

1. Applicable Scope:

This standard specification is for use in consumer electronics, computers, telecommunications, control instruments...etc.

2. Part Number:

It is composed by Type, Rated Wattage, Nominal Resistance, Tolerance, Temperature Coefficient and Package/Terminal Form. e.g.

RN 1/4W 1KΩ F _____ T/B
 Type Rated Wattage Nominal Resistance Tolerance Temp. Coefficient Package/Terminal Form

2.1 Type :

Precision Metal Film Resistors are Called "RN".

2.2 Rated Wattage:

Shown by "W", such as 1/8W,1/4WS,1/4W,1/2WS,0.6W,1/2W,1W,1WL.

2.3 Nominal Resistance:

Ω,KΩ,MΩ are its unit, which be in accordance with JIS-C6409 article 6 (EIA RS-196A) series.

2.4 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.

Code	Tolerance(±)
J	5%
G	2%
F	1%
D	0.5%
C	0.25%
B	0.1%

2.5 Temperature Coefficient:

Code	T.C.
T-1	±100ppm/°C
T-2	±50ppm/°C
T-9	±25ppm/°C

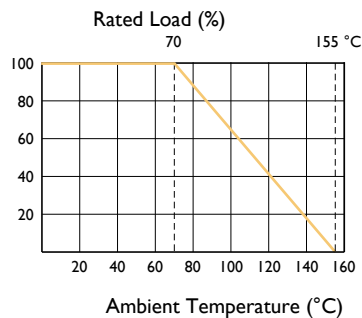
2.6 Package/Terminal Form:

T/B=tape in box; Nil= Bulk; M form.

Remark : RN Series Resistors are RoHS Compliant.

3. Rated Power:

Rated power is the value of Max load voltage specified at the ambient temperature of 70°C, and shall meet the functions of electrical and mechanical performance. When the ambient temperature surpasses above mentioned temperature, the value declines as per following DERATING CURVE



3.1 Rated Voltage:

It is calculated through the following formula:

where E: rated voltage (V)

P: rated power (W)

R: nominal resistance value (Ω)

$$E = \sqrt{PXR}$$

However, in case the voltage calculated exceeds the maximum load voltage, such the maximum load voltage shall be regarded as its rated voltage, means whichever less.

4. Dimension and structure:

4.1 Dimension:



Unit: mm

TYPE	D±1	L±1	H±3	d±0.1	Resistance Range	Max Working Voltage
RN	1.7±0.2	3.7max	28	0.45	10Ω~10MΩ	150V
1/8W						200V
1/4WS						
1/4W	2.4±0.5	6.4	28	0.6	10Ω~10MΩ	250V
1/2WS						
1WSS						
1/2W	3.5	9	28	0.65	10Ω~2MΩ	350V
1W	4.5	11	28	0.8	10Ω~2MΩ	500V
1WL	5	15	28	0.8	10Ω~2MΩ	500V

- © Notes:1. Too low or too high ohmic value can be supplied only case by case
- 2. Max Overload Voltage is 2 times of Max Working voltage
- 3. RN 1W & RN 1WL are coated by flameproof paint

4.2 Structure :

4.2.1 Ceramic Rod:

It is made of Forste imported from Japan.

4.2.2 Terminal:

Terminal is to be firmly connected with resistors element, both electrically and mechanically, and allow easy soldering.

4.2.3 Coating:

Coating is done by EPOXY insulating paint which is solid enough to be free from looseness, crack and easy breakage. The paint shall be limited within 1mm of lead wires from resistors body. (Coating can also be made by flameproof paint upon request.)

4.2.4 Marking:

Marking is made on resistors surface by color coding.

5. Operating Temperature Range: -55°C ~155°C**6. Mechanical Performance:****6.1 Terminal tensile:**

To Fix the resistor body, a static load of 1kg.is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

6.2 Twist withstand:

To bend the lead wire at the point of about 6mm from resistor body to 90°, then catch the wire at 1.2 ±0.4mm apart from the bent point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn 2 times without causing any break and looseness.

7. Electrical Performance:**7.1 Resistance Temperature Coefficient:**

It shall be as follows:

Code	T.C.
T-1	±100ppm/°C
T-2	±50ppm/°C
T-9	±25ppm/°C

$$\text{T.C. (ppm/°C)} = \left[\frac{R2 - R1}{R1} \right] \times \left[\frac{1}{T2 - T1} \right] \times 10^6$$

where

R1: resistance value at reference temperature

R2: resistance value at test temp.

T1: reference temp. (usu. 25°C)

T2: test temp. (about 75°C)

7.2 Temperature Cycle:

Following temp. cycles are to be made 5 times and then put at room temp. for one hour, the resistance value change rate between pre-and-post test shall be within ±0.25%.

Steps	Temperature(°C)	Time (minutes)
1 st step	-55 ± 3	30
2 nd step	Room temp.	3
3 rd step	155 ± 3	30
4 th step	Room temp.	3

7.3 Short Time Over Load:

When the resistors are applied 2.5 times as much as rated voltage for 5 seconds continuously, it shows no evidence of arc, flame...etc. Removing the voltage and place the resistors to the normal condition for 30 minutes, the resistance value change rate between pre-and-post test shall be within ±0.5%.

7.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC 500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over 10000M Ω .

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying Max overload voltage (RN 1W & RN 1WL:Applying AC 350V, RN 1/4WS:Applying AC 300V) for one minute and should find no physical damage to the resistors, such as arc,char...etc.

7.6 Load Life:

The resistors arrayed are sent into the 70 $^{\circ}$ C oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000 $_{.0}^{+48}$ hours in total. Then, after removing the voltage, take the resistors out of the oven and left under normal temp. for one hour cooling. The resistance value change rate between pre-and-post test shall be within $\pm 2\%$.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of 40 $\pm 2^{\circ}$ C and the humidity of 90~95%, then rated power is applied for 1.5 hours and cut off for 0.5 hour. The similar cycle will be repeated for 1000 $_{.0}^{+48}$ hours in total (including cut- off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp. for one hour. The resistance value change rate between pre-and- post test shall be within $\pm 1.5\%$. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

7.8 Solder-ability:

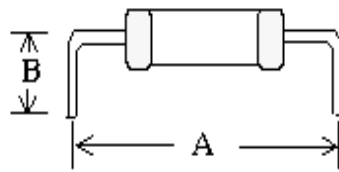
The leads with flux are dipped in a melted solder of 235 $\pm 5^{\circ}$ C for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

7.9 Resistance to Soldering Heat:

Two leads are together dipped in a melted solder of 270 $\pm 5^{\circ}$ C for 10 ± 1 seconds, or 350 $\pm 10^{\circ}$ C for 3.5 ± 0.5 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm 0.5\%$.

8. Others:

8.1 M Form:

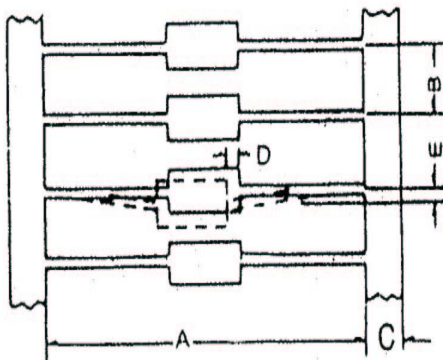


Unit: mm

Form	M1	M2	M3
A	10±0.5	12.5±0.5	15±0.5
B	7±1	6±1	6±1
	10±1	6±1	6±1

RN 1/4W & 1/2WS & 0.6W :M1 & M2, RN 1/2W:M3

8.2 Tape Type Dimension:



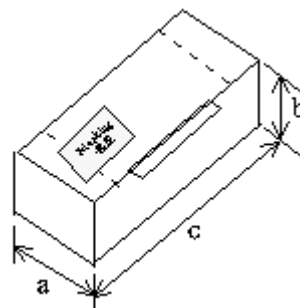
Unit: mm

Wattage	Size Type	A	B	C±1	D Max	E Max
		≤1/4W	T-26	26 ⁺¹ ₋₀	5±0.5	6
	T-52	52±1	5±0.5	6	0.6	1.2
1/2W	T-52	52±1	5±0.5	6	0.6	1.2
1W	T-63	63±1	5±1	6	0.6	1.2
1WL	T-63	63±1	10±1	6	0.6	1.2

8.3 Tape In Box :

Unit: mm

Wattage	TYPE	QTY PER BOX	a	b	c
1/8W	T-26	5,000	50	70	255
1/4WS	T-52	5,000	75	70	255
1/4W	T-26	4,000	50	90	255
1/2WS	T-52	5,000	75	100	255
0.6W	T-52	5,000	75	100	255
1/2W	T-52	1,000	75	55	255
1W	T-63	1,000	85	105	260
1WL	T-63	1,000	100	110	265



9. Precautions In Use:

To prevent electric corrosion risk (10 ppm defect rate over 1 year use), the resistance value over 100KΩ should be limited at 50V when ambient temperature and humidity is higher than 85°C/85%.