

**SPECIFICATION FOR APPROVAL****1/4W, 0805, Low Resistance Chip Resistor (Lead / Halogen Free)****1. Scope**

This specification applies to 2.0mm x 1.25mm size 1/4W, fixed metal film chip resistors rectangular type for use in electronic equipment.

**2. Type Designation**

RL1220        -          
(1)        (2)                    (3)                    (4)

Where (1) Series No.

(2) Temperature coefficient of resistance ( T.C.R. )  
refer to paragraph 4-1

(3) Resistance value: refer to paragraph 4-1

For example—

Three digits of number (  $0.1 \leq R$  )

R10 =  $0.1\Omega$

1R0 =  $1.0\Omega$

Four digits of number (  $R < 0.1\Omega$  )

R022 =  $0.022\Omega$

The “R” shall be used as a decimal point.

(4) Resistance tolerance: refer to paragraph 4-1.





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### 4. Ratings

#### 4-1 Specification

Power Rating*	1/4 W		
Resistance Value	0.010Ω~0.039Ω	0.043Ω~0.091Ω	0.1Ω~10Ω
Resistance Tolerance	± 1%(F) , ± 2%(G) , ± 5%(J)		
T.C.R (Temperature Coefficient of Resistance)	0 ~ +350ppm/(T)	0 ~ +200ppm/°C (S) 0 ~ +350ppm/°C (T)	0 ~ +100ppm/°C (R) 0 ~ +200ppm/°C (S)

Note\*:

Power Rating is based on continuous full load operation at rated ambient temperature of 70°C .  
For resistors operated at ambient temperature in excess of 70°C , the maximum load shall be derated in accordance with the following curve.

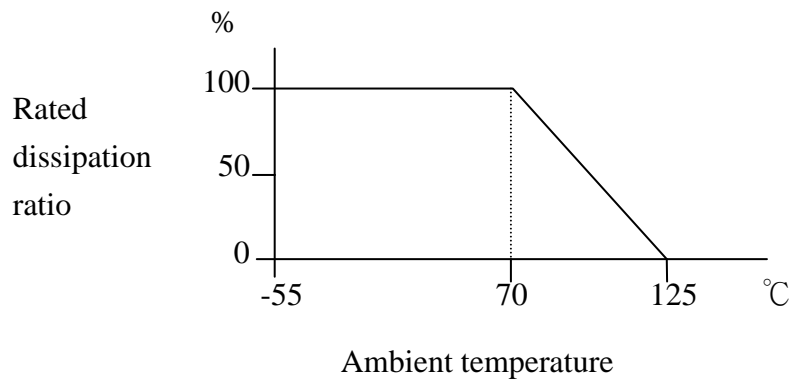


Figure 2 Derating Curve

#### 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

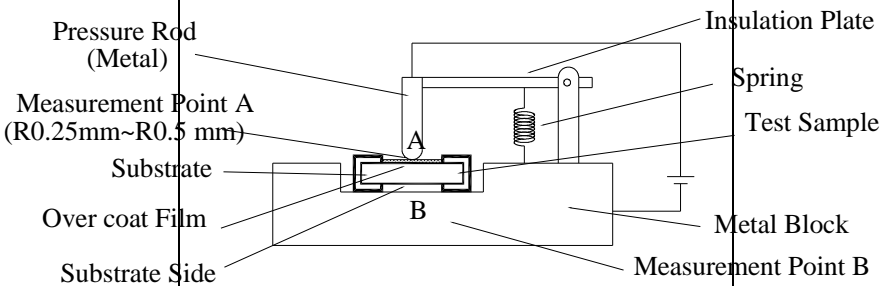
A rated resistance shall be marked on the protective coat with three digit of number.

Example -- 0.22Ω → R22

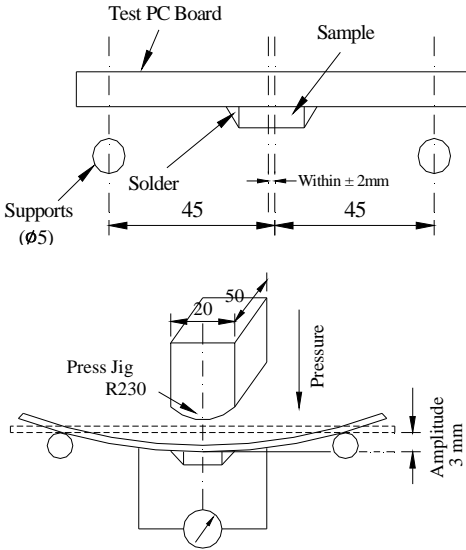
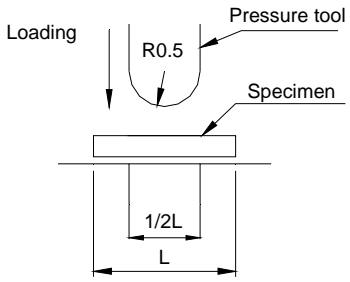
But, there is no marking in the rated resistance under 0.1Ω

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### 6. Characteristics

No	Test Item	Condition of Test	Requirements
1	Resistance and tolerance	Refer to IEC 60115-1 Sub-clause 4.5.	Not exceed the specified tolerance on rated resistance in paragraph 4-1
2	Temperature Coefficient of Resistance	Resistance shall be measured under standard atmospheric conditions. When the temperature reaches and maintained at 100°C higher than the temperature of standard atmospheric conditions, resistance shall be measured again. The measurement shall be made after a period of 30 min, after each specified temperature is reached. Refer to IEC 60115-1, Sub-clause 4.13	Not exceed the temperature tolerance coefficient of resistance in paragraph 4-1
3	Insulation Resistance	Place the specimen on the groove of metal plate so the edge of metal block positions almost center of both electrodes, with the surface of insulation enclosure located downward or upward and pressurize the block by a of $1.0 \pm 0.2N$ . The test voltage shall be $100 \pm 15V$ d.c., and maintain this voltage for about 1 min. The insulation resistance shall then be measured while applying the voltage.	(1)Between electrode and insulating enclosures. 100MΩ or more (2)Between electrode and base material.. 1000MΩ or more
			
		Refer to IEC 60115-1, Sub-clause 4.6.	
4	Voltage Proof	The specimen shall be tested as shown in paragraph 6.1.4. The test voltage shall be a voltage of 100V voltage : $100V_{AC}$ The voltage is gradually increased at a rate of about 100 V/s. from almost 0 V to the specified voltage and maintained as it is for $60s. \pm 5s$ , then gradually decreased to almost 0 V. Refer to IEC 60115-1.Sub-clause 4.7.	Change in resistance: $\pm (0.5\%)$ Without damage by flash over, burning or breakdown etc.

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<p>5</p>	<p>Substrate bending test (Bond strength of the end face plating)</p>	<p>Apply pressure in the direction of the arrow at a rate of about 1mm/s.until bent width reaches 3 mm and hold for 30 s.</p>  <p>Refer to IEC 60115-1 Sub-clause 4.33.</p>	<p>Change in resistance: <math>\pm</math> (0.5%) Without mechanical damage such as breaks.</p>
<p>6</p>	<p>Body strength</p>	<p>A load of 10N (1.02kgf) using a R0.5 pressure rod shall be applied to the center in the direction of the arrow and held for <math>10 \pm 1</math> sec.</p> 	<p>Change in resistance : <math>\pm</math> (0.5%) Without mechanical damage such as breaks.</p>



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7	Resistance to Soldering Heat	<p>(1) Solder bath method Pre-heat : 100 to 110°C 30 sec. Temperature : 270 ± 5°C 10 ± 1 sec.</p> <p>(2) Reflow Soldering method Peak temperature : 260 ± 5°C 10 sec or less Temperature : 220 ± 5°C 60 sec max. 2 cycles or less The temperature shall be surface temperature.</p> <p>(3) Soldering iron method Bit Temperature : 350 ± 5°C Time : 3 +1/0 sec</p> <p>The specimen shall be stored at standard atmospheric conditions for 1 hr after which the measurements shall be made. Refer to IEC 60115-1 Sub-clause 4.18.</p>	<p>Change in resistance : ± (0.5%) Without mechanical damage. Electrical characteristics shall be satisfied.</p>															
8	Solderability	<p>Solder temperature : 245 ± 5°C Duration of immersion: 2 ± 0.5 sec</p> <p>Refer to IEC 60115-1 Sub-clause 4.17</p>	<p>A new uniform coating of solder shall cover minimum of 95% of the surface being immersed.</p>															
9	Solvent Resistance	<p>Immersion cleaning At normal temperature, 5min Isopropyl alcohol Refer to IEC 60115-1 Sub-clause 4.29</p>	<p>Without distinct damage in appearance</p>															
10	Rapid Change of Temperature	<p>The specimen shall be subjected to 5 continuous cycles, each as shown in the figure below.</p> <table border="1" data-bbox="544 1552 1066 1787"> <thead> <tr> <th></th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±3°C</td> <td>30min</td> </tr> <tr> <td>2</td> <td>RT</td> <td>2~3min</td> </tr> <tr> <td>3</td> <td>+125±2°C</td> <td>30min</td> </tr> <tr> <td>4</td> <td>RT</td> <td>2~3min</td> </tr> </tbody> </table> <p>Use for Testing board B. R.T.=Room Temperature Refer to IEC 60115-1 Sub-clause 4.19</p>		Temperature	Time	1	-55±3°C	30min	2	RT	2~3min	3	+125±2°C	30min	4	RT	2~3min	<p>Change in resistance : ± (0.5%) Without mechanical damage and distinct damage.</p>
	Temperature	Time																
1	-55±3°C	30min																
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11	Endurance (damp heat with load)	The specimen shall be placed in the test chamber at a temperature $60 \pm 2^{\circ}\text{C}$ and a relative humidity 90 to 95%. And then subjected to a voltage cycle consisting of rated d.c. voltage application of 1 hr 30min and rest of 30min repeatedly for $1,000 + 48 / 0$ h. However the applied voltage shall not exceed the limited element voltage.	Change in resistance : $\pm$ (1.0%) Without mechanical damage and distinct damage.
12	Endurance	The specimen shall be placed in the test chamber at $70 \pm 2^{\circ}\text{C}$ . And then subjected to a voltage cycle consisting of rated d.c. voltage application for 1 or 30 min and rest of 30 min repeatedly for $1,000 \begin{smallmatrix} +48 \\ 0 \end{smallmatrix}$ h. However the applied voltage shall not exceed the limited element voltage. Refer to IEC 60115-1 Sub-clause 4.25	Change in resistance : $\pm$ (1.0%) Without mechanical damage and distinct damage.

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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  $200 \mu\text{m}$  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  $245 \pm 5^{\circ}\text{C}$  (peak) for 5 to 10 seconds in an upper-heater oven.

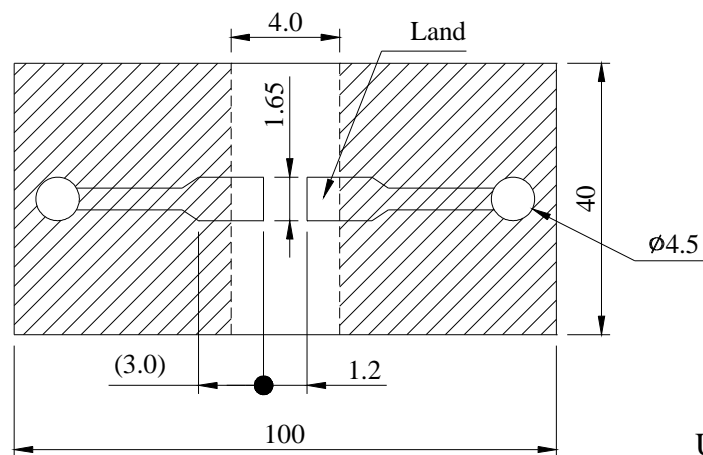
Test board A

Material : Glass Fabric Epoxy Resin ( Refer to JIS C 6484 )

Board thickness : 1.6mm

Copper foil thickness : 0.035mm

Solder Resist Coating



Unit : mm





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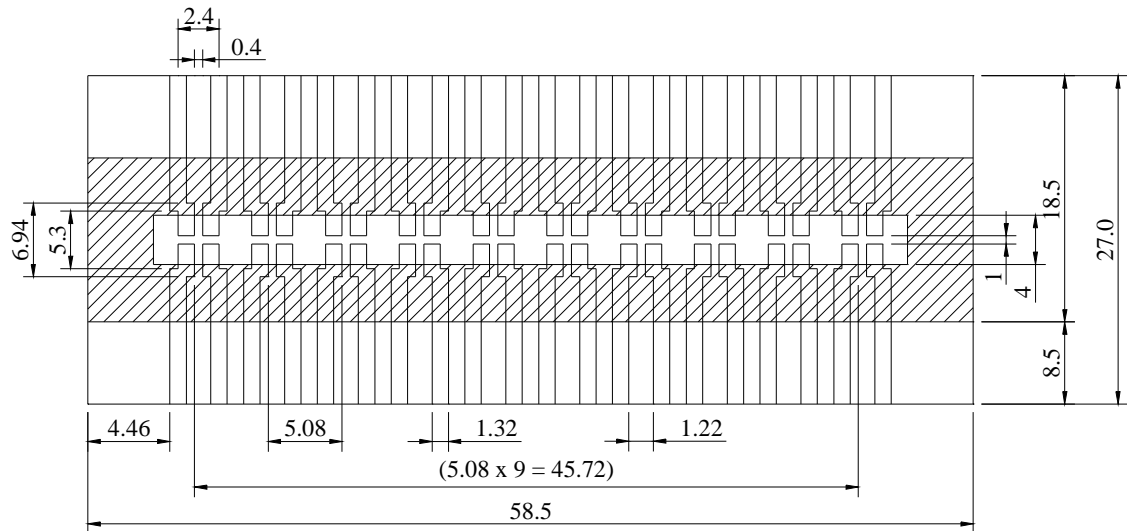
#### Test Board B

Material : Glass Fabric Epoxy Resin ( Refer to JIS C 6484 )

Board thickness : 1.6mm

Copper foil thickness : 0.035mm

Solder Resist Coating



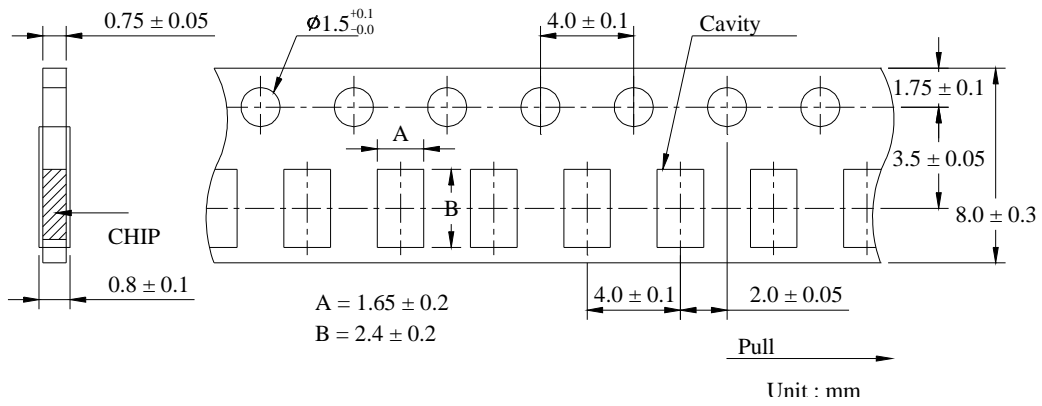
Unit : mm

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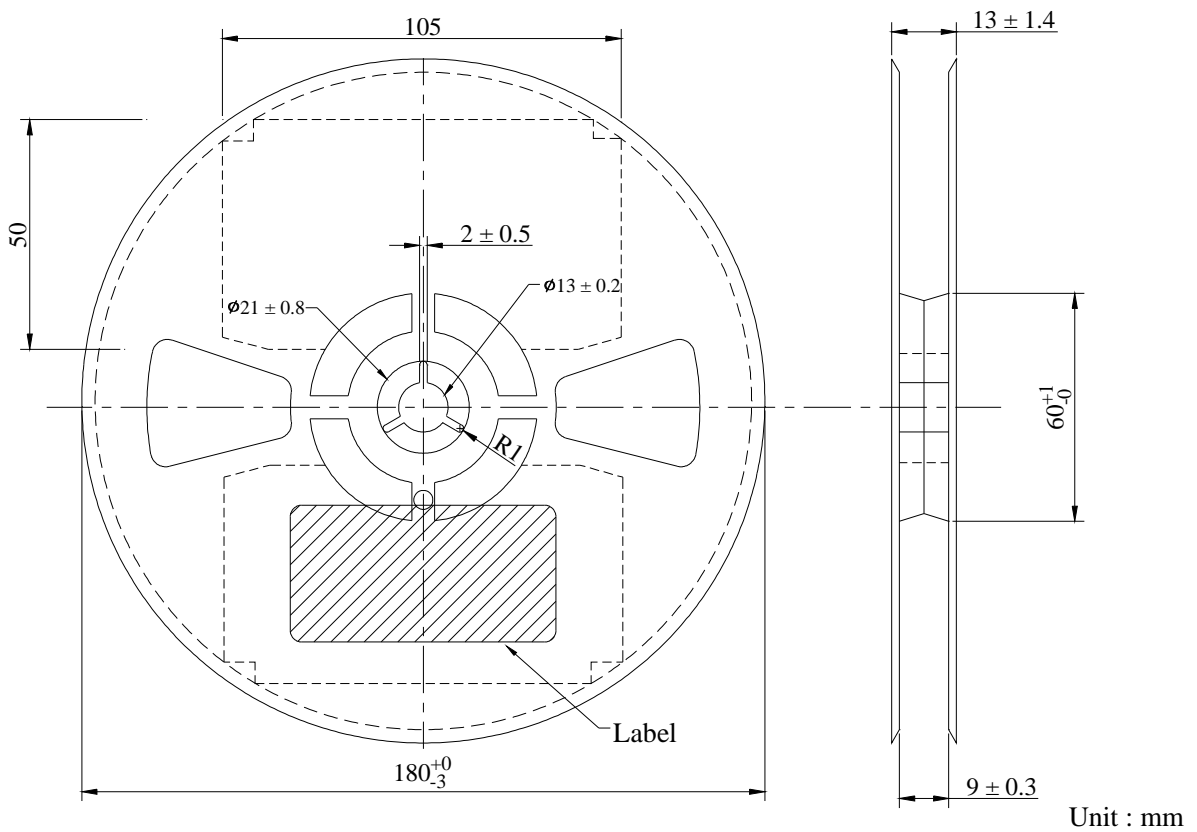
### 7. Packaging

#### 7-1 Dimensions

##### 7-1-1 Tape packaging dimensions



##### 7-1-2 Reel Dimensions



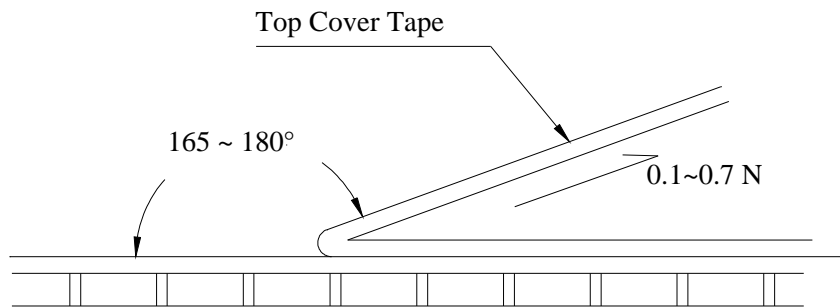


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### 7-2 Peel force of top cover tape

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.



### 7-2 Numbers of taping

5,000 pieces/reel

### 7-3 Label marking

The following items shall be marked on single of the reel.

- (1) Type designation .
- (2) Quantity
- (3) Manufacturing date code
- (4) Manufacturer's name
- (5) The country of origin
- (6) Shipping number
- (7) Identification showing lead free products.