A S J

ASJ PTE LTD

CHIP RESISTOR NETWORK SPECIFICATION (CONVEX)

Reference No.	:	SYS – ENG – 202
Revision No.	:	U

COPY FOR REFERENCE ONLY

1.0 SCOPE

This specification specified thick film chip resistor network used in high density SMD mounting for higher productivity with reduced assembling cost. In case there are discrepancies in specifications between this specification and the customer's specifications, the latter shall precede.

2.0 PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

YCN	XX	X	-	XXXX	-	X	X
Resistor Network	Type	No.of Resistor		Resistance Value Code		Tolerance	Packaging
YCN-Convex	10	2				F - ±1%	F - 5K
	16	4				G - ±2%	T - 10K
						J - ±5%	Y – 20K
						Z - zero ohm	

3.0 RATING

3.1 Rated Power

Table 1

(a) Zero Ohm Jumper Rated Power

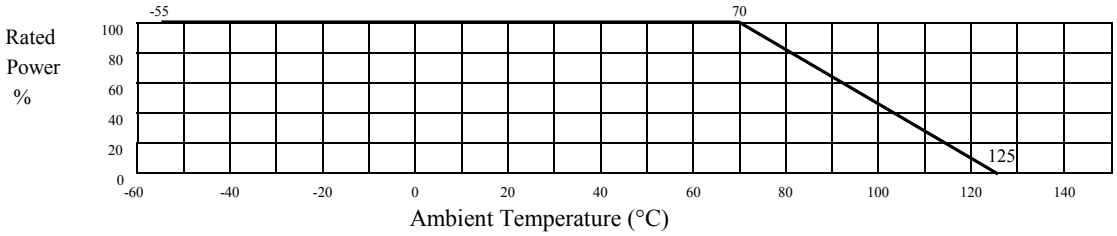
Type	Rated Current	Dielectric Withstanding Voltage	Resistance Tolerance
YCN10	1A	300V	< 50 mΩ
YCN16	1A	300V	< 50 mΩ

(b) Resistor Rated Power

Type	Rated Power	Max. Working Voltage	Max.Overload Voltage
YCN10	1/16W	50V	100V
YCN16	1/16W	50V	100V

Rated Power shall be the load power corresponding to nominal wattage suitable for continuous use at 70°C ambient temperature. 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



3.2 Operating Temperature Range -55°C ~+125°C

3.3 Storage Temperature Range -5°C ~+40°C

3.4 Flammability Rating : Tested in accordance to UL94, V-0

3.5 Moisture Sensitivity Level Rating : Level 1

3.6 Resistance Range, Resistance Tolerance and Temperature Coefficient of Resistance.

Table 2

Product	No. of Resistor	Resistance Range	Temperature Coefficient of Resistance	Resistance Tolerance
YCN 10	2, 4	10Ω to 1MΩ	±250ppm/°C	±1% & ±2%
		10Ω to 1MΩ	±200ppm/°C	±5%
YCN 16	2, 4	1Ω to 1MΩ	±200ppm/°C	±1%, ±2% & 5%
Zero Ohm Jumper		< 0.05Ω		

3.7 Rated Voltage

The rated voltage is calculated from the rated power and nominal resistance by the following formula:

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

Where E : Rated Voltage (V)
P : Rated Power (W)
R : Nominal Resistance (Ω)

In case the value calculated by the formula exceeds the maximum working voltage given in Table 1, the maximum working voltage in Table 1 shall be regarded as the rated voltage.

4.0 MARKING ON PRODUCT

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

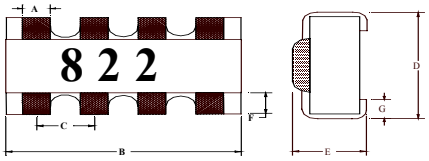
Table 3 Marking on product

Part Number	Color	Marking
YCN10 YCN16	Light Brown	① Tolerance : ±1.0% (F) Marking by four numerals ② Tolerance: ±2.0% (G), ±5.0% (J) Marking by three numerals ③ Chip jumper resistor The marking used shall be 0

5.0 COMPONENT DIMENSION

5.1 Dimension

YCN TYPE (CONVEX)

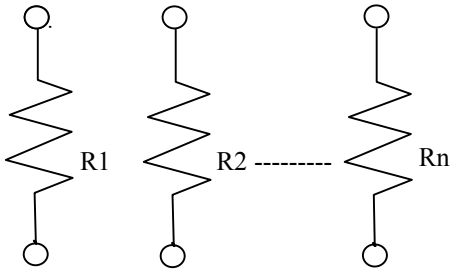


Type	Number of resistor	A	B	C	D	E	F	G
YCN10	2 4	0.30±0.10 0.33±0.10	1.00±0.10 2.00±0.10	0.65±0.05 0.50±0.10	1.00±0.10	0.30±0.10 0.40±0.10	0.15±0.10 0.20±0.10	0.25±0.10
YCN16	2 4	0.50±0.15	1.60±0.20 3.20±0.20	0.80±0.05	1.60±0.20	0.50±0.10	0.30±0.15	0.30±0.15

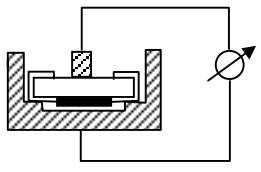
Unit of Measurement : mm

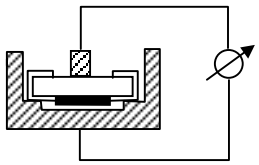
5.2 Schematic

n = 4



6.0 ELECTRICAL CHARACTERISTICS AND TEST CONDITIONS

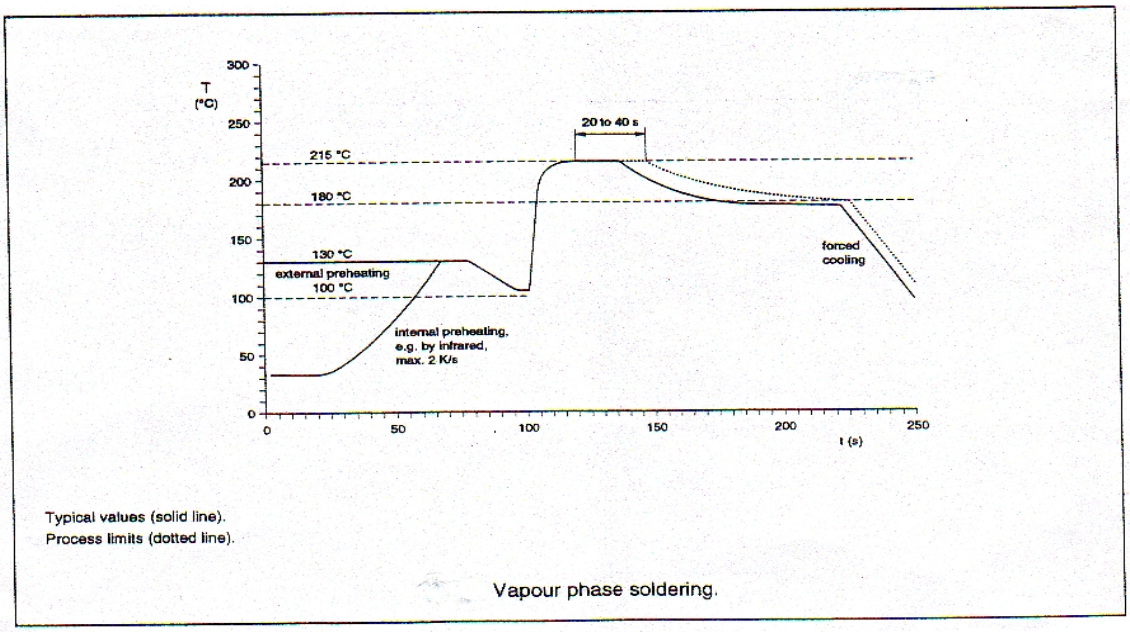
CHARACTERISTICS		SPECIFICATIONS		TESTING CONDITIONS
		Zero Ohm	**Resistance**	
1	Resistance Value	≤ 50 mΩ	Resistance accuracy being fully rely with respect to tolerance of resistor.	***JIS C 5202 5.1*** Application time to be within 5 secs . Applied Voltage for resistance measurement : <10Ω 0.1V 10~99Ω 0.3V 100~999 1.0V 1K~ 9.9K 3.0 V 10K~ 99.9K 10.0 V 100K~999K 30.0 V 1M & Over 50.0 V
2	Resistance Temperature Coefficient	NA	Refer Section 3.4 Table 2	***JIS C 5202 5.2*** Measure R at t_o=25^{0}C and after 45 minutes measure R at t=125^{0}C. *Calculation :* $TCR(ppm/^0C)=\frac{R-R_0}{R_0} * \frac{1}{t-t_0} * 10^6$
3	Short Time Overload	≤ 50 mΩ	±(1%+0.05Ω)	***JIS C 5202 5.5*** Apply at 2.5 times rated voltage for 5 seconds. Applied voltage shall not exceed maximum overload voltage or current.
4	Insulation Resistance	> 10G Ω		***JIS C 5202 5.6*** Apply 100V ± 15VDC for 1 minutes 

5	Dielectric Withstanding Voltage	No failure of resistor such as short-circuit, burning, breakdown.			***JIS C 5202 5.7*** Apply 300VAC for 1 minutes ± 10secs. 
		≤ 50 mΩ	±(1%+0.05Ω)		
6	Noise	NA	1~9Ω	<-10dB (0.32μv/v)	***JIS C 5202 5.9*** Vn(dB) = T –f(T-S) - D
			10~99Ω	<-5dB (0.52μv/v)	
			100~999Ω	<0dB (1.0μv/v)	
			1K~9.9KΩ	<10dB (3.2μv/v)	
			10K~99.9KΩ	<18dB (5.6μv/v)	
			100K~999.9KΩ	<20dB (10μv/v)	
			>1MΩ	<30dB (32μv/v)	
7	Terminal Strength - Bend Test	≤ 50mΩ	Tolerance resistor. With no evidence of mechanical damage after releasing the pressure. ±(1%+0.05Ω)		***JIS C 5202 6.1.4(1) Method 2*** Apply force till 3mm bend and hold for 30±1sec. Measure resistance while applying pressure.
8	Resistance to soldering heat	≤ 50mΩ	±(1%+0.05Ω)		***JIS C 5202 6.10*** A) Solder bath method Preheat : 120±10 °C for 40 secs. Resistor dipped entirely in solder bath of 260±5°C for 10±1sec. B) Reflow soldering method Peak : 240±5°C 220±5°C for 40sec. C) Soldering Iron method Bit temp.: 300±5°C Application time of soldering iron is 3 ±1 sec. After which the sample shall be left at ambient temperature for 1~ 2 hrs before measurement.

9	Solderability	≥ 95% Coverage		***JIS C 5202 6.11*** Solder : 60% Tin / 40% Lead 215±3°C for 2^{+1}_{-0} secs.
10	Resistance to Solvent	≤ 50mΩ	±(1%+0.05Ω) Marking shall be legible without mechanical damage in appearance.	***JIS C 5202 6.9*** Immerse in 20°C~25°C Isoproyl Alcohol solvent for 60±10secs.
11	Low Temperature	≤ 50mΩ	±(1%+0.05Ω)	***JIS C 5202 7.1*** -55±5°C for 1000 $\pm^{48}_{0}$ hours Sample shall be left at ambient temperature for 1~ 2 hrs after test before measuring final resistance.
12	Low Temperature with Load	≤ 50mΩ	±(1%+0.05Ω)	***JIS C 5202 7.1*** -55±5°C for 90 minutes, 0.1 rated continuous working voltage as per 3.5 shall be applied for 45 $\pm^{5}_{0}$ minutes. Voltage Sample shall be left at ambient temperature for ≈ 8 hrs after the removal of the voltage for 15 $\pm^{5}_{0}$ before measuring final resistance.
13	High Temperature	≤ 100mΩ	±(1%+0.05Ω)	***JIS C 5202 7.2*** 125±5°C for 1000 $\pm^{48}_{0}$ hours Sample shall be left at ambient temperature for 1~ 2 hrs after test before measuring final resistance.
14	Thermal Shock (Temperature Cycling)	≤ 50mΩ	±(0.5%+0.05Ω) for 1% tolerance resistor ±(1%+0.05Ω) for 2%, 5% tolerance resistor	***JIS C 5202 7.4*** Step Temp. (°C) Time (Minute) 1 -55±5 30 mins 2 25±5 5 mins max 3 155±5 30 mins 4 25±5 5 mins max Repeat step 1 to 4 for 5 cycles

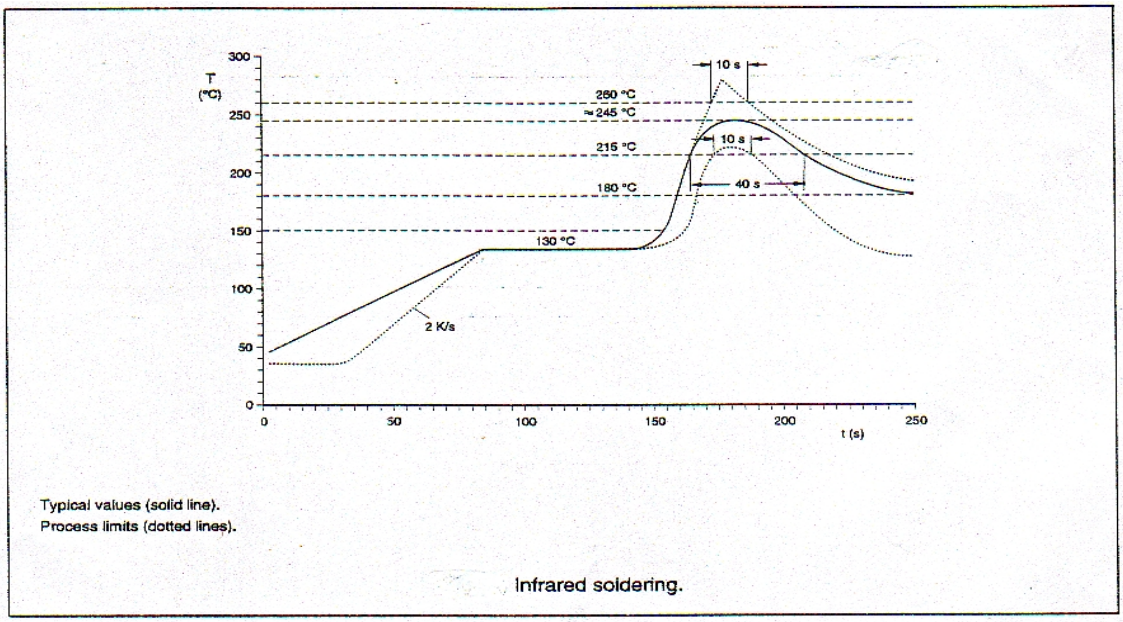
15	Resistance to damp Heat (Humidity)	≤ 100mΩ	±(0.5%+0.05Ω) for 1% tolerance resistor ±(2.0%+0.05Ω) for 2%, 5% tolerance resistor	***JIS C 5202 7.5*** 40±5°C and 90~95%RH for $1000\pm_{0}^{48}$hours Sample shall be left at ambient temperature for 1~ 2 hrs after test before measuring final resistance.
16	Loadlife	≤ 100mΩ	±(1.0%+0.05Ω) for 1% tolerance resistor ±(3.0%+0.1Ω) for 2%, 5% tolerance resistor	***JIS C 5202 7.10*** At 70±5°C Apply DC rated voltage at 90minutes On, 30minutes Off for $1000\pm_{0}^{48}$hours Sample shall be left at ambient temperature for 1~ 2 hrs after test before measuring final resistance.

6.1 Soldering Profile



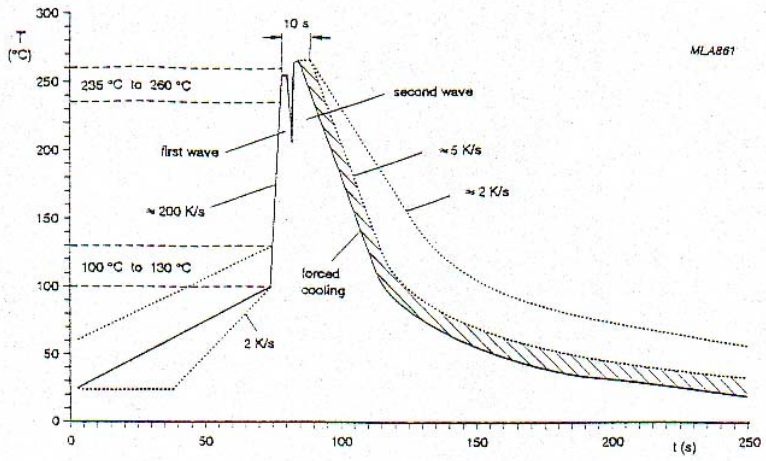
Typical values (solid line).
Process limits (dotted line).

Vapour phase soldering.



Typical values (solid line).
Process limits (dotted lines).

Infrared soldering.

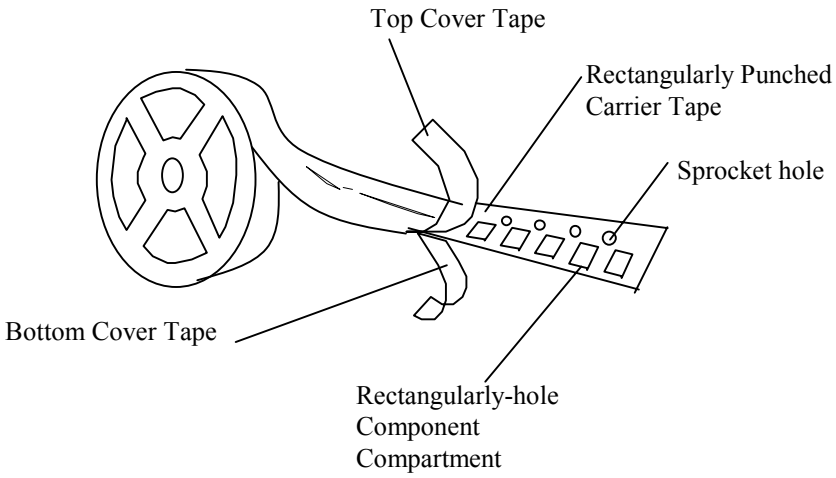


Typical values (solid line).
Process limits (dotted lines).
The capacitors may be soldered twice in accordance with this method if desired.

7.0 TAPING

7.1 Structure of Taping

Taping of Rectangularly Punched Carrier System



7.2 Materials

(1) Every taping shall consist of materials as shown in Table 4.

(2) Every taping shall not adversely affect the mechanical, electrical and solderability performances.

(3) Materials of taping shall generate no statics.

(4) The taped products are stored at a temperature -5 to +40°C and a relative humidity 40 to 60% without exposing to direct sunlight and, after such conditioning, the tape shall show no deterioration in performances such as change in adhesion force or peel forces.

Table 4 Materials of Taping

Type	Carrier Tape	Top Cover Tape	Bottom Cover Tape
Taping of Rectangularly Punched Carrier System	Paper	Thermal adhesion polyester	Thermal adhesion paper

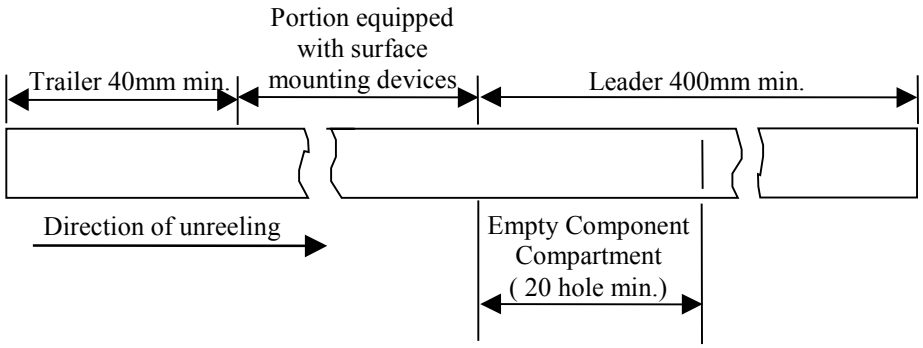
7.3 Leader and Trailer Tape

1) Leader Tape The length of leader tape shall be at least 400 mm including 20 or more of rectangular holes (component compartments) in which no component is placed. The 20 or more empty component compartments shall be sealed with the top cover tape (see Fig. 2).

2) Trailer Tape The trailer tape at the hub of reel shall be least 40 mm in length including carrier tape with empty component compartments. The empty component compartments shall be sealed with the top cover tape.

The last portion of the carrier tape shall release from the reel hub.

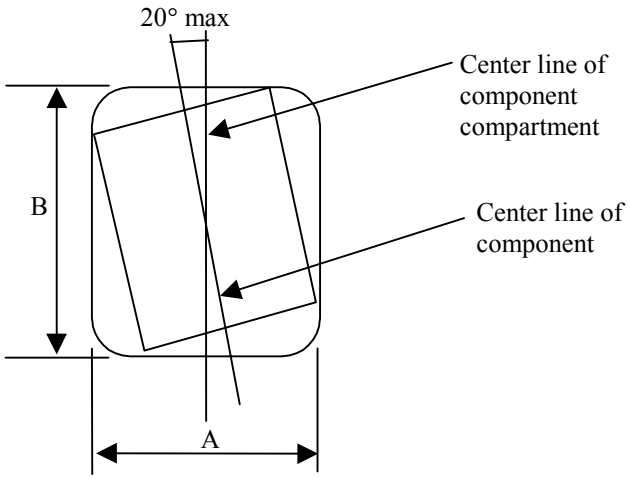
Fig. 2 Explanation of Leader and Trailer Tape



7.4 Position of Taped Component

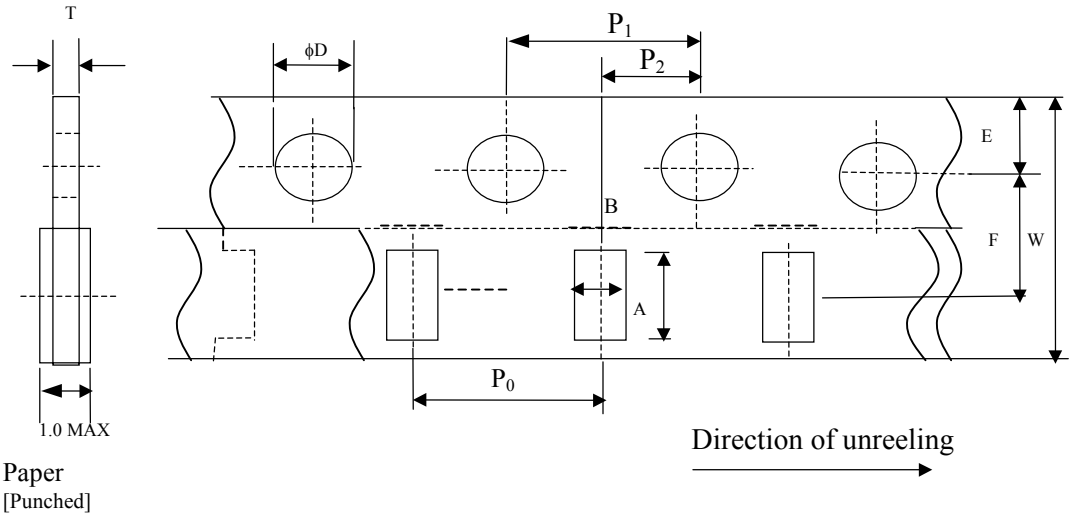
Position of Taped component The angle made by the center line of taped component and the center line of component compartment shall not exceed 20 degrees (see Fig. 3).

Fig. 3 Angle between Center Line of Component and Center Line of Component compartment



7.5 Tape Dimension

7.5.1 Paper Tape



Remark : Pitch tolerance over any 10 pitches of Po is ± 0.20 mm

Type	No of resistor	A	B	W	E	F	T	Po,P1	P2	ϕD
YCN10	2 4	1.20±0.10 2.20±0.10	1.20±0.10 2.00±0.20	8.00±0.20	1.75±0.10	3.50±0.05	0.45±0.10	4.00±0.10	2.00±0.05	1.50±0.10
YCN16	2 4	1.90±0.10 3.50±0.10	1.90±0.20 2.00±0.20	8.00±0.20	1.75±0.10	3.50±0.05	0.75±0.10	4.00±0.10	2.00±0.05	1.50±0.10

Unit of Measurement : mm

7.6 Performance of Taping

7.6.1 Strength of carrier tape and top cover tape
When a tensile force of 10N (1.02 kgf) is applied in the direction of unreeling the tape, the carrier tape and top cover tape shall withstand this force.

7.6.2 Peel force of top cover tape
The peel force of top cover tape shall be 0.1N to 0.7N (10 to 70 gf) when the top cover tape is pulled at a speed of 200mm/min with the angle between the tape during peel and the direction of unreeling maintained at 165 to 180 degree as illustrated in Fig 4.

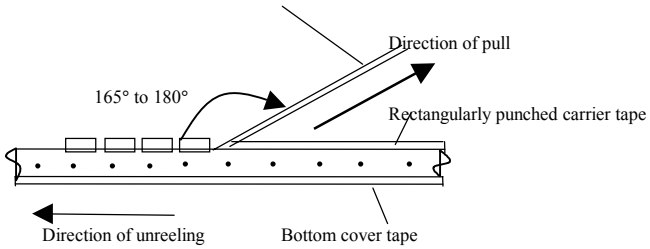


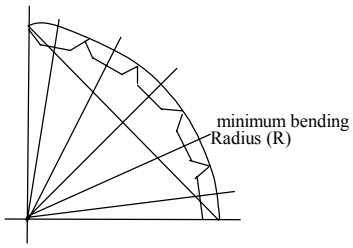
Fig. 4 Peeling Test

7.6.3 Minimum Bending Radius
When the tape is bent with the minimum bending radius specified in Fig 5 and Table 5, components shall maintain their position and shall be free from abnormalities such as damage.

Table 5

Type	Minimum Bending Radius
TSR4G	25.0 mm
TSR2G	30.0 mm
TSR1G	40.0 mm

Fig. 5 Explanation of Minimum Bending Radius



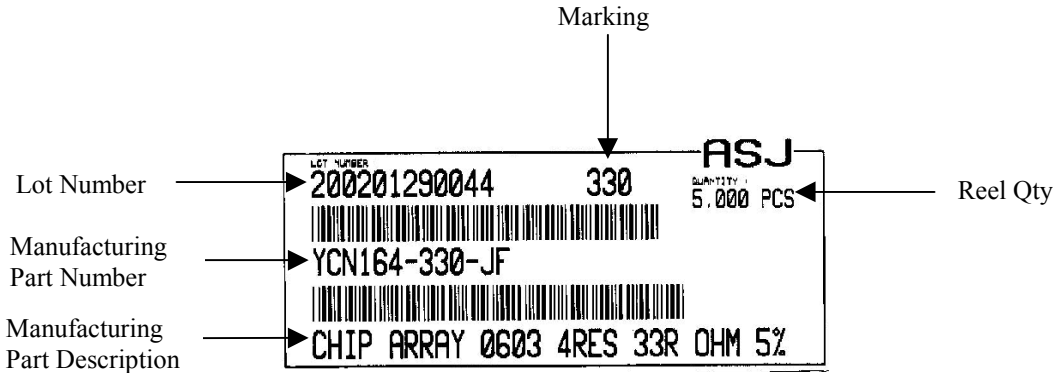
7.7 Packaging

7.7.1 Standard Packaging Pan Size

Packaging	No. of Resistor	2	4
Tape	YCN10	10000	10000
	YCN16	5000	5000

7.7.2 Identification

A label indicating product type, resistance value and tolerance shall be pasted on the surface of each reel.



How to read lot Number :

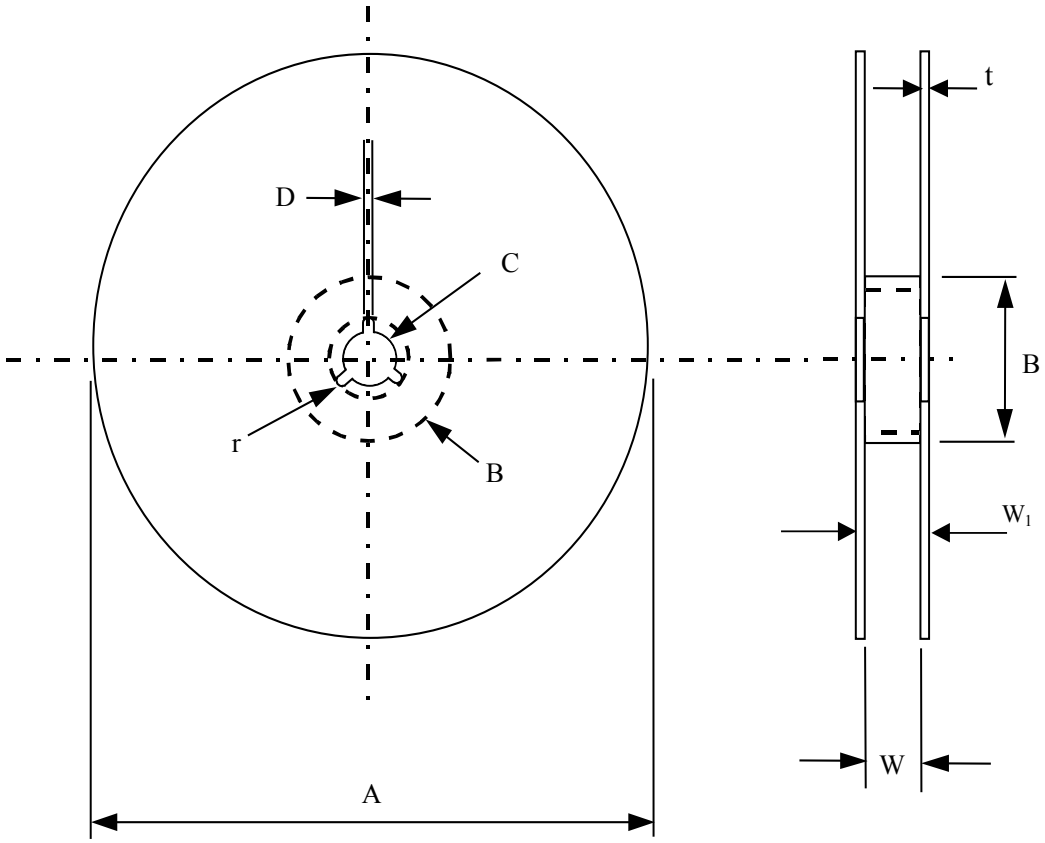
XXXX	XX	XX	XXXX
Year	Mth	Day	Serialize Number

Lot Number : 8 digits running numbers

Date Code : YYYYMMDD

YYYY - Year
MM - Month
DD - Date

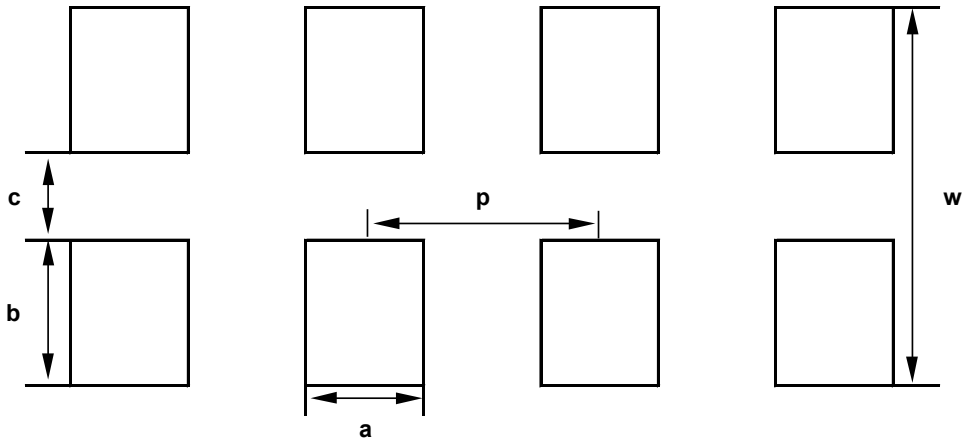
7.7.3 Reel Dimension



TYPE	NO OF RESISTOR	A	B	C	D	W	W_1	t	r
YCN10	2	ϕ178±2.0	$\phi 60 \pm {}^{1}_{0}$	13± 0.2	2.0± 0.5	11±1.0	14.4 max	1.0± 0.1	1.0
	4	ϕ178±2.0	$\phi 60 \pm {}^{1}_{0}$	13± 0.2	2.0± 0.5	11±1.0	14.4 max	1.0± 0.1	1.0
YCN16	2	ϕ178±2.0	$\phi 60 \pm {}^{1}_{0}$	13± 0.2	2.0± 0.5	11±1.0	14.4 max	1.0± 0.1	1.0
	4	ϕ178±2.0	$\phi 60 \pm {}^{1}_{0}$	13± 0.2	2.0± 0.5	11±1.0	14.4 max	1.0± 0.1	1.0

Unit of Measurement : mm

8.0 SOLDER LAND PATTERN



Part	c	w	p	a	b
YCN104	0.5	2.1	0.5	0.25	0.8
YCN164	0.8	3.1	0.8	0.44	1.15

Unit of Measurement : mm

9.0 APPLICABLE STANDARDS

JIS C 5202	Test Methods of Fixed Resistors for Electronic Equipment.
JIS C 0806	Packaging of Electronic Components on continuous tapes (surface mount devices).
MIL-STD-202	Test Methods for Electronic and Electrical Parts.
IPC/JEDEC J STD 020B	Moisture / Reflow sensitivity classification for non hermetic solid state surface mount devices.