



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): _____

版本日期(Ver Date): 2020年07月20日 A0版

供方签章 (SUPPLIER SIGNATURE)		客户承认签章 (APPROVAL SIGNATURE)	
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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。

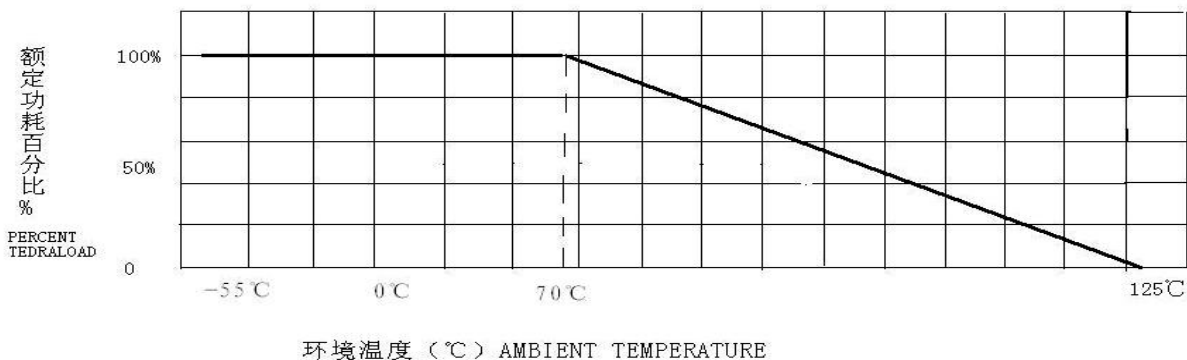
The type designation shall be in the following form and as specified.

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																														
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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



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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]。

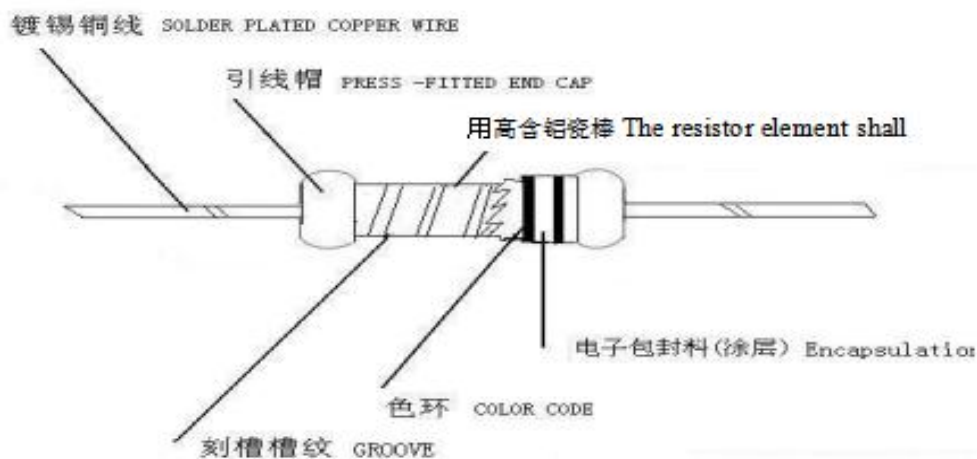
The dimensions shall be satisfied with [5. External dimensions].

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)





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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)



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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.			



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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)

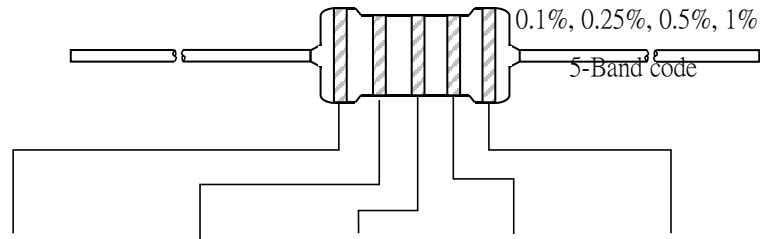


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4. 表示 Indication

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)



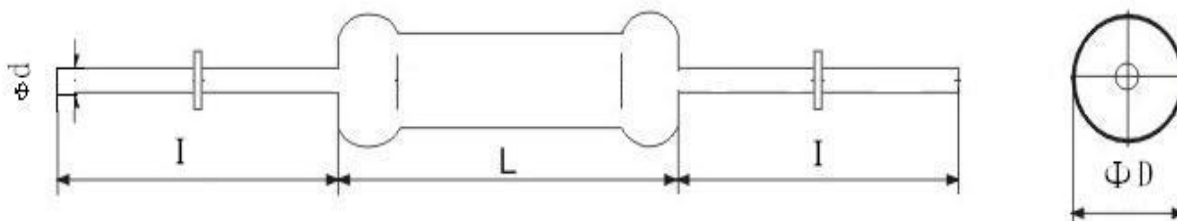
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5. 外形寸法 External dimensions

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

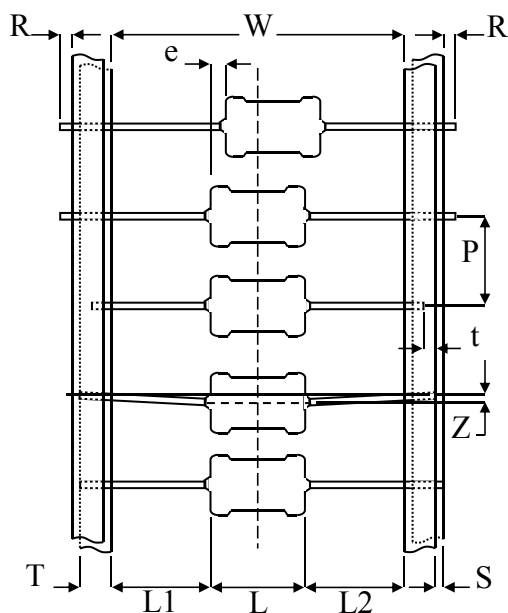


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5.2 带装 Axial Lead Taping

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

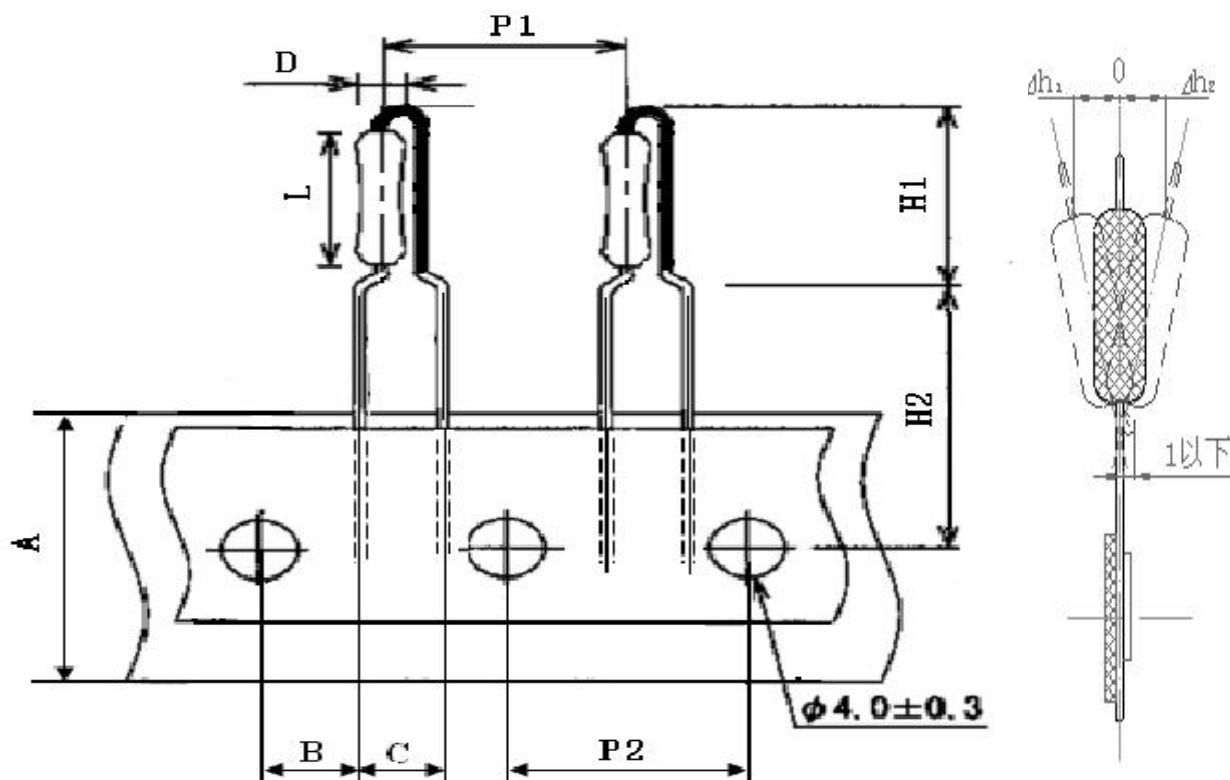


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5.3 FAT 立式编带形状适用于 (1/2W、1WS、1W、2W、3W 功率电阻)

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	$21.5^0_{-2.0}$	$16.0^{+1.0}_{-0.5}$

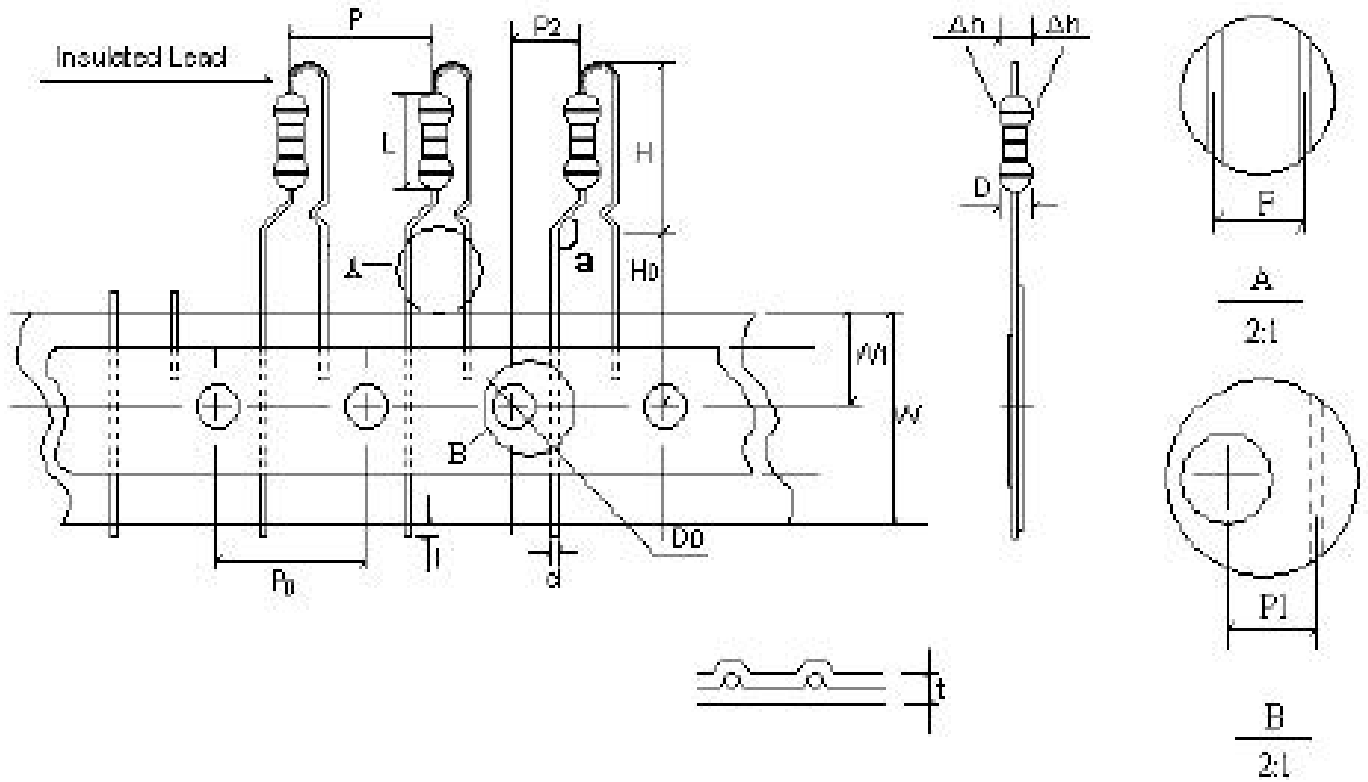


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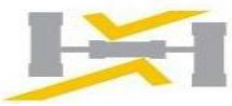
MF/RJ METAL FILM RESISTORS

5.4 FK2 内弯型, (1/2W、1WS、1W、2WS、3W 功率电阻)

注: 引线需涂脚漆的下单需备注说明, 否则默认为不涂装脚漆。



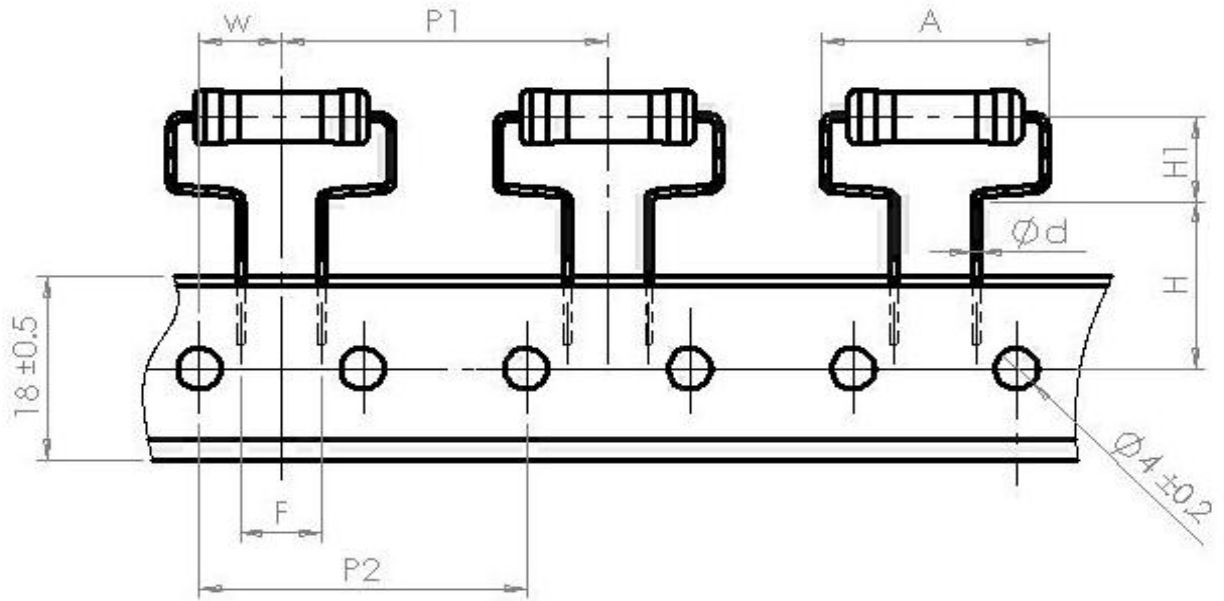
规格	尺寸 (mm)							
	W	D0	F	P	P0	P1	H	H0
1/2W	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
1WS	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
1W	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
2WS	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
2W	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.5	3.85 ± 0.7	$21.5^{0}_{-2.0}$	$16.0^{+1.0}_{-0.5}$
3WS	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.5	3.85 ± 0.7	$21.5^{0}_{-2.0}$	$16.0^{+1.0}_{-0.5}$



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5.5 MT 型卧式编带，适用余 2W、3W 功率

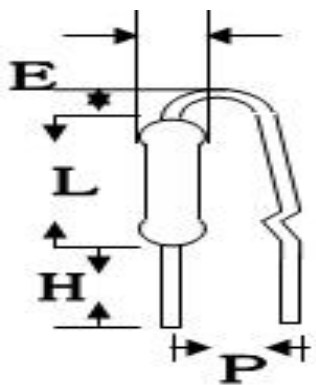


功率	F	W	P1	P2	H	H1	AMax
2W	5.0±1.0	6.5±1.0	25.4±1.0	25.4±1.0	18±1	8.0±1.5	21
3W	10.0±1.0	7.5±1.0	30±1.0	30±0.5	17±1	8.0±1.5	21

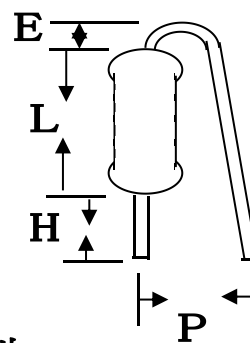


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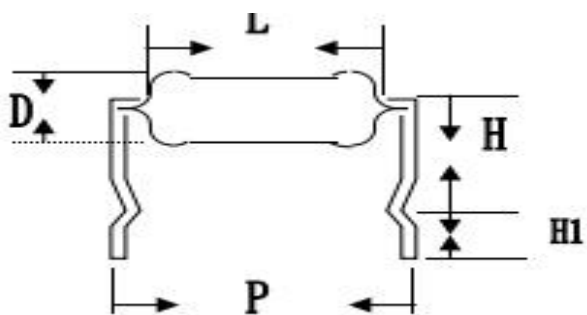
FK2 型



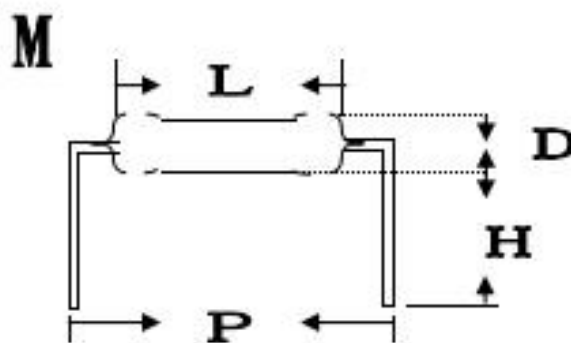
F 型

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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