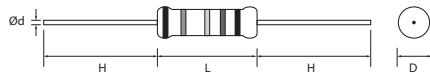


## Feature

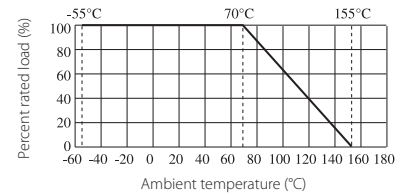
- EIA standard color.
- Flame Retardant type available
- Low noise & voltage coefficient
- Low temperature coefficient range
- Multiple epoxy coating on vacuum-deposited metal film provides superior moisture protection
- Nichrome resistive element provides stable performance in various environments



## Dimension (mm)



## Derating Curve



## Specification

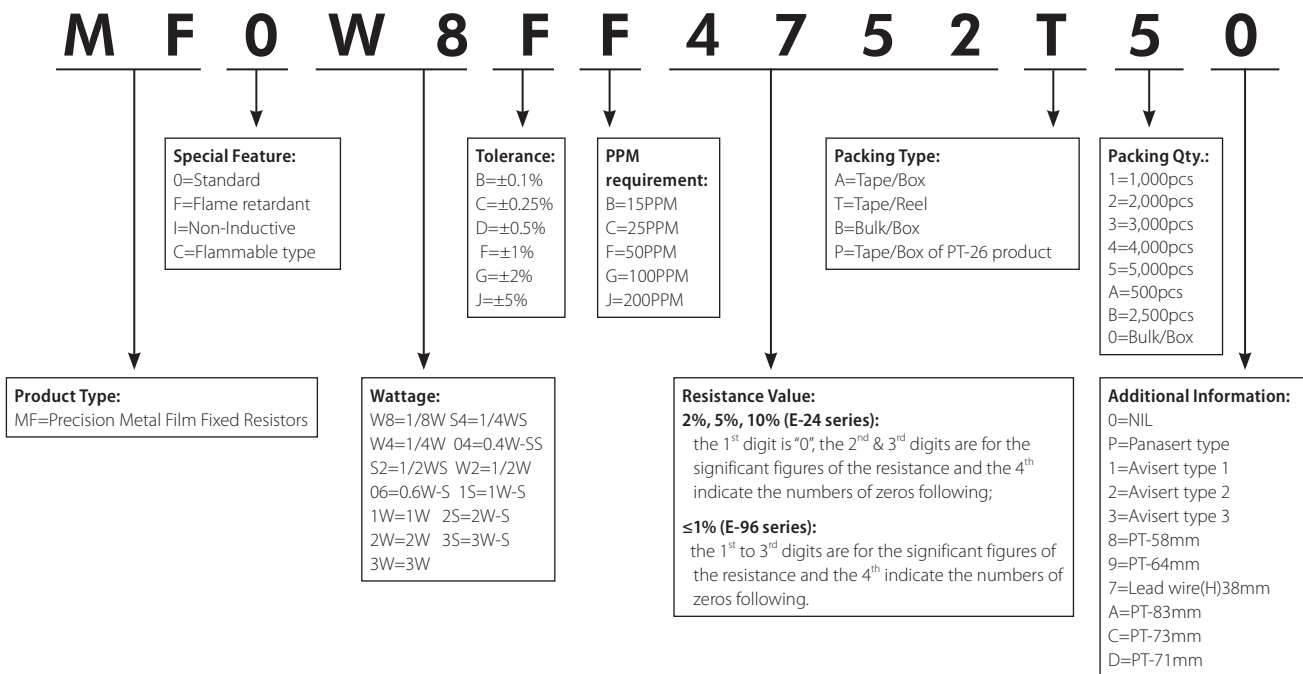
| Part No | Type     | Power Rating<br>70 °C | Dimension (mm) |          |        |     |    | MAX. Working Voltage | MAX. Overload Voltage | Dielectric Withstanding Voltage |
|---------|----------|-----------------------|----------------|----------|--------|-----|----|----------------------|-----------------------|---------------------------------|
|         |          |                       | 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   | MF0W8    | ±1%            | 10Ω~1MΩ          | ±50  | ±0.25%        | 51.1Ω~200KΩ      | ±15 |
| MF0S4   | MF0S4    | ±2%            | 10Ω~1MΩ          | ±100 | ±0.5%         | 51.1Ω~511KΩ      | ±25 |
| MF004   | MF004    | ±5%            | 1Ω~1MΩ           | ±200 | ±0.5%         | 51.1Ω~511KΩ      | ±50 |
| MF0W4   | MF-25    | ±1%            | 10Ω~1MΩ          | ±50  | ±0.1%         | 10Ω~1MΩ          | ±15 |
| MF0S2   | MF-50-S  | ±2%            | 1Ω~1MΩ           | ±100 | ±0.25%        | 10Ω~1MΩ          | ±25 |
| MF006   | MF-60-S  | ±5%            | 1Ω~1MΩ           | ±200 | ±0.5%         | 10Ω~1MΩ          | ±50 |
| MF0W2   | MF-50    | ±1%            | 10Ω~1MΩ          | ±50  | ±0.1%         | 100Ω~330KΩ       | ±15 |
| MF01S   | MF-100-S | ±2%            | 10Ω~1MΩ          | ±100 | ±0.25%        | 51.1Ω~511KΩ      | ±25 |
|         |          | ±5%            | 1Ω~1MΩ           | ±200 | ±0.5%         | 10Ω~1MΩ          | ±50 |
| MF01W   | MF-100   | ±1%            | 51.1Ω~1MΩ        | ±50  | ±0.1%         | 100Ω~330KΩ       | ±15 |
| MF02S   | MF-200-S | ±2%            | 51.1Ω~1MΩ        | ±100 | ±0.25%        | 51.1Ω~511KΩ      | ±25 |
| MF02W   | MF-200   |                |                  |      |               |                  |     |
| MF03S   | MF-300-S | ±5%            | 1Ω~1MΩ           | ±200 | ±0.5%         | 51.1Ω~1MΩ        | ±50 |
| MF03W   | MF-300   |                |                  |      |               |                  |     |

## Performance Specification

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

## Ordering Procedure (Example: MF 1/8W 1% 47.5K $\Omega$ T/R-5000)



## New/Old Part.no Contrast

| New Part.no   | Old Part.no   | New Part.no   | Old Part.no   |
|---------------|---------------|---------------|---------------|
| MF0W8FF***A*0 | MFR0W8F***A*0 | MF01SFF***A*0 | MFR01SF***A*0 |
| MF0S4FF***A*0 | MFR0S4F***A*0 | MF01WFF***A*0 | MFR01WF***A*0 |
| MF004FF***A*0 | MFR004F***A*0 | MF02SFF***A*0 | MFR02SF***A*0 |
| MF0W4FF***A*0 | MFR0W4F***A*0 | MF02WFF***A*0 | MFR02WF***A*0 |
| MF0S2FF***A*0 | MFR0S2F***A*0 | MF03SFF***A*0 | MFR03SF***A*0 |
| MF0W2FF***A*0 | MFR0W2F***A*0 | MF03WFF***A*0 | MFR03WF***A*0 |
| MF006FF***A*0 | MFR006F***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<sup>st</sup>~4<sup>th</sup> digits:
  - a) This is to indicate the SMD Resistor size. Example: 1206, TC05 or HV03;
  - b) For Resistor Network & Coated type, the 1<sup>st</sup>~3<sup>rd</sup> digits are to indicate the product type and the 4<sup>th</sup> digit is the special feature. Example: RNLA = Resistor Network 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<sup>th</sup> digit will be "0". Example: PRW0=PRW type; PRWC=PRWC type.
2. 5<sup>th</sup>~6<sup>th</sup> 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      | 1W | 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<sup>th</sup> digit will be the letters W, S or U to represent the size required & the 6<sup>th</sup> 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<sup>th</sup> digit will be a number or a letter code and the 6<sup>th</sup> 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<sup>th</sup> & 6<sup>th</sup> 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<sup>th</sup> & 6<sup>th</sup> digits will be indicated with "00" and the actual wattage being indicated at the last 3 digits (12<sup>th</sup>~14<sup>th</sup>) 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<sup>th</sup> & 6<sup>th</sup> digit is to be used to denote the number of pins required. Example: 09 = 9pins; 12 = 12pins.
- h) For Jumper Wires the 5<sup>th</sup> & 6<sup>th</sup> 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<sup>th</sup> digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance. As for Metal Film Fixed Resistor products, it is also to denote the standard PPM as follows:

|                           |                         |                   |
|---------------------------|-------------------------|-------------------|
| <b>B</b> = ±0.1% (15PPM)  | <b>G</b> = ±2% (100PPM) | <b>W</b> = ±0.05% |
| <b>C</b> = ±0.25% (25PPM) | <b>J</b> = ±5% (200PPM) | <b>L</b> = ±0.01% |
| <b>D</b> = ±0.5% (50PPM)  | <b>K</b> = ±10%         |                   |
| <b>F</b> = ±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<sup>th</sup> digit still shows "F" but separately note the requirement of "25PPM"

4. The 8<sup>th</sup> to 11<sup>th</sup> digits is to denote the Resistance Value:

- For the standard resistance values of E-24 series in 5% & 10% tolerance, the 8<sup>th</sup> digit is "0", the 9<sup>th</sup> & 10<sup>th</sup> digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the number of zeros following
- For the standard resistance values of E-96 series in  $\leq 2\%$  tolerance, the 8<sup>th</sup> digit to the 10<sup>th</sup> digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the number of zeros following.
- 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.
- The following numbers and the letter codes is to be used to indicate the number of zeros in the 11<sup>th</sup> 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 = $10^{-6}$ |            |

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

Example:

E-24 series

0120 = 12 ohm  
0123 = 12K ohm  
012J = 1.2 ohm

E-96 series

1210 = 121 ohm  
1302 = 13K ohm  
196J = 19.6 ohm

Cement Resistors

W120 = 12 ohm Wire-wound type  
W12J = 1.2 ohm Wire-wound type  
P273 = 27 kohm Power Film type

5. The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits:

- The 12<sup>th</sup> digit is to denote the Packaging type with the following codes:  
A = Tape / Box (Ammono Pack)      C = Bulk in Cassette (for Chip product)  
B = Bulk / Box      T = Tape / Reel      P = Tape / Box of PT-26 product
- The 13<sup>th</sup> 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

TD = T/R-20,000  
TE = T/R-15,000  
T4 = T/R-4,000

Other products

A5 = T/B-5,000  
TB = T/R-2,500  
B0 = B/B

- For the Forming type products, the 13<sup>th</sup> & 14<sup>th</sup> 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 |

- For power rating over 100watt, the 12<sup>th</sup> to the 14<sup>th</sup> digits are to denote the actual wattage of the products:

Example: 100 = 100watt    150 = 150watt    225 = 225watt

- For some products, the 14<sup>th</sup> 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)

- For some products, the 14<sup>th</sup> 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 |        |        |        |        |        |