

### 1. 适用范围 / SCOPE

此份规格书涵盖 HFCL0603/1206-series 金属陶瓷电流感测电阻组件相关规格。

This specification covers HFCL0603/1206-series, which are Metal Foil Current Sensing Resistor.

### 2. 产品型号 / TYPE NUMBER

<b>HFCL</b>	<b>0603/1206</b>	<b>M</b>	<b>1W0</b>	<b>Rxxx</b>	<b>*</b>
	(1)	(2)	(3)	(4)	(5)

- (1) 产品系列号 / SERIES NUMBER : Ex.HFCL1206= 长电极/ Long electrode ; 四端子 / four terminal ; 无侧导/ without side electrode ; 尺寸 / size “0.12×0.06”
- (2) 产品材质 / Material : M = 锰铜合金 / MnCu alloy
- (3) 产品瓦特数 / Power Rating : Ex. 1W0=1.0 Watt
- (4) 产品阻值 / Nominal Resistance Value : Ex. 5m Ω → R005
- (5) 组件电阻偏差值 / Resistance Tolerance : Ex. D=±0.5% ; F=±1%

### 3. 产品尺寸 / PRODUCT DIMENSIONS

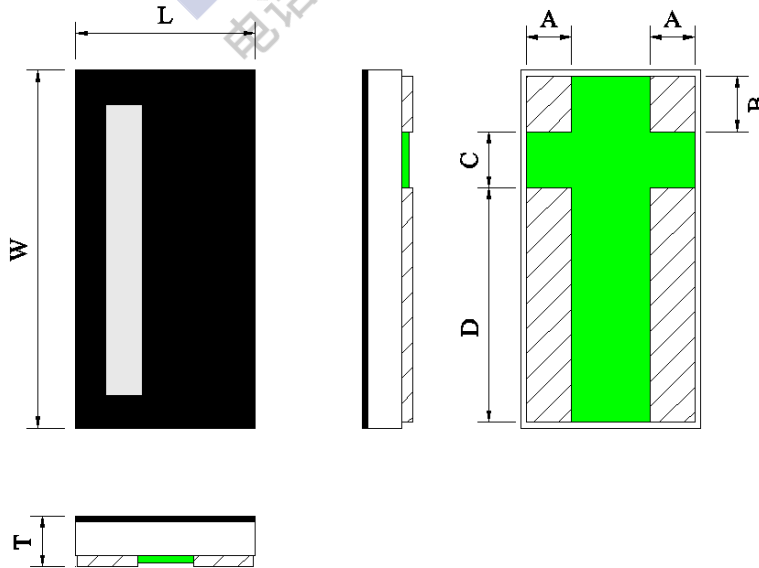


圖 1 / Fig.1

Unit(mm)

Part Number	W	L	A	B	C	D	T
HFCL0603MW33-series R001~R025	1.60±0.20	0.80±0.15	0.18±0.10	0.23±0.10	0.40±0.10	0.93±0.20	0.55±0.10
HFCL1206M1W0-series 0M50~R025	3.20±0.20	1.55±0.20	0.41±0.20	0.46±0.20	0.50±0.20	2.16±0.20	0.50±0.20

4. 产品结构及使用材料说明 (参考图 2) / STRUCTURE & MATERIAL (Ref to Fig.2)

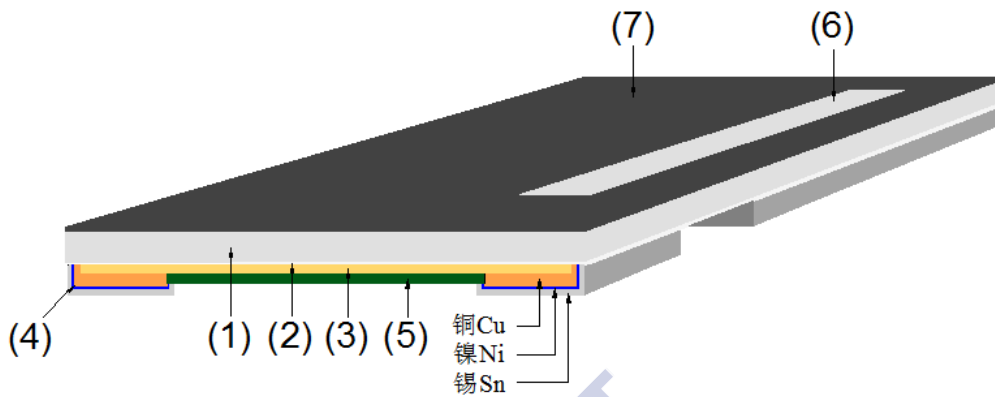


图 2 / Fig.2

- 4.1 基板 / Substrate(1) : 氧化铝陶瓷基板 / Alumina Ceramic
- 4.2 粘着层 / Adhesion layer(2) : 环氧树脂 / Epoxy
- 4.3 电阻本体 / Resistive element(3) : 铜合金 / Cu - alloy
- 4.4 端电极 / Terminal electrode(4) : 锡、镍、铜 / Sn、Ni、Cu
- 4.5 保护防焊层 / Protective coating(5) : 防火级环氧树脂,符合 UL- 94-V0 要求(绿色) /  
Flame-retardant epoxy, meets UL- 94-V0 requirements(green)
- 4.6 文印防焊层 / Marking coating(6) : 防火级环氧树脂,符合 UL- 94-V0 要求(白色) /  
Flame-retardant epoxy, meets UL- 94-V0 requirements (white)
- 4.7 文印防焊层 / Marking coating(7) : 防火级环氧树脂,符合 UL- 94-V0 要求(黑色) /  
Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

5. 电气特性 / ELECTRICAL CHARACTERISTICS

Part Number	Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm/°C)
HFCL0603MW33-series R001~R025	1~4	0.33	±1%(F)	±100
	5~25	0.33		±50
HFCL1206M1W0-series 0M50~R025	0.5~0.75	1.0	±1%(F)	±150
	1~4	1.0		±100
	5~25	1.0	±0.5%(D) / ±1%(F)	±50

规格外阻值可依客户需求提供 / We can provide other resistance value per request

6. 产品特性及信赖性测试规范 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

測試方法 Parameter	條件 Conditions	允收標準 Requirements
瞬間過載測試 / Short Time Over Load	$P = 2.5P_r$ ; $T = 25 \pm 2^\circ\text{C}$ , $t = 5\text{sec}$ .	$\pm 1.0\%$ IEC60115-1 4.13
高溫測試 / High Temp. Exposure	$T = +125 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$	$\pm 1.0\%$ MIL-STD-202, Method 108
耐濕性測試 / Moisture Resistance	$T = 40 \pm 2^\circ\text{C}$ ; $\text{RH} = 90 \sim 95\%$ ; $1000\text{h}$	$\pm 1.0\%$ JIS C 5201-1 4.24
冷熱衝擊測試 / Thermal Shock	-55 $\pm 3^\circ\text{C}$ to 125 $\pm 3^\circ\text{C}$ with 30 minute dwell at each temperature and 1 min maximum transition time. 1000 cycles. -55 $\pm 3^\circ\text{C}$ 至 125 $\pm 3^\circ\text{C}$ , 每个温度值的停留时间为 30 分钟, 每个温度之间的切换必须在 1 分钟内完成 .进行 1000 个循环	$\pm 1.0\%$ JESD22-A-104
在 70 $^\circ\text{C}$ 下负载寿命测试 / Load Life at 70 $^\circ\text{C}$	$V_{\text{test}} = V_{\text{max}}$ ; $T = 70 \pm 2^\circ\text{C}$ ; $t = 90\text{min ON}$ , 30min OFF, 1000h	$\pm 1.0\%$ IEC60115-1 4.25
可焊性測試 / Solderability	浸入錫爐 / Dip into solder at $T = 245 \pm 5^\circ\text{C}$ , $t = 3 \pm 1\text{sec}$ .	錫涵蓋面積 / The covered area > 95% IEC60115-1 4.17
抗焊熱性測試 / Resistance to Solder Heat	One reflow cycle according to JEDEC J-STD-020 followed by dip with $T = 260^\circ\text{C}$ , $t = 10\text{sec}$ . 依照 JEDEC J-STD-020 标准, 进行一个循环的回流焊, 接着冷却然后将样品浸入温度为 260 $^\circ\text{C}$ 的熔化焊锡炉中 10 秒.	Part must meet initial specifications following test JEDEC J-STD-020
機械衝擊測試 / Mechanical Shock	加速度 $a = 50\text{G}$ , 振幅时间 $t = 11\text{ms}$ $a = 50\text{G}$ , $t = 11\text{ms}$	$\pm 1.0\%$ MIL-STD-202, Method 213, Condition A
基板彎曲測試 / Substrate Bending	兩支撐點間距 / Span between fulcrums : 90mm ; 振幅 / Bend Width: 2mm ; 时间 / Time: 10s. 測試板 / Test board: 玻璃纖維板 / Glass-Epoxy Board ; 厚度 / Thickness = 1.6mm	$\pm 1.0\%$ IEC60115-1 4.33

## 7. 环境特性 / ENVIRONMENTAL CHARACTERISTIC

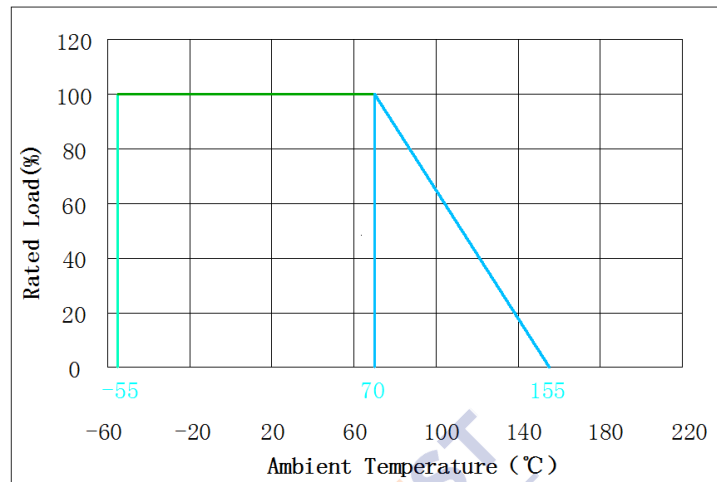
### 7-1 操作温度范围: -55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$ / Operating Temperature: -55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$

#### 额定功率温度衰变曲线 / Typical Thermal Derating Curve

额定功率乃指于 70 $^\circ\text{C}$  以内可连续满额功率使用的术语。

下图为当操作温度高于 70 $^\circ\text{C}$  时的可使用功率衰减曲线。

Power rating is based on continuous full load operation at rated ambient temperature of 70 $^\circ\text{C}$ . For resistors operated at ambient temp. in excess of 70 $^\circ\text{C}$ , the max. load shall be derated in accordance with the following curve.



### 7-2 存储条件 / STORAGE CONDITIONS

在温度+10°C~40°C、相对湿度 $\leq 75\%$ 的密闭条件下可存放2年。 /

Under airtight in temperature+10°C~40°C、relative humidity  $\leq 75\%$  can store 2 years.

在温度+10°C~60°C、相对湿度为95%的非露天下最多可存放30天。 /

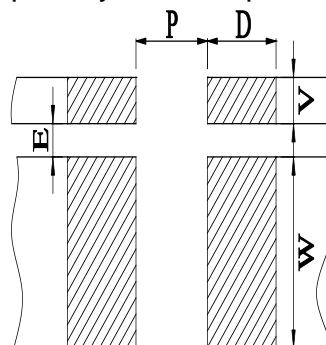
Without dew in temperature+10°C~60°C、relative humidity be 95% maximum value for 30days.

### 8. 焊锡垫尺寸及焊接条件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8-1 建议如下图焊接方式焊接，并满足所要求的尺寸。 / Propose that the following picture installation way is installed, and satisfied the required size.

Part Number	P	W	D	V	E	Loading
HFCL0603MW33-series	0.35mm	1.30mm	0.40mm	0.40mm	0.20mm	0.33W
HFCL1206M1W0-series	0.762mm	2.29mm	1.014mm	0.762mm	0.381mm	1.00W

loading : 适用于本公司建议焊垫设计并用于限定稳定电流下 /  
suit for specific pad layout and specific steady current



### 8-2 建议客户焊接参数 / Recommended Customer Soldering Parameters

8-2-1 回流焊温度曲线 / Solder reflow Temperature condition (图 3 / Fig.3)

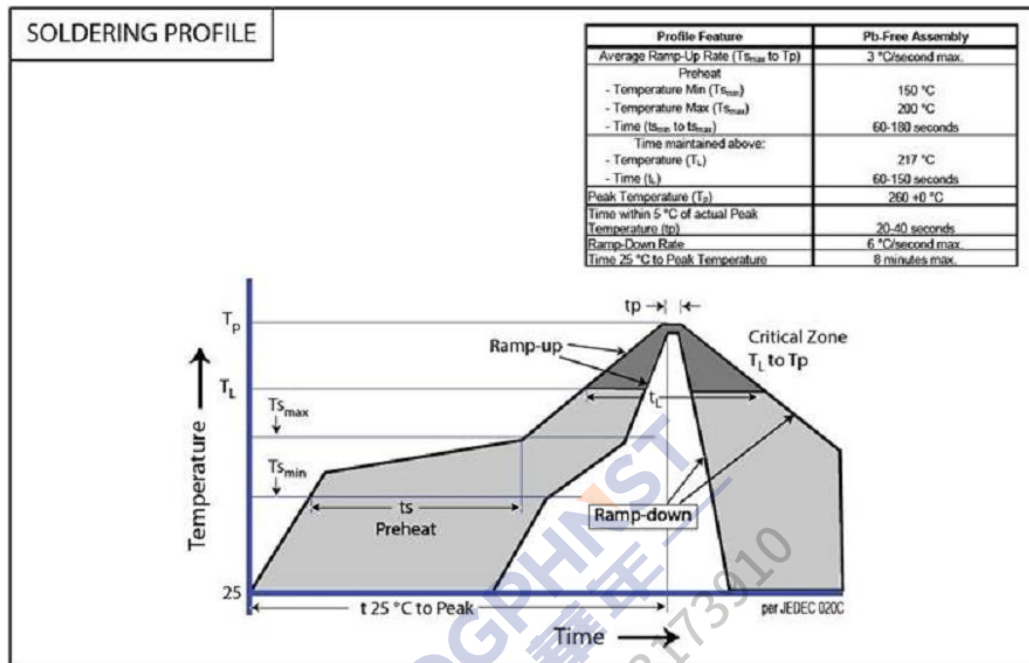


图3 / Fig.3

8-2-2 允许烙铁焊接条件(热风设备) / Rework temperature (hot air equipment) : 350°C, 3~5seconds

8-2-3 焊接方法建议 / Recommended reflow methods

焊接热源方式可用红外线, 热蒸气, 热风. / IR, vapor phase oven, hot air oven

如果焊锡温度超过允许最高温度, 则产品本身会有功能损坏的疑虑. / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

## 9. 批量生产后出货测试项目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生产均须作入库检验, 每一批生产单量不可超过500Kpcs. /

Qualification shall consist of passing a program of following tests. Parts shall be pulled from each lot and maximum lot quantity shall be within 500Kpcs.

### 9-1 外观 / Visual

方法 / Procedure : 利用放大镜进行检查 / Visual

标准 / Acceptance Criteria : 不能有脏污、不洁、文印错误、破损等 / No parts are outstandingly stained

### 9-2 尺寸 / Dimensions

方法 / Procedure : 使用合适且经校正的标尺 / As appropriate, calipers, micrometers, optical comparator, or approved gages

标准 / Acceptance Criteria : 尺寸均在标准范围内 / No parts outside specific dimensions

### 9-3 单体组件电阻( $R_o$ ) / Resistance ( $R_o$ )

方法 / Procedure : 在 25°C 下利用四线量测技术量测之 / Resistance shall be measured with 25°C in the 4-wire resistance test

标准 / Acceptance Criteria : 电阻值均在規定标准范围内 / The resistance of the test device shall be within the limits specified

#### 9-4 电阻温度系数 / TCR

方法 / Procedure : 利用四线法量测出组件分别在 25°C 及 125°C 下的电阻值, 并将其带入下面公式中即可得出 TCR 值 / Getting the sampling device resistance values measured in 25°C and 125°C and put them in to the following equation to calculate the TCR

标准 / Acceptance Criteria : 温度系数值均在規定标准范围内 / All parts must within the specific  

$$TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^6$$

#### 9-5 绝缘电阻 / Insulation resistance (Ri)

方法 / Procedure : 利用绝缘测试仪器量测 / Resistance between protective layer and resistive shall be measured by high ohm meter

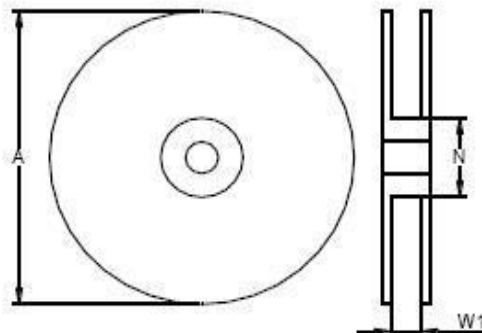
标准 / Acceptance Criteria : 防焊层与电阻本体绝缘电阻至少高于 100MΩ / The resistance of the test device shall over 100MΩ

### 10. 包装讯息 / PACKAGING INFORMATION

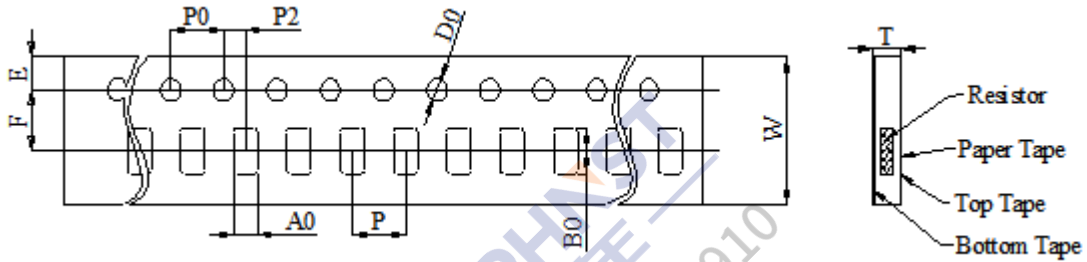
#### 10-1 包装数量、重量 / QUANTITY & WEIGHT

型号 / Type Number	数量 / Quantity (pcs)	重量 / Weight (g)
HFCL0603MW33-series	5,000	130±40
HFCL1206M1W0-series	5,000	160±40

#### 10-2 卷轮规格 / Reel & Tape specifications

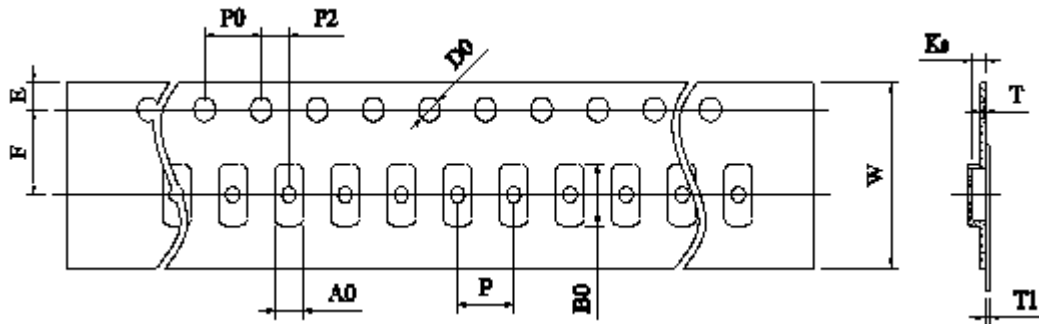


型号 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
HFCL0603MW33-series	178	60	9.0
HFCL1206M1W0-series	178	60	9.0



Unit(mm)

HFCL0603MW33-series							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	0.98 ± 0.20	B0	1.85 ± 0.20	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.75 ± 0.20	/	/	/	/



Unit(mm)

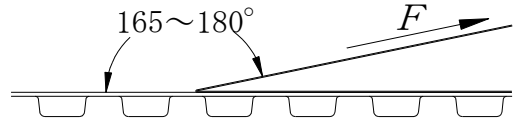
HFCL1206M1W0-series							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	1.90 ± 0.20	B0	3.50 ± 0.20	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	0.85 ± 0.20



**10-3 密封胶膜剥离强度要求 / Peeling Strength of Seal Tape**

F = 剥离强度 : 0.1 – 1.0N ( 10 - 100gf )

F = Peeling Strength: 0.1 – 1.0N (10 - 100gf )

**11. 其他 / OTHERS**

11-1 如果在使用中有超出本规格书的要求，必须经由双方协商确认。 / In the event that an impropriety is found beyond this specification ,it shall be fixed by mutual agreement between the parties.

11-2 如果本规格书有不适当的情况，必须通过双方协商并由本公司修改。 / In the event that an impropriety is found in this specification , Juneway Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties.

DG  
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