

# DATA SHEET

## METAL FILM RESISTORS

High Power, Flameproof  
FMP Series

±1%, ±5%

1/2W to 3W

RoHS compliant & Halogen Free





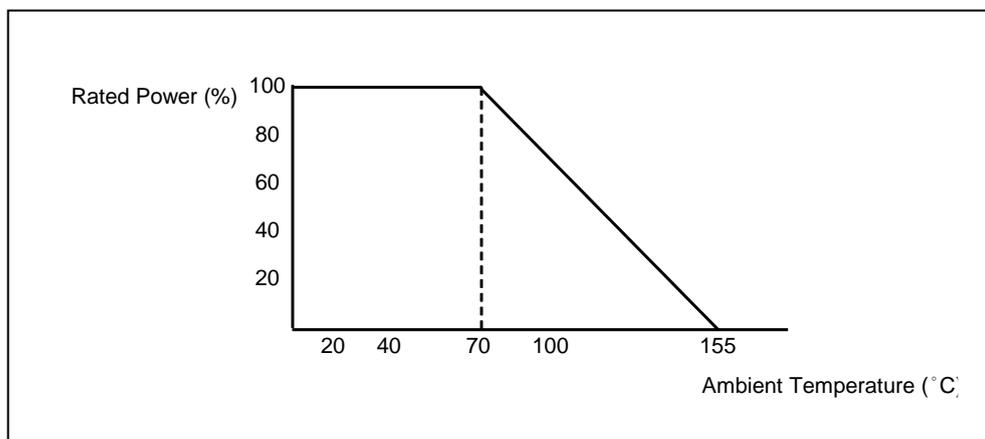
**DIMENSIONS**

Unit: mm



| Ultra Miniature | L          | ψD        | H        | ψd          |
|-----------------|------------|-----------|----------|-------------|
| FMP-50          | 3.4 ± 0.3  | 1.9 ± 0.2 | 28 ± 2.0 | 0.45 ± 0.05 |
| FMP100          | 6.3 ± 0.5  | 2.4 ± 0.2 | 28 ± 2.0 | 0.55 ± 0.05 |
| FMP200          | 9.0 ± 0.5  | 3.9 ± 0.3 | 26 ± 2.0 | 0.55 ± 0.05 |
| FMP3WS          | 11.5 ± 1.0 | 4.5 ± 0.5 | 35 ± 2.0 | 0.8 ± 0.05  |
| FMP300          | 15.5 ± 1.0 | 5.0 ± 0.5 | 33 ± 2.0 | 0.8 ± 0.05  |

**DERATING CURVE**



**ELECTRICAL CHARACTERISTICS**

| CHARACTERISTICS             | FMP-50  | FMP100 | FMP200 | FMP3WS | FMP300 |
|-----------------------------|---|--------|--------|--------|--------|
| Power Rating at 70 °C       | 1/2W  | 1W     | 2W     | 3W     | 3W     |
| Maximum Working Voltage     | 200V  | 350V   | 500V   | 500V   | 750V   |
| Maximum Overload Voltage    | 400V  | 600V   | 700V   | 700V   | 1000V  |
| Voltage Proof on Insulation | 300V  | 500V   | 500V   | 500V   | 500V   |
| Resistance Range            | 1Ω ~ 4M7Ω for E24 & E96 series value                    |        |        |        |        |
| Operating Temp. Range       | - 55°C to +155°C  |        |        |        |        |
| Temperature Coefficient     | ±100ppm/°C , ±50ppm/°C(FMP-50 & FMP100 types, R ≥ 10RΩ) |        |        |        |        |

Note: For resistance value out of above range is by request.

**TEST AND REQUIREMENTS**

| TEST                          | TEST METHOD      | PROCEDURE  | APPRAISE                                  |
|-------------------------------|------------------|--|---|
| Short Time Overload           | IEC 60115-1 4.13 | 2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)                  | ± 1.0 % + 0.05Ω                           |
| Voltage Proof on Insulation   | IEC 60115-1 4.7  | In V-Block for 60 sec. test voltage as above table                                 | No Breakdown                              |
| Temperature Coefficient       | IEC 60115-1 4.8  | Between -55°C to +155°C  | By Type                                   |
| Insulation Resistance         | IEC 60115-1 4.6  | In V-Block for 60 sec.   | >1,000MΩ                                  |
| Solderability                 | IEC 60115-1 4.17 | 245±5°C for 3±0.5 Sec.   | 95% Min. coverage                         |
| Solvent Resistance of Marking | IEC 60115-1 4.30 | IPA for 5±0.5 Min. with ultrasonic   | No deterioration of coatings and markings |
| Robustness of Terminations    | IEC 60115-1 4.16 | Direct load for 10 Sec. in the direction of the terminal leads                     | ≥2.5Kg(24.5N)                             |
| Periodic-pulse Overload       | IEC 60115-1 4.39 | 4 times RCWV(or Umax., whichever less) 10,000 cycles (1 Sec. on, 25 Sec.off)       | ±1.0%+0.05Ω                               |
| Damp Heat Steady State        | IEC 60115-1 4.24 | 40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV(or Umax., whichever less) | ±2.0%+0.05Ω                               |
| Endurance at 70°C             | IEC 60115-1 4.25 | 70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)      | ±2.0%+0.05Ω                               |
| Temperature Cycling           | IEC 60115-1 4.19 | -55°C → Room Temp. → +155°C → Room Temp.(5 cycles)                                 | ±1.0%+0.05Ω                               |
| Resistance to Soldering Heat  | IEC 60115-1 4.18 | 260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body                   | ±0.25%+0.05Ω                              |
| Accidental Overload Test      | IEC 60115-1 4.26 | 4 times RCWV(or Umax., whichever less) for 1 Min.                                  | No evidence of flaming or arcing          |

Note:

**RCWV (Rated Continuous Working Voltage ):**

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

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

or max. working voltage whichever is less

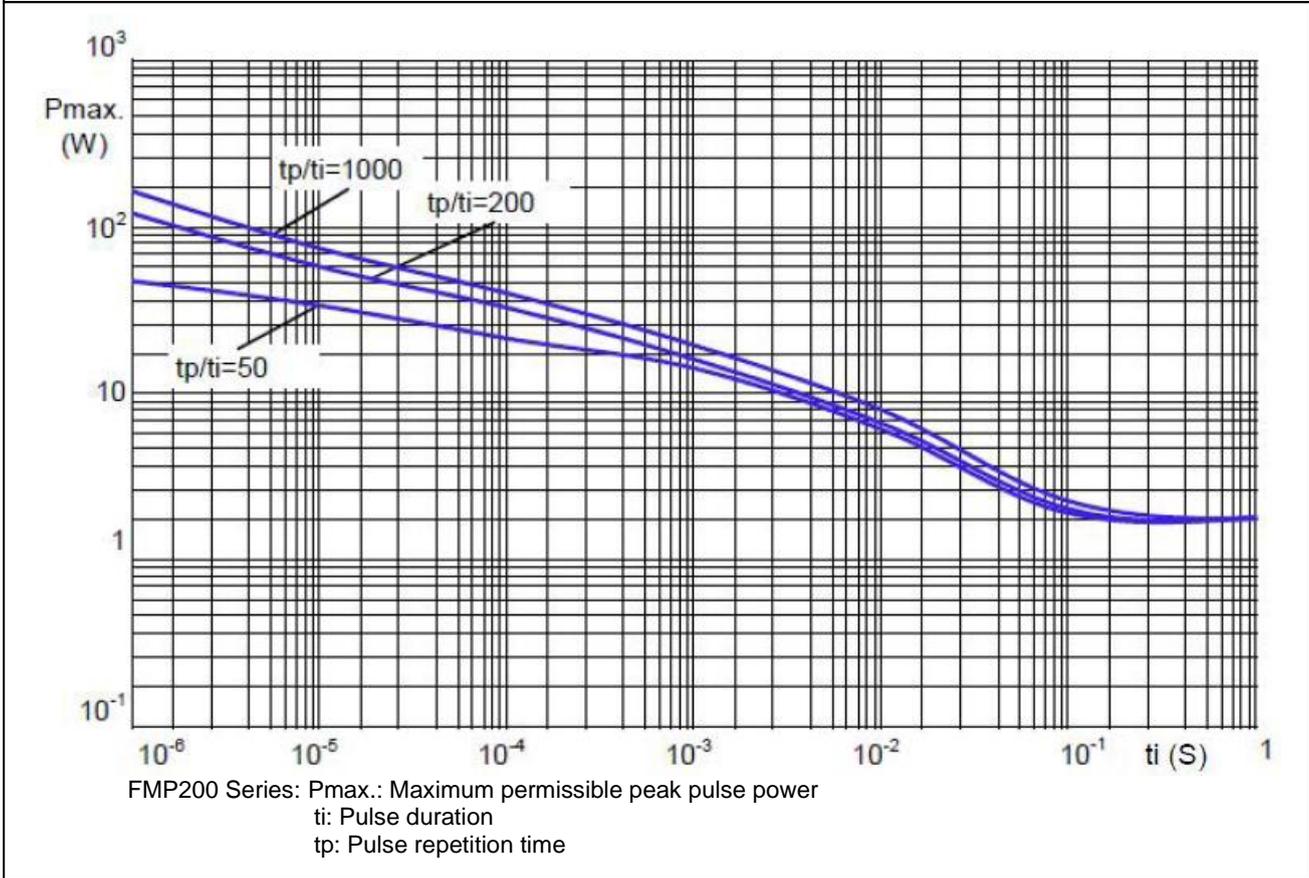
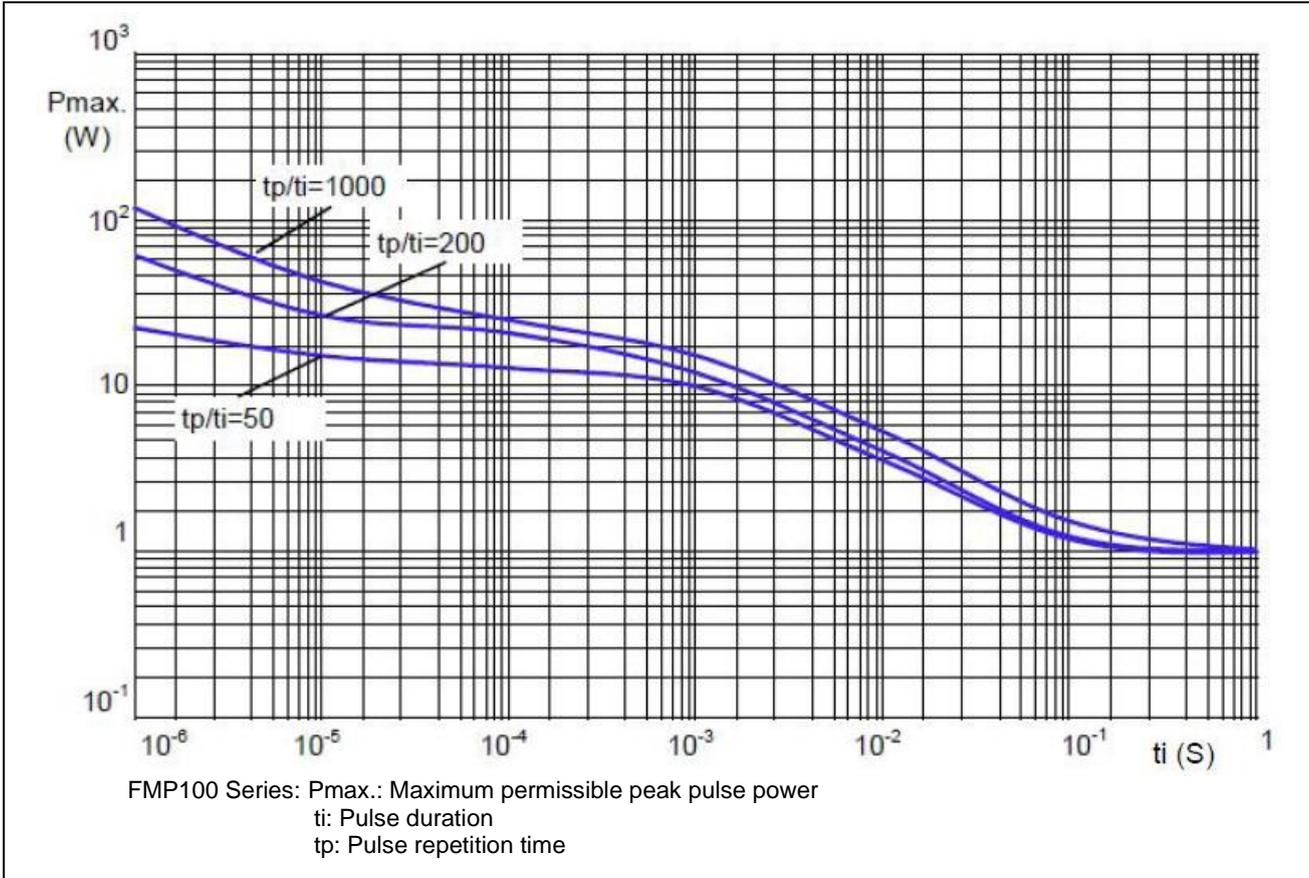
Where

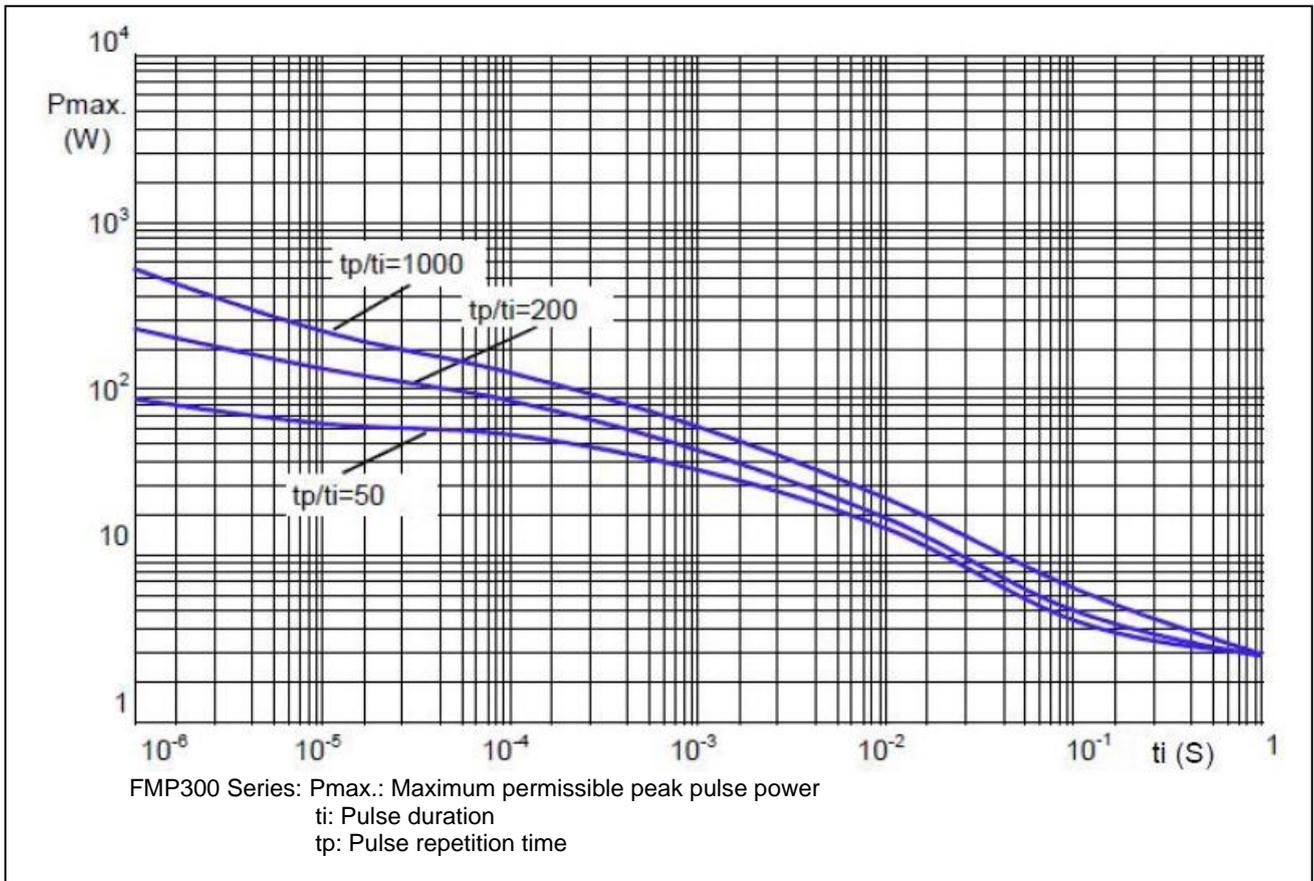
V=Continuous rated DC or  
AC (rms) working voltage (V)

P=Rated power (W)

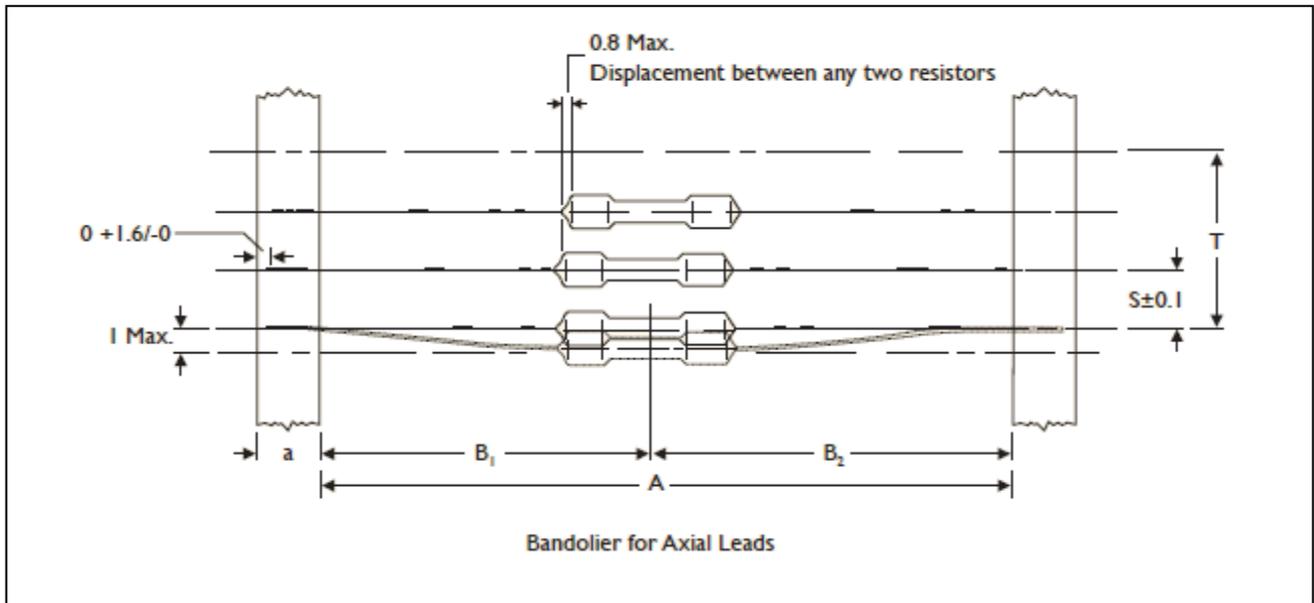
R=Resistance value (Ω)

**PULSE DIAGRAMS**





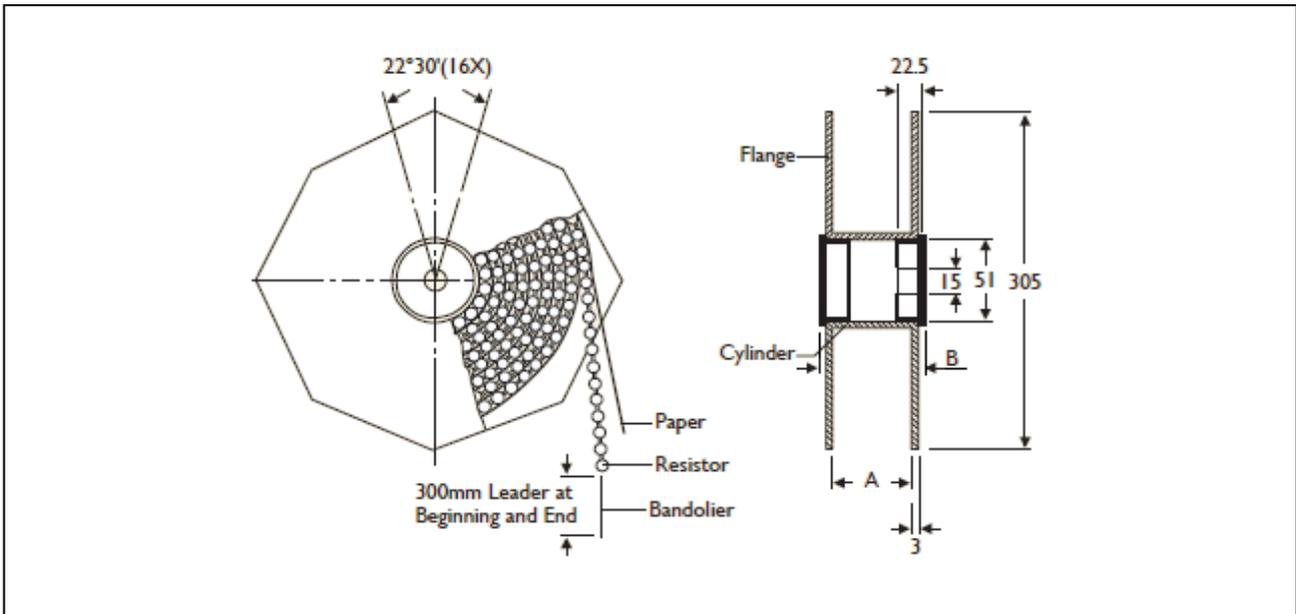
**AXIAL / REEL TAPE SPECIFICATION**



Unit: mm

| Ultra Miniature  | a       | A          | B1-B2 (Max.) | S (spacing) | T (max. deviation of spacing)               |
|------------------|---------|------------|--------------|-------------|---|
| FMP-50           | 6 ± 0.5 | 52.4 ± 1.5 | 1.2          | 5           | 0.5 mm per 5 spacing<br>1 mm per 10 spacing |
|                  |         | 26.0 ± 1.5 | 1            |             |   |
| FMP100<br>FMP200 | 6 ± 0.5 | 52.4 ± 1.5 | 1.2          | 5           |   |
| FMP3WS           | 6 ± 0.5 | 73.0 ± 1.5 | 1.5          | 5           |   |
|                  |         | 52.4 ± 1.5 | 1.2          |             |   |
| FMP300           | 6 ± 0.5 | 73.0 ± 1.5 | 1.5          | 10          |   |

**TAPE ON REEL PACKING**

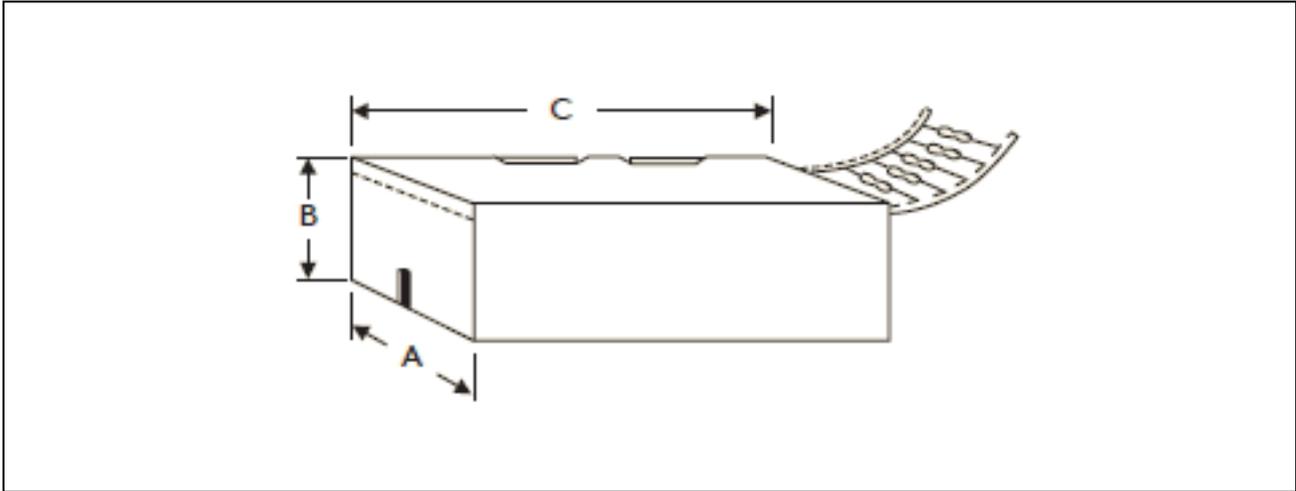


TYPE

Unit: mm/piece

| Ultra Miniature | Across Flange(A) | B    | Quantity Per Reel |
|-----------------|------------------|------|-------------------|
| FMP-50          | 66.5             | 75.5 | 5,000             |
| FMP100          | 66.5             | 75.5 | 5,000             |
| FMP200          | 66.5             | 75.5 | 2,500             |
| FMP3WS          | 87               | 96   | 2,000             |
| FMP300          | 87               | 96   | 1,000             |

**TAPE ON BOX PACKING**



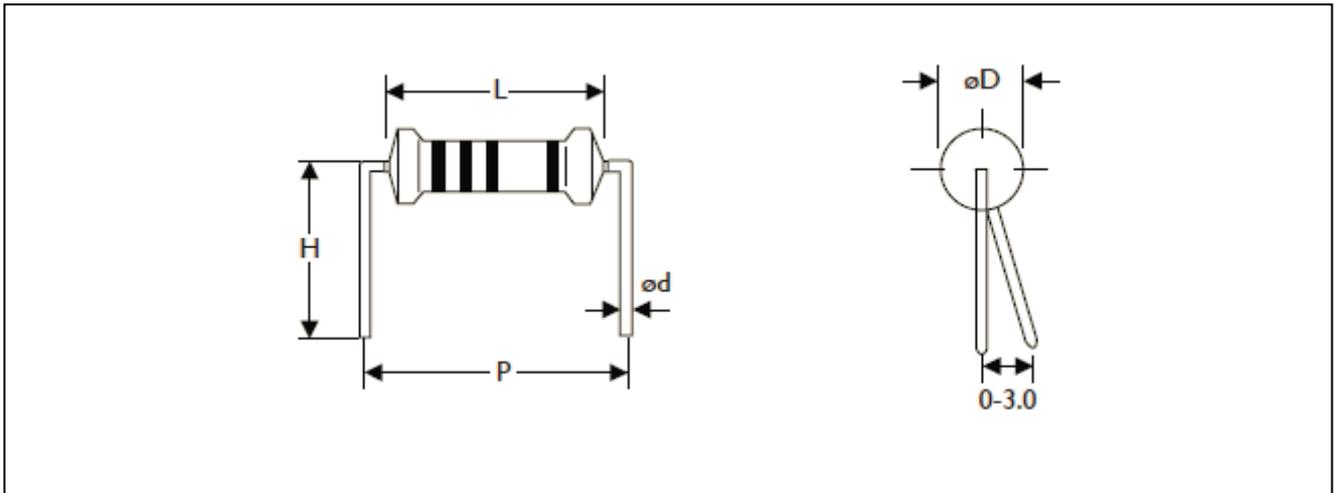
| TYPE            | DIMENSIONS |     |     | Quantity Per Box |
|-----------------|------------|-----|-----|------------------|
|                 | A          | B   | C   |                  |
| Ultra Miniature |            |     |     |                  |
| FMP-50          | 81         | 70  | 260 | 5,000            |
| FMP100          | 81         | 104 | 260 | 5,000            |
| FMP200          | 73         | 45  | 258 | 1,000            |
| FMP3WS          | 103        | 78  | 260 | 1,000            |
| FMP300          | 103        | 78  | 260 | 1,000            |

**BULK PACKING**

| Ultra Miniature | Piece/Per Inner Box | Bag/Per Inner Box | Piece Per Bag |
|-----------------|---------------------|-------------------|---------------|
| FMP-50          | 10,000              | 10                | 1,000         |
| FMP100          | 10,000              | 10                | 1,000         |
| FMP200          | 5,000               | 5                 | 1,000         |
| FMP3WS          | 2,000               | 4                 | 500           |
| FMP300          | 1,000               | 2                 | 500           |

**FORMING**

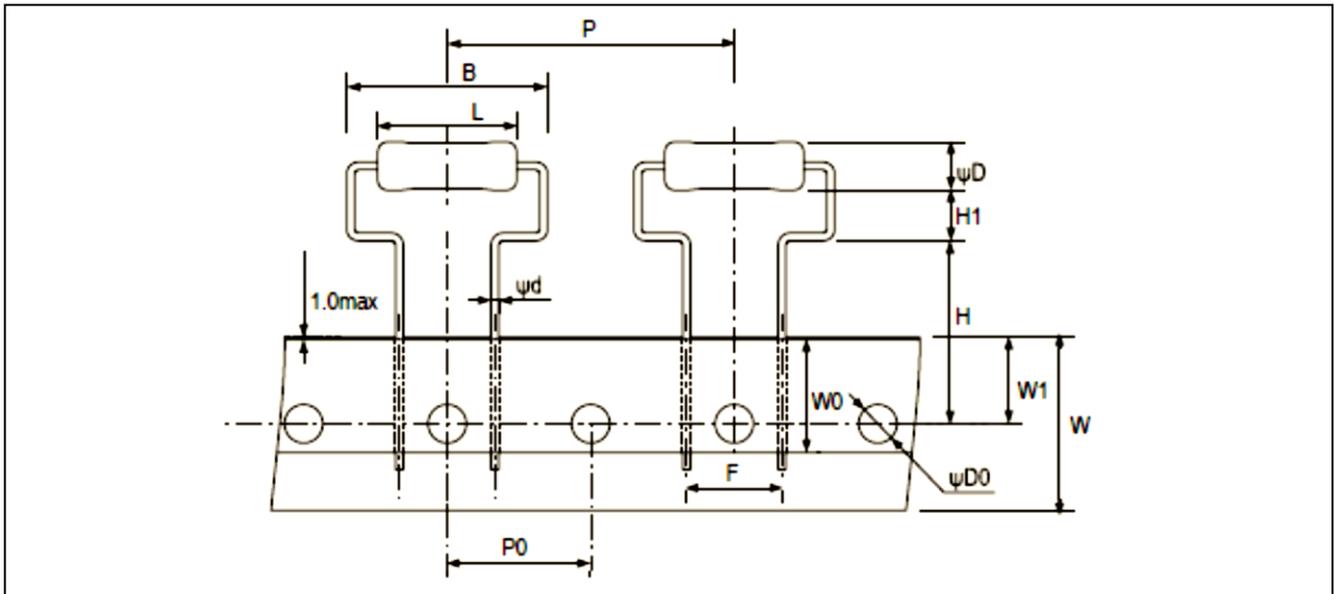
**M TYPE**



| TYPE            | DIMENSIONS |           |             |          |          | Unit: mm |
|-----------------|------------|-----------|-------------|----------|----------|----------|
|                 | L          | ψD        | ψd          | P        | H        |          |
| Ultra Miniature |            |           |             |          |          |          |
| FMP-50          | 3.4± 0.3   | 1.9 ± 0.2 | 0.45 ± 0.05 | 6.0 ± 1  | 10.0 ±1  |          |
| FMP100          | 6.3 ± 0.5  | 2.4 ± 0.2 | 0.55 ± 0.05 | 10.0 ± 1 | 10.0 ± 1 |          |
| FMP300          | 15.5 ± 1.0 | 5.0± 0.5  | 0.8 ± 0.05  | 20.0 ± 1 | 15.0 ± 1 |          |

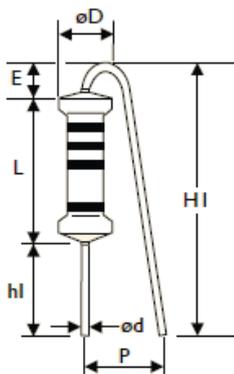


**MHC TYPE**

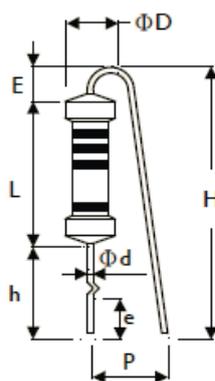


| TYPE      | DIMENSIONS |          |          |          |          |          |          |          | Unit: mm |
|-----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Miniature | L          | ψD       | ψd       | B        | H        | H1       | P        | P0       |          |
|           | 15.5±1.0   | 5.0±0.5  | 0.8±0.05 | 21.0Max. | 19.0±1.0 | 5.25±1.0 | 30.0±1.0 | 15.0±0.3 |          |
| FMP300    | F          | W        | W0       | W1       | ψD0      |          |          |          |          |
|           | 10.0±0.5   | 18.0±0.5 | 5.0Min.  | 9.0±0.5  | 4.0±0.2  |          |          |          |          |

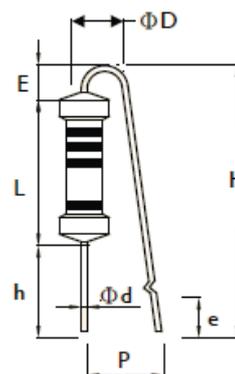
**F TYPE**



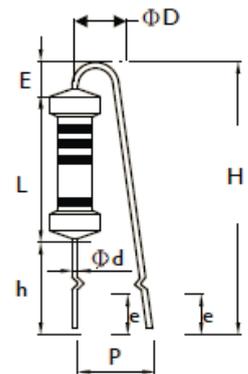
**FK TYPE**



**FFK TYPE**

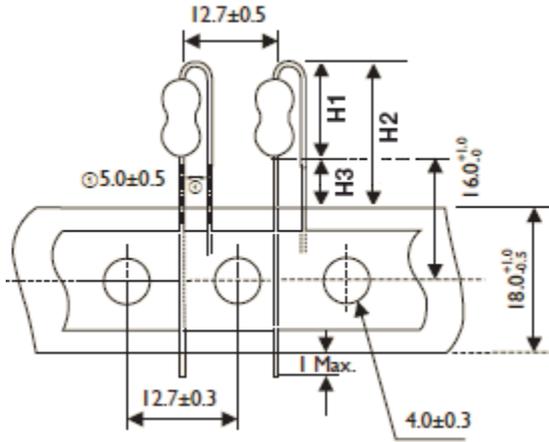


**FKK TYPE**



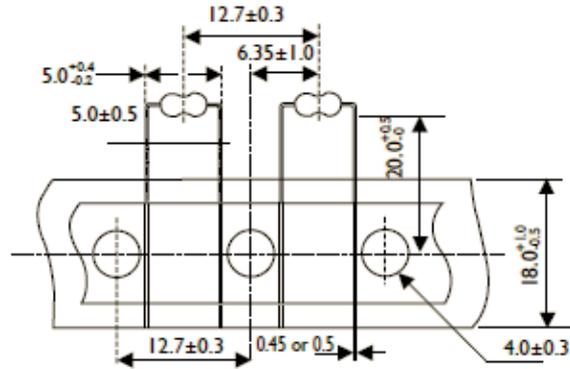
| TYPE            | DIMENSIONS |         |           |     |     |        |     |         |        |       | Unit: mm |
|-----------------|------------|---------|-----------|-----|-----|--------|-----|---------|--------|-------|----------|
| Ultra Miniature | L          | ψD      | ψd        | P   | h   | H Max. | h1  | H1 Max. | E Max. | e     |          |
|                 | 9.0±0.5    | 3.9±0.3 | 0.55±0.05 | 6±1 | -   | -      | 5±1 | 18.5    | 3.5    | -     |          |
| FMP300          | 15.5±1     | 5.0±0.5 | 0.8±0.05  | 8±1 | 8±1 | 28     | 5±1 | 25      | 3.5    | 3.5±1 |          |

**FT TYPE (Taping Pack)**



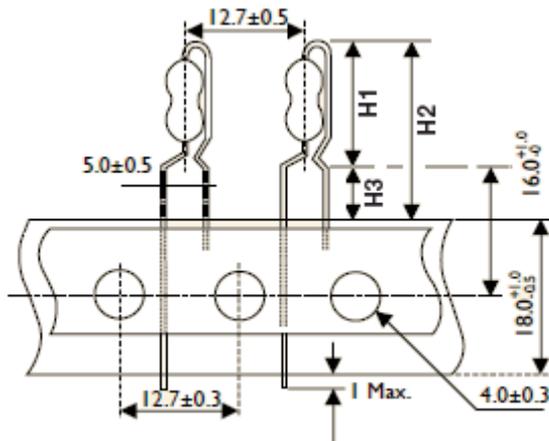
**MT TYPE (Taping Pack)**

Rated Watts : 0.5W

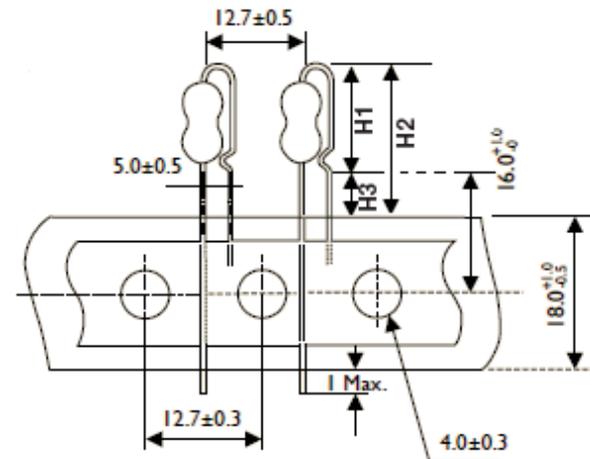


| TYPE                   | DIMENSIONS     |                |                | Unit: mm |
|------------------------|----------------|----------------|----------------|----------|
| <b>Ultra Miniature</b> | <b>H1 Max.</b> | <b>H2 Max.</b> | <b>H3 Max.</b> |          |
| FMP100                 | 10             | 18.5           | 8.5            |          |
| FMP200                 | 13             | 21.5           | 8.5            |          |
| FMP3WS                 | 16             | 24.5           | 8.5            |          |

**PN TYPE (Taping Pack)**



**AV TYPE (Taping Pack)**



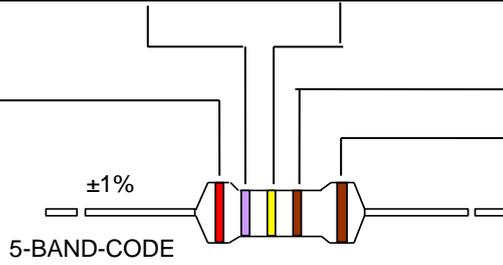
| TYPE                   | DIMENSIONS     |                |                | Unit: mm |
|------------------------|----------------|----------------|----------------|----------|
| <b>Ultra Miniature</b> | <b>H1 Max.</b> | <b>H2 Max.</b> | <b>H3 Max.</b> |          |
| FMP100                 | 13             | 21.5           | 8.5            |          |
| FMP200                 | 17             | 25.5           | 8.5            |          |
| FMP3WS                 | 19             | 27.5           | 8.5            |          |

| TYPE                   | DIMENSIONS     |                |                | Unit: mm |
|------------------------|----------------|----------------|----------------|----------|
| <b>Ultra Miniature</b> | <b>H1 Max.</b> | <b>H2 Max.</b> | <b>H3 Max.</b> |          |
| FMP100                 | 11.5           | 20             | 8.5            |          |
| FMP200                 | 14.5           | 23             | 8.5            |          |
| FMP3WS                 | 17.5           | 26             | 8.5            |          |

**MARKING**



| COLOR  | 1st BAND | 2nd BAND | 3rd BAND | MULTIPLIER | TOLERANCE   |
|--------|----------|----------|----------|------------|-------------|
| BLACK  | 0        | 0        | 0        | 1Ω         |             |
| BROWN  | 1        | 1        | 1        | 10Ω        | ± 1% ( F )  |
| RED    | 2        | 2        | 2        | 100Ω       |             |
| ORANGE | 3        | 3        | 3        | 1KΩ        |             |
| YELLOW | 4        | 4        | 4        | 10KΩ       |             |
| GREEN  | 5        | 5        | 5        | 100K       |             |
| BLUE   | 6        | 6        | 6        | 1MΩ        |             |
| VIOLET | 7        | 7        | 7        | 10MΩ       |             |
| GREY   | 8        | 8        | 8        | 0.001Ω     |             |
| WHITE  | 9        | 9        | 9        | 0.0001Ω    |             |
| GOLD   |          |          |          | 0.1Ω       | ± 5 % ( J ) |
| SILVER |          |          |          | 0.01Ω      |             |



**REVISION HISTORY**

| REVISION  | DATE         | CHANGE NOTIFICATION | DESCRIPTION  |
|-----------|--------------|---------------------|--|
| Version 4 | Aug.31, 2023 |                     | - Update legal disclaimer and footer version numbers |
| Version 3 | May.25, 2023 |                     | - Updated the tape specification of FMP300           |
| Version 2 | Oct.25, 2021 |                     | - Add F type for FMP200 series                       |
| Version 1 | Oct.12, 2021 | -                   | - Updated the tape specification of FMP200           |
| Version 0 | Aug.2, 2021  | -                   | - First issue of this specification                  |

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