Innovative Service Around the Globe YAGEO

DATA SHEET

WIREWOUND RESISTORS

High Power

PNP Series

±1%, ±5%

1W to 4W

RoHS compliant & Halogen Free

Product specification – April 3, 2024 V.4

APPLICATIONS

- Power applications
- Home appliance
- Industry

FEATURES

- Ultra miniature size
- Wide resistance range
- Stable performance and high reliability
- Flameproof coating equivalent to UL-94V-0
- RoHS compliant & halogen free

ORDERING INFORMATION

Part number of the high power wirewound resistor are identified by the series, power rating, tolerance, packing, temperature coefficient, forming and resistance value.

PART NUMBER

PNP	200	F	T	F	73-	10R
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SERIES

PNP Series

(2) POWER RATING

100 = 1W	300 = 3W
200 = 2W	400 = 4W

(3) TOLERANCE

F = ±1%	J = ±5%

(4) PACKAGING TYPE

R = Reel Pack	B= Bulk
T= Box Pack	

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

F=±100ppm/°C	- = Based on spec.

(6) FORMING

52- = 52.4mm	FFK = F-form Kink
73- = 73mm	FKK = FKK Type
M = M-Type Forming	FT = FT Type Forming
MB = M-form W/flat	PN = PANAsert
F = F Type	AV = AVIsert
FK = FK Type	

52H = 52.4mm, non-painting on soldering spots

73H = 73mm, non-painting on soldering spots

Note: 52.4mm and 73mm represent dimension A of the axial type, please refer to the category of AXIAL/REEL TAPE SPECIFICATION for the detail.

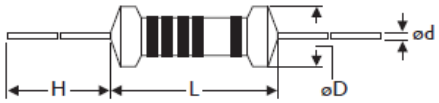
(7) RESISTANCE VALUE

E24 & E96 Series
Example:

1R = 1Ω, 10R = 10Ω, 100R = 100Ω

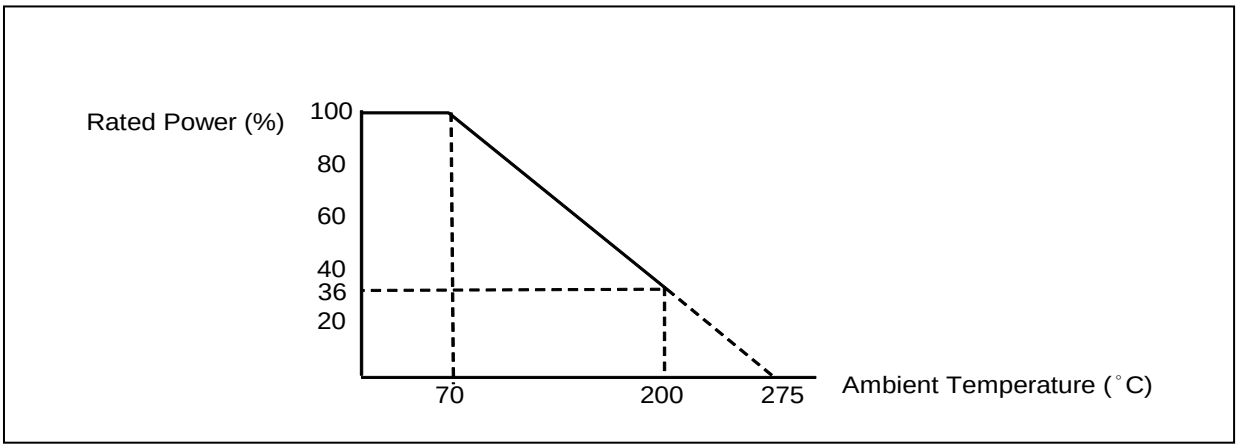
DIMENSIONS

Unit: mm



Ultra Miniature	L	ψD	H	ψd
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

DERATING CURVE



ELECTRICAL CHARACTERISTICS

CHARACTERISTICS	PNP100	PNP200	PNP300	PNP400
Power Rating at 70 °C	1W	2W	3W	4W
Resistance Range (±1%)	0.22Ω~130Ω	0.1Ω~820Ω	0.1Ω~2.2KΩ	0.1Ω~2.8KΩ
Resistance Range (±5%)	0.1Ω~130Ω	0.1Ω~820Ω	0.1Ω~2.2KΩ	0.1Ω~2.8KΩ
Voltage Proof on Insulation	300V			
Maximum working voltage	√(P X R)			
Operating Temp. Range	- 40°C to +200°C			
Temperature Coefficient	±100ppm/°C, ±300ppm/°C			

Note: For resistance value out of above range is by request.

TEST AND REQUIRMENTS

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	10 times rated power for 5 Sec.	±2%+0.05Ω
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.	>100MΩ
Solderability	IEC 60115-1 4.17	245±5°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	≥2.5Kg(24.5N)
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV(or Umax., whichever less)	±5.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)	±5.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C ➔ Room Temp. ➔ +200°C➔ Room Temp.(5 cycles)	±1.0%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±1.0%+0.05Ω
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):

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$V=\sqrt{(P \times R)}$
or max. working voltage whichever is less

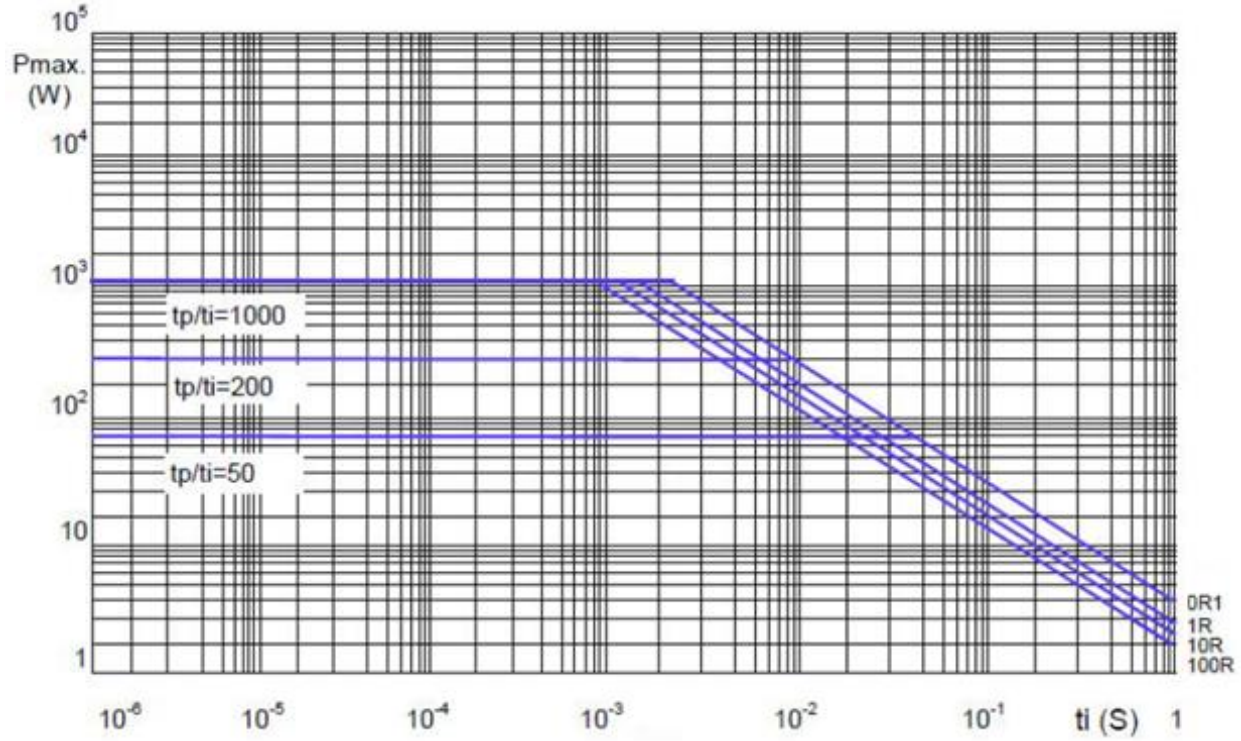
Where

V=Continuous rated DC or
AC (rms) working voltage (V)

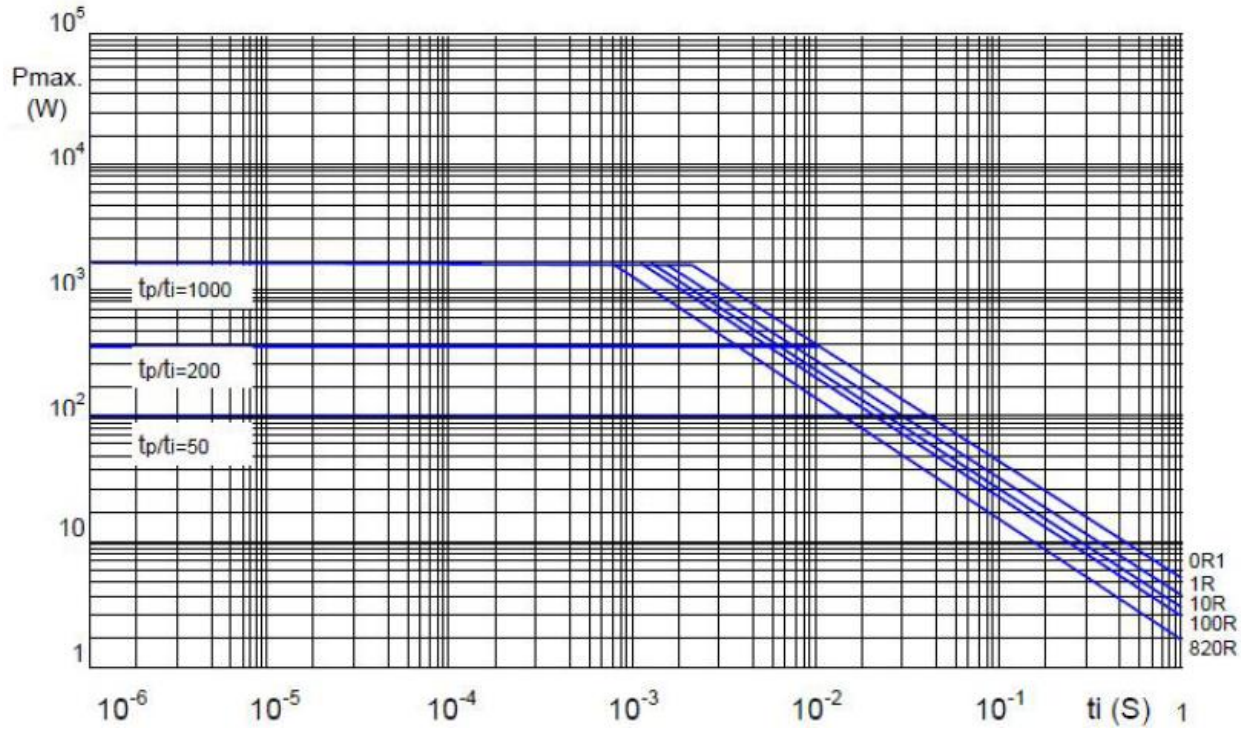
P=Rated power (W)

R=Resistance value (Ω)

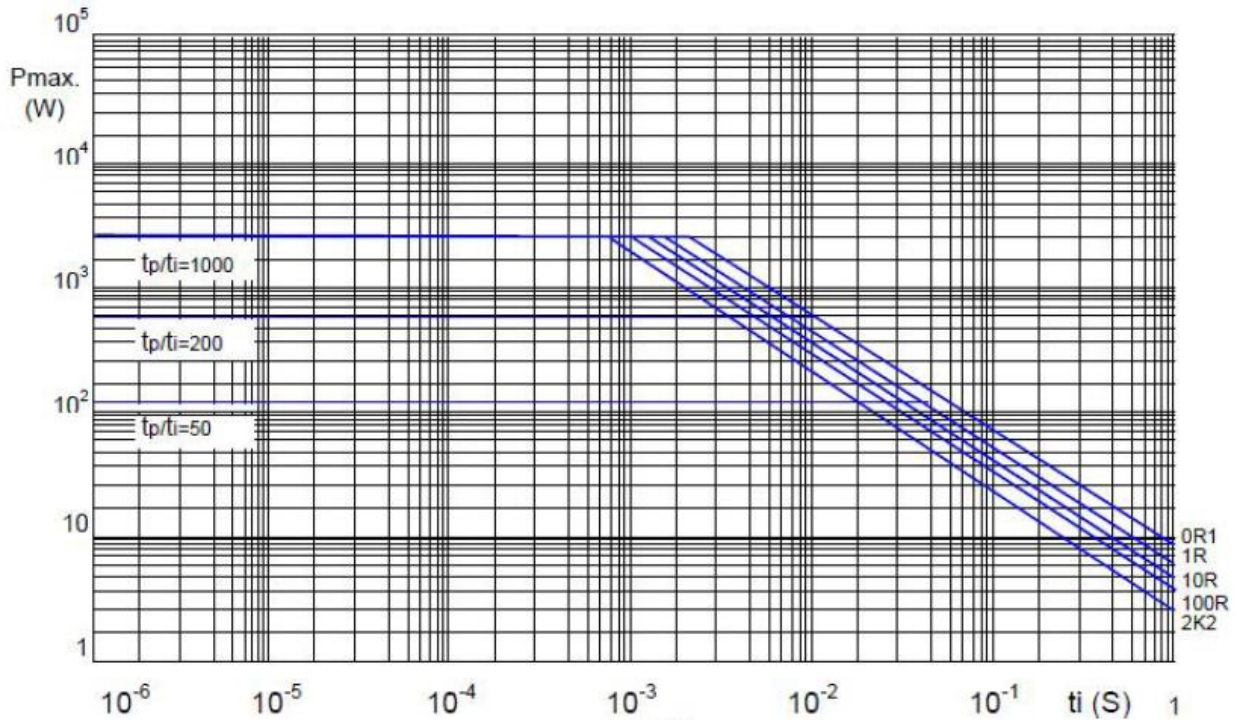
PULSE DIAGRAMS



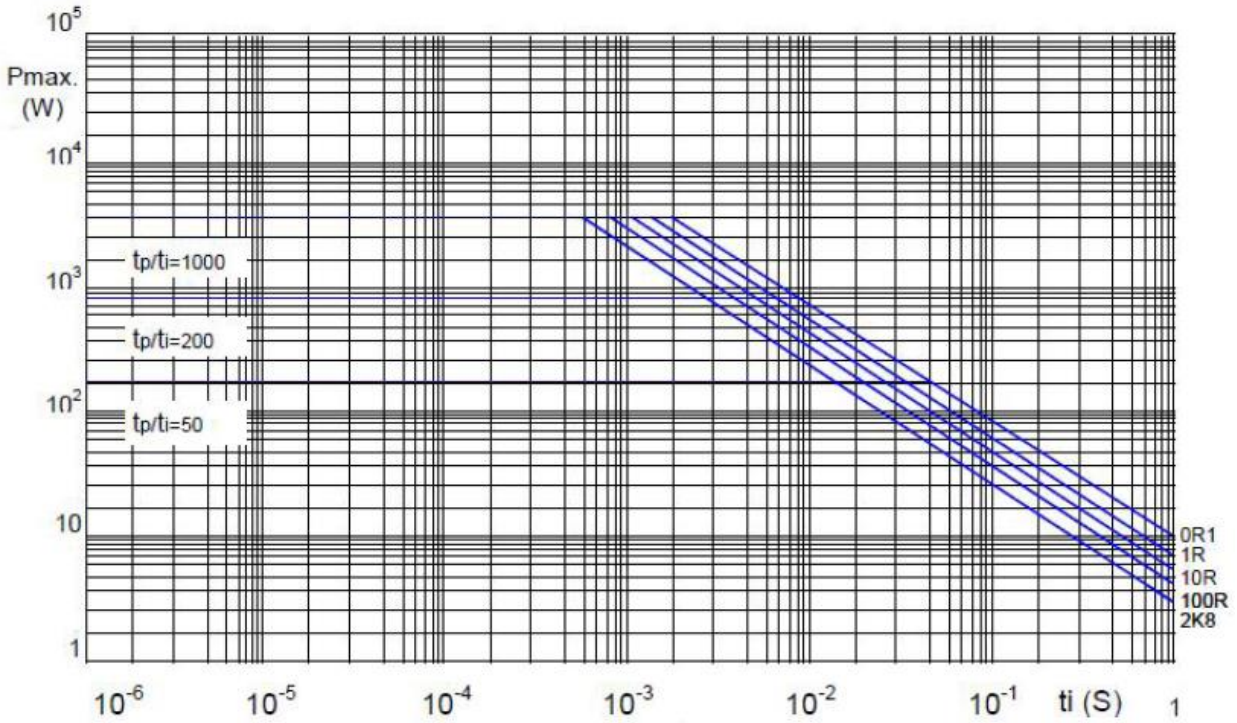
PNP100 Series: Pmax.: Maximum permissible peak pulse power
ti: Pulse duration
tp: Pulse repetition time



PNP200 Series: Pmax.: Maximum permissible peak pulse power
ti: Pulse duration
tp: Pulse repetition time

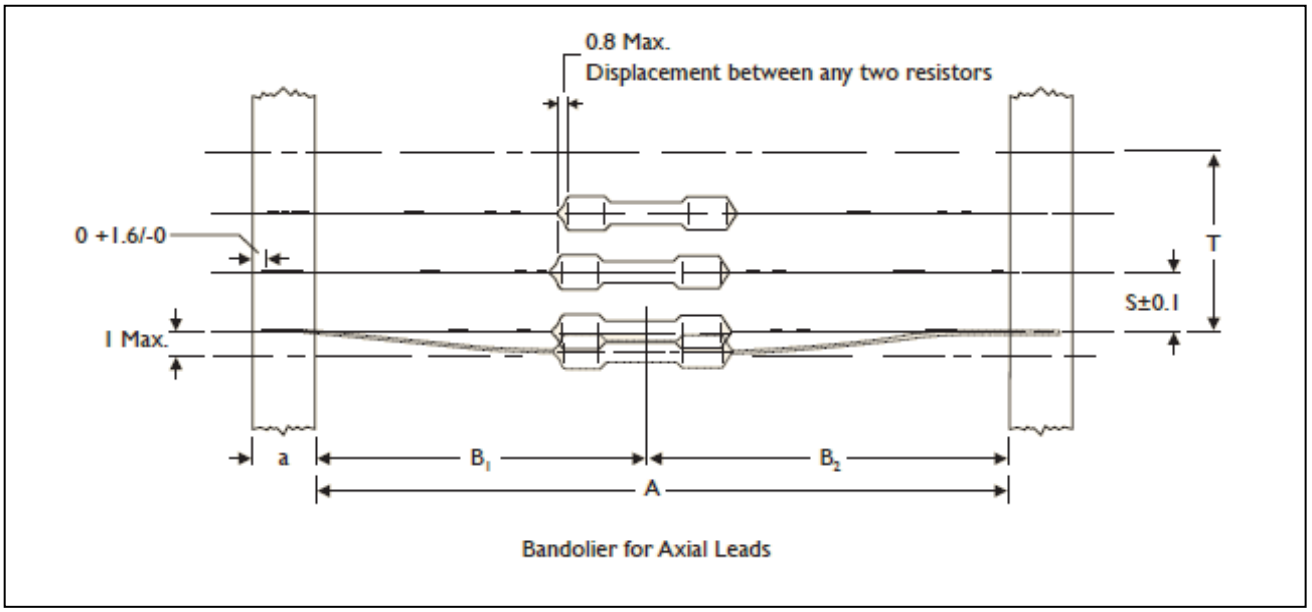


PNP300 Series: Pmax.: Maximum permissible peak pulse power
ti: Pulse duration
tp: Pulse repetition time



PNP400 Series: Pmax.: Maximum permissible peak pulse power
ti: Pulse duration
tp: Pulse repetition time

AXIAL / REEL TAPE SPECIFICATION

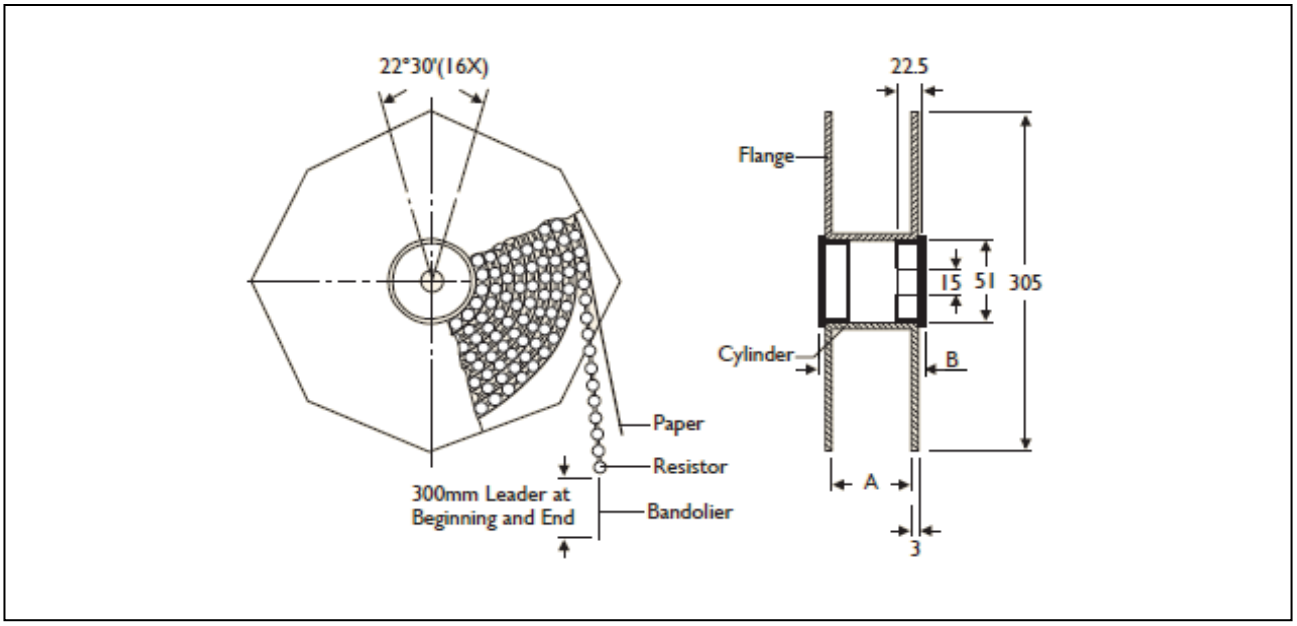


Bandolier for Axial Leads

Unit: mm

Ultra Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
PNP100	6 ± 0.5	52.4 ± 1.5	1.2	5	1 mm per 10 spacing, 0.5 mm per 5 spacing
PNP200	6 ± 0.5	52.4 ± 1.5	1.2	5	
PNP300	6 ± 0.5	73.0 ± 1.5	1.5	5	
		52.4 ± 1.5	1.2		
PNP400	6 ± 0.5	73.0 ± 1.5	1.5	10	
		52.4 ± 1.5	1.2		

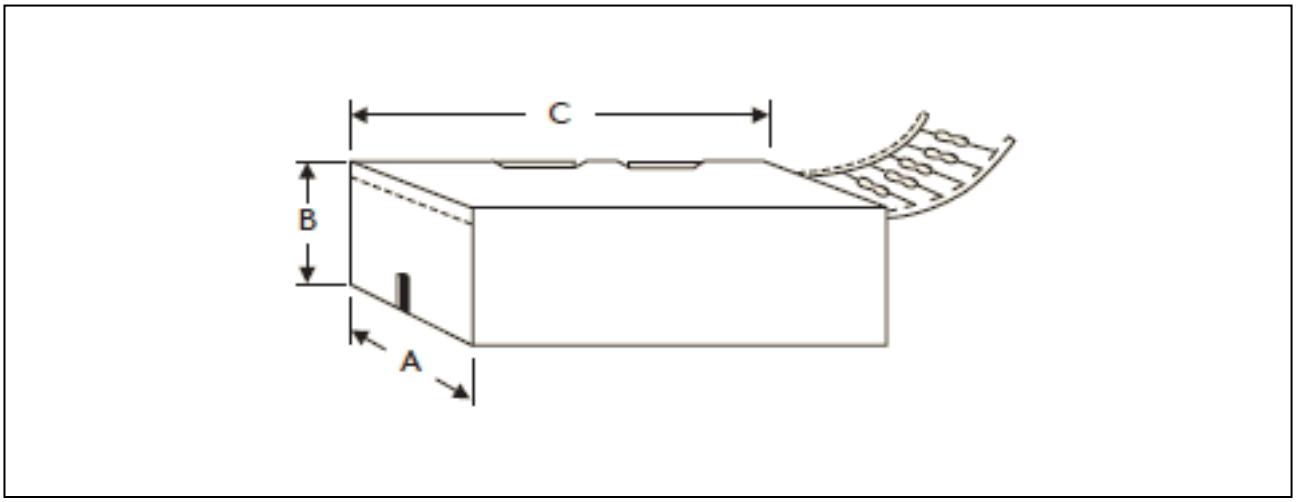
TAPE ON REEL PACKING



TYPE Unit: mm/piece

Ultra Miniature	Across Flange(A)	B	Quantity Per Reel
PNP100	66.5	75.5	5,000
PNP200	66.5	75.5	2,500
PNP300	87	96	2,000
PNP400	87	96	1,000

TAPE ON BOX PACKING



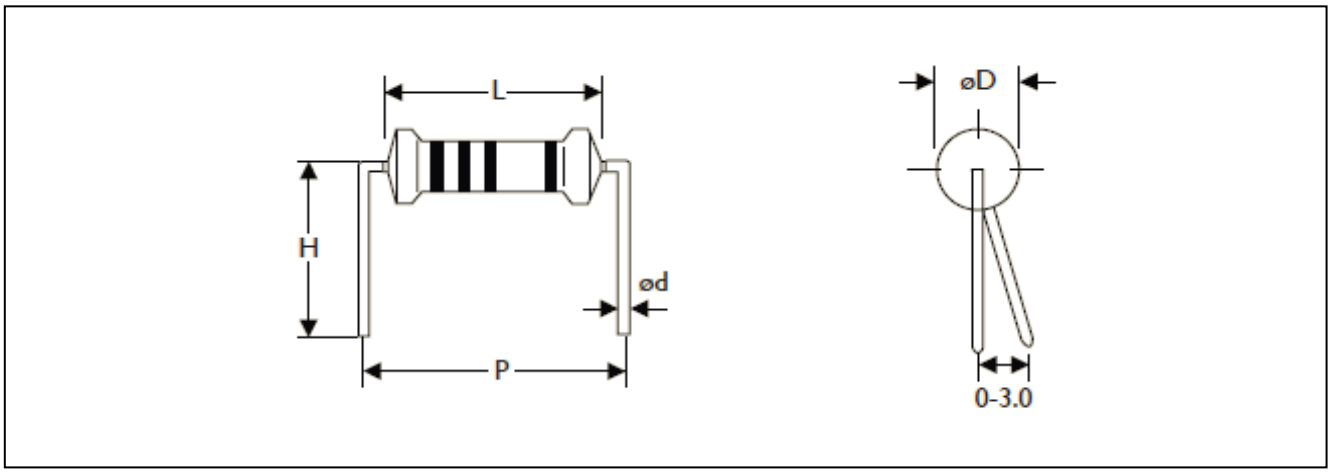
TYPE	DIMENSIONS			Unit: mm/piece
Ultra Miniature	**A**	**B**	**C**	**Quantity Per Box**
PNP100	81	104	260	5,000
PNP200	73	45	258	1,000
PNP300	81	91	260	1,000
PNP300	103	78	260	1,000
PNP400	81	91	260	1,000
PNP400	103	94	260	1,000

BULK PACKING

Ultra Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
PNP100	10,000	10	1,000
PNP200	5,000	5	1,000
PNP300	2,000	4	500
PNP400	1,000	2	500

FORMING

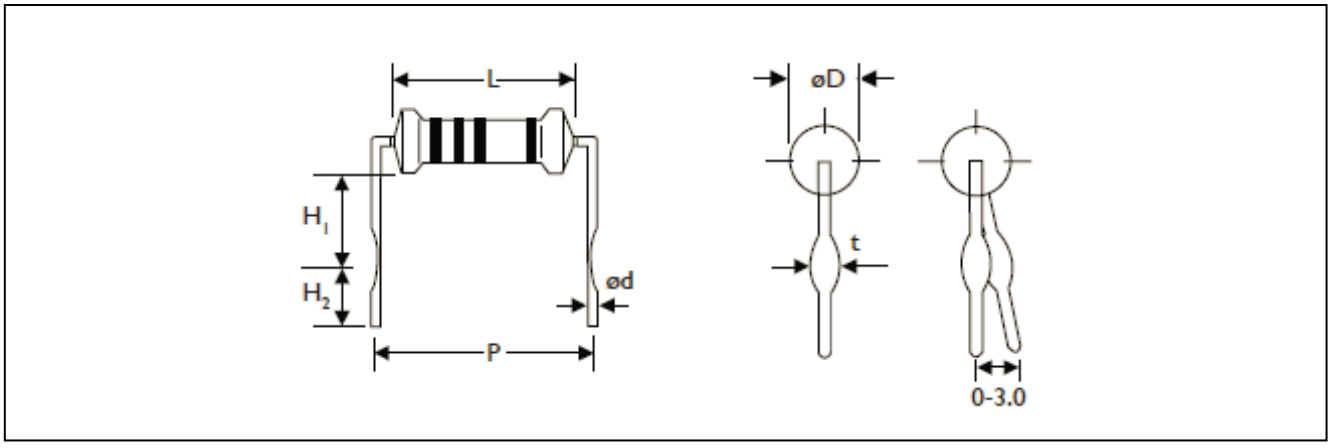
M TYPE



TYPE DIMENSIONS Unit: mm

Ultra Miniature	L	ψD	ψd	P	H
PNP100	6.3 ± 0.5	2.5 ± 0.3	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
PNP200	9.0 ± 0.5	3.5± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1
PNP300	11.5 ± 1.0	4.6± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1
PNP400	15.5 ± 1.0	5.2 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1

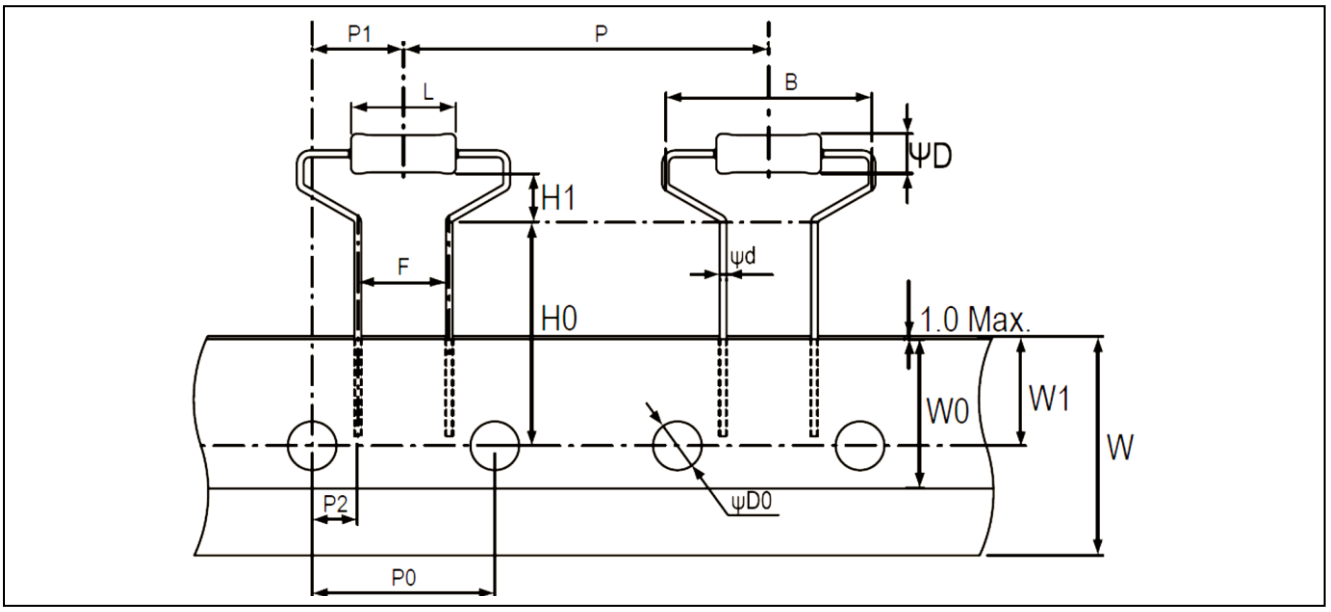
MB TYPE



TYPE DIMENSIONS Unit: mm

Ultra Miniature	L	ψD	ψd	P	H1	H2	t
PNP100	6.3 ± 0.5	2.5± 0.3	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
PNP200	9.0 ± 0.5	3.5± 0.3	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
PNP300	11.5 ± 1.0	4.6 ± 0.5	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
PNP400	15.5 ± 1.0	5.2 ± 0.5	0.8 ± 0.05	20.0 ± 1	10.0 ± 1	5.0 ± 1	1.4 ± 0.2

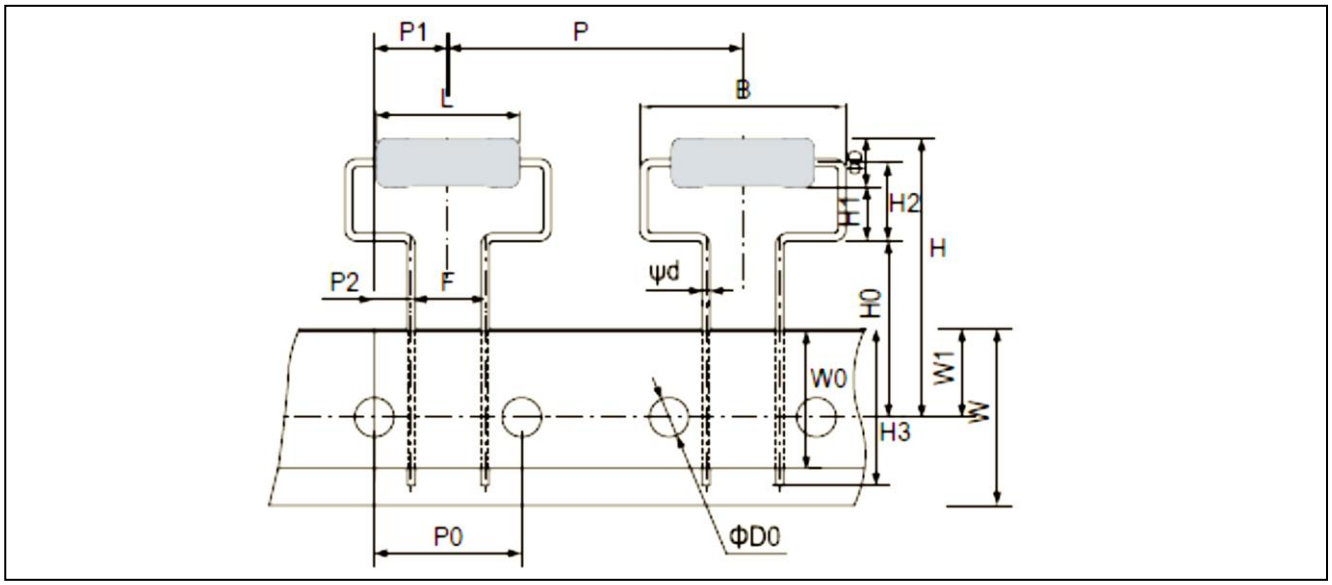
MHA TYPE



TYPE DIMENSIONS Unit: mm

Miniature	**L**	**ψD**	**ψd**	**B**	**H0**	**HI**	**P**	**P0**
	9.0±0.5	3.5±0.3	0.55±0.05	17.5Max	19.0±1.0	4.0±1.0	30.0±1.0	15.0±0.3
PNP200	**P1**	**P2**	**F**	**W**	**W0**	**W1**	**ΨD0**	
	7.5±1.0	3.75±0.5	7.5±0.5	18.0±0.5	5.0Min	9.0±0.5	4.0±0.2	

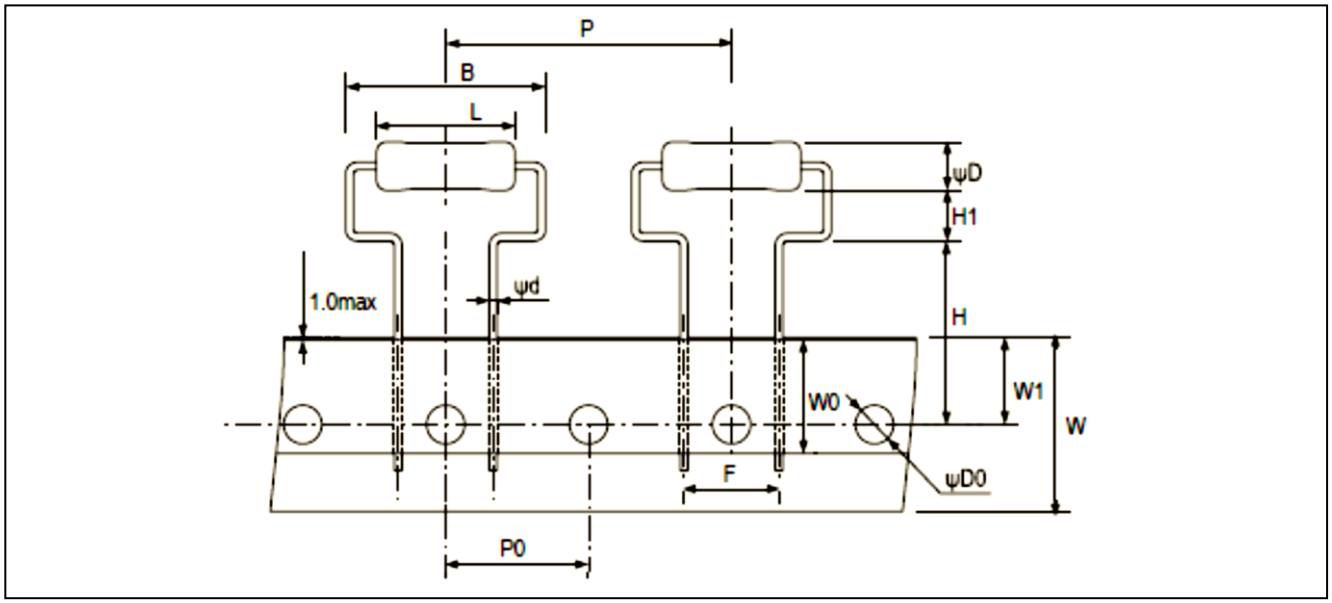
MHB TYPE



TYPE DIMENSIONS Unit: mm

Miniature	L	ψD	ψd	B	H	H0	HI	H2	H3
	15.5±1.0	5.2±0.5	0.8±0.05	21.0Max.	30Max.	18.0±1.0	5.5(Ref.)	8.0±1.5	16Max.
PNP400	**P**	**P0**	**PI**	**P2**	**F**	**W**	**W0**	**W1**	**ΨD0**
	30.0±1.0	15.0±0.3	7.5±1.0	3.75±0.8	7.5±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.3

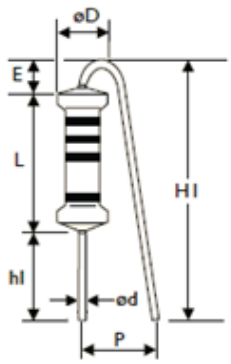
MHC TYPE



TYPE DIMENSIONS Unit: mm

Miniature	L	ψD	ψd	B	H	HI	P	P0
	15.5±1.0	5.2±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3
PNP400	**F**	**W**	**W0**	**W1**	**ΨD0**			
	10.0±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.2			

F TYPE



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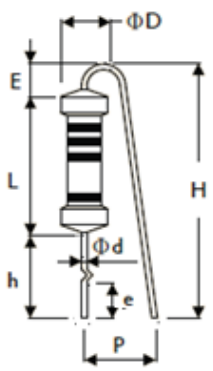

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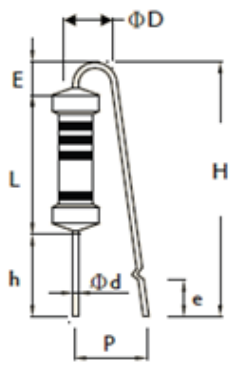

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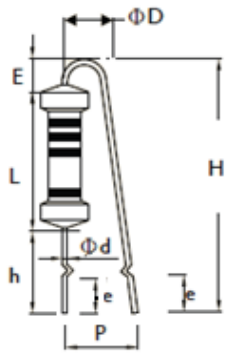
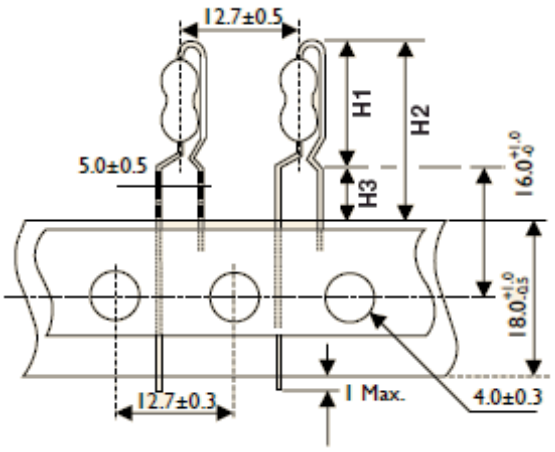


TYPE DIMENSIONS Unit: mm

Ultra Miniature	L	ψD	ψd	P	h	H Max.	hl	HI Max.	E Max.	e
PNP200	9.0±0.5	3.5±0.3	0.55±0.05	6±1	8±1	22	5±1	18.5	3.5	3.5±1
PNP300	11.5±1	4.6±0.5	0.8±0.05	6±1	8±1	24	5±1	20	3.5	3.5±1
PNP400	15.5±1	5.2±0.5	0.8±0.05	8±1	8±1	28	5± 1	25	3.5	3.5±1

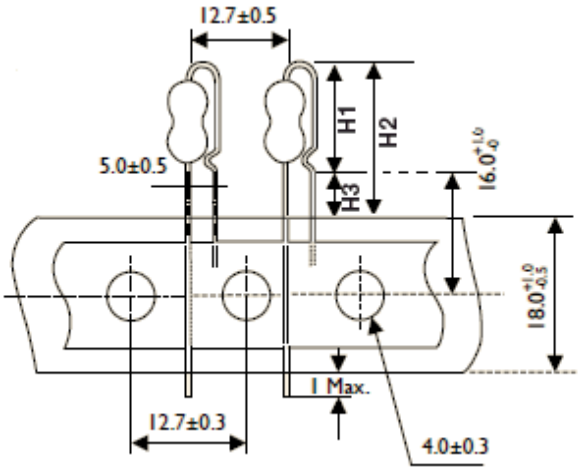
PN TYPE (Taping Pack)



TYPE DIMENSIONS Unit: mm

Ultra Miniature	H1 Max.	H2 Max.	H3 Max.
PNP100	13	21.5	8.5
PNP200	17	25.5	8.5
PNP300	19	27.5	8.5

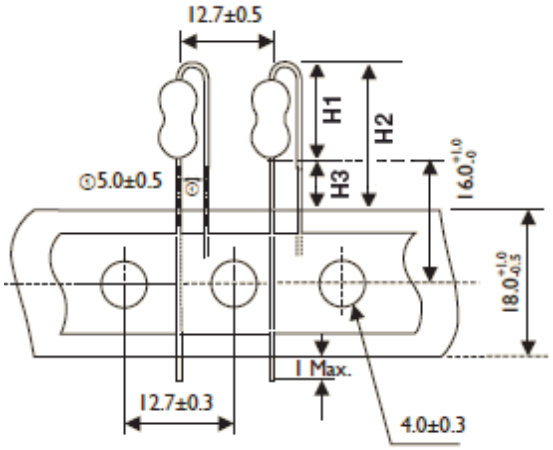
AV TYPE (Taping Pack)



TYPE DIMENSIONS Unit: mm

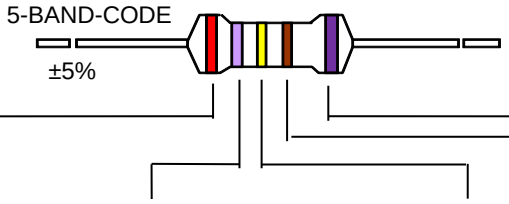
Ultra Miniature	H1 Max.	H2 Max.	H3 Max.
PNP100	11.5	20	8.5
PNP200	14.5	23	8.5
PNP300	17.5	26	8.5

FT TYPE (Taping Pack)

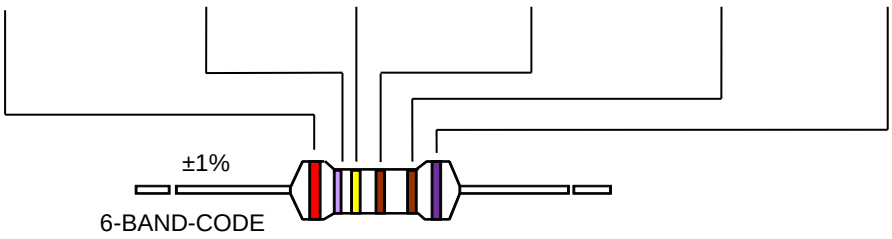


TYPE	DIMENSIONS		Unit: mm
Ultra Miniature	**H1 Max.**	**H2 Max.**	**H3 Max.**
PNP100	10	18.5	8.5
PNP200	13	21.5	8.5
PNP300	16	24.5	8.5

MARKING



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	±1 % (F)
RED	2	2	2	100Ω	
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100KΩ	
BLUE	6	6	6	1MΩ	
VIOLET	7	7	7	10MΩ	PNP Series
GREY	8	8	8		
WHITE	9	9	9		
GOLD				0.1Ω	±5 % (J)
SILVER				0.01Ω	



REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 4	Apr.1, 2024	-	- Added forming code description for part number
Version 3	Nov.8, 2023	-	- 52H type and 73H type are included
Version 2	Sep.6, 2023	-	- Updated legal disclaimer and footer versions numbers
Version 1	Aug.3, 2022	-	- Update the resistance value description
Version 0	Aug.2, 2021	-	- First issue of this specification

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