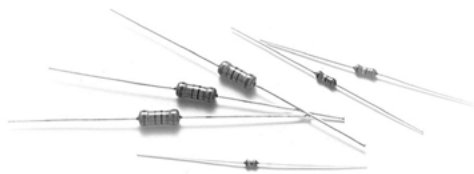


Wirewound Resistors

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.

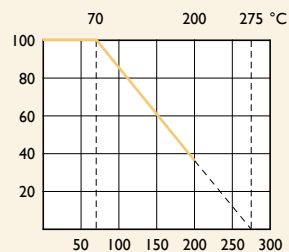
FEATURES

Power Rating	1W, 2W, 3W, 4W
Resistance Tolerance	±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 70°C, power rating must be derated in accordance with the curve below.

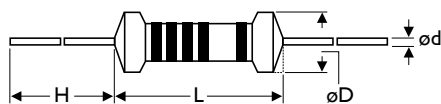
Rated Load (%)



Ambient Temperature (°C)

DIMENSIONS

Unit: mm



5th color code: violet

STYLE	DIMENSION			
Ultra Miniature	L	øD	H	ød
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	$\pm 300\text{ppm}/^\circ\text{C}$			

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 by type	By type
Temperature Coefficient	IEC 60115-1 4.8	-55°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 for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. 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

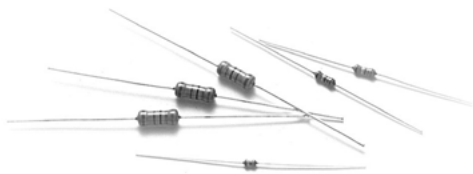
Note: RCWV(Rated Continuous Working Voltage) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.

Revision: 201304

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.

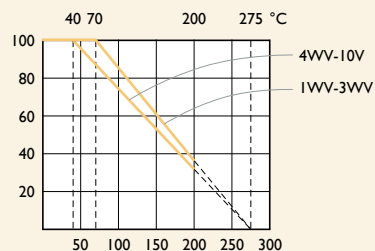
FEATURES

Power Rating	1W, 3W, 4W, 5W, 7W, 10W
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.

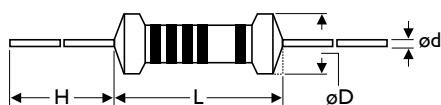
Rated Load (%)



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

DIMENSIONS

Unit: mm



5th color code: violet

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 ± 1.0	5.5 ± 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
PNP10V	44 ± 1.0	8.0 ± 0.5	28 ± 2.0	0.8 ± 0.05

Note:

ELECTRICAL CHARACTERISTICS

STYLE	PNPIWV	PNP3WV	PNP4WV	PNP5WV	PNP7WV	PNP10V
Power Rating at 40°C			4W	5W	7W	10W
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	0.1 Ω - 17K 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	0.1 Ω - 17K 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 by type	By type
Temperature Coefficient	IEC 60115-1 4.8	-55°C to +155°C	By type
Insulation Resistance	IEC 60115-1 4.6	in V-block for 60 Sec.	>100M Ω
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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: 201304



EXPLANATIONS OF ORDERING CODE

MFR	-12	F	T	F	52-	100R
Code 1 - 3 Series Name See Index	Code 4 - 6 Power Rating -05 = $\varnothing$ d0.5mm -06 = $\varnothing$ d0.6mm -07 = $\varnothing$ d0.7mm -08 = $\varnothing$ d0.8mm -10 = $\varnothing$ d1.0mm -14 = $\varnothing$ d1.4mm -12 = 1/6W -25 = 1/4W 25S = 1/4WS -50 = 1/2W 50S = 1/2WS 100 = 1W 1WS = 1WS 200 = 2W 2WS = 2WS 204 = 0.4W 207 = 0.6W 300 = 3W 3WS = 3WS 3WM = 3WM 400 = 4W 500 = 5W 5WS = 5WS 5SS = 5WSS 700 = 7W 7WS = 7WS 10A = 10W 20A = 20W 30A = 30W 40A = 40W 50A = 50W 10S = 10WS 15A = 15W 25A = 25W 10B = 100W 25B = 250W	Code 7 Tolerance P = $\pm 0.02\%$ A = $\pm 0.05\%$ B = $\pm 0.1\%$ C = $\pm 0.25\%$ D = $\pm 0.5\%$ F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ K = $\pm 10\%$ - = Base on Spec.	Code 8 Packing Style T = Tape/Box R = Tape/Reel B = Bulk	Code 9 Temperature Coefficient of Resistance - = Base on Spec. A = ± 5 ppm/ $^{\circ}$ C B = ± 10 ppm/ $^{\circ}$ C C = ± 15 ppm/ $^{\circ}$ C S = ± 20 ppm/ $^{\circ}$ C D = ± 25 ppm/ $^{\circ}$ C E = ± 50 ppm/ $^{\circ}$ C F = ± 100 ppm/ $^{\circ}$ C G = ± 200 ppm/ $^{\circ}$ C H = ± 250 ppm/ $^{\circ}$ C I = ± 300 ppm/ $^{\circ}$ C J = ± 350 ppm/ $^{\circ}$ C	Code 10 - 12 Forming Type 26- = 26mm 52- = 52.4mm 73- = 73mm 81- = 81mm 91- = 91mm F = F Type FK = FK Type FKK = FKK Type FFK = F-form Kink M = M-Type Forming MB = M-form W/flat MT = MT Type Forming MR = MR Type AV = AVIsert PN = PANAsert	Code 13 - 17 Resistance Value 0R1 = 0.1 100R = 100 10K = 10,000 10M = 10,000,000

EXCEPTION:

• Cement series:

<Code 8>: Special packing style code

B: Bulk with wirewound or metal oxide sub-assembly for resistance value

W: Bulk with ceramic based wirewound sub-assembly for resistance value

M: Bulk with metal oxide sub-assembly for resistance value

F: Bulk with Fiberglass based wirewound sub-assembly for resistance value

<Code 10-12>: Without forming code

Example: **SQP500JB-10R**

• JPW series:

<Code 13-17>: without resistance value code

Example: **JPW-06-T-52-**

Mouser Electronics

Authorized Distributor

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Yageo:

[PNP300JR-73-10R](#) [PNP300JR-73-100R](#) [PNP300JR-73-2K2](#) [PNP300JR-73-4R7](#) [PNP300JR-73-2R7](#) [PNP300JR-73-27R](#) [PNP300JR-73-1R](#) [PNP300JR-73-0R56](#) [PNP300JR-73-0R1](#) [PNP300JR-73-2R2](#) [PNP5WVJT-73-5R](#) [PNP300JR-73-47R](#) [PNP300JR-73-0R47](#) [PNP300JR-73-0R33](#) [PNP300JR-73-0R12](#) [PNP300JR-73-150R](#) [PNP300JR-73-33R](#) [PNP300JR-73-75R](#) [PNP300JR-73-18R](#) [PNP300JR-73-15R](#) [PNP300JR-73-5R6](#) [PNP5WVJT-73-0R33](#) [PNP300JR-73-22R](#) [PNP300JR-73-12R](#) [PNP7WVJT-91-68R](#) [PNP300JR-73-1R8](#) [PNP300JR-73-0R39](#) [PNP300JR-73-39R](#) [PNP300JR-73-0R75](#) [PNP300JR-73-120R](#) [PNP7WVJT-91-0R15](#) [PNP300JR-73-56R](#) [PNP7WVJT-91-0R47](#) [PNP300JR-73-7R5](#) [PNP7WVJT-91-1R8](#) [PNP200JR-52-1R](#) [PNP7WVJT-91-1R](#) [PNP200JR-52-10R](#) [PNP400JR-73-27R](#) [PNP3WVJT-73-47R](#) [PNP300JR-73-1R5](#) [PNP200JR-52-27R](#) [PNP5WVJT-73-22R](#) [PNP5WVJT-73-1R5](#) [PNP3WVJT-73-1R](#) [PNP200JR-52-12R](#) [PNP1WVJT-52-10R](#) [PNP200JR-52-75R](#) [PNP300JR-73-0R22](#) [PNP200JR-52-18R](#) [PNP5WVJT-73-100R](#) [PNP300JR-73-0R18](#) [PNP300JR-73-0R27](#) [PNP5WVJT-73-4R7](#) [PNP200JR-52-47R](#) [PNP5WVJT-73-1R](#) [PNP200JR-52-15R](#) [PNP5WVJT-73-47R](#) [PNP300JR-73-9R1](#) [PNP300JR-73-91R](#) [PNP5WVJT-73-12R](#) [PNP300JR-73-1R2](#) [PNP300JR-73-3R9](#) [PNP300JR-73-0R15](#) [PNP300JR-73-3R3](#) [PNP200JR-52-39R](#) [PNP3WVFTF73-120R](#) [PNP5WVJT-73-470R](#) [PNP1WVJR-52-6R8](#) [PNP5WVJT-73-1K](#) [PNP3WVJR-73-10R](#) [PNP1WVFTF52-22R](#) [PNP3WVJR-73-0R1](#) [PNP5WVJT-73-220R](#) [PNP3WVJR-73-100R](#) [PNP3WVJR-73-1R](#) [PNP7WVJT-91-5R](#) [PNP3WVJR-73-220R](#) [PNP300JR-73-470R](#) [PNP5WVJT-73-2K7](#) [PNP1WVJR-52-0R15](#) [PNP1WVJR-52-0R1](#) [PNP3WVJR-73-4R7](#) [PNP100JT-52-45R](#) [PNP5WVJT-73-0R47](#) [PNP1WVJR-52-100R](#) [PNP1WVJT-52-0R1](#) [PNP5WVJT-73-10R](#) [PNP7WVJT-91-4R7](#) [PNP1WVJT-52-0R22](#) [PNP1WVJT-52-0R47](#) [PNP5WVJT-73-0R1](#) [PNP200JT-52-10R](#) [PNP1WVJT-52-0R33](#) [PNP300JT-73-30R](#) [PNP300JT-73-0R47](#) [PNP300JT-73-3R9](#) [PNP1WVJT-52-3R3](#) [PNP300JT-73-82R](#) [PNP7WVJT-91-2R7](#)