

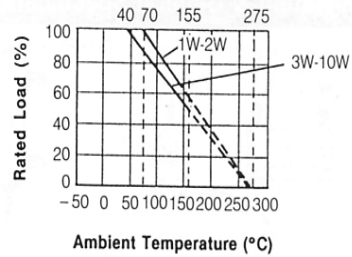
WIRE WOUND RESISTORS

KNP (FLAME-PROOF COATING TYPE)
 NKNP (NON-INDUCTIVE TYPE)

FEATURE

- High stable pulse characteristics!
- Super heat dissipation!
- Instant overload capability!
- Low noise!
- No annual shift on resistance value!
- Tolerance available: $\pm 5\%$, $\pm 2\%$, $\pm 1\%$
- Special tight tolerance are available on request!

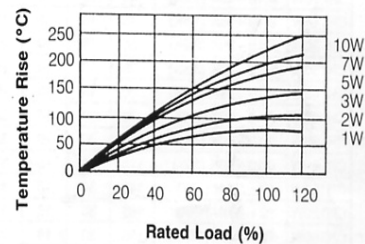
DERATING CURVE



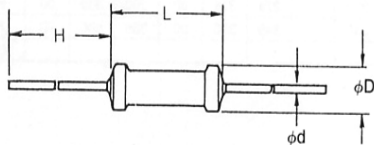
CHARACTERISTICS

Temperature Coefficient	± 300 PPM/°C
Insulation Resistance	> 100 M Ω
Load Life (1,000 hours)	$\pm 5\% + 0.05\Omega$
Short-time Overload	$\pm 2\% + 0.05\Omega$
Dielectric Withstanding Volt	$\pm 2\% + 0.05\Omega$
Moisture Resistance	$\pm 5\% + 0.05\Omega$
Shock and Vibration	$\pm 1\% + 0.05\Omega$
Effect of Soldering	$\pm 2\% + 0.05\Omega$

TEMPERATURE RISE



DIMENSIONS



TYPE	RATED POWER	DIMENSIONS (mm)				RESISTANCE RANGE (ω)
		D ± 0.5	L ± 1	H ± 3	d ± 0.02	
KNP-50	1/2W	3.2	9.0	28	0.60	0.1-50
KNP-100S	1WS	3.2	9.0	28	0.60	0.1-50
KNP-100	1W	4.0	11	35	0.80	0.1-250
KNP-200S	2WS	4.0	11	35	0.80	0.1-250
KNP-200	2W	5.0	15	35	0.80	0.1-400
KNP-300S	3WS	5.0	15	35	0.80	0.1-400
KNP-300	3W	6.0	17	35	0.80	0.1-600
KNP-400	4W	6.0	17	35	0.80	0.1-600
KNP-500S	5WS	6.0	17	35	0.80	0.1-600
KNP-500	5W	8.0	24	35	0.80	0.1-800
KNP-600	6W	8.0	24	35	0.80	0.1-800
KNP-700	7W	8.0	32	35	0.80	0.1-1K
KNP-800	8W	8.0	41	35	0.80	0.1-1K
KNP-1000	10W	8.0	54	35	0.80	0.1-1K

NKNP series and special resistance values of KNP are available on your request

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	1WS	10Ω	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 1WS, 2WS, 3WS.

2.3 Nominal Resistance:

Ω, KΩ 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.

F=±1%, G=±2%, J=±5%, K=±10%.

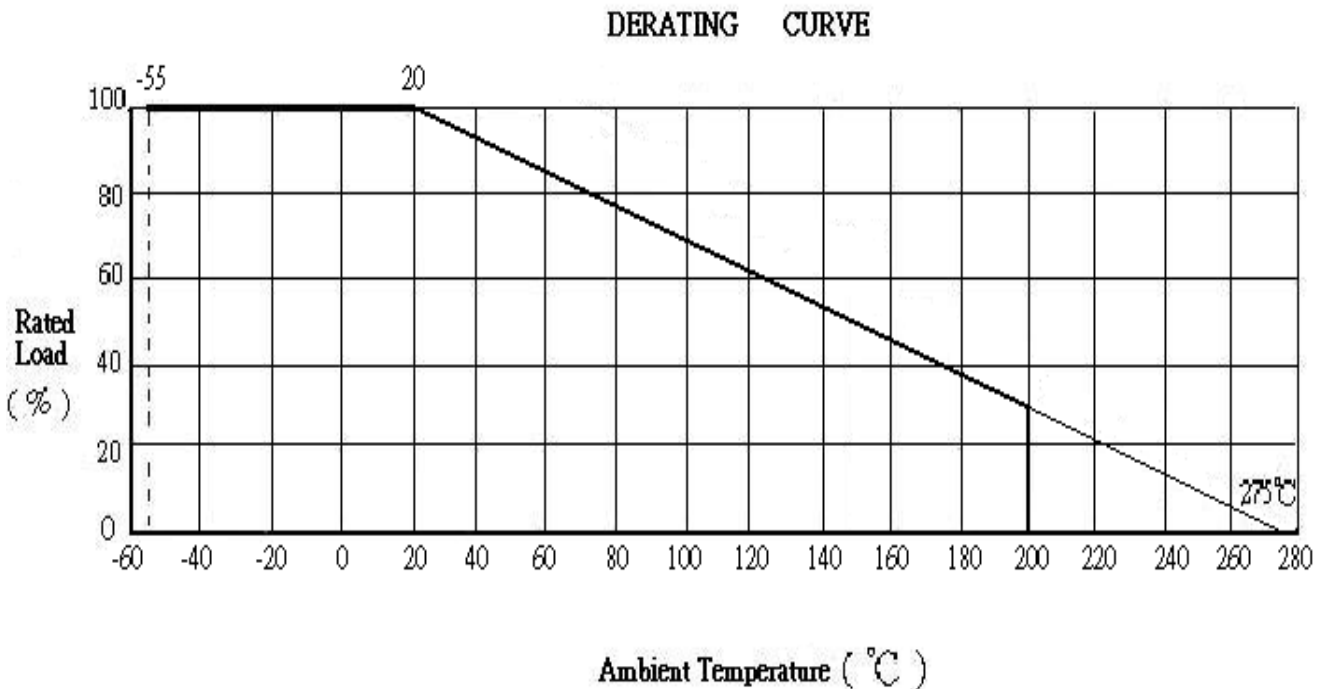
2.5 Package/Terminal Form :

T/B=tape in box; Nil= Bulk; F forms.

Remark: KNP Series Resistors are RoHS Compliant.

3. Rated Power:

Rated power is the value of Max load voltage specified at the ambient temperature of 20°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:

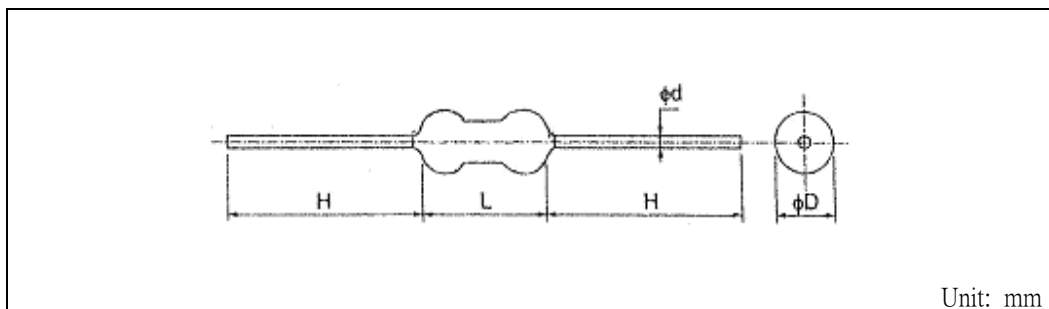
$$E = \sqrt{PXR}$$

where E: rated voltage (V)
P: rated power (W)
R: total nominal resistance (Ω)

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:



TYPE	D \pm 1	L \pm 1	H \pm 3	d \pm 0.1	Resistance Range	Dielectric Withstanding Voltage
KNP						
1WS	2.6 \pm 0.5	6.8	28	0.65	0.1 Ω ~ 200 Ω	250V
2WS	3	9	28	0.65	0.1 Ω ~ 300 Ω	350V
3WS	5	11	28	0.8	0.1 Ω ~ 800 Ω	500V

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 light 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:

Marking is made on resistors surface by color coding.

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

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body, a static load of 1kg.(3WS:2.5kgs.) 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 shell be within ±500ppm/°C)

$$T.C (ppm/°C) = [(R2 - R1) ÷ R1] × [1 ÷ (T2 - T1)] × 10^6$$

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 ±1%.

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

7.3 Short Time Over Load:

When the resistors are applied 5 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 ±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 1000MΩ.

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 ±3%.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of 40 ±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 ±3%. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

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7.8 Solder-ability:

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

7.9 Resistance to Soldering Heat:

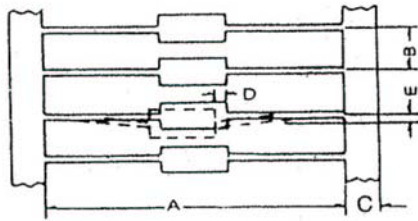
Two leads are together dipped in a melted solder of $270 \pm 5^\circ\text{C}$ for 10 ± 1 seconds, or $350 \pm 10^\circ\text{C}$ for 3.5 ± 0.5 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm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

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 Taping Specifications:



Unit : mm

KNP	Size Type	A	B	C ± 1	D Max	E Max
		1WS	T-52	52 ± 1	5 ± 0.5	6
2WS	T-52	52 ± 1	5 ± 0.5	6	0.6	1.2
3WS	T-63	63 ± 1	5 ± 0.5	6	0.6	1.2

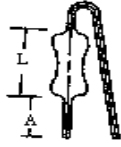
8.2 Tape in Box:

KNP	TYPE	QTY PER BOX	Unit : mm		
			a	b	c
1WS	T-52	5,000	144	84	272
2WS	T-52	1,000	75	55	255
3WS	T-63	1,000	85	105	260

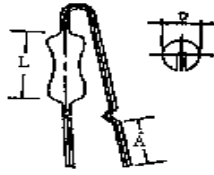
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8.3 F Form:

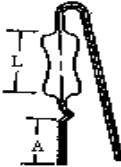
F1



F2



F3



F4



Unit: mm

KNP	L±1	D±1	A+1/-0.5
3WS	11	5	3.5