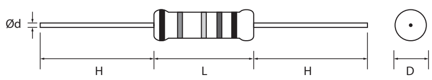
Precision Metal Film Fixed Resistors

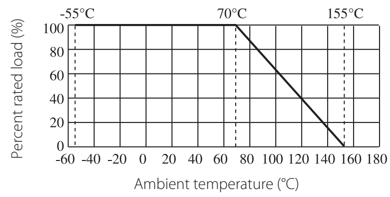
Feature

- EIA standard color.
- Flame Retardant type available
- Low noise & voltage coefficient
- Low temperature coefficient range
- Multiple epoxy coating on vacuum-deposited metal film provideds superior moisture protection
- Nichrome resistive element provides stable performance in various environments

Dimension (mm)



Derating Curve



Specification

Part No	Type	Power Rating 70 °C	Dimension (mm)					MAX. Working Voltage	MAX. Overlaod Voltage	Dielectric Withstanding Voltage
			D	L	d ±0.05	H±3	PT			
MF0W8	MF-12	1/8W	1.9±0.3	3.3±0.3	0.45	28	52	200V	400V	400V
MF0S4	MF-25-S	1/4W-S	1.9±0.3	3.3±0.3	0.45	28	52			
MF004	MF-40-SS	0.4W-SS	1.9±0.5	3.3±0.3	0.45	28	52	200V	400V	400V
MF0W4	MF-25	1/4W	2.2±0.3	6.5±1.0	0.54	28	52	250V	500V	500V
MF0S2	MF-50-S	1/2W-S	2.2±0.5	6.5±1.0	0.54	28	52	250V	500V	250V
MF0W2	MF-50	1/2W	3.0±0.6	9.5±1.0	0.54	28	52	350V	700V	700V
MF006	MF-60-S	0.6W-S	2.2±0.5	6.5±1.0	0.54	28	52	250V	500V	500V
MF01S	MF-100-S	1W-S	3.0±0.6	9.5±1.0	0.54	28	52	350V	700V	700V
MF01W	MF-100	1W	4.5±0.6	11.5±1.0	0.70	25	52	500V	1000V	1000V
MF02S	MF-200-S	2W-S	4.5±0.6	11.5±1.0	0.70	25	52	500V	1000V	1000V
MF02W	MF-200	2W	5.0±0.6	15.5±1.0	0.70	28	64	500V	1000V	1000V
MF03S	MF-300-S	3W-S	5.0±0.6	15.5±1.0	0.70	28	64	500V	1000V	1000V
MF03W	MF-300	3W	6.0±0.6	17.5±1.0	0.75	28	64	500V	1000V	1000V

Part No	Type	Standard Order			Special Order		
		Tolerance	Resistance Range	TCR	Tolerance	Resistance Range	TCR
MF0W8 **MF0S4** **MF004**	MF0W8 MF0S4 MF004	±1%	10Ω~1MΩ	±50	±0.25%	51.1Ω~200KΩ	±15
		±2%	10Ω~1MΩ	±100	±0.5%	51.1Ω~511KΩ	±25
		±5%	1Ω~1MΩ	±200	±0.5%	51.1Ω~511KΩ	±50
MF0W4 **MF0S2** **MF006**	MF-25 MF-50-S MF-60-S	±1%	10Ω~1MΩ	±50	±0.1%	10Ω~1MΩ	±15
		±2%	1Ω~1MΩ	±100	±0.25%	10Ω~1MΩ	±25
		±5%	1Ω~1MΩ	±200	±0.5%	10Ω~1MΩ	±50
MF0W2 **MF01S**	MF-50 MF-100-S	±1%	10Ω~1MΩ	±50	±0.1%	100Ω~330KΩ	±15
		±2%	10Ω~1MΩ	±100	±0.25%	51.1Ω~511KΩ	±25
		±5%	1Ω~1MΩ	±200	±0.5%	10Ω~1MΩ	±50
MF01W **MF02S** **MF02W** **MF03S** **MF03W**	MF-100 MF-200-S MF-200 MF-300-S MF-300	±1%	51.1Ω~1MΩ	±50	±0.1%	100Ω~330KΩ	±15
		±2%	51.1Ω~1MΩ	±100	±0.25%	51.1Ω~511KΩ	±25
		±5%	1Ω~1MΩ	±200	±0.5%	51.1Ω~1MΩ	±50

Performance Specification

Short-time Overload	ΔR/R ≤ ±(0.5%+0.05 Ω),with no evidence of mechanical damage
Dielectric withstanding voltage	With no evidence of flashover, mechanical damage,arcing or insulation breakdown
Pulse Overload	ΔR/R ≤ ± （1%+0.05),with no evidence of mechanical damage
Terminal strength	No evidence of mechanical damage
Soldering heat	ΔR/R ≤ ±(1%+0.05 Ω) with no evidence of mechanical damage
Solderability	Coverage must be over 95%.
Resistance to solvent	No deterioration of protective coating and markings
Rapid change of temperature	ΔR/R ≤ ±(1%+0.05 Ω） with no evidence of mechanical damage
Load life in humidity	Normal type: ΔR/R ≤ ±1.5% & Flame retardant type: ΔR/R ≤ ±5%
Load life	Normal type: ΔR/R ≤ ±1.5% & Flame retardant type: ΔR/R ≤ ±5%

Ordering Procedure (Example: MF 1/8W 1% 47.5KΩ T/R-5000)

M F 0 W 8 F F 4 7 5 2 T 5 0

Product Type:
MF=Precision Metal Film Fixed Resistors

Special Feature:
0=Standard
F=Flame retardant
I=Non-Inductive
C=Flammable type

Wattage:
W8=1/8W S4=1/4WS
W4=1/4W 04=0.4W-SS
S2=1/2WS W2=1/2W
06=0.6W-S 1S=1W-S
1W=1W 2S=2W-S
2W=2W 3S=3W-S
3W=3W

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

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

Resistance Value:
2%, 5%, 10% (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 numbers of zeros following;

≤1% (E-96 series):
the 1st to 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following.

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

Packing Qty.:
1=1,000pcs
2=2,000pcs
3=3,000pcs
4=4,000pcs
5=5,000pcs
A=500pcs
B=2,500pcs
0=Bulk/Box

Additional Information:
0=NIL
P=Panasert type
1=Avisert type 1
2=Avisert type 2
3=Avisert type 3
8=PT-58mm
9=PT-64mm
7=Lead wire(H)38mm
A=PT-83mm
C=PT-73mm
D=PT-71mm

New/Old Part.no Contrast

New Part.no	Old Part.no
MF0W8FF**A*0**	MFR0W8F****A*0
MF0S4FF**A*0**	MFR0S4F****A*0
MF004FF**A*0**	MFR004F****A*0
MF0W4FF**A*0**	MFR0W4F****A*0
MF0S2FF**A*0**	MFR0S2F****A*0
MF0W2FF**A*0**	MFR0W2F****A*0
MF006FF**A*0**	MFR006F****A*0

New Part.no	Old Part.no
MF01SFF**A*0**	MFR01SF****A*0
MF01WFF**A*0**	MFR01WF****A*0
MF02SFF**A*0**	MFR02SF****A*0
MF02WFF**A*0**	MFR02WF****A*0
MF03SFF**A*0**	MFR03SF****A*0
MF03WFF**A*0**	MFR03WF****A*0

Remark: For more details, please check page 135, Part No. System

1	2	3	4	5	6	7	8	9	10	11	12	13	14

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

1. 1^{st}~4^{th} digits:
   a) This is to indicate the SMD Resistor size. Example: 1206, TC05 or HV03;
   b) For Resistor Network & Coated type, the 1^{st}~3^{rd} digits are to indicate the product type and the 4^{th} digit is the special feature. Example: RNLA = Resistor Newtork Circuit A type; CFRF = Carbon Film Fixed Resistors Non-Flame type; MORI = Metal Oxide Film Fixed Resistor Non-Inductive type.
   c) For Cement Fixed Resistors, these 4 digits are to indicate the product type but if the product type has only 3 digits, the 4^{th} digit will be "0". Example: PRW0=PRW type; PRWC=PRWC type.

2. 5^{th}~ 6^{th} digits:
   a) This is to indicate the wattage or power rating. To distinguish the sizes and the numbers, the following codes are used, and please refer to the following chart for details: W = Normal Size; S = Small Size; U = Ultra Small Size; "1" ~ "G" to denotes "1" ~ "16" as Hexadecimal:

1/16W ~ 1/2W (<1W)

Wattage	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	1/12	1/13	1/14	1/15	1/16
Normal Size	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE	WF	WG
Small Size	S2	S3	S4	S5	S6	S7	S8	S9	SA	SB	SC	SD	SE	SF	SG
Ultra Small Size	U2	U3	U4	U5	U6	U7	U8	U9	UA	UB	UC	UD	UE	UF	UG

1W ~ 16W (≥1W)

Wattage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Normal Size	IW	2W	3W	4W	5W	6W	7W	8W	9W	AW	BW	CW	DW	EW	FW	GW
Small Size	1S	2S	3S	4S	5S	6S	7S	8S	9S	AS	BS	CS	DS	ES	FS	GS
Ultra Small Size	1U	2U	3U	4U	5U	6U	7U	8U	9U	AU	BU	CU	DU	EU	FU	GU

   b) For power rating less than 1W, the 5^{th} digit will be the letters W, S or U to represent the size required & the 6^{th} digit will be a number or a letter code. Example: WA = 1/10W; U2 = 1/2W-SS
   c) For power rating of 1W to 16W, the 5^{th} digit will be a number or a letter code and the 6^{th} digit will be the letters of W, S or U. Example: AW = 10W; 3S = 3W-S.
   d) For power rating between 20W to 99W, the 5^{th} & 6^{th} digits will show the whole numbers of the power rating itself. Example: 20 = 20W; 75 = 75W.
   e) For power rating of 100W & over, the 5^{th} & 6^{th} digits will be indicated with "00" and the actual wattage being indicated at the last 3 digits (12^{th}~14^{th}) of the Part No.
   f) For special power ratings, the following codes are to be used:
      1). WH = 1/32W (10P8 Chip Network) 2). 07 = 3/4WS (Chip 2010 size)
      3). 04 = 0.4W-SS (0.4 watt Ultra Small size) 4). 06 = 0.6W-S (0.6 watt Small size)
      5). 2A = 2.5W 6). 6A = 6.5W 7). WK= 2/3W 8). 1A =1.5W 9). 1.25W =1Q
   g) For Resistor Network, since the power rating is fixed as 1/8W for A circuit & 1/5W for B circuit, the 5^{th} & 6^{th} digit is to be used to denote the number of pins required. Example: 09 = 9pins; 12 = 12pins.
   h) For Jumper Wires the 5^{th} & 6^{th} digits will be indicated with "00" .
   i) For Thin Film Chip Resistors, these 2 digits will be used to indicated the requested Temperature coefficient:
      1). 05 = 5PPM 2). 10 = 10PPM 3). 15 = 15PPM 4). 25 = 25PPM 5). 50 = 50PPM

3. The 7^{th} digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resisance Tolerance. As for Metal Film Fixed Resistor products, it is also to denote the standard PPM as follows:

   B = ±0.1% (15PPM) **G** = ±2% (100PPM) **W** = ±0.05%
   C = ±0.25% (25PPM) **J** = ±5% (200PPM) **L** = ±0.01%
   D = ±0.5% (50PPM) **K** = ±10%
   F = ±1% (50PPM)

Remark: *if it is not one of the above standard "tolerance-TCR", the requirement should be clearly stated when placing order.*
Example: ±1% (25PPM), the 7^{th} digit still shows "F" but separately note the requirement of "25PPM"

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

a) For the standard resistance values of E-24 series in 5% & 10% tolerance, 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

b) For the standard resistance values of E-96 series in ≤2% tolerance, the 8th digit to the 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following.

c) For the code to the significant figures to E-24 & E-96 series, please refer to page 170 & 171 of the standards Resistance Value list.

d) The following numbers and the letter codes is to be used to indicate the number of zeros in the 11th digit:

$0 = 10^0$	$1 = 10^1$	$2 = 10^2$	$3 = 10^3$	$4 = 10^4$	$5 = 10^5$	$6 = 10^6$
$J = 10^{-1}$	$K = 10^{-2}$	$L = 10^{-3}$	$M = 10^{-4}$	$N = 10^{-5}$	$P = 10^{-6}$	

e) For Cement Resistors the 8th digit will be coded with "W" or "P" to denote Wire-wound type or Power Film type respectively of the Cement Fixed Resistor proudct. The 9th to 11th please refer to point 4.a

Example:

E-24 series	E-96 series	Cement Resistors
0120 = 12 ohm	1210 = 121 ohm	W120 = 12 ohm Wire-wound type
0123 = 12K ohm	1302 = 13K ohm	W12J = 1.2 ohm Wire-wound type
012J = 1.2 ohm	196J = 19.6 ohm	P273 = 27 kohm Powe Film type

5. The 12th, 13th & 14th digits:

a) The 12th digit is to denote the Packaging type with the following codes:

A = Tape / Box (Ammo Pack)	C = Bulk in Cassette (for Chip product)	
B = Bulk / Box	T = Tape / Reel	P = Tape / Box of PT-26 product

b) The 13th digit is normally to indicate the Packing Quantity of Tape/Box or Tape/Reel packaging types. Except for Chip products Bulk packing, this digit should be filled "0" or other products with "Bulk/Box packaging requirement. The following letter codes is to be used for some packaging quantities.

A = 500pcs	B = 2,500pcs	C = 10,000pcs	N = 12,500pcs	E = 15,000pcs
D = 20,000pcs	G = 25,000pcs	L = 45,000pcs	H = 50,000pcs	J = 60,000pcs

Example:

CHIP product	Other products
TD = T/R-20,000	A5 = T/B-5,000
TE = T/R-15,000	TB = T/R-2,500
T4 = T/R-4,000	B0 = B/B

c) For the Forming 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 wire	F3 = F3 type

d) For power rating over 100watt, the 12th to the 14th digits are to denote the actual wattage of the products:
Example: 100 = 100watt 150 = 150watt 225 = 225watt

e) For some products, the 14th digit alone can use to denote special features or additional information with the following codes:

P = Panasert type	1 = Avisert 1 type	2 = Avisert 2 type
3 = Avisert 3 type	A = CO 1/4W - A type	B = CO 1/4W - B type

E = used to denote the “Environment Protection, lead Free type” of SMD category resistors (now, this became the Standard type of SMD)

f) For some products, the 14th digit alone can use to denote special features or additional information with the following codes:

B=1/32W C=1/16W F=1/10W G=1/8W H=1/6W J=1/4W K=1/3W M=1/2W
N=3/4W P=1W S=Special