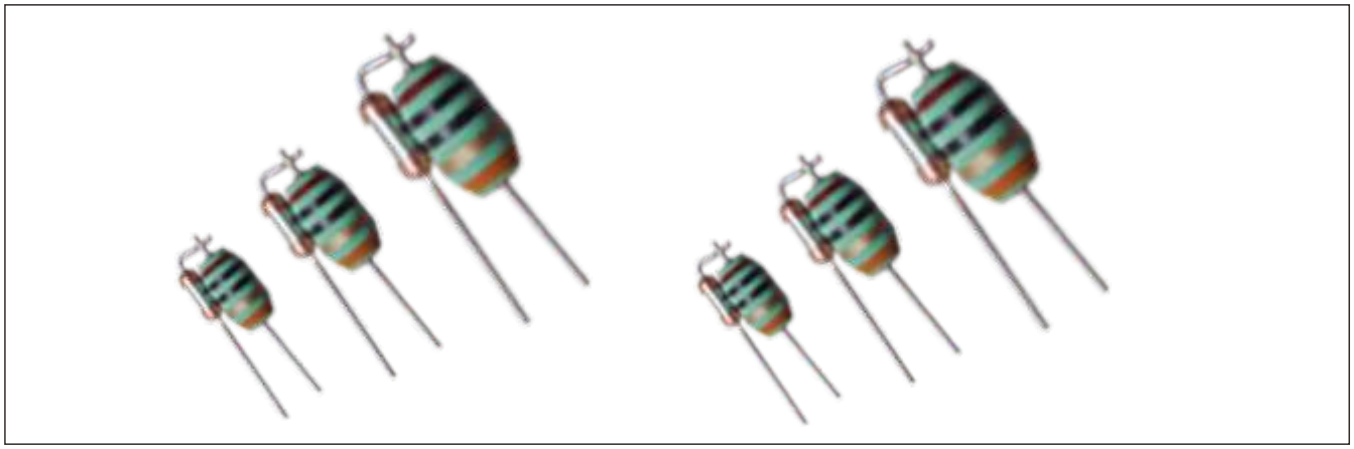


1. Applicable Scope:

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, Safety Version & Special Wire, Style and Special Forming. e.g.

KNPF	2WS	1R-100R	J	H	Fuse	T
Type	Rated Wattage	Nominal Resistance	Tolerance	Safety Version & Special Wire	Style	Lead Length

2.1 Type :

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

2.2 Rated Wattage:

Shown by "W", such as 2WS.

2.3 Nominal Resistance:

Ω is its unit, which be in accordance with JIS-C6409 article 6 (EIA RS-196A) series.resistance value 1Ω-100Ω

2.4 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.J＝±5%.

2.5 Safety Version & Special Wire:

Letter "H" indicates safety version & special wire.

2.6 Style:

Word "Fuse" indicates a resistor combines a thermal element.

2.7 Lead Length:

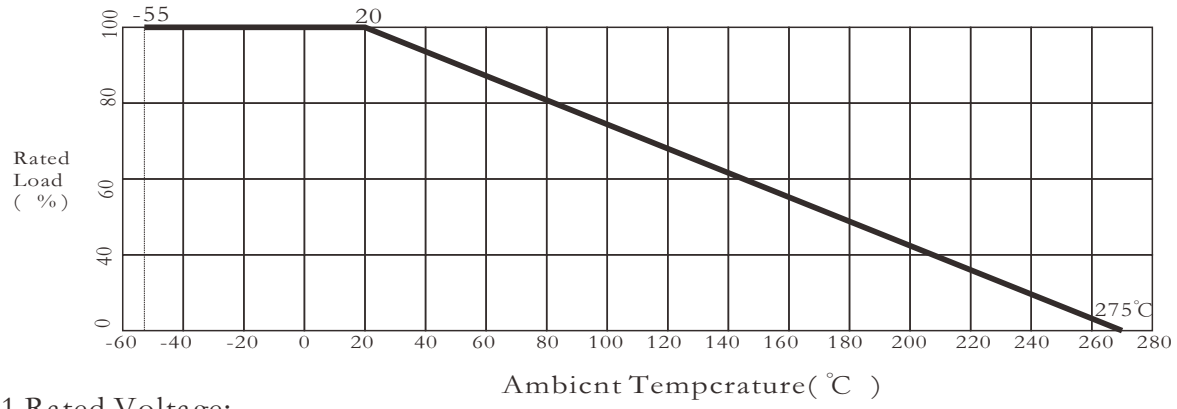
Letter "T" indicates Special Forming.

Remark:KNPF Series Resistors are RoHS & Halogen FreeCompliant.

3. Rated Power:

Rated power is the value of Max load voltage specified at the ambient temperature of 20℃, 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.

DERATING CURVE



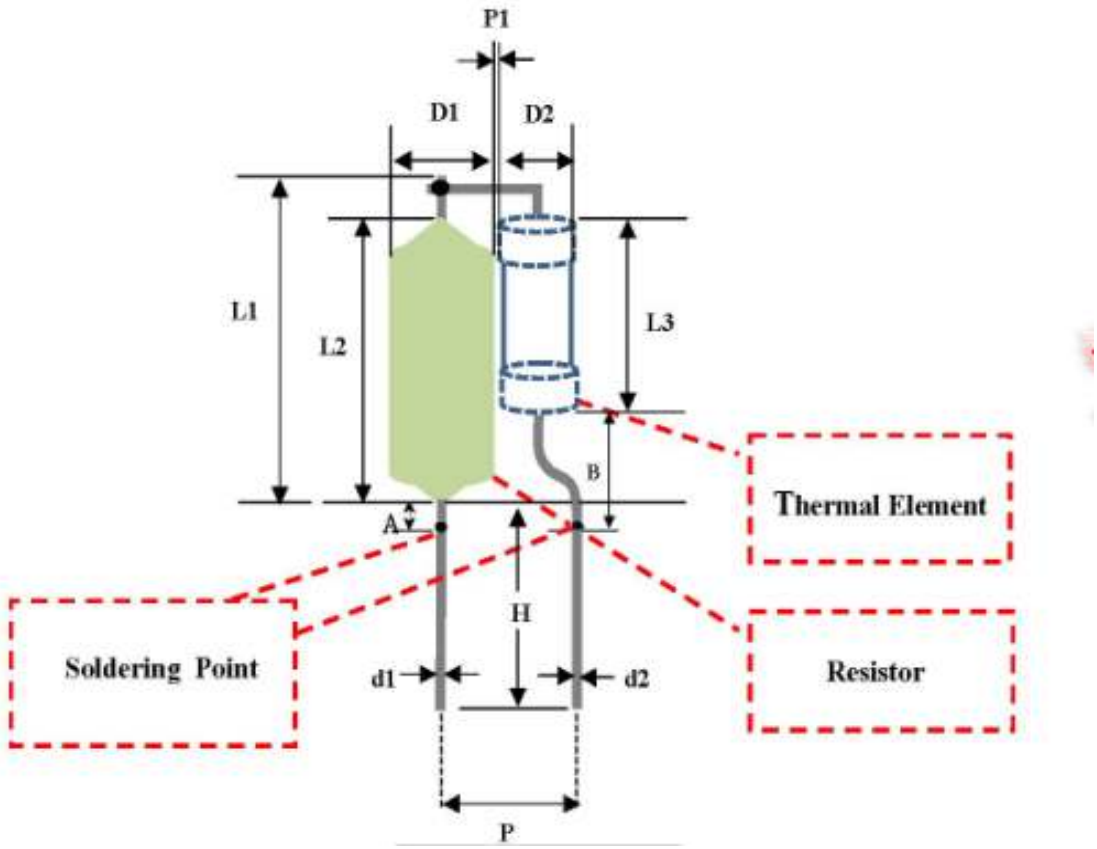
3.1 Rated Voltage:

It is calculated through the following formula:

$E = \sqrt{P.R}$ 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 beregarded as its rated voltage, means whichever less.

4. Dimension and structure:



Dimension (mm)													
L1	L2	L1—L2	L3	L4	D1	D2	d1	d2	P	H	P1	A	B
11±0.5	8.8±0.2	2.2±0.7	5.6±0.2	18min	4.5±0.5	2.2±0.2	0.5±0.2	0.65±0.1	5 Ref.	5±0.5	※	1 Min.	1 Min.

※ The smallest distance between the resistor and the thermal element should be less than 0.7 mm

4.2 Structure:

4.2.1 Terminal:

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

4.2.2 Coating:

Coating is done by light green flameproof paint (resistant to 800℃)or Silicon Resin which is solid enough to befree from looseness, crack and easy breakage. It is also resistant to cleaning and industrial solvents, and the paintshall be limited within 1mm of lead wires from resistor body.

4.2.3 Marking:

Marking is made on resistors surface,by five color coding;1st,2nd,3rd:nominal resistance, 4th: tolerance,5th:yellow color band for safety version & special wire.

4.2.4 Thermal element:

Two layers are separately deposited on a ceramic body:the first layer is special film with high resistancevalue and the second layer is pure Tin with low resistance value. Then comes to the capping & weldingprocess in which the tin -coated lead wires are welded into the end caps

Function Tmperature(℃)	Holding Temperature(℃)	Max Working Voltage	Max Working Current
260 ± 10	200	250V	1 A

4.3.5 Diameter of winding wire :

0.09mm ± 0.006mm

5. Operating Temperature Range: -55℃ ～200℃

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body,a static load of1kg.is to be gradually applied into the terminal for 10 seconds without causingany 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 fromthe 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 breakand looseness.

7. Electrical Performance:

7.1 Resistance Temperature Coefficient:

It shall be within ±200ppm/℃ or +4500ppm/℃

$$T.C\ (ppm/℃) = [(R2-R1) \div R1] \times [1 \div (T2-T1)] \times 10$$

where R1: resistance value at reference temperature

R2: resistance value at test temp.
T1: reference temp. (usu. 25℃)
T2: test temp. (about 75℃)

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 ratebetween pre-and-post test shall be within ±1%.

Steps	Temperature(℃)	Time (minutes)
1st step	-55 ± 3	30
2nd step	Room temp.	3
3rd step	200 ± 3	30
4th 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 valuechange 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 oflead wires and metal trough, measuring the Insulation Resistance which shall be over 1000MΩ.

7.5 Voltage Withstanding:

Resistors are located in aV-shaped metal trough.Applying AC1000V for an 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℃oven, applying rated voltage at the cycle of1.5hours ON,0.5 hourOFF for1000^{+48}_{-0}hours in total.Then,after removing the voltage take the resistors out of the oven and left under normal temp.forone 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℃ and the humidity of 90～95%,then 1/10 DC rated power is applied for1.5hours and cut off for0.5 hour.The similar cycle will be repeated for1000^{+48}_{-0}hours intotal (including cut-off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp.for an hour.The resistance value change ratebetween pre-and-post test shall be within ±3%Ther ealso 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 ±5℃ for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

7.9 Resistance to Soldering Heat: (Suitable for wave-flow and iron solderings)

7.9.1 The leads of resistor are dipped to 1mm from the body in a melted solder of 270±5℃ for 10 ±1 seconds, or 350±10℃ 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 ±1%.

7.9.2 The leads of thermal element are dipped to 1mm from the body in a melted solder of 270 ±5℃ for 10 ±1 seconds,or 350 ±10℃ for 3.5 ±0.5 seconds, Then remove the resistors and leaving them at room temp.for one hour.Theresistance valuechange rate between pre-and-post test shall be within ±1%.

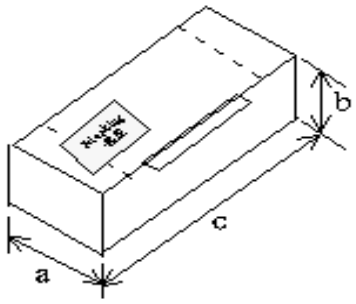
7.10 Non-flammability:

The resistors have to fulfill "Fast release of the resistor at maximum overload", and shall not get flame.

7.11 Surge Withstanding:

The resistors are designed to withstand2.5kV.1.2/50μs pulse according toIEC61000 -4-5, 30 pulses per voltage, 10seconds between each pulse. The resistance value change rate between pre-and-post test shall be within ±5%.

8. Bulk Packing:



Unit: mm

QTY PER BOX	a	b	c
2000 pcs	155	75	265