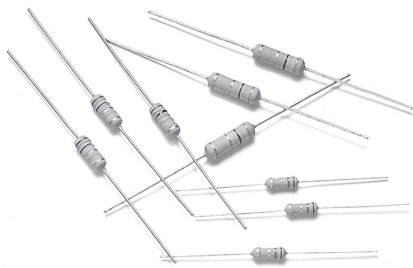


Wirewound Resistors

General Type

Normal & Miniature Style [KNP Series]



INTRODUCTION

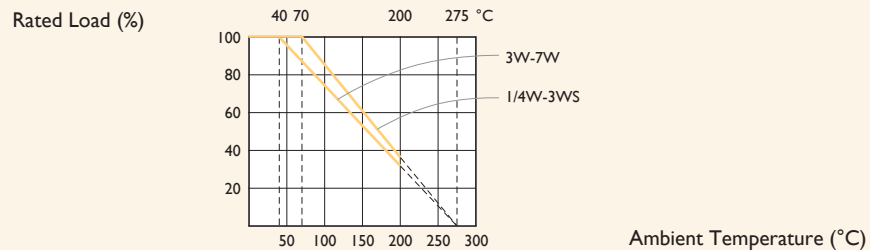
The resistor element is a resistive wire which is wound in a single layer on a ceramic rod, with tinned connecting wires of electrolytic copper welded to the end-caps. The ends of the resistive wire are connected to the caps by welding. The resistors are coated with layers of green color flame-proof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

FEATURES

Power Rating	1/4W, 1/2W, 1W, 2W, 3W, 4W, 5W, 7W
Resistance Tolerance	$\pm 1\%$, $\pm 5\%$
T.C.R.	$\pm 300\text{ppm}/^{\circ}\text{C}$
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	ϕD	H	ϕd
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 MB Type) $\phi d = 0.8 \pm 0.05$ 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-I 4.13	10 times rated power for 5 Sec.	$\pm 2.0\% + 0.05\Omega$
Voltage Proof on Insulation	IEC 60115-I 4.7	In V-Block for 60 sec., test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-I 4.8	Between -40°C to +155°C	By type
Insulation Resistance	IEC 60115-I 4.6	in V-block for 60 Sec.	>100M Ω
Solderability	IEC 60115-I 4.17	235 $\pm 5^\circ\text{C}$ for 3 ± 0.5 Sec	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-I 4.30	IPA for 5 ± 0.5 Min. with ultrasonic	No deterioration of coatings and markings
Robustness of Terminations	IEC 60115-I 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-I 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-I 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-I 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-I 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-I 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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