

# DATA SHEET

## METAL FILM RESISTORS

Precision  
MFP Series

$\pm 0.1\%$ ,  $\pm 0.25\%$

1/6W to 3W

RoHS compliant & Halogen Free





**ORDERING INFORMATION**

Part number of the precision metal film resistors are identified by the series, power rating, tolerance, packing, temperature coefficient, forming and resistance value.

**APPLICATIONS**

- High precision circuit
- Power applications
- Medical equipment
- Measurement instruments
- Industrial electronic

**FEATURES**

- AEC-Q200 qualified
- Wide resistance range
- Narrow tolerance & low TCR
- High stability
- RoHS compliant & halogen-free

**PART NUMBER**

<u>MFP</u> (1)	<u>200</u> (2)	<u>B</u> (3)	<u>T</u> (4)	<u>D</u> (5)	<u>73-</u> (6)	<u>100R</u> (7)
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**(1) SERIES**

MFP Series

**(2) POWER RATING**

-12 = 1/6W	-50 = 1/2W
25S = 1/4W	1WS = 1W
204=0.4W	100 = 1W
-25 = 1/4W	2WS = 2W
50S = 1/2W	200 = 2W
207=0.6W	3WS = 3W

**(3) TOLERANCE**

B = ±0.1%	A = ±0.05%
C = ±0.25%	P = ±0.02%

**(4) PACKAGING**

R = Reel Pack	B = Bulk
T = Box Pack	

**(5) TEMPERATURE COEFFICIENT OF RESISTANCE**

A = ±5ppm/°C	C = ±15ppm/°C
B = ±10ppm/°C	D = ±25ppm/°C

**(6) FORMING**

26- = 26mm	MT = MT Type Forming
52- = 52.4mm	FT = FT Type Forming
73- = 73mm	PN = PANAsert
M = M-Type Forming	AV = AVIsert

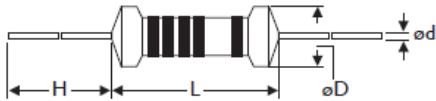
**(7) RESISTANCE VALUE**

E192 Series  
 Example:  
 100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

**DIMENSIONS**

For ±0.1% tolerance

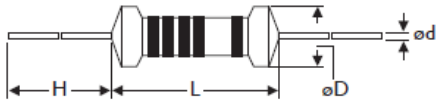
Unit: mm



Normal	Miniature	L	ψD	H	ψd
MFP-12	MFP25S	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.56 ± 0.05
MFP204	-	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.56 ± 0.05
MFP-25	MFP50S	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.65 ± 0.05
MFP207	-	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.65 ± 0.05
MFP-50	MFP1WS	9.0 ± 0.5	3.3 ± 0.3	26 ± 2.0	0.65 ± 0.05
MFP100	MFP2WS	11.5 ± 1.0	4.5 ± 0.5	35 ± 2.0	0.8 ± 0.05
MFP200	MFP3WS	15.5 ± 1.0	5.0 ± 0.5	33 ± 2.0	0.8 ± 0.05

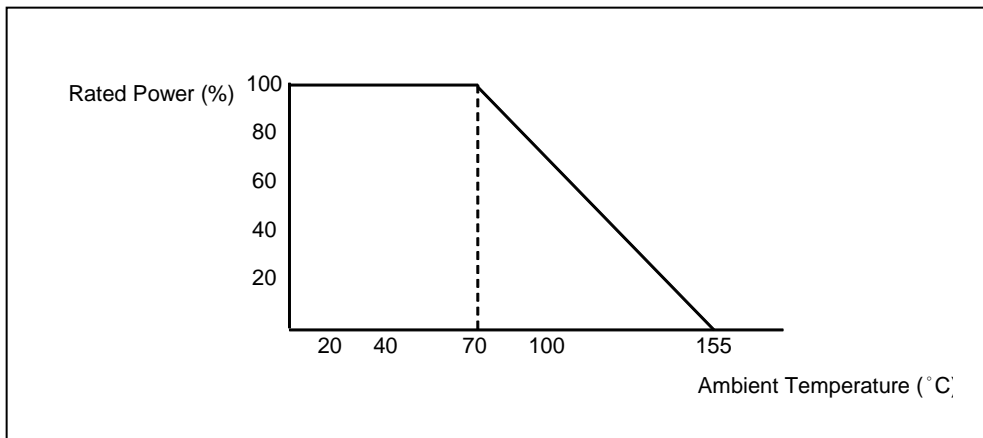
For ±0.25%, ±0.02%, ±0.05% tolerances

Unit: mm



Normal	Miniature	L	ψD	H	ψd
MFP-12	MFP25S	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.45 ± 0.05
MFP204	-	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.45 ± 0.05
MFP-25	MFP50S	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
MFP207	-	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
MFP-50	MFP1WS	9.0 ± 0.5	3.3 ± 0.3	26 ± 2.0	0.55 ± 0.05
MFP100	MFP2WS	11.5 ± 1.0	4.5 ± 0.5	35 ± 2.0	0.8 ± 0.05
MFP200	MFP3WS	15.5 ± 1.0	5.0 ± 0.5	33 ± 2.0	0.8 ± 0.05

**DERATING CURVE**



**ELECTRICAL CHARACTERISTICS**

CHARACTERISTICS	MFP-12	MFP204	MFP-25	MFP207	MFP-50	MFP100	MFP200
Power Rating at 70 °C	1/6W	0.4W	1/4W	0.6W	1/2W	1W	1W
Maximum Working Voltage	150V	200V	250V	250V	350V	500V	500V
Maximum Overload Voltage	300V	400V	500V	600V	700V	1000V	1000V
Voltage Proof on Insulation	300V	300V	500V	500V	500V	1000V	1000V
Resistance Range	10Ω ~ 1MΩ for E192 series value						
Operating Temp. Range	- 55°C to +155°C						
Temperature Coefficient	±15ppm/°C , ±25ppm/°C, (±5ppm/°C, ±10ppm/°C on request)						

CHARACTERISTICS	MFP25S	MFP50S	MFP1WS	MFP2WS	MFP3WS
Power Rating at 70 °C	1/4W	1/2W	1W	2W	3W
Maximum Working Voltage	200V	250V	400V	500V	500V
Maximum Overload Voltage	400V	600V	800V	1000V	1000V
Voltage Proof on Insulation	300V	500V	700V	1000V	1000V
Resistance Range	10Ω ~ 1MΩ for E192 series value				
Operating Temp. Range	- 55°C to +155°C				
Temperature Coefficient	±15ppm/°C , ±25ppm/°C, (±5ppm/°C, ±10ppm/°C on request)				

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	2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)	± 0.25 % + 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 -55°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>10,000MΩ
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)
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV(or Umax., whichever less) 10,000 cycles (1 Sec. on, 25 Sec.off)	±1.0%+0.05Ω

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)	±1.5%+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)	±1.5%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C → Room Temp. → +155°C → Room Temp.(5 cycles)	±0.75%+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	±0.25%+0.05Ω

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

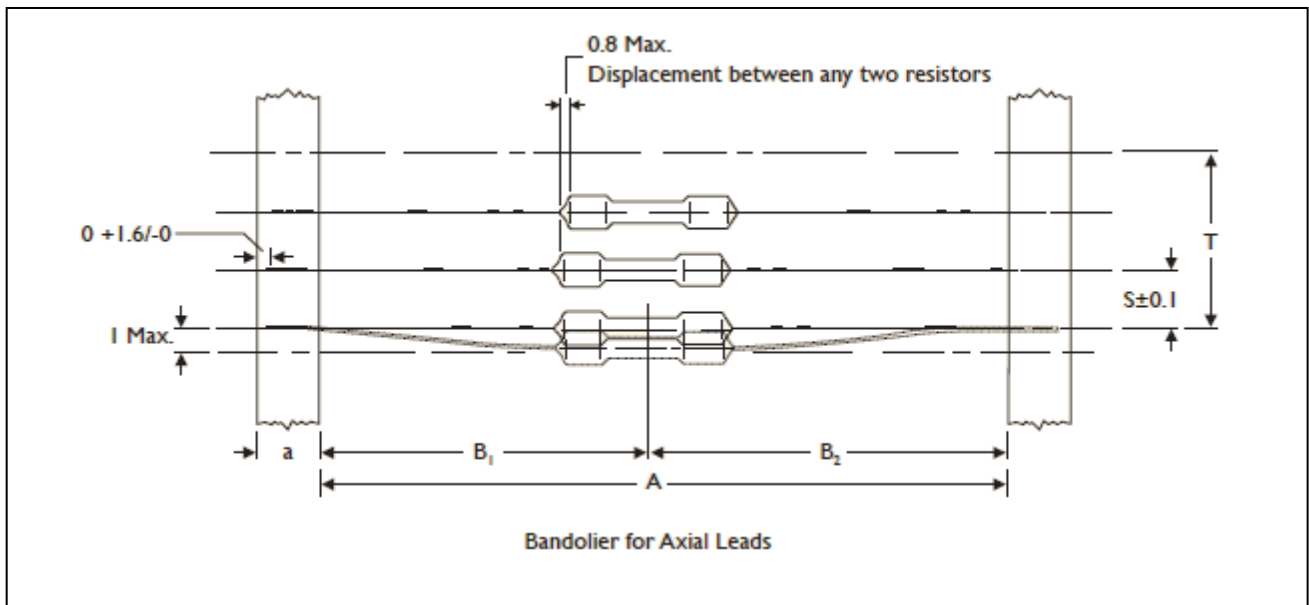
Where

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

P=Rated power (W)

R=Resistance value (Ω)

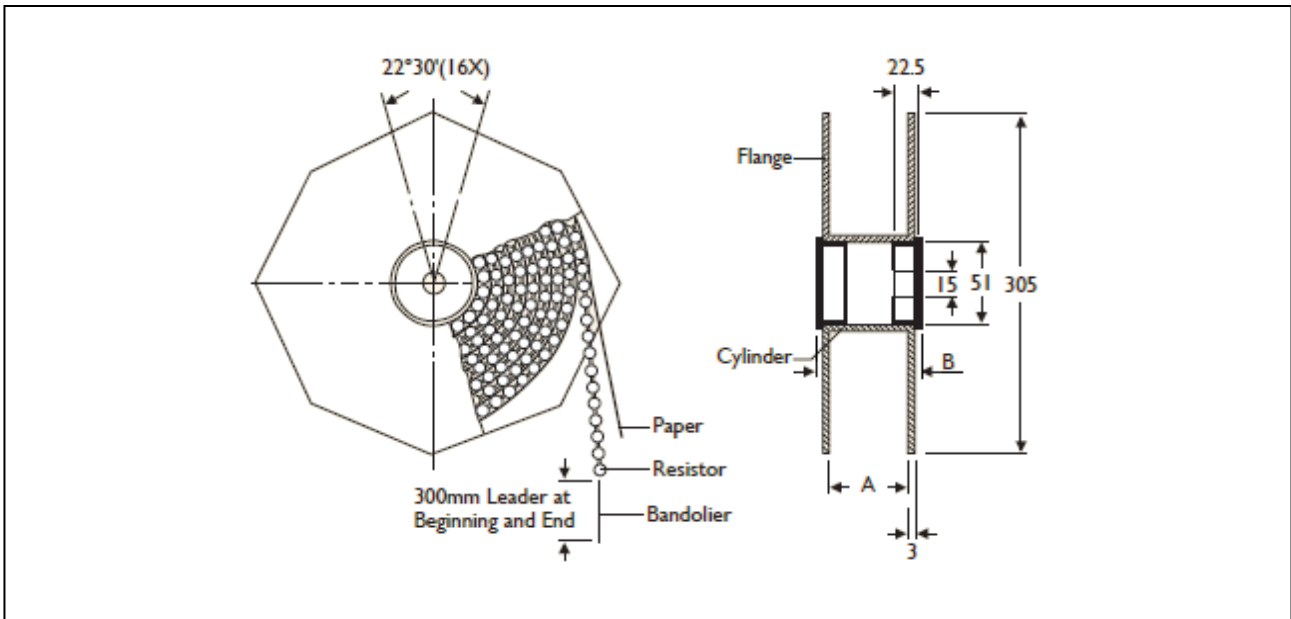
**AXIAL / REEL TAPE SPECIFICATION**



Unit: mm

Normal	Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
MFP-12	MFP25S	6 ± 0.5	52.4 ± 1.5	1.2	5	
			26.0 ± 1.5	1		
MFP204	-	6 ± 0.5	52.4 ± 1.5	1.2	5	
			26.0 ± 1.5	1		
MFP-25	MFP50S	6 ± 0.5	52.4 ± 1.5	1.2	5	
			26.0 ± 1.5	1		
MFP207	-	6 ± 0.5	52.4 ± 1.5	1.2	5	1 mm per 10 spacing, 0.5 mm per 5 spacing
			26.0 ± 1.5	1		
MFP-50	MFP1WS	6 ± 0.5	52.4 ± 1.5	1.2	5	
MFP100	MFP2WS	6 ± 0.5	73.0 ± 1.5	1.5	5	
			52.4 ± 1.5	1.2		
MFP200	MFP3WS	6 ± 0.5	73.0 ± 1.5	1.5	10	
			52.4 ± 1.5	1.2		

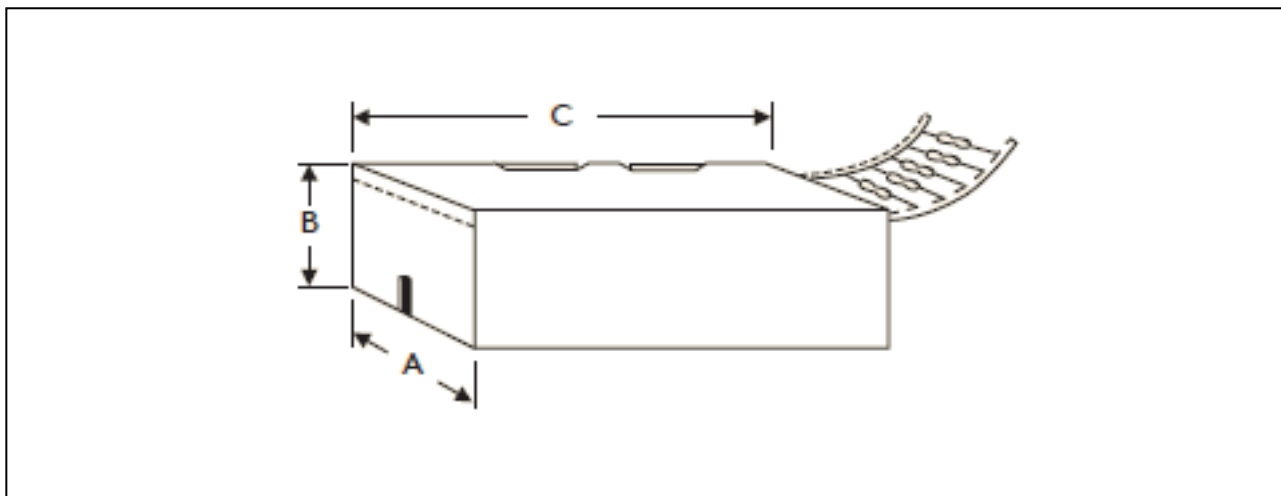
**TAPE ON REEL PACKING**



TYPE

Unit: mm/piece

Normal	Miniature	Across Flange(A)	B	Quantity Per Reel
MFP-12	MFP25S	66.5	75.5	5,000
MFP204	-	66.5	75.5	5,000
MFP-25	MFP50S	66.5	75.5	5,000
MFP207	-	66.5	75.5	5,000
MFP-50	MFP1WS	66.5	75.5	2,500
MFP100	MFP2WS	87	96	2,000
MFP200	MFP3WS	87	96	1,000

**TAPE ON BOX PACKING**

TYPE		DIMENSIONS			Unit: mm/piece
Normal	Miniature	A	B	C	Quantity Per Box
MFP-12	MFP25S	48	102	255	5,000
MFP-12	MFP25S	81	70	260	5,000
MFP204	-	48	102	255	5,000
MFP204	-	81	70	260	5,000
MFP-25	MFP50S	48	102	255	5,000
MFP-25	MFP50S	81	104	260	5,000
MFP-207	-	48	102	255	5,000
MFP-207	-	81	104	260	5,000
MFP-50	MFP1WS	73	45	258	1,000
MFP100	MFP2WS	81	78	260	1,000
MFP100	MFP2WS	103	91	260	1,000
MFP200	MFP3WS	81	91	260	1,000
MFP200	MFP3WS	103	94	260	1,000

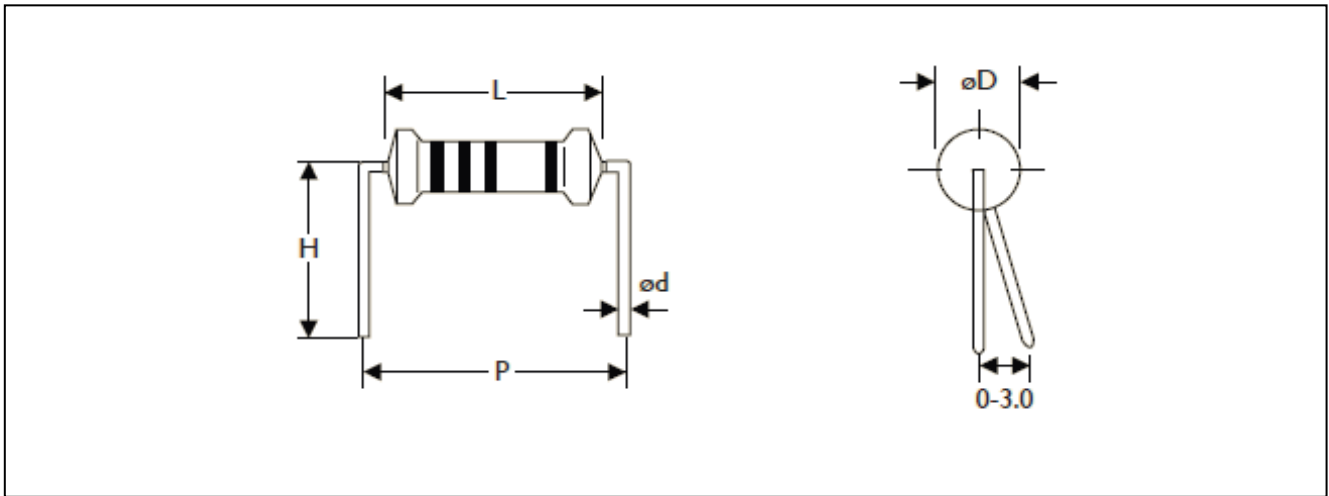
**BULK PACKING**

Normal	Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
MFP-12	MFP25S	10,000	10	1,000
MFP204	-	10,000	10	1,000
MFP-25	MFP50S	10,000	10	1,000
MFP207	-	10,000	10	1,000
MFP-50	MFP1WS	5,000	5	1,000
MFP100	MFP2WS	2,000	4	500
MFP200	MFP3WS	1,000	2	500



**FORMING**

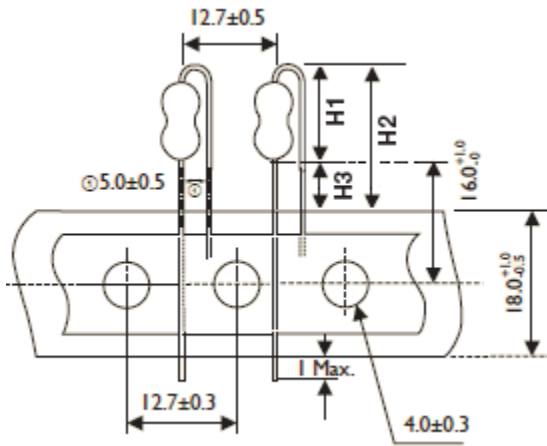
**M TYPE (For ±0.25% tolerance only)**



TYPE		DIMENSIONS					Unit: mm
Normal	Miniature	L	ψD	ψd	P	H	
MFP-12	MFP25S	3.4 ± 0.3	1.9 ± 0.2	0.45 ± 0.05	6.0 ± 1	10.0 ± 1	
MFP204	-	3.4 ± 0.3	1.9 ± 0.2	0.45 ± 0.05	6.0 ± 1	10.0 ± 1	
MFP-25	MFP50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1	
MFP207	-	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1	
MFP-50	MFP1WS	9.0 ± 0.5	3.3 ± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1	
MFP100	MFP2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1	
MFP200	MFP3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1	

**FT TYPE (Taping Pack)**

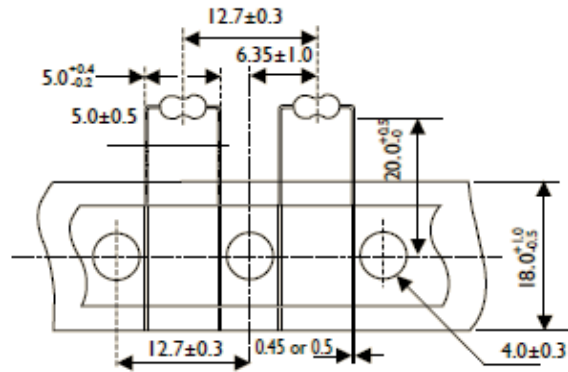
For ±0.25% tolerance only



**MT TYPE (Taping Pack)**

For ±0.25% tolerance only

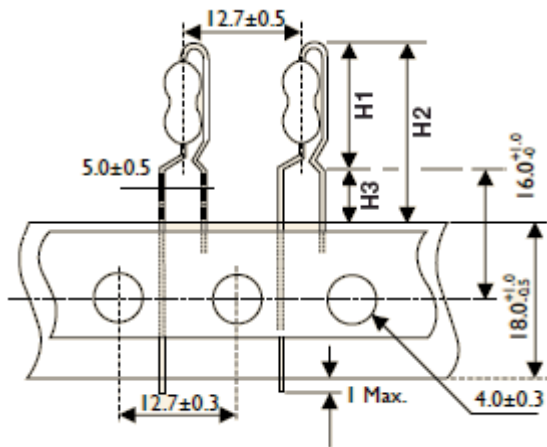
Rated Watts : 1/6W,1/4WS,0.4W



TYPE		DIMENSIONS			Unit: mm
Normal	Miniature	H1 Max.	H2 Max.	H3 Max.	
MFP-25	MFP50S	10	18.5	8.5	
MFP207	-	10	18.5	8.5	

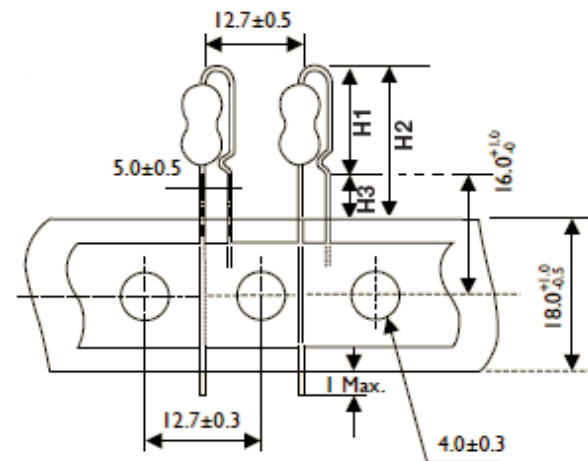
**PN TYPE (Taping Pack)**

For ±0.25% tolerance only



**AV TYPE (Taping Pack)**

For ±0.25% tolerance only

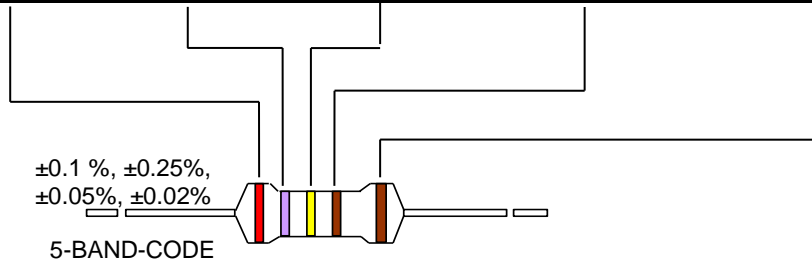


TYPE		DIMENSIONS			Unit: mm
Normal	Miniature	H1 Max.	H2 Max.	H3 Max.	
MFP-25	MFP50S	13	21.5	8.5	
MFP207	-	13	21.5	8.5	

TYPE		DIMENSIONS			Unit: mm
Normal	Miniature	H1 Max.	H2 Max.	H3 Max.	
MFP-25	MFP50S	11.5	20	8.5	
MFP207	-	11.5	20	8.5	

**MARKING**

COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	
RED	2	2	2	100Ω	
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100K	
BLUE	6	6	6	1MΩ	± 0.25 % ( C )
VIOLET	7	7	7	10MΩ	± 0.1 % ( B )
GREY	8	8	8	0.001Ω	± 0.05 % ( A )
WHITE	9	9	9	0.0001Ω	± 0.02 % ( P )
GOLD				0.1	
SILVER				0.01	



**REVISION HISTORY**

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Sep.6, 2023	-	- Updated legal disclaimer and footer versions numbers
Version 1	Jul.13, 2022	-	- Added tolerance +/-0.02% color code
Version 0	Aug.2, 2021	-	- First issue of this specification

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