

1/2W 3720 LOW RESISTNACE CHIP RESISTOR

1. Scope

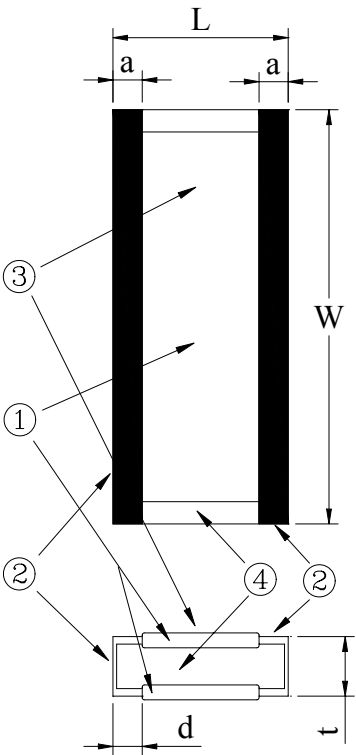
This specification applies to 3.75mm x 2.0mm size 1/2W, fixed metal film low resistance value chip resistors rectangular type.

2. Type Designation

RL3720    □    -    □□□□    -    □    N  
(1)        (2)        (3)        (4)    (5)

- Where
- (1) Type and size
  - (2) Temperature coefficient of resistance ( T.C.R. )
  - (3) Nominal Resistance value:  
Four digits of number  
R010 = 0.010 Ω  
The “ R ” shall be used as a decimal point.
  - (4) Resistance tolerance:  
Refer to paragraph 4-1
  - (5) N = Sn plating (Lead free , RoHS compliant)

3. Construction and Physical Dimensions



Code Letter	Dimensions (mm)
	3720
L	2.00 ± 0.20
W	3.75 ± 0.30
t	0.8 ± 0.2
a	0.40 ± 0.2
d	0.40 ± 0.2

- ① Resistive element : Metal film  
(Under protection film)
- ② Electrode : Solder Sn (on Cu)
- ③ Protection film : Epoxy resin
- ④ Substrate : Alumina

Figure 1. Construction and Dimensions

#### 4. Ratings

##### 4-1 Nominal Resistance Value and Temperature Coefficient of Resistance

Power Rating*	1/2 W
Resistance Value	0.003Ω ~ 0.05Ω
Resistance Tolerance	± 1%(F) , ± 2%(G) , ± 5%(J)
Temperature Coefficient of Resistance	±100ppm/°C

##### 4-2 Rated Voltage

The rated voltage shall be determined by the following expression.

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

Where V : Rated voltage (V)

R : Nominal resistance value (Ω)

P : Rated dissipation (W)

##### 4-3 Operating and Storage Temperature Range

-55 to +125°C

#### 5. Marking

Resistance value mark on a top surface use four or three digits by JIS.

White bars are Cynotec internal use only.

Example

0.01Ω

R010

0.02Ω

R020



## 6. Characteristics

### 6-1 Electrical

#### 6-1-1 Resistance

Resistance value shall be within the tolerance specified in paragraph 4-1

Refer to JIS C 5202 5.1

#### 6-1-2 Temperature Coefficient of Resistance

Not exceed the temperature coefficient of resistance specified

Room temperature → Room temperature + 100°C

Refer to JIS C 5202 5.2

#### 6-1-3 Insulation Resistance

##### (1) Between Electrode and Protection Film

100MΩ or over

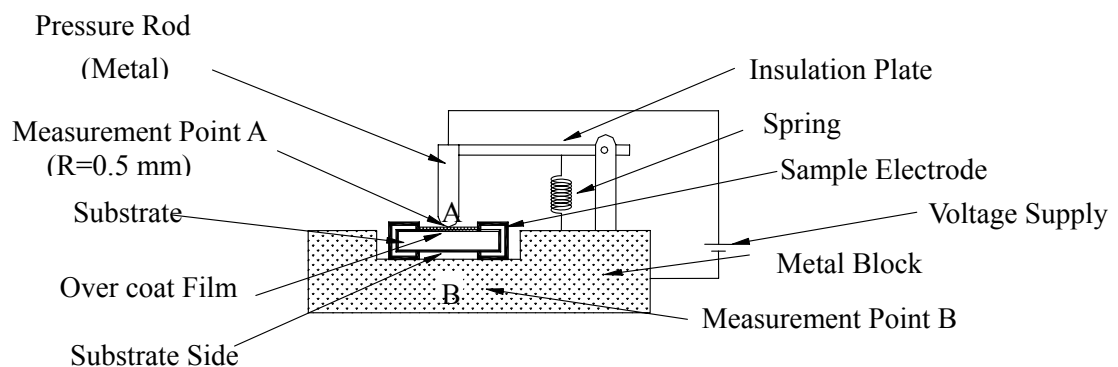
##### (2) Between Electrode and Substrate

1,000MΩ or over

The resistor shall be cramped in the metal block and tested, as shown below.

Test voltage : 100V<sub>DC</sub> for 1 minute

Refer to JIS C 5202 5.6 Mounting condition G.



#### 6-1-4 Voltage Proof

$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Without damage by flashover, fire or breakdown, etc.

The voltage : 100V<sub>AC</sub> (rms.) for 1 minute

Refer to JIS C 5202 5.7

## 6-2 Mechanical

### 6-2-1 Terminal Strength

$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

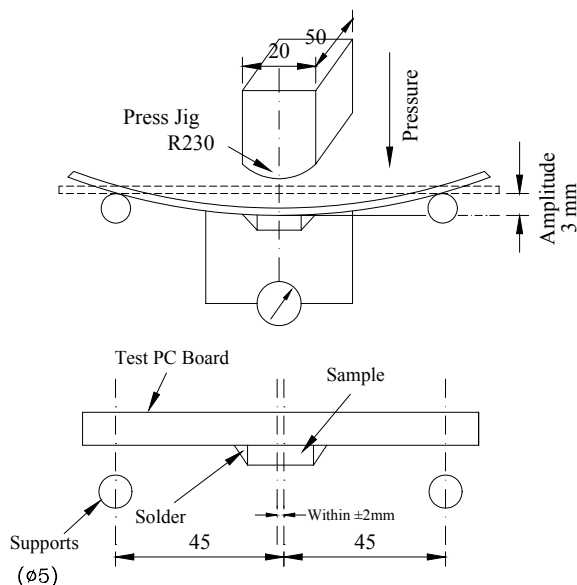
Without mechanical damage such as breaks.

Electrical characteristics shall be satisfied.

If there are electrodes on both surfaces, it shall satisfy the above specifications on whichever surface it may be fixated on.

Bending width : 3 mm 30 seconds

Refer to JIS C 5202 6.1.4.



Refer to EIAJ RC-2530

Unit : mm

### 6-2-2 Body Strength

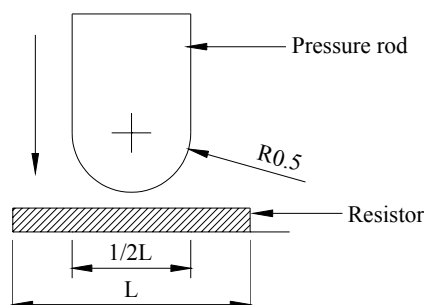
$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Without mechanical damage such as breaks.

A load of 10N using a R0.5 pressure rod shall be applied to the center in the direction of the arrow and held for 10 seconds.

Refer to JIS C 5202 6.2



Unit : mm

6-2-3 Solderability

A new uniform coating of solder shall cover minimum of 95% of the surface being immersed.

Temperature of solder :  $245 \pm 5^{\circ}\text{C}$

Immersion duration :  $2 \pm 0.5$  seconds

Refer to JIS C 5202 6.5

6-2-4 Resistance to Soldering Heat

$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Electrical characteristics shall be satisfied.

Without distinct deformation in appearance.

(1) Solder bath method

Pre-heat : 100 to  $110^{\circ}\text{C}$      30 seconds

Temperature :  $270 \pm 5^{\circ}\text{C}$       $10 \pm 1$  seconds

(2) Reflow Soldering method

Peak temperature :  $240 \pm 5^{\circ}\text{C}$      5 seconds

Temperature :  $220 \pm 5^{\circ}\text{C}$      40 seconds

The heating apparatus shall be the upper-heated oven and temperature shall be the board surface temperature.

(3) Soldering iron method

Bit temperature :  $350 \pm 5^{\circ}\text{C}$      5 seconds

The resistor shall be stored at standard atmospheric conditions for 1 hour, after which the measurements shall be made.

Refer to JIS C 5202 6.4

6-2-5 Resistance to Solvent

Without mechanical damage and distinct damage in appearance.

Immersion cleaning

At normal temperature 300 seconds in Isopropyl Alcohol.

Refer to JIS C 5202

6-3 Endurance

6-3-1 Rapid Change of Temperature

$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Without distinct damage

Resistance shall be subjected to 5 cycles of the temperature cycle as following :

$-55 \pm 2^{\circ}\text{C}$ , 30 minutes  $\rightarrow$  room temperature, 2 ~ 3 minutes

$\rightarrow +125 \pm 2^{\circ}\text{C}$ , 30 minutes  $\rightarrow$  room temperature, 2 ~ 3 minutes

Refer to JIS C 5202 7.4

6-3-2 Dump Heat with Load

$R > 0.002$ , Resistance Change :  $\pm (0.5\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Without distinct damage

$40 \pm 2^{\circ}\text{C}$  with relative humidity of 90 to 95% RH

DC rated voltage for 1.5 hours on 0.5 hours off

1,000 + 48 / - 0 hours

Refer to JIS C 5202 7.9

6-3-3 Endurance at  $70 \pm 2^{\circ}\text{C}$

$R > 0.002$ , Resistance Change :  $\pm (1.0\%)$

$R \leq 0.002$ , Resistance Change :  $\pm (3.0\%)$

Without distinct damage

DC rated voltage for 1.5 hours on 0.5 hours off

1,000 + 48 / - 0 hours

Refer to JIS C 5202 7.10

Mounting of the test sample onto the test board shall be either of following methods.

(1) Mounting by solder dipping

Epoxy based glue shall be applied in the middle of two lands of the test board. The resistor shall be mounted in such a way that the electrodes of resistors will be evenly placed in the land area and then adhesive resin shall be cured. After applying the Resin Flux with 25 weight % Methyl Alcohol, the board shall be soldered by dipping into a molten solder bath with  $260 \pm 5^{\circ}\text{C}$  for 3 to 5 seconds

(2) Mounting by reflow soldering

Solder paste with approximate  $300 \mu\text{m}$  thickness shall be applied to the land of test board. The resistor shall be mounted in such way that the electrodes of resistors will be evenly placed in the land area and then shall be soldered under the circumstance that the surface temperature of the board shall be raised  $240 \pm 5^{\circ}\text{C}$  (peak) for 3 to 5 seconds in an upper-heater oven.

Test board A1, A2

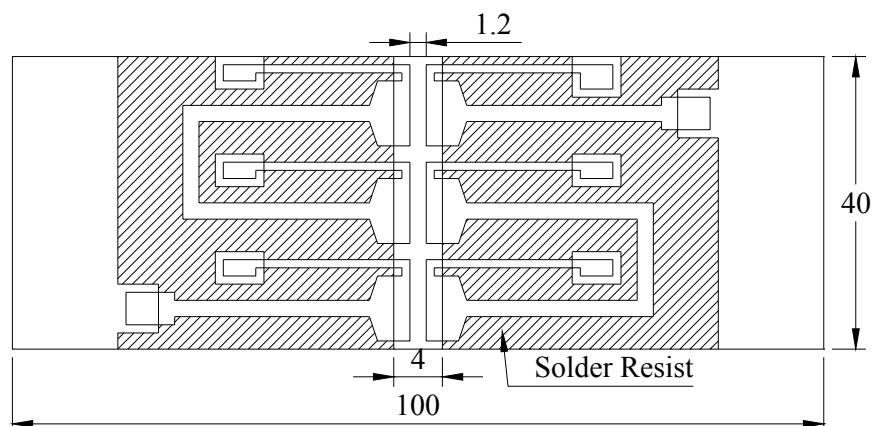
Material : Glass Fabric Epoxy Resin

Board thickness : 1.6mm

Copper foil thickness : 0.035mm

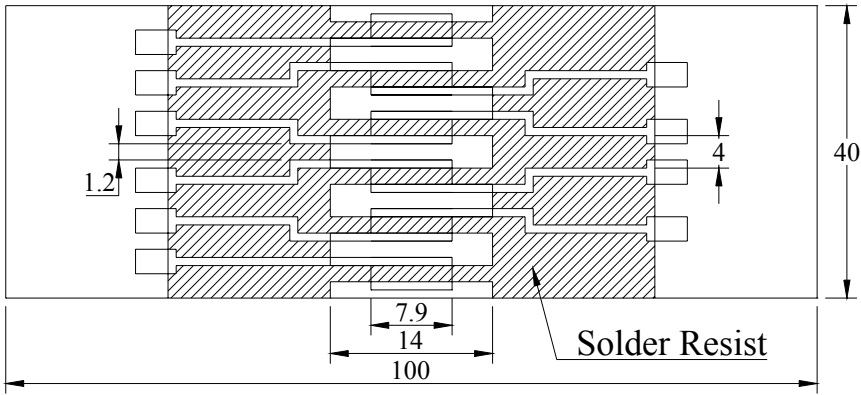
Solder Resist Coating

(1) Test Board A1



Unit : mm

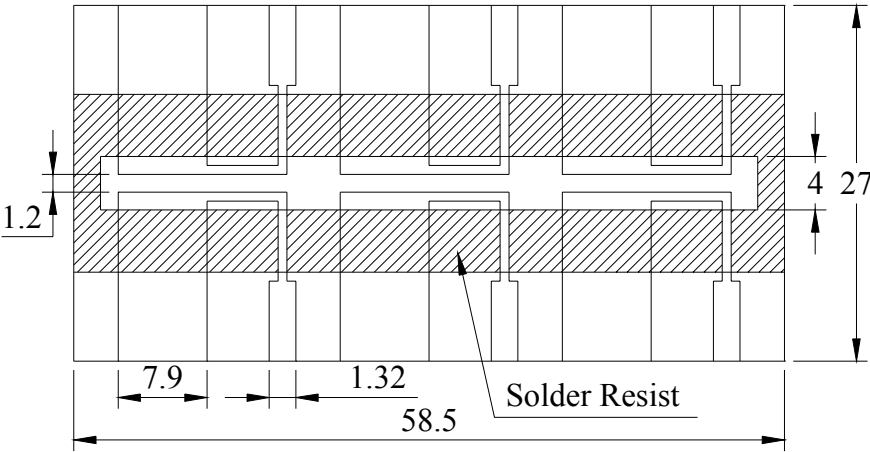
(2) Test Board A2



Unit : mm

Test Board B

Material : Glass Fabric Epoxy Resin  
Board thickness : 1.6mm  
Copper foil thickness : 0.035mm  
Solder Resist Coating



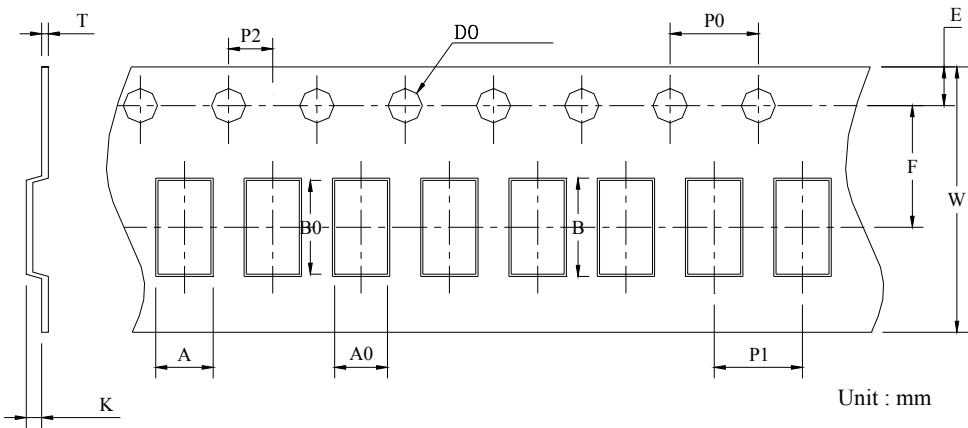
Unit : mm



7. Packaging

7-1 Dimensions

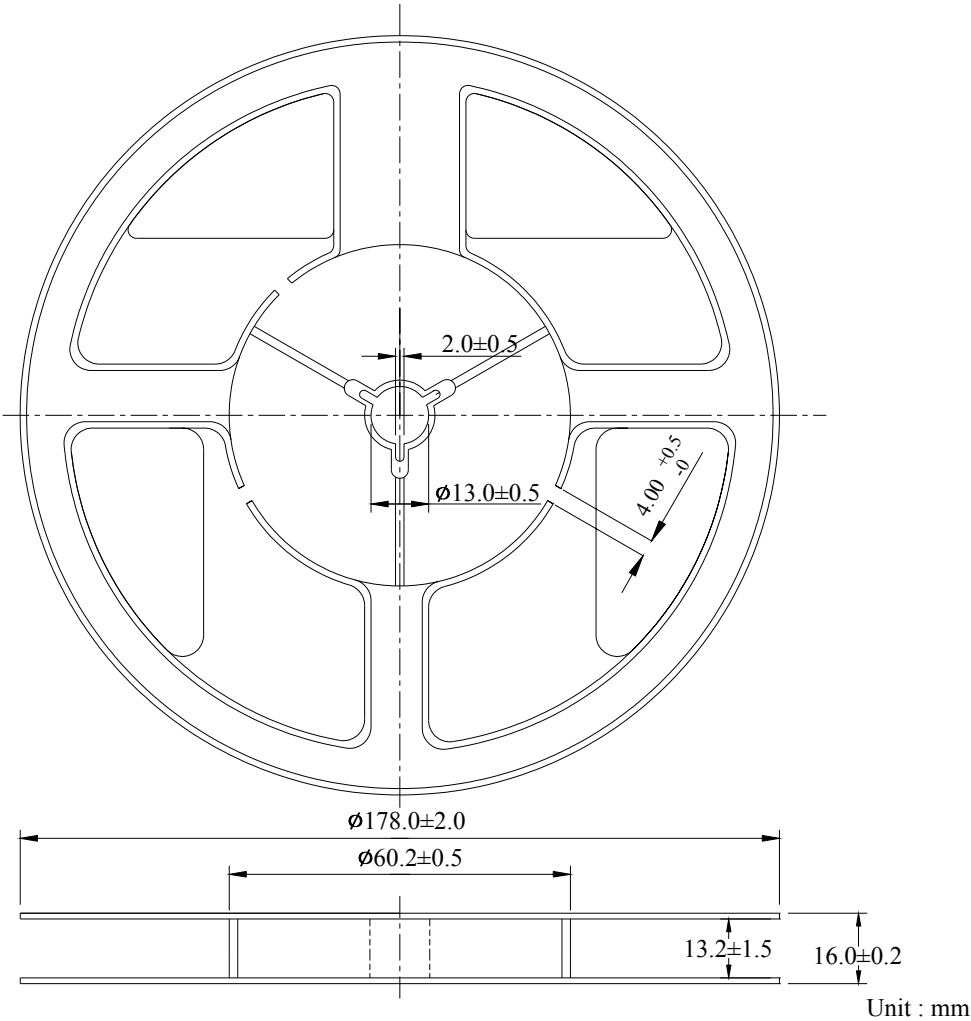
7-1-1 Tape packaging dimensions



A	2.6 ± 0.2	D0	φ 1.55 ± 0.05
A0	2.33 ± 0.1	K	1.1 ± 0.1
B	4.3 ± 0.2	T	0.3 ± 0.05
B0	4.1 ± 0.2	P0	4.0 ± 0.1
E	1.75 ± 0.1	P1	4.0 ± 0.1
F	5.5 ± 0.1	P2	2.0 ± 0.2
W	12.0 ± 0.2		

Unit : mm

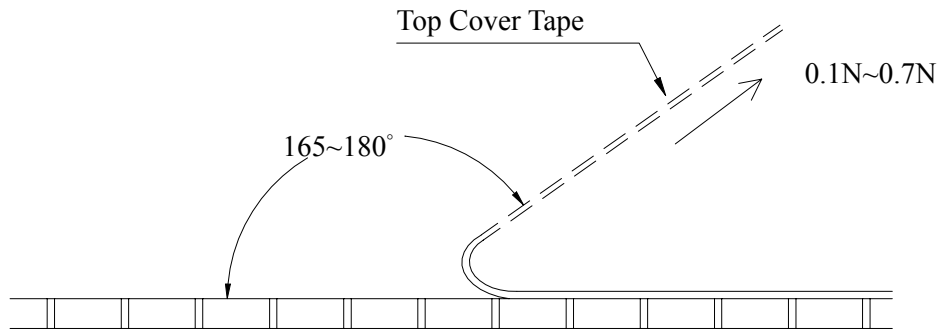
7-1-2 Reel Dimensions



7-2 Peel force of top cover tape

The peel speed shall be about 300 mm/min.

The peel force of top cover tape shall be between 0.1 to 0.7 N



7-3 Numbers of taping

2,000 pieces/reel

7-4 Making

The following items shall be marked on the reel.

- (1) Type designation.
- (2) Quantity
- (3) Manufacturing date code
- (4) Manufacturer's name
- (5) The country of origin