

Approval Sheet

for

Metal Film Resistors

MFN series

$\pm 0.5\%$ & $\pm 1\%$

YAGEO CORPORATION

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1. PRODUCT:

METAL FILM RESISTORS

(Normal & Miniature Style)

2. PART NUMBER:

Part number of the metal film resistor is identified by the name, power, tolerance, packing, temperature coefficient, special type and resistance value.

Example :

MFN	-25	F	T	F	52-	100R
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Series Name	Power Rating	Resistance Tolerance	Packing Style	Temperature Coefficient of Resistance	Special Type	Resistance Value

(1) Style: MFN SERIES

(2) Power Rating : -12=1/6W 、 25S=1/4W 、 -25=1/4W 、 50S=1/2W 、 -50=1/2W 、 1WS=1W 、 100=1W 、 2WS=2W 、 200=2W 、 3WS=3W

(3) Tolerance : D=±0.5% F=±1%

(4) Packaging Type: R=Paper Taping Reel
T=Tape on Box Packing
B=Bulk Packing


(5) Temperature Coefficient : C=15PPM D=25PPM E=50PPM F=100PPM

(6) Special Type : 26=26mm
52=52.4mm
73=73mm
F=F-Type Forming
FK=FK-Type Forming
FFK=FFK-Type Forming
FKK=FKK-Type Forming
M=M-Type Forming for Bulk
MT=MTsert (rated watts -12 & 25s size only)
PN=PANAsert (rated watts -25 & 50s size only)
AV=Avlsert (rated watts -25 & 50s & -50 & 1ws size only)

(7) Resistance Value : E24 & E96 Series (for±1%), 0Ω .

Example : 1R 、 10R 、 100R 、 10K 、 100K 、 330K 、 1M.....

3. BAND-CODE:



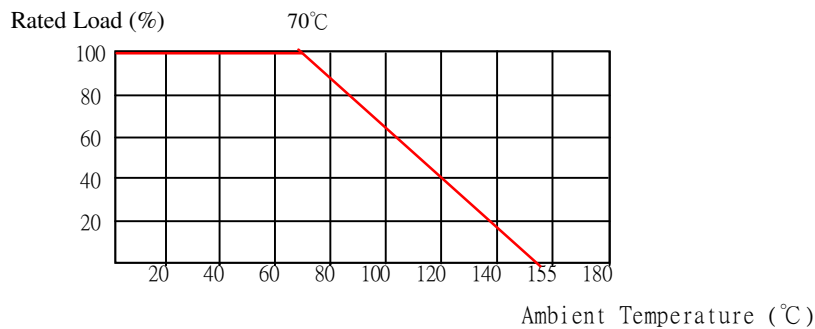
COLOR	1ST BAND	2ND BAND	3ND BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	± 1 % (F)
RED	2	2	2	100Ω	
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100K	± 0.5 % (D)
BLUE	6	6	6	1MΩ	
VIOLET	7	7	7	10MΩ	
GREY	8	8	8		
WHITE	9	9	9		
GOLD				0.1Ω	
SILVER				0.01Ω	

4. ELECTRICAL CHARACTERISTICS

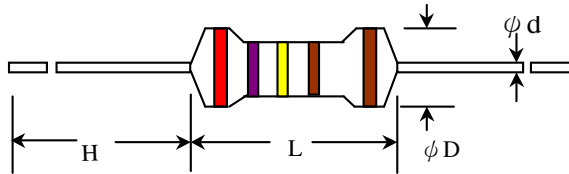
STYLE	MFN-12		MFN25S	MFN-25	MFN50S	MFN-50	MFN1WS	MFN100	MFN2WS	MFN3WS
									MFN200	
Power Rating at 70 °C	1/6W		1/4W		1/2W		1W		2W	3W
Maximum Working Voltage	200V		250V	300V	350V	400V	500V			
Maximum Overload Voltage	400V		500V	600V	700V	800V	1000V			
Dielectric Withstanding Voltage	300V	400V	500V			700V	1000V			
Resistance Range	1Ω ~ 10MΩ & 0Ω for E24 & E96 series value									
Operating Temp. Range	- 55 °C to + 155 °C									
Temperature Coefficient	±15ppm/°C , ±25ppm/°C , ±50ppm/°C , ±100ppm/°C									

* Below or over this resistance range on request.

5. DERATING CURVE



6. DIMENSIONS



STYLE		DIMENSION			
Normal	Miniature	L	ϕD	H	ϕd
MFN-12	MFN25S	3.4±0.3	1.9±0.2	28±2.0	0.45±0.05
MFN-25	MFN50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05
MFN-50	MFN1WS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05
MFN100	MFN2WS	11.5±1.0	4.5±0.5	35±2.0	0.8±0.05
MFN200	MFN3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05

7. ENVIRONMENTAL CHARACTERISTICS

(1) Short Time Over Load Test

At 2.5 times of the rated voltage. (If the voltage exceeds the maximum load voltage, the maximum load voltage will be used as the rated voltage) applied for 5 seconds, the resistor should be free from defects after the resistor is released from load for about 30 minutes

$$\text{Short Time Overload Voltage} = 2.5 * \sqrt{\text{Power Rating} \times \text{Resistance Value}}$$

The change of the resistance value should be within $\pm 0.25 \% + 0.05 \Omega$

(2) Dielectric Withstanding Voltage

The resistor is placed on the metal V Block. Apply a Table I dielectric withstanding between the terminals connected together with the block for about 60 seconds.

The resistor shall be able to withstand without breakdown or flashover.

(3) Temperature Coefficient Test

Test of resistors above room temperature $100^{\circ}\text{C} \pm 2^{\circ}\text{C}$ (Testing Temperature 115°C to 130°C) at the constant temperature silicon plate for over 5 minutes. Then measure the resistance value.

The Temperature Coefficient is calculated by the following equation and its value should be within the range of requested.

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

R = Resistance value under the testing temperature

R₀ = Resistance value at the room temperature

t = The testing temperature

t₀ = Room temperature

(4) Insulation Resistance

Apply test terminal on lead and resistor body.
The test resistance should be high than 10,000M ohm.

(5) Solderability

Immerse the specimen into the solder pot at 260 ± 5 °C for 5 ± 0.5 seconds.
At least 95% solder coverage on the termination.

(6) Resistance to Solvent

The specimen into the appropriate solvent of IPA condition of ultrasonic machine for 1 minutes.
The specimen is no deterioration of coatings and color code.

(7) Terminal Strength

Direct Load – Resistors shall be held by one terminal and the load shall be gradually applied in the direction of the longitudinal axis of the resistor unit the applied load reacheds 5 pounds °
The load shall be held for 10 seconds. The load of weight shall be ≥ 2.5 kg (24.5N).

(8) Pulse Overload

Apply 4 times of rated voltage to the specimen at the 1 second on and 25 seconds off cycle,
subjected to voltage application cycles specified in 10,000 time °
The change of the resistance value shall be within $\pm 1.0\% + 0.05 \Omega$

(9) Load Life in Humidity

Place the specimen in a test chamber at 40 ± 2 °C and 90 ~ 95 % relative humidity. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1,000 hours
The change of the resistance value shall be within $\pm 1.5 \% + 0.05 \Omega$

(10) Load Life Test

Placed in the constant temperature chamber of 70 ± 3 °C the resistor shall be connected to the lead wire at the point of 25mm. Length with each terminal, the resistors shall be arranged not much effected mutually by the temperature of the resistors and the excessive ventilation shall not be performed, for 90 minutes on and 30 minutes off under this condition the rated D.C. voltage is applied continuously for 1000+48/-0 hours then left at no-load for 1hour, measured at this time the resistance value °
The change of the resistance value shall be within $\pm 1.5 \% + 0.05 \Omega$.
There shall be no remarkable change in the appearance and the color code shall be legible after the test.

(11) Temperature Cycling Test

The temperature cycle shown in the following table shall be repeated 5 times consecutively. The measurement of the resistance value is done before the first cycle and after ending the fifth cycle, leaving in the room temperature for about 1 hour °

Temperature Cycling Conditions:

Step	Temperature(°C)	Time (minute)
1	-55 ± 3	30
2	25 ± 3	2 ~ 3
3	155 ± 3	30
4	25 ± 3	2 ~ 3

The change of the resistance value shall be within $\pm 0.75 \% + 0.05 \Omega$
After the test the resistor shall be free from the electrical or mechanical damage.

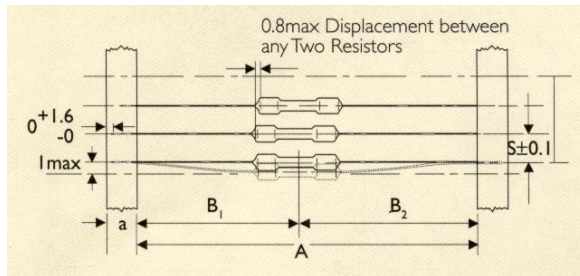
(12) Resistance to Soldering Heat

The terminal lead shall be dipped into the solder pot at $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 3 ± 0.5 seconds up to 2~2.5 mm.

The change of the resistance value shall be within $\pm 0.25\% + 0.05\Omega$

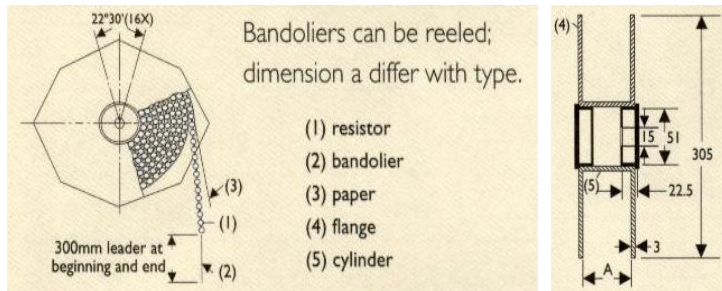
8. PACKING METHODS

Bandolier for Axial leads



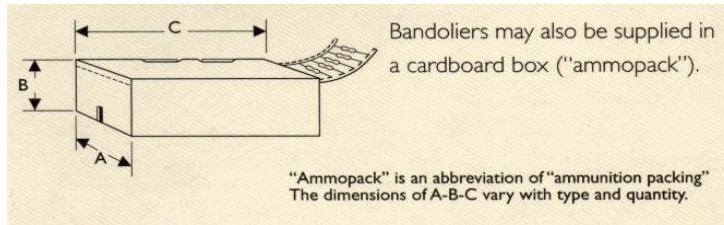
STYLE		DIMENSIONS			Unit: : mm	
Normal	Miniature	a	A	B1-B2	S (spacing)	T (max. deviation of spacing)
MFN-12	MFN25S	6 ± 0.5	52.4 ± 1.0 26.0 ± 1.0	1.2 1.0	5	
MFN-25	MFN50S	6 ± 0.5	52.4 ± 1.0 26.0 ± 1.0	1.2 1.0	5	1 mm per 10 spacing
MFN-50	MFN1WS	6 ± 0.5	52.4 ± 1.0	1.2	5	0.5 mm per 5 spacing
MFN100	MFN2WS	6 ± 0.5	73.0 ± 1.5 52.4 ± 1.0	1.5 1.2	5	
MFN200	MFN3WS	6 ± 0.5	73.0 ± 1.5 52.4 ± 1.0	1.5 1.2	10	

9. TAPE ON REEL PACKING



STYLE		TAPE ON REEL	
Normal	Miniature	ACROSS FLANGE (A)	Qty per reel
MFN-12	MFN25S	72	5,000
MFN-25	MFN50S	72	5,000
MFN-50	MFN1WS	72	2,500
MFN100	MFN2WS	95	2,000
MFN200	MFN3WS	95	1,000

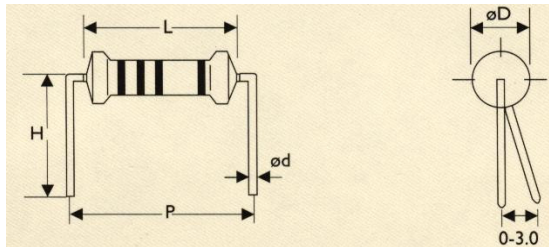
10. TAPE ON BOX PACKING



STYLE		Standard Lead Length			Short Lead Length			Qty per box
Normal	Miniature	W (A)	H (B)	L (C)	W (A)	H (B)	L (C)	
MFN-12	MFN25S	81	70	260	48	102	255	5,000
MFN-25	MFN50S	81	104	260	48	102	255	5,000
MFN-50	MFN1WS	73	45	258	—	—	—	1,000
MFN100	MFN2WS	103	78	260	81	91	260	1,000
MFN200	MFN3WS	103	94	260	81	91	260	1,000

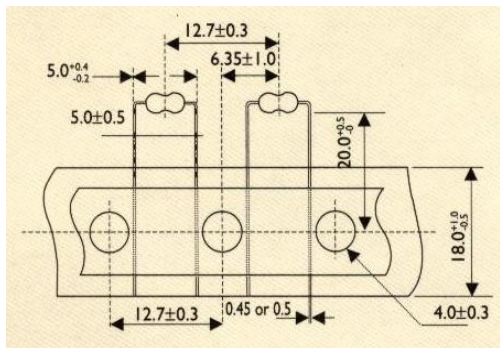
11. SPECIAL TYPE (FORMING DIMENSIONS)

M TYPE

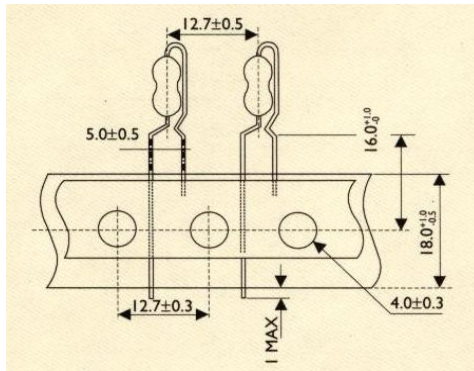


STYLE		DIMENSIONS					UNIT : mm
Normal	Miniature	L	ϕD	ϕd	P	H	
MFN-12	MFN25S	3.4 ± 0.3	1.9 ± 0.2	0.45 ± 0.05	6.0 ± 1.0	10.0 ± 1	
MFN-25	MFN50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1	
MFN-50	MFN1WS	9.0 ± 0.5	3.3 ± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1	
MFN100	MFN2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1	
MFN200	MFN3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1	

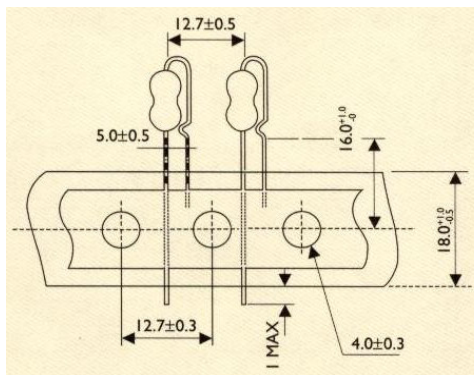
MT Type Forming for Taping (Rated Watts -12 & 25S size only)



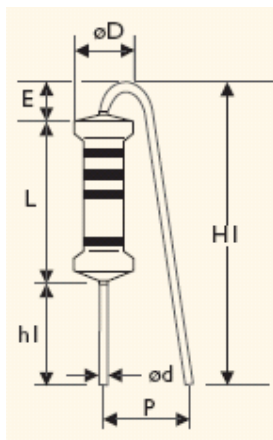
PN Type Forming for Taping (Rated Watts -25 & 50S size only)



AV Type Forming for Taping (Rated Watts -25 & 50S & -50 & 1WS size only)

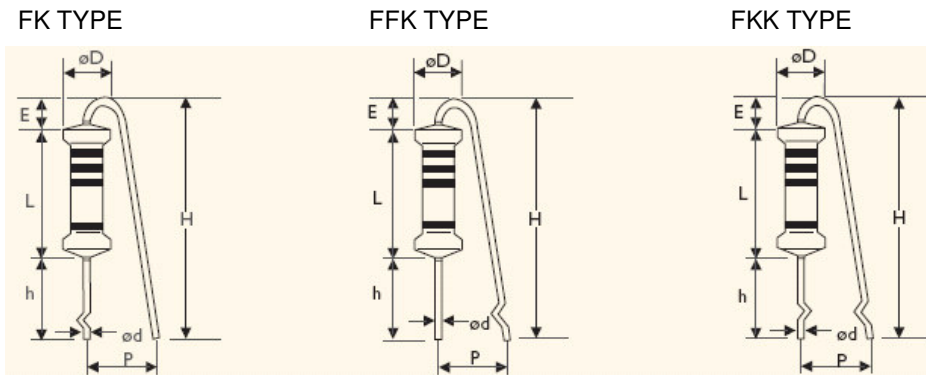


F TYPE



STYLE		DIMENSIONS					UNIT : mm	
Normal	Miniature	L	ϕD	ϕd	P	h1	H1 max	E max
MFN100	MFN2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	6.0 ± 1	5.0 ± 1	20	3.5
MFN200	MFN3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	6.0 ± 1	5.0 ± 1	25	3.5

* MFN-25/50S is available



STYLE		DIMENSIONS					UNIT : mm	
Normal	Miniature	L	ϕD	ϕd	P	h	H max	E max
MFN100	MFN2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	6.0 ± 1	10.0 ± 1	25	3.5
MFN200	MFN3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	6.0 ± 1	10.0 ± 1	30	3.5

* MFN-25/50S is available

12. Plant Address

- A. Taiwan Xindian Plant
3F, No.5, Lane 560, Chung Cheng Road,
Xindian, Taipei, Taiwan, ROC
(台北縣新店市中正路 560 巷 5 號 3 樓)
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Fax. 886-2-6629-8898
- B. China Dongguan Plant
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Tangxia Zhen, Dongguan, Guangdong, China
(廣東省東莞市塘廈鎮高麗工業區高麗路 7-1 號)
Tel. 86-769-8772 0275
Fax. 86-769-8772 0275 #4333
- C. China MuDu Plant
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