

## ALTERNATION HISTORY RECORDS 变更记录

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# 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/Terminal Form. e.g.

KNP	3W	22R	J	T/B
Type	Rated Wattage	Nominal Resistance	Tolerance	Package/Terminal Form

### 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, 3WL, 5W, 6W, 7W, 8W, 10W.

### 2.3 Nominal Resistance:

$\Omega$ ,  $K\Omega$  are its unit, which be in accordance with IEC publication 63 E24 series or E96 series;

Letter "22R" indicates resistance value  $22\Omega$ .

### 2.4 Tolerance:

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

F=±1%, G=±2%, J=±5%.

### 2.5 Package/Terminal Form:

Nil: Bulk

T/B=Standard tape in box; T/R=Standard tape & reel.

T52=52 mm width special tape in box; R52=52 mm width special tape & reel.

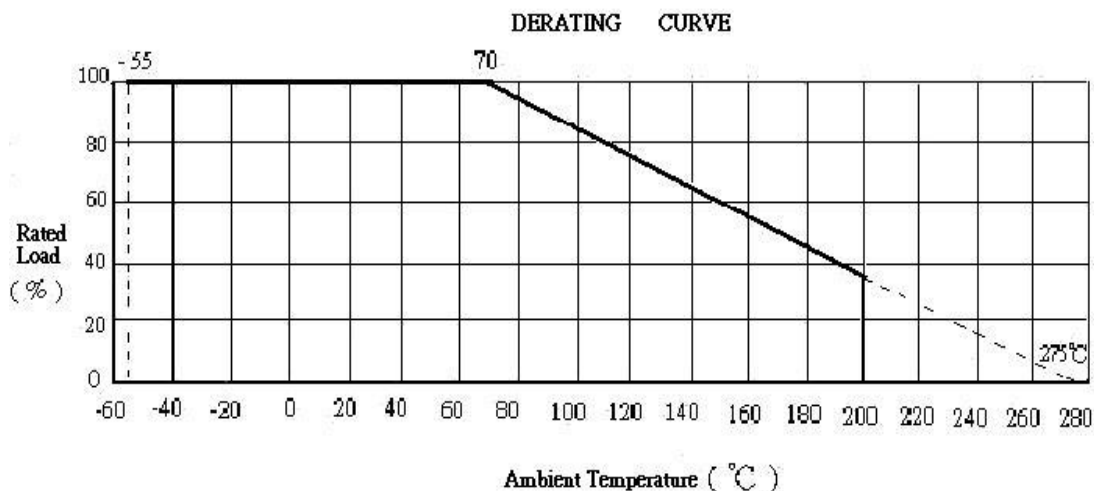
T63=63 mm width special tape in box; R63=63 mm width special tape & reel.

F forms; MG form; M form; Letter "PA" indicates radial type lead taping.

Remark: KNP Series Resistors are RoHS & Halogen Free Compliant.

## 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.



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## 3.1 Rated Voltage:

It is calculated through the following formula:

$$E = \sqrt{PXR}$$

where E: rated voltage (V)  
P: rated power (W)  
R: total nominal resistance ( $\Omega$ )

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 $\pm$ 1	L $\pm$ 1	H $\pm$ 3	d $\pm$ 0.1	Resistance Range ( $\Omega$ )	Dielectric Withstanding Voltage
KNP						
1/4W	2.6 $\pm$ 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	0.1~ 500	350V
2W	5	11	28	0.8	0.1~ 800	500V
3W	5.5	13	38 28	0.8	0.1~ 800	500V
3WL	5.5	15	38 28	0.8	0.1~ 800	500V
5W	6.5	19	38	0.8	0.1~ 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.

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### 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 0.1Ω): Marking is made on resistors surface by four colors coding.

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

4th: tolerance.

4.2.3.2 1~6W(below 0.1Ω): 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 0.1Ω): 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 1Ω shall be within ±500ppm/°C)

$$T.C \text{ (ppm/°C)} = [(R_2 - R_1) \div R_1] \times [1 \div (T_2 - T_1)] \times 10^6$$

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)

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### 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 <sup>st</sup> step	-55 $\pm$ 3	30
2 <sup>nd</sup> step	Room temp.	3
3 <sup>rd</sup> step	200 $\pm$ 3	30
4 <sup>th</sup> 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 $\Omega$ .

### 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<sup>+48</sup><sub>-0</sub> 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<sup>+48</sup><sub>-0</sub> 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:

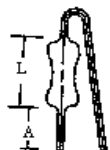
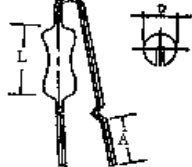
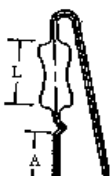
Two leads are together dipped in a melted solder of 270  $\pm$ 5°C for 10 $\pm$ 1 seconds, or 350  $\pm$ 10°C for 3.5  $\pm$ 0.5 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within  $\pm 1\%$ .

### 7.10 Nonflammability:

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

## 8. Others:

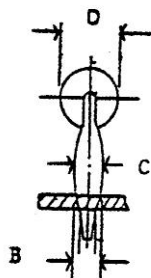
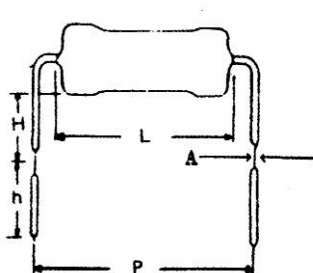
### 8.1 F Forms:

**F1**

**F2**

**F3**

**F4**


Unit: mm

KNP	$L \pm 1$	$D \pm 1$	$A+1/-0$	APPLICABLE
1/2W	9	3	3.5	F1~F4
1W	9	4	3.5	F1~F4
2W	11	5	3.5	F1~F4
3WL	15	5.5	3.5	F1~F4
6W	24	8.5	3.5	F3

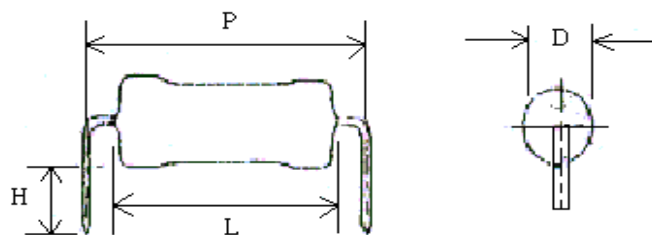
### 8.2 MG Form:



Unit: mm

KNP	$L \pm 1$	$D \pm 1$	P	H	$h \pm 1$	$A \pm 0.02$	$B \pm 0.05$	$C \pm 0.2$
1/2W	9	3	$12.5 \pm 1.5$	$7 \pm 1$	4.5	0.23	0.8	1.2
1W	9	4	$15 \pm 1.5$	$7 \pm 1$	4.5	0.23	0.8	1.2
2W	11	5	$15 \pm 1.5$	$7 \pm 1$	4.5	0.25	1	1.4
3WL	15	5.5	$20 \pm 2$	$10 \pm 2$	4.5	0.25	1	1.4

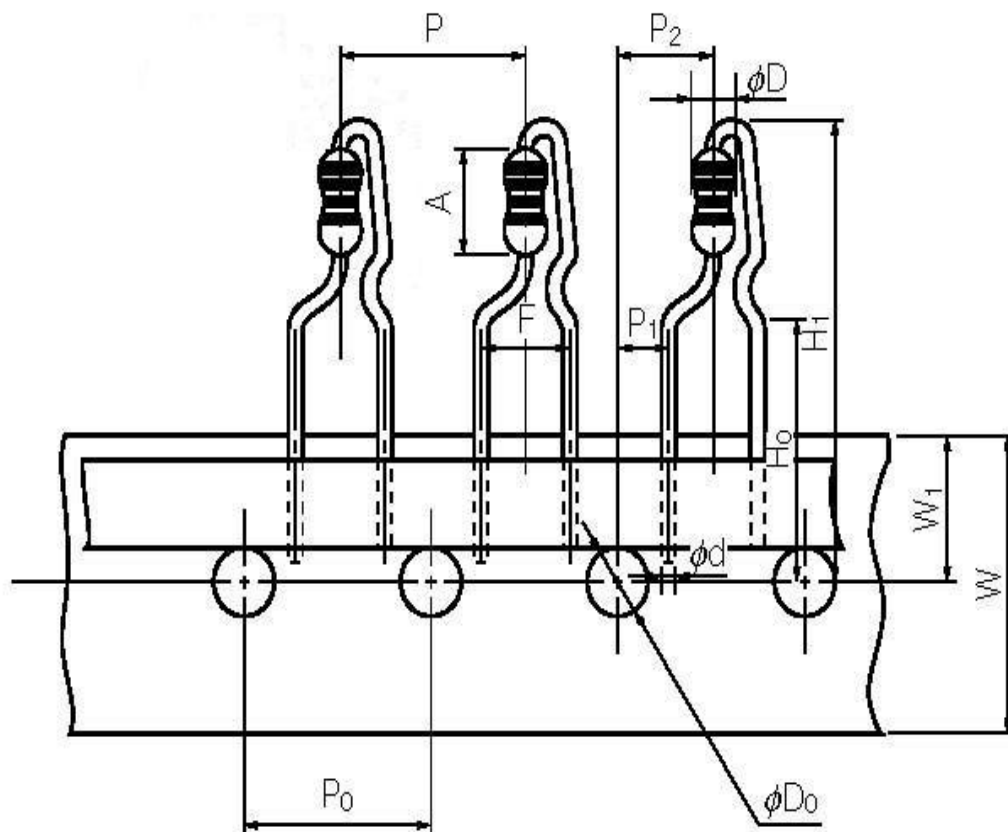
8.3 M Form:



Unit: mm

KNP	$L \pm 1$	$D \pm 1$	P	$H \pm 0.5$
1W	9	4	$15 \pm 1.5$	3.5
2W	11	5	$15 \pm 1.5$	3.5
3W	13	5.5	$20 \pm 2$	3.5
3WL	15	5.5	$20 \pm 2$	3.5
5W	19	6.5	$25 \pm 2$	3.5

## 8.4 Radial type lead tapping(PA):



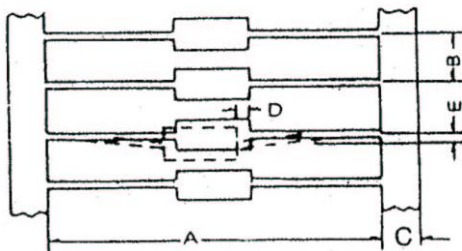
Unit: mm

KNP	P ±1	P <sub>0</sub> ±0.3	P <sub>1</sub> ±0.7	P <sub>2</sub> ±1	F ±0.8	W ±0.5	W <sub>1</sub> ±0.5	H <sub>1</sub> max	H <sub>0</sub> ±0.5	φ D <sub>0</sub> ±0.2	A ±1	φ d ±0.1	φ D ±1	REMARK
1W	12.7	12.7	3.85	6.35	5	18	9	32	16	4	9	0.65	4	
2W	12.7	12.7	3.85	6.35	5	18	9	38	16	4	11	0.8	5	

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## 8.5 Packing:

### 8.5.1 Taping Specifications :



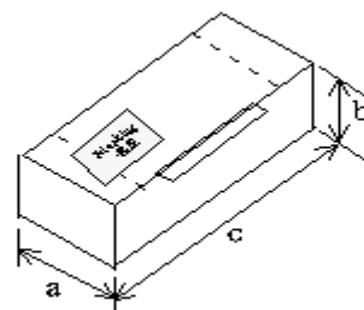
Unit: mm

KNP	Package	A	B	C ± 1	D Max	E Max
≤ 1W	T/B, T/R	52 ± 1	5 ± 0.5	6	0.5	1.2
2W	T52, R52	52 ± 1	5 ± 0.5	6	0.5	1.2
	T/B, T/R	63 ± 1	5 ± 0.5	6	0.5	1.2
3W	T63, R63	63 ± 1	10 ± 1	6	0.6	1.2
	T/B, T/R	76 ± 1.5	10 ± 1	6	0.5	1.2
3WL	T63, R63	63 ± 1	10 ± 1	6	0.6	1.2
	T/B, T/R	76 ± 1.5	10 ± 1	6	0.5	1.2
5W	T/B, T/R	82 ± 1.5	10 ± 1	6	0.6	1.2

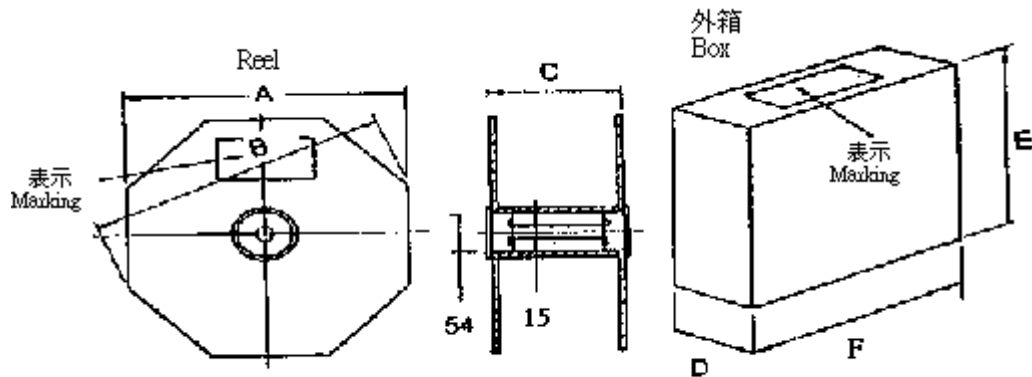
### 8.5.2 Tape in Box:

Unit: mm

KNP	Package	QTY PER BOX	a	b	c
1/2W	T/B	1,000	75	55	255
1W	T/B	1,000	75	55	255
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
3WL	T63	1,000	100	110	265
	T/B	1,000	106	110	265
5W	T/B	500	98	95	270



## 8.5.3 Tape &amp; Reel:



KNP	Package	QTY PER REEL	A	B	C	D	E	F
1/2W	T/R	5,000	305	330	75	90	310	310
1W	T/R	2,500	285	310	75	80	295	295
2W	R52	2,500	285	310	75	95	295	295
	T/R	2,500	285	310	75	95	295	295
3W	R63	1,000	285	310	90	105	295	295
	T/R	1,000	285	310	90	105	295	295
3WL	R63	1,000	285	310	90	105	295	295
	T/R	1,000	285	310	90	105	295	295
5W	T/R	1000	285	310	110	120	295	295