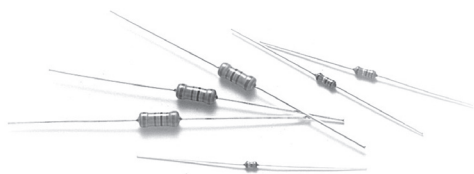


Wirewound Resistors

High Power Type

Ultra Miniature Style [PNP Series]



INTRODUCTION

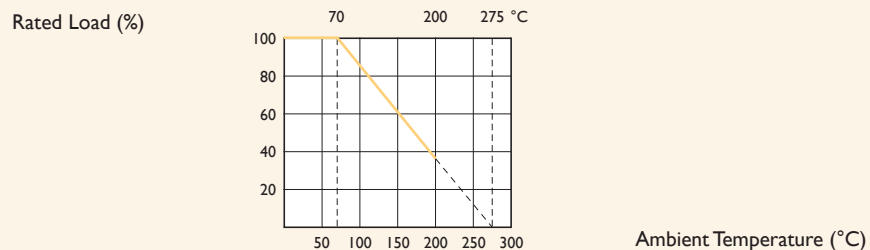
The resistor element is a resistive wire which is wound in a single layer on a ceramic rod, with tinned connecting wires of electrolytic copper welded to the end-caps. The ends of the resistive wire are connected to the caps by welding. The resistors are coated with layers of green color flame-proof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

FEATURES

Power Rating	1W, 2W, 3W, 4W
Resistance Tolerance	$\pm 1\%$, $\pm 5\%$
T.C.R.	$\pm 100\text{ppm}/^{\circ}\text{C}$, $\pm 300\text{ppm}/^{\circ}\text{C}$
Flameproof Multi-layer Coating Meets	UL-94V-0
Flameproof Feature Meets Overload Test	UL-1412

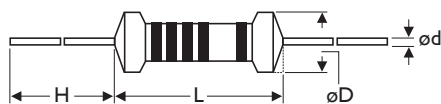
DERATING CURVE

For resistors operated in ambient temperatures above 70°C , power rating must be derated in accordance with the curve below.



DIMENSIONS

Unit: mm



5th color code: violet

STYLE	DIMENSION			
Ultra Miniature	L	ϕD	H	ϕd
PNP100	6.3 ± 0.5	2.5 ± 0.3	28 ± 2.0	0.55 ± 0.05
PNP200	9.0 ± 0.5	3.5 ± 0.3	26 ± 2.0	0.55 ± 0.05
PNP300	11.5 ± 1.0	4.6 ± 0.5	35 ± 2.0	0.8 ± 0.05
PNP400	15.5 ± 1.0	5.2 ± 0.5	33 ± 2.0	0.8 ± 0.05

Note:

ELECTRICAL CHARACTERISTICS

STYLE	PNP100	PNP200	PNP300	PNP400
Power Rating at 70°C	1W	2W	3W	4W
Maximum working voltage	$\sqrt{P \times R}$			
Voltage Proof on Insulation	300V			
Resistance Range ($\pm 1\%$)	0.22 Ω - 130 Ω	0.1 Ω - 820 Ω	0.1 Ω - 2.2K Ω	0.1 Ω - 2.8K Ω
Resistance Range ($\pm 5\%$)	0.1 Ω - 130 Ω	0.1 Ω - 820 Ω	0.1 Ω - 2.2K Ω	0.1 Ω - 2.8K Ω
Operating Temp. Range	-40°C to +200°C			
Temperature Coefficient	$\pm 100\text{ppm}/^\circ\text{C}$, $\pm 300\text{ppm}/^\circ\text{C}$			

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	245 $\pm 5^\circ\text{C}$ 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

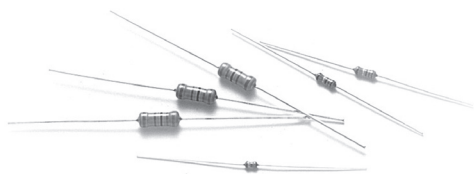
Note: RCWV(Rated Continuous Working Voltage) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.

Revision: 2020

Wirewound Resistors

High Power Type

Normal Style [PNP V 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. High power in small package. The 5th color band is violet to represent PNPV series.

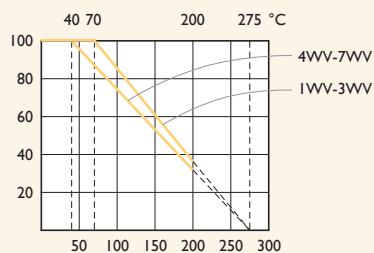
FEATURES

Power Rating	1W, 3W, 4W, 5W, 7W
Resistance Tolerance	$\pm 1\%$, $\pm 5\%$
T.C.R.	$\pm 100\text{ppm}/^{\circ}\text{C}$, $\pm 300\text{ppm}/^{\circ}\text{C}$
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.

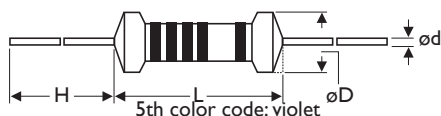
Rated Load (%)



Ambient Temperature ($^{\circ}\text{C}$)

DIMENSIONS

Unit: mm



STYLE	DIMENSION			
Normal	L	ϕD	H	ϕd
PNP1WV	10 ± 1.0	4.3 ± 0.5	26 ± 2.0	0.8 ± 0.05
PNP3WV	13 ± 1.0	5.5 ± 0.5	34 ± 2.0	0.8 ± 0.05
PNP4WV	17.5 ± 1.0	6.2 ± 0.5	32 ± 2.0	0.8 ± 0.05
PNP5WV	17 ± 1.0	7.5 ± 0.5	32 ± 2.0	0.8 ± 0.05
PNP7WV	25 ± 1.0	7.5 ± 0.5	38 ± 2.0	0.8 ± 0.05

Note:

ELECTRICAL CHARACTERISTICS

STYLE	PNP1WV	PNP3WV	PNP4WV	PNP5WV	PNP7WV
Power Rating at 40°C			4W	5W	7W
Power Rating at 70°C	1W	3W			
Maximum working voltage	$\sqrt{P \times R}$				
Voltage Proof on Insulation	300V				
Resistance Range ($\pm 1\%$)	0.1 Ω - 1K Ω	0.1 Ω - 2.8K Ω	0.1 Ω - 4.3K Ω	0.1 Ω - 8.2K Ω	0.1 Ω - 10K Ω
Resistance Range ($\pm 5\%$)	0.047 Ω - 1K Ω	0.047 Ω - 2.8K Ω	0.047 Ω - 4.3K Ω	0.047 Ω - 8.2K Ω	0.1 Ω - 10K Ω
Operating Temp. Range	-40°C to +200°C				
Temperature Coefficient	$\pm 100\text{ppm}/^\circ\text{C}$, $\pm 300\text{ppm}/^\circ\text{C}$				

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.	$\pm 2.0\% + 0.05\Omega$
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Temperature Cycling	IEC 60115-1 4.19	-55°C $\Rightarrow$ Room Temp. $\Rightarrow$ +155°C $\Rightarrow$ Room Temp. (5 cycles)	$\pm 1.0\% + 0.05\Omega$
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Accidental Overload Test	IEC 60115-1 4.26	4 times RCWV for 1 Min.	No evidence of flaming or arcing

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

Revision: 2020

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