Towards Excellence in *Quality, Service & Innovation*

ASJ

DATA SHEET

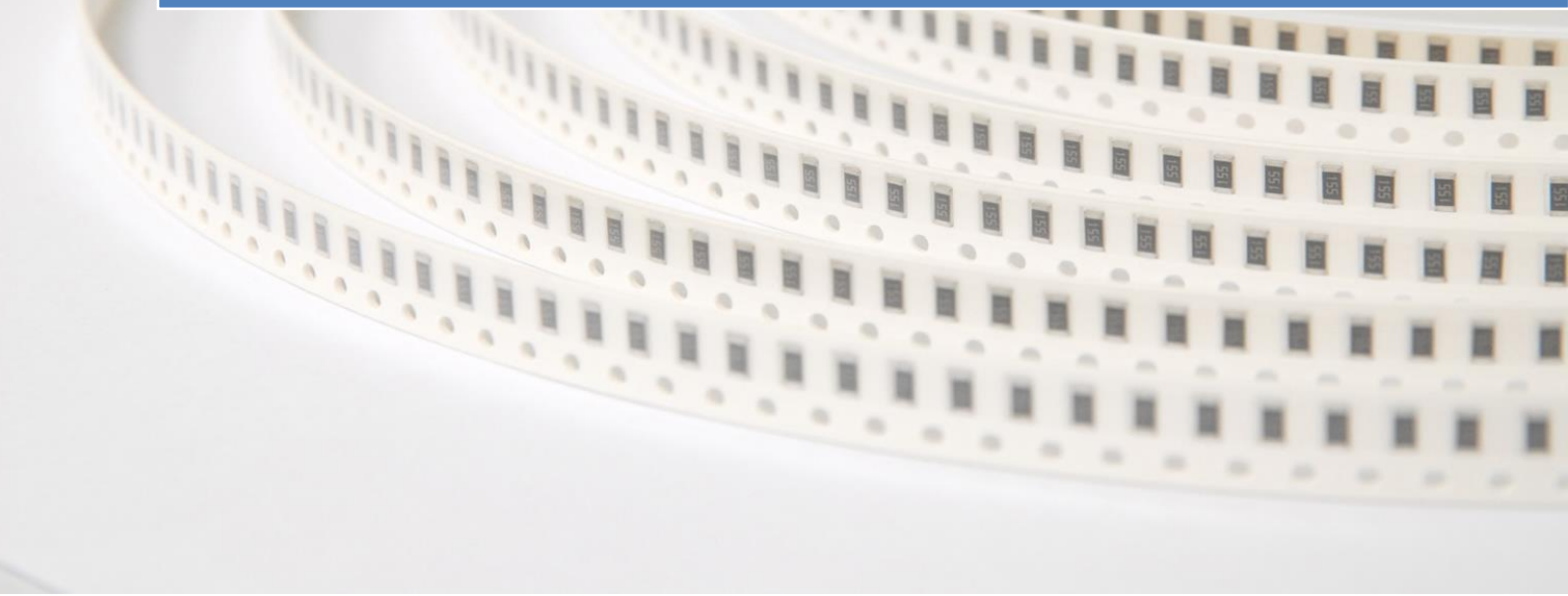
Thick Film Chip Resistor Array Network

YCN Series

5.0%, TCR ±200

SIZE: 158R/158T

RoHS-Compliant



Product Specification – September 15, 2023 V6

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 **For 3-digit only* *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℃	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.

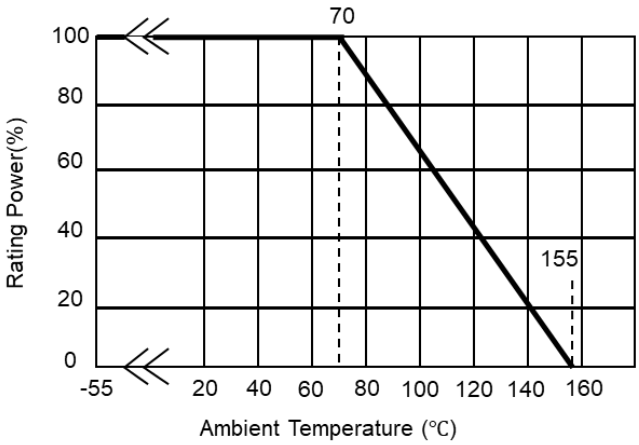


Fig.1 Power Derating Characteristics

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.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power at 70℃	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/℃)	Resistance J(±5%) E-12	Number of Terminals	Number of Resistors	JUMPER Rated Power	JUMPER Resistance Value
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℃ ~ +155℃					

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 3rd digit for number of zeros.
YCN158T	White	

4.1 Numeric Numbering

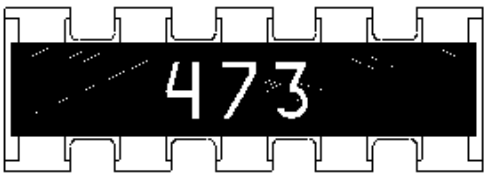
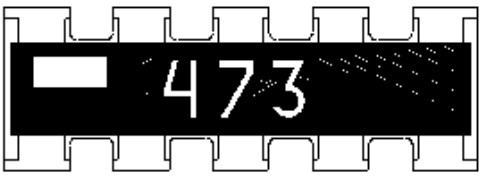
4.1.1 5% Tolerance: ***Three Numerals Marking***

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

Example

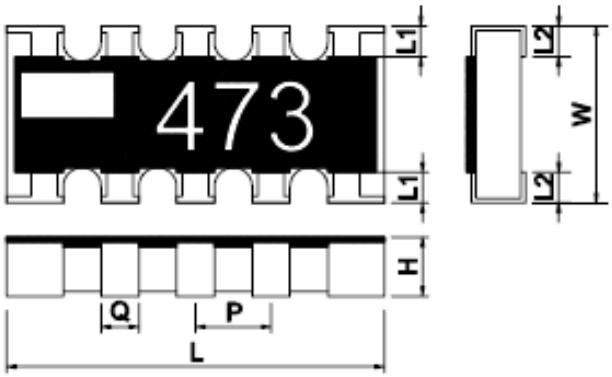
Nominal Resistance	***Marking***	***Remarks***
1 Ω	1R0	$1 \times 10^0 = 1$
10 Ω	100	$10 \times 10^0 = 1\ 0$
100 Ω	101	$10 \times 10^1 = 1\ 00$
4.7K Ω	472	$47 \times 10^2 = 47\ 00$
47K Ω	473	$47 \times 10^3 = 47\ 000$
470K Ω	474	$47 \times 10^4 = 47\ 0000$
4.7M Ω	475	$47 \times 10^5 = 47\ 00000$

4.1.2 Chip Resistors Network Appearance:

R type	T type
	

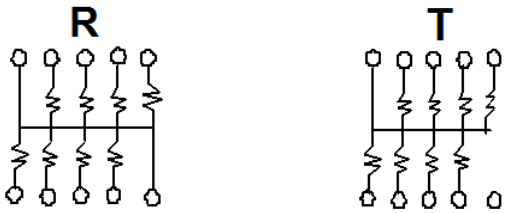
5. DIMENSION

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

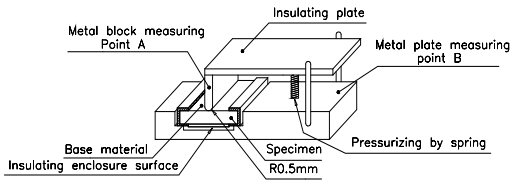


5.3 Plating Thickness

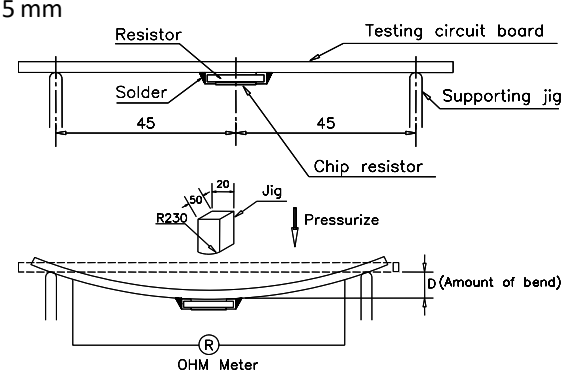
Ni : ≧2μm
Sn (Lead Free): ≧3μm
Sn (Tin): Matte Sn

6. RELIABILITY TEST

6.1 Electrical Performance Test

Item	Conditions	Specifications Resistors
Temperature Coefficient of Resistance	***Refer to JIS-C5201-1 4.8*** $TCR(ppm/^{\circ}C) = \frac{(R2-R1)}{R1(T2-T1)} x10^6$ R1: Resistance at room temperature R2: Resistance at -55℃ or +125℃ T1: Room temperature T2 :Temperature -55℃ or +125℃	Refer item 3.10
Short Time Overload	***Refer to JIS-C5201-1 4.13*** 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)	△R=±2.0%
Insulation Resistance	***Refer to JIS-C5201-1 4.6*** 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.  	≧$10^9\Omega$
Dielectric Withstand Voltage	***Refer to JIS-C5201-1 4.7*** Put the resistor in the fixture, add 300 VAC in +,- terminal for 60 sec.	No short or burned on the appearance.
Intermittent Overload	***Refer to JIS-C5201-1 4.13*** Put the tested resistor in chamber under temperature 25±2℃ and load 2.5 times rated DC voltage for 1 sec on , 25 sec off , 10000^{+400}_{-0} test cycles, then it be left at no-load for 1 hour , then measure its resistance variance rate.	△R=±5.0%

6.2 Mechanical Performance Test

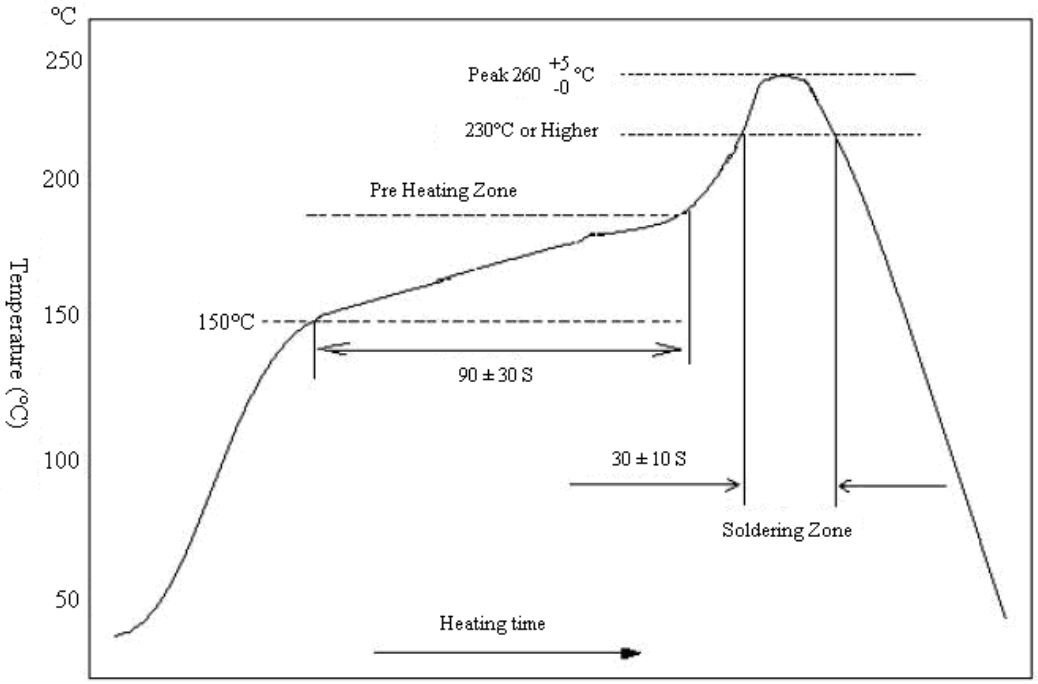
Item	Conditions	Specifications Resistors
Resistance to Solvent	***Refer to JIS-C5201-1 4.29*** The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 5 minutes, then the resistor is left in the room for 48 hrs, then measure its resistance variance rate.	△R=±0.5%
Resistance to Soldering Heat	***Refer to JIS-C5201-1 4.18*** ◎Test method 1 (Solder pot test): The tested resistor be immersed into molten solder of 260^{+5}_{-0} ℃ for 10 seconds. Then the resistor is left in the room for 1 hour. ◎Test method 2 (Solder pot test): The tested resistor be immersed into molten solder of 260^{+5}_{-0} ℃ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area.	Test item 1: (1).Variance rate on resistance △R%=±1.0% 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.
Solderability	***Refer to JIS-C5201-1 4.17*** Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105℃, 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. Test method: The tested resistor be immersed into solder pot in temperature 230±5℃ for 2 sec, then the resistor is left as placed under microscope to observed its solder area.	Solder coverage over 95%
Joint Strength of Solder	***Refer to JIS-C5201-1 4.33*** ◎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  	△R%=±1.0%

6.3 Environmental Test

Item	Conditions	Specifications Resistors
Resistance to Dry Heat	***Refer to JIS-C5201-1 4.25*** Put tested resistors in chamber under temperature 155±5℃ for 1,000±4 hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate.	△R=±2.0%
Thermal Shock	***Refer to MIL-STD 202 Method 107*** 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. Testing Condition Lowest Temperature: -55±5℃ Highest Temperature: 125±5℃ Temperature-retaining time: 15 minutes each	△R=±1.0%
Loading Life in Moisture	***Refer to JIS-C5201-1 4.24*** Put the tested resistor in the chamber under temperature 40±2℃, 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.	△R=±2.0%
Load Life	***Refer to JIS-C5201-1 4.25*** Put the tested resistor in chamber under temperature 70±2℃ 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.	△R=±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



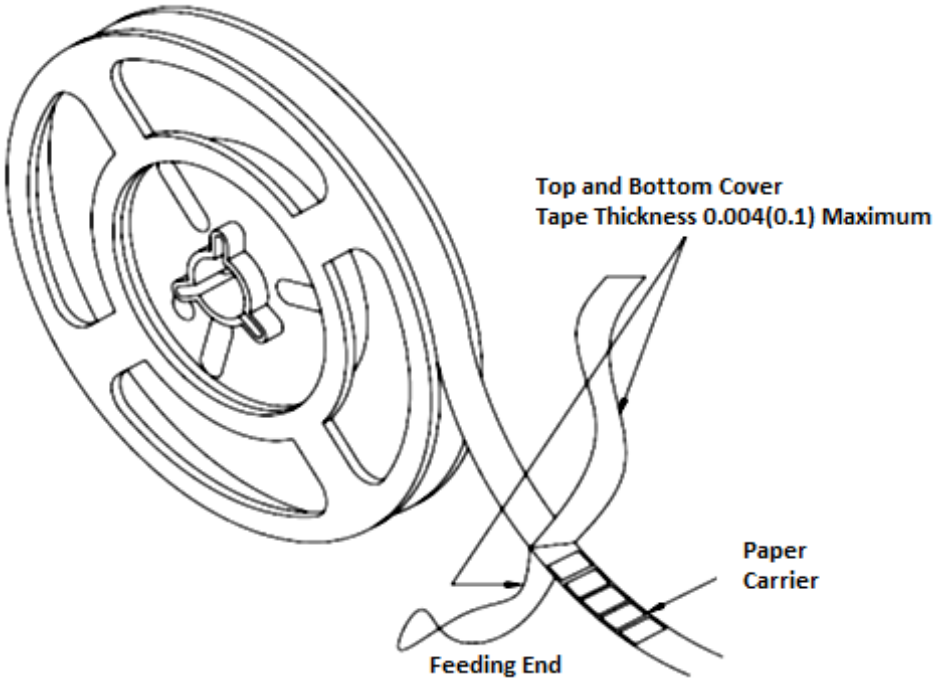
Remark: The peak temperature of soldering heat is 260^{+5}_{-0} ℃ for 10 seconds.

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

7. TAPING

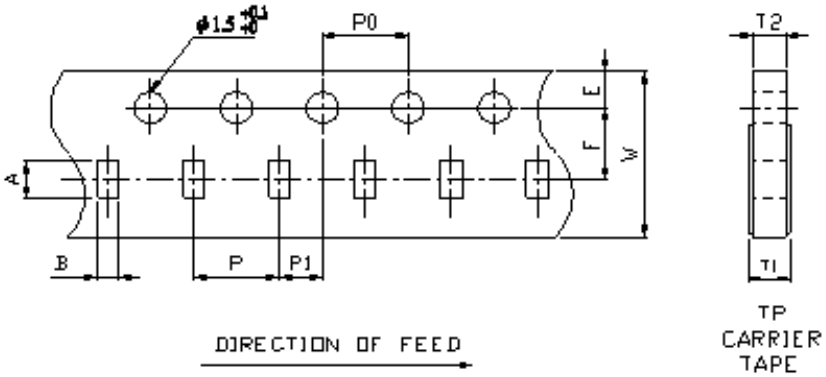
7.1 Structure of Taping

Paper Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System



Remark : Pitch tolerance over any 10 pitches of Po 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

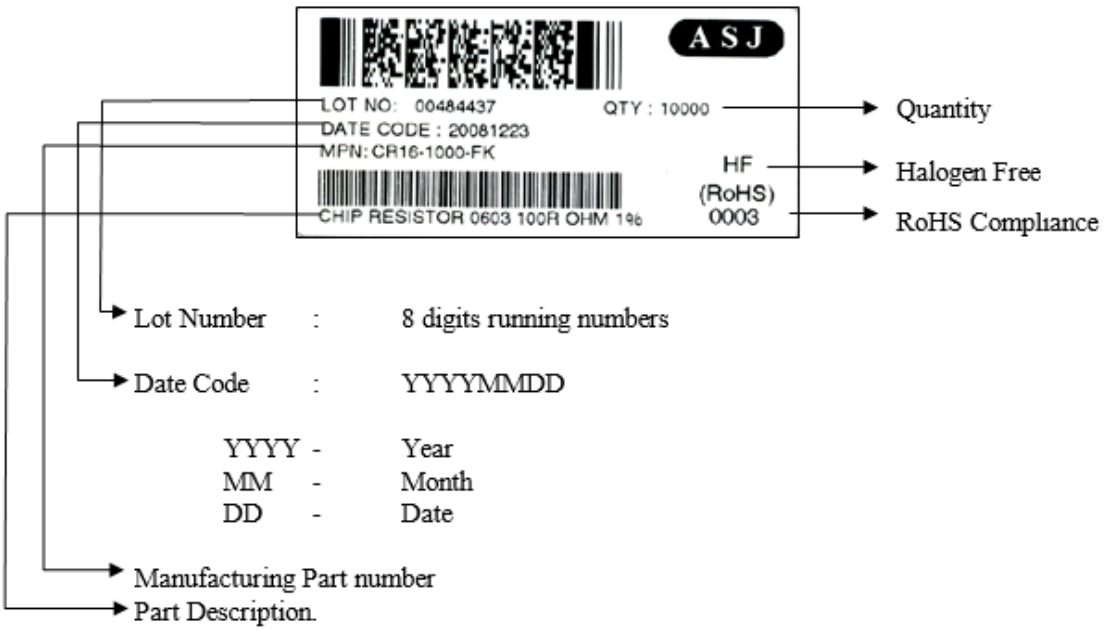
7.3.1 Taping

Quantity – Tape and Reels

Code	Quantity	Reel
YCN158R YCN158T	5000	7”
	10000	10”
	20000	13”

7.3.2 Identification

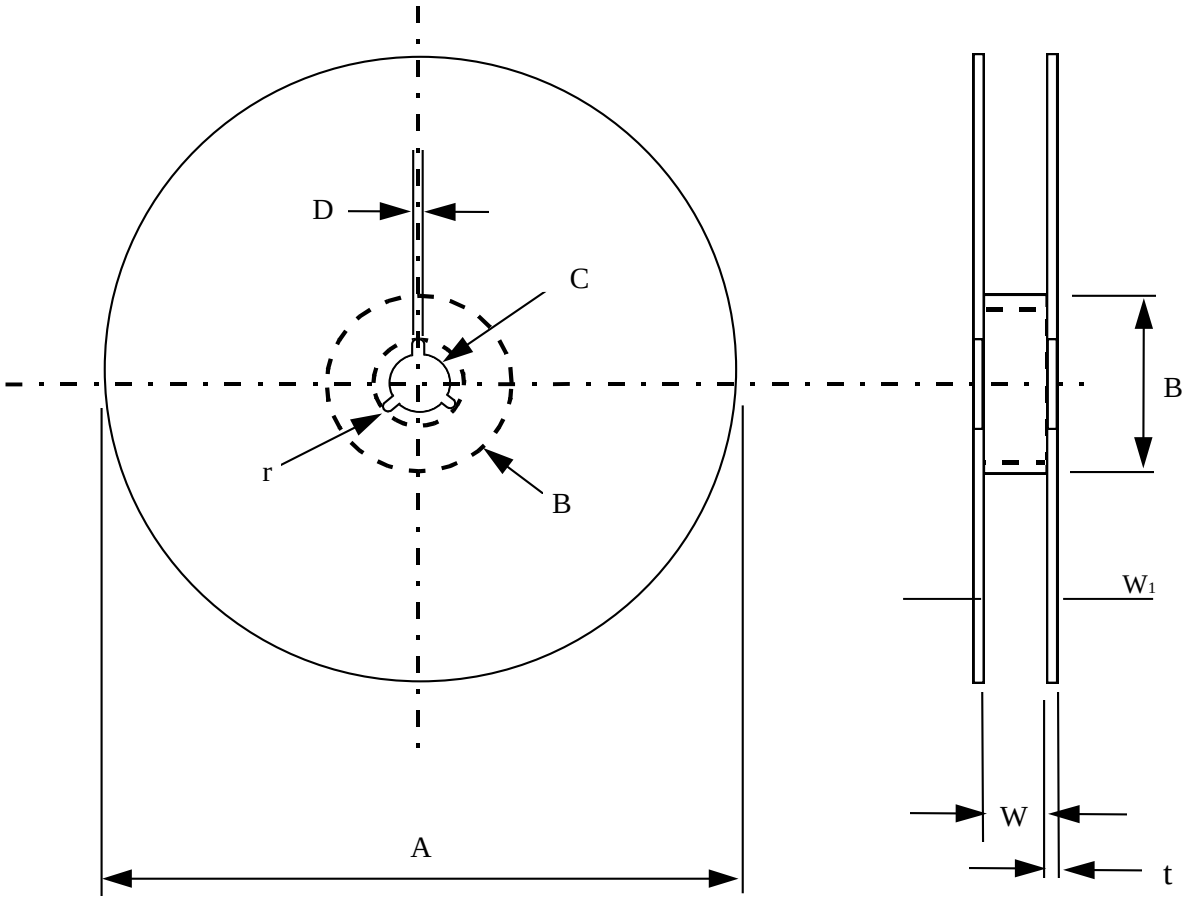
Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



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

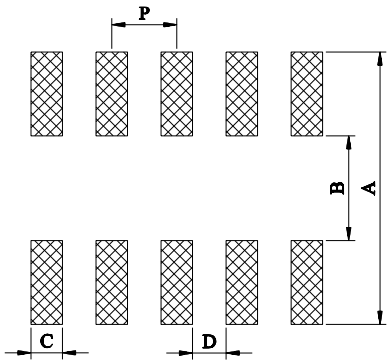


Model	A	B	C	D	W	W_1	t	r
7"Reel (5K) (except 0402 10K)	ϕ178±2.0	ϕ80min	13± 0.2	ϕ2.0± 0.5	11± 0.1	14.4 max	1.0± 0.1	1.0
7"Reel (4K)	ϕ178±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	13±1.0	14.4 max	1.2± 0.1	1.0
10"Reel (10K)	ϕ254±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	1.5± 0.1	1.0
13"Reel (20K, 50K)	ϕ330±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	2.1± 0.1	-
13"Reel (20K)	ϕ330±1.0	ϕ100±1	13.5±0.5	2~3±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



TYPE \ DIM	A	B	C	D	P
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

ASJ

DATA SHEET

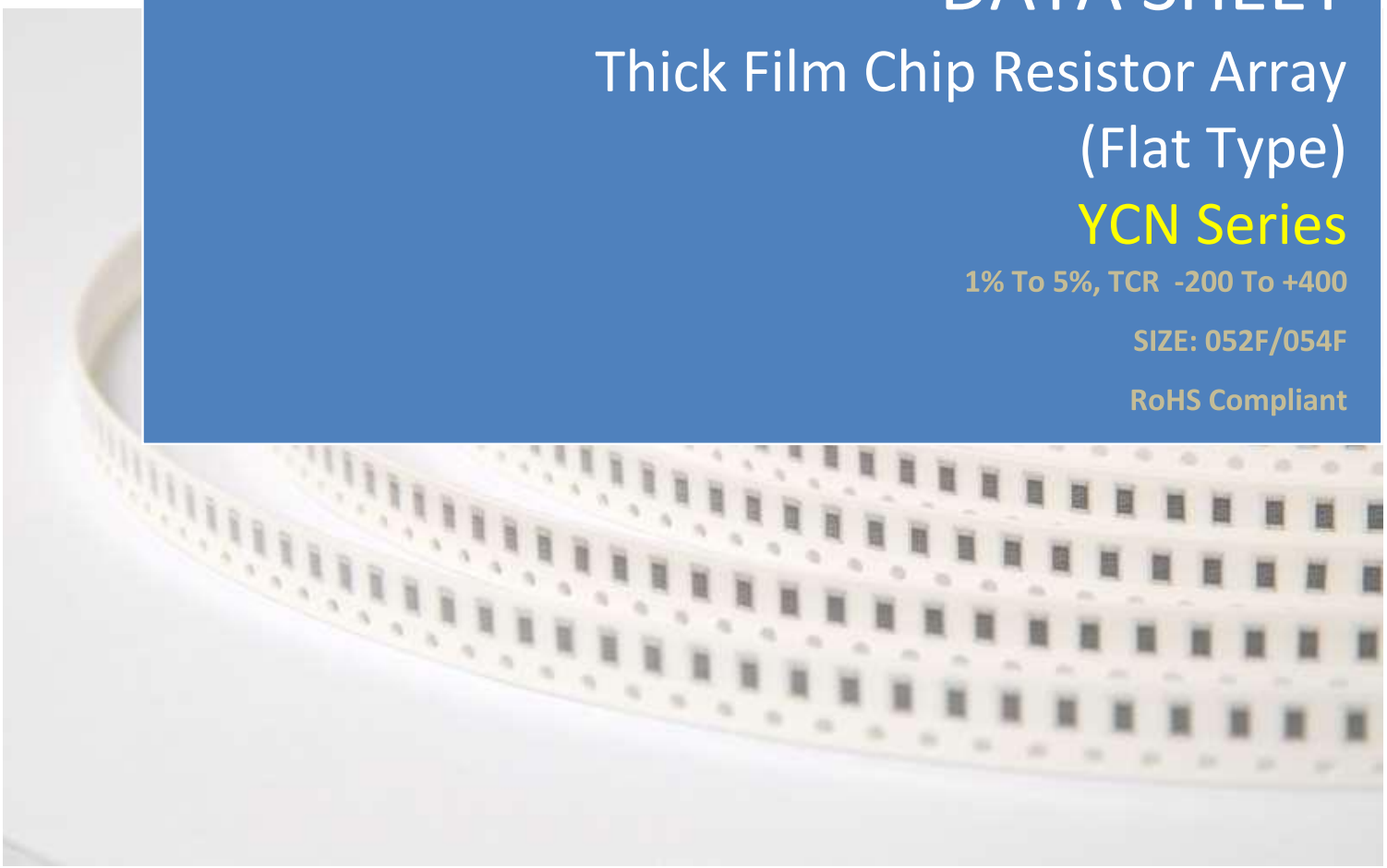
Thick Film Chip Resistor Array (Flat Type)

YCN Series

1% To 5%, TCR -200 To +400

SIZE: 052F/054F

RoHS Compliant



1. SCOPE

1.1 This specification is applicable to Lead-free and Halogen-free of RoHS Directive for YCN series flat 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	052	F	-	XXXX			-	J	K
Type	Size (Configuration)	Terminal Type		Nominal Resistance				Resistance Tolerance	Packaging
Thick Film Chip Resistor Array	052-0201 x 2 054-0201 x 4	F-Flat Type		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101 JUMPER=000		F=±1% J=±5%	K=10,000 pcs Lead Free Y=20,000 pcs Lead Free N=50,000 pcs Lead Free
					4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002 JUMPER=0000			

3. RATING

3.1 Rated Power

3.1.1 Resistor Rated Power

Type	Rated Power at 70℃	Max. Working Voltage	Max. Overload Voltage	JUMPER Rated Current	JUMPER Resistance Value
YCN052F (0201x2)	$\frac{1}{32}$ W	12.5V	25V	0.5A	50mΩ MAX.
YCN054F (0201x4)	$\frac{1}{32}$ W	12.5V	25V	0.5A	50mΩ MAX..

3.2 Power Derating Characteristics

Temperature Range： - 55 ~+155 ℃

For resistors operated in ambient temperatures 70°C, power rating shell be derated in accordance with the Fig. 1 curve below:

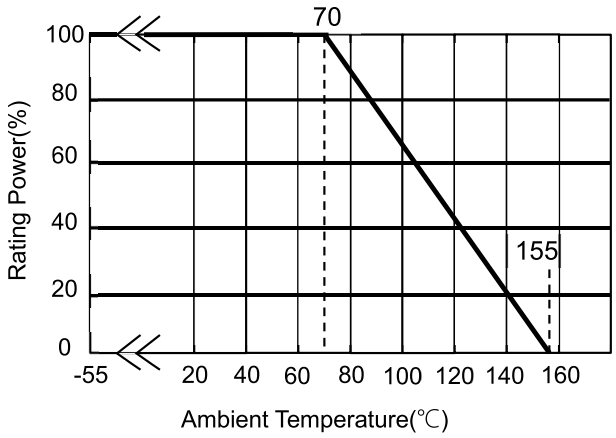


Fig.1 Power Derating Characteristics

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

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.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power at 70℃	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/°C)	Resistance Range F(±1%) J(±5%)	Number of Terminals	Number Of Resistors	JUMPER Rated Current	JUMPER Resistance Value
YCN052F (0201x2)	$\frac{1}{32}$ W	12.5V	25V	+400/-200	10Ω≦R≦100Ω	4	2	0.5A	50mΩ MAX.
				±250	100Ω＜R≦1MΩ				
YCN054F (0201x4)	$\frac{1}{32}$ W	12.5V	25V	+400/-200	10Ω≦R≦100Ω	8	4	0.5A	50mΩ MAX..
				±250	100Ω＜R≦1MΩ				
Operating Temperature Range				−55℃ ~ +155℃					

3.11 Rated Voltage

Resistance Range: ≧ 1Ω

Rated Voltage: The resistor shall have a DC continuous working voltage or an rms. AC Continuous working voltage at commercial-line frequency and waveform 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)

Resistance Range: (0 Ω)

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

$$I = \sqrt{P/R}$$

I= Rated current (A)
P= Power rating (w)
R= Nominal resistance(Ω)

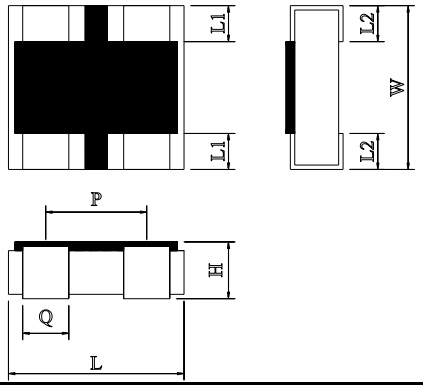
4. MARKING

- YCN052F/YCN054F No marking

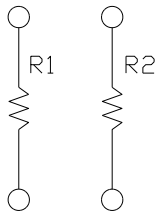
5. DIMENSION

5.1 Dimension

YCN052F

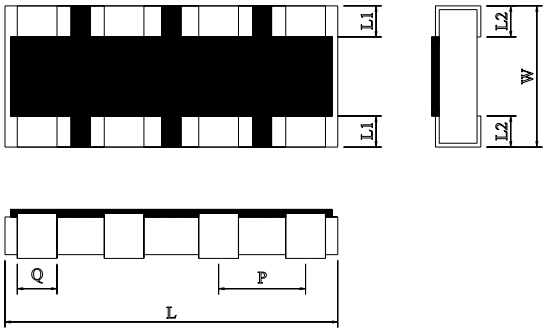


Circuits

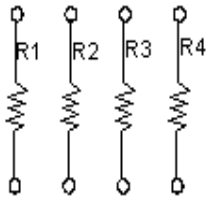


R1=R2

YCN054F



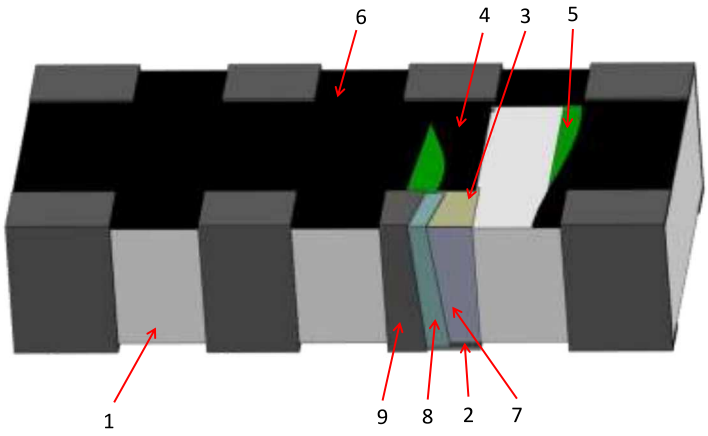
Circuits



R1=R2=R3=R4

Type	Dimensions (mm)						
	L	W	H	L1	L2	P	Q
YCN052F (0201x2)	0.80±0.05	0.60±0.05	0.23±0.10	$0.20^{+0.05}_{-0.10}$	$0.10^{+0.10}_{-0.05}$	0.50±0.05	0.20±0.10
YCN054F (0201x4)	1.40±0.05	0.60±0.05	0.23±0.10	$0.20^{+0.05}_{-0.10}$	$0.10^{+0.10}_{-0.05}$	0.40±0.05	0.20±0.10

5.2 Structure Graph



1	Ceramic substrate	6	2nd Protective coating
2	Bottom inner electrode	7	Terminal inner electrode
3	Top inner electrode	8	Ni plating
4	Resistive layer	9	Sn plating
5	1st Protective coating		

5.3 Plating Thickness

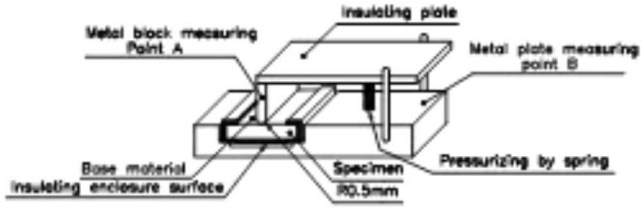
Ni：≧ 2 μm

Sn (Tin)：≧ 3 μm

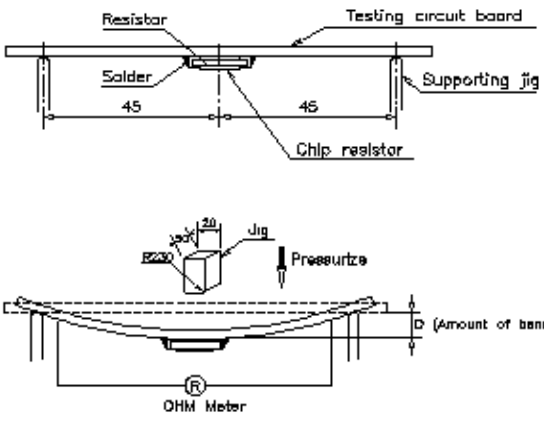
Sn (Tin)：Matte Sn

6. RELIABILITY TEST

6.1 Electrical Performance Test

Item	Conditions	Specifications	
		Resistors	Jumper
Temperature Coefficient of Resistance	***Refer to JIS-C5201-1 4.8*** $TCR(ppm/^{\circ}C) = \frac{(R2-R1)}{R1(T2-T1)} x10^6$ R1: Resistance at room temperature R2: Resistance at -55℃ or +125℃ T1: Room temperature T2: Temperature -55℃ or +125℃	Refer item 3.10	NA
Short Time Overload	***Refer to JIS-C5201-1 4.13*** 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)	△R=±2.0%	Refer to item 3.10
Insulation Resistance	***Refer to JIS-C5201-1 4.6*** 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. 	≧10^9Ω	
Dielectric Withstand Voltage	***Refer to JIS-C5201-1 4.7*** Put the resistor in the fixture, add 300 VAC in +,- terminal for 60 sec.	No short or burned on the appearance.	

6.2 Mechanical Performance Test

Item	Conditions	Specifications	
		Resistors	Jumper
Resistance to Solvent	***Refer to JIS-C5201-1 4.29*** The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 5 minutes, then the resistor is left in the room for 48 hr , then measure its resistance variance rate.	△R=±1.0%	Refer to item 3.10
Solderability	***Refer to JIS-C5201-1 4.17*** The resistor be immersed into solder pot in temperature 235±5℃ for 2 sec, then the resistor is left as placed under microscope to observed its solder area.	Solder coverage over 95%	
Resistance to Soldering Heat	***Refer to JIS-C5201-1 4.18*** ◎Test method 1 (solder pot test): The tested resistor be immersed into molten solder of 260^{+5}_{-0} ℃ for 10 seconds. Then the resistor is left in the room for 1 hour. ◎Test method 2 (solder pot test): The tested resistor be immersed into molten solder of 260^{+5}_{-0} ℃ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area.	Test item 1: (1).Variance rate on resistance △R%=±1.0% 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.	Refer to item 3.10
Joint Strength of Solder	***Refer to JIS-C5201-1 4.33*** ◎Bending Strength: Solder tested resistor on the PC board, add force in the middle down, and under load measure its resistance variance rate. D=3mm 	△R%=±1.0% .	Refer to item 3.10

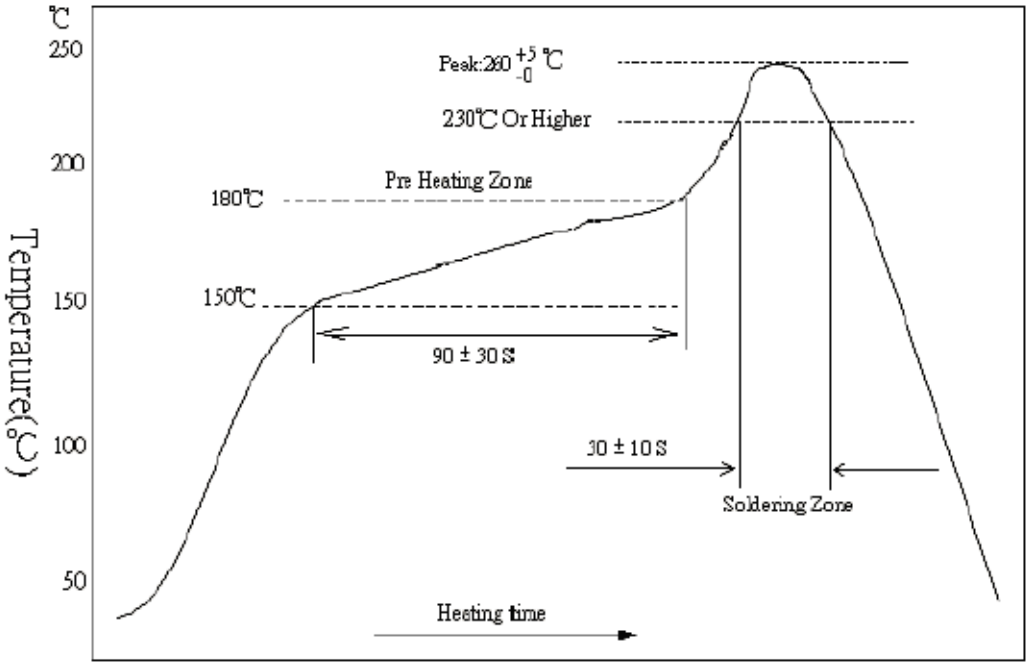
6.3 Environmental Performance

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Conditions</th><th colspan="2">Specifications</th></tr>
<tr><th>Resistors</th><th>Jumper</th></tr>
<tr><td>Resistance to Dry Heat</td><td>Refer to JIS-C5201-1 4.25
Put tested resistors in chamber under temperature 155±5℃ for 1,000±4 hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate.</td><td>△R=±1.0%</td><td>Refer to item 3.10</td></tr>
<tr><td>Thermal Shock</td><td>Refer to MIL-STD 202 Method 107
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>
<tr><th colspan="2">Testing Condition</th></tr>
<tr><td>Lowest Temperature</td><td>-55±5℃</td></tr>
<tr><td>Highest Temperature</td><td>125±5℃</td></tr>
<tr><td>Temperature-retaining time</td><td>15 minutes each</td></tr>
</table></td><td>△R=±1.0%</td><td>Refer to item 3.10</td></tr>
<tr><td>Loading Life in Moisture</td><td>Refer to JIS-C5201-1 4.24
Put the tested resistor in the chamber under temperature 40±2℃, 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.</td><td>△R=±3.0%</td><td>Refer to item 3.10</td></tr>
<tr><td>Load Life</td><td>Refer to JIS-C5201-1 4.25
Put the tested resistor in chamber under temperature 70±2℃ 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.</td><td>△R=±3.0%</td><td>Refer to item 3.10</td></tr>
</table>

6.4 Soldering Profile

Technical application notes: This is for recommendation, customer please perform adjustment according to actual application.

6.4.1 Lead-Free Reflow Soldering Profile



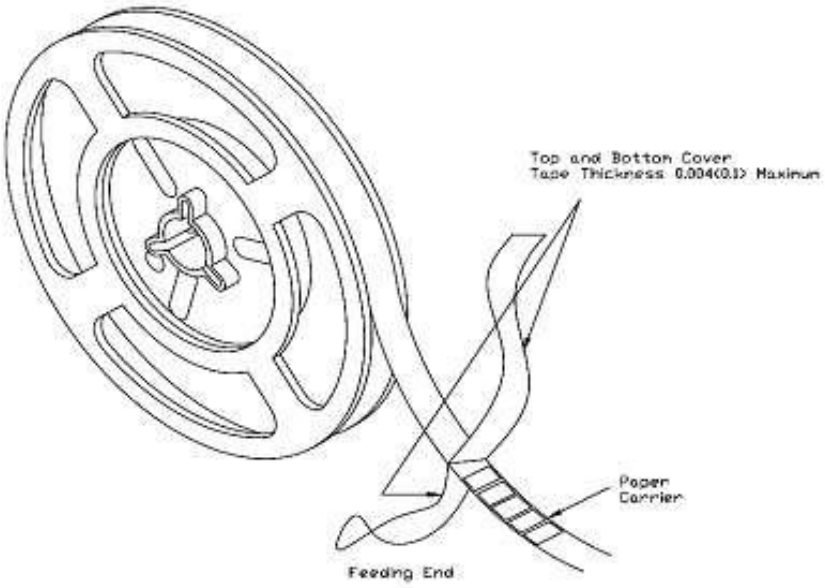
Remark: The peak temperature of soldering heat is 260^{+5}_{-0} ˚C for 10 seconds.

6.4.2 Soldering Iron: Temperature 350ºC±10ºC, dwell time shall be less than 3 sec.

7. TAPING

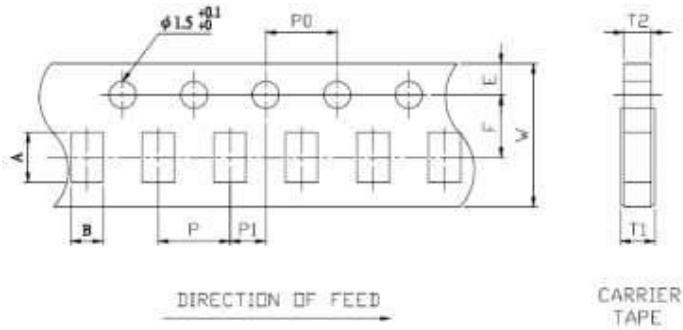
7.1 Structure of Taping

Paper Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System



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

Array/Network	Dimensions (mm)										
Type	**A**	**B**	**W**	**E**	**F**	**T1**	**T2**	**P**	**P0**	**10xP0**	**P1**
YCN052F	0.90±0.10	0.70±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.40±0.05	0.30±0.05	2.00±0.10	4.00±0.05	40.00±0.20	2.00±0.05
YCN054F	1.60±0.10	0.75±0.05	8.00±0.20	1.75±0.10	3.50±0.05	0.40±0.05	0.30±0.05	2.00±0.10	4.00±0.05	40.00±0.20	2.00±0.05

7.3 Packaging

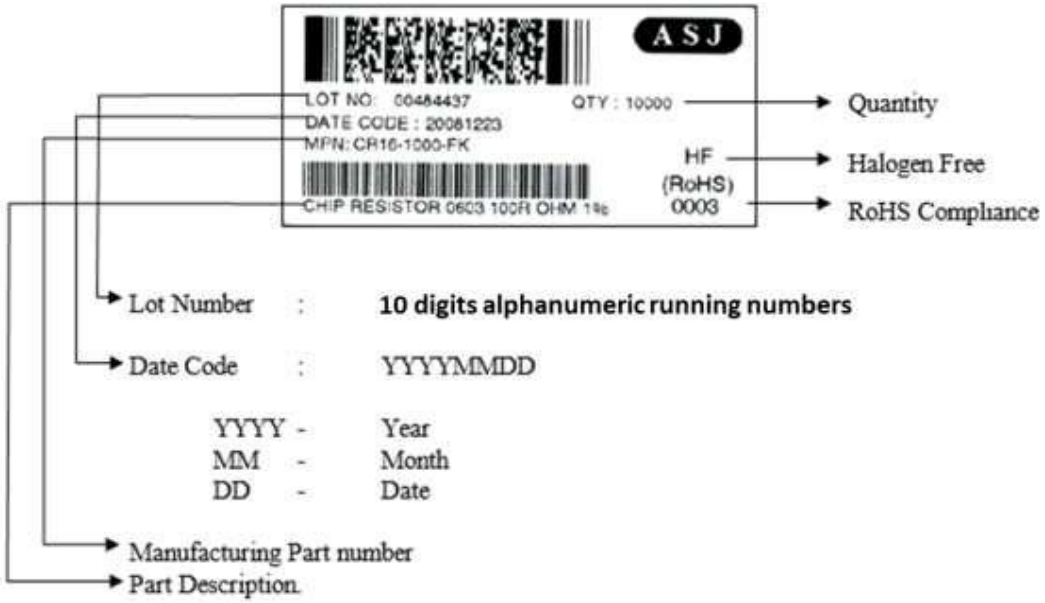
7.3.1 Taping

Quantity – Tape and Reels

Array & Networks	
Reels	Component / Reel
	Paper Carrier
	(2mm Pitch)
7"	10,000
10"	20,000
13”	50,000

7.3.2 Identification

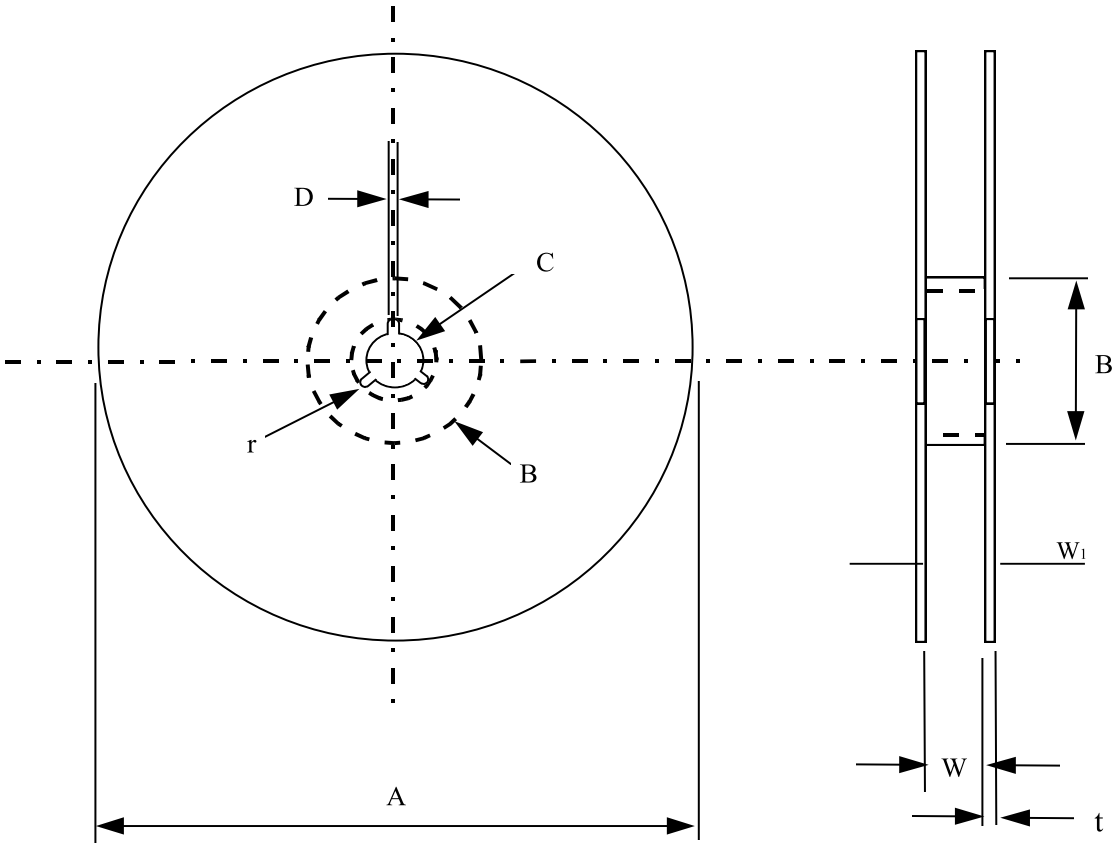
Production label that indicates the 10 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



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

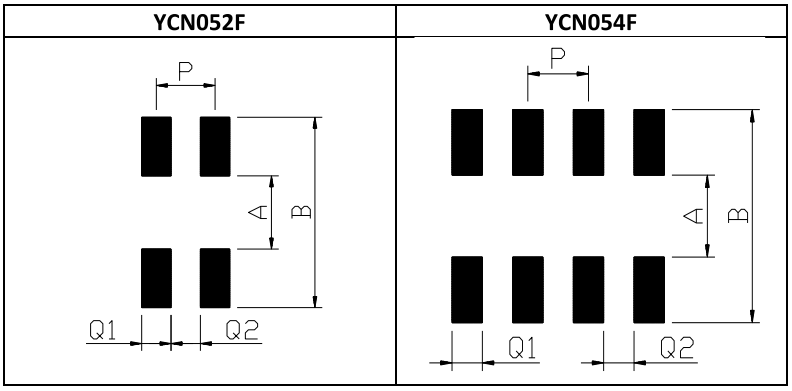
7.3.4 Reel Dimensions



Model	A	B	C	D	W	W_1	t	r
7"Reel (5K) (except 0402 10K)	ϕ178±2.0	ϕ80min	13± 0.2	ϕ2.0± 0.5	11± 0.1	14.4 max	1.0± 0.1	1.0
10"Reel (10K)	ϕ254±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	1.5± 0.1	1.0
13"Reel (20K, 50K)	ϕ330±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	2.1± 0.1	-
13"Reel (20K)	ϕ330±1.0	ϕ100±1	13.5±0.5	2~3±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.



Product (Type)	Dimensions - mm				
	A	B	P	Q1	Q2
YCN052F (0201x2)	0.30	0.90	0.50	0.30	0.20
YCN054F (0201x4)	0.30	0.90	0.40	0.20	0.20

9. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	14.12.2018		Initial Release
Version 2	16.11.2023		Revise clause 3.8 Product Assurance Revise clause 7.3.2 Identification

ASJ

DATA SHEET

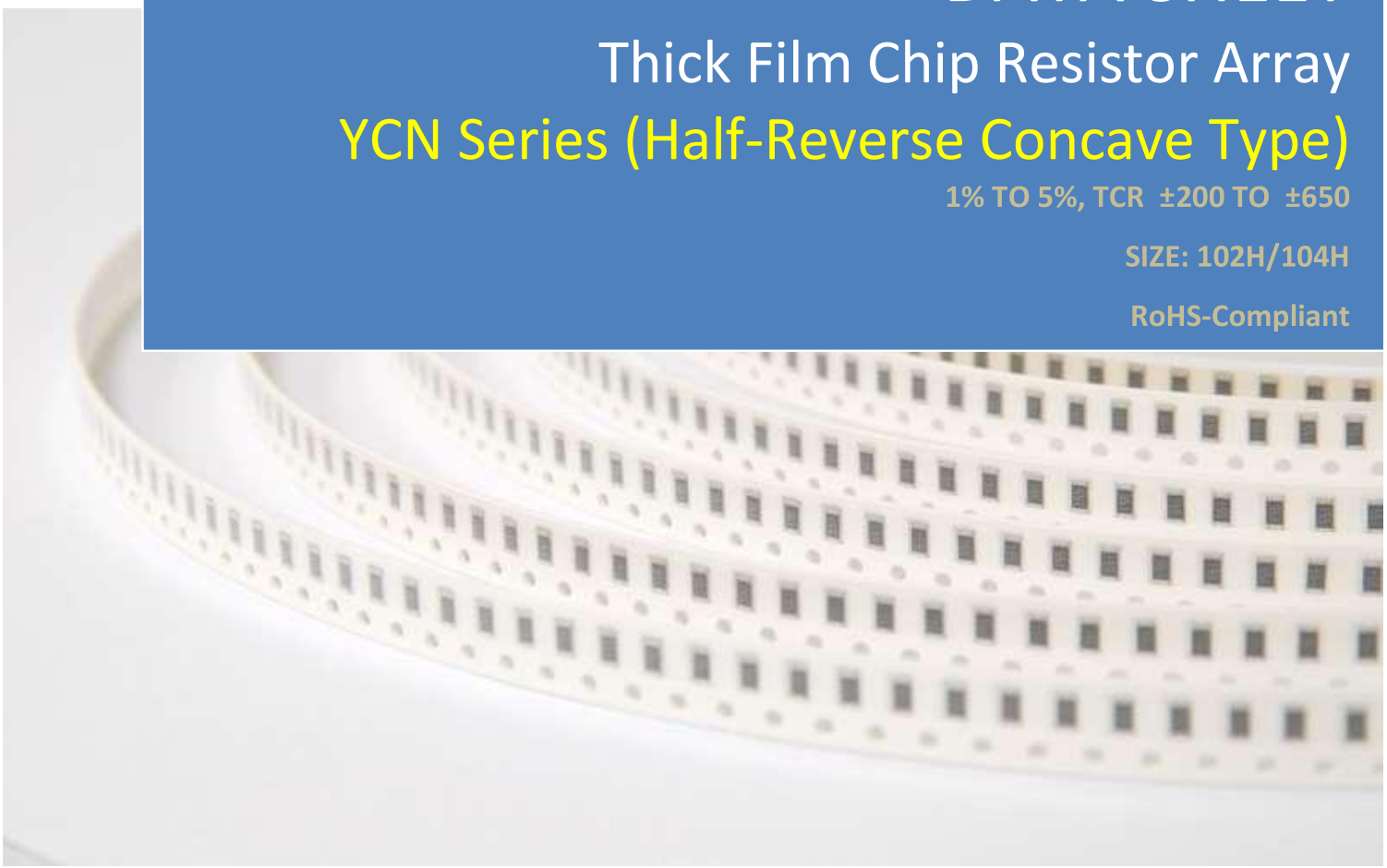
Thick Film Chip Resistor Array

YCN Series (Half-Reverse Concave Type)

1% TO 5%, TCR ±200 TO ±650

SIZE: 102H/104H

RoHS-Compliant



1. SCOPE

1.1 This specification is applicable to Lead-free and Halogen-free of RoHS Directive for YCN series half-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	H	-	XXX		-	J	K
Type	Size (Inch/mm)	Terminal Type		Nominal Resistance			Resistance Tolerance	Packaging
Thick Film Chip Resistors Array	102 - 0402 x 2 104 - 0402 x 4	H:- Half 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℃	Max. Working Voltage	Max. Overload Voltage	JUMPER Rated Current	JUMPER Resistance Value
YCN102H (0402x2)	$\frac{1}{16}$ W	25V	50V	1A	50mΩ MAX.
YCN104H (0402x4)	$\frac{1}{16}$ W	25V	50V	1A	50mΩ MAX..

3.2 Power Derating Characteristics

Temperature Range： - 55 ~+155 ℃

For resistors operated in ambient temperatures 70°C, power rating shell be derated in accordance with the curve below:

curve in Fig. 1.

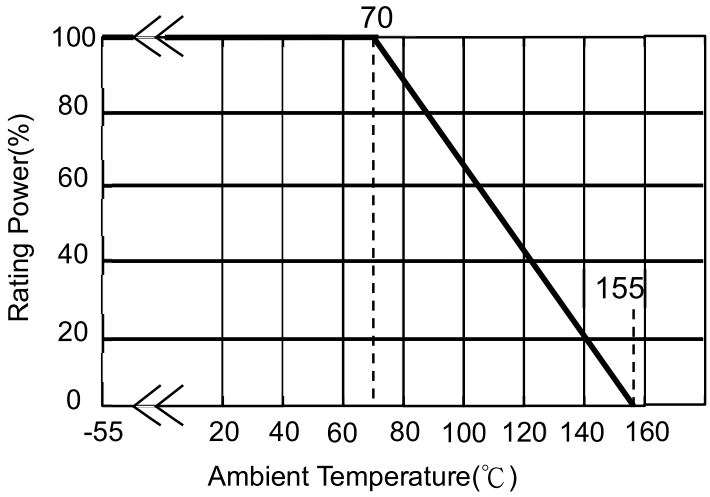


Fig.1 Power Derating Characteristics

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.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power at 70℃	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/℃)	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				
YCN102H (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				
YCN104H (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℃ ~ ＋155℃						

3.11 Rated Voltage

Rated Voltage: The resistor shall have a DC continuous working voltage or an rms. AC Continuous working voltage at commercial-line frequency and waveform 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)

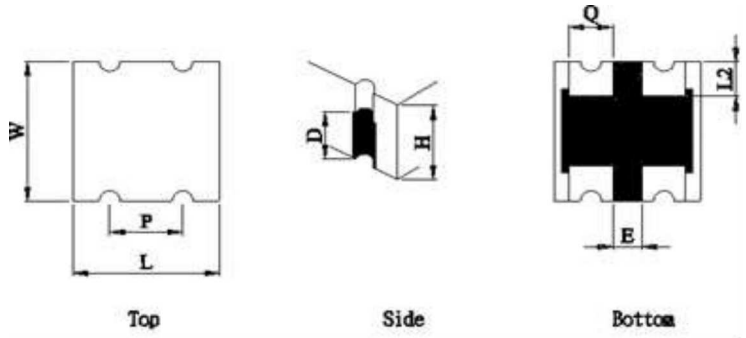
4. MARKING ON PRODUCT

	Type	Resistance Range	Tolerance ≤1%	Tolerance >1%
Array	102H	All	No Marking	
		Jumper=0Ω		
	104H	All	4-digits Marking	3-digits Marking
		Jumper=0Ω	--	1-digit Marking

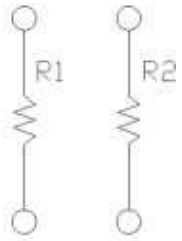
5. DIMENSION

5.1 Dimension

YCN102H

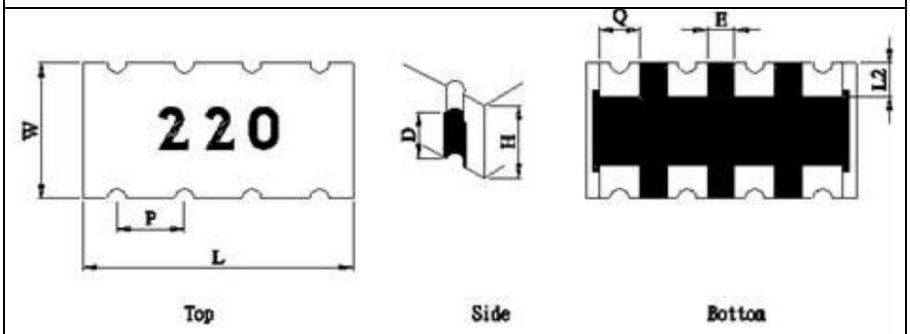


Circuits

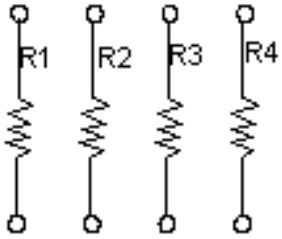


R1=R2

YCN104H



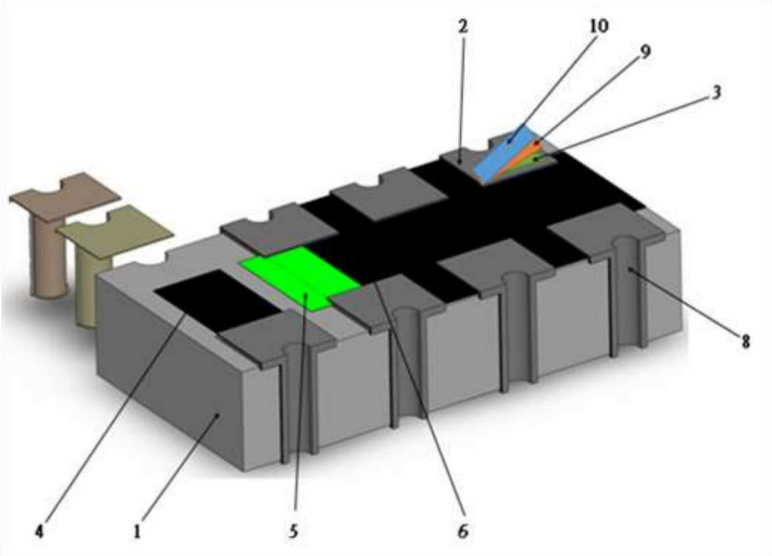
Circuits

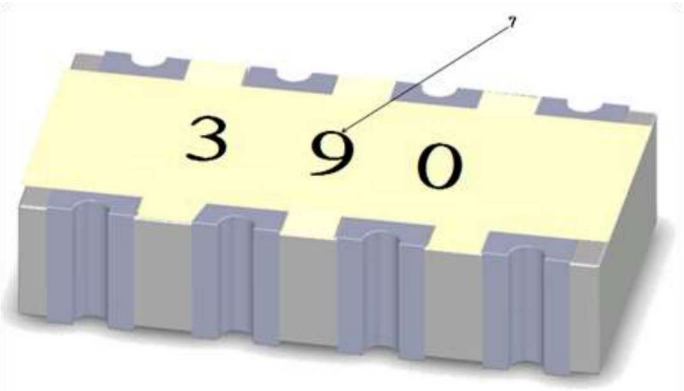


R1=R2=R3=R4

TYPE / DIM	L	W	H	L2	D	P	Q	E
YCN102H (0402x2)	1.00±0.10	1.00±0.10	0.30±0.10	0.25±0.10	0.6 H (Min.)	(0.50)	0.30±0.10	0.15±0.10
YCN104H (0402x4)	2.00±0.10	1.00±0.10	0.45±0.10	0.25±0.10	0.6 H (Min.)	(0.50)	0.30±0.10	0.15±0.10

5.2 Structure Graph





1	Ceramic substrate	6	2nd Protective coating
2	1st Top inner electrode	7	Marking
3	2nd Top inner electrode	8	Terminal inner electrode
4	Resistive layer	9	NI plating
5	1st Protective coating	10	Sn plating

5.3 Plating Thickness:

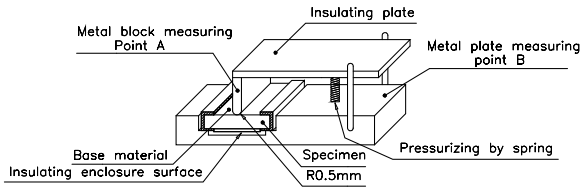
Ni：≥ 2 μm

Sn (Tin)：≥ 2 μm

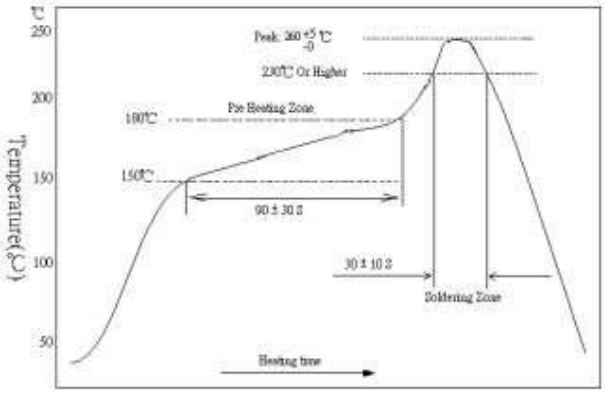
Sn (Tin)：Matte Sn

6. RELIABILITY TEST

6.1 Electrical Performance Test

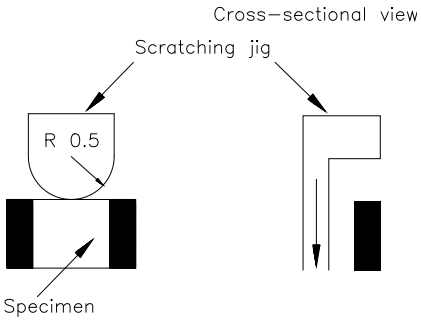
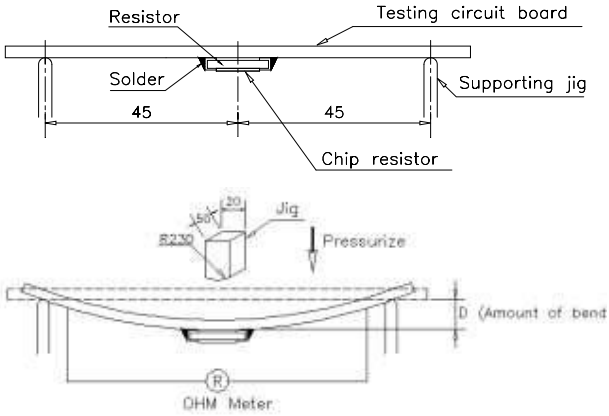
Item	Conditions	Specifications	
		Resistors	Jumpe
Temperature Coefficient of Resistance	$TCR(ppm/^{\circ}C) = \frac{(R2-R1)}{R1(T2-T1)} x10^6$ R1: Resistance at room temperature R2: Resistance at -55℃ or +125℃ T1: Room temperature T2: Temperature -55℃ or +125℃ Refer to JIS-C5201-1 4.8	Refer item 3.10 General Specifications	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%：△R=±1.0% 5%：△R=±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  	≧10^9Ω	
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±2℃ and load 2.5 times rated DC voltage for 1 sec on , 25 sec off , $10{,}000^{+400}_{-0}$ 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	△R=±5.0%	50mΩ Lower

6.2 Mechanical Performance Test

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Conditions</th><th colspan="2">Specifications</th></tr>
<tr><th>Resistors</th><th>Jumper</th></tr>
<tr><td>Resistance to Solvent</td><td>The tested resistor be immersed into isopropyl alcohol of 20~25℃ 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</td><td>△R=±0.5%</td><td>50mΩ Lower</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>◎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℃ or lower and a humidity of 70% RH or lower.
<table>
<tr><th>Step</th><th>Procedure</th><th>Environmental test condition</th></tr>
<tr><td>1</td><td>Resistance measuring</td><td>Room temperature</td></tr>
<tr><td>2</td><td>Baking</td><td>125℃， 24 hours</td></tr>
<tr><td>3</td><td>Humidification</td><td>85℃，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℃，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>
</table>
◎Reflow temperature curve
 

◎Component surface temperature
<table>
<tr><th colspan="3">Table 1 Description example in specification document(1)</th></tr>
<tr><td>Temperature-retaining time:230℃ or higher</td><td>Peak temperature</td><td>Temperature measured at the component body surface during preheating</td></tr>
<tr><td>30 seconds</td><td>240℃</td><td>150 to 160 ℃</td></tr>
</table></td><td>△R=±1.0%</td><td>50mΩ Lower</td></tr>
</table>

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Conditions</th><th colspan="2">Specifications</th></tr>
<tr><th>Resistors</th><th>Jumper</th></tr>
<tr><td></td><td>
<table>
<tr><th colspan="3">Table 2 Description example in specification document(2)</th></tr>
<tr><td>Temperature</td><td>Temperature-retaining time</td><td>Temperature measured at the component body surface during preheating</td></tr>
<tr><td>220℃ or higher</td><td>90 seconds</td><td>150 to 160℃</td></tr>
<tr><td>230℃ or higher</td><td>60 seconds</td><td></td></tr>
<tr><td>240℃ or higher</td><td>5 seconds</td><td></td></tr>
<tr><td>Peak</td><td>245℃</td><td></td></tr>
</table>
◎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℃ or lower and a humidity of 70% RH or lower.
<table>
<tr><th>Step</th><th>Procedure</th><th>Environmental test condition</th></tr>
<tr><td>1</td><td>Resistance measuring</td><td>Room temperature</td></tr>
<tr><td>2</td><td>Baking</td><td>125℃， 24 hours</td></tr>
<tr><td>3</td><td>Humidification</td><td>85℃，85%，168 hours</td></tr>
<tr><td>4</td><td>Solder pot test</td><td>260±3℃， 10 sec</td></tr>
<tr><td>5</td><td>Placed</td><td>85℃，65%，24 hours</td></tr>
<tr><td>6</td><td>Solder pot test</td><td>260±3℃， 10 sec</td></tr>
<tr><td>7</td><td>Resistance measuring</td><td>Room temperature</td></tr>
</table>
By Sony (SS-00254-5)
Refer to JIS-C5201-1 4.18</td><td colspan="2">No evidence of electrode damage.
No side conductive peel off.</td></tr>
<tr><td>Solder ability</td><td>Preconditioning:
Put the tested resistor in the apparatus of PCT, at a temperature of 105℃, 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.
Test method:
◎ solder pot test:
The resistor be immersed into solder pot in temperature 235±5℃ for 2 sec, then the resistor is left as placed under microscope to observed its solder area.
Refer to JIS-C5201-1 4.17</td><td colspan="2">Solder coverage over 95%</td></tr>
</table>

Item	Conditions	Specifications	
		Resistors	Jumper
Joint Strength of Solder	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. 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 :YCN102H = 10N YCN104H = 20N  Refer to JIS-C5201-1 4.32 ◎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  Refer to JIS-C5201-1 4.33	Test item 1 : △R=±1.0% Test item 2 : △R=±1.0% 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.	50mΩ Lower

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Conditions</th><th colspan="2">Specifications</th></tr>
<tr><th>Resistors</th><th>Jumper</th></tr>
<tr><td>Terminal Strength</td><td>◎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.
<table><tr><th colspan="2">Table 1 Temperature cycle test condition</th></tr><tr><td></td><td>Testing condition</td></tr><tr><td>Lowest temperature</td><td>-35±5℃</td></tr><tr><td>Highest temperature</td><td>105±5℃</td></tr><tr><td>Temperature-retaining time</td><td>15 minutes each</td></tr></table>By SONY (SS-00254-9)</td><td></td><td></td></tr>
<tr><td>Leaching Test</td><td>The tested resistor be immersed into molten solder of 260±5℃ for 30 seconds. Then the resistor is left as placed under microscope to observed its solder area.
By SONY (SS-00254-9)</td><td colspan="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.</td></tr>
</table>

6.3 Environmental Performance

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Conditions</th><th colspan="2">Specifications</th></tr>
<tr><th>Resistors</th><th>Jumpe</th></tr>
<tr><td>Resistance to Dry Heat</td><td>Put tested resistors in chamber under temperature 155±5℃ 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</td><td>1%：△R=±1.0%
5%：△R=±2.0%</td><td>50mΩ Lower</td></tr>
<tr><td>Thermal Shock</td><td>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><tr><td></td><td>Testing Condition</td></tr><tr><td>Lowest Temperature</td><td>-55±5℃</td></tr><tr><td>Highest Temperature</td><td>125±5℃</td></tr><tr><td>Temperature-retaining time</td><td>15 minutes each</td></tr></table>Refer to MIL-STD 202 Method 107</td><td>△R=±1.0%</td><td>50mΩ Lower</td></tr>
<tr><td>Loading Life in Moisture</td><td>Put the tested resistor in the chamber under temperature 40±2℃, 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.

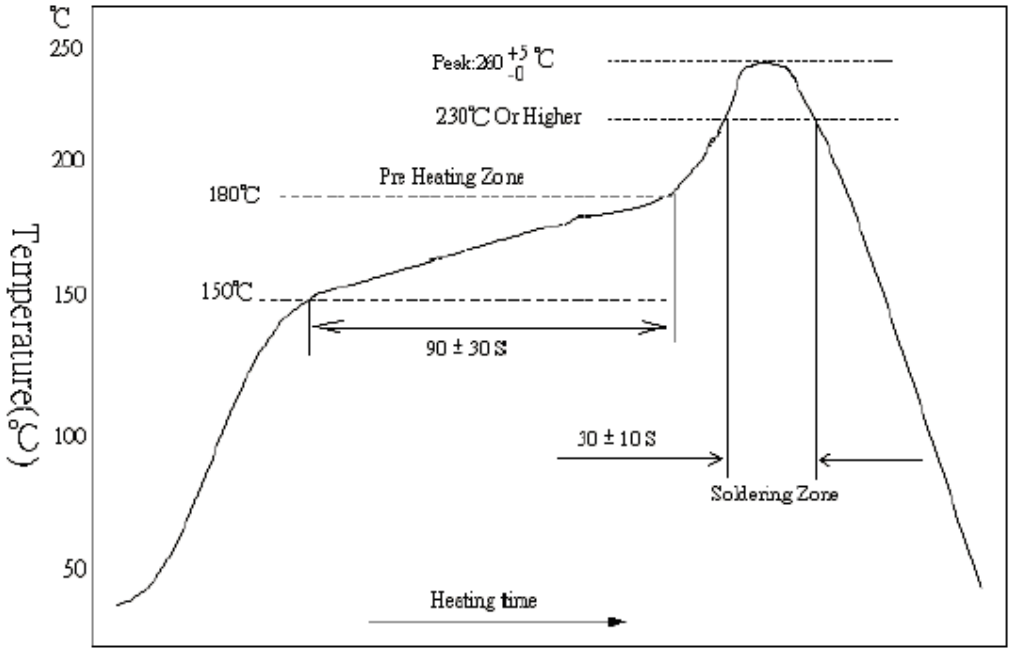
Refer to JIS-C5201-1 4.24</td><td>1%：△R=±2.0%
5%：△R=±3.0%</td><td>50mΩ Lower</td></tr>
<tr><td>Load Life</td><td>Put the tested resistor in chamber under temperature 70±2℃ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.

Refer to JIS-C5201-1 4.25</td><td>1%：△R=±2.0%
5%：△R=±3.0%</td><td>50mΩ Lower</td></tr>
</table>

6.4 Soldering Profile

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

6.4.1 Lead-Free Reflow Soldering Profile



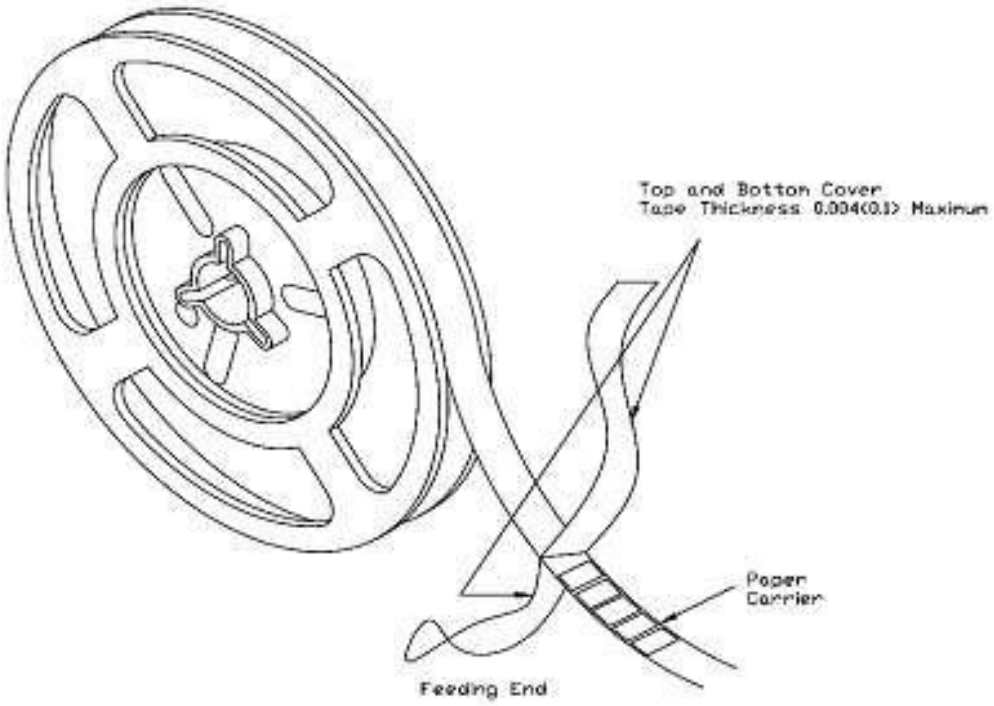
Remark: The peak temperature of soldering heat is 260^{+5}_{-0} ˚C for 10 seconds.

6.4.2 Soldering Iron: Temperature 350ºC±10ºC, dwell time shall be less than 3 sec.

7. TAPING

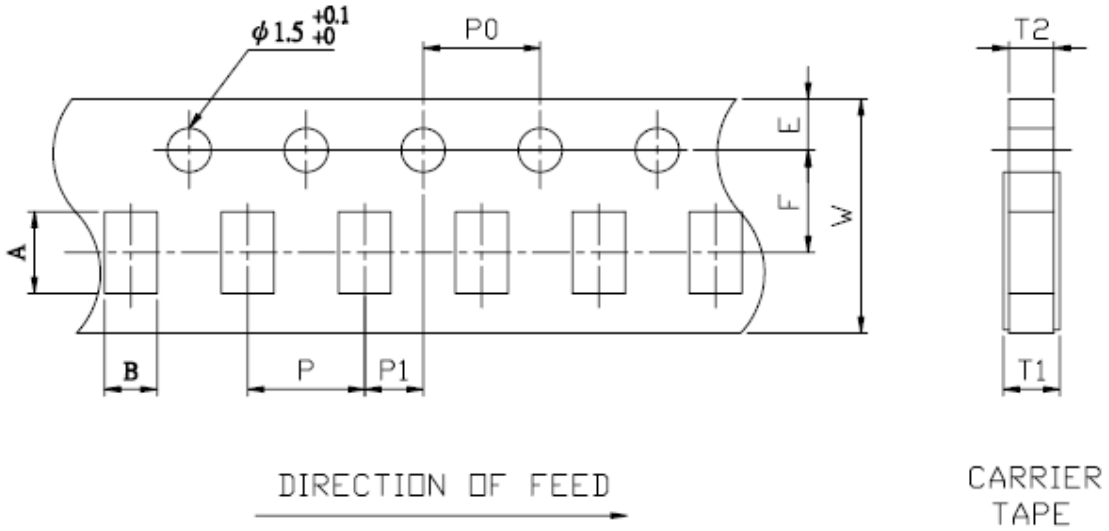
7.1 Structure of Taping

Paper Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System



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

Array/Network	Dimensions (mm)										
Type	A	B	W	E	F	T1	T2	P	P0	10xP0	P1
YCN102H	1.20±0.10	1.20±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.40+0.2/-0	0.40±0.10	2.00±0.10	4.00±0.05	40.00±0.20	2.00±0.05
YCN104H	2.20±0.10	1.20±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.60+0.2/-0	0.60±0.10	2.00±0.10	4.00±0.05	40.00±0.20	2.00±0.05

7.3 Packaging

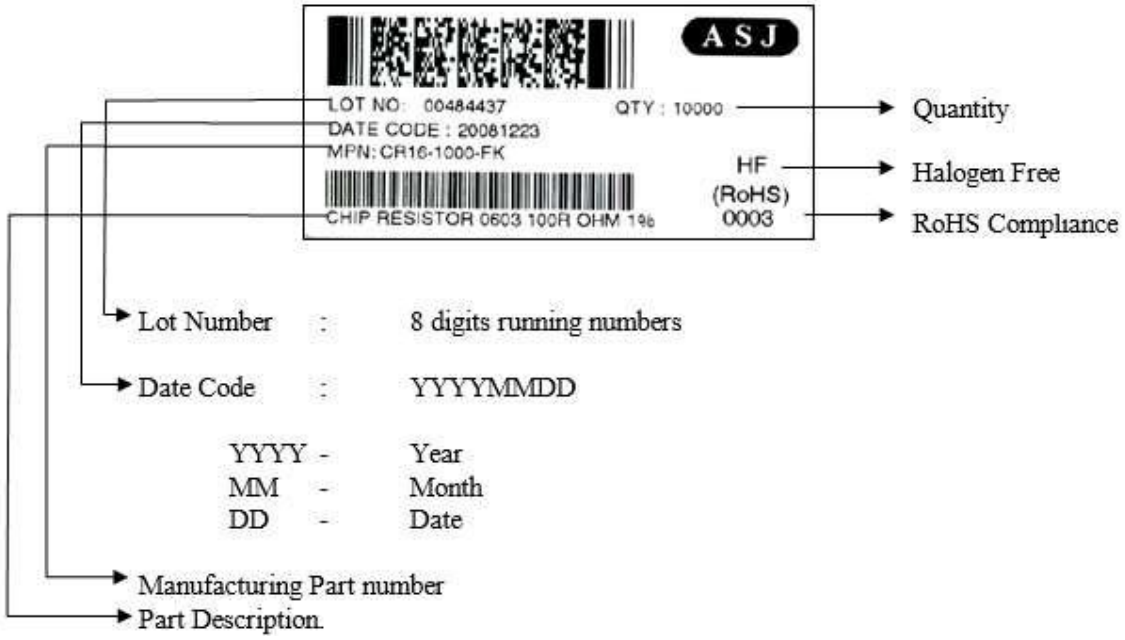
7.3.1 Taping

7.3.1.1 Quantity – Tape and Reels

Array & Networks		
Size	Reels	**Component / Reel**
		Paper Carrier
		(2mm Pitch)
YCN102H/YCN104H	**7"**	10,000
	10"	20,000
	13”	50,000

7.3.2 Identification

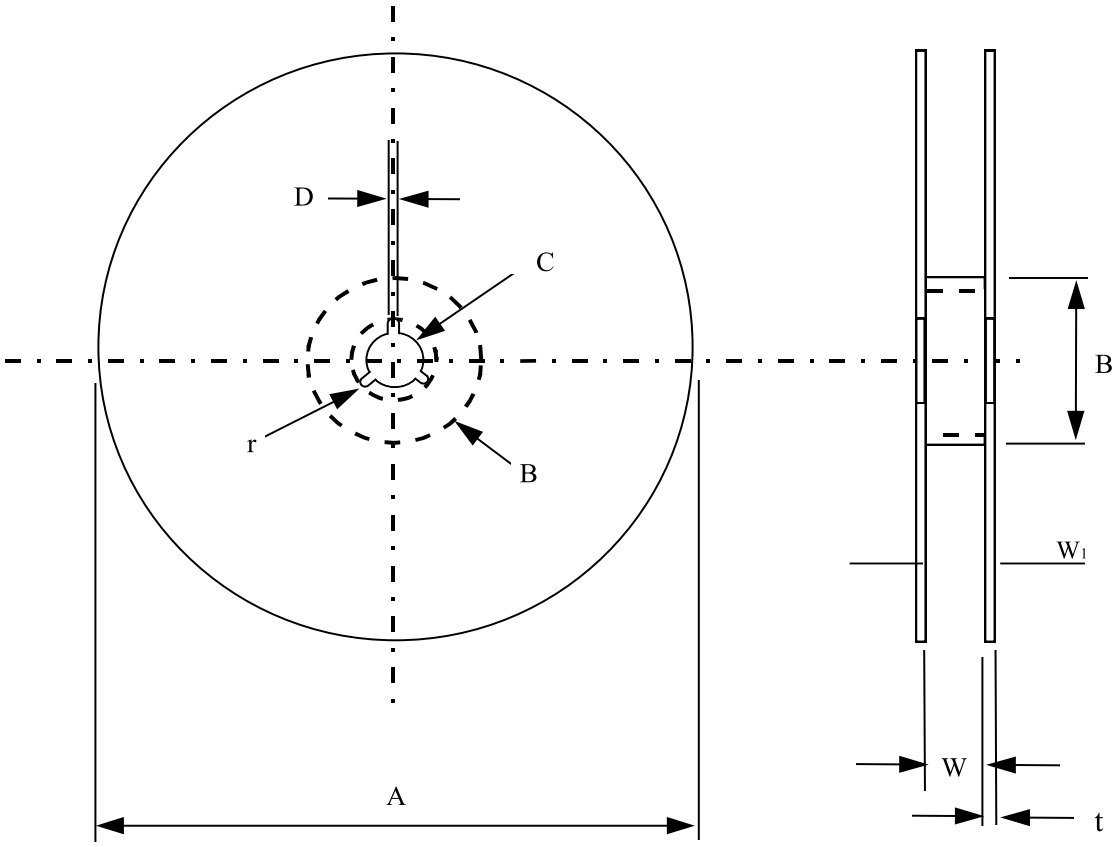
Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



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

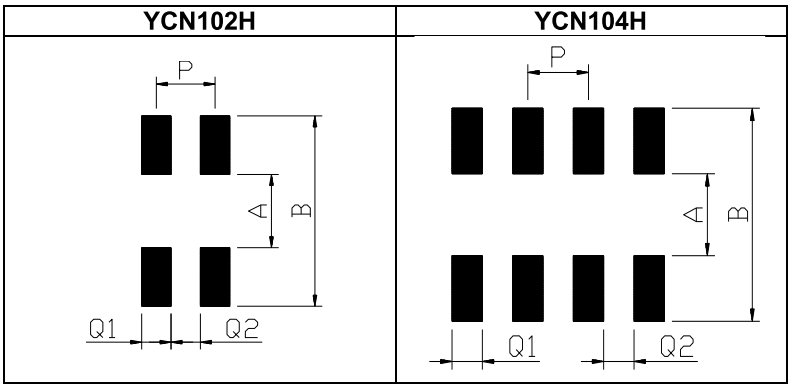
7.3.4 Reel Dimensions



Model	A	B	C	D	W	W_1	t	r
7"Reel (5K) (except 0402 10K)	ϕ178±2.0	ϕ80min	13± 0.2	ϕ2.0± 0.5	11± 0.1	14.4 max	1.0± 0.1	1.0
10"Reel (10K)	ϕ254±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	1.5± 0.1	1.0
13"Reel (20K, 50K)	ϕ330±2.0	ϕ60min	13± 0.2	ϕ2.0± 0.5	11± 1.0	14.4 max	2.1± 0.1	-

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.



Product (Type)	Dimensions - mm				
	A	B	P	Q1	Q2
YCN102H (0402x2)	0.50	2.00	0.50	0.28	0.22
YCN104H (0402x4)	0.50	2.00	0.50	0.28	0.22

9. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	24.07.2023		Initial Release