

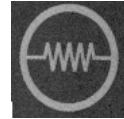
**Approval Sheet**  
for  
**Metal Film Resistors**  
**MF0 series**  
**±1%**

**YAGEO CORPORATION**

**Headquarters:** 3F, No.233-1, Pao Chiao Rd., Hsin Tien, Taipei, Taiwan, R.O.C.

**Tel:** 886-2-2917-7555 **Fax:** 886-2-2917-0100

URL: [www.yageo.com](http://www.yageo.com)



**1. PRODUCT:**

METAL FILM RESISTORS

**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 :

<b>MF0</b>	<b>207</b>	<b>F</b>	<b>T</b>	<b>E</b>	<b>52-</b>	<b>100R</b>
(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: MFR SERIES

(2) Power Rating : 204 = 0.4W · 207 = 0.6W

(3) Tolerance : B=±0.1% C=±0.25% 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

(6) Special Type : 26- = 26mm  
52- = 52.4mm  
M = M-Type Forming for Bulk  
MT = M-Type Forming for Taping ( Rated 0204 size only )  
FT = F-Type Forming for Taping ( Rated 0207 size only )  
PN = PANAsert ( Rated 0207 size only )  
AV = Avlsert ( Rated 0207 size only )

(7) Resistance Value : E24 & E96 Series ( for±1% )

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

### 3. BAND-CODE:

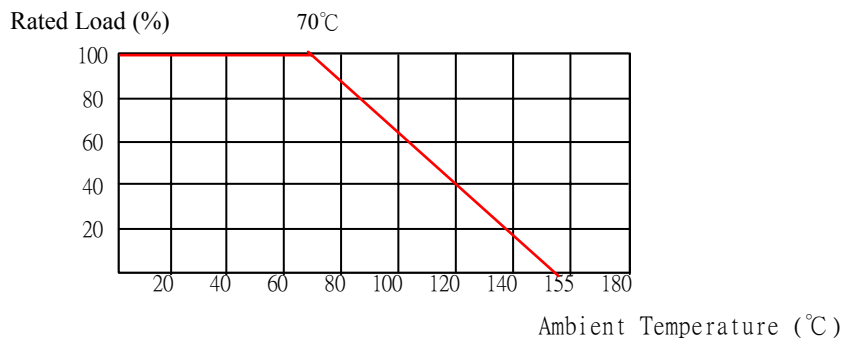
COLOR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	± 1 % ( F )
RED	2	2	2	100Ω	
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100K	± 0.5 % ( D )
BLUE	6	6	6	1MΩ	± 0.25 % ( C )
VIOLET	7	7	7	10MΩ	± 0.1 % ( B )
GREY	8	8	8		
WHITE	9	9	9		
GOLD				0.1Ω	
SILVER				0.01Ω	

### 4. ELECTRICAL CHARACTERISTICS

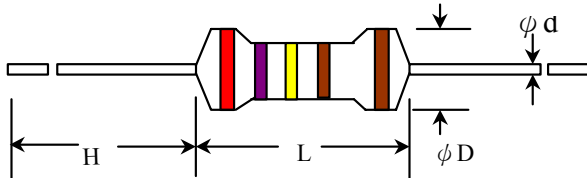
STYLE	MF0204	MF0207
Power Rating at 70 °C	0.4W	0.6W
Maximum Working Voltage	200V	300V
Maximum Overload Voltage	400V	600V
Dielectric Withstanding Voltage	300V	500V
Operating Temp. Range	- 55 °C to + 155 °C	
Standard Value Range	1 0Ω ~ 1 MΩ for E24 & R96 series value	
Minimum Value Range	1 Ω	0.2 Ω
Temperature Coefficient	±50 ppm /°C	

\* Standard resistance is 10Ω~ 1MΩ, below or over this resistance on request.

### 5. DERATING CURVE



## 6. DIMENSIONS



Unit : mm

STYLE	L	φD	H	φd
MF0204	3.4±0.3	1.9±0.2	28±2.0	0.5±0.05
MF0207	6.3±0.5	2.4±0.2	28±2.0	0.6±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 ± 0.25 % + 0.05 Ω

### (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°C ± 2°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

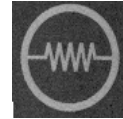
**R<sub>0</sub>** = Resistance value at the room temperature

**t** = The testing temperature

**t<sub>0</sub>** = 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  $235 \pm 5$  °C for  $5 \pm 0.5$  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 reaches 5 pounds ◦  
The load shall be held for 10 seconds. The load of weight shall be  $\geq 2.5$  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  $40 \pm 2$  °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  $70 \pm 3$  °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 ◦

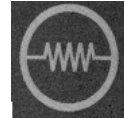
Temperature Cycling Conditions:

Step	Temperature(°C)	Time (minute)
1	$-55 \pm 3$	30
2	$25 \pm 3$	2 ~ 3
3	$155 \pm 3$	30
4	$25 \pm 3$	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.

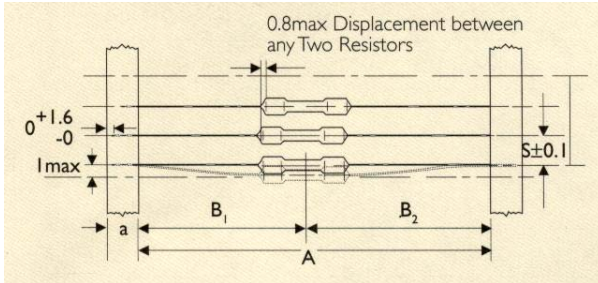
(12) Resistance to Soldering Heat

The terminal lead shall be dipped into the solder pot at  $350 \pm 10$  °C for  $3 \pm 0.5$  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

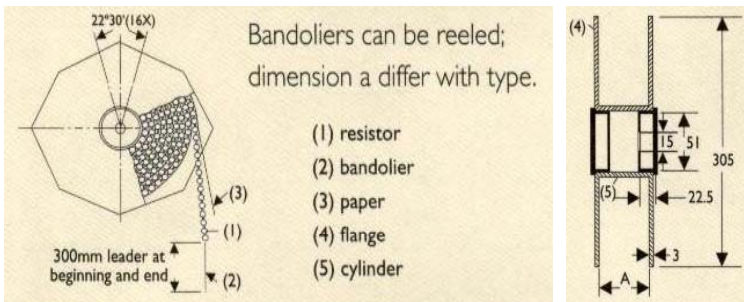
Bandolier for Axial leads



Unit: : mm

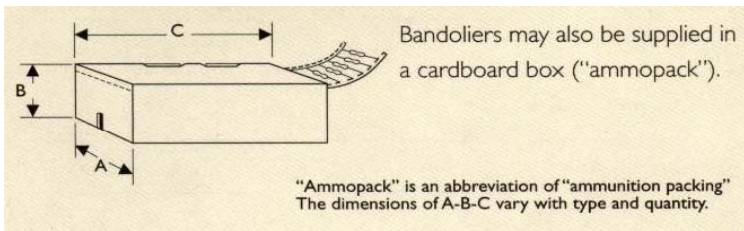
STYLE	a	A	B1-B2	S (spacing)	T (max. deviation of spacing)
MF0204	6 ± 0.5	52.4 ± 1.0	1.0	5	0.5 mm per 5 spacing
		26.0 ± 1.0	1.0		
MF0207	6 ± 0.5	52.4 ± 1.0	1.0	5	1 mm per 10 spacing
		26.0 ± 1.0	1.0		

## 9. TAPE ON REEL PACKING



STYLE	ACROSS FLANGE (A)	Qty per reel
MF0204	72	5,000
MF0207	72	5,000

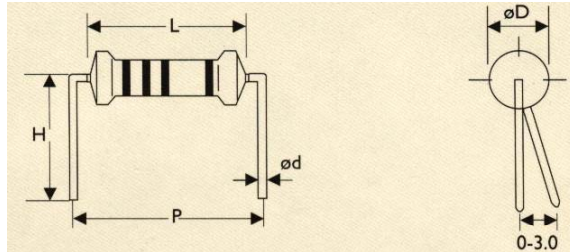
## 10. TAPE ON BOX PACKING



STYLE	Standard Lead Length			Short Lead Length			Qty per box
	W (A)	H (B)	L (C)	W (A)	H (B)	L (C)	
MF0204	81	70	260	48	102	255	5,000
MF0207	81	104	260	48	102	255	5,000

### 11. SPECIAL TYPE ( FORMING DIMENSIONS )

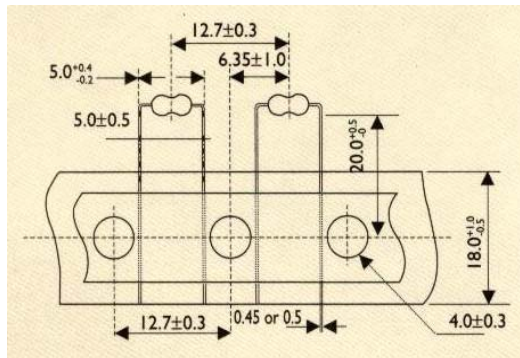
M TYPE Forming for Bulk



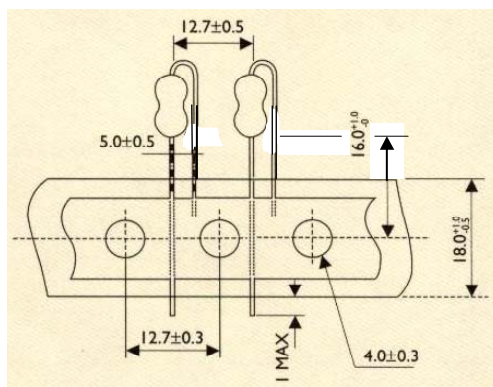
UNIT : mm

STYLE	L	$\phi D$	$\phi d$	P	H
MF0204	$3.4 \pm 0.3$	$1.9 \pm 0.2$	$0.5 \pm 0.05$	$6.0 \pm 1$	$10.0 \pm 1$
MF0207	$6.3 \pm 0.5$	$2.4 \pm 0.2$	$0.6 \pm 0.05$	$10.0 \pm 1$	$10.0 \pm 1$

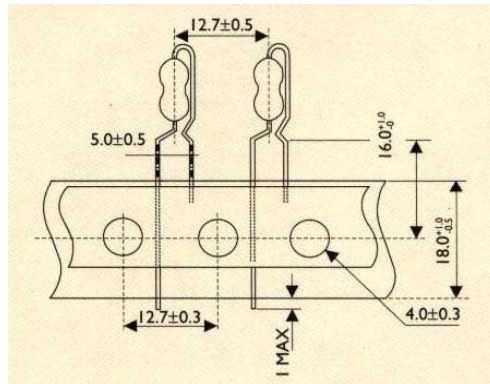
MT Type Forming for Taping ( Rated 0204 size only )



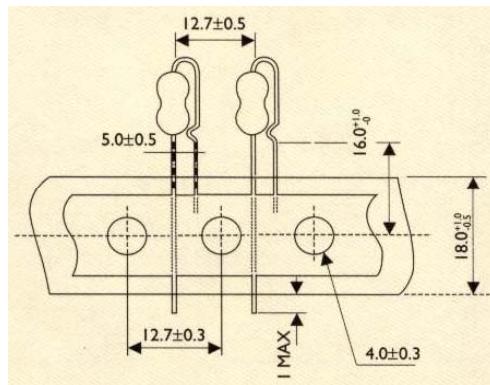
FT Type Forming for Taping ( Rated 0207 size only )



## PN Type Forming for Taping ( Rated 0207 size only )



## AV Type Forming for Taping ( Rated 0207 size only )

**12. Plant Address**

- A. Taiwan Hsin Tien Plant  
1F, No.5, Lane 560, Chung Cheng Road,  
Hsin Tien Taipei, Taiwan, ROC  
(台北縣新店市中正路 560 巷 5 號 1 樓)  
Tel. 886-2-2218-2139  
Fax. 886-2-2218-2138
- B. China Dongguan Plant  
7-1, Gaoli Road, Gaoli Industrial Zone  
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. 86-769-772 0275  
Fax. 86-769-772 0295
- C. China MuDu Plant  
No.158, Fengjiang Road, No.1 Building of NanBangIND.Zone,  
Mu Du New District, Suzhou, China  
(江蘇省蘇州市木瀆新區楓江路 158 號南濱工業區 1 號)  
Tel. 86-512-66518889  
Fax. 86-512-66519889