

DATA SHEET

METAL FILM RESISTORS

Flameproof FMF Series

 $\pm 0.5\%,\ \pm 1\%,\ \pm 2\%,\ \pm 5\%$ 1/4W to 3W RoHS compliant & Halogen Free



YAGEO

Product specification – August 13, 2021 V.0

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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 Series(2) POWER RATING-25 = 1/4W200 = 2W50 = 1/2W300 = 2W-50 = 1/2W300 = 1/2W300 = 1/2W300 = 2W-50 = 1/2W300 = 2 ± 2%F = ± 10%G = ± 2%F = Heal PackB = BulkT = Box Pack(6) FEMPERATURE COEFFICIENT OF RESISTANCEE=±50ppm/°C- = Based on spec.F=±100ppm/°CC26- = 26mmFK = FK Type52- = 52.4mmFKK = FKK TypeM = M-Type FormingFT = FT Type FormingM = M-Type FormingFT = FT Type FormingM = M-Type FormingFT = FT Type FormingM = M-form W/flatPN = PANAsertF = F TypeAV = AVIsert	POWER RATING $25 = 1/4W$ $2WS = 2W$ $0S = 1/2W$ $200 = 2W$ $50 = 1/2W$ $3WS = 3W$ $S0 = 1/2W$ $3WS = 3W$ $WS = 1W$ $100 = 1W$ OLERANCE $0 = \pm 0.5\%$ $G = \pm 2\%$ $2 \pm 1\%$ $J = \pm 5\%$ PACKAGINGR = Reel PackB = BulkEMPERATURE COEFFICIENT OF RESISTANCEETENDERATURE COEFFICIENT OF RESISTANCE <td col<="" th=""><th>(1) SE</th><th>RIES</th><th></th><th></th><th></th><th></th><th></th></td>	<th>(1) SE</th> <th>RIES</th> <th></th> <th></th> <th></th> <th></th> <th></th>	(1) SE	RIES					
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Example: $100R = 100\Omega$, $10K = 10,000\Omega$, $1M = 1,000,000\Omega$		5) TEI E== F== 52- 73- M= MB F = 7) RE E24 Exa	MPERAT =50ppm/° =100ppm/° =26mm = 26mm = 52.4mi = 73mm = 73mm = M-Type = M-form F Type SISTANC = & E96 S mple:	rURE C PC PC m Formir n W/flat CE VAI Series	ng t			- = Based on spec. FK = FK Type FFK = F-form Kink FKK = FKK Type FT = FT Type Forming PN = PANAsert AV = AVIsert	

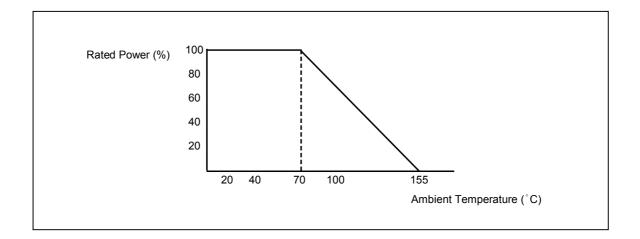
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FMF

DIMENSIONS

						Unit: mm
	Normal	Miniature	L	ψD	н	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
l←H→l←↓ øD	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 ~ 4M	7Ω for E24 a	& E96 series	value			
Operating Temp. Range	- 55°C to	+155°C					
Temperature Coefficient	±50ppm/	°C , ±100pp	m/°C				

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

FMF

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	Ву Туре
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	$260\pm3^{\circ}$ C for 10 ± 1 Sec., immersed to a point 3 ± 0.5 mm 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

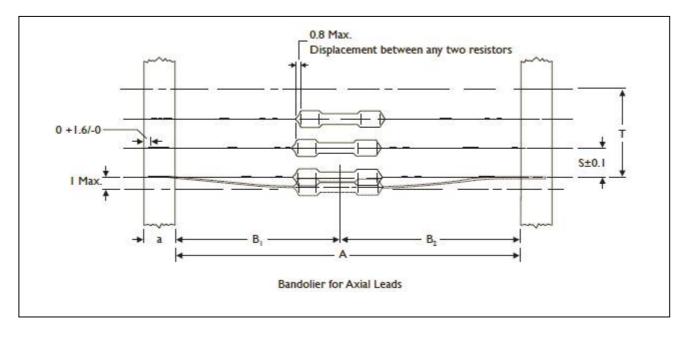
Note:

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=√(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)
```

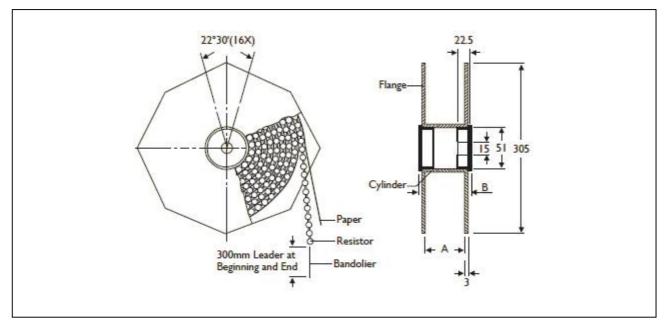




Unit:	mm
Ome.	

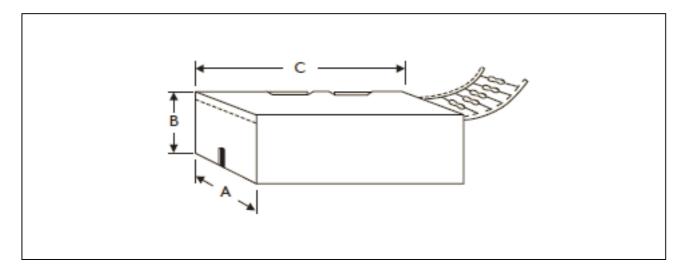
Normal	Miniature	а	Α	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)	
FMF-25	FMF50S	6 ± 0.5	52.4 ± 1.5	1.2	- 5		
FIVIE-20		0 ± 0.5	26.0 ± 1.5	1.0	- 5		
FMF-50	FMF1WS	6 ± 0.5	52.4 ± 1.5	1.2	5	- 1 mm por 10 oppoing	
		C + O F	73.0 ± 1.5	1.5	F	-1 mm per 10 spacing, 0.5 mm per 5 spacing	
FMF100	FMF2WS	IF2WS 6 ± 0.5	52.4 ± 1.5	1.2	- 5		
		C + O 5	73.0 ± 1.5	1.5	10	_	
FMF200	FMF3WS	6 ± 0.5	52.4 ± 1.5	1.2	- 10		

TAPE ON REEL PACKING



TYPE				Unit: mm/piece
Normal	Miniature	Across Flange(A)	В	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



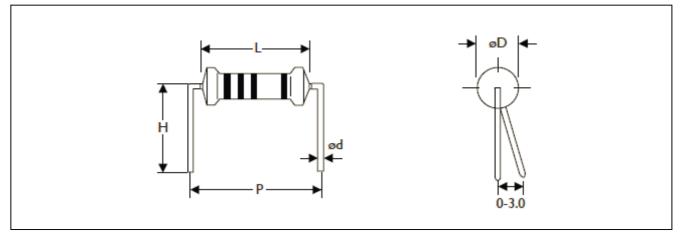
TYPE		DIMENSION	S		Unit: mm/piece
Normal	Miniature	Α	В	С	Quantity Per Box
FMF-25	FMF50S	48	102	255	5,000
FMF-25	FMF50S	81	104	260	5,000
FMF-50	FMF1WS	73	45	258	1,000
FMF100	FMF2WS	81	91	260	1,000
FMF100	FMF2WS	103	78	260	1,000
FMF200	FMF3WS	81	91	260	1,000
FMF200	FMF3WS	103	94	260	1,000

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

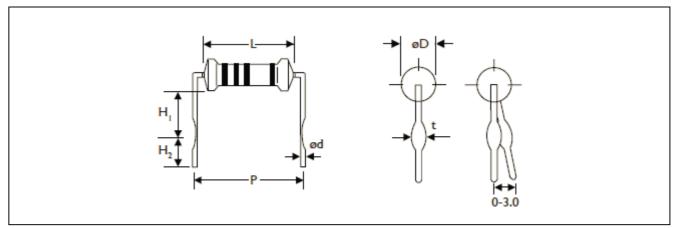
FORMING

M TYPE



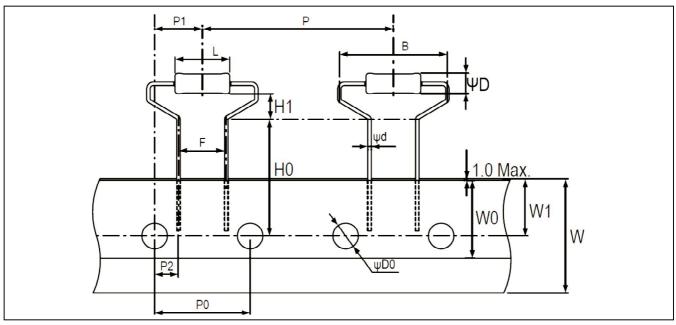
TYPE		DIMENSIONS	DIMENSIONS						
Normal	Miniature	L	ψD	ψd	Р	Н			
FMF-25	FMF50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1			
FMF-50	FMF1WS	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1			
FMF100	FMF2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1			
FMF200	FMF3WS	15.5 ± 1.0	5.0 ± 0.5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

MB TYPE



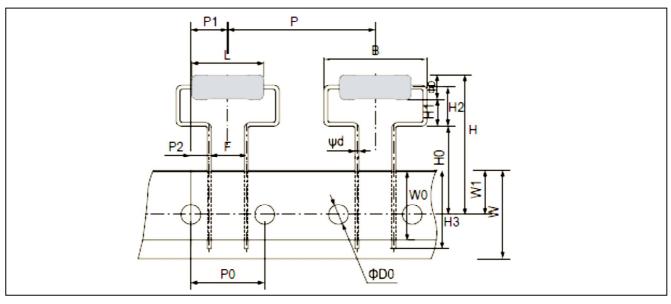
TYPE		DIMENSIONS							
Normal	Miniature	L	ψD	ψd	Р	H1	H2	t	
FMF-50	-	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2	
-	FMF1WS	9.0 ± 0.5	3.3± 0.3	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FMF100	FMF2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FMF200	FMF3WS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



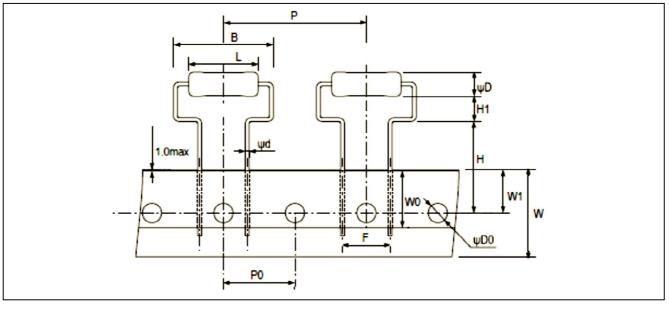
TYPE	TYPE DIMENSIONS							Unit: mm	
Normal	Miniature	L	ψD	ψd	В	H0	н	Р	P0
		9.0±0.5	3.3±0.3	0.55±0.05	17.5Max	19.0±1.0	4.0±1.0	30.0±1.0	15.0±0.3
FMF-50	FMF1WS	P1	P2	F	W	W0	W1	ΨD0	
		7.5±1.0	3.75±0.5	7.5±0.5	18.0±0.5	5.0Min	9.0±0.5	4.0±0.2	

MHB TYPE



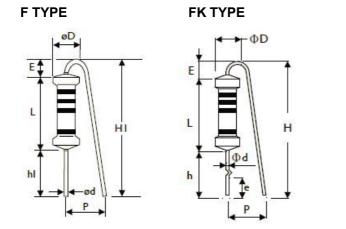
TYPE		DIMENSIONS								Unit: mm
Normal	Miniature	L	ψD	ψd	В	н	H0	н	H2	H3
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	30Max.	18.0±1.0	5.5(Ref.)	8.0±1.5	16Max.
FMF200	FMF3WS	Р	P0	PI	P2	F	W	W0	W1	ΨD0
		30.0±1.0	15.0±0.3	7.5±1.0	3.75±0.8	7.5±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.3

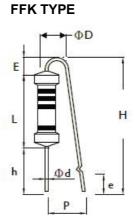
MHC TYPE

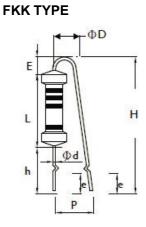


TYPE		DIMENSIC	ONS						Unit: mm
Normal	Miniature	L	ψD	ψd	В	н	НІ	Р	P0
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3
FMF200	FMF3WS	F	W	W0	W1	ΨD0			
		10.0±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.2	_		

15



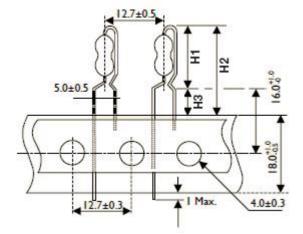


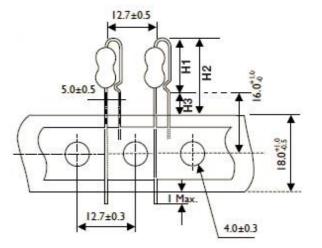


TYPE DIMENSIONS								Unit: mm			
Normal	Miniature	L	ψD	ψd	Ρ	h	H Max.	hl	HI Max.	E Max.	е
FMF-50	FMF1WS	9.0±0.5	3.3±0.3	0.55±0.05	6±1	8±1	22	5±1	18.5	3.5	3.5±1
FMF100	FMF2WS	11.5±1	4.5±0.5	0.8±0.05	6±1	8±1	24	5±1	20	3.5	3.5±1
FMF200	FMF3WS	15.5±1	5.0±0.5	0.8±0.05	8±1	8±1	28	5± 1	25	3.5	3.5±1

FMF

PN TYPE (Taping Pack)



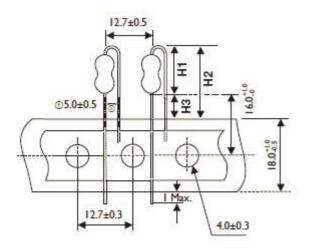


AV TYPE (Taping Pack)

TYPE		DIMEN	ISIONS	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	

TYPE		DIMEN	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

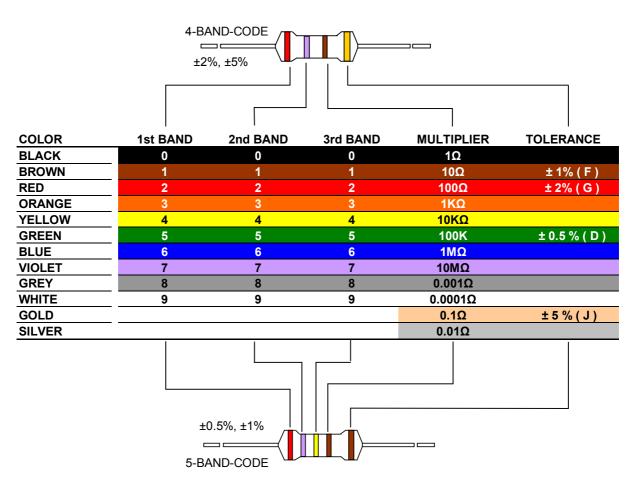
FT TYPE (Taping Pack)



TYPE		DIME	NSIONS	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

FMF

MARKING



REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Aug. 2, 2021	-	- First issue of this specification

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FMF

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