

**SPECIFICATION FOR APPROVAL****1/8W 0816 LOW RESISTNACE CHIP RESISTOR**

1. Scope

This specification applies to 0.8mm x 1.60mm size 1/8W, fixed metal film chip resistors rectangular type for use in electronic equipment.

2. Type Designation

RL0816□ - □□□ □
(1) (2) (3)

Where (1) Series No :refer to paragraph 4-1
RL0816T or RL0816S

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

For example—

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

R10 = 0.1Ω

1R0 = 1.0Ω

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

R022 = 0.022Ω

(3) Resistance tolerance:

F = $\pm 1\%$

G = $\pm 2\%$

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3. Construction and Physical Dimensions

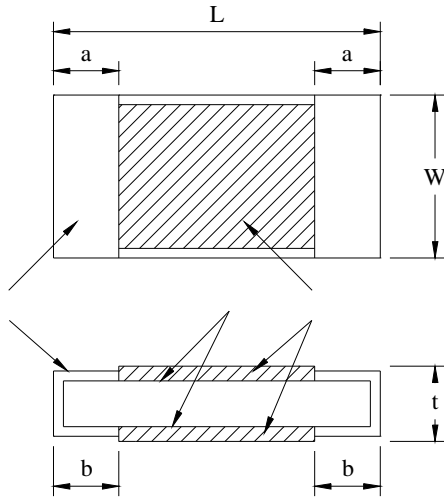


Figure 1-1. Double sides structure ($\leq 0.091\Omega$)

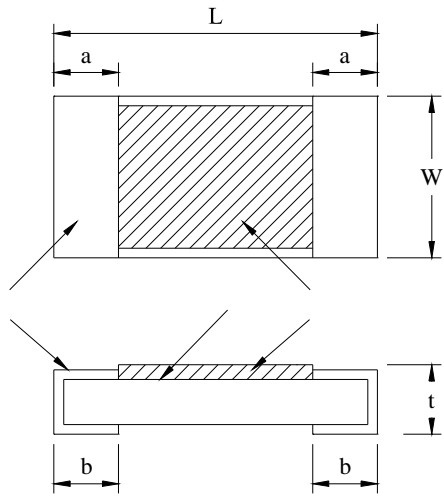


Figure 1-2. Single side structure ($> 0.091\Omega$)

Code Letter	Dimensions (mm)	
	Double sides Structure	Single side Structure
L	1.60 ± 0.10	1.60 ± 0.10
W	0.80 ± 0.10	0.80 ± 0.10
t	0.50 ± 0.10	0.45 ± 0.10
a	0.20 ± 0.15	0.20 ± 0.15
b	0.20 ± 0.15	0.20 ± 0.15

Note :

- ① Resistive element Nickel alloy film
- ② Electrode plating
- ③ Protective coat Sn 100% (Lead free)
- ④ Substrate Epoxy Resin coating
- Alumina ceramic

mass : 2mg (ref.)



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4. Ratings

4-1 Specification

Power Rating*	1/8 W	
Series No.	RL0816T	RL0816S
Resistance Value	0.015Ω, 0.020Ω ~ 0.091Ω	0.1Ω ~ 6.8Ω
Resistance Tolerance	± 1%(F) , ± 2%(G)	

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.

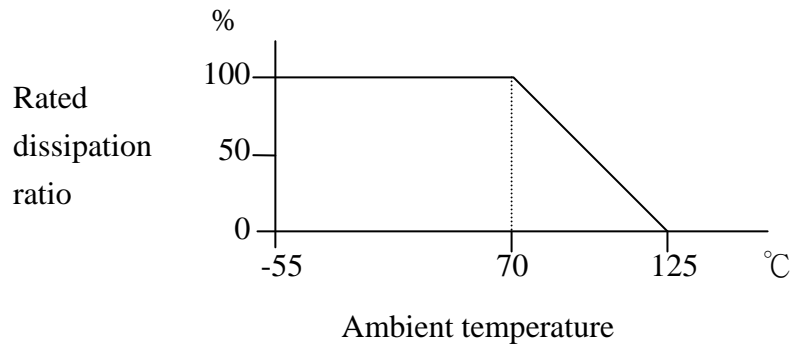


Figure 2 Derating Curve

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

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5. Characteristics

5-1 Electrical

5-1-1 Resistance and tolerance

Resistance value shall be within the tolerance specified in paragraph 4-1
Refer to IEC 60115-1 Sub-clause 4.5.

5-1-2 Temperature Coefficient of Resistance

Not exceed the temperature coefficient of resistance specified in paragraph 4-1
Room temperature → Room temperature + 100°C
Refer to IEC 60115-1 Sub-clause 4.13.

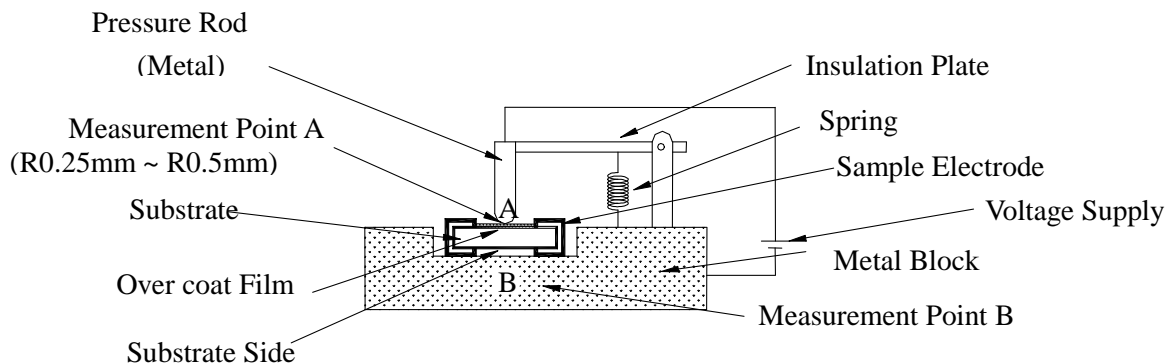
5-1-3 Short Time Overload

Resistance Change : $\pm (0.5\%)$
Without significant damage by flashover (spark , arching), burning or breakdown etc.
Test voltage : 2.5 times the rated voltage.
Duration : 5 seconds
Refer to IEC 60115-1 Sub-clause 4.13.

5-1-4 Insulation Resistance

- (1) Between Electrode and Protection Film
100M Ω or over
- (2) Between Electrode and Substrate
1,000M Ω or over

The resistor shall be cramped in the metal block and tested , as shown below.
Test voltage : $100 \pm 15V_{DC}$ for 1 minute
Refer to IEC 60115-1 Sub-clause 4.6.



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5-1-5 Voltage Proof

Resistance Change : $\pm (0.5\%)$

Without damage by flashover, fire or breakdown, as shown below.

The resistor shall be tested as shown in paragraph 4-1-4

The voltage : 100V_{AC} (rms.) for 1 minute

Refer to IEC 60115-1 Sub-clause 4.7.

5-2 Mechanical

5-2-1 Terminal Strength

Resistance Change : $\pm (0.5\%)$

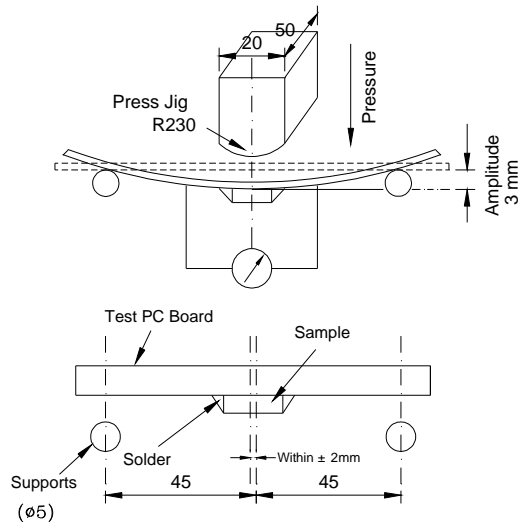
Without mechanical damage such as breaks.

Electrical characteristics shall be satisfied.

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

Bending Amplitude : 3 mm 30 seconds

Refer to IEC 60115-1 Sub-clause 4.33.



Refer to EIAJ RC-2530

Unit : mm

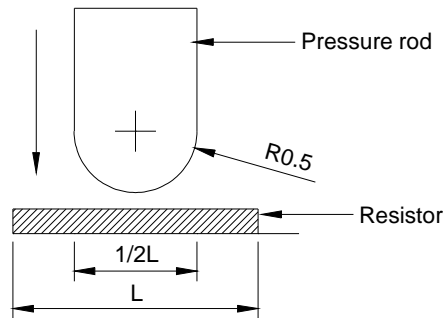
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5-2-2 Body Strength

Resistance Change : $\pm (0.5\%)$

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 ± 1 seconds.



Unit : mm

5-2-3 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 ± 0.5 seconds

Refer to IEC 60115-1 Sub-clause 4.17.

5-2-4 Resistance to Soldering Heat

Resistance Change : $\pm (0.5\%)$

Electrical characteristics shall be satisfied.

Without distinct deformation in appearance.

(1) Solder bath method

Pre-heat : 100 to 110°C 30 seconds

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

(2) Reflow Soldering method

Peak temperature : $260 \pm 5^\circ\text{C}$ 10 seconds or less

Temperature : $220 \pm 5^\circ\text{C}$ 60 seconds max.

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

(3) Soldering iron method

Bit temperature : $350 \pm 5^\circ\text{C}$ $3 \pm 1/0$ seconds

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

Refer to IEC 60115-1 Sub-clause 4.18.



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5-2-5 Resistance to Solvent

Without mechanical damage and distinct damage in appearance.

Immersion cleaning

At normal temperature 300 seconds in Isopropyl Alcohol.

Refer to IEC 60115-1 Sub-clause 4.29.

5-3 Endurance

5-3-1 Rapid Change of Temperature

Resistance Change : $\pm (0.5\%)$

Without distinct damage

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

$-55 \pm 3^{\circ}\text{C}$, 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 IEC 60115-1 Sub-clause 4.19.

5-3-2 Dump Heat with Load

Resistance Change : $\pm (1.0\%)$

Without distinct damage

$60 \pm 2^{\circ}\text{C}$ with relative humidity of 90 to 95%

DC rated voltage for 1.5 hours on 0.5 hour off

1,000 + 48 / - 0 hours

5-3-3 Endurance at 70°C

Resistance Change : $\pm (1.0\%)$

Without distinct damage

$70 \pm 2^{\circ}\text{C}$

DC rated voltage for 1.5 hours on 0.5 hour off

1,000 + 48 / -0 hours

Refer to IEC 60115-1 Sub-clause 4.25.

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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 temperature) for 5 to 10 seconds in an upper-heater oven.

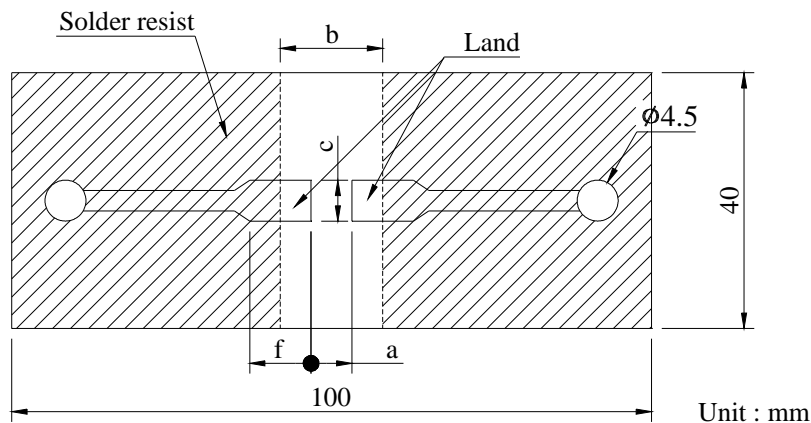
Test Board

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

Board thickness : 1.6mm

Copper foil thickness : 0.035mm

(1) Test board A

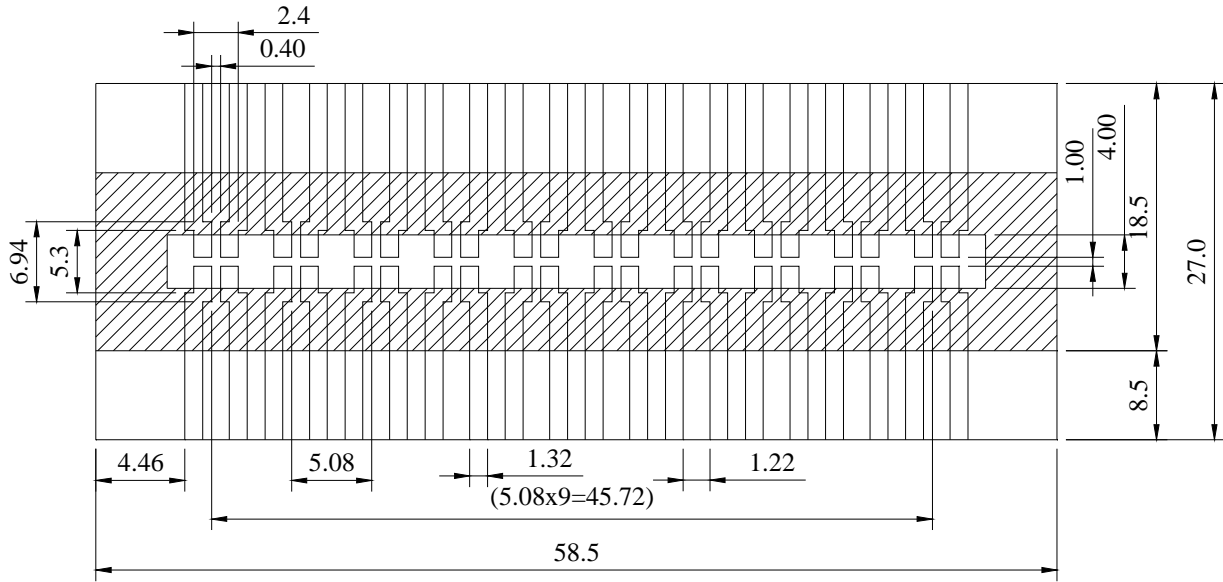


a	b	c	f
1.0	3.0	1.2	(2.0)



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(2) Test board B (For another test)



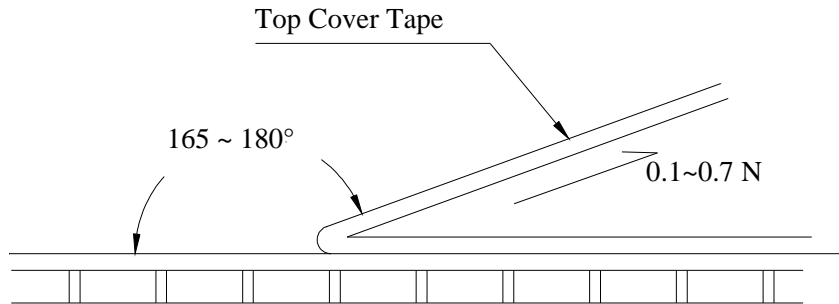
Unit : mm

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6-2 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.



6-3 Numbers of taping

5,000 pieces/reel

6-4 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.

6-5 Note

Manufactured by our joint company. (Susumu Co., Ltd.)