



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): FR 绕线保险丝电阻系列

规格(Specification): _____

客户料号(Cus. P/N): _____

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FR/RXF 线绕保险丝电阻器

WIRE-WOUND FUSIBLE RESISTORS

1. 一般事项 General

1.1 适用 Scope

本承认书适用于 [线绕保险丝电阻器], 符合环境关联物质要求之 RoHS 测试。

This specification is available for Wirewound 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。

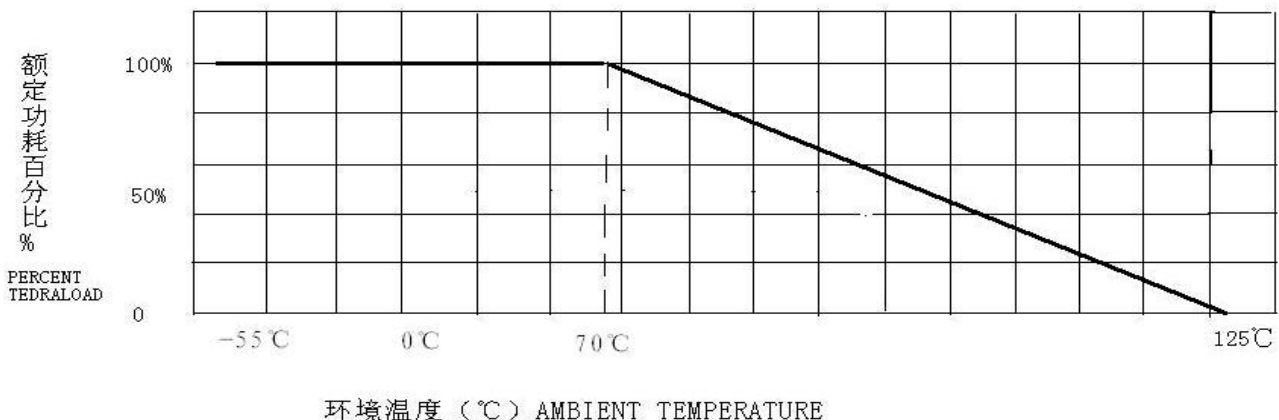
The type designation shall be in the following form and as specified.

FR	1 WS	10R	±5%	T52
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
	标准 Normal	E-24 Series	J ±5%	P 型 P Type
	小型 Small	E-96 Series	G ±2%	M 型 M Type
	1/4W		F ±1%	MB 型 MB Type
	1/2W			FK1 型 FK1 Type
	1W			FK2 型 FK2 Type
	2W			FKK 型 FKK Type
	3W			T52 型指编带内宽尺寸为 52mm, 详见《尺寸图 5.2 项》
	5WS			

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	耐电压 Dielectric withstanding voltage	阻值范围(Ω) KNP Resistance Range(Ω)
Normal size	FR1/2W,	0.5W	0.05 Ω ~1K Ω
	FR1W,	1W	
	FR2W,	2W	
	FR3W	3W	
	FR5W,	5W	
	FR3WS,	3W	
	FR5WS,	5W	

2. 构造 Construction

2.1 外形尺寸 External dimensions

参照本承认书的 [5. 外形尺寸]。

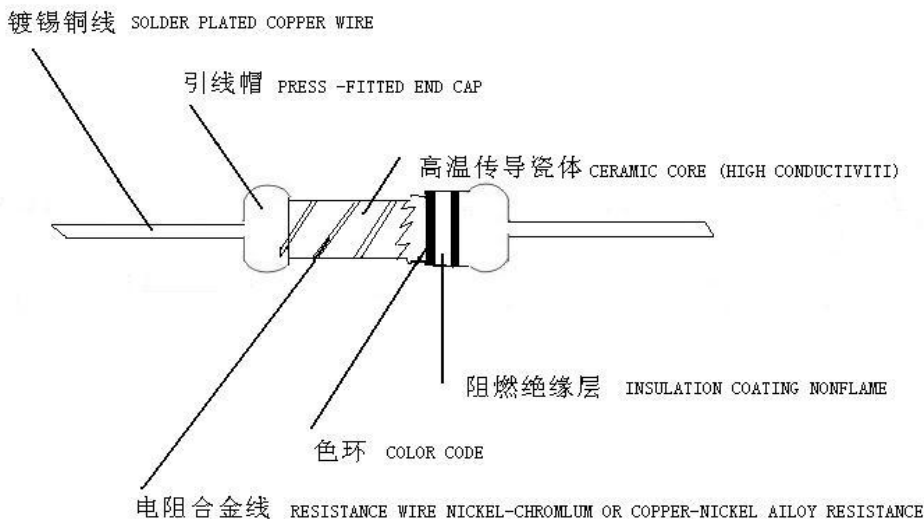
The dimensions shall be satisfied with [5. External dimensions].

2.2 构造图 Structure diagram

FR 系列之绕线保险丝固定电阻器系按下表的材料而构成:

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

2.3 外观颜色 Resistor body color: 灰色 (Gray)





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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	±350PPM/°C (±500PPM/°C < 1Ω)	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	±(2%+0.05 Ω)以内。 不得有机械的损伤。 Within ±(2%+0.05 Ω) No evidence of mechanical damage.	7.4 项参照 Comply with 7.4 低温侧: -55°C/30 分, 室温: 10~15 分钟 高温侧: +80°C/30 分, 室温: 10~15 分钟 5 回 Low side: -55°C/30min, Room temp.: 10 to 15min High side: 80°C/30min, Room temp.: 10 to 15min 5 cycles
耐湿负荷寿命 Load life in humidity	±(5%+0.05 Ω)以内。 Within ±(5%+0.05 Ω)	7.9 项参照 Comply with 7.9 40±2°C, 湿度 90~95%, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) 40±2°C, 90 to 95%RH, 1000h Rated voltage (90 min ON, 30 min OFF)
负荷寿命 Load life	±(5%+0.05 Ω)以内。 Within ±(5%+0.05 Ω)	7.10 项参照 Comply with 7.10 70±3°C, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) 70±3°C, 1000h Rated voltage (90 min ON, 30 min OFF)

● 熔断性能 FUSING CHARACTERISTICS :

额定功耗 Rated power	标称阻值范围 Nominal resistance range		
	<2 Ω	2 Ω~10 Ω	>10 Ω
	熔断时间 fusing time (S)		
12 倍	—	<60	<30
16 倍	<60	<30	<15
25 倍	<30	<15	<7.5

说明: 本熔断参数依据顾客确认样品协议生产。

Note: The circuit breaker parameters are produced according to the sample agreement confirmed by the customer.

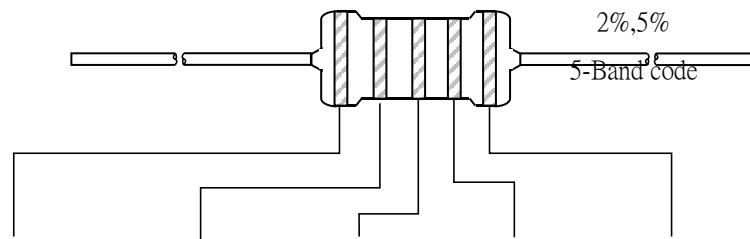


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4. 表示 Indication

色码 Color Code



颜色 Color	第 1 数字 1 st figure	第 2 数字 2 nd figure	倍 率 Multiplier	误差率 Tolerance	区 分 Distinguish
黑 Black	0	0	10^0		「黑色」表示有感绕线电阻， 「绿色」表示无感绕线电阻。 KNP type in 'Black', NKNP type in 'Green'.
棕 Brown	1	1	10^1	±1% (F)	
红 Red	2	2	10^2	±2% (G)	
橙 Orange	3	3	10^3		
黄 Yellow	4	4	10^4		
绿 Green	5	5	10^5		
蓝 Blue	6	6	10^6		
紫 Violet	7	7	10^7		
灰 Gray	8	8			
白 White	9	9			
金 Gold			10^{-1}	±5% (J)	
银 Silver			10^{-2}	±10% (K)	
无 Plain					



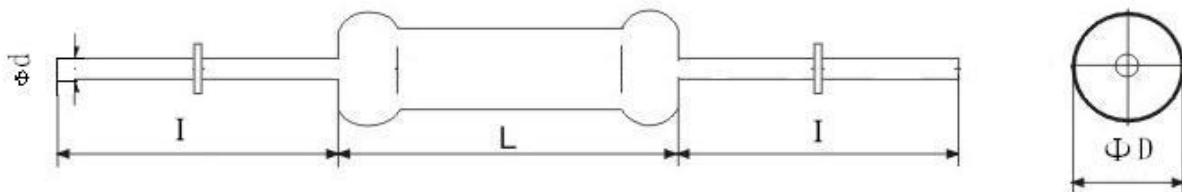
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5. 外形尺寸 External dimensions

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	$L \pm 1.0$	ϕD	$\phi d \pm 0.1$	$I \pm 2.0$
1/4W	1/2WS	60	6.5	2.3 ± 0.5	0.40	28
1/2W	1WS	60	9.0	3.2 ± 0.5	0.50	28
1W	2WS	60	11.5	4.5 ± 1.0	0.60	25
		73	11.5	4.5 ± 1.0	0.60	31
2W	3WS	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
3W	5WS	94	17.5	6.0 ± 1.0	0.70	38
5W		94	24.5	8.0 ± 1.0	0.70	35

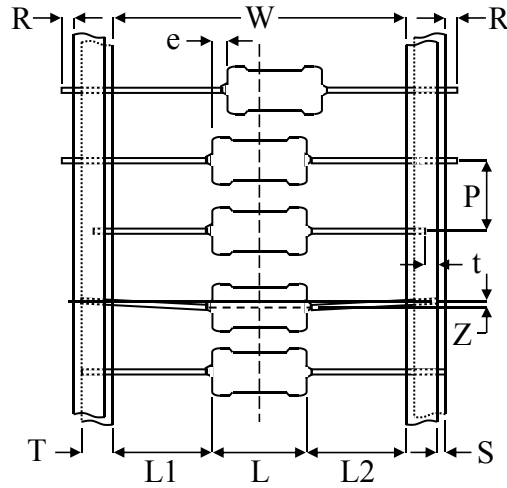


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5.2 带装 Axial Lead Taping

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.
1/4W	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

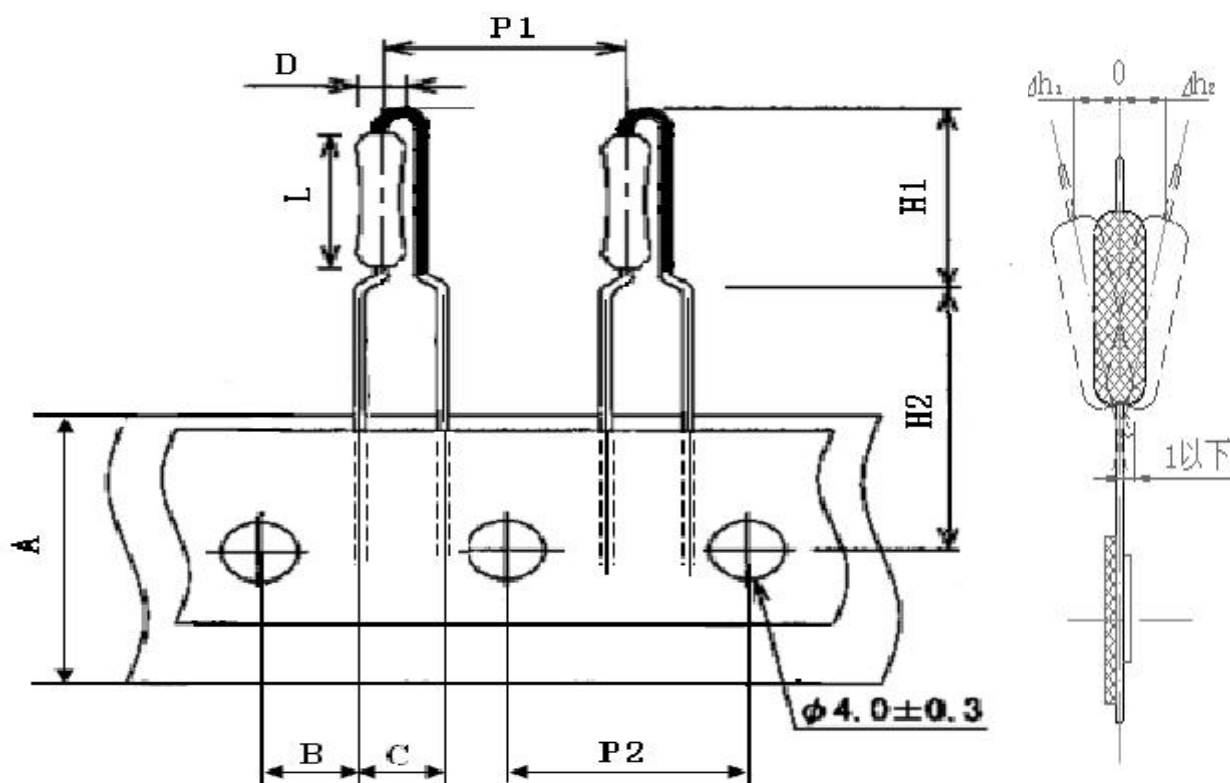


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5.3 FAT 立式编带形状适用于 (1/2W、1WS、1W、2W、3W 功率电阻)

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}

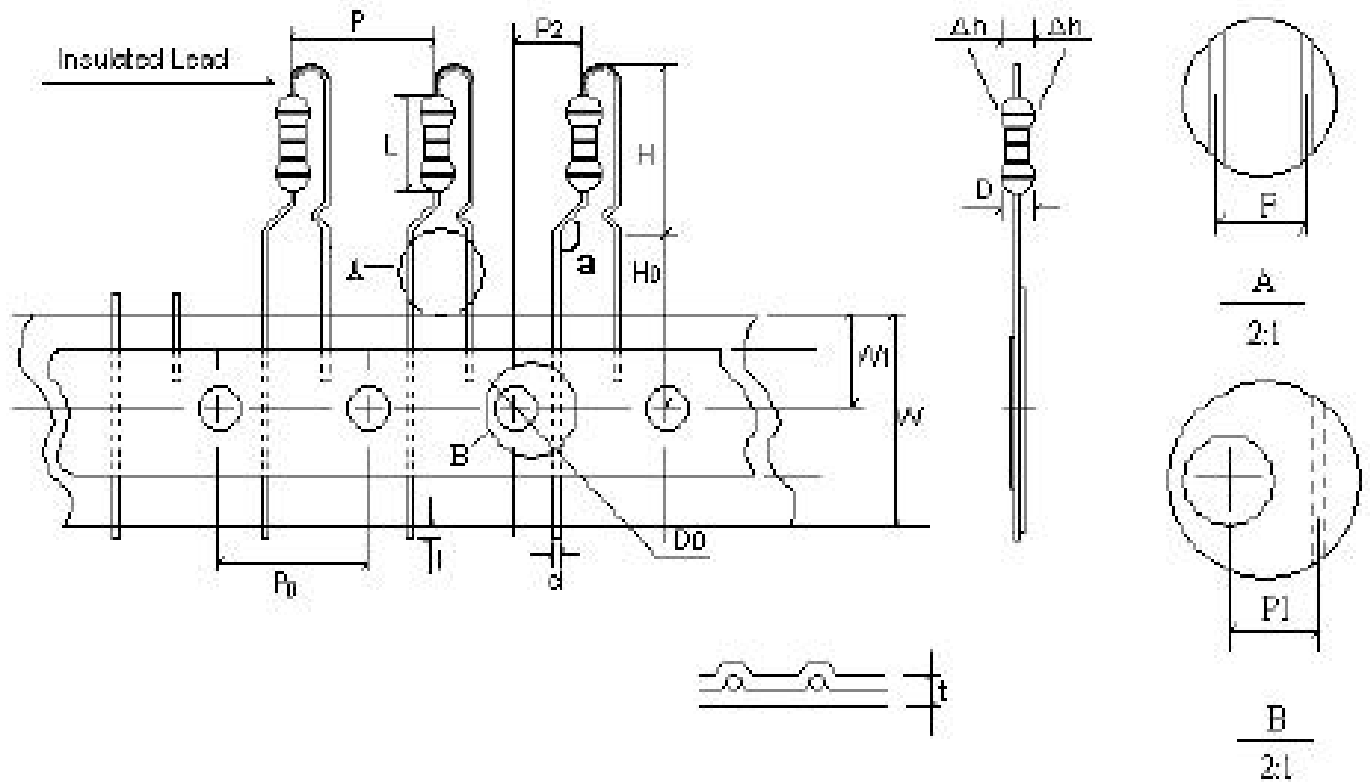


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5.4 FK2 内弯型, (1/2W、1WS、1W、2WS、3W 功率电阻)

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。



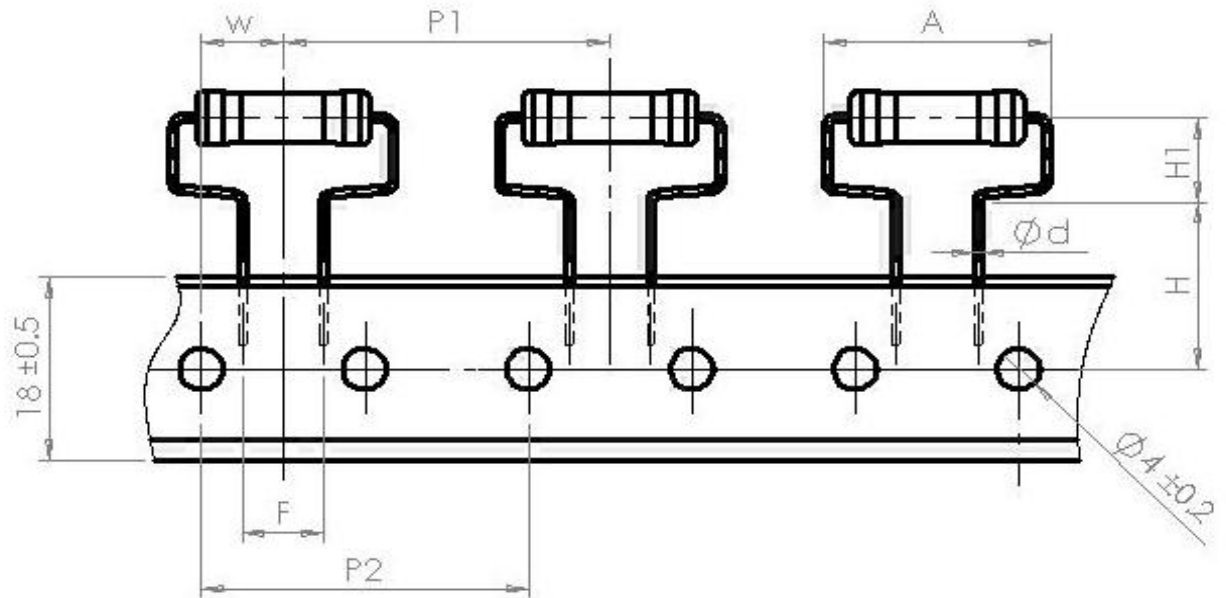
规格	尺寸 (mm)							
	W	DO	F	P	P0	P1	H	H0
1/2W	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
1WS	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5	12.7 ± 0.5	12.7 ± 0.3	3.85 ± 0.7	16.0 ± 1.5	$16.0^{+1.0}_{-0.5}$
1W	$18.0^{+1.0}_{-0.5}$	4.0 ± 0.3	5.0 ± 0.5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

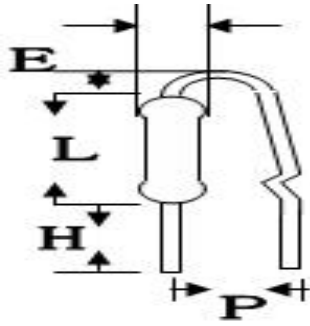


功率	F	W	P1	P2	H	H1	AMax
2W	5.0±1.0	6.5±1.0	25.4±1.0	25.4±1.0	18±1	8.0±1.5	21
3W	10.0±1.0	7.5±1.0	30±1.0	30±0.5	17±1	8.0±1.5	21

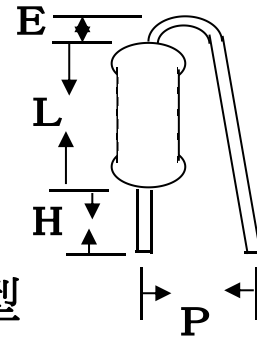


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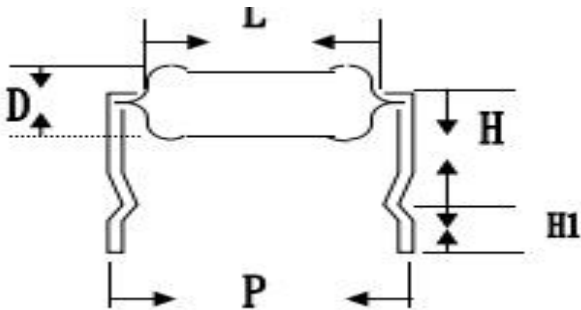
FK2 型



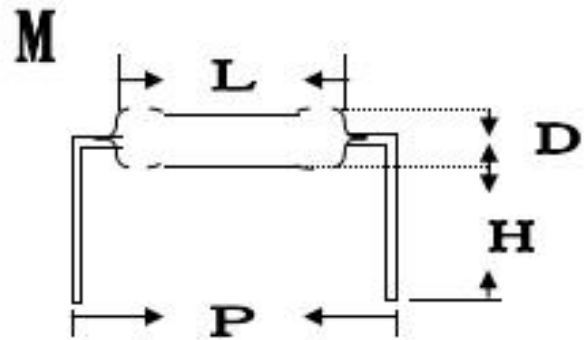
F 型

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 MA X	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 MA X	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