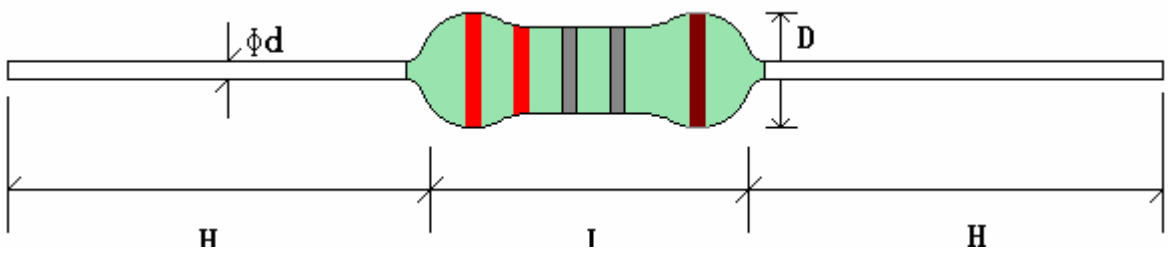
1.0 Scope:

This specification for approve relates to Lead-Free Metal Film Fixed Resistors manufactured by UNIOHM'S specification.

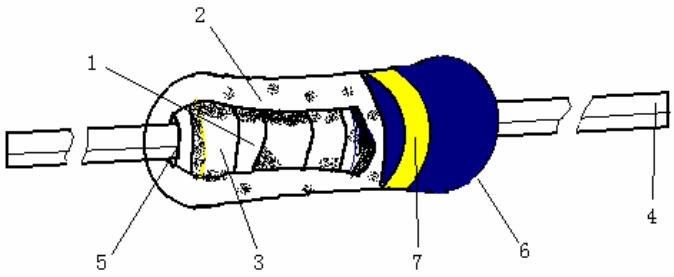
2.0 Ratings & Dimension:



2.1 Normal size:

Type	Dimension(mm)				Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Tolerance	Resistance Range
	D Max.	L Max.	d ±0.05	H ±3					
MF 0.6WS	2.7	6.8	0.54	28	250V	500V	250V	±1%	10Ω~1MΩ

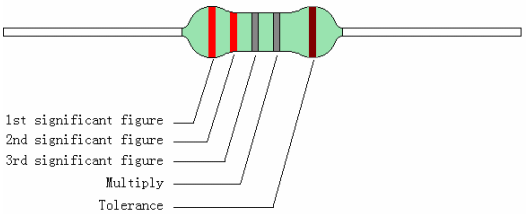
3.0 Construction:



No.	Name	Material
1	Basic Body	Rod type ceramics
2	Resistor	Metal Film
3	End Cap	Cold steel plated with copper/tin
4	Lead Wire	Tin solder coated copper wire
5	Joint	By Welding
6	Coating	(1). Celluloid paint
		(2) Insulated Resin : Light Green
7	Color Code	Epoxy resin

4.0 Resistor marked:

Resistors shall be marked with color coding
Colors shall be in accordance with JIS C 0802



4.1 Label:

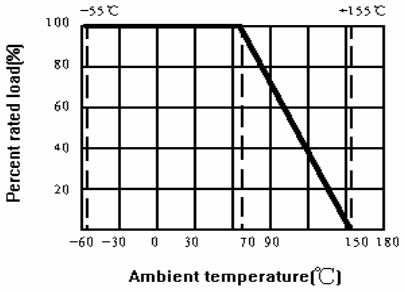
Label shall be marked with following items:

(1) Type and style
(2) Nominal resistance
(3) Resistance tolerance
(4) Quantity
(5) Lot number
(6) PPM

Example:

METAL FILM FIXED RESISTORS	
WATT: 0.6WS	VAL:53.6Ω
Q'TY: 5,000	TOL: 1%
LOT: 9021548	PPM:

5.0 Derating Curve



5.1 Voltage rating:

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

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

Where: RCWV = rated dc or RMS ac continuous working voltage at commercial-line frequency and waveform (VOLT.)
P = power rating (WATT.) R= nominal resistance (OHM)

6.0 Performance Specification:

Characteristic	Limits	Test Method (JIS-C-5201& JIS-C-5202)
Temperature Coefficient	±50PPM/℃Max..	4.8 natural resistance changes 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 temp. (T_1) R_2:Resistance value at room temp.+100℃ (T_2) Test pattern: room temp. (T_1), room temp. +100℃(T_2)
Short-time overload	Resistance change rate is: ±(0.5%+0.05Ω)Max. With no evidence of mechanical damage.	4.13 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.	4.7 Resistors shall be clamped in the trough of a 90°metallic v-block and shall be tested at ac potential respectively specified in the above list for 60-70 seconds.
Pulse overload	Resistance change rate is: ± (1%+0.05Ω) Max. With no evidence of mechanical damage.	4.28 Resistance change after 10,000 cycles (1 second “ON ”, 25 seconds “OFF ”) at 4 times RCWV.
Terminal strength	No evidence of mechanical damage	4.16 Direct load: Resistance to a 2.5 kg direct load for 10 seconds 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	4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260℃ ±5℃ solder for 10±1 seconds.
Solderability	95% coverage Min.	4.17 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: 2~3seconds.
Temperature cycling	Resistance change rate is: ±(1%+0.05Ω) Max.. With no evidence of mechanical damage.	4.19 Resistance change after continuous five cycles for duty cycle specified:

Step	Temperature	Time
1	-55℃ ± 3℃	30mins
2	Room temp.	10 – 15mins
3	+155℃ ± 2℃	30mins
4	Room temp.	10 – 15mins

Resistance to solvent	No deterioration of protective coatings & markings	4.29 Specimens shall be immersed in a bath of trichloroethylene completely for 3 min. With ultrasonic
Load life in humidity	±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℃±2℃ and 90 to 95% relative humidity.
Load life	±5%	4.25.1 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.

7.0 Explanation of Part No. System:

The standard Part No. includes 14 digits with the following explanation:

7.1 Coated type, the 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.

Example:

MFR0= Metal Film Fixed Resistors type;

7.2 5th~6th digits:

7.2.1 This is to indicate the wattage or power rating. To dieting the size and the numbers, The following codes are used; and please refer to the following chart for detail:

W=Normal Size; S=Small Size; “1” ~ “G” to denotes “1” ~ “16” as Hexadecimal:

1/16W~1/2W (＜1W)

Wattage	1/2	0.6	1/4	1/5	1/6	1/8	1/10	1/16
Normal Size	W2	/	W4	W5	W6	W8	WA	WG
Small Size	S2	06	S4	S5	S6	S8	SA	SG

7.2.2 For power rating less than 1 watt, the 5th digit will be the letters W, S or U to represent the size required & the 6th digit will be a number or a letter code.

Example:

06=0.6WS; U2=1/2W-SS.

7.3 The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.

F=±1% G=±2% J=±5% K= ±10%

7.4 The 8th to 11th digits is to denote the Resistance Value.

7.4.1 For the standard resistance values of E-24 series, the 8th digit is "0" ,the 9th & 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following;

For the standard resistance values of E-96 series, the 8th digit to the 10th digits is to denote the significant figures of the resistance and the 11th digit is the 11th digit is the zeros following.

7.4.2 The following number s and the letter codes are to be used to indicate the number of zeros in the 11th digit:

$0=10^0$ $1=10^1$ $2=10^2$ $3=10^3$ $4=10^4$ $5=10^5$

$6=10^6$ $J=10^{-1}$ $K=10^{-2}$ $L=10^{-3}$ $M=10^{-4}$

7.4.3 The 12th, 13th & 14th digits.

The 12th digit is to denote the Packaging Type with the following codes:

A=Tape/Box (Ammo pack) B=Bulk/Box

T=Tape/Reel P=Tape/Box of PT-26 products

7.4.4 The 13th digit is normally to indicate the Packing Quantity of Tape/Box & Tape/Reel packaging types. The following letter code is to be used for some packing quantities:

A=500pcs B=2500pcs C=10000pcs

D=20000pcs G=25000pcs H=50000pcs

7.4.5 For the FORMED type products, the 13th & 14th digits are used to denote the forming types of the product with the following letter codes:

MF=M-type with flattened lead wire F0= F-type

MK= M-type with kinked lead wire F1= F1-type

ML= M-type with normal lead wire F2= F2-type

MC= M type with kinked lead and narrow pitch wire F3= F3-type

7.4.6 For some items, the 14th digit alone can use to denote special features of additional information with the following codes:

P=Panasert type 1=Avisert type 1 2=Avisert type 2

3=Avisert type 3 A=Cutting type CO 1/4W-A type B= Cutting type CO 1/4W-B type

8.0 Ordering Procedure (Example: MF 0.6WS ±1% 53.6Ω T/B-5000)

M F R F 0 6 F 5 3 6 J A 5 0

Product Type:
MFR=Metal film fixed resistors

Wattage:
06=0.6WS

Special Features:
0= Standard product
F= Flame Retardant

Tolerance:
F=±1%

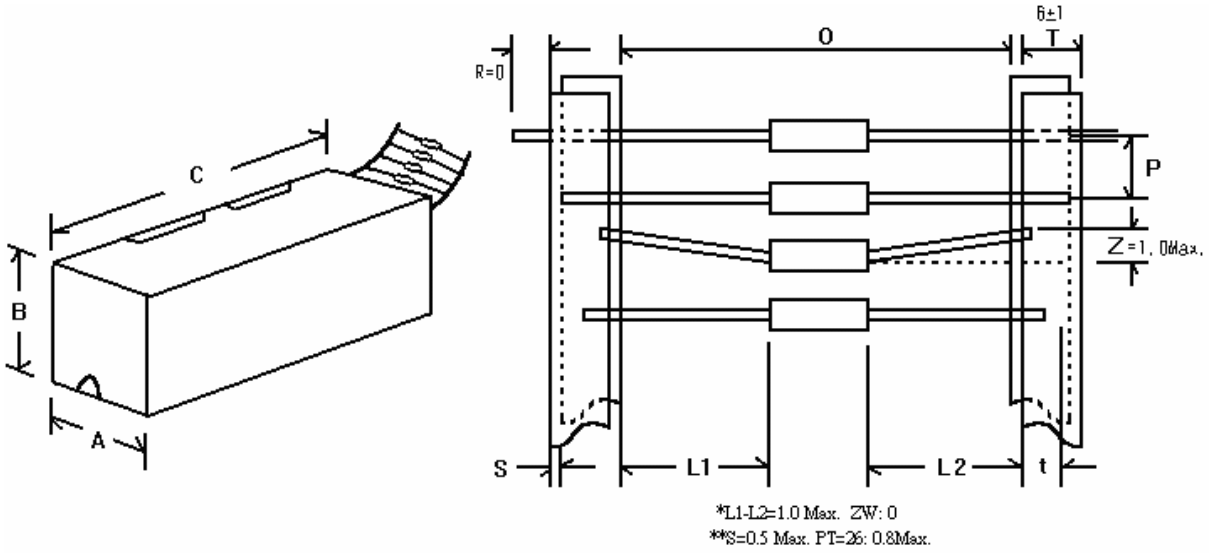
Resistance Value:
E-24 series:
The 1st digit will be "0" ;the2nd & 3rd digits are for the significant figures of the resistance and the 4th digit indicate the numbers of zeros following.
J=10^{-1}; K=10^{-2}; L=10^{-3}

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

Packing quantity:
10=1,000pcs
20=2,000pcs
30=3,000pcs
40=4,000pcs
50=5,000pcs
A0=500pcs
B0=2,500pcs
Forming type:
MF=MB- type
MK=MK type
MC=MC-type
ML=M type
F0=F type
F1=F1 type
F2=F2 type
F3=F3 type

9.0 Standard Packing:

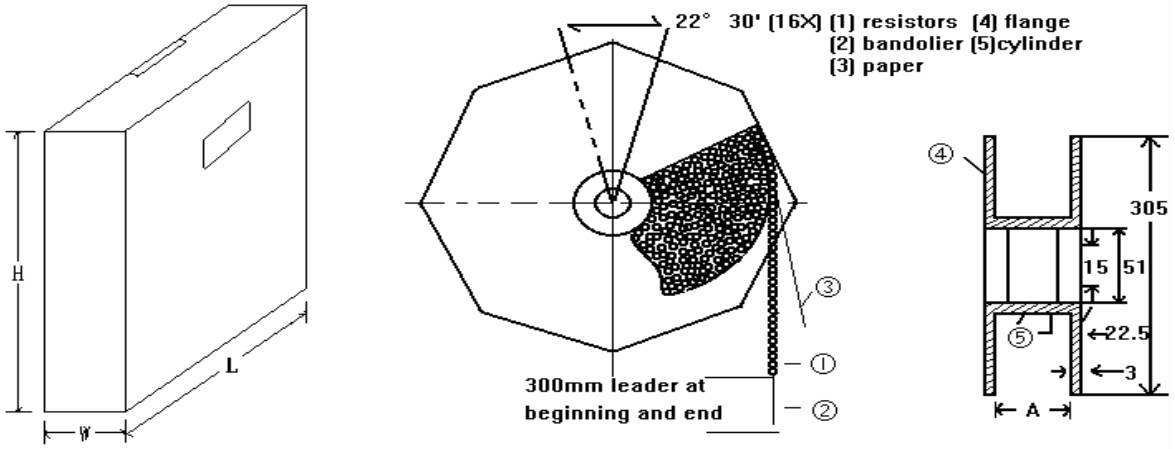
9.1 Tapes in Box Packing



Dimension of T/B (mm)

Part No.	O	P	A±5	B±5	C±5	Qty/Box
MF 0.6WS	52±1	5±0.3	70	115	250	5,000pcs

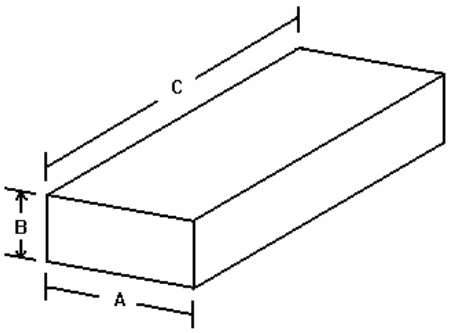
9.2 Tapes in Reel Packing



Dimension of Reel (mm)

Part No.	A	W±5	H±5	L±5	Qty/Box
MF 0.6WS	73±2	85	295	290	5,000pcs

9.3 Bulk in Box Packing



Dimension of Box (mm)

Part No.	A±5	B±5	C±5	Qty/Box
MF 0.6WS	140	80	240	500/1,0000pcs

10.0 Storage:

The products should be placed in the dry and ventilation with 6~35℃ and lower than 35~88%RH,and prevent it from pressing and humidity.