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## **Approval Sheet**

for

# **Metal Film High Precision Resistors**

## **MHP series**

### **$\pm 0.02\%$ & $\pm 0.05\%$**

**YAGEO CORPORATION**

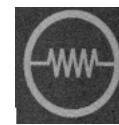
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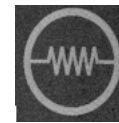
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<b>Description</b>	<b>Metal Film High Precision Resistors</b>		
<b>Series</b>	MHP	<b>Rev.</b>	01



## 1. PRODUCT:

Metal film high precision resistors, painting color is blue.

## 2. PART NUMBER:

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

Example :

<b>MHP</b>	<b>-25</b>	<b>A</b>	<b>T</b>	<b>B</b>	<b>73-</b>	<b>100R</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>
Series	Power	Resistance	Packing	Temperature	Special	Resistance
Name	Rating	Tolerance	Style	Coefficient	Type	Value
				of Resistance		

(1) Style : MHP SERIES

(2) Power Rating : -25=1/4W、-50=1/2W

(3) Tolerance : = P=  $\pm 0.02\%$ 、A=  $\pm 0.05\%$

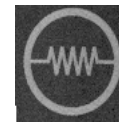
(4) Packaging Type : B = Bulk Packing

(5) Temperature Coefficient : A=5PPM B=10PPM

(6) Special Type : 73- = 73mm

(7) Resistance Value : E192 Series

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



### 3. BAND-CODE:

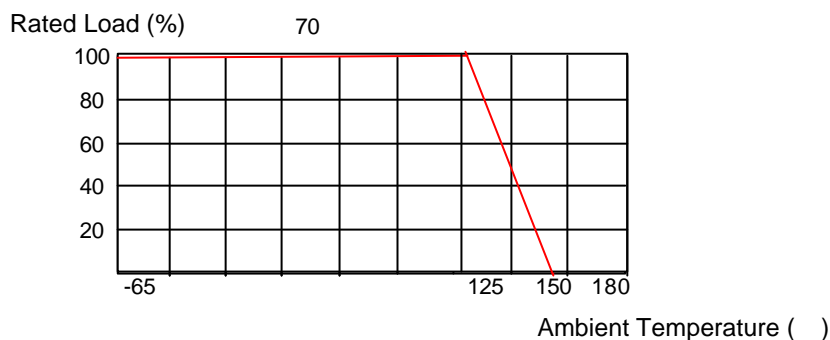


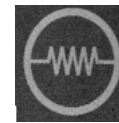
### 4. ELECTRICAL CHARACTERISTICS

STYLE	MHP-25	MHP-50
Power Rating at 70	1/4W	1/2W
Maximum Working Voltage	250V	300V
Maximum Overload Voltage	500V	600V
Dielectric Withstanding Voltage	450V	900V
Resistance Range	1 ~ 5M for E192 series value	
Operating Temp. Range	- 65 to + 150	
Temperature Coefficient	±5 ppm / , ±10 ppm /	

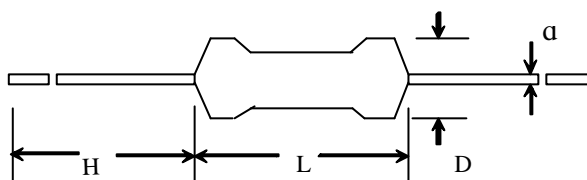
Below or over this resistance range on request.

### 5. DERATING CURVE





## 6. DIMENSIONS



STYLE	DIMENSION			
Normal	L	D	H	d
MHP-25	6.2 ±0.3	1.8 ±0.3	36 ±0.0	0.63 ±0.05
MHP-50	9.1 ±0.3	2.1 ±0.3	36 ±0.0	0.63 ±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  $\pm 0.25 \% + 0.05$

### (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  $85^{\circ}\text{C} \pm 1^{\circ}\text{C}$  at the constant temperature silicon plate for over 1 hour at an ambient temperature  $165^{\circ}\text{C}$ . Then measure the resistance value.

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

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

$R$  = Resistance value under the testing temperature

$R_0$  = Resistance value at the room temperature

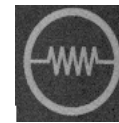
$t$  = The testing temperature

$t_0$  = Room temperature

### (4) Insulation Resistance

Apply test terminal on lead and resistor body.

The test resistance should be high than 10,000M ohm.



(5) Resistance to Solvent

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

(6) 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 reached 2 pounds.  
The load shall be held for 5 seconds. The load of weight shall be 0.9 kg ( 9N ).

(7) Load Life in Humidity

Place the specimen in a test chamber at -10 °C + 65 °C and 80 ~ 98 % 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 240 hours. The change of the resistance value shall be within  $\pm 0.5 \% + 0.05$

(8) 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  $\pm 1.0 \% + 0.05$  .  
There shall be no remarkable change in the appearance and the color code shall be legible after the test.

(9) 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 0.5 hour.

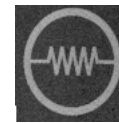
Temperature Cycling Conditions:

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  $\pm 0.015 \% + 0.05$   
After the test the resistor shall be free from the electrical or mechanical damage.

(10) 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  $\pm 0.1 \% + 0.05$



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