



深圳市咸阳华星机电有限公司

SHENZHEN XIANYANG HUAXING MACHINERG & ELECTRONIC.CO;LTD

承认书

(APPROVE SHEET)

客 户(Customer): _____

品 名(Description): MF 金属膜电阻器

规格(Specification): _____

客户料号(Cus. P/N): _____

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MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

1. 一般事项 General

1.1 适用 Scope

本承认书适用于 [金属皮膜固定电阻器], 符合环境关联物质要求之 RoHS 测试。

This specification is available for **Metal Film Fixed Resistor**, it accords with RoHS test of Environment related substance requirement.

1.2 形名(例) Type designation (example)

依使用种类、额定电力、公称电阻值、容许误差及型状而区别,其构造如下。

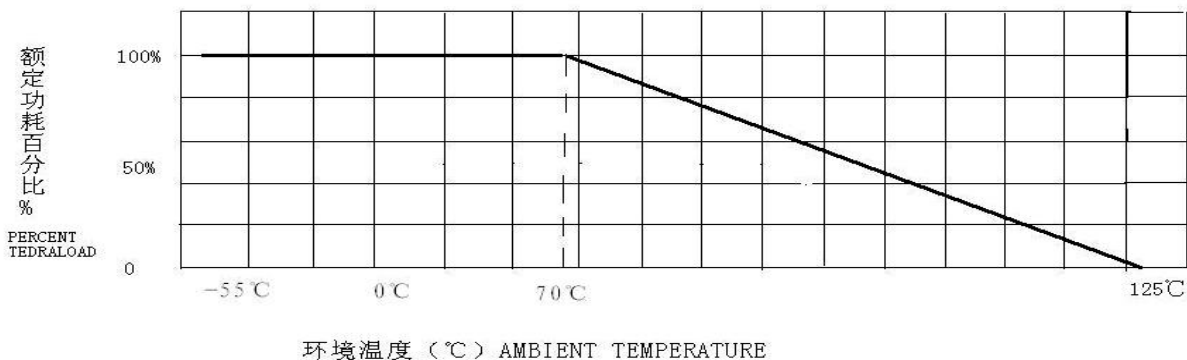
The type designation shall be in the following form and as specified.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|--------------------------------------|------------------------------------|------------|-------|------|-----|----|-----|----|-----|----|-----|---|-------------|-------------|---|---|------|---|------|---|------|---|------------|------------|--------------|----------------|----------------|----------------|
| MF | 2 W | 100K | ± 1% | T62 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 种类 Type | 额定电力 Rated power | 公称电阻值 Nominal resistance value | 电阻值容许误差 Resistance tolerance | 形状 Form | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <td>标准 Normal</td> <td>小型 Small</td> </tr> <tr> <td>1/4W</td> <td>1/2WS</td> </tr> <tr> <td>1/2W</td> <td>1WS</td> </tr> <tr> <td>1W</td> <td>2WS</td> </tr> <tr> <td>2W</td> <td>3WS</td> </tr> <tr> <td>3W</td> <td>5WS</td> </tr> </table> | 标准 Normal | 小型 Small | 1/4W | 1/2WS | 1/2W | 1WS | 1W | 2WS | 2W | 3WS | 3W | 5WS | <table border="1"> <tr> <td>E-24 Series</td> </tr> <tr> <td>E-96 Series</td> </tr> </table> | E-24 Series | E-96 Series | <table border="1"> <tr> <td>J</td> <td>± 5%</td> </tr> <tr> <td>G</td> <td>± 2%</td> </tr> <tr> <td>F</td> <td>± 1%</td> </tr> </table> | J | ± 5% | G | ± 2% | F | ± 1% | <table border="1"> <tr> <td>P 型 P Type</td> </tr> <tr> <td>M 型 M Type</td> </tr> <tr> <td>MB 型 MB Type</td> </tr> <tr> <td>FK1 型 FK1 Type</td> </tr> <tr> <td>FK2 型 FK2 Type</td> </tr> <tr> <td>FKK 型 FKK Type</td> </tr> </table> | P 型 P Type | M 型 M Type | MB 型 MB Type | FK1 型 FK1 Type | FK2 型 FK2 Type | FKK 型 FKK Type |
| 标准 Normal | 小型 Small | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1/4W | 1/2WS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1/2W | 1WS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1W | 2WS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2W | 3WS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3W | 5WS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-24 Series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-96 Series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J | ± 5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | ± 2% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | ± 1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P 型 P Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M 型 M Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MB 型 MB Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FK1 型 FK1 Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FK2 型 FK2 Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FKK 型 FKK Type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

1.3 额定电力 Rated power

额定电力系应在周围温度 70°C 可以连续负载的最大电力, 如表-1; 但周围温度如超过 70°C 时之额定电力则依图一的电力递减曲线实施。

Rated power is maximum power which can be continuously loaded at specified ambient temperature 70°C, as Table-1; however when the ambient temperature exceeds 70°C, rated power should be determined from the derating curve of Fig.1.



1.4 使用环境温度: -55°C ~ +125°C Operating ambient temperature -55°C ~ +125°C



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

- 1.5 功率因数计算公式: $E = \sqrt{(P \times R)}$ Where E: 额定电压 Rated voltage(V)
P: 定格电力 Rated power(W)
R: 公称电阻值 Nominal resistance(Ω)

| 种类 Type | 定格电力 Rated power | 最高使用电压 Maximum working voltage | 最高过负荷电压 Maximum overload voltage |
|-------------|---------------------|--------------------------------------|--|
| Normal size | MF1/8W | 0.125W | 150V |
| | MF1/4W | 0.25W | 250V |
| | MF1/2W | 0.5W | 300V |
| | MF1W | 1W | 350V |
| | MF2W | 2W | 500V |
| | MF3W | 3W | 500V |
| | MF5W | 5W | 500V |

2. 构造 Construction

2.1 外形尺寸 External dimensions

参照本承认书的 [5. 外形尺寸]。

The dimensions shall be satisfied with [5. External dimensions].

2.2 构造图 Structure diagram

MF 系列之金属皮膜固定电阻器系按下表的材料而构成:

The construction of resistor (MF series) shall be as follows:

2.3 外观颜色 Resistor body color: 蓝色(Blue)





MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

3. 参数特性 Characteristics

表-3 Table-3

| 项目 Item | 规格值 Performance | 试验方法(依据 JIS C 5202) Test methods(Conform to JIS C 5202) |
|--|--|---|
| 温度系数 Temperature Coefficient | ±200PPM/°C 以内。 Within ±200PPM/°C . | 5.2 项参照 Comply with 5.2 $\frac{R_1 - R_0}{R_0(T_1 - T_0)} \times 10^6 (\text{PPM}/^\circ\text{C})$ R ₀ :室温(T ₀)所测量之电阻值。 R ₁ :室温+100°C(T ₁)后所测量之电阻值。 R ₀ :Resistance value at room temp.(T ₀). R ₁ :Resistance value at room temp.plus 100°C (T ₁) |
| 短时间过负荷 Short time overload | ±(1%+0.05 Ω)以内。 不得有机械的损伤。 Within ±(1%+0.05 Ω). No evidence of mechanical damage. | 5.5 项参照 Comply with 5.5 额定电压×2.5 倍,5 秒。 不可超过最高过负荷电压(见表-1) Rated voltage×2.5 times,5s But not to exceed maximum overload voltage.(See table-1) |
| 绝缘电阻 Insulation Resistance | 10 ⁴ MΩ 以上。 10 ⁴ MΩ or more. | 5.6 项参照 Comply with 5.6 置于 V 型槽方法。 施加直流电压 500V 60 秒。 V-block method Resistor shall be tested at DC 500V for 60 seconds. |
| 耐电压 Dielectric Withstanding Voltage | 无电弧放电、烧损及绝 缘破坏等异状。 No evidence of flashover mechanical damage, arcing or insulation breakdown. | 5.7 项参照 Comply with 5.7 常压,置于 V 型槽方法。 施加个别规定之交流电压 60 秒。(见表-1) Constant pressure, V-block method Resistor shall be tested at AC potential respectively for 60 seconds. (See table-1) |
| 断续过负荷 Pulse overload | ±(2%+0.05 Ω)以内。 Within ±(2%+0.05 Ω) | 5.8 项参照 Comply with 5.8 额定电压×4 倍,10000 回(1 秒 ON,25 秒 OFF)。 不可超过最高断续电压(见表-1) Rated voltage X 4 times, 10000 cyc.(1s ON, 25s OFF) But not to exceed maximum pulse voltage. (See table-1) |



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

| 项目 Item | 规格值 Performance | 试验方法(依据 JIS C 5202) Test methods(Conform to JIS C 5202) | | | |
|---------------------------------------|---|---|-------------------|--------------------------------|----------------|
| 端子强度 Terminal strength | 端子不得断裂及松弛。 No evidence of mechanical damage. | 6.1 项参照 Comply with 6.1 | | | |
| | | 引张强度 Tensile strength | 线径 mm Diameter | 引张力 Tensile force N(kgf) | 时 间 Time |
| | | | Φ0.38mm~0.50mm | 5(0.51) | 10±1 second |
| Φ0.50mm~0.80mm | 10(1.02) | | | | |
| | | 扭转强度：自电阻体起约 6mm~6.5mm 处之端子线,以约 0.75mm 曲率半径弯曲 90 度,其次由弯曲处向端子线先端 1.2±0.4mm 处挟定端子引出轴,作回转轴,以约 5 秒时间沿直面回转 360° 再逆转 360°,如此施行回逆转 2 次,不可发生折断及松动现象。 Tensional strength: To bend the lead wire at the point of about 6mm~6.5mm from resistor body. about 0.75mm curvature radii to 90° then catch the wire at 1.2±0.4mm apart from the bend point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of same 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn for 2 times without causing any break and looseness. | | | |
| 焊锡耐热性 Resistance to soldering heat | ±(1%+0.05 Ω)以内。 不得有机械的损伤。 Within ±(1 %+0.05 Ω) No evidence of mechanical damage. | 6.4 项参照 Comply with 6.4 350±10℃, 3±1.0 秒, 试验后放置半小时。 350±10℃, 3±1.0s After test leave for 0.5h. | | | |
| 焊锡附着性 Solderability | 导线至少 95%以上新锡覆盖。 Covered with new solder by 95% at least. | 6.5 项参照 Comply with 6.5 焊锡温度: 255±5℃。 浸锡时间: 3±1.0 秒。 Test temperature of solder:255±5℃ Dipping time in solder:3±1.0 s | | | |
| 耐溶剂性 Resistance to solvent | 涂装及色码不得脱落。 No deterioration of protective coating and markings. | 6.9 项参照 Comply with 6.9 放入酒精溶剂之超音波机内, 保持 3 分钟。 Specimens shall be immersed in a bath of isoproalcohol completely for 3 minutes with ultrasonic. | | | |



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

| 项目 Item | 规格值 Performance | 试验方法(依据 JIS C 5202) Test methods(Conform to JIS C 5202) |
|------------------------------------|--|--|
| 温度循环 Temperature cycle | $\pm(2\%+0.05\ \Omega)$ 以内。 不得有机械的损伤。 Within $\pm(2\%+0.05\ \Omega)$ No evidence of mechanical damage. | 7.4 项参照 Comply with 7.4 低温侧: $-55^{\circ}\text{C}/30$ 分, 室温: 10~15 分钟 高温侧: $+80^{\circ}\text{C}/30$ 分, 室温: 10~15 分钟 5 回 Low side: $-55^{\circ}\text{C}/30\text{min}$, Room temp.: 10 to 15min High side: $80^{\circ}\text{C}/30\text{min}$, Room temp.: 10 to 15min 5 cycles |
| 耐湿负荷寿命 Load life in humidity | $\pm(5\%+0.05\ \Omega)$ 以内。 Within $\pm(5\%+0.05\ \Omega)$ | 7.9 项参照 Comply with 7.9 $40\pm 2^{\circ}\text{C}$, 湿度 90~95%, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) $40\pm 2^{\circ}\text{C}$, 90 to 95%RH, 1000h Rated voltage (90 min ON, 30 min OFF) |
| 负荷寿命 Load life | $\pm(5\%+0.05\ \Omega)$ 以内。 Within $\pm(5\%+0.05\ \Omega)$ | 7.10 项参照 Comply with 7.10 $70\pm 3^{\circ}\text{C}$, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) $70\pm 3^{\circ}\text{C}$, 1000h Rated voltage (90 min ON, 30 min OFF) |

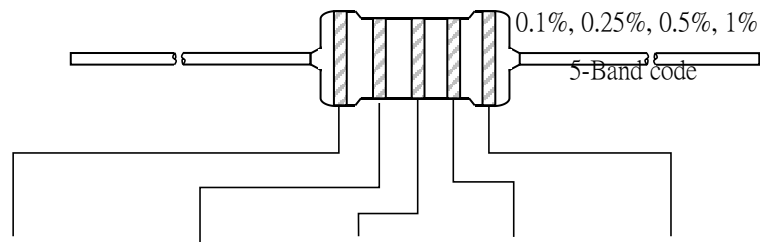


MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

4. 表示 Indication

色码 Color Code



| 颜色 Color | 第 1 数字 1 st figure | 第 2 数字 2 nd figure | 第 3 数字 3 RD figure | 倍 率 Multiplier | 误差率 Tolerance |
|----------|----------------------------------|----------------------------------|----------------------------------|-------------------|------------------|
| 黑 Black | 0 | 0 | 0 | 10^0 | |
| 棕 Brown | 1 | 1 | 1 | 10^1 | ±1% (F) |
| 红 Red | 2 | 2 | 2 | 10^2 | ±2% (G) |
| 橙 Orange | 3 | 3 | 3 | 10^3 | |
| 黄 Yellow | 4 | 4 | 4 | 10^4 | |
| 绿 Green | 5 | 5 | 5 | 10^5 | ±0.5% (D) |
| 蓝 Blue | 6 | 6 | 6 | 10^6 | ±0.25% (C) |
| 紫 Violet | 7 | 7 | 7 | 10^7 | ±0.1% (B) |
| 灰 Gray | 8 | 8 | 8 | | ±0.05% (A) |
| 白 White | 9 | 9 | 9 | | |
| 金 Gold | | | | 10^{-1} | ±5% (J) |
| 银 Silver | | | | 10^{-2} | ±10% (K) |
| 无 Plain | | | | | ±20% (M) |



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

5. 外形寸法 External dimensions

5.1 散装 P 型 P type

P Type



| 种类 Type | | 尺寸 Dimensions | | | | |
|--------------------|-------------------|---------------|-------------|---------------|------------------|-------------|
| 普通型 Normal Size | 小型化 Small Size | I | $L \pm 1.0$ | ψD | $\psi d \pm 0.1$ | $I \pm 2.0$ |
| MF1/8W、1/6W | MF1/4WS | 60 | 3.2 | 1.8 ± 0.5 | 0.40 | 28 |
| MF1/4W | MF1/2WS | 60 | 6.5 | 2.3 ± 0.5 | 0.40 | 28 |
| MF1/2W | MF1WS | 60 | 9.0 | 3.2 ± 0.5 | 0.50 | 28 |
| MF1W | MF2WS | 60 | 11.5 | 4.5 ± 1.0 | 0.60 | 25 |
| | | 73 | 11.5 | 4.5 ± 1.0 | 0.60 | 31 |
| MF2W | MF3WS | 70 | 15.5 | 5.0 ± 1.0 | 0.70 | 25 |
| | | 81 | 15.5 | 5.0 ± 1.0 | 0.70 | 33 |
| | | 94 | 15.5 | 5.0 ± 1.0 | 0.70 | 40 |
| MF3W | MF5WS | 94 | 17.5 | 6.0 ± 1.0 | 0.70 | 38 |
| MF5W | | 94 | 24.5 | 8.0 ± 1.0 | 0.70 | 35 |

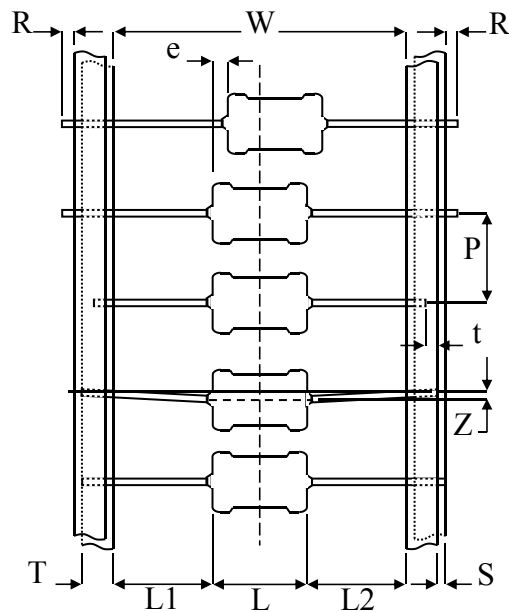


MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

5.2 带装 Axial Lead Taping

Txx Type



单位：mm
Unit：mm

| 种类 Type | | 带状 Taping | 尺寸 Dimensions | | | | | | | | | |
|-----------------|----------------|-----------|---------------|--------------------------------|--------|------------|-------|--------|--------|--------|--------|--------|
| 普通型 Normal Size | 小型化 Small Size | | L | W | P | L1-L2 Max. | T | Z Max. | R Max. | t Max. | e Max. | S Max. |
| 1/6W | | T52 | 3.2±0.5 | 52±1.0 | 5±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 1/4W | 1/2WS | T26 | 6.5±0.5 | 26 ⁺¹ ₋₀ | 5±0.5 | 0.5 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| | | T52 | 6.5±0.5 | 52±1.0 | 5±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 1/2W | 1WS | T52 | 9.0±1.0 | 52±1.0 | 5±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 1W | 2WS | T52 | 11.5±1.0 | 52±1.0 | 5±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| | | T67 | 11.5±1.0 | 67±1.0 | 5±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 2W | 3WS | T52 | 15.5±1.0 | 52±1.0 | 10±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| | | T73 | 15.5±1.0 | 73±1.0 | 10±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| | | T84 | 15.5±1.0 | 84±1.0 | 10±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 3W | 5WS | T84 | 17.5±1.5 | 84±1.0 | 10±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |
| 5W | | T84 | 24.5±1.5 | 84±1.0 | 10±0.5 | 1.0 | 6±0.5 | 1.2 | 0 | 3.0 | 0.6 | 0.5 |

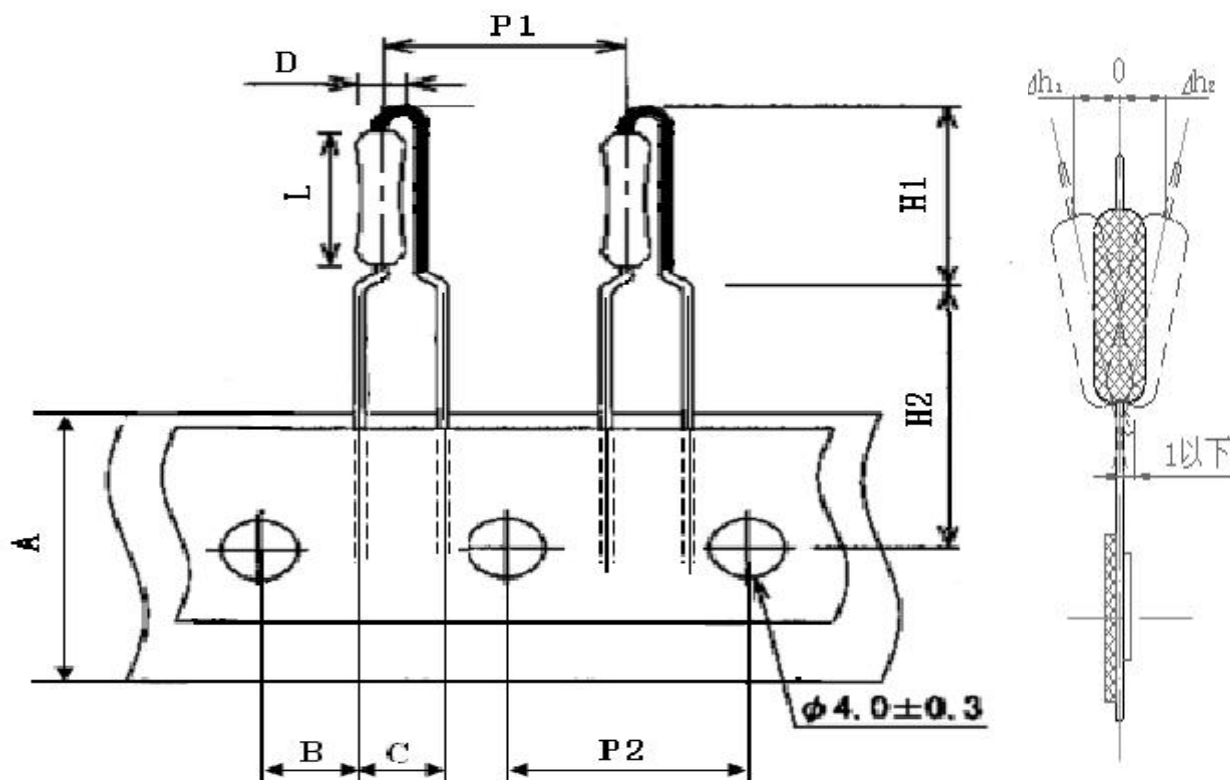


MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

5.3 FAT 立式编带形状适用于 (1/2W、1WS、1W、2W、3W 功率电阻)

注：引线涂脚漆的客户下单需备注说明，否则默认为不涂装脚漆。



| 规格 | 尺寸 (mm) | | | | | | |
|------|----------------------|----------------|---------------|----------------|----------------|-----------------|----------------------|
| | A | B | C | P1 | P2 | H1 | H2 |
| 1/2W | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.3 | 16.0 ± 1.5 | $16.0^{+1.0}_{-0.5}$ |
| 1WS | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.3 | 16.0 ± 1.5 | $16.0^{+1.0}_{-0.5}$ |
| 1W | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.3 | 16.0 ± 1.5 | $16.0^{+1.0}_{-0.5}$ |
| 2WS | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.3 | 16.0 ± 1.5 | $16.0^{+1.0}_{-0.5}$ |
| 2W | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.5 | $21.5^0_{-2.0}$ | $16.0^{+1.0}_{-0.5}$ |
| 3WS | $18.0^{+1.0}_{-0.5}$ | 3.85 ± 0.5 | 5.0 ± 0.5 | 12.7 ± 0.5 | 12.7 ± 0.5 | $21.5^0_{-2.0}$ | $16.0^{+1.0}_{-0.5}$ |



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS

5.5 MT 型卧式编带，适用余 2W、3W 功率



| 功率 | F | W | P1 | P2 | H | H1 | AMax |
|----|----------|---------|----------|----------|------|---------|------|
| 2W | 5.0±1.0 | 6.5±1.0 | 25.4±1.0 | 25.4±1.0 | 18±1 | 8.0±1.5 | 21 |
| 3W | 10.0±1.0 | 7.5±1.0 | 30±1.0 | 30±0.5 | 17±1 | 8.0±1.5 | 21 |



MF/RJ 金属膜电阻器

MF/RJ METAL FILM RESISTORS



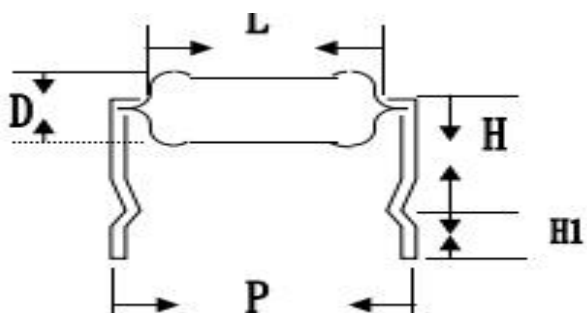
FK2 型



F 型

| 瓦特数 Watts | 尺寸 Dimensions (mm) | | | | |
|--------------|--------------------|----------|---------|-------|-------|
| | ΦD | L | P | E Max | H Max |
| 1/2w,1ws | 3.2±0.5 | 9.0±1.0 | 6.0±2.0 | 3.5 | 5.0 |
| 1w,2ws | 4.5±1.0 | 11.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |
| 2w,3ws | 5.0±1.0 | 15.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |
| 3w | 6.0±1.0 | 17.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |

| 瓦特数 Watts | 尺寸 Dimensions (mm) | | | | |
|--------------|--------------------|----------|---------|-------|-------|
| | ΦD | L | P | E Max | H Max |
| 1/2w,1ws | 3.2±0.5 | 9.0±1.0 | 6.0±2.0 | 3.5 | 5.0 |
| 1w,2ws | 4.5±1.0 | 11.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |
| 2w,3ws | 5.0±1.0 | 15.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |
| 3w | 6.0±1.0 | 17.5±1.0 | 9.0±2.0 | 3.5 | 5.0 |



MK 型



M 型

| 瓦特数 Watts | 尺寸 Dimensions (mm) | | | | |
|--------------|--------------------|----------|----------|-------|---------|
| | D | L | P | H MAX | H1 |
| 1/2w,1ws | 3.2±0.5 | 9.0±1.0 | 12.5±1.5 | 10.0 | 4.0±0.5 |
| 1w,2ws | 4.5±1.0 | 11.5±1.0 | 15±1.5 | 10.0 | 4.0±0.5 |
| 2w,3ws | 5.0±1.0 | 15.5±1.5 | 20±2.0 | 10.0 | 4.0±0.5 |
| 3W5WS | 6.0±1.0 | 17.5±1.5 | 25±2.0 | 10.0 | 4.0±0.5 |

| 瓦特数 Watts | 尺寸 Dimensions (mm) | | | | |
|--------------|--------------------|----------|----------|-------|---------|
| | D | L | P | H MAX | H1 |
| 1/2w,1ws | 3.2±0.5 | 9.0±1.0 | 12.5±1.5 | 10.0 | 4.0±0.5 |
| 1w,2ws | 4.5±1.0 | 11.5±1.0 | 15±1.5 | 10.0 | 4.0±0.5 |
| 2w,3ws | 5.0±1.0 | 15.5±1.5 | 20±2.0 | 10.0 | 4.0±0.5 |
| 3W5WS | 6.0±1.0 | 17.5±1.5 | 25±2.0 | 10.0 | 4.0±0.5 |

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