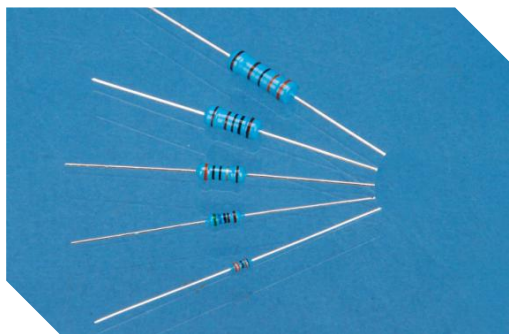




编号 PART NUMBER

MF	1/4W	100R	J	I	52	E	CU
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) 类型 Type

MF 金属膜电阻

(2) 功率 RatedPower

1/8W = 0.125W	1/2W = 0.5W	2W = 2W
1/4WS = 0.25WS	1WS = 1WS	3WS = 3WS
1/4W = 0.25W	1W = 1W	3W = 3W
1/2WS = 0.5WS	2WS = 2WS	5WS = 5WS
		5W = 5W

S 代表小型化功率

(3) 阻值 Resistance value

E24 & E96 & E192 Series

Example:

0R1=0.1Ω 10R=10Ω 100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

(4) 精度 Tolerance

A=±0.05% B=±0.1% D=±0.5% F=±1% G=±2% J=±5% K=±10%

(5) 成品型态 Finished form

T: 编带 Box Pack B: 散装 Bulk M: M Type MK: MK Type
MB: MB Type F: FK Type FK: FK Type FKK: FKK Type

(6) 编带间距尺寸 (T Type) Braid spacing size

52= 52mm±1.5mm 63= 63mm±1.5mm 73= 73mm±1.5mm

(7) 温度系数 TCR

A=±5PPM B=10PPM C=±15PPM D=±25PPM E=±50PPM
F=±100PPM - = Based on spec

(8) 引线材质 Lead material

CU=镀锡铜线 Tinned copper wire
CP=镀锡铜包钢(铁) Tinned copper-clad steel

特点 FEATURES

高精度的产品

TOR QUALITY AND HIGH RELIABILITY

低电流噪声 (小于 0.2UV)

LOW NOISE (< 0.2UV)

低电阻温度系数 ±5PPM~±100PPM

LOW T.C.R ±5PPM~±100PPM

极好的长期稳定性

EXCELLENT LONG TERM STABILITY

环保无铅产品

RoHS COMPLIANT/LEAD-FREE AVAILABLE

标准误差: ±0.1%, ±0.25%, ±0.5%, ±1%.

(阻值 1M ≤ R < 1R 生产实际控制在 ±2% 以下)

STANDARD TOLERANCES: ±0.1%,
±0.25%, ±0.5%, ±1% (The resistance

value of 1M ≤ R < 1R is controlled

below ±2% in actual production)

应用 Apply

各种交、直流电子电路

Various AC and DC electronic circuits

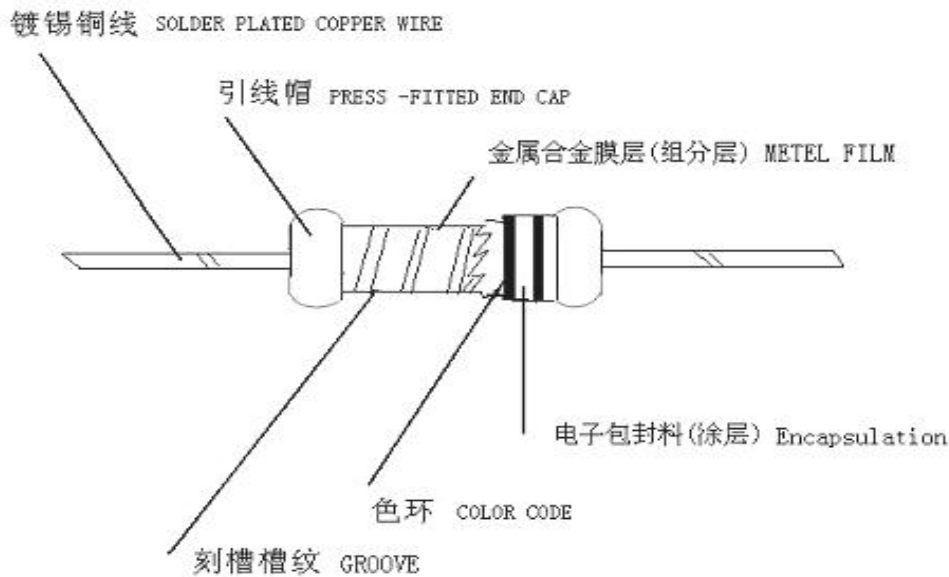
各种精密仪器仪表

Various precision instruments and meters

精密取样

Precision sampling

结构图 CONSTRUCTION



REMARK: 底漆颜色 COATING COLOR: 兰色 Blue

主要技术指标 MAIN SPECIFICATION

表一

型号 Type	最大工作电压 MAX WORKING	最大负荷电压 MAX OVERLOAD	额定功率 Rated Power at 70℃	电阻范围 RESISTANCE VALUE RANGE	绝缘耐压 Dielectric withstanding	工作温度范围 Operating Temp. Range
MF1/8W	200V	400V	1/8W	0.1Ω - 1MΩ	300V	-55℃~+155℃
MF1/4W / 1/4WS	250V	500V	1/4W / 1/4WS	0.1Ω - 10MΩ	350V	
MF1/2W / 1/2WS	350V	700V	1/2W / 1/2WS	0.1Ω - 10MΩ	350V	
MF1W / 1WS	500V	1000V	1W / 1WS	0.1Ω - 10MΩ	500V	
MF2W / 2WS	500V	1000V	2W / 2WS	0.1Ω - 10MΩ	500V	
MF3W / 3WS	500V	1000V	3W / 3WS	0.1Ω - 10MΩ	500V	
MF5W	550V	1000V	5W	0.1Ω - 10MΩ	500V	

降功耗曲线 DERATING CURVE

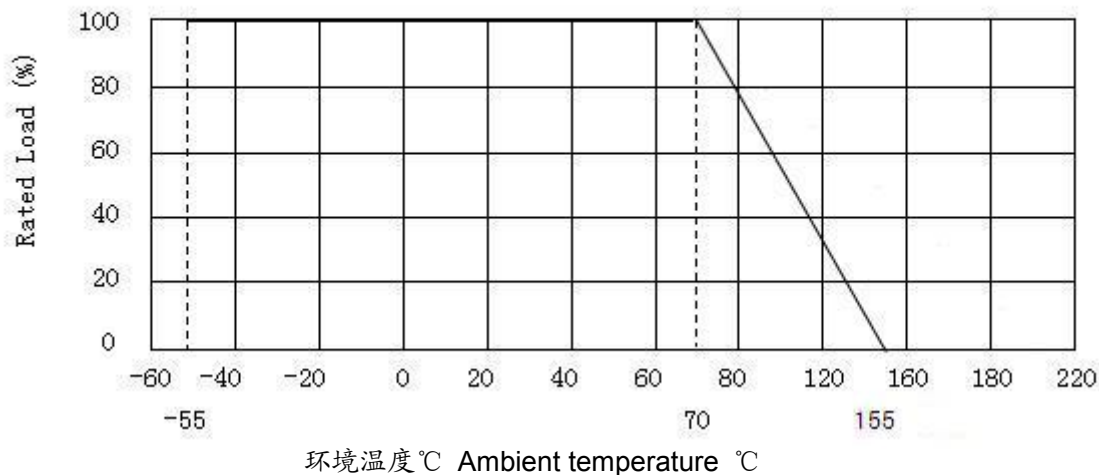
额定功率 POWER RATING

额定功率的定义为在环境温度 70℃ 最大输出功率。当环境温度超过 70℃，额定功率按下图曲线递减。

Power rating is defined as maximum power rating continuously applied under ambient temperature at 70℃. when the ambient temperature exceeds 70℃, The rated power decreases according to the curve below



图一 功率轻减曲线 Figure1 Power derating curve



额定电压 RATED VOLTAGE

额定电压为交流或直流电压（频率为 50Hz 或 60Hz）额定电压计算方式为：

Rated voltage is defined as the DC or AC (effective Value at commercial frequency example 50 C/S, 60 C/S), Voltage when rated power is applied and can be calculated

By the following :

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

V = RATED VOLTAGE

P = RATED POWER (WATTS)

R = NOMINAL RESISTANCE VALUE (OHM)

When the calculated rated voltage exceeds the Maximum usable voltage flue shown in CHART, the Maximum usable voltage is defined as the voltage According to the power-decreasing curve shown in CHART.

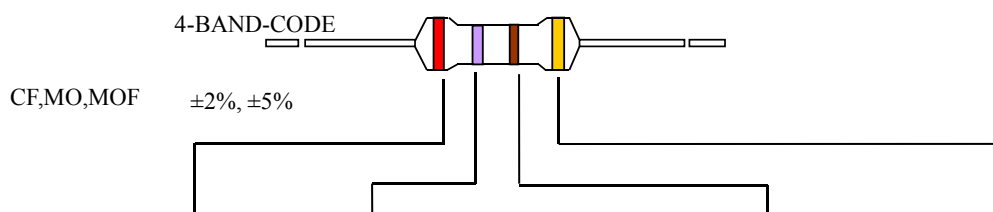
产品特性 Product characteristics



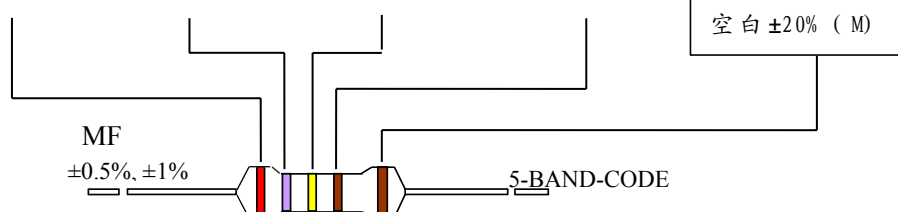
项目 Item	规格值 Performance	试验方法 (依据 JIS C 5202) Test methods (Conform to JIS C 5202)
温度系数 Temperature coefficient	$\geq 10\Omega$: $\pm 100\text{PPM}/^\circ\text{C}$ $\pm 50\text{PPM}/^\circ\text{C}$ $\pm 25\text{PPM}/^\circ\text{C}$ $\pm 15\text{PPM}/^\circ\text{C}$ $< 10\Omega$: $\pm 200\text{PPM}/^\circ\text{C}$	5.2 项参照 Comply with 5.2 $\text{PPM}/^\circ\text{C} = \frac{R - R_0}{R_0} * \frac{10^6}{T - T_0}$ R = Measured resistance (Ω) at T T $^\circ\text{C}$ 电阻实测值 (Ω) R ₀ = Measured resistance (Ω) at T ₀ T ₀ $^\circ\text{C}$ 电阻实测值 (Ω) T = Measured test temperature($^\circ\text{C}$) 测试温度的实测值 (室温+100 $^\circ\text{C}$) T ₀ = Measured base temperature($^\circ\text{C}$) 基准温度的实测值 (室温)
短时间过负荷 Short time overload	$\pm (0.5\%+0.05\Omega)$ 以内。 不得有机械的损伤。 within $\pm (0.5\%+0.05\Omega)$ No evidence of mechanical damage.	5.5 项参照 Comply with 5.5 额定电压 X 2.5 倍, 5 秒。 不可超过最高过负荷电压 (见表-1) Rated voltage X 2.5 times, 5s But not to exceed maximum overload voltage. (See table-1)
绝缘抵抗 Insulation resistance	$104\text{M}\Omega$ 以上。 $104\text{M}\Omega$ 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	$\pm (0.5\%+0.05\Omega)$ 以内。 within $\pm (0.5\%+0.05\Omega)$	5.8 项参照 Comply with 5.8 额定电压 X 3 倍, 1000 回 (1 秒 ON, 25 秒 OFF)。 不可超过最高断续电压 (见表-1) Rated voltage X 3 times, 1000 cyc.(1s ON, 25s OFF) But not to exceed maximum pulse voltage.(See table-1)
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: $25\text{N}(2.5\text{Kgf})$, 保持 10 秒。 Tensile strength: $25\text{N}(2.5\text{kgf})$, for 10 seconds. 扭转强度: 360° 交互回转 5 次。 Torsional strength: Rotated through 360° , 5 rotations.
焊锡耐热性 Resistance to soldering heat	$\pm (0.5\%+0.05\Omega)$ 以内。 不得有机械的损伤。 within $\pm (0.5\%+0.05\Omega)$ No evidence of mechanical damage.	6.4 项参照 Comply with 6.4 $350 \pm 10^\circ\text{C}$, 3 ± 0.5 秒 或 $260 \pm 5^\circ\text{C}$, 10 ± 1 秒, 试验后放置 3 小时。 $350 \pm 10^\circ\text{C}$, $3 \pm 0.5\text{s}$ or $260 \pm 5^\circ\text{C}$, $10 \pm 1\text{s}$, After test leave for 3h.
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: $245 \pm 5^\circ\text{C}$ 。 浸锡时间: 5 ± 0.5 秒。 Test temperature of solder: $245 \pm 5^\circ\text{C}$ Dipping time in solder: $5 \pm 0.5\text{s}$

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 放入异丙醇溶剂之超音波机内，保持 3 分钟。 Specimens shall be immersed in a bath of isopropyl alcohol completely for 3 minutes with ultrasonic.
温度循环 Temperature cycle	$\pm(1\%+0.05\Omega)$ 以内。 不得有机械的损伤。 within $\pm(1\%+0.05\Omega)$ No evidence of mechanical damage.	7.4 项参照 Comply with 7.4 低温侧: $-55 \pm 3^\circ\text{C}$: 30 分钟, 室温: 2 ~ 3 分钟 高温侧: $+155 \pm 2^\circ\text{C}$: 30 分钟, 室温: 2 ~ 3 分钟 5 次 Low side: $-55 \pm 3^\circ\text{C}$: 30min, Room temp.: 2 to 3min High side: $+155 \pm 2^\circ\text{C}$: 30min, Room temp.: 2 to 3min 5 cycles
耐湿负荷寿命 Load life in humidity	$\pm(1.5\%+0.05\Omega)$ 以内。 within $\pm(1.5\%+0.05\Omega)$	7.9 项参照 Comply with 7.9 $40 \pm 2^\circ\text{C}$, 湿度 90 ~ 95%, 1000 小时 1/10 定格电压 (90 分钟 ON, 30 分钟 OFF) $40 \pm 2^\circ\text{C}$, 90 to 95%RH, 1000h 1/10 Rated voltage (90 min ON, 30 min OFF)
负荷寿命 Load life	$\pm(2\%+0.05\Omega)$ 以内。 within $\pm(2\%+0.05\Omega)$	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)

色环标示 Marking



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER (倍数 10^n)	TOLERANCE (精度)
BLACK	0	0	0	10^0	
BROWN	1	1	1	10^1	$\pm 1\%$ (F)
RED	2	2	2	10^2	$\pm 2\%$ (G)
ORANGE	3	3	3	10^3	
YELLOW	4	4	4	10^4	
GREEN	5	5	5	10^5	$\pm 0.5\%$ (D)
BLUE	6	6	6	10^6	$\pm 0.25\%$ (G)
VIOLET	7	7	7	10^7	$\pm 0.1\%$ (B)
GREY	8	8	8	10^8	$\pm 0.05\%$ (A)
WHITE	9	9	9	10^9	
GOLD				10^{-1}	$\pm 5\%$ (J)
SILVER				10^{-2}	$\pm 10\%$ (K)

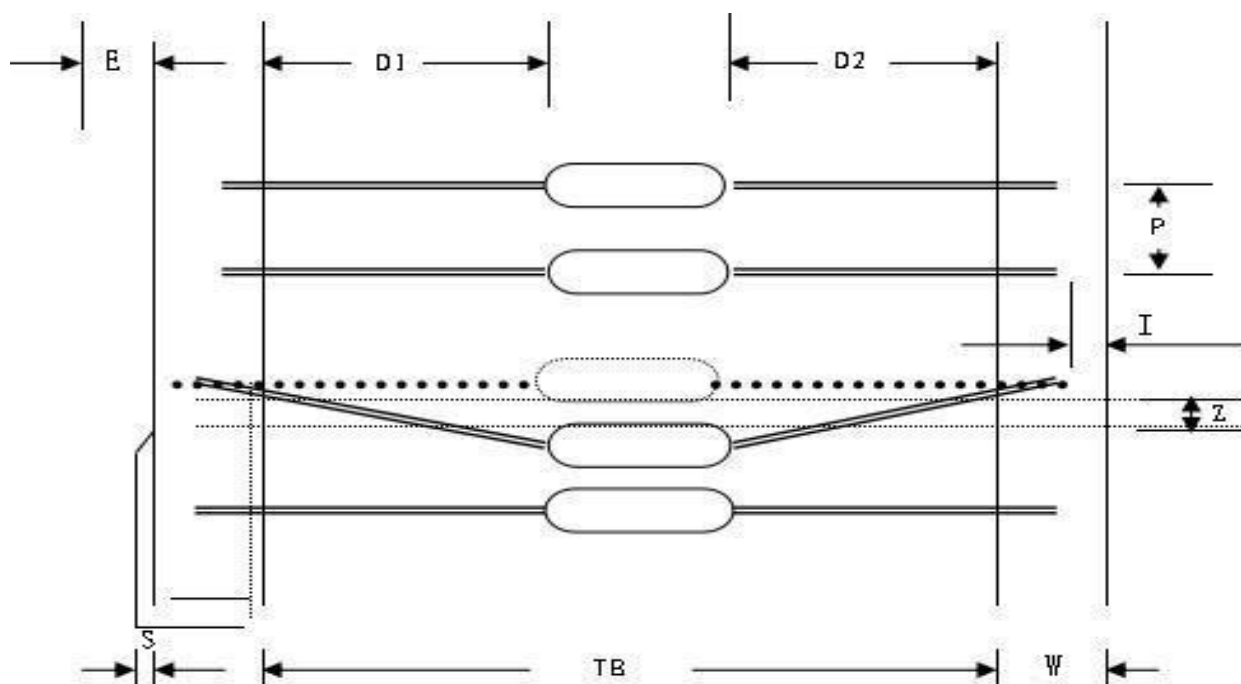


B 型尺寸 Dimension (B TYPE) 单位(Unit): mm



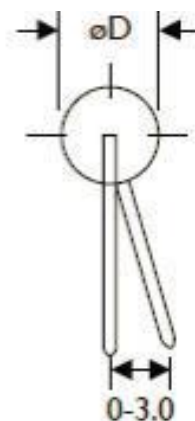
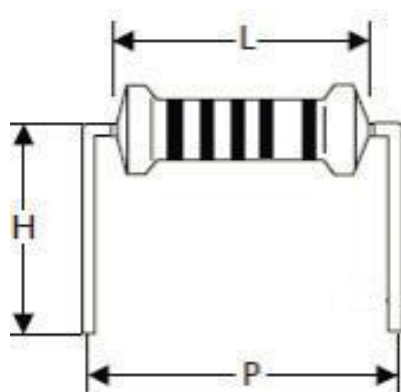
TYPE		L	Φ D	H	Φ d		PULLING(Kg)
					铜 (cu)	铁 (cp)	
1/8W / 1/4WS	T52	3.2±0.3	1.8±0.3	28±2.0	0.40±0.05	0.40±0.05	2.5Kg-30S
1/4W / 1/2WS	T52	6.0±0.5	2.3±0.3	27±2.0	0.45±0.05	0.40±0.05	2.5Kg-30S
1/2W / 1WS	T52	9.0±1.0	3.5±0.5	26±2.0	0.56±0.05	0.50±0.05	2.5Kg-30S
1W / 2WS	T52	11.0±1.0	4.5±0.5	25±2.0	0.65±0.05	0.60±0.05	3Kg-30S
	T63	11.0±1.0	4.5±0.5	31±2.0	0.65±0.05	0.60±0.05	3Kg-30S
	T73	11.0±1.0	4.5±0.5	34±2.0	0.65±0.05	0.60±0.05	3Kg-30S
2W / 3WS	T63	15.0±1.0	5.0±0.5	29±2.0	0.70±0.05	0.70±0.05	5Kg-30S
	T73	15.0±1.0	5.0±0.5	33±2.0	0.70±0.05	0.70±0.05	5Kg-30S
3W / 5WS	T63	17.0±1.0	6.0±0.5	27±2.0	0.70±0.05	0.70±0.05	5Kg-30S
	T73	17.0±1.0	6.0±0.5	32±2.0	0.70±0.05	0.70±0.05	5Kg-30S
5W		24.0±1.0	8.0±1.0	28±2.0	0.75±0.05	0.70±0.05	5Kg-30S

编带尺寸 Taping Dimension (TB TYPE) 单位(Unit): mm



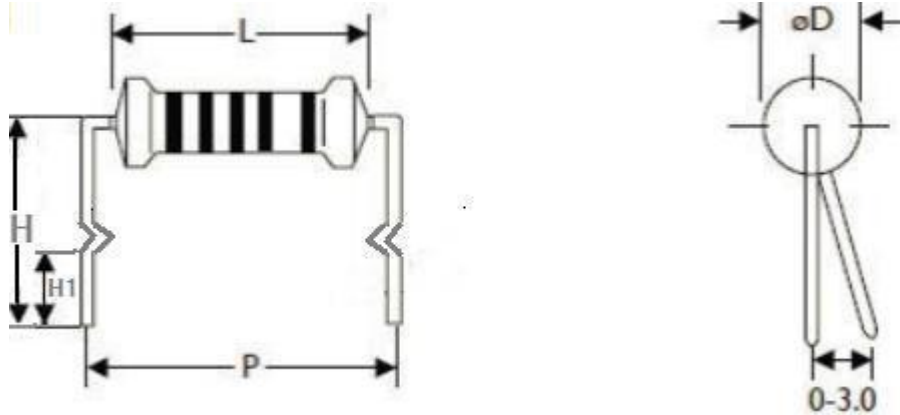
WATTS	Type	TB	P±0.5	W±0.5	(D1-D2) MAX	E MAX	Z MAX	S MAX	(I) MAX
1/6W/ 1/8W 1/4WS	T 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/4W / 1/2WS	T 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/2W / 1WS	T 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1W / 2WS	T52	52±1.5	5	6	0.8	0	1.4	0.8	3.2
	T 63	63±1.5	5	6	0.8	0	1.4	0.8	3.2
	T 73	73±1.5	5	6	0.8	0	1.4	0.8	3.2
2W / 3WS	T63	63±1.5	5	6	0.8	0	1.4	0.8	3.2
	T 73	73±1.5	5	6	0.8	0	1.4	0.8	3.2
3W / 5WS	T 73	73±1.5	10	6	0.8	0	1.4	0.8	3.2
	T63	63±1.5	5	6	0.8	0	1.4	0.8	3.2
5W	T 73	73±1.5	10	6	0.8	0	1.4	0.8	3.2

M 型尺寸 M - TYPE 单位(Unit): mm



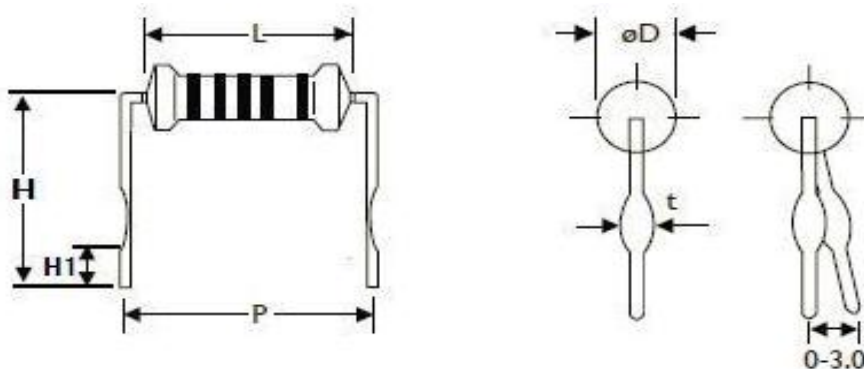
功率 WATTS	尺寸 DIMENSIONS(mm)			
	L	P±1	H±1	ΦD
1/8W/1/4WS	3.2±0.3	6	6	1.8±0.3
1/4W / 1/2WS	6.0±0.5	10	10	2.3±0.3
1/2W / 1WS	9.0±1.0	13	10	3.5±0.5
1W / 2WS	11.0±1.0	15	13	4.5±0.5
2W / 3WS	15.0±1.0	20	15	5.0±0.5
3W / 5WS	17.0±1.0	23	15	6.0±0.5
5W	24.0±1.0	33	15	8.0±1.0

MK 型尺寸 MK- TYPE 单位(Unit): mm



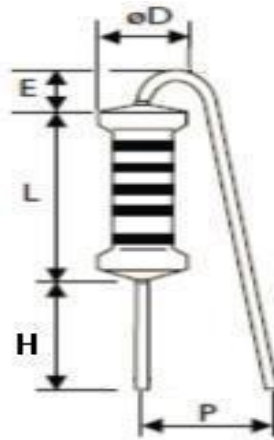
功率 WATTS	尺寸 DIMENSIONS(mm)				
	L	P±1	H±1	H1±0.5	ΦD
1/2W / 1WS	9.0±1.0	15	10	5	3.5±0.5
1W / 2WS	11.0±1.0	15.5	11	3.6	4.5±0.5
2W / 3WS	15.0±1.0	20	11	3.6	5.0±0.5
3W / 5WS	17.0±1.0	23	10.6	3.6	6.0±0.5
5W	24.0±1.0	27	13	5	8.0±1.0

MB 型尺寸 MB- TYPE 单位(Unit): mm



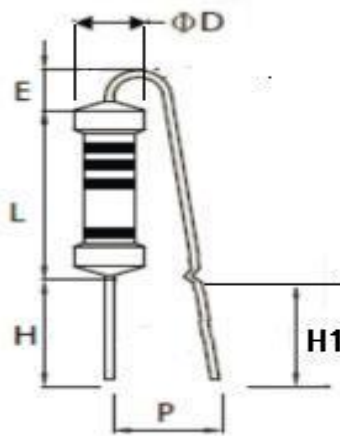
功率 WATTS	尺寸 DIMENSIONS(mm)				
	L	P±1	H±1	H1±0.5	ΦD
1/2W / 1WS	9.0±1.0	13	13	3.6	3.5±0.5
1W / 2WS	11.0±1.0	16	11	3.6	4.5±0.5
2W / 3WS	15.0±1.0	20	13.6	3.6	5.0±0.5
3W / 5WS	17.0±1.0	23	13	5	6.0±0.5
5W	24.0±1.0	27	13	5	8.0±1.0

F 型尺寸 F-TYPE 单位(Unit): mm



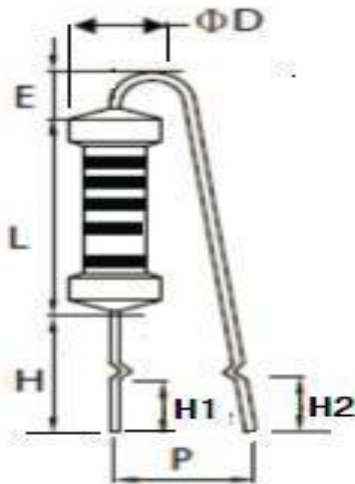
功率 WATTS	尺寸 DIMENSIONS(mm)				
	L	P±2	H±0.5	E Max	ΦD
1/4W / 1/2WS	6.0±0.5	6	5/3.6	3.5	2.3±0.3
1/2W / 1WS	9.0±1.0	8	5/3.6	3.5	3.5±0.5
1W / 2WS	11.0±1.0	8	5/3.6	3.5	4.5±0.5
2W / 3WS	15.0±1.0	10	5/3.6	3.5	5.0±0.5
3W / 5WS	17.0±1.0	12	5/3.6	3.5	6.0±0.5
5W	24.0±1.0	20	5/3.6	3.5	8.0±1.0

FK 型尺寸 FK-TYPE 单位(Unit): mm



功率 WATTS	尺寸 DIMENSIONS(mm)					
	L	P±2	H ±0.5	H1±0.8	E Max	ΦD
1W / 2WS	11.0±1.0	7	5/3.6	5/3.6	3.5	4.5±0.5
2W / 3WS	15.0±1.0	7	5/3.6	5/3.6	3.5	5.0±0.5
3W / 5WS	17.0±1.0	10	5/3.6	5/3.6	3.5	6.0±0.5

FKK 型尺寸 FKK- TYPE 单位(Unit): mm



功率 WATTS	尺寸 DIMENSIONS(mm)						
	L	P±2	H ±1	H1±0.5	H2±0.8	E Max	ΦD
1W / 2WS	11.0±1.0	7	10	3.6	3.6	3.5	4.5±0.5
2W / 3WS	15.0±1.0	7	10	3.6	3.6	3.5	5.0±0.5

包装 PACKING

标签规格 LABEL SPECIFICATION

- 1) . 型号及功率 TYPE、WATTS
- 2) . 电阻值和误差 RESISTOR VALUE AND TOLERANCE
- 3) . 数量 QUANTITY
- 4) . 生产批号 LOT NO

包装数量 Packing quantity

Unit: BOX / Kpcs

TYPE QTY	1/8W	1/4W	1/2W	1W	2W	3W	5W
T52	5	5	2.5	1	NA	NA	NA
T63	NA	NA	NA	1	1	0.5	0.25
T73	NA	NA	NA	1	1	0.5	0.25
B	20	10	5	4	3	2	1
F	20	10	5	4	3	2	1
M	20	10	5	4	3	2	1
MB	NA	NA	NA	4	3	2	1
MK	NA	NA	NA	4	3	2	1