

SPECIFICATION FOR APPROVAL

1/20W, 0201 Low Resistance Chip Resistor (Lead / Halogen free)

1. Scope

This specification applies to 0.3mm x 0.6mm size 1/20W, fixed metal film chip resistors rectangular type for use in electronic equipment.

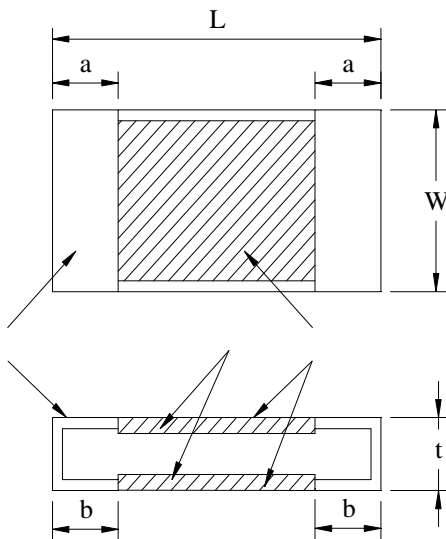
2. Type Designation

RL0603 — D — □□□□ □
 (1) (2) (3) (4)

Where

- (1) Series No.
- (2) Power rating
D = 1/20W
- (3) Resistance value:
For example—
R070 = 0.070 Ω
R100 = 0.1 Ω
- (4) Resistance tolerance:
F = ± 1%
G = ± 2%
J = ± 5%

3. Construction and Physical Dimensions



Code Letter	Dimensions (mm)
L	0.6 ± 0.03
W	0.31 ± 0.04
t	0.27 ± 0.04
a	0.14 ± 0.06
b	0.14 ± 0.06

- ① Resistive element : Metal film
(Under protection film)
- ② Electrode : Solder Sn (on Cu)
Sn 100% (Lead free)
- ③ Protection film : Epoxy resin
- ④ Substrate : Alumina

Figure 1. Construction and Dimensions



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4. Electrical Specifications

4-1 Specification

Power Rating*	1/20 W	
Resistance Range	0.020Ω ~ <0.070Ω	0.070Ω ~ 1.0Ω
Resistance Tolerance	±1% , ±2% , ±5%	
T.C.R. (Temperature Coefficient of Resistance)	0~500 ppm/°C	± 200ppm/°C

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.

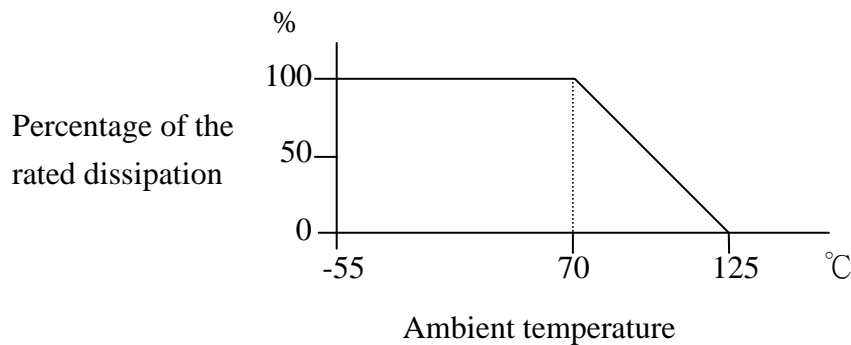


Figure 2 Derating Curve

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

Test Item	Condition of Test	Requirements
Short Time Overload	2.5 * Rated power for 5 seconds Refer to JIS C 5201-1 4.13	$\Delta R : \pm (0.5\%+0.0005\Omega)$ Without significant damage by flashover (spark, arching), burning or breakdown etc.
Insulation Resistance	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 JIS C 5201-1 4.6 Mounting condition G.	Between Electrode and Protection Film $100M\Omega$ or over Between Electrode and Substrate $1,000M\Omega$ or over
Voltage Proof	The voltage : $100V_{AC}$ (rms.) for 1 minute Refer to JIS C 5201-1 4.7	$\Delta R : \pm (0.5\%+0.0005\Omega)$ Without damage by flashover, fire or breakdown, as shown below.
Thermal Shock	$-55 \sim 125^{\circ}C$ 5 cycles, 15 min at each extreme condition Refer to JIS C 5201-1 4.19	$\Delta R : \pm (1.0\%+0.0005\Omega)$ Without distinct damage in appearance
Low Temperature Storage	Kept at $-55^{\circ}C$, 1,000 hours Refer to JIS C 5201-1 4.23.4	$\Delta R : \pm (1.0\%+0.0005\Omega)$ Without distinct damage in appearance
High Temperature Exposure	Kept at $125^{\circ}C$ for 1,000 hours Refer to JIS C 5201-1 4.23.2	$\Delta R : \pm (1.0\%+0.0005\Omega)$ Without distinct damage in appearance
Solderability	Temperature of Solder : $245 \pm 5^{\circ}C$ Immersion Duration : 2 ± 0.5 second Refer to JIS C 5201-1 4.17	Uniform coating of solder cover minimum of 95% surface being immersed
Resistance to Soldering Heat	Dipped into solder at $270 \pm 5^{\circ}C$ for 10 ± 1 seconds Refer to JIS C 5201-1 4.18	$\Delta R : \pm (0.5\%+0.0005\Omega)$ Without distinct deformation in appearance

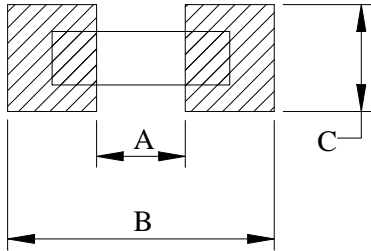
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Test Item	Condition of Test	Requirements
Load Life	Rated voltage for 1.5 hours followed by a pause 0.5 hour at $70 \pm 2^{\circ}\text{C}$. Cycle repeated 1000 hours Refer to JIS C 5201-1 4.25	$\Delta R : \pm (1.0\% + 0.0005\Omega)$ Without distinct damage in appearance
Damp Heat with Load	$40 \pm 2^{\circ}\text{C}$ with relative humidity 90% to 95%. D.C. rated voltage for 1.5 hours ON and 30 minutes OFF. Cycle repeated 1,000 hours Refer to JIS C 5201-1 4.24	$\Delta R : \pm (1.0\% + 0.0005\Omega)$ Without distinct damage in appearance
Mechanical Shock	100 G's for 6 milliseconds. 5 pulses Refer to JIS C 5201-1 4.21	$\Delta R : \pm (0.5\% + 0.0005\Omega)$ Without mechanical damage such as break
Bending Test	Glass-Epoxy board thickness : 1.6mm Bending width : 2mm Between the fulcrums : 90mm Refer to JIS C 5201-1 4.33	$\Delta R : \pm (0.5\% + 0.0005\Omega)$ Without mechanical damage such as break



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6. Recommend Land Pattern Dimensions



A	0.3
B	1.0
C	0.3 ~ 0.7

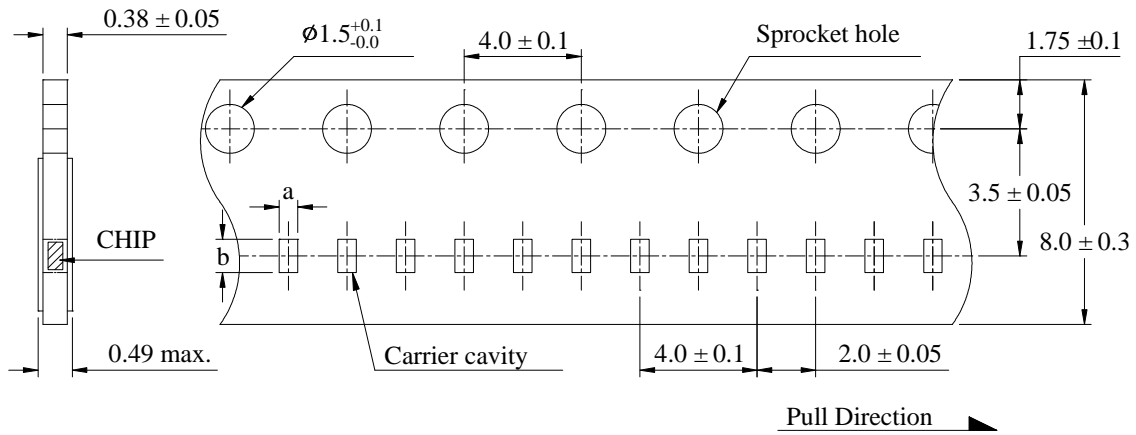
Unit : mm

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7. Packaging

7-1 Dimensions

7-1-1 Tape packaging dimensions

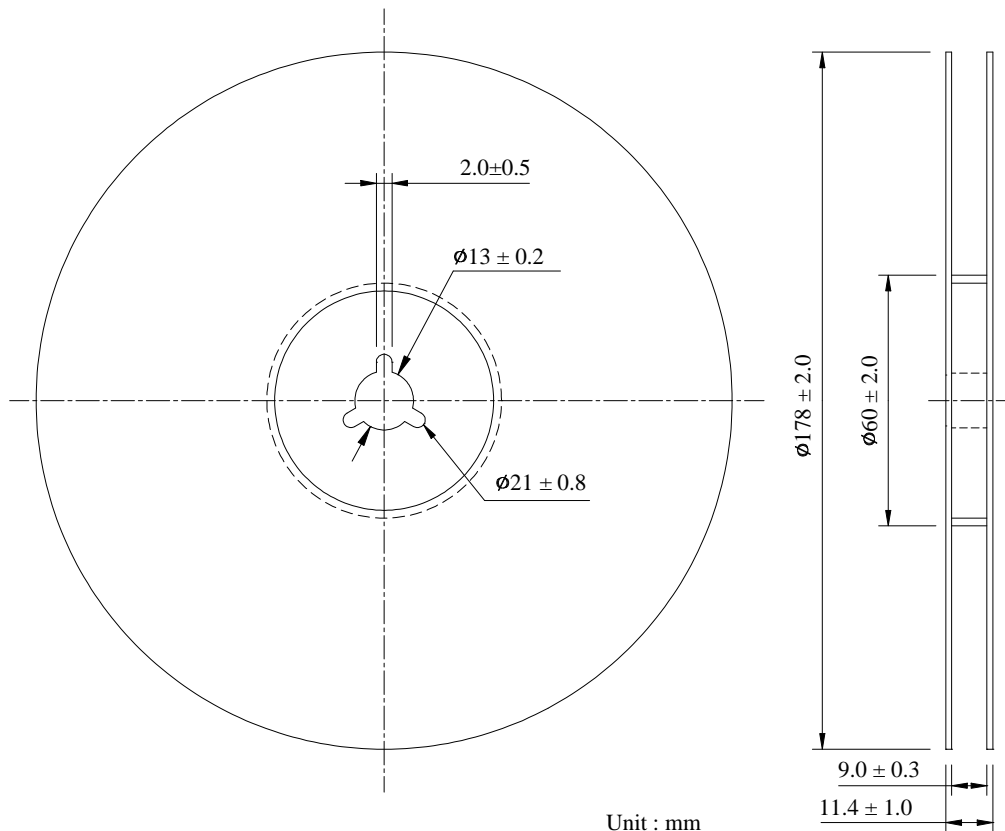


※Pre-empted holes : 150 holes (or 30cm) or more.

Code letter	a	b
Dimension	0.40 ± 0.05	0.7 ± 0.05

Unit : mm

7-1-2 Reel dimensions



Unit : mm

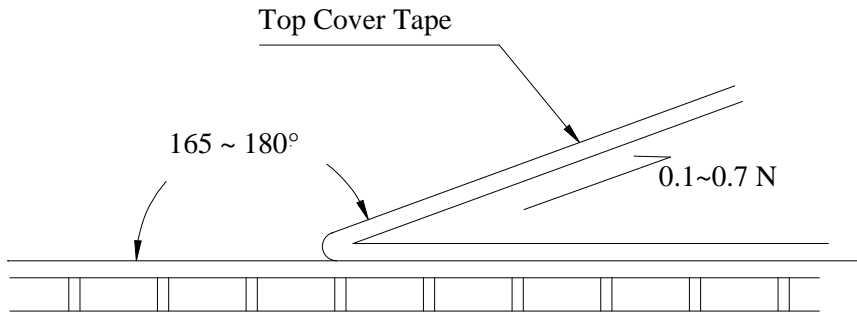


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7-2 Peel force of top cover tape

The peel speed shall be about 300 mm/min.

The peel force of top cover tape shall be between 0.1 to 0.5 N.



7-3 Numbers of taping

10,000 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