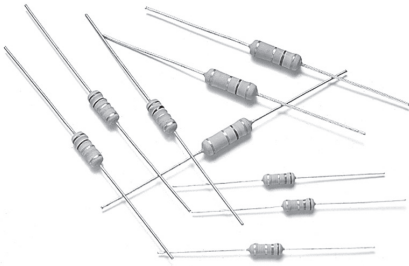


Wirewound Resistors

General Type

Normal & Miniature Style [KNP Series]



INTRODUCTION

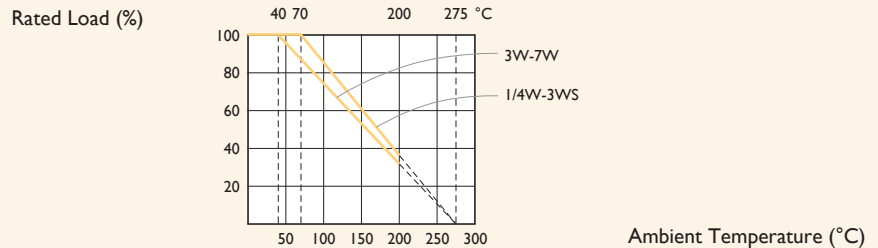
The resistor element is a resistive wire which is wound in a single layer on a ceramic rod, with tinned connecting wires of electrolytic copper welded to the end-caps. The ends of the resistive wire are connected to the caps by welding. The resistors are coated with layers of green color flame-proof lacquer.

FEATURES

| | |
|--|------------------------------------|
| Power Rating | 1/4W, 1/2W, 1W, 2W, 3W, 4W, 5W, 7W |
| Resistance Tolerance | ±1%, ±5% |
| T.C.R. | ±300ppm/°C |
| Flameproof Multi-layer Coating Meets | UL-94V-0 |
| Flameproof Feature Meets Overload Test | UL-1412 |

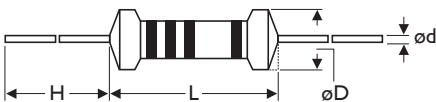
DERATING CURVE

For resistors operated in ambient temperatures above 40°C, power rating must be derated in accordance with the curve below.



DIMENSIONS

Unit: mm



| STYLE | | DIMENSION | | | |
|--------|------------------|-----------|---------|--------|-----------|
| Normal | Miniature | L | øD | H | ød |
| KNP-25 | KNP50S | 6.3±0.5 | 2.5±0.3 | 28±2.0 | 0.55±0.05 |
| KNP-50 | KNP1WS | 9.0±0.5 | 3.5±0.3 | 26±2.0 | 0.55±0.05 |
| KNP100 | KNP2WS KNP3SS | 11.5±1.0 | 4.6±0.5 | 35±2.0 | 0.8±0.05 |
| KNP200 | KNP3WS | 15.5±1.0 | 5.2±0.5 | 33±2.0 | 0.8±0.05 |
| KNP300 | KNP5WS | 17.5±1.0 | 6.2±0.5 | 32±2.0 | 0.8±0.05 |
| KNP400 | | | | | |
| KNP500 | KNP7WS | 24.5±1.0 | 8.2±0.5 | 38±2.0 | 0.8±0.05 |
| KNP600 | | | | | |
| KNP700 | - | 24.5±1.0 | 8.2±0.5 | 38±2.0 | 0.8±0.05 |

Note: KNP1WS (for MBType) ød = 0.8±0.05 mm

ELECTRICAL CHARACTERISTICS

NORMAL STYLE

| STYLE | KNP-25 | KNP-50 | KNP100 | KNP200 | KNP300 | KNP400 | KNP500 | KNP600 | KNP700 |
|--------------------------------|------------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|--------|------------------------------|--------|--------|
| Power Rating at 40°C | | | | | 3W | 4W | 5W | 6W | 7W |
| Power Rating at 70°C | 1/4W | 1/2W | 1W | 2W | | | | | |
| Maximum working voltage | $\sqrt{P \times R}$ | | | | | | | | |
| Voltage Proof on Insulation | 250V | 300V | 400V | | | | | | |
| Resistance Range ($\pm 1\%$) | 0.1 Ω - 150 Ω | 0.1 Ω - 750 Ω | 0.1 Ω - 1.5K Ω | 0.1 Ω - 2.4K Ω | 0.1 Ω - 3.3K Ω | | 0.1 Ω - 6.2K Ω | | |
| Resistance Range ($\pm 5\%$) | 0.1 Ω - 200 Ω | 0.1 Ω - 800 Ω | 0.1 Ω - 2.2K Ω | 0.1 Ω - 2.7K Ω | 0.1 Ω - 3.9K Ω | | 0.1 Ω - 6.8K Ω | | |
| Operating Temp. Range | -40°C to +200°C | | | | | | | | |
| Temperature Coefficient | $\pm 300\text{ppm}/^\circ\text{C}$ | | | | | | | | |

Note: Special value is available on request

MINIATURE STYLE

| STYLE | KNP50S | KNP1WS | KNP2WS | KNP3SS | KNP3WS | KNP5WS | KNP7WS |
|--------------------------------|------------------------------------|-----------------------------|------------------------------|--------|------------------------------|------------------------------|--------|
| Power Rating at 40°C | | | | | | 5W | 7W |
| Power Rating at 70°C | 1/2W | 1W | 2W | 3W | | | |
| Maximum working voltage | $\sqrt{P \times R}$ | | | | | | |
| Voltage Proof on Insulation | 200V | 300V | 400V | | | | |
| Resistance Range ($\pm 1\%$) | 0.1 Ω - 150 Ω | 0.1 Ω - 750 Ω | 0.1 Ω - 1.5K Ω | | 0.1 Ω - 2.4K Ω | 0.1 Ω - 3.3K Ω | |
| Resistance Range ($\pm 5\%$) | 0.1 Ω - 200 Ω | 0.1 Ω - 800 Ω | 0.1 Ω - 2.2K Ω | | 0.1 Ω - 2.7K Ω | 0.1 Ω - 3.9K Ω | |
| Operating Temp. Range | -40°C to +200°C | | | | | | |
| Temperature Coefficient | $\pm 300\text{ppm}/^\circ\text{C}$ | | | | | | |

Note: Special value is available on request

ENVIRONMENTAL CHARACTERISTICS

| PERFORMANCE TEST | TEST METHOD | | APPRAISE |
|-------------------------------|------------------|--|---|
| Short Time Overload | IEC 60115-1 4.13 | 10 times rated power for 5 Sec. | $\pm 2.0\% + 0.05\Omega$ |
| Voltage Proof on Insulation | IEC 60115-1 4.7 | In V-Block for 60 sec., test voltage as above table | No Breakdown |
| Temperature Coefficient | IEC 60115-1 4.8 | Between -40°C to +155°C | By type |
| Insulation Resistance | IEC 60115-1 4.6 | in V-block for 60 Sec. | >100M Ω |
| Solderability | IEC 60115-1 4.17 | 235 $\pm 5^\circ\text{C}$ for 3 ± 0.5 Sec | 95% Min. coverage |
| Solvent Resistance of Marking | IEC 60115-1 4.30 | IPA for 5 ± 0.5 Min. with ultrasonic | No deterioration of coatings and markings |
| Robustness of Terminations | IEC 60115-1 4.16 | Direct load for 10 Sec. in the direction of the terminal leads | $\geq 2.5\text{kg}$ (24.5N) |
| Damp Heat Steady State | IEC 60115-1 4.24 | 40 $\pm 2^\circ\text{C}$, 90-95% RH for 56 days, loaded with 0.1 times RCWV | $\pm 5.0\% + 0.05\Omega$ |
| Endurance at 70°C | IEC 60115-1 4.25 | 70 $\pm 2^\circ\text{C}$ at RCWV (or U_{max} , whichever less) for 1,000 Hr. (1.5Hr:on, 0.5Hr: Off) | $\pm 5.0\% + 0.05\Omega$ |
| Temperature Cycling | IEC 60115-1 4.19 | -55°C \Rightarrow Room Temp. \Rightarrow +155°C \Rightarrow Room Temp. (5 cycles) | $\pm 1.0\% + 0.05\Omega$ |
| Resistance to Soldering Heat | IEC 60115-1 4.18 | 260 $\pm 3^\circ\text{C}$ for 10 ± 1 Sec., immersed to a point 3 $\pm 0.5\text{mm}$ from the body | $\pm 1.0\% + 0.05\Omega$ |
| Accidental Overload Test | IEC 60115-1 4.26 | 4 times RCWV for 1 Min. | No evidence of flaming or arcing |

Note: Rated Continuous Working Voltage (RCWV) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.

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