ROYALOHM

SPECIFICATION FOR APPROVAL

TRANSFER ELECTRONIC

Description : Metal Film Fixed Resistors

(Resistance Range: 1Ω ~ 9.9Ω)

Royalohm Part no.: MF006FFxxxxA50 (MF 0.6 W-S +/- 1% 50ppm)

Approved by

Parts corresponding to RoHS Compliant: 2005-Apr.-1

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Issue Date: 2006/12/22

CHANGE NOTIFICATION HISTORY

Version	Date of Version	History	Remark
1	2006/12/22	1. Resistance range: 1Ω----9.9Ω	
		2. Lead wire diameter: 0.54 ± 0.05 (Unit: mm)	

Customer: TRANSFER ELECTRONIC	Part No.: MF006FFxxxxA50

1. Scope:

This specification for approval relates to Metal Film Fixed Resistors manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form :

(Ex.)	MF	0.6 W-S	F	1Ω
	Type	Power Rating	Resistance Tolerance	Nominal Resistance

3. Ratings:

Ratings shall be shown in the table 1.

Table 1

Type	MF
Rated Power	0.6W at 70□
Max. Working Voltage	250 V
Max. Overload Voltage	500 V
Dielectric Withstanding Voltage	500 V
Rated Ambient Temp.	70 □
Operating Temp. Range	-55□ --- +155□
Resistance Tolerance	± 1%
Resistance Value	1Ω---9.9Ω

3.1 Power rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70 □. For temperature in excess of 70 □ , the load shall be derated as shown in the figure 1.

3.2 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform curresponding to the power rating , as determined from the following formula :

$$RCWV = \sqrt{P \times R}$$

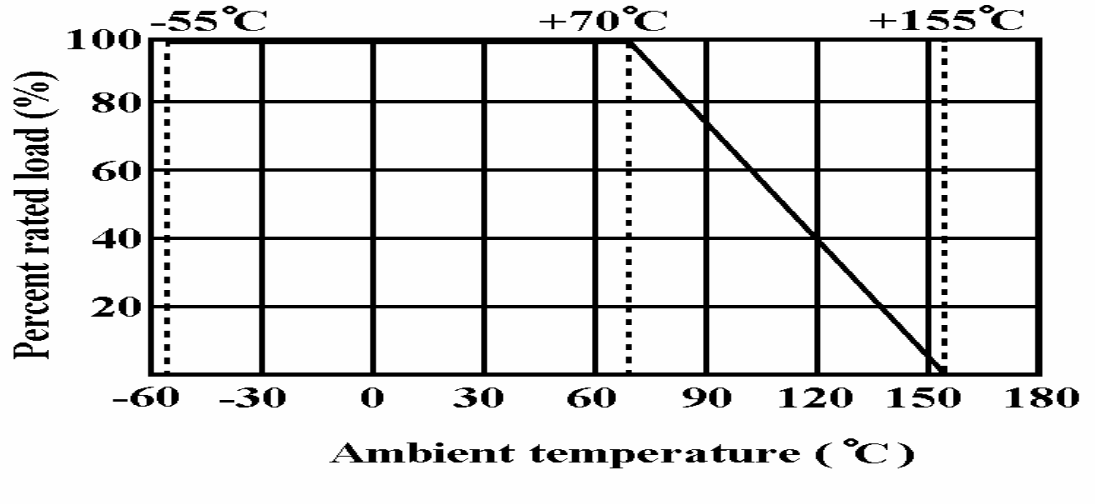
Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value

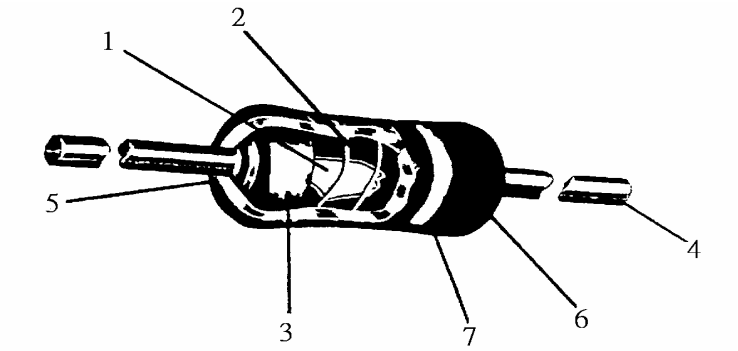
Figure 1.



3.3 Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-96 series, and resistance tolerance shall be shown by table 1.

4. Construction :



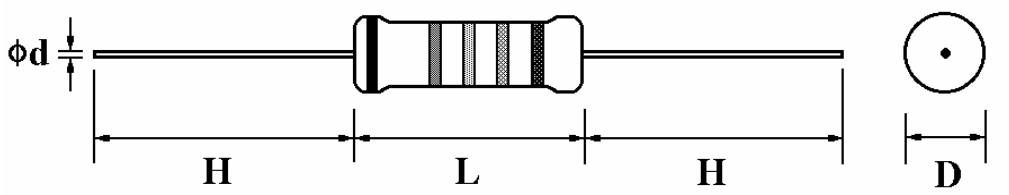
No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance Film	Metal Film
3	End Cap	Steel (Tin plated iron surface)
4	Lead Wire	Annealed copper wire coated with tin
5	Joint	By Welding
6	Coating	Insulated resin (Color : Apple Green)
7	Color Code	Epoxy Resin

Metal Film Fixed Resistors		
5. Characteristics :		
Characteristics	Limits	Test Methods (JIS C 5201-1)
DC. Resistance	Must be within the specified tolerance	5.1 The limit of error of measuring apparatus shall not exceed allowable range or 1% of resistance tolerance
Temperature coefficient	Within the temperature coefficient specified below : ± 50 PPM/□ Max.	5.2 Natural resistance change per temp. degree centigrade $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/□) R_1: Resistance value at room temperature (t1) R_2: Resistance value at room temp. plus 100 □ (t_2)
Short time overload	Resistance change rate is ± (0.5% + 0.05Ω) Max. with no evidence of mechanical damage	5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	5.7 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively specified in the table 1. for 60 + 10/ -0 seconds
Pulse overload	Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage	5.8 Resistance change after 10,000 cycles (1 sec. "on" , 25 secs. "off") at 4 times RCWV
Terminal strength	No evidence of mechanical damage	6.1 **Direct load** : Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads **Twist test :** Terminal leads shall be bent through 90 ° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations
Resistance to soldering heat	Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage	6.4 Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350□ ± 10 □ solder for 3 ± 0.5 seconds

Metal Film Fixed Resistors

<table>
<tr><th>Characteristics</th><th>Limits</th><th>Test Methods
(JIS C 5201-1)</th></tr>
<tr><td>Solderability</td><td>95 % coverage Min.</td><td>6.5 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes.
Test temp. of solder : 245□ ± 3□
Dwell time in solder : 2 ~ 3 seconds</td></tr>
<tr><td>Resistance to solvent</td><td>No deterioration of protective coatings and markings</td><td>6.9 Specimens shall be immersed in bath of trichroethane completely for 3 mins. with ultrasonic</td></tr>
<tr><td>Temperature cycling</td><td>Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage</td><td>7.4 Resistance change after continuous 5 cycles for duty shown below:
<table>
<tr><th>Step</th><th>Temperature</th><th>Time</th></tr>
<tr><td>1</td><td>-55□ ± 3□</td><td>30 mins</td></tr>
<tr><td>2</td><td>Room temp.</td><td>10□15 mins</td></tr>
<tr><td>3</td><td>+155□ ± 2□</td><td>30 mins</td></tr>
<tr><td>4</td><td>Room temp.</td><td>10□15 mins</td></tr>
</table></td></tr>
<tr><td>Load life in humidity</td><td><table>
<tr><th>Resistance value</th><th>□ R/R</th></tr>
<tr><td>Normal type</td><td>± 1.5 %</td></tr>
</table></td><td>7.9 Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity test chamber controlled at 40 □ ± 2 □ and 90 to 95 % relative humidity</td></tr>
<tr><td>Load life</td><td><table>
<tr><th>Resistance value</th><th>□ R/R</th></tr>
<tr><td>Normal type</td><td>± 1.5 %</td></tr>
</table></td><td>7.10 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70□ ± 2□ ambient</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

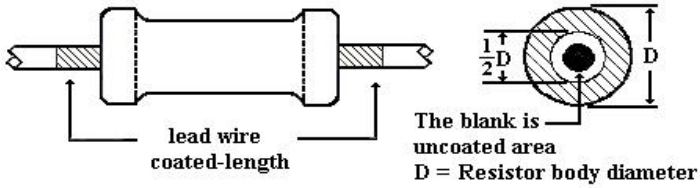
6. Dimension : Unit : mm



Type	Power Rating	D (Max.)	L (Max.)	d ± 0.05	H ± 3
MF	0.6W-S	2.5 mm	6.8 mm	0.54 mm	28 mm

Painting method:

Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the are angle.

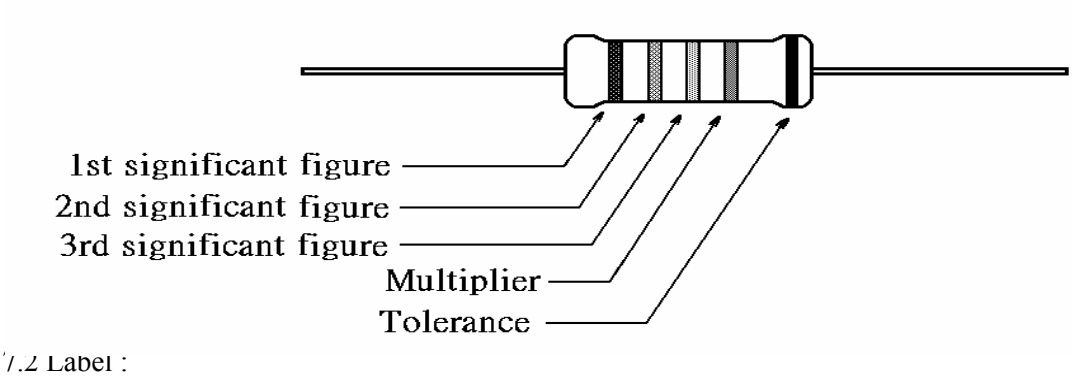


7. Marking :

7.1 Resistor :

Resistors shall be marked with color coding

colors shall be in accordance with JIS C 0802



7.2 Label :

Label shall be marked with following items:

(1) Type and style

(2) Nominal resistance

(3) Resistance tolerance

(4) Quantity

(5) Lot number

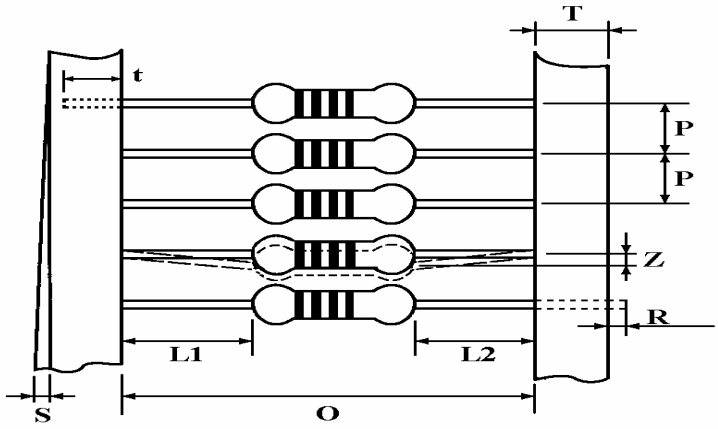
(6) PPM

Example :

Metal Film Fixed Resistors					
Watt	:	0.6W-S	Val	:	1E
Q'TY	:	5,000	Tol	:	1%
Lot	:	813478	PPM	:	50
ROYALOHM					Pb Free

8. Packing specification :

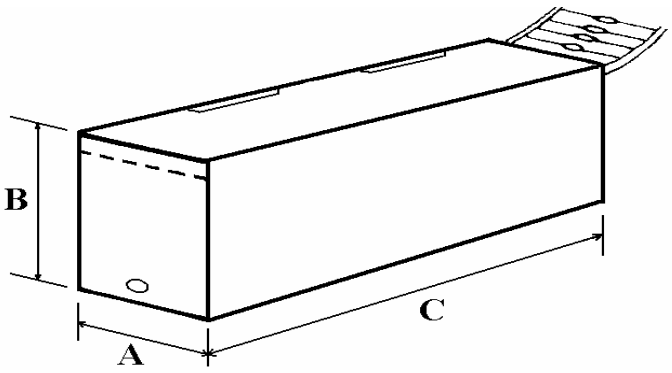
8.1 Taping dimension :



Dimensions (mm)

Type	Style	O	P	L_1-L_2	T	Z	R	t	S
MF-60s	PT-52	52 ± 1	5 ± 0.3	1 Max.	6 ± 1	1 Max.	0	4 ± 1	0.5 Max.

8.2 Tape in box packing :



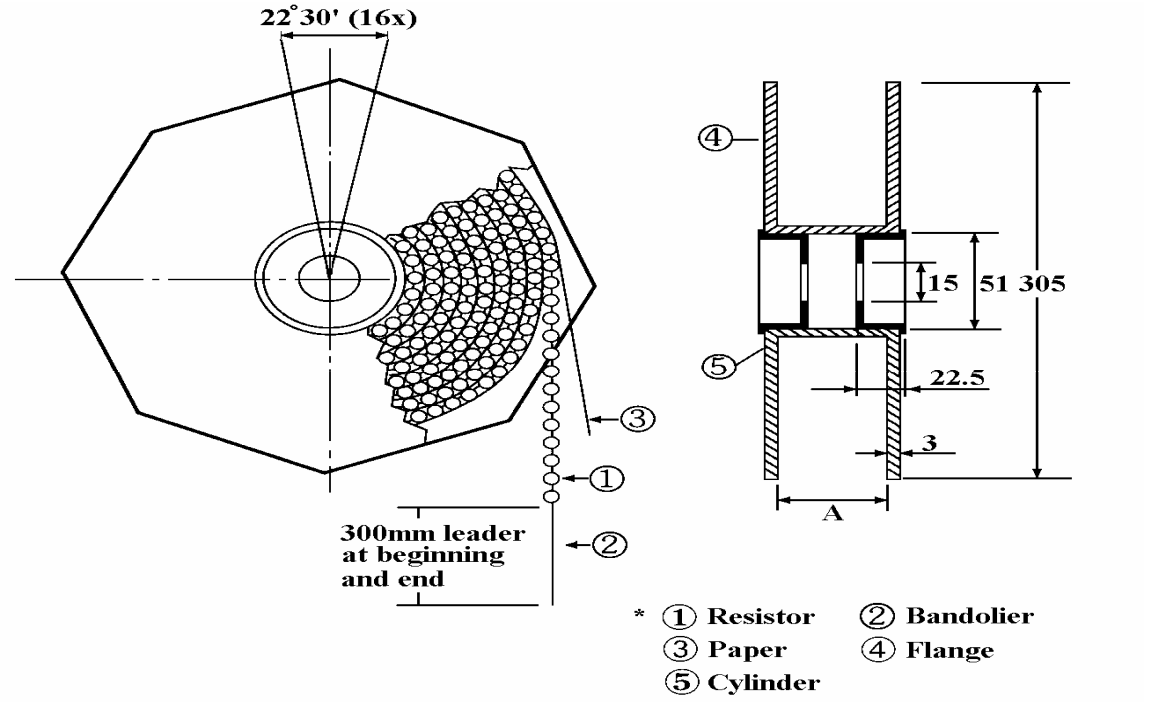
Bandoliers may also be contained in a cardboard box ("Ammopack")

Dimension (mm)

Type	Style	L (C) ± 5	W (A) ± 5	H (B) ± 5	Quantity Per Box (pcs.)
MF-60s	PT-52	250	75	96	5,000

"Ammopack" is an abbreviation of "ammunition pack"

8.3 Tape on reel packing :



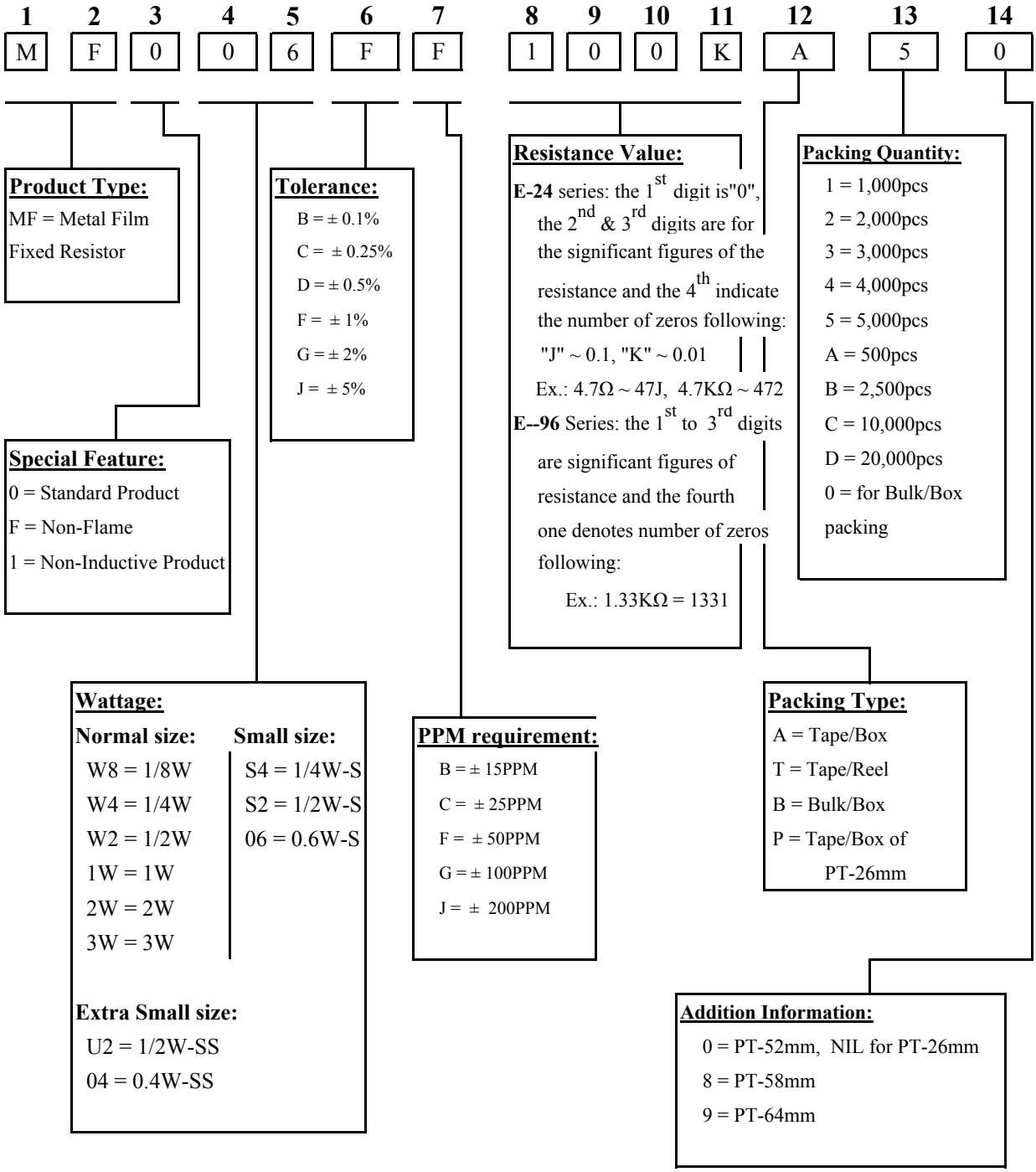
Dimension (mm) :

Type	Style	Across Flange (A)	Quantity Per Reel
MF-60s	PT-52	73 ± 2	5,000 pcs.

Part Number System

Explanation of Part Number System

(Metal Film Fixed Resistors)



Sample: MF 0.6W-S +/- 1% 1Ω T/B 5,000 → MF006FF100KA50

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