

Rated power

The rated power is the maximum load power for continuous use at ambient temperatures up to 70°C, while the mechanical and electrical performance requirements are met ⑥. Above this ambient temperature, the power is derated according to the derating curve (Fig. 1).

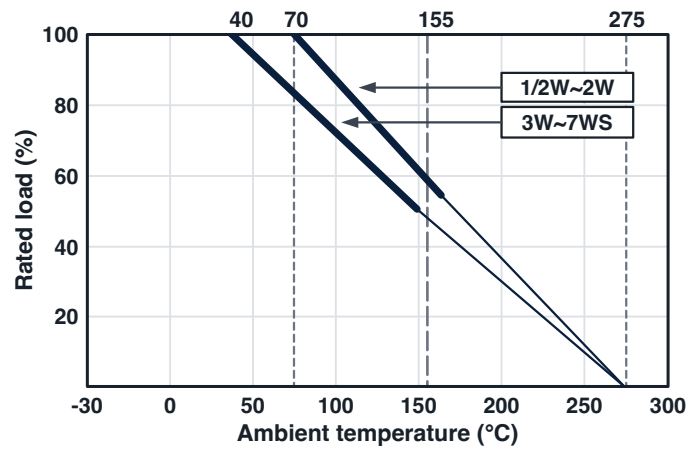


Fig. 1: Derating curve ⑦

Rated voltage

The rated continuous working voltage is calculated with the formula below. If the calculated voltage exceeds the maximum working voltage, the maximum working voltage is taken as the rated voltage (whichever is less) ⑧.

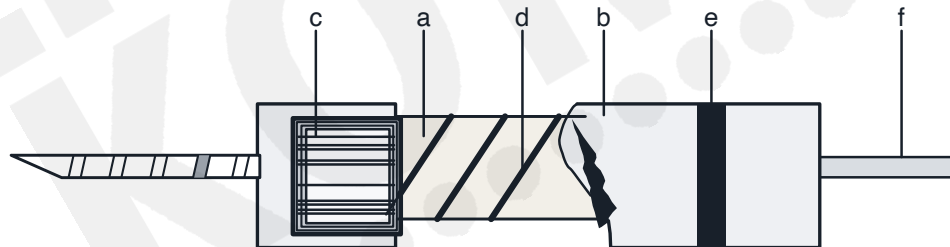
$$E = \sqrt{P \times R}$$

where E = rated continuous working voltage, RCWV (V); P = rated power (W); R = nominal resistance value (Ω).

Notes

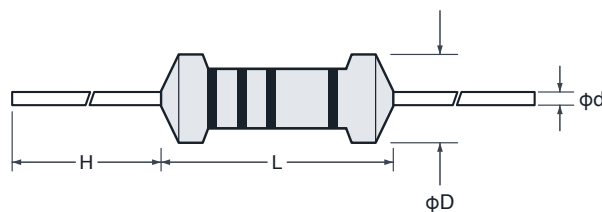
- KNP resistance range: 0.01Ω-1KΩ (NKNP: 0.01Ω-100Ω) ⑨.
- Characteristics of the non-inductive wirewound resistor (NKNP): it reduces noise and transient surges in all kinds of electronic circuits. Used as a current sensor or in the snubber section of switching power supplies or uninterruptible power supplies (UPS), it keeps noise interference to a minimum, allows a higher oscillation frequency or a smaller size than previous products, saves material cost and prevents oscillation; with lower surges, electromagnetic interference is also reduced.

Construction



a	Ceramic core (high thermal conductivity)	d	Copper-nickel alloy wire, wound (high stability) ⑩
b	Non-flammable insulating paint, solvent-proof	e	Colour code band (permanent, per MIL & EIA standards)
c	End cap (high-reliability fit by the original cap-pressing method)	f	Tin-plated lead wire

Specifications



Power rating	Dimension (mm)				Dielectric withstanding ⑪	Resistance range ⑨
	L	D	H	d ±0.05		
1/2W/1WS	9.0±0.5	3.2±0.5	26±2.0	0.50	300	0.01Ω-100Ω
1W/2WS	11.0±1.0	4.2±0.5	35±3.0	0.65	350	0.01Ω-360Ω
2W/3WS	15.0±1.0	5.0±0.5	33±3.0	0.72	500	0.01Ω-470Ω
3W/5WS	17.0±1.0	6.0±0.5	38±3.0	0.72	500	0.01Ω-1KΩ
5W/7WS	24.0±1.0	8.0±0.5	35±3.0	0.72	700	0.01Ω-1KΩ
10W	53.0±1.0	8.0±1.0	35±3.0	0.72	700	0.01Ω-1KΩ

Mechanical performance

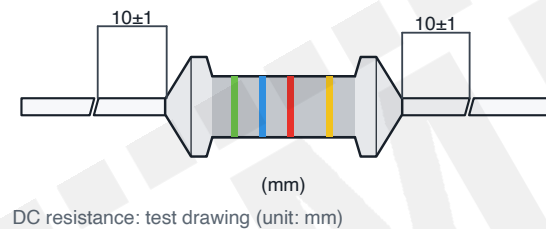
Terminal bend	The terminal shall withstand 4 bends of 90° without breakage or damage, with the resistor fixed in a vertical position ⑫.
Terminal tensile	With the resistor body fixed, a static load of 2.5kg is applied gradually to the terminal in the direction of the resistor axis and held for 10 seconds; the terminal shall not loosen or come off.
Twist withstand	The lead wire is bent to 90° with a bend radius of about 0.8mm at a point about 6mm from the resistor body. The wire is then clamped at 1.2±0.4mm from the bend towards the lead end and turned 360° clockwise, perpendicular to the resistor axis, at about 5 seconds per turn, and then 360° counterclockwise; this is one whole turn. The turn is repeated 2 times without causing any break or looseness.

Operating temperature range

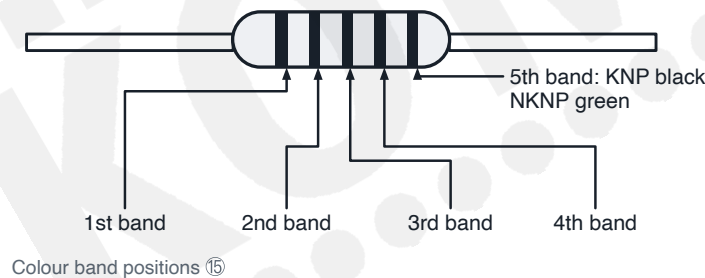
-50°C ~ 275°C

Electrical performance

Item	Specification	Test method (JIS C5202)
DC resistance	Within the specified tolerance of the resistance value	As shown in the drawing below (unit: mm)
Short-time overload	Within $\pm(2\%+0.05\Omega)$	5.5: permanent resistance change after applying 2.5 times RCWV for 5 seconds ⑬
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown	5.7: the resistor is clamped in a V-block and tested at the voltage specified in the Specifications table for 60 seconds
Solderability	3/4 of the terminal surface covered with new solder	6.5: 235±5°C, 3±0.5 sec



Colour coding



Colour	1st band 1st significant figure	2nd band 2nd significant figure	3rd band Multiplier	4th band Tolerance
Silver			0.01	±10%(K)
Gold			0.1	±5%(J)
Black	0	0	1	
Brown	1	1	10	±1%(F)
Red	2	2	100	±2%(G)
Orange ⑭	3	3	1K	
Yellow	4	4	10K	
Green	5	5	100K	±0.5%(D)
Blue	6	6	1M	±0.25%(C)
Purple	7	7	10M	±0.1%(B)
Grey	8	8		
White	9	9		

Note: body coating: generally grey non-flammable paint; miniaturised types are coated pink or green.

Precautions for use

- Humidity degrades the solderability of the terminals. Store the resistors at a temperature below 40°C and a humidity below 70%RH.
- As far as possible, do not open the smallest packing unit during storage.
- At high ambient temperatures, reduce the applied power according to the power derating curve.
- Avoid connecting several resistors in parallel or in series in order to use them at high voltage or high current.
- Because of the special coating material, the coating is weak against external impact; handle the resistors with care.
- Cleaning weakens the coating somewhat; left to dry naturally, it recovers its strength. Do not touch the coating or apply anything to it for 20 minutes after cleaning.
- Resistors generate heat. Do not stack resistors together or place them close to other heat-generating components, as this impedes heat dissipation.

Notes

- ① The original sheet gives two different part-number schemes: How to order (product code, rated power, packing, tolerance, total characters, resistance value; example KNP 25 B J 2 100) and Part number (type, rated wattage, terminal form, characteristic, nominal resistance, tolerance; example KNP 10W P(M.F) T-2($\pm 350\text{PPM}/^\circ\text{C}$) Ω J($\pm 5\%$)). The terminal forms P, M and F are not described further — subject to manufacturer confirmation.
- ② Product code: KNP is described as “KNP wire wound fusible resistor”, while the Type clause defines KNP as a non-flammable coated wirewound resistor (inductive); “fusible” is not used elsewhere for KNP — subject to manufacturer confirmation.
- ③ Power ratings: 25S = 1/4WS, 50S = 1/2WS, 300 = 3W and 500 = 5W; small-size ratings are ordered as written (1WS, 2WS, 3WS, 5WS, 7WS) (not listed on the manufacturer's sheet; added on supplementary confirmation). A code does not mean the rating is available in this series. 1/6W and 1/16W have no small-size (S) version; not every power rating has one. As printed: the rated-power codes cover 1/8W, 1/6W (code 12, listed twice; shown once), 1/4W, 1/2W, 1W, 2W, 1WS, 2WS, 5W, 7W and 10W; the ordering example uses 25 (1/4W). The Rated wattage clause gives examples up to 40W, the Specifications table covers 1/2W/1WS to 10W, and the derating curve legend gives 1/2W~2W and 3W~7WS — subject to manufacturer confirmation.
- ④ Tolerance codes: How to order lists F ($\pm 1\%$) and J ($\pm 5\%$) only; the Tolerance clause also lists G ($\pm 2\%$) — subject to manufacturer confirmation.
- ⑤ Total characters: the third example is printed “10K=1000=4”, while the resistance value example gives 10K = 10,000 — subject to manufacturer confirmation.
- ⑥ Rated power: the English text of the original defines rated power as the value of the max. load voltage; the Chinese text defines it as the maximum load power, which is printed here — subject to manufacturer confirmation.
- ⑦ Derating curve: the text gives rated power up to 70°C, but the 3W~7WS line (legend printed “3,W~7WS”) starts derating at 40°C; the dashed line labelled 70 is drawn at about 75°C on the axis scale; the left end of the temperature axis is labelled -30 but lies at about -50°C on the scale (operating temperature range -50°C ~ 275°C). Which legend belongs to which line is shown only by the arrows — subject to manufacturer confirmation.
- ⑧ Rated voltage: no maximum working voltage is given on the original sheet — subject to manufacturer confirmation.
- ⑨ Resistance range: the Notes in the Rated power section give 0.01 Ω -1K Ω for KNP and 0.01 Ω -100 Ω for NKNP; the Specifications table gives one range per power rating (up to 1K Ω) without separating KNP and NKNP — subject to manufacturer confirmation.
- ⑩ Construction d: the English text gives copper-nickel alloy wire, the Chinese text nickel-chromium alloy wire; the English is printed — subject to manufacturer confirmation.
- ⑪ Specifications: on the original sheet the dielectric withstanding values are given without a unit, as a sub-column under the heading “DIMENSION (mm)” — subject to manufacturer confirmation.
- ⑫ Terminal bend: the English text specifies 4 bends of 90°; the Chinese text specifies bending 90° and back, then 90° in the opposite direction, three times. The English is printed — subject to manufacturer confirmation.
- ⑬ Short-time overload: the English text gives 2.5 times RCWV, the Chinese text 3.16 times the rated voltage; the English is printed — subject to manufacturer confirmation.
- ⑭ Colour code, digit 3: the English text prints “Pink”, the Chinese text orange; the Chinese is printed — subject to manufacturer confirmation.
- ⑮ Colour coding: the drawing shows five bands, the table defines bands 1 to 4 only. The 5th-band label reads KNP black and NKNP green; on the original the NKNP line has no leader of its own — subject to manufacturer confirmation.