



Document No.:S-E05-1521

TY-OHM ELECTRONIC WORKS CO.,LTD.

WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

RESISTOR SPECIFICATION

Version : 2015.A

APPROVED BY

APPROVED	REVIEWED	PREPARED
<i>Jack Luo</i> OCT 30, 2015	<i>Jack Luo</i> OCT 30, 2015	<i>Rob Lo</i> OCT 30, 2015

Unauthorized duplication is prohibited

WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

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 and Package. e.g.

KNP	1W	10R	J	T/B
Type	Rated Wattage	Nominal Resistance	Tolerance	Package

2.1 Type :

Wire Wound Resistors, Flameproof/Resin Paint are called "KNP".

2.2 Rated Wattage:

Shown by "W", such as 1/4W, 1/2W, 1W, 2W, 3W, 5W, 6W, 7W, 8W, 10W.

2.3 Nominal Resistance:

Ω , $K\Omega$ are its unit, which be in accordance with IEC publication 63 E24 series or E96 series;
Letter "10R" indicates resistance value 10Ω .

2.4 Tolerance:

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

F= $\pm 1\%$, G= $\pm 2\%$, J= $\pm 5\%$.

2.5 Package:

Nil: Bulk

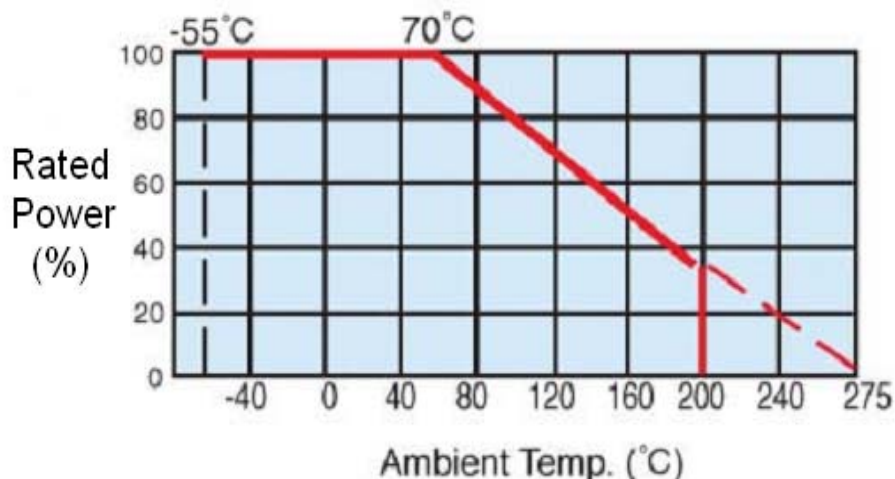
T/B= Standard tape in box.

T52= 52 mm width special tape in box.

T63= 63 mm width special tape in box.

3. Rated Power:

Rated power is the value of Max load power 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.



WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

3.1 Rated Voltage:

It is calculated through the following formula:

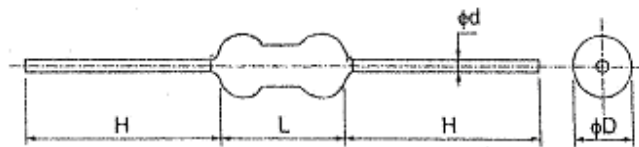
$$V = \sqrt{P \times R}$$

where V: rated voltage
P: rated power
R: total nominal resistance

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 (Ω)	Dielectric Withstanding Voltage
KNP						
1/4W	2.6±0.5	6.8	28	0.6	0.1 ~ 200	250V
1/2W	3	9	28	0.65	0.1 ~ 300	350V
1W	4	9	28	0.65	0.01 ~ 500	350V
2W	5	11	28	0.8	0.01 ~ 800	500V
3W	5.5	13	38	0.8	0.01 ~ 800	500V
3WL	5.5	15	38	0.8	0.01 ~ 800	500V
5W	6.5	19	38	0.8	0.01 ~ 800	500V
6W	8.5	24	38	0.8	0.1 ~ 1K	500V
7W	8.5	32	33	0.8	0.1 ~ 1.5K	500V
8W	8.5	41	38	0.8	0.1 ~ 2.2K	800V
10W	8.5	53	38	0.8	0.1 ~ 3.3K	1000V

© Notes: Too low or too high ohmic values can be supplied only case by case.

WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

4.2 STRUCTURE:

4.2.1 Terminal:

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

4.2.2 Coating:

Coating is done by green flameproof paint (resistant to 800°C) or Silicon Resin which is solid enough to be free from looseness, crack and easy breakage. It is also resistant to cleaning and industrial solvents, and the paint shall be limited within 2mm of lead wires from resistor body.

4.2.3 Marking:

4.2.3.1 1~6W(above 0.1 Ω): Marking is made on resistors surface by four colors coding.

1st,2nd,3rd: nominal resistance.

4th: tolerance.

4.2.3.2 1~6W(below 0.1 Ω): Marking is made on the surface with Rated Wattage, Nominal Resistance, Tolerance, Maker's trade mark (TY-OHM).

4.2.3.3 1~6W(below 0.1 Ω): Special marking is made on resistors surface only case by case.

4.2.3.4 7~10W: Marking is made on the surface with Rated Wattage, Nominal Resistance, Tolerance, Maker's trade mark (TY-OHM).

5. Operating Temperature Range: -55°C ~ 200°C

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body, a static load of 2.5kgs. (1W: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 10 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 within ±300ppm/°C. (under 1 Ω shall be within ±1000ppm/°C)

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

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)

WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

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 $\pm 1\%$.

Steps	Temperature(°C)	Time (minutes)
1 st step	-55 \pm 3	30
2 nd step	Room temp.	3
3 rd step	200 \pm 3	30
4 th step	Room temp.	3

7.3 Short Time Over Load:

When the resistors are applied 10 times as much as rated power 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 $\pm 2\%$.

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 1000M Ω .

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying suitable voltage listed on DIMENSION 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°C oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000⁺⁴⁸₀ 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 $\pm 3\%$.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of 40 \pm 2°C and the humidity of 90~95%, then 1/10 DC rated power is applied for 1.5 hours and cut off for 0.5 hour. The similar cycle will be repeated for 1000⁺⁴⁸₀ 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 $\pm 3\%$. 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°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°C for 10 \pm 1 seconds, or 350 \pm 10°C for 3.5 \pm 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 $\pm 1\%$.

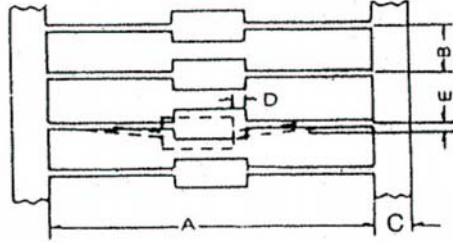
7.10 Nonflammability:

The resistors are applied the power of 16 times the rated wattage for 5 min. and shall not get flame.

WIRE WOUND RESISTORS, FLAMEPROOF/RESIN PAINT

8. Packing:

8.1 Taping Specifications :



Unit: mm

KNP	Package	A	B	C ± 1	D Max	E Max
≤ 1W	T/B	52 ± 1	5 ± 0.5	6	0.5	1.2
1W	T63	63 ± 1	5 ± 0.5	6	0.5	1.2
2W	T52	52 ± 1	5 ± 0.5	6	0.5	1.2
	T/B	63 ± 1	5 ± 0.5	6	0.5	1.2
3W	T63	63 ± 1	10 ± 1	6	0.6	1.2
	T/B	76 ± 1.5	10 ± 1	6	0.5	1.2

8.2 Tape in Box:

Unit: mm

KNP	Package	QTY PER BOX	a	b	c
1/4W	T/B	5,000	75	100	255
1/2W	T/B	1,000	75	55	255
1W	T/B	1,000	75	55	255
1W	T63	1,000	90	58	267
2W	T52	1,000	75	100	255
	T/B	1,000	85	105	260
3W	T63	1,000	100	110	265
	T/B	1,000	106	110	265

