

ROYALOHM

SPECIFICATION FOR APPROVAL

TRELIK

Description : Metal Film Fixed Resistors

Max. Working Voltage: 350V

Royalohm Part no.: MFFU2JJxxxxA50 (MF 1/2W-SS +/- 5% Non-Flame)

Approved by

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

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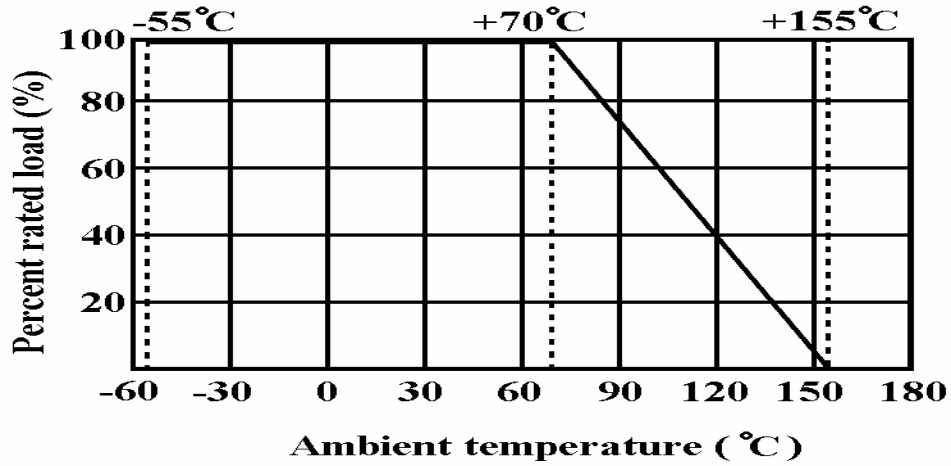
Approved	Checked	Prepared
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Issued Date: 2008/04/04

Metal Film (Non-Flame) Fixed Resistors

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

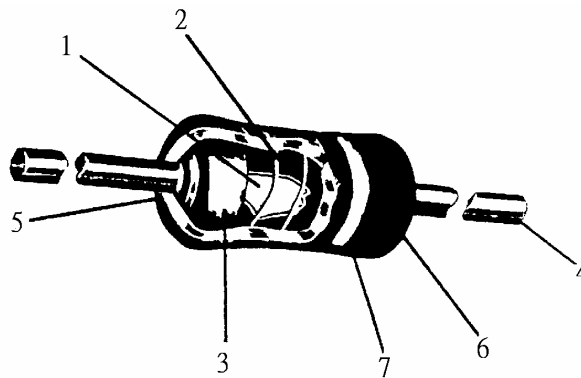
Figure 1.



3.3 Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-24 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 & Non-Flame Paint (Color : Green Meeting U L 94 V O Standard)
7	Color Code	Non-Flame Paint Epoxy Resin

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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 5% of resistance tolerance
Temperature coefficient	Within the temperature coefficient specified below : ± 200 PPM/°C Max.	5.2 Natural resistance change per temp. degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R1: Resistance value at room temperature (t1) R2: Resistance value at room temp. plus 100 °C (t2)
Short time overload	Resistance change rate is ± (0.5% + 0.05 Ω) 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% + 0.05 Ω) 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% + 0.05 Ω) 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°C ± 10 °C solder for 3 ± 0.5 seconds

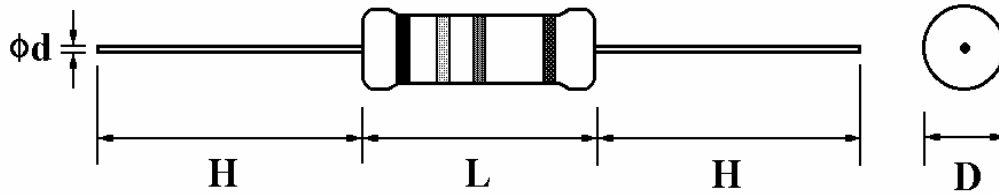
Metal Film (Non-Flame) Fixed Resistors

Metal Film (Non-Flame) Fixed Resistors																	
Characteristics	Limits	Test Methods (JIS C 5201-1)															
Solderability	95 % coverage Min.	6.5 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder : 245°C ± 3°C Dwell time in solder : 2 ~ 3 seconds															
Resistance to solvent	No deterioration of protective coatings and markings	6.9 Specimens shall be immersed in bath of trichroethane completely for 3 mins. with ultrasonic															
Temperature cycling	Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage	7.4 Resistance change after continuous 5 cycles for duty shown below: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Step</th> <th style="text-align: center;">Temperature</th> <th style="text-align: center;">Time</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">-55°C ± 3°C</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10~15 mins</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">+155°C ± 2°C</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10~15 mins</td> </tr> </tbody> </table>	Step	Temperature	Time	1	-55°C ± 3°C	30 mins	2	Room temp.	10~15 mins	3	+155°C ± 2°C	30 mins	4	Room temp.	10~15 mins
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Load life in humidity	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: center;">Resistance value</th> <th style="text-align: center;">Δ R/R</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Non-Flame type</td> <td style="text-align: center;">± 5 %</td> </tr> </tbody> </table>	Resistance value	Δ R/R	Non-Flame type	± 5 %	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 °C ± 2 °C and 90 to 95 % relative humidity											
Resistance value	Δ R/R																
Non-Flame type	± 5 %																
Load life	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: center;">Resistance value</th> <th style="text-align: center;">Δ R/R</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Non-Flame type</td> <td style="text-align: center;">± 5 %</td> </tr> </tbody> </table>	Resistance value	Δ R/R	Non-Flame type	± 5 %	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°C ± 2°C ambient											
Resistance value	Δ R/R																
Non-Flame type	± 5 %																

Metal Film (Non-Flame) Fixed Resistors

6. Dimension :

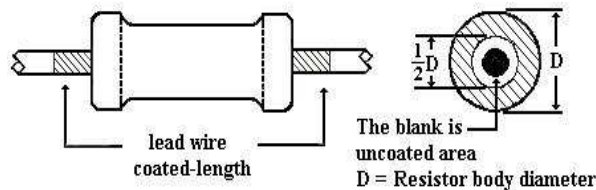
Unit : mm



Type	Power Rating	D (Max.)	L (Max.)	$d \pm 0.05$	$H \pm 3$
MF	1/2W-SS	2.5 mm	6.8 mm	0.54 mm	28 mm

Painting method:

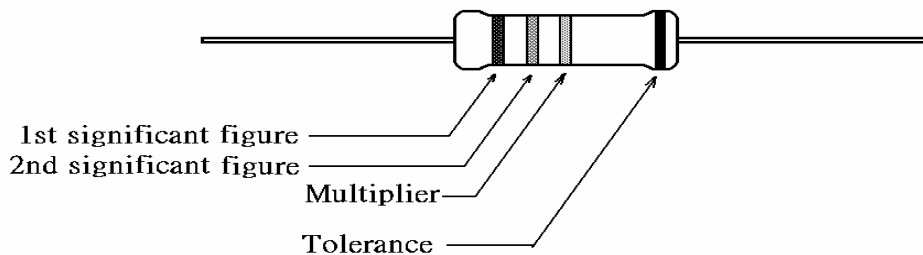
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the arc angle.



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

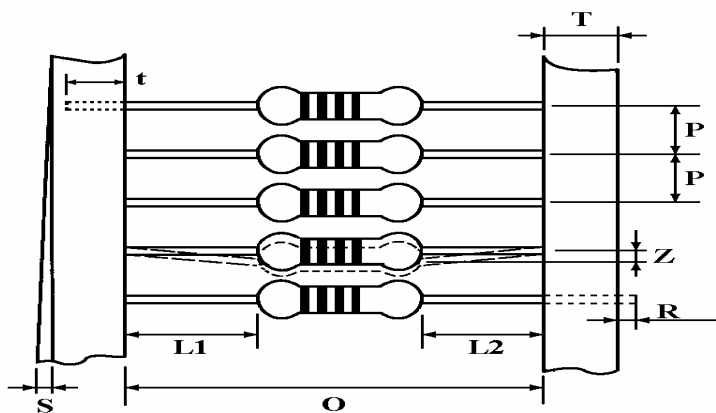
Example :

Metal Film Fixed Resistors			
Watt :	1/2W-SS	Val :	1E
Q'TY :	5,000	Tol :	5%
Lot :	319022	PPM :	200
	ROYALOHM		Pb Free

Metal Film (Non-Flame) Fixed Resistors

8. Packing specification :

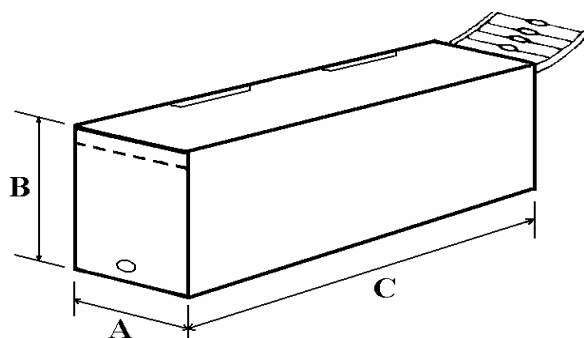
8.1 Taping dimension :



Dimensions (mm)

Type	Style	O	P	L1-L2	T	Z	R	t	S
MF-50ss	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")

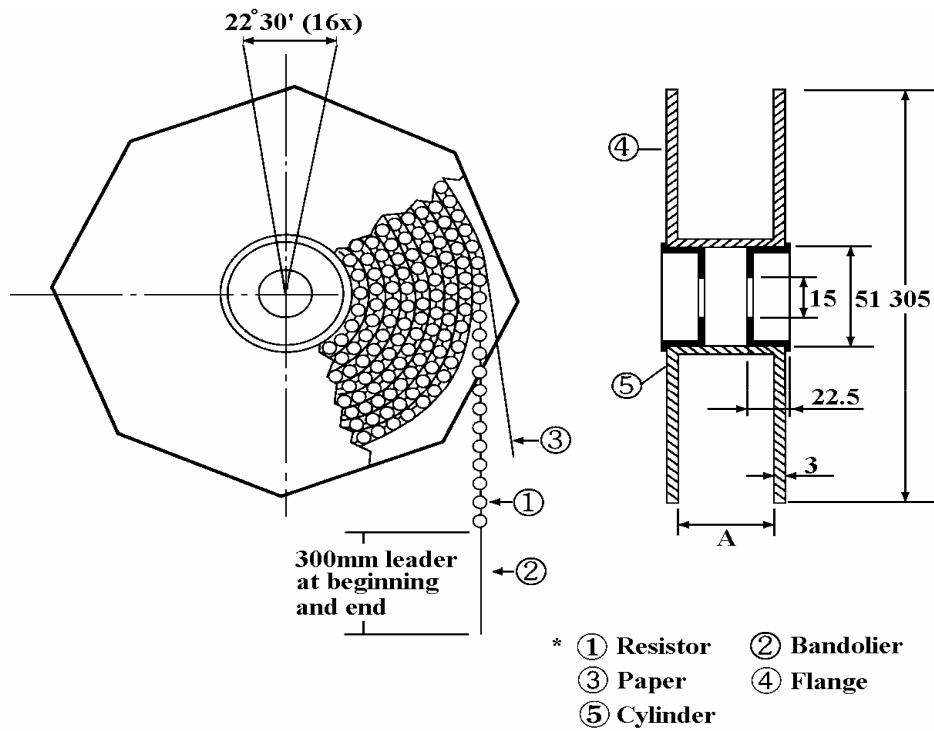
Dimension (mm)

Type	Style	L (C) ± 5	W (A) ± 5	H (B) ± 5	Quantity Per Box (pcs.)
MF-50ss	PT-52	250	75	96	5,000

"Ammopack" is an abbreviation of "ammunition pack"

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8.3 Tape on reel packing :



Dimension (mm) :

Type	Style	Across Flange (A)	Quantity Per Reel
MF-50ss	PT-52	73 ± 2	5,000 pcs.

Part Number System

Explanation of Part Number System (Metal Film Fixed Resistors)

1 2 3 4 5 6 7 8 9 10 11 12 13 14
M F F U 2 J J 0 1 0 J A 5 0

Product Type:
MF = Metal Film
Fixed Resistor

Special Feature:
0 = Standard Product
F = Non-Flame
I = Non-Inductive Product

Tolerance:
B = ± 0.1%
C = ± 0.25%
D = ± 0.5%
F = ± 1%
G = ± 2%
J = ± 5%

Resistance Value:
E-24 series: the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros following:
"J" ~ 0.1, "K" ~ 0.01
Ex.: 4.7Ω ~ 47J, 4.7KΩ ~ 472
E--96 Series: the 1st to 3rd digits are significant figures of resistance and the fourth one denotes number of zeros following:
Ex.: 1.33KΩ = 1331

Packing Quantity:
1 = 1,000pcs
2 = 2,000pcs
3 = 3,000pcs
4 = 4,000pcs
5 = 5,000pcs
A = 500pcs
B = 2,500pcs
C = 10,000pcs
D = 20,000pcs
0 = for Bulk/Box packing

Wattage:
Normal size:
W8 = 1/8W
W4 = 1/4W
W2 = 1/2W
1W = 1W
2W = 2W
3W = 3W
Small size:
S4 = 1/4W-S
S2 = 1/2W-S
06 = 0.6W-S
Extra Small size:
U2 = 1/2W-SS
04 = 0.4W-SS

PPM requirement:
B = ± 15PPM
C = ± 25PPM
F = ± 50PPM
G = ± 100PPM
J = ± 200PPM

Packing Type:
A = Tape/Box
T = Tape/Reel
B = Bulk/Box
P = Tape/Box of PT-26mm

Addition Information:
0 = PT-52mm, NIL for PT-26mm
8 = PT-58mm
9 = PT-64mm

Sample: MF 1/2W-SS +/- 5% 200ppm 1Ω T/B 5,000 → MFFU2JJ010JA50