Innovative Service Around the Globe YAGEO

DATA SHEET

METAL FILM RESISTORS

High Ohmic

MFH Series

±1%, ±2%, ±5%

1/6W to 2W

RoHS compliant & Halogen Free

YAGEO

Product specification – September 27, 2023 V.1

APPLICATIONS

- All general purpose applications
- Power applications

FEATURES

- AEC-Q200 qualified
- High resistance range
- High stability
- RoHS compliant & halogen-free

ORDERING INFORMATION

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

PART NUMBER

MFH	200	F	T	F	73-	5M1
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SERIES NAME

MFH Series

(2) POWER RATING

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

(3) TOLERANCE

F = ±1%	G = ±2%	J = ±5%

(4) PACKAGING TYPE

R = Reel Pack	T = Box Pack	B = Bulk

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

E=±50ppm/°C	G=±200ppm/°C
F=±100ppm/°C	- = Based on spec.

(6) FORMING

26- = 26mm	FK = FK Type
52- = 52.4mm	FFK = F-form Kink
73- = 73mm	FKK = FKK Type
26G = 26mm, ψd ≥ 0.6mm	MT = MT Type Forming
M = M-Type Forming	FT = FT Type Forming
MB = M-form W/flat	PN = PANAsert
F = F Style	AV = AVIsert

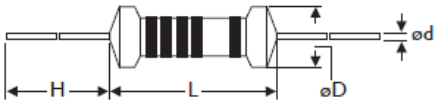
52A=52.4mm, ψd=0.4±0.02mm
52B=52.4mm, ψd=0.45±0.02mm
52C=52.4mm, ψd=0.5±0.02mm
52G=52.4mm, ψd ≥ 0.6mm
52H=52.4mm, non-painting on soldering spots
73G = 73mm, ψd ≥ 0.6mm

(7) RESISTANCE VALUE

E24 & E96 & E192 Series
Example:
5M1 = 5,100,000Ω, 10M = 10,000,000Ω, 20M = 10,000,000Ω

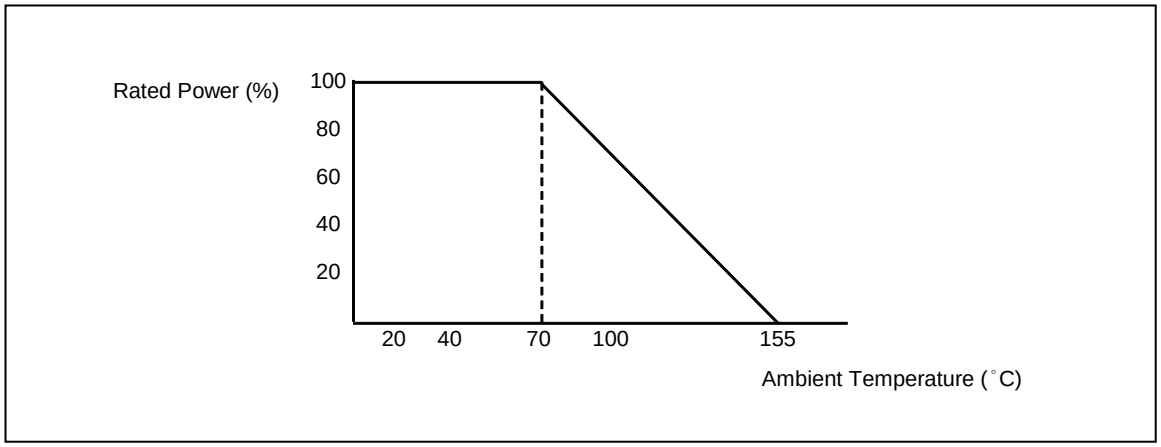
DIMENSIONS

Unit: mm



Normal	Miniature	L	ψD	H	ψd
MFH-12	MFH25S	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.45 ± 0.05
-	MFH204	3.4 ± 0.3	1.9 ± 0.2	28 ± 2.0	0.45 ± 0.05
MFH-25	MFH50S	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
-	MFH207	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
MFH-50	MFH1WS	9.0 ± 0.5	3.3 ± 0.3	26 ± 2.0	0.55 ± 0.05
MFH200	-	15.5 ± 1.0	5.0 ± 0.5	33 ± 2.0	0.8 ± 0.05

DERATING CURVE



ELECTRICAL CHARACTERISTICS

CHARACTERISTICS	MFH-12	MFH25S	MFH-25	MFH50S	MFH-50	MFH1WS	MFH200
Power Rating at 70 °C	1/6W	1/4W	1/4W	1/2W	1/2W	1W	2W
Maximum Working Voltage	200V	200V	250V	250V	500V	500V	500V
Maximum Overload Voltage	400V	400V	500V	600V	700V	800V	1000V
Voltage Proof on Insulation	450V	450V	450V	450V	750V	750V	900V
Resistance Range	4M7Ω~22M for E24 & E96 series value						
Operating Temp. Range	- 55°C to +155°C						
Temperature Coefficient	±50ppm/°C , ±100ppm/°C, ±200ppm/°C						

TYPE	MFH204	MFH207
Power Rating at 70 °C	0.4W	0.6W
Maximum Working Voltage	250V	350V
Maximum Overload Voltage	500V	700V
Voltage Proof on Insulation	300V	500V
Resistance Range	4M7Ω~10M for E24 & E96 series value	
Operating Temp. Range	- 55°C to +155°C	
Temperature Coefficient	±50ppm/°C , ±100ppm/°C	

TEST AND REQUIRMENTS

Normal	Miniature	Resistance Range Ω	Tolerance ± %	Temperature Coefficient ± ppm/°C
MFH-12	MFH25S	4M75 ~ 22M	1,2,5	200
MFH-25	MFH50S	4M75 ~ 5M	1,2,5	50
		4M75 ~ 22M1	1,2,5	100
		4M75 ~ 50M	1,2,5	200
MFH-50	MFH1WS	4M75 ~ 10M	1,2,5	50
		4M75 ~ 15M	1,2,5	100
		4M75 ~ 22M	1,2,5	200
MFH200	-	4M75 ~ 10M	1,2,5	50
		4M75 ~ 15M	1,2,5	100
		4M75 ~ 22M	1,2,5	200

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)	±0.1%+0.05Ω ±1.0%+0.05Ω for MFH204 type ±0.25%+0.05Ω for MFH207 type
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)
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)	±2.0%+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)	±1.0%+0.05Ω ±1.5%+0.05Ω for MFH204 type and MFH207 type
Temperature Cycling	IEC 60115-1 4.19	-55°C ➔ Room Temp. ➔ +155°C ➔ Room Temp.(5 cycles)	±0.15%+0.05Ω ±0.75%+0.05Ω for MFH204 type and MFH207 type
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	±0.05%+0.05Ω ±0.25%+0.05Ω for MFH204 type and MFH207 type

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=√(P X R)
or max. working voltage whichever is less

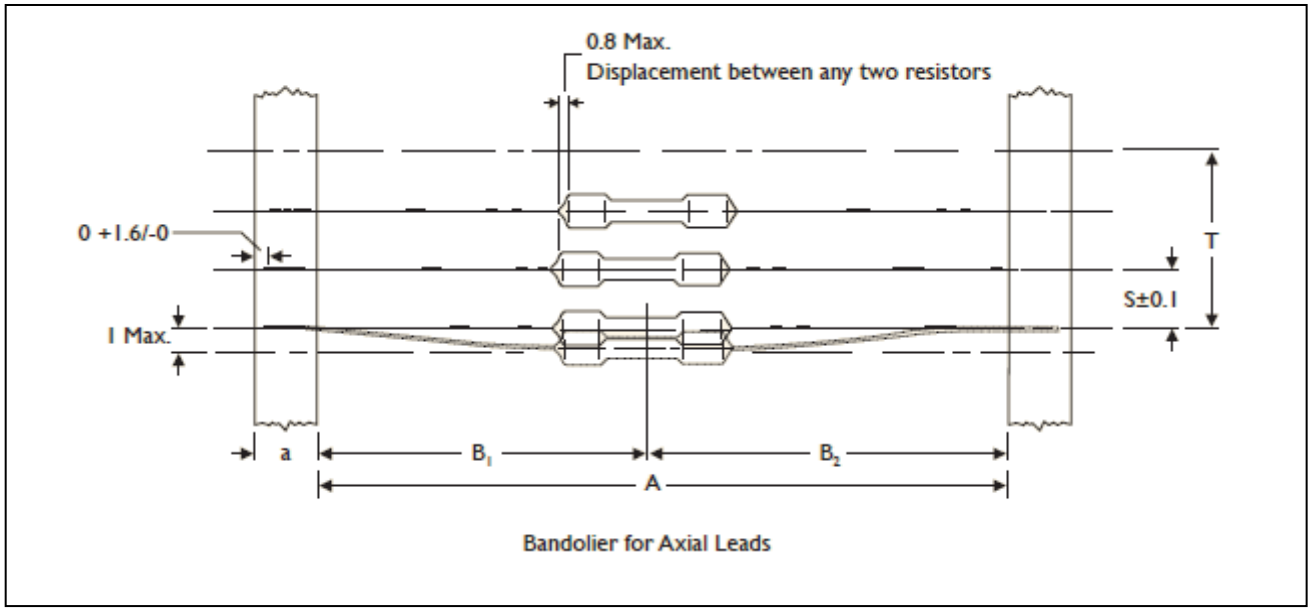
Where

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

P=Rated power (W)

R=Resistance value (Ω)

AXIAL / REEL TAPE SPECIFICATION

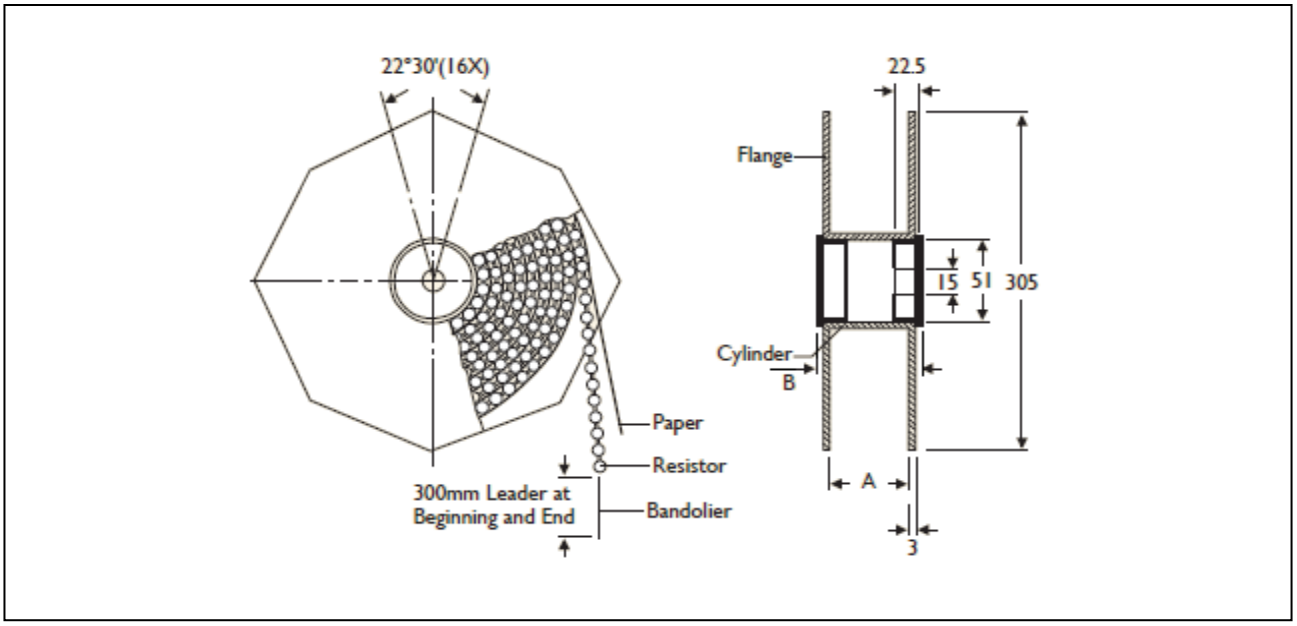


Bandolier for Axial Leads

Unit: mm

Normal	Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
MFH-12	MFH25S	6 ± 0.5	52.4 ± 1.5	1.2	5	1 mm per 10 spacing, 0.5 mm per 5 spacing
	MFH204		26.0 ± 1.5	1.0		
MFH-25	MFH50S	6 ± 0.5	52.4 ± 1.5	1.2	5	
	MFH207		26.0 ± 1.5	1.0		
MFH-50	MFH1WS	6 ± 0.5	52.4 ± 1.5	1.2	5	
MFH200	-	6 ± 0.5	73.0 ± 1.5	1.5	10	
			52.4 ± 1.5	1.2		

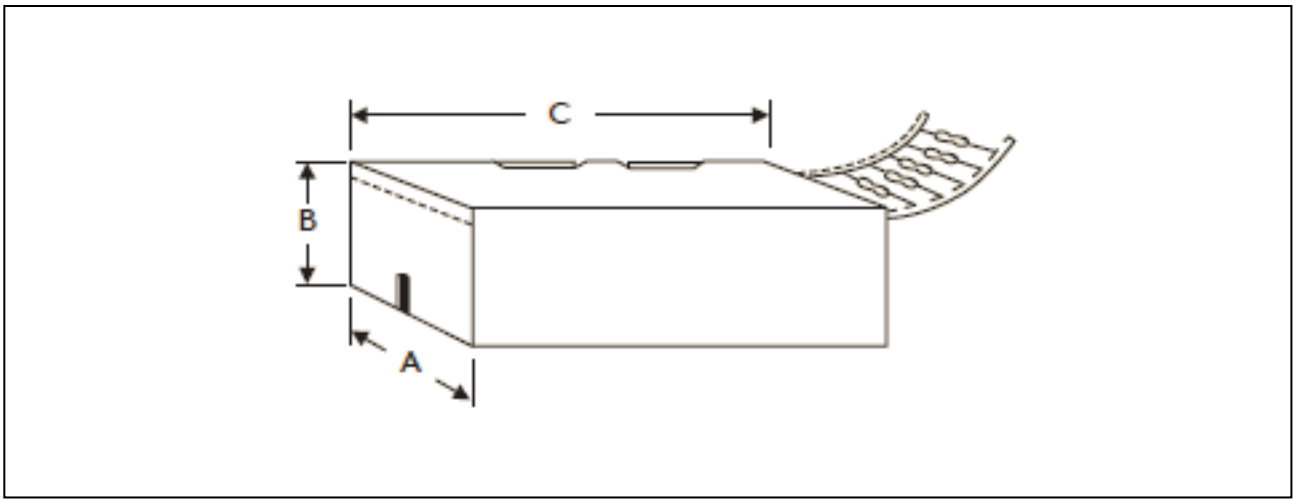
TAPE ON REEL PACKING



TYPE Unit: mm/piece

Normal	Miniature	Across Flange(A)	B	Quantity Per Reel
MFH-12	MFH25S MFH204	66.5	75.5	5,000
MFH-25	MFH50S MFH207	66.5	75.5	5,000
MFH-50	MFH1WS	66.5	75.5	2,500
MFH200	-	87	96	1,000

TAPE ON BOX PACKING



TYPE DIMENSIONS Unit: mm/piece

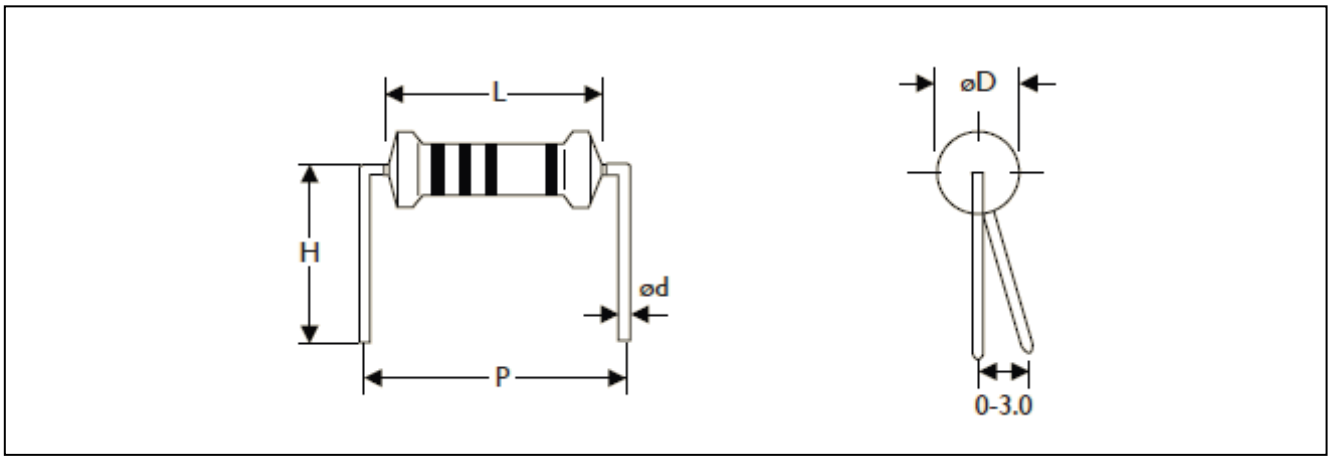
Normal	Miniature	A	B	C	Quantity Per Box
MFH-12	MFH25S MFH204	48	102	255	5,000
MFH-12	MFH25S MFH204	81	70	260	5,000
MFH-25	MFH50S MFH207	48	102	255	5,000
MFH-25	MFH50S MFH207	81	104	260	5,000
MFH-50	MFH1WS	73	45	258	1,000
MFH200	-	81	91	260	1,000
MFH200	-	103	94	260	1,000

BULK PACKING

Normal	Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
MFH-12	MFH25S MFH204	10,000	10	1,000
MFH-25	MFH50S MFH207	10,000	10	1,000
MFH-50	MFH1WS	5,000	5	1,000
MFH200	-	1,000	2	500

FORMING

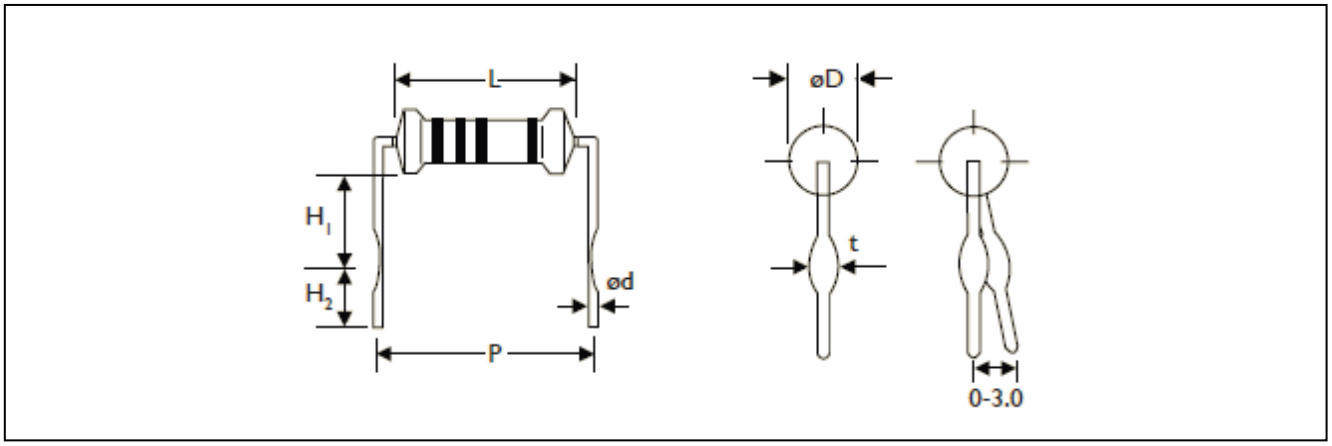
M TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	P	H
MFH-12	MFH25S	3.4± 0.3	1.9 ± 0.2	0.45 ± 0.05	6.0 ± 1	10.0 ±1
-	MFH204	3.4± 0.3	1.9 ± 0.2	0.45 ± 0.05	6.0 ± 1	10.0 ±1
MFH-25	MFH50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
-	MFH207	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
MFH-50	MFH1WS	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1
MFH200	-	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1

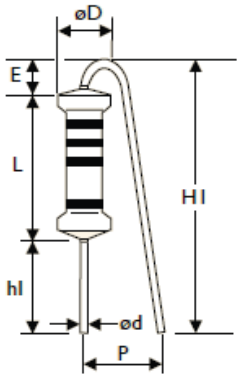
MB TYPE



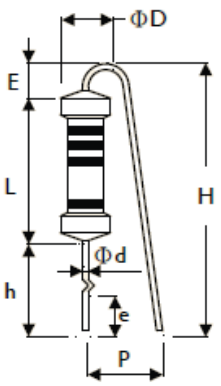
TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	P	H1	H2	t
MFH-25	MFH50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
-	MFH207	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
MFH-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
-	MFH1WS	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
MFR200	-	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

F TYPE



FK TYPE



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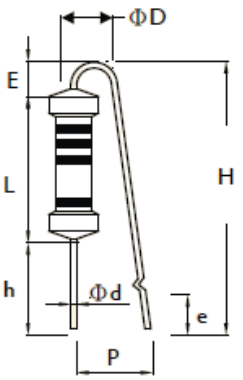

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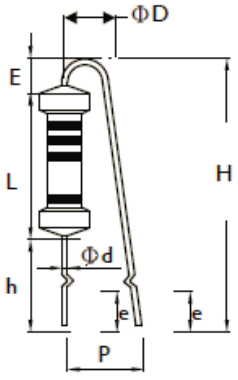
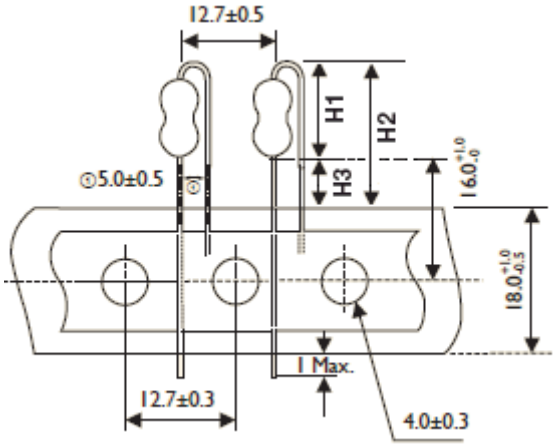


TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	P	h	H Max.	hl	Hl Max.	E Max.	e
MFH-50	MFH1WS	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
MFH200	-	15.5±1	5.0±0.5	0.8±0.05	8±1	8±1	28	5± 1	25	3.5	3.5±1

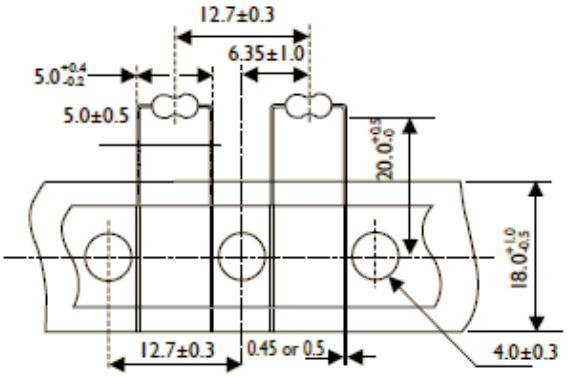
FT TYPE (Taping Pack)



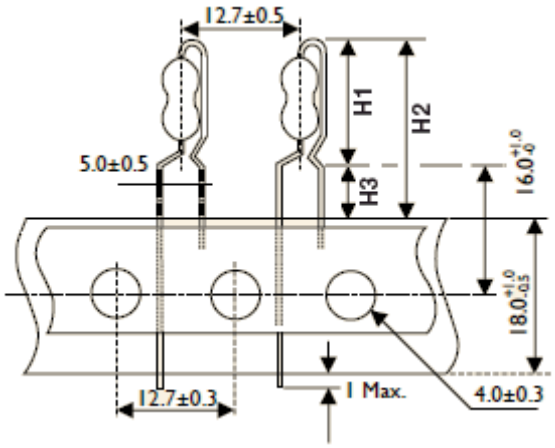
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
MFH-25	MFH50S MFH207	10	18.5	8.5
MFH-50	MFH1WS	13	21.5	8.5

MT TYPE (Taping Pack)

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

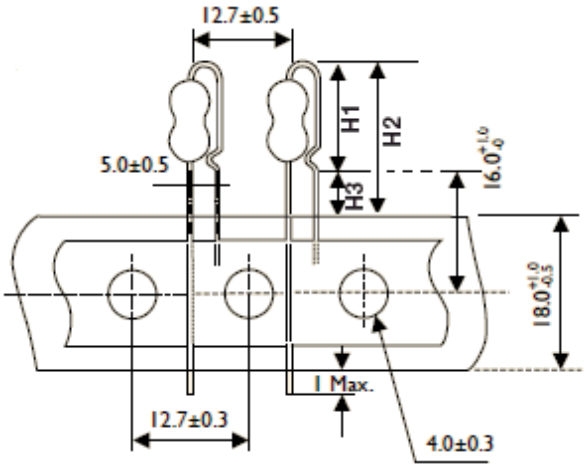


PN TYPE (Taping Pack)



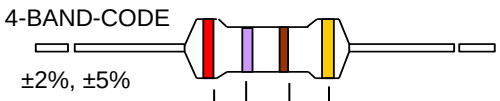
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
MFH-25	MFH50S MFH207	13	21.5	8.5
MFH-50	MFH1WS	17	25.5	8.5

AV TYPE (Taping Pack)

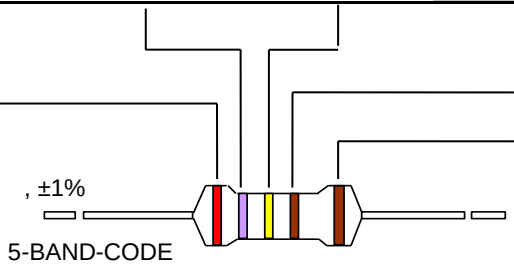


TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
MFH-25	MFH50S MFH207	11.5	20	8.5
MFH-50	MFH1WS	14.5	23	8.5

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	
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 1	Sep. 6, 2023	-	- Update legal disclaimer
Version 0	Aug. 4, 2021	-	- First issue of this specification

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