

# Approval Sheet

for

**MELF Metal Film Resistors**

**MMF series**

**$\pm 0.1\%$ ,  $\pm 0.25\%$ ,  $\pm 0.5\%$ ,  
 $\pm 1\%$ ,  $\pm 2\%$  &  $\pm 5\%$**

**YAGEO CORPORATION**

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

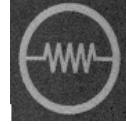
**Tel:** 886-2-2917-7555 **Fax:** 886-2-6629-8898

**Xindian Plant:** 3F, No.5, Lane 560, Chung Cheng Rd., Xindian Taipei, Taiwan, R.O.C

**Tel:** 886-2-2218-2139 **Fax:** 886-2-2218-2138

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



**1. PRODUCT:**

MELF METAL FILM RESISTORS  
Blue color on the body

**2. PART NUMBER:**

Part number of the MELF Metal Film Resistor is identified by the name, power, tolerance, packing, temperature coefficient, special type and resistance value.

Example :

<b>MMF</b>	<b>25S</b>	<b>F</b>	<b>R</b>	<b>E</b>	<b>100R</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>
Series Name	Power Rating	Resistance Tolerance	Packing Style	Temperature Coefficient of Resistance	Resistance Value

(1) Style: MMF SERIES

(2) Power Rating : -12=1/6W, 25S=1/4W, 204 = 0.4W, -25=1/4W,  
50S=1/2W, 207 = 0.6W, -50=1/2W, 1WS=1W

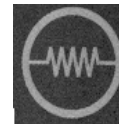
(3) Tolerance : B =  $\pm 0.1\%$   
C =  $\pm 0.25\%$   
D =  $\pm 0.5\%$   
F =  $\pm 1\%$   
G =  $\pm 2\%$   
J =  $\pm 5\%$

(4) Packaging Type: R = Paper Taping Reel

(5) Temperature Coefficient : C =  $\pm 15\text{PPM}/^\circ\text{C}$   
D =  $\pm 25\text{PPM}/^\circ\text{C}$   
E =  $\pm 50\text{PPM}/^\circ\text{C}$   
F =  $\pm 100\text{PPM}/^\circ\text{C}$   
G =  $\pm 200\text{PPM}/^\circ\text{C}$

(6) Resistance Value : E96 & E192 Series

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



### 3. BAND-CODE:



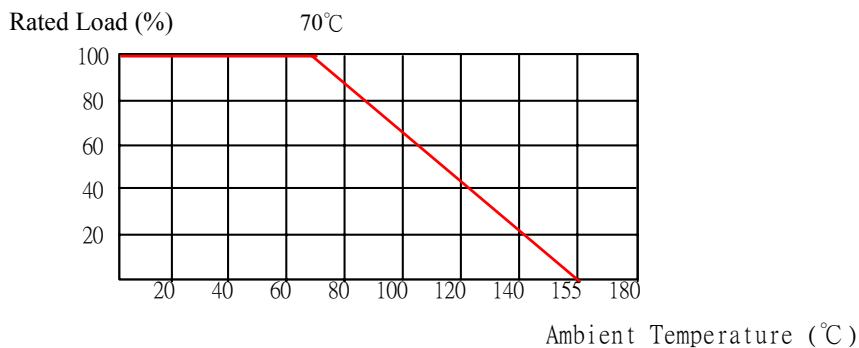
COLOR	1ST BAND	2ND BAND	3ND BAND	MULTIPLIER
BLACK	0	0	0	1Ω
BROWN	1	1	1	10Ω
RED	2	2	2	100Ω
ORANGE	3	3	3	1KΩ
YELLOW	4	4	4	10KΩ
GREEN	5	5	5	100K
BLUE	6	6	6	1MΩ
VIOLET	7	7	7	10MΩ
GREY	8	8	8	
WHITE	9	9	9	
GOLD				0.1Ω
SILVER				0.01Ω

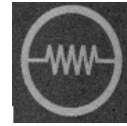
### 4. ELECTRICAL CHARACTERISTICS

STYLE	MMF-12	MMF25S	MMF204	MMF-25	MMF50S	MMF207	MMF-50	MMF1WS
Power Rating at 70 °C	1/6W	1/4W	0.4W	1/4W	1/2W	0.6W	1/2W	1W
Maximum Working Voltage	150V	200V		250V			350V	
Maximum Overload Voltage	300V	400V		500V			700V	
Dielectric Withstanding Voltage	300V			500V			700V	
Resistance Range	10Ω ~ 1MΩ & 0Ω for E96 & 100Ω ~100KΩ for E192 series value							
Operating Temp. Range	- 55 °C to + 155 °C							
Temperature Coefficient	±15 ppm /°C, ±25 ppm /°C, ±50 ppm /°C, ±100 ppm /°C, ±200 ppm /°C							

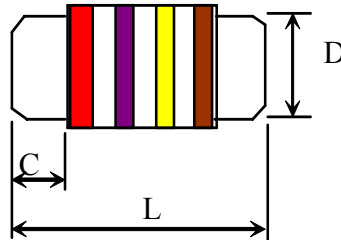
\* Below or over this resistance on request.

### 5. DERATING CURVE





## 6. DIMENSIONS



Unit : mm

STYLE		DIMENSION			
Normal	Miniature		L	D	C (Min)
MMF-12	MMF25S	MMF204	3.50 ± 0.2	1.40 ± 0.15	0.5
MMF-25	MMF50S	MMF207	5.90 ± 0.2	2.20 ± 0.1	0.5
MMF-50	MMF1WS		8.50 ± 0.2	3.20 ± 0.2	0.5

## 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 ( for normal size )

The change of the resistance value should be within ± 0.50 % + 0.05 Ω ( for miniature size )

### (2) 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.

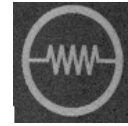
$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

**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



(3) Solderability

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

(4) 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.

(5) 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  $\pm 1.0\% + 0.05 \Omega$

(6) 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  $\pm 2\% + 0.1 \Omega$

(7) 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  $\pm 2\% + 0.1 \Omega$ .  
There shall be no remarkable change in the appearance and the color code shall be legible after the test.

(8) 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 ◦

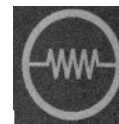
Temperature Cycling Conditions:

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.

(9) 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  $\pm 0.5\% + 0.05 \Omega$



## 8. PACKING METHODS

STYLE				REEL	
SIZE	Normal	Miniature		Packaging	Qty per reel
0204	MMF-12	MMF25S	MMF204	7"	3,000PCS
0207	MMF-25	MMF50S	MMF207	7"	2,000PCS
0309	MMF-50	MMF1WS		13"	2,500PCS

## 9. 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)  
 Tel. 886-2-2218-2139  
 Fax. 886-2-6629-8898
- 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. 86-769-8772 0275  
 Fax. 86-769-8772 0275 #4333
- C. China Mudu Plant  
 No.158, Jinchang Road, No.1 Building of NanBangIND.Zone,  
 Mu Du New District, Suzhou, China  
 (江蘇省蘇州市木瀆新區金長路 158 號南濱工業區 1 號)  
 Tel. 86-512-66518889  
 Fax. 86-512-66519889