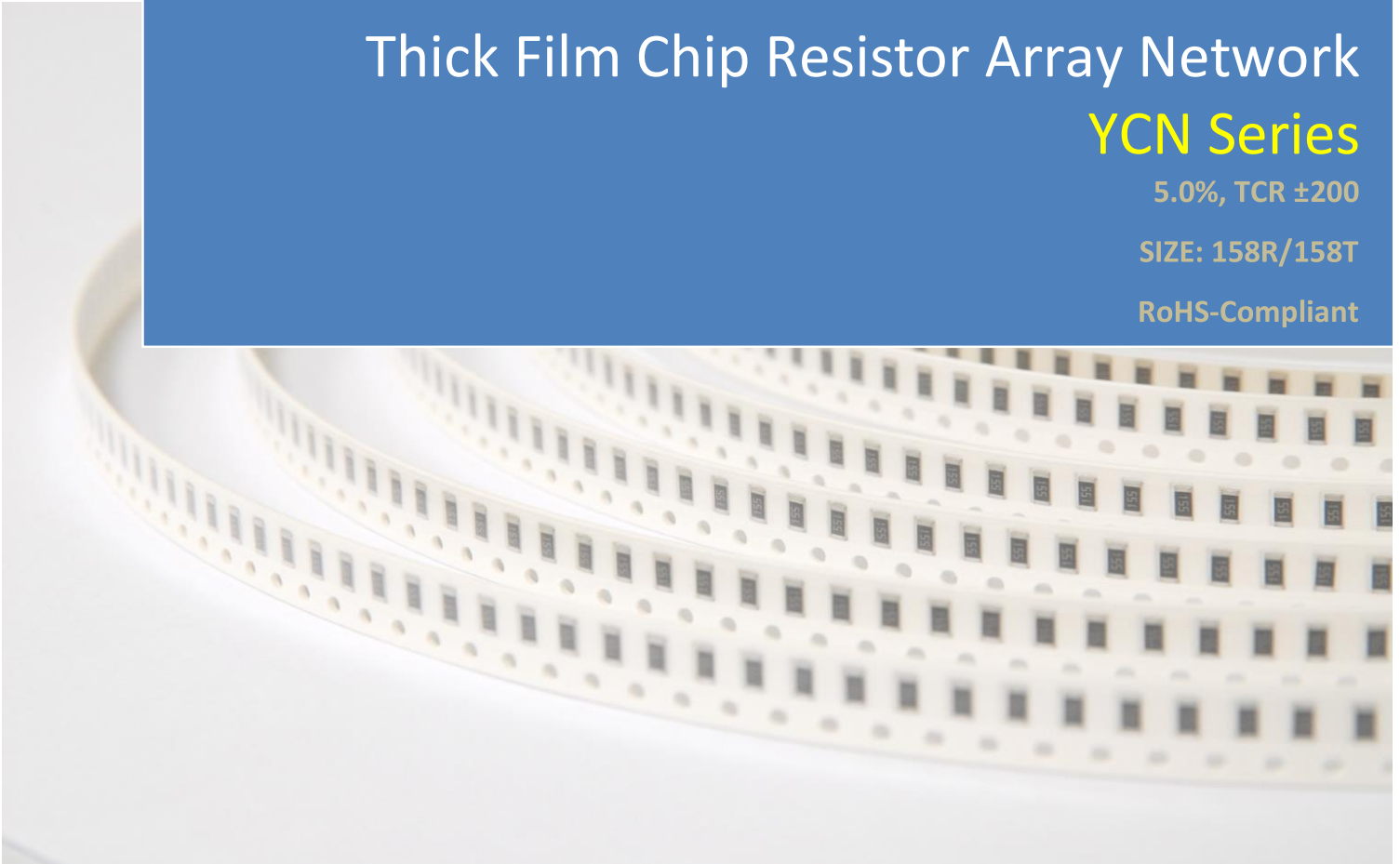
Thick Film Chip Resistor Array Network

YCN Series

5.0%, TCR ± 200

SIZE: 158R/158T

RoHS-Compliant



THICK FILM CHIP RESISTOR ARRAY NETWORK

YCN Series

DS-ENG-014

Page: 2 of 16

1. SCOPE

- 1.1 This specification is applicable to Lead-free and Halogen-free of RoHS Directive for YCN series thick film chip resistor array network.
- 1.2 The product is for general electronic purpose.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

| | | | | | | |
|---------------------------------|--------------------------------------|--------------------|---|---|---|---|
| YCN | 158R | - | 100 | - | J | L |
| Type | Size (Inch/mm) | Nominal Resistance | | Resistance Tolerance | | Packaging |
| Thick Film Chip Resistors Array | 158R (0612/1632) 158T (0612/1632) | 3-Digit | EX. 10Ω = 100 4.7Ω = 4R7 JUMPER = 000 | J = ±5% Z = Zero ohm <i>*For 3-digit only</i> Ex. YCN158R-000-ZL | | L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free |

3. RATING

3.1 Rated Power

3.1.1 Resistor Rated Power

| Type | Rated Power at 70°C | Max. Working Voltage | Max. Overload Voltage | JUMPER Rated Power | JUMPER Resistance Value |
|---------|---------------------|----------------------|-----------------------|--------------------|-------------------------|
| YCN158R | $\frac{1}{16}$ W | 25V | 50V | 1A | 50mΩ MAX. |
| YCN158T | $\frac{1}{16}$ W | 25V | 50V | 1A | 50mΩ MAX. |



- 3.2 Power Derating Characteristics
Rated Power shall be the load power corresponding to nominal wattage suitable for continuous use at 70°C ambient temperatures. In case the ambient temperature exceeds 70°C, reduce the load power in accordance with Derating curve in Fig. 1.

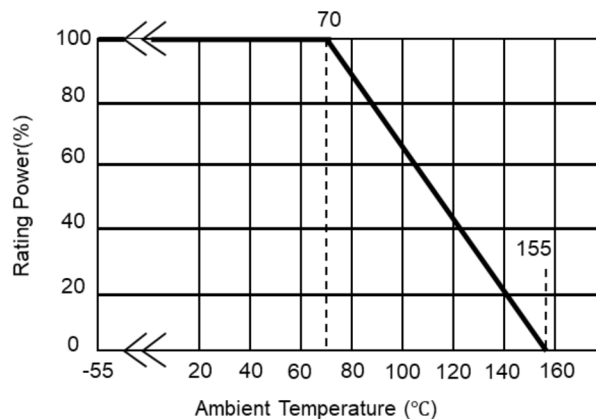


Fig.1 Power Derating Characteristics

- 3.3 Standard Atmospheric Condition
Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = + 5°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 kPa to 106kPa

If there may be any doubt about the results, measurement shall be made within the following limits:

Ambient Temperature = 20 ± 2°C

Relative Humidity = 60 to 70% RH

Air Pressure = 86 kPa to 106kPa
- 3.4 Operating Temperature Range -55°C to +155°C
- 3.5 Storage Temperature Range -5°C to + 40°C / < 85% RH
- 3.6 Flammability Rating Tested in accordance to UL-94, V-0
- 3.7 Moisture Sensitivity Level Rating: Level 1
- 3.8 Product Assurance
ASJ resistors shall warranty 24 months from manufacturing date with control conditions.
- 3.9 ASJ resistors are RoHS-compliant in accordance to RoHS Directive.

THICK FILM CHIP RESISTOR ARRAY NETWORK

YCN Series

DS-ENG-014

Page: 4 of 16

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

| Type | Rated Power at 70°C | Max. Working Voltage | Max. Overload Voltage | T.C.R. (ppm/°C) | Resistance | Number of Terminals | Number of Resistors | JUMPER Rated Power | JUMPER Resistance Value |
|------------------------------------|---------------------|----------------------|-----------------------|-----------------|-------------|---------------------|---------------------|--------------------|-------------------------|
| | | | | | J(±5%) E-12 | | | | |
| YCN158R | $\frac{1}{16}$ W | 25V | 50V | ±200 | 47Ω~1MΩ | 10 | 8 | 1A | 50mΩ MAX. |
| YCN158T | $\frac{1}{16}$ W | 25V | 50V | ±200 | 33Ω~1MΩ | 10 | 8 | 1A | 50mΩ MAX. |
| Operating Temperature Range | | | | -55°C ~ +155°C | | | | | |

3.11 Rated Voltage

The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following.

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

E= Rated voltage (V)

P= power rating (W)

R= Nominal resistance(Ω)

4. MARKING ON PRODUCT

The nominal resistance shall be marked on the surface of each resistor.

| Part Number | Color | Marking on Product |
|-------------|-------|---|
| YCN158R | White | E-24 Series: 3 digits First two digits for significant figure and 3 rd digit for number of zeros. |
| YCN158T | White | |

4.1 Numeric Numbering

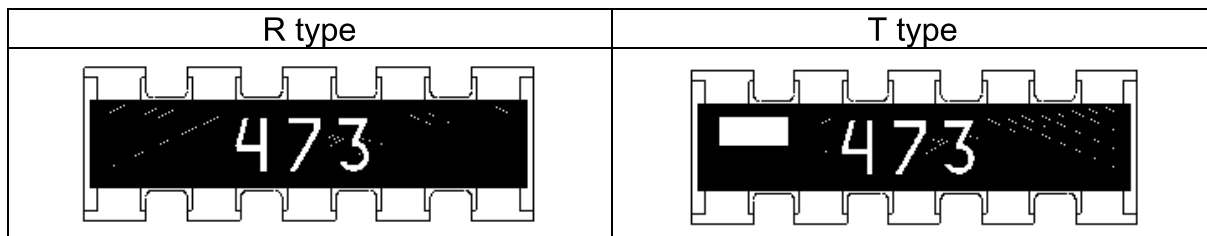
4.1.1 5% Tolerance: **Three Numerals Marking**

First 2 digits are significant figures, third digit is number of zeros. Letter R is decimal point.

Example

| Nominal Resistance | Marking | Remarks |
|--------------------|---------|----------------------------|
| 1 Ω | 1R0 | $1 \times 10^0 = 1$ |
| 10 Ω | 100 | $10 \times 10^0 = 10$ |
| 100 Ω | 101 | $10 \times 10^1 = 100$ |
| 4.7K Ω | 472 | $47 \times 10^2 = 4700$ |
| 47K Ω | 473 | $47 \times 10^3 = 47000$ |
| 470K Ω | 474 | $47 \times 10^4 = 470000$ |
| 4.7M Ω | 475 | $47 \times 10^5 = 4700000$ |

4.1.2 Chip Resistors Network Appearance:



THICK FILM CHIP RESISTOR ARRAY NETWORK

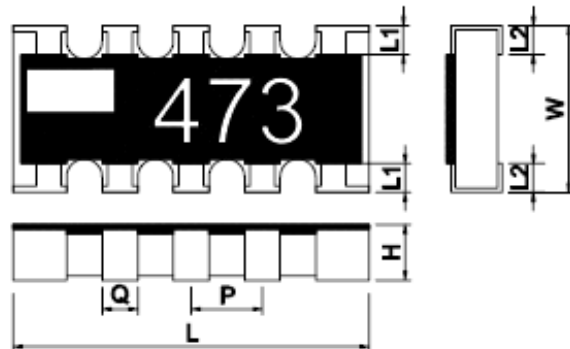
YCN Series

DS-ENG-014

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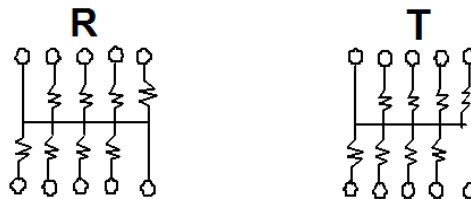
5. DIMENSION

5.1 Dimension



| Type | Dimensions | | | | | | |
|---------|----------------------|-----------|-------------|----------------|----------------|-----------|-----------|
| | Inches (Millimeters) | | | | | | |
| | L | W | H | L ₁ | L ₂ | P | Q |
| YCN158R | 3.20±0.20 | 1.60±0.15 | 0.55 ± 0.10 | 0.30±0.15 | 0.30±0.15 | 0.64±0.10 | 0.32±0.10 |
| YCN158T | | | | | | | |

5.2 Circuit diagram



5.3 Plating Thickness

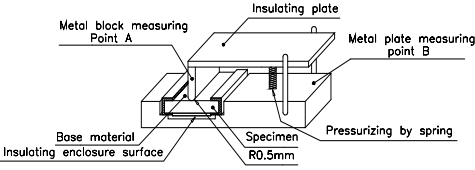
Ni : $\geq 2\mu\text{m}$

Sn (Lead Free): $\geq 3\mu\text{m}$

Sn (Tin): Matte Sn

6. RELIABILITY TEST

6.1 Electrical Performance Test

| Item | Conditions | Specifications |
|---------------------------------------|---|---------------------------------------|
| | | Resistors |
| Temperature Coefficient of Resistance | <p>Refer to JIS-C5201-1 4.8</p> $TCR(ppm/^{\circ}C) = \frac{(R2 - R1)}{R1(T2 - T1)} \times 10^6$ <p>R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2 :Temperature -55°C or +125°C</p> | Refer item 3.10 |
| Short Time Overload | <p>Refer to JIS-C5201-1 4.13</p> <p>Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3. general specifications)</p> | $\Delta R = \pm 2.0\%$ |
| Insulation Resistance | <p>Refer to JIS-C5201-1 4.6</p> <p>Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material.</p>  | $\geq 10^9 \Omega$ |
| Dielectric Withstand Voltage | <p>Refer to JIS-C5201-1 4.7</p> <p>Put the resistor in the fixture, add 300 VAC in +, - terminal for 60 sec.</p> | No short or burned on the appearance. |
| Intermittent Overload | <p>Refer to JIS-C5201-1 4.13</p> <p>Put the tested resistor in chamber under temperature $25 \pm 2^{\circ}C$ and load 2.5 times rated DC voltage for 1 sec on , 25 sec off , 10000_{-0}^{+400} test cycles, then it be left at no-load for 1 hour , then measure its resistance variance rate.</p> | $\Delta R = \pm 5.0\%$ |

6.2 Mechanical Performance Test

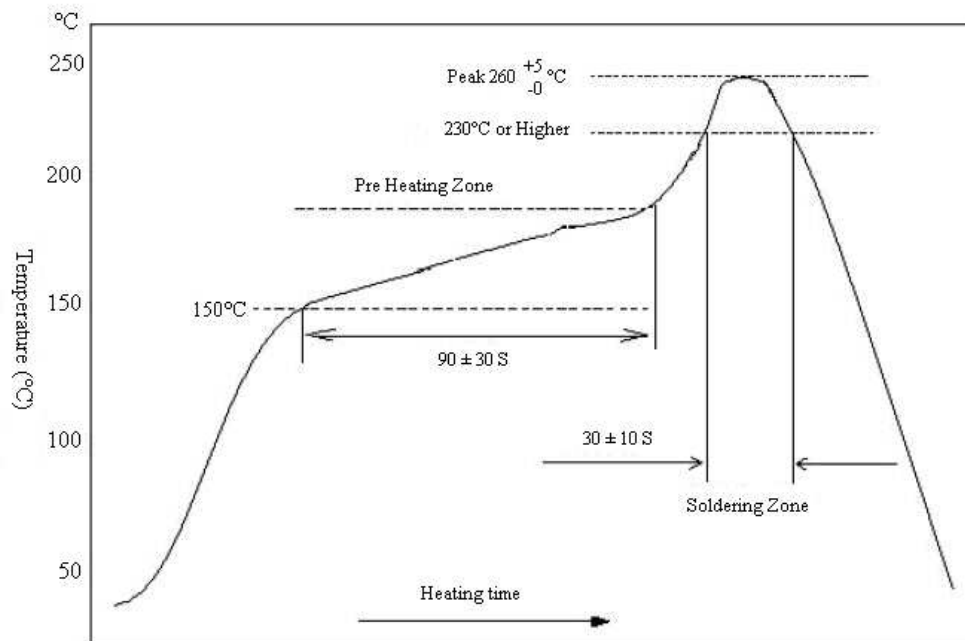
| Item | Conditions | Specifications |
|------------------------------|--|---|
| | | Resistors |
| Resistance to Solvent | <p>Refer to JIS-C5201-1 4.29</p> <p>The tested resistor be immersed into isopropyl alcohol of 20~25°C for 5 minutes, then the resistor is left in the room for 48 hrs, then measure its resistance variance rate.</p> | $\Delta R = \pm 0.5\%$ |
| Resistance to Soldering Heat | <p>Refer to JIS-C5201-1 4.18</p> <p>©Test method 1 (Solder pot test): The tested resistor be immersed into molten solder of $260 \pm 5^\circ\text{C}$ for 10 seconds. Then the resistor is left in the room for 1 hour.</p> <p>©Test method 2 (Solder pot test): The tested resistor be immersed into molten solder of $260 \pm 5^\circ\text{C}$ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area.</p> | <p>Test item 1: (1).Variance rate on resistance $\Delta R\% = \pm 1.0\%$</p> <p>Test item 2: (1).Solder coverage over 95%. (2).The underlying material (such as ceramic) shall not be visible at the crest corner area of the electrode.</p> |
| Solderability | <p>Refer to JIS-C5201-1 4.17</p> <p>Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105°C, humidity of 100% RH, and pressure of 1.22×10^5 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more.</p> <p>Test method: The tested resistor be immersed into solder pot in temperature $230 \pm 5^\circ\text{C}$ for 2 sec, then the resistor is left as placed under microscope to observed its solder area.</p> | Solder coverage over 95% |
| Joint Strength of Solder | <p>Refer to JIS-C5201-1 4.33</p> <p>©Bending Strength: Solder tested resistors on to PC board. add force in the middle down , and under load measure its resistance variance rate. D = 5 mm</p> | $\Delta R\% = \pm 1.0\%$ |

6.3 Environmental Test

| Item | Conditions | Specifications | | | | | | | | |
|----------------------------|--|------------------------|--|--------------------|----------------------------|---------------------|----------------------------|----------------------------|-----------------|------------------------|
| | | Resistors | | | | | | | | |
| Resistance to Dry Heat | <p>Refer to JIS-C5201-1 4.25</p> <p>Put tested resistors in chamber under temperature $155\pm 5^{\circ}\text{C}$ for $1,000\pm 4$ hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate.</p> | $\Delta R = \pm 2.0\%$ | | | | | | | | |
| Thermal Shock | <p>Refer to MIL-STD 202 Method 107</p> <p>Put the tested resistor in the thermal shock chamber under the temperature cycle which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hour, and measure its resistance variance rate.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th colspan="2">Testing Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>$-55\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Highest Temperature</td> <td>$125\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> | Testing Condition | | Lowest Temperature | $-55\pm 5^{\circ}\text{C}$ | Highest Temperature | $125\pm 5^{\circ}\text{C}$ | Temperature-retaining time | 15 minutes each | $\Delta R = \pm 1.0\%$ |
| Testing Condition | | | | | | | | | | |
| Lowest Temperature | $-55\pm 5^{\circ}\text{C}$ | | | | | | | | | |
| Highest Temperature | $125\pm 5^{\circ}\text{C}$ | | | | | | | | | |
| Temperature-retaining time | 15 minutes each | | | | | | | | | |
| Loading Life in Moisture | <p>Refer to JIS-C5201-1 4.24</p> <p>Put the tested resistor in the chamber under temperature $40\pm 2^{\circ}\text{C}$, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p> | $\Delta R = \pm 2.0\%$ | | | | | | | | |
| Load Life | <p>Refer to JIS-C5201-1 4.25</p> <p>Put the tested resistor in chamber under temperature $70\pm 2^{\circ}\text{C}$ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p> | $\Delta R = \pm 3.0\%$ | | | | | | | | |

6.4 Soldering Profile (Technical application notes : This is for recommendation, customer please perform adjustment according to the actual application)

6.4.1 Lead-Free IR Reflow Soldering Profile



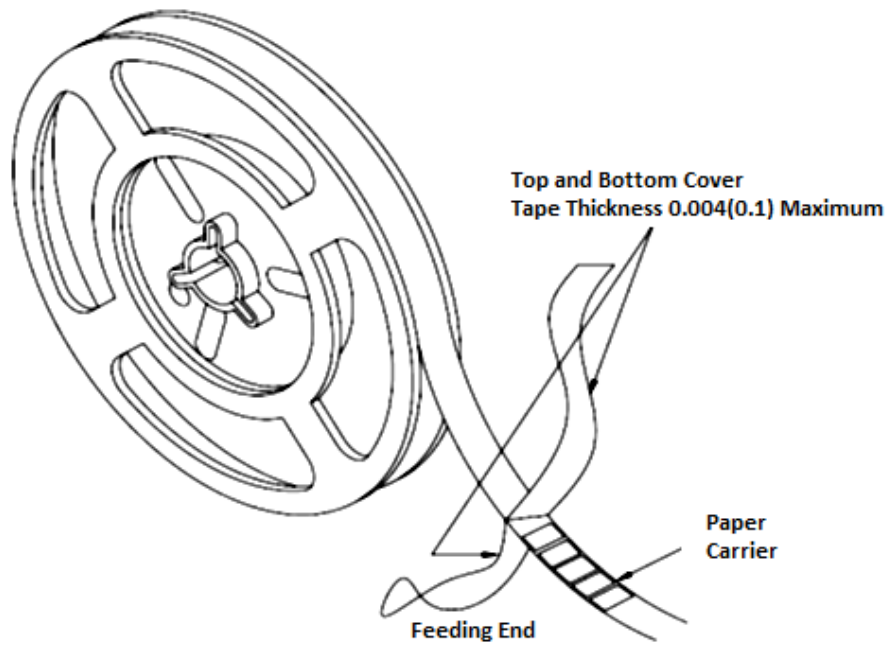
Remark: The peak temperature of soldering heat is 260⁺⁵₋₀ °C for 10 seconds.

6.4.2 Soldering Iron : temperature 350°C±10°C , dwell time shall be less than 3 sec

7. TAPING

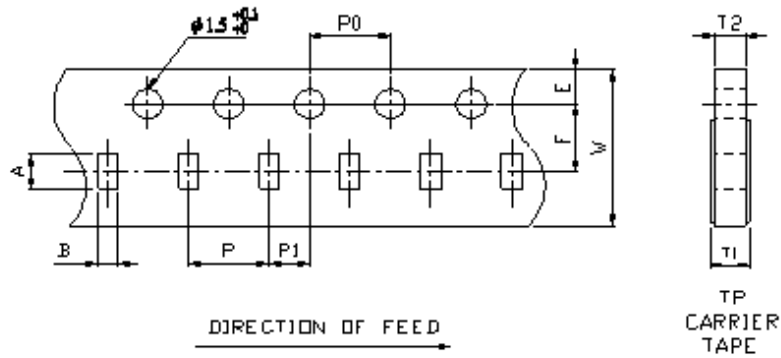
7.1 Structure of Taping

Paper Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System



Remark : Pitch tolerance over any 10 pitches of P_0 is ± 0.2 mm

| Packaging | Array/Network | Dimensions (mm) | | | | | | | | | | |
|-----------|--------------------|-----------------|-----------|-----------|-----------|-----------|-----------------------------------|-----------|-----------|-----------|------------|-----------|
| | Type | A | B | W | E | F | T1 | T2 | P | P0 | 10xP0 | P1 |
| | YCN158R YCN158T | 3.50±0.20 | 1.90±0.20 | 8.00±0.20 | 1.75±0.10 | 3.50±0.05 | 0.75 ^{+0.2} ₀ | 0.75±0.10 | 4.00±0.10 | 4.00±0.05 | 40.00±0.20 | 2.00±0.05 |

7.3 Packaging

7.3.1 Taping

Quantity – Tape and Reels

| Code | Quantity | Reel |
|--------------------|----------|------|
| YCN158R YCN158T | 5000 | 7" |
| | 10000 | 10" |
| | 20000 | 13" |

7.3.2 Identification

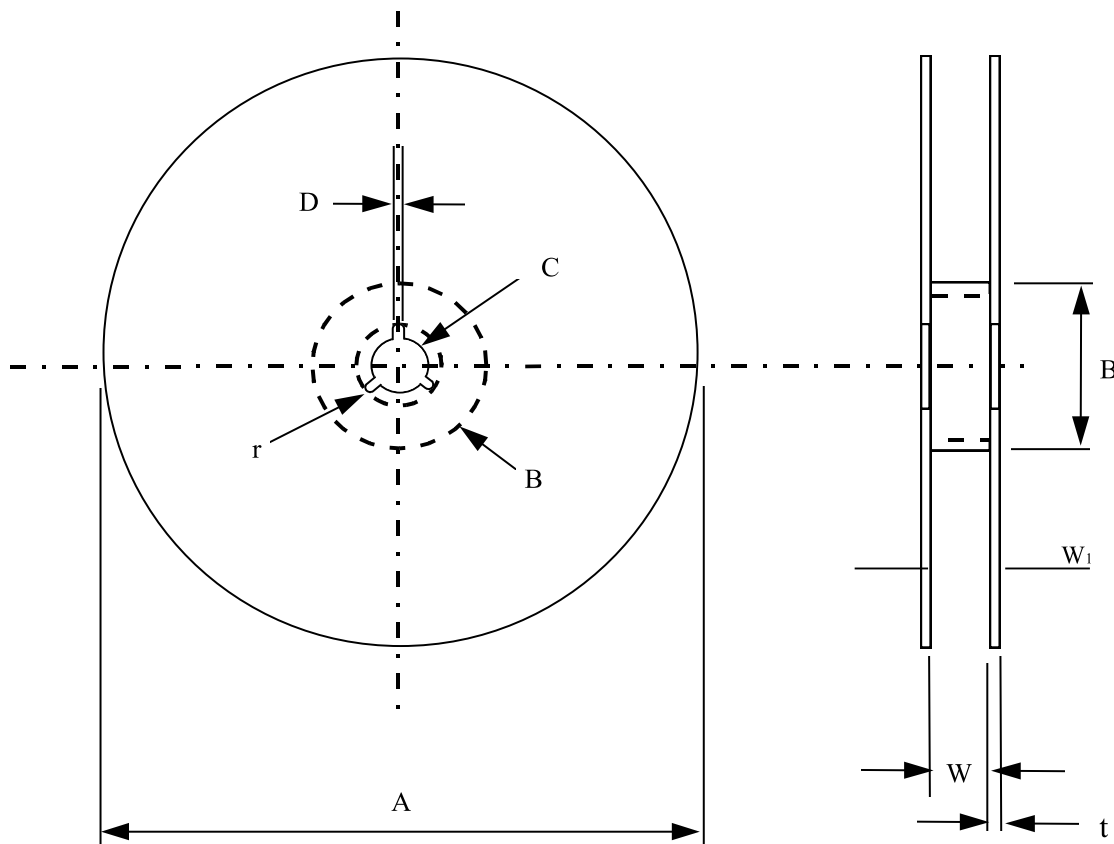
Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



7.3.3 Packaging Reel Box

| Dimension | Reel Box | Number of Reels |
|--------------------|----------|-----------------|
| 185 × 60 × 186 mm | 25K Box | 5 |
| 185 × 120 × 186 mm | 50K Box | 10 |

7.3.4 Reel Dimensions



| Model | A | B | C | D | W | W ₁ | t | r |
|--------------------------------------|--------------------|----------------------|----------------|--------------------|--------------|----------------|---------------|-----|
| 7" Reel (5K) (except 0402 10K) | $\phi 178 \pm 2.0$ | $\phi 80 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 0.1 | 14.4 max | 1.0 ± 0.1 | 1.0 |
| 7" Reel (4K) | $\phi 178 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 13 ± 1.0 | 14.4 max | 1.2 ± 0.1 | 1.0 |
| 10" Reel (10K) | $\phi 254 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 1.0 | 14.4 max | 1.5 ± 0.1 | 1.0 |
| 13" Reel (20K, 50K) | $\phi 330 \pm 2.0$ | $\phi 60 \text{min}$ | 13 ± 0.2 | $\phi 2.0 \pm 0.5$ | 11 ± 1.0 | 14.4 max | 2.1 ± 0.1 | - |
| 13" Reel (20K) | $\phi 330 \pm 1.0$ | $\phi 100 \pm 1$ | 13.5 ± 0.5 | $2 \sim 3 \pm 0.5$ | 10 ± 0.5 | - | - | - |

8. SURFACE MOUNT LAND PATTERNS DESIGN (FOR REFLOW SOLDERING)

When a component is soldered, the resistance after soldering changes slightly depending on the size of the soldering area and the amount of soldering. When designing a circuit, it is necessary to consider the effect of a decrease or increase in its resistance.

Unit : mm

| | DIM | A | B | C | D | P |
|--------------------|------|-----|-----|------|------|------|
| | TYPE | | | | | |
| YCN158R YCN158T | | 2.6 | 1.0 | 0.34 | 0.30 | 0.64 |

9. REVISION HISTORY

| REVISION | DATE | CHANGE NOTIFICATION | DESCRIPTION |
|-----------|------------|---------------------|--|
| Version.1 | 13.02.2015 | | Initial Release |
| Version.2 | 14.12.2018 | | Datasheet update |
| Version.3 | 15.08.2019 | | Update resistance range in clause 3.10 |
| Version.4 | 15.09.2020 | | Revise clause 3.5 |
| Version.5 | 15.09.2021 | | Revise clause 2 Part Numbering System |
| Version 6 | 15.09.2023 | | Revise clause 3.8 Product Assurance |