Innovative Service Around the Globe YAGEO

DATA SHEET

METAL FILM RESISTORS

Flameproof

FMF Series

±0.5%, ±1%, ±2%, ±5%

1/4W to 3W

RoHS compliant & Halogen Free

YAGEO

Product specification – April 3, 2024 V.2

APPLICATIONS

- All general purpose applications
- Power applications

FEATURES

- Wide resistance range
- High stability
- Flameproof coating equivalent to UL-94V-0
- RoHS compliant & halogen-free

ORDERING INFORMATION

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

PART NUMBER

FMF	-25	F	T	F	52-	100R
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SERIES

FMF Series

(2) POWER RATING

-25 = 1/4W	2WS = 2W
50S = 1/2W	200 = 2W
-50 = 1/2W	3WS = 3W
1WS = 1W	100 = 1W

(3) TOLERANCE

D = ±0.5%	G = ±2%
F = ±1%	J = ±5%

(4) PACKAGING

R = Reel Pack	B = Bulk
T = Box Pack	

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

E=±50ppm/°C	- = Based on spec.
F=±100ppm/°C	

(6) FORMING

26- = 26mm	FK = FK Type
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

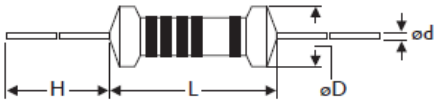
Note:26mm, 52.4mm and 73mm represent dimension A of the axial type, please refer to the category of AXIAL/REEL TAPE SPECIFICATION for the detail.

(7) RESISTANCE VALUE

E24 & E96 Series
Example:
100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

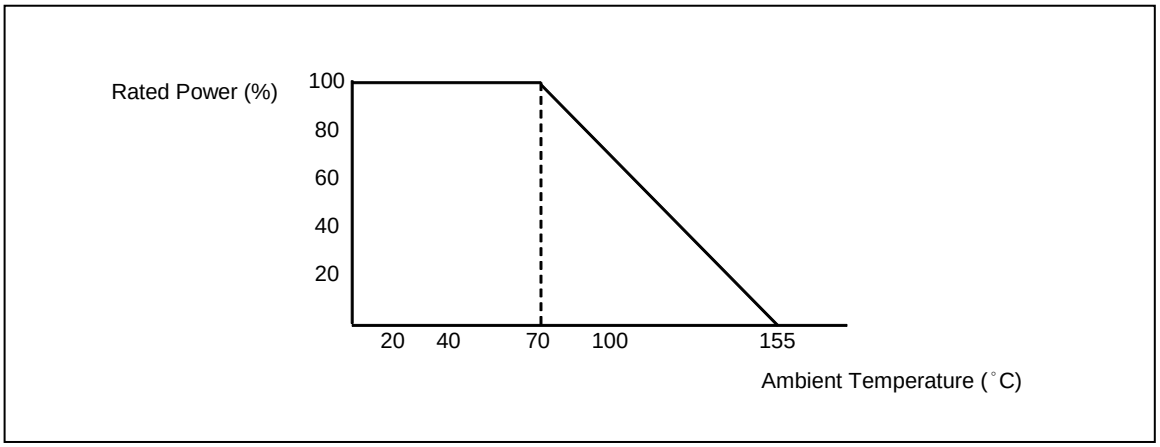
DIMENSIONS

Unit: mm



Normal	Miniature	L	ψD	H	ψd
FMF-25	FMF50S	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
FMF-50	FMF1WS	9.0 ± 0.5	3.3 ± 0.3	26 ± 2.0	0.55 ± 0.05
FMF100	FMF2WS	11.5 ± 1.0	4.5 ± 0.5	35 ± 2.0	0.8 ± 0.05
FMF200	FMF3WS	15.5 ± 1.0	5.0 ± 0.5	33 ± 2.0	0.8 ± 0.05

DERATING CURVE



ELECTRICAL CHARACTERISTICS

CHARACTERISTICS	FMF-25	FMF50S	FMF-50	FMF1WS	FMF100	FMF2WS	FMF3WS
Power Rating at 70 °C	1/4W	1/2W	1/2W	1W	1W	2W	3W
Maximum Working Voltage	250V	300V	350V	400V	500V	500V	500V
Maximum Overload Voltage	500V	600V	700V	800V	1000V	1000V	1000V
Voltage Proof on Insulation	400V	400V	500V	500V	500V	500V	500V
Resistance Range	1Ω ~ 4M7Ω for E24 & E96 series value						
Operating Temp. Range	- 55°C to +155°C						
Temperature Coefficient	±50ppm/°C , ±100ppm/°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	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.	>1,000MΩ
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)D
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 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	±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
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

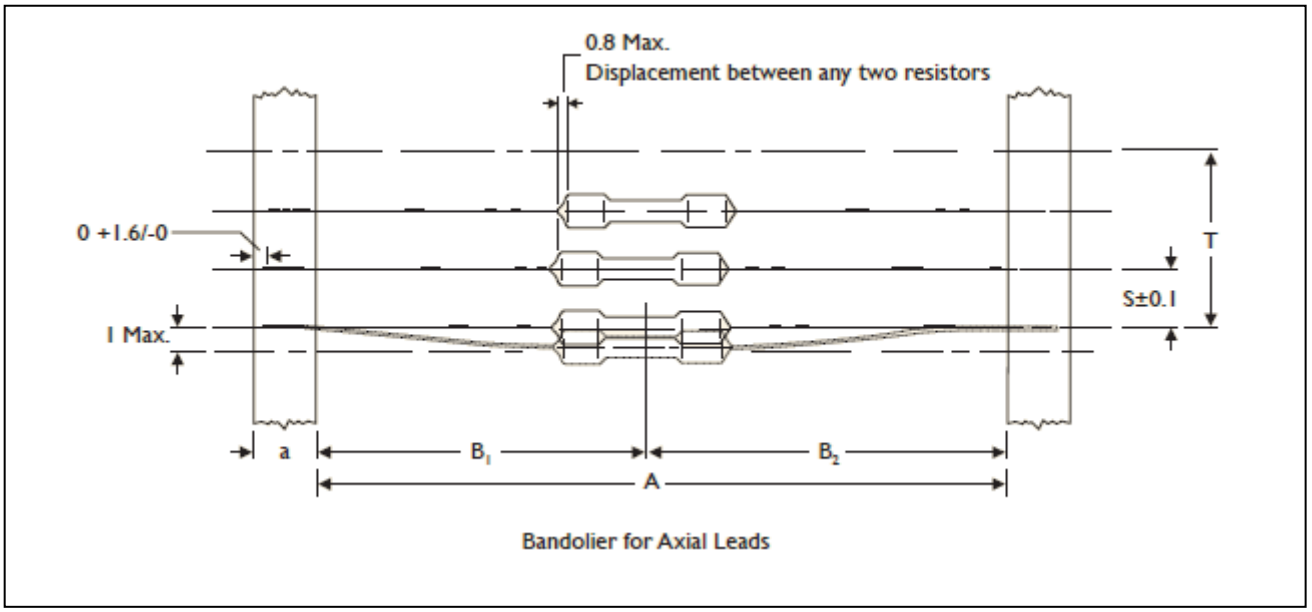
Where

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

P=Rated power (W)

R=Resistance value (Ω)

AXIAL / REEL TAPE SPECIFICATION

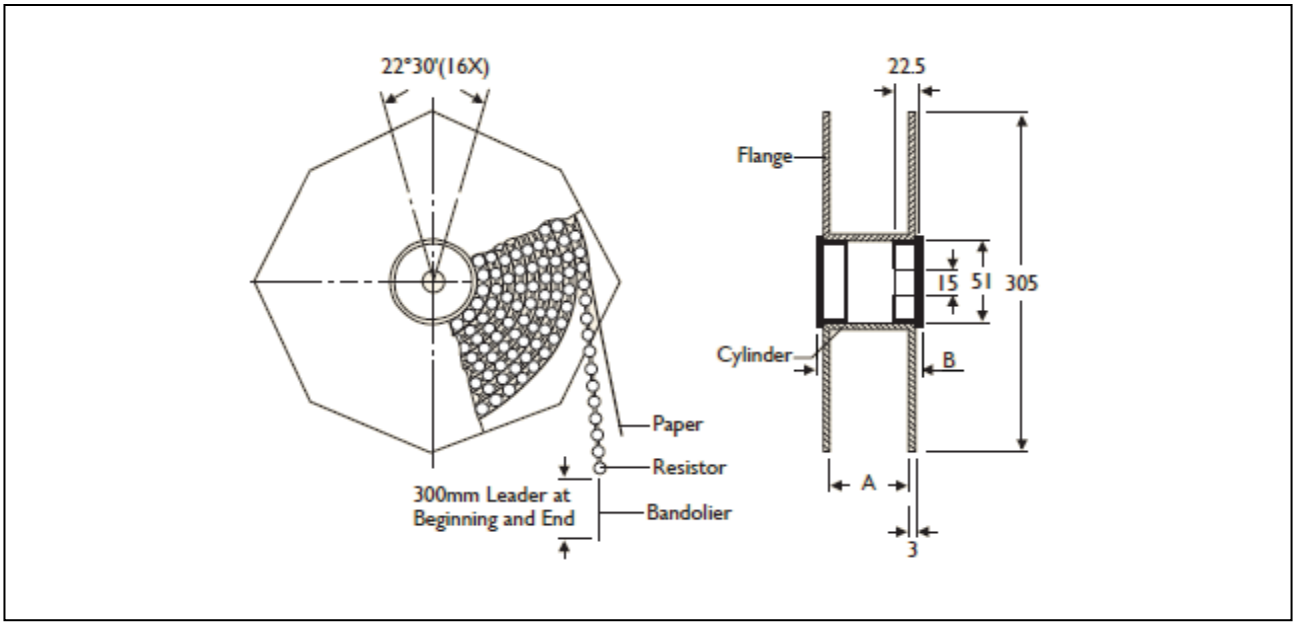


Bandolier for Axial Leads

Unit: mm

Normal	Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
FMF-25	FMF50S	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	1.0		
FMF-50	FMF1WS	6 ± 0.5	52.4 ± 1.5	1.2	5	
FMF100	FMF2WS	6 ± 0.5	73.0 ± 1.5	1.5	5	
			52.4 ± 1.5	1.2		
FMF200	FMF3WS	6 ± 0.5	73.0 ± 1.5	1.5	10	
			52.4 ± 1.5	1.2		

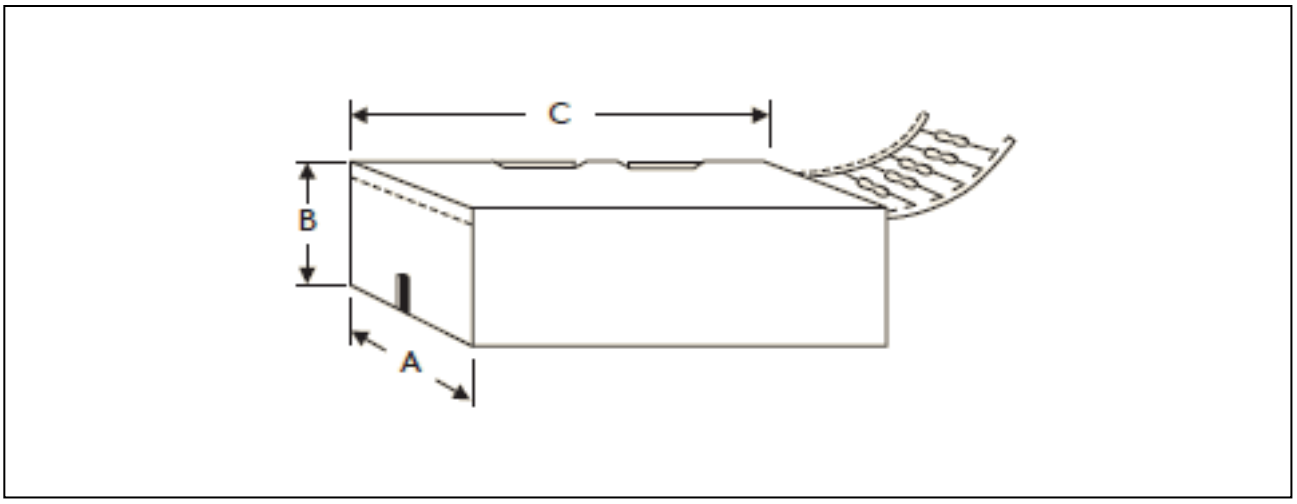
TAPE ON REEL PACKING



TYPE Unit: mm/piece

Normal	Miniature	Across Flange(A)	B	Quantity Per Reel
FMF-25	FMF50S	66.5	75.5	5,000
FMF-50	FMF1WS	66.5	75.5	2,500
FMF100	FMF2WS	87	96	2,000
FMF200	FMF3WS	87	96	1,000

TAPE ON BOX PACKING



TYPE DIMENSIONS Unit: mm/piece

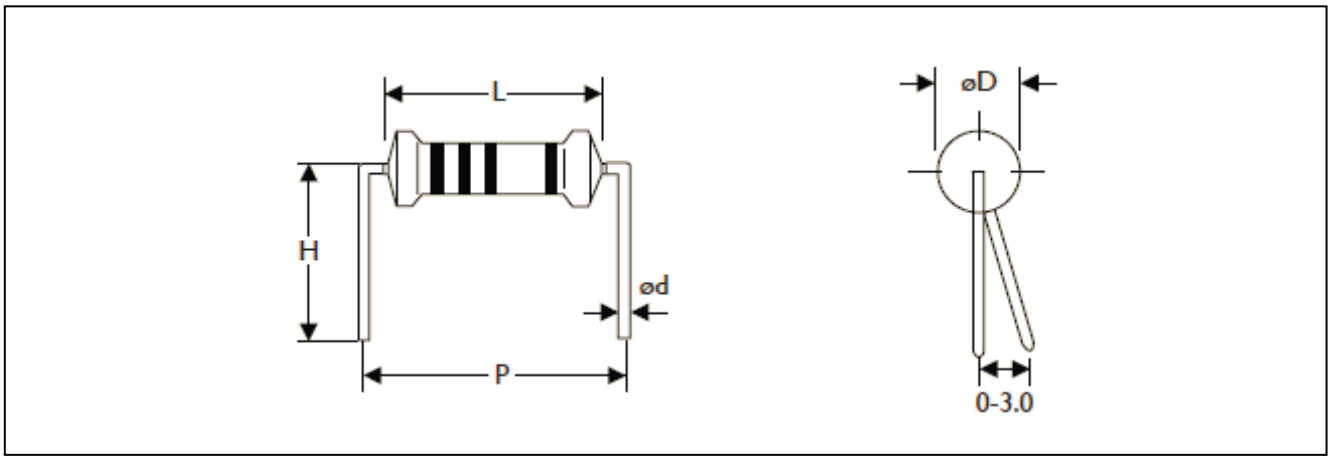
Normal	Miniature	A	B	C	Quantity Per Box
FMF-25	FMF50S	48	102	255	5,000
FMF-25	FMF50S	81	104	260	5,000
FMF-50	FMF1WS	73	45	258	1,000
FMF100	FMF2WS	81	91	260	1,000
FMF100	FMF2WS	103	78	260	1,000
FMF200	FMF3WS	81	91	260	1,000
FMF200	FMF3WS	103	94	260	1,000

BULK PACKING

Normal	Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
FMF-25	FMF50S	10,000	10	1,000
FMF-50	FMF1WS	5,000	5	1,000
FMF100	FMF2WS	2,000	4	500
FMF200	FMF3WS	1,000	2	500

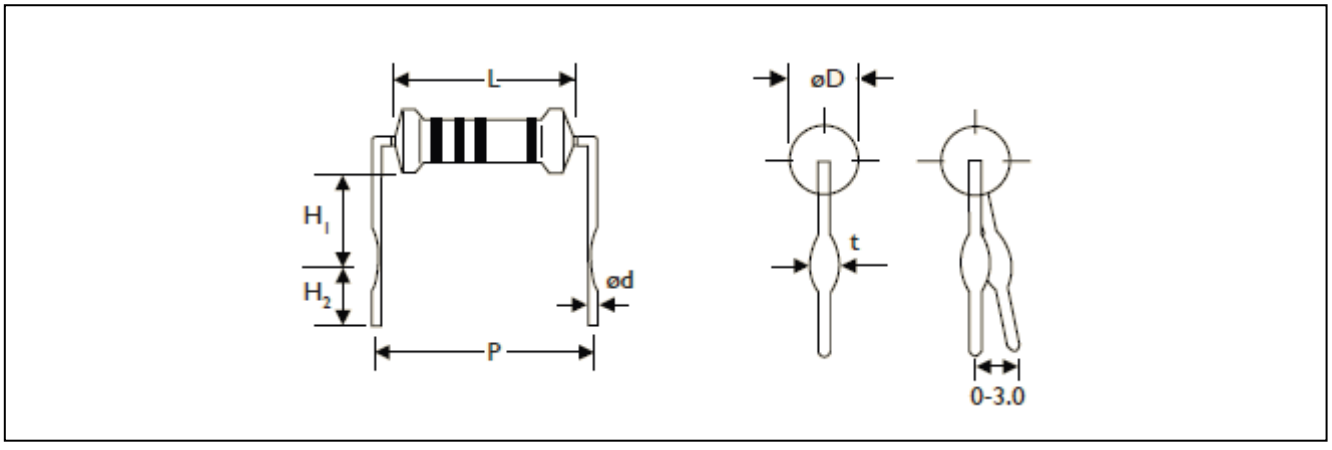
FORMING

M TYPE



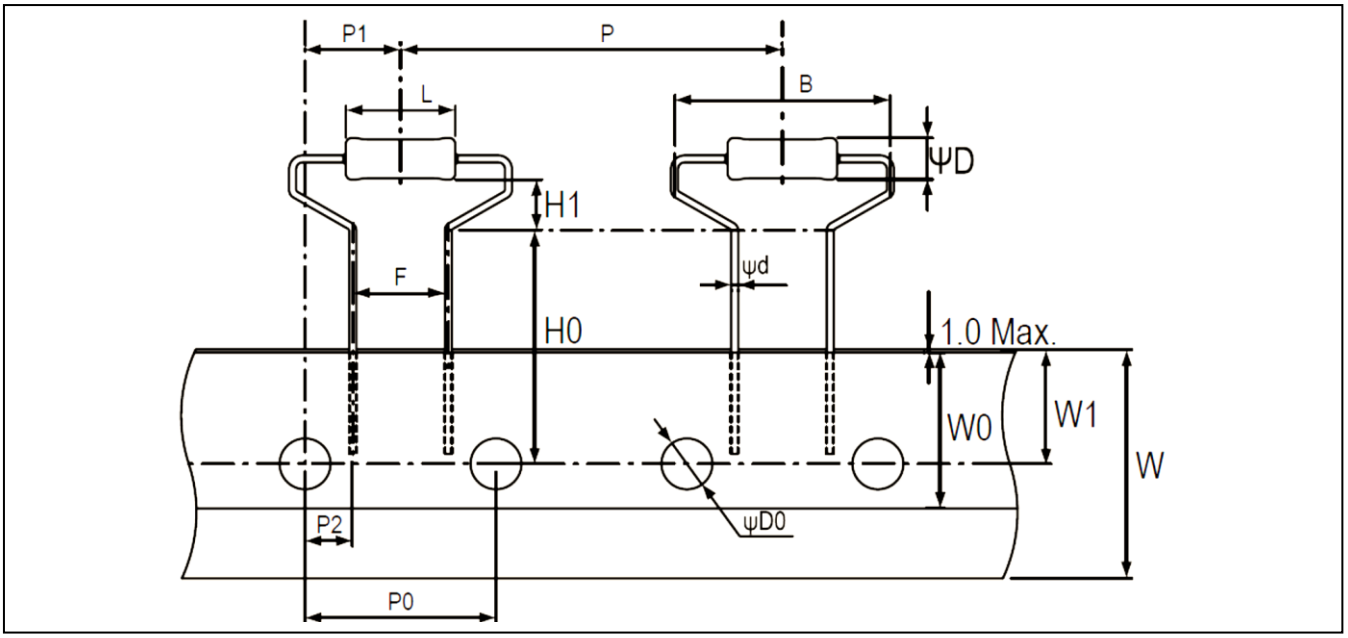
TYPE		DIMENSIONS				Unit: mm
Normal	**Miniature**	**L**	**ψD**	**ψd**	**P**	**H**
FMF-25	FMF50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
FMF-50	FMF1WS	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1
FMF100	FMF2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1
FMF200	FMF3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1

MB TYPE



TYPE		DIMENSIONS						Unit: mm
Normal	**Miniature**	**L**	**ψD**	**ψd**	**P**	**H1**	**H2**	**t**
FMF-50	-	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
-	FMF1WS	9.0 ± 0.5	3.3± 0.3	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
FMF100	FMF2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
FMF200	FMF3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	10.0 ± 1	5.0 ± 1	1.4 ± 0.2

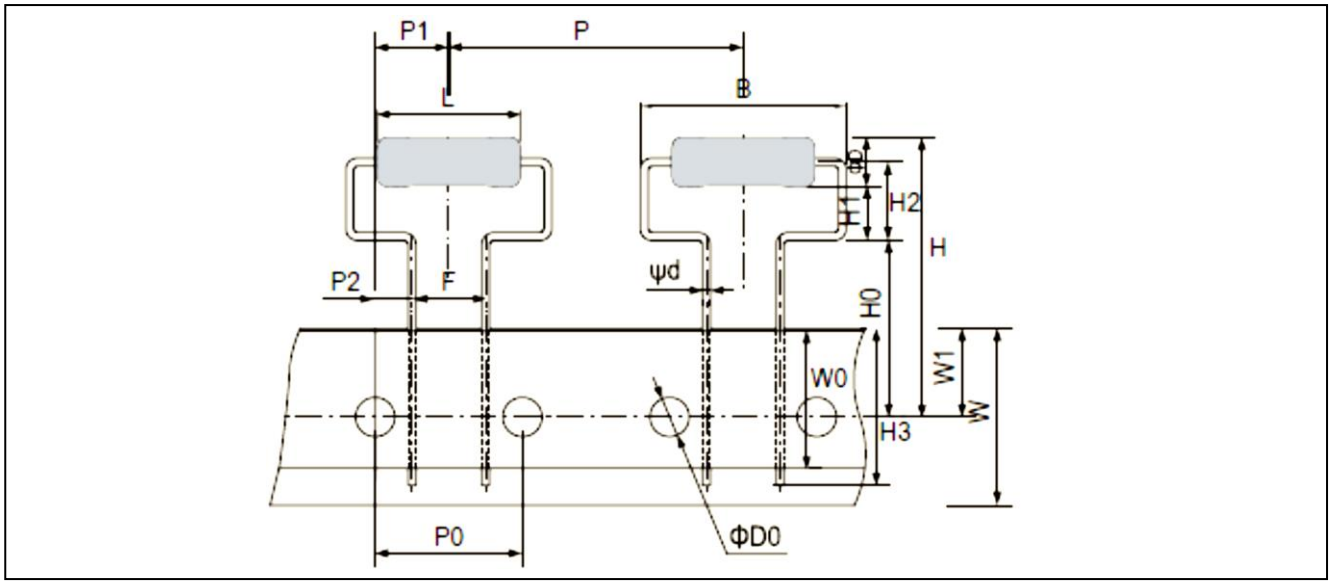
MHA TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	B	H0	HI	P	P0
		9.0±0.5	3.3±0.3	0.55±0.05	17.5Max	19.0±1.0	4.0±1.0	30.0±1.0	15.0±0.3
FMF-50	FMF1WS	**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	

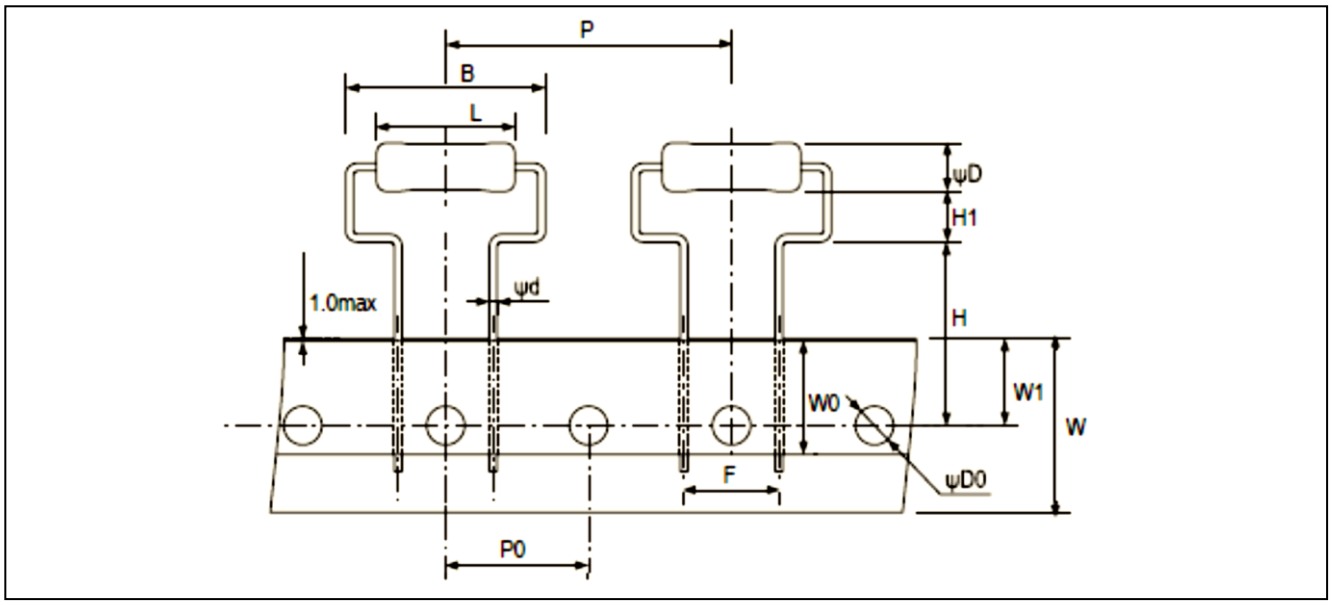
MHB TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	B	H	H0	HI	H2	H3
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	30Max.	18.0±1.0	5.5(Ref.)	8.0±1.5	16Max.
FMF200	FMF3WS	**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

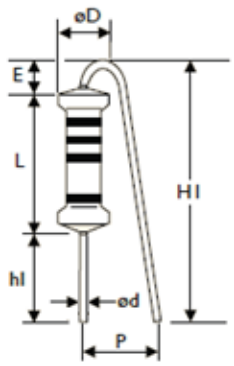
MHC TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	B	H	HI	P	P0
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3
FMF200	FMF3WS	**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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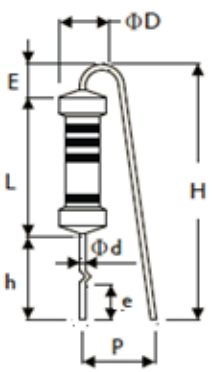

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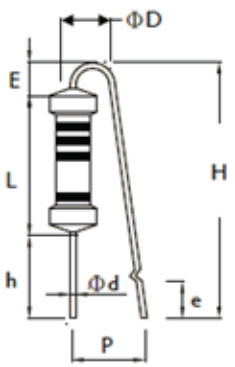

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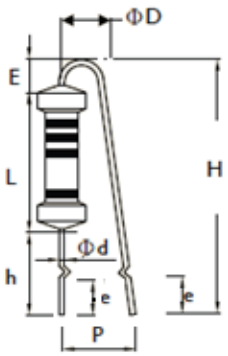
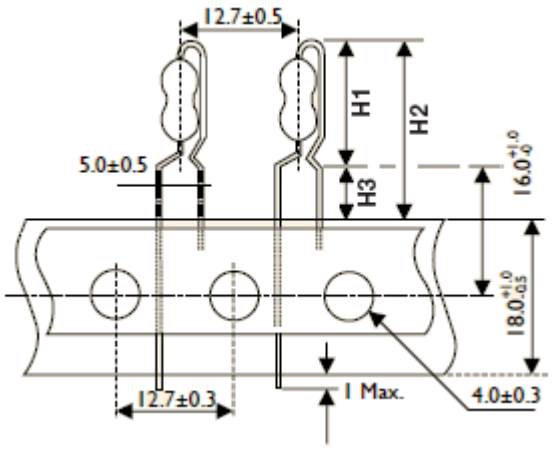


TYPE DIMENSIONS Unit: mm

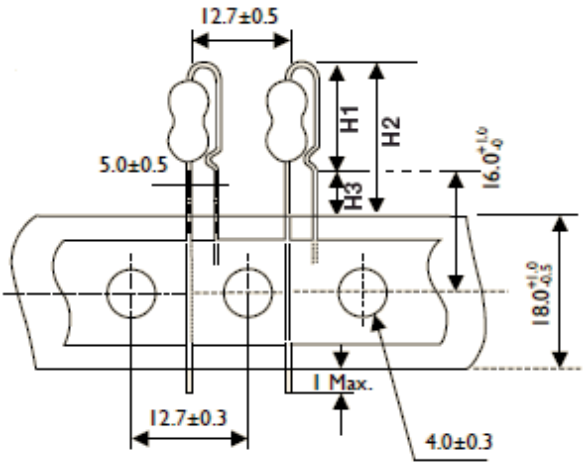
Normal	Miniature	L	ψD	ψd	P	h	H Max.	hI	HI Max.	E Max.	e
FMF-50	FMF1WS	9.0±0.5	3.3±0.3	0.55±0.05	6±1	8±1	22	5±1	18.5	3.5	3.5±1
FMF100	FMF2WS	11.5±1	4.5±0.5	0.8±0.05	6±1	8±1	24	5±1	20	3.5	3.5±1
FMF200	FMF3WS	15.5±1	5.0±0.5	0.8±0.05	8±1	8±1	28	5± 1	25	3.5	3.5±1

PN TYPE (Taping Pack)



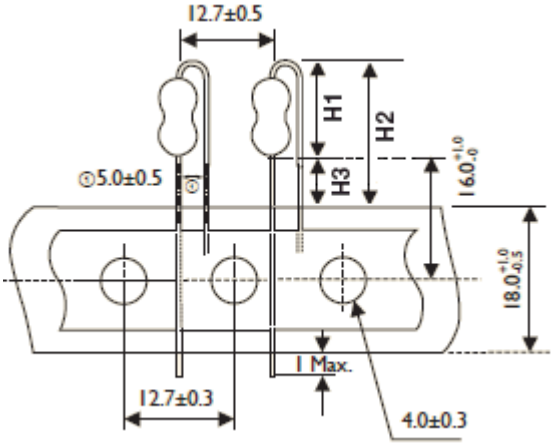
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FMF-25	FMF50S	13	21.5	8.5
FMF-50	FMF1WS	17	25.5	8.5
FMF100	FMF2WS	19	27.5	8.5

AV TYPE (Taping Pack)



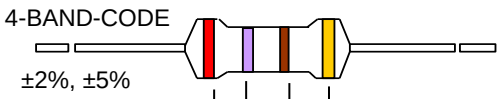
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FMF-25	FMF50S	11.5	20	8.5
FMF-50	FMF1WS	14.5	23	8.5
FMF100	FMF2WS	17.5	26	8.5

FT TYPE (Taping Pack)

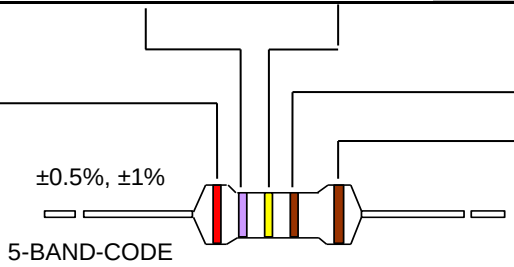


TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FMF-25	FMF50S	10	18.5	8.5
FMF-50	FMF1WS	13	21.5	8.5
FMF100	FMF2WS	16	24.5	8.5

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	± 2% (G)
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100K	± 0.5 % (D)
BLUE	6	6	6	1MΩ	
VIOLET	7	7	7	10MΩ	
GREY	8	8	8	0.001Ω	
WHITE	9	9	9	0.0001Ω	
GOLD				0.1Ω	± 5 % (J)
SILVER				0.01Ω	



REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Apr. 2, 2024	-	- Added forming code description for part number
Version 1	Aug. 31, 2023	-	- Update legal disclaimer
Version 0	Aug. 2, 2021	-	- First issue of this specification

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