



# 承认书

## APPROVAL SHEET

客户名称: 深圳市福昌辉科技有限公司  
**Customer**

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产品名称: 绕线型片式电感器  
**Part Name** Wire Wound Chip inductor

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产品规格: FHW1008UC1R0KGT  
**Specification**

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版本号: 16.01  
**Version No.**

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日期: 2017-7-20  
**DATE**

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制造 Manufacturer			客户 Customer		
拟制 <b>Draft by</b>	审核 <b>Checked by</b>	确认 <b>Approve by</b>	检验 <b>Check by</b>	审核 <b>Checked by</b>	批准 <b>Approval by</b>
林晓华	徐雪枫	区军沛			



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## 2 外形尺寸与内部结构 Dimension & Inner-configuration:



序号 No.	部位 Component	材料 Material												
1	瓷/磁芯 Core	陶瓷芯电感 Ceramic Core: 陶瓷体 $Al_2O_3$ 铁氧体芯电感 Ferrite Core: 镍锌铁氧体 Ni-Zn ferrite												
2	电极 Electrode	<table border="1"> <thead> <tr> <th>分类 Type</th> <th>底层 Layout 0</th> <th>中层 Layout 1</th> <th>表层 Layout 2</th> </tr> </thead> <tbody> <tr> <td>陶瓷芯电感 Ceramic core</td> <td>钨或钼锰 W or Mo-Mn</td> <td>镍 Ni</td> <td>金或锡 Au or Sn</td> </tr> <tr> <td>铁氧体芯电感 Ferrite core</td> <td>银 Ag</td> <td>镍 Ni</td> <td>锡 Sn</td> </tr> </tbody> </table>	分类 Type	底层 Layout 0	中层 Layout 1	表层 Layout 2	陶瓷芯电感 Ceramic core	钨或钼锰 W or Mo-Mn	镍 Ni	金或锡 Au or Sn	铁氧体芯电感 Ferrite core	银 Ag	镍 Ni	锡 Sn
		分类 Type	底层 Layout 0	中层 Layout 1	表层 Layout 2									
		陶瓷芯电感 Ceramic core	钨或钼锰 W or Mo-Mn	镍 Ni	金或锡 Au or Sn									
铁氧体芯电感 Ferrite core	银 Ag	镍 Ni	锡 Sn											
3	漆包线 wire	铜 Cu												
4	包封层 encapsulation layer	树脂 Epoxy												
5	标识 Marking	树脂 Epoxy												

单位 Unit: mm (inch)

型号 Size	L (Max)	W (Max)	T (Max)	A	B	C	D	E
2520(1008)	2.92(0.115)	2.79(0.110)	2.10(0.083)	2.00(0.079)	0.50(0.020)	2.54(0.100)	1.02(0.040)	1.27(0.050)

## 3 产品品名构成 Product Spec. Model

FHW 1008 UC 1R0 K G T  
① ② ③ ④ ⑤ ⑥ ⑦

- ① 绕线型片式电感器系列 Wire Wound Inductor Series;
- ② 外形尺寸 Dimensions: 1008;
- ③ 芯片类型 Material: UC;
- ④ 标称电感量 Inductance: 1R0=1000nH;
- ⑤ 标称电感值偏差 Tolerance: F--- $\pm 1\%$ ; G--- $\pm 2\%$ ; J--- $\pm 5\%$ ; K--- $\pm 10\%$ ;
- ⑥ 电极表面镀层材料 Terminal: G---金端头 Gold;
- ⑦ 包装类型 Packaging type: T---卷带盘装 Tape&Reel; B---散装 Bulk。





## 5 可靠性试验项目 Reliability Testing Items

序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
1	工作温度范围 Operating Temperature Range	FHW-UC/HC series: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ FHW-UF/IF/QF/HF series: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$	
2	可焊性 Solder ability	外观不发生变化; 超过 90% 的焊锡覆盖在端电极表面 There shall be no case deformation or change in appearance. The metalized area must have more than 90% solder coverage.	在 $245 \pm 5^{\circ}\text{C}$ 熔融的焊锡 (96.5Sn/3.0Ag/0.5Cu) 中浸置 $5 \pm 1$ 秒钟。 Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at $245 \pm 5^{\circ}\text{C}$ for $5 \pm 1$ seconds.
3	耐焊接热 Soldering Heat Resistance	外观不发生变化; 感量变化不超过 $\pm 5\%$ ; Q 值变化不超过 $\pm 10\%$ 。 There shall be no case deformation or change in appearance. Inductance shall not change more than $\pm 5\%$ ; Q shall not change more than $\pm 10\%$ .	在 $260 \pm 5^{\circ}\text{C}$ 熔融的焊锡 (96.5Sn/3.0Ag/0.5Cu) 中浸置 $10 \pm 1$ 秒钟。 Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 1$ seconds.
4	介质耐压 Dielectric Withstand Voltage	外观不发生变化; 无击穿现象 here shall be no case deformation or change in appearance. No evidence of voltage breakdown.	在电感器端子和包封层间施加 500V 交流电压, 持续一分钟。 Input 500v AC between the electrodes and the resin of inductor and keep on one minute.
5	绝缘电阻 Insulation Resistance	铁氧体芯: $\geq 500\text{M}\Omega$ 陶瓷芯: $\geq 1000\text{M}\Omega$ Ferrite: $\geq 500\text{M}\Omega$ Ceramic: $\geq 1000\text{M}\Omega$	在电感器端子和包封层间施加 100V 直流电压, 持续一分钟。 Input 100v DC between the electrodes and the resin of inductor and keep on one minute.
6	端电极附着力 (推力测试) Component Adhesion (Push of test)	绕线型片式电感器: Wire Wound Chip inductor: 0402UC series: $\geq 0.45\text{Kg}$ 0603UF series: $\geq 0.9\text{Kg}$ 0603UC series、0805UF series: $\geq 1.3\text{Kg}$ Other series: $\geq 2\text{Kg}$	



序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
7	过载 Over Loading	外观不发生变化；电感器不开路。 There shall be no case deformation or change in appearance. Inductors shall not have a open winding.	将规定额定电流 2 倍的直流电流加于电感器，其电流误差为 $\pm 2\%$ ，保持 5 分钟。 Direct current of rating current between inductor terminals, Direct current error $\pm 2\%$ , and keep on five minutes.
8	振动 Vibration	无开路或短路； 感量变化不超过 $\pm 5\%$ ； Q 值变化不超过 $\pm 10\%$ 。 Inductors shall not have a shorted or open winding. Inductance shall not change more than $\pm 5\%$ . Q shall not change more than $\pm 10\%$ .	振幅 1.5mm，频率 10~55Hz，每个方向保持 2 小时。 Inductors shall be subjected to vibration of 1.5mm amplitude frequency 10~55Hz (10Hz to 55Hz to 10Hz in a period of 1 minute) for 2 hours in each of three (X、Y、Z) axes.
9	温度变化 Temperature Change	外观不发生变化； 感量变化不超过 $\pm 5\%$ ； Q 值变化不超过 $\pm 10\%$ 。 There shall be no case deformation or change in appearance. Inductance shall not change more than $\pm 5\%$ . Q shall not change more than $\pm 10\%$ .	FHW-UC/HC 系列：+125℃ 60 分钟 $\leftrightarrow$ -40℃ 60 分，钟循环 5 次； FHW-UF/IF/QF/HF 系列：+85℃ 60 分钟 $\leftrightarrow$ -40℃ 60 分，钟循环 5 次； 室温下放置一小时后测试。 FHW-UC/HC series : +125℃ 60minutes $\leftrightarrow$ -40℃ 60minutes 5 Cycles; FHW-UF/IF/QF/HF series : +85℃ 60minutes $\leftrightarrow$ -40℃ 60minutes 5 Cycles; Inductors are to be tested after 1 hour at room temperature.
10	高温 High temperature	外观不发生变化； 感量变化不超过 $\pm 5\%$ ； Q 值变化不超过 $\pm 10\%$ 。 There shall be no case deformation or change in appearance. Inductance shall not change more than $\pm 5\%$ . Q shall not change more than $\pm 10\%$ .	FHW-UC/HC 系列产品放置于温度+125 $\pm 5$ ℃的环境中存放 96 $\pm 2$ 小时； FHW-UF/IF/QF/HF 系列产品放置于温度+85 $\pm 5$ ℃的环境中存放 96 $\pm 2$ 小时； 在室温下放置 1 小时后进行测试。 FHW-UC/HC series shall be subjected to +125 $\pm 5$ ℃ for 96 $\pm 2$ hours; FHW-UF/IF/QF/HF series shall be subjected to +85 $\pm 5$ ℃ for 96 $\pm 2$ hours; Inductors are to be tested after one hour at room temperature.



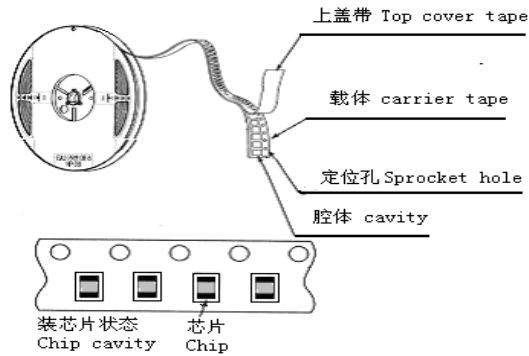
序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
11	低温 Low temperature	外观不发生变化; 感量变化不超过 $\pm 5\%$ ; Q 值变化不超过 $\pm 10\%$ There shall be no case deformation or change in appearance. Inductance shall not change more than $\pm 5\%$ . Q shall not change more than $\pm 10\%$	将电感器放置于温度 $-40 \pm 2^\circ\text{C}$ 的环境中存放 $96 \pm 2$ 小时, 然后在室温下放置 1 小时后进行测试。 Inductors shall be subjected to $-40 \pm 2^\circ\text{C}$ for $96 \pm 2$ hours. Inductors are to be tested after one hour at room temperature.
12	恒定湿热 Static Humidity	外观不发生变化; 感量变化不超过 $\pm 5\%$ ; Q 值变化不超过 $\pm 10\%$ There shall be no case deformation or change in appearance. Inductance shall not change more than $\pm 5\%$ . Q shall not change more than $\pm 10\%$ .	将电感器放置在于湿度 $93 \pm 3\%$ , 温度 $50 \pm 2^\circ\text{C}$ 的环境中存放 $96 \pm 2$ 小时, 经过 1 小时的风干后进行测试。 Inductors shall be subjected to $93 \pm 3\%$ R.H. at $50 \pm 2^\circ\text{C}$ for $96 \pm 2$ hours. Inductors are to be tested after having air dried for one hou.
13	耐久性 durability (Life)	电感器不应短路或断路。 Inductors shall not have a shorted or open winding.	FHW-UC/HC 系列产品加额定电流在 $125 \pm 2^\circ\text{C}$ 温度条件下存放 1000 小时; FHW-UF/IF/QF/HF 系列产品加额定电流在 $85 \pm 2^\circ\text{C}$ 温度条件下存放 1000 小时; 然后在室温下放置 4 小时后进行测试。 FHW-UC/HC series shall be store at $125 \pm 2^\circ\text{C}$ for 1000 hours with rated current applied; FHW-UF/IF/QF/HF series shall be store at $85 \pm 2^\circ\text{C}$ for 1000 hours with rated current applied; Inductors shall be tested after four hours at room temperature.





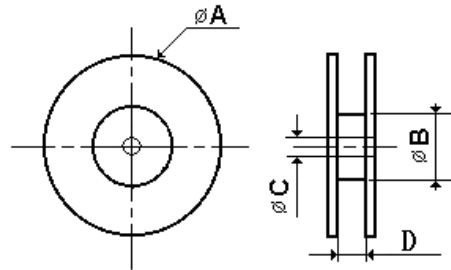
## 6 产品包装 Packaging

### 1) 编带图 Taping drawings

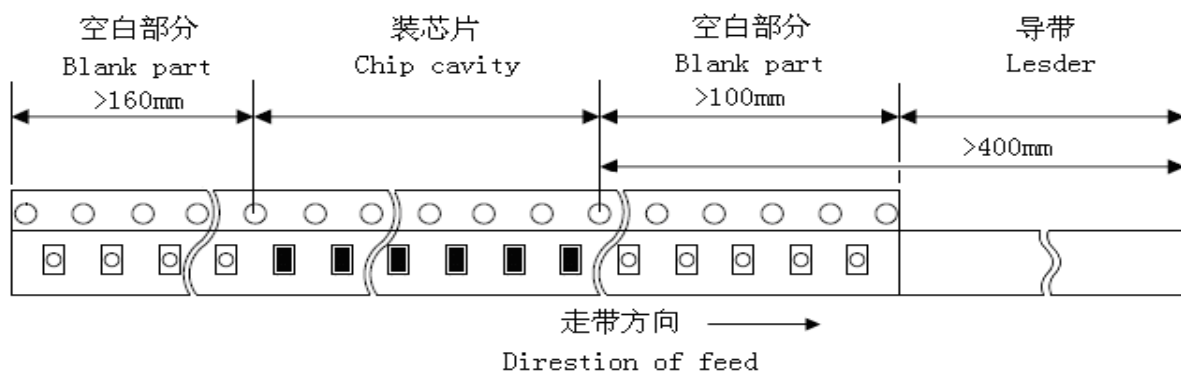


### 2) 卷盘尺寸 Reel dimensions (Unit:mm)

Part NO.	$\Phi A$ typ.	$\Phi B$ typ.	$\Phi C$ typ.	D typ.
1008	178	60	13	8.4

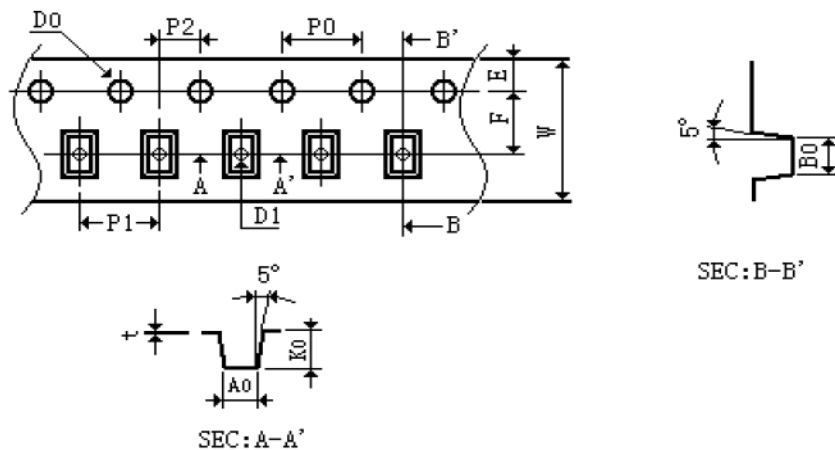


### 3) 导带及空格部分 Leader and blank portion



### 4) 编带尺寸 Taping dimensions (Unit: mm)

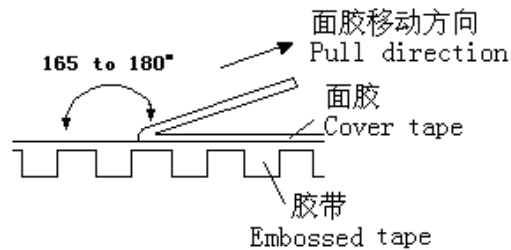
- 塑料胶带 Embossed tape





Part NO.	0603	0805	1008	1210	1812
W	8.00	8.00	8.00	8.00	12.00
E	1.75	1.75	1.75	1.75	1.75
F	3.50	3.50	3.50	3.50	5.50
D0	1.50	1.50	1.50	1.50	1.50
D1	0.50	0.65	0.65	0.65	1.50
P0	4.00	4.00	4.00	4.00	4.00
P1	4.00	4.00	4.00	4.00	8.00
P2	2.00	2.00	2.00	2.00	2.00
P0×10	40.00	40.00	40.00	40.00	40.00
t	0.23	0.23	0.25	0.23	0.25
A0	1.15	1.85	2.73	2.96	3.22
B0	1.85	2.45	2.90	3.60	4.82
K0	0.95	1.50	2.34	2.40	2.98

5) 剥离力检验 Peeling off force



①盖带的剥离力要求 Peeling required

0402~1210 系列 : 20 克~80 克 0402~1210 series : 20g~80g

②测试条件 Test condition

盖带剥离速度: 300mm/min±10%

Speed of peeling off : 300mm/min±10%

盖带剥离角度: 165° ~180°

Angle of peeling off: 165° ~180°

6) 包装数量 (单位: 粒) Packaging number (Unit: Pcs )

类型 Size		1812	1210	1008	0805	0603	0402
每卷数量 Per Reel		2000	2000	2000	3000	4000	5000
每盒数量 Per Box	3 卷盒	-----	6000	6000	9000	12000	15000
	5 卷盒	10000	10000	10000	15000	20000	25000
	10 卷盒	-----	20000	20000	30000	40000	50000
每箱数量 Per Case	1.5 盒箱	-----	30000	30000	45000	60000	75000
	3 盒箱	-----	60000	60000	90000	120000	150000
	4 盒箱	-----	80000	80000	120000	160000	200000
	5 盒箱	-----	120000	120000	180000	240000	300000
	大 3 盒箱	30000	-----	-----	-----	-----	-----



## 6) 标签粘贴位置 Label stick station

卷盘标签	纸盒标签	纸盒标签	外箱标签
			

## 7 推荐焊接条件 Recommend Soldering Conditions

### 1) 焊接条件 Soldering Conditions

本产品建议使用回流焊接法。

Applicable soldering process to the products is reflow soldering.

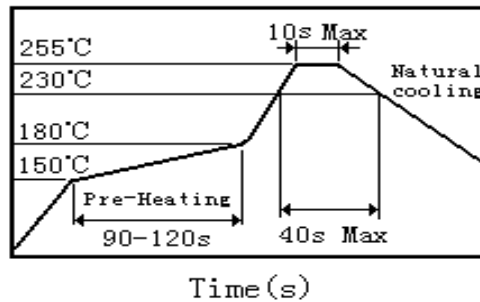
#### ① 焊剂要求 Flux, Solder

- 使用松香基助焊剂，禁止使用卤化物含量超过 0.2(wt)% 的强酸性助焊剂。  
Don't use highly acidic flux with halide content exceeding 0.2(wt)%(chlorine conversion value).
- 使用无铅焊料 (96.5Sn /3.0Ag/0.5Cu)。  
Using lead-free solder (96.5Sn /3.0Ag/0.5Cu)。

#### ② 焊接要求 Soldering conditions

- 预热时，产品表温与焊料温度的温差最大不允许超出 150℃，焊接完冷却时，产品表温与溶剂温度之间的温差最大不超过 100℃。预热不足有可能引发产品表面裂纹，从而导致产品品质下降。  
Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150℃ max. Also cooling into solvent after soldering should be in such way that the temperature difference is limited to 100℃ max. Un-enough pre-heating may cause cracks on the ferrite, resulting in the deterioration of product quality.
- 产品要在以下画出的曲线允许的范围进行焊接。其它焊接条件可能引起产品电极的腐蚀。当焊接重复时，允许的时间为第一次做的累计时间。  
Products should be soldered within the following allowable range indicated by the slanted line. The excessive soldering conditions may cause the corrosion of the electrode. When soldering is repeated, allowable time is the accumulated time.

### 2) 回流焊曲线 Reflow soldering profile



### 3) 手工焊接 Iron soldering

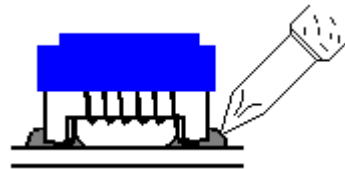
烙铁温度：350°C (Max)

功率：最大为 30W

烙铁停留时间：<5S (注意不要将烙铁碰到产品线圈及包封层)。

Perform soldering at 350°C on 30W max.

Soldering Time: < 5S (Take care not to apply the tip of the soldering iron to the terminal electrodes)。



## 8 清洗 Cleaning

### 1) 清洗条件 Cleaning Conditions

a. 清洗温度：60°C (Max)      Cleaning temperature: 60°C max.

b. 清洗时间：5 分钟 (Max)      Cleaning time: 5 minutes Max.

c. 超声波功率：最大为 200W      Ultrasonic output power: 200W max.

## 9 存储要求 Storage Requirements

### 1) 存储期限 Storage period

距电感公司出厂检验时间 6 个月内，产品可以使用检验时间可以通过包装外侧标记的检验号确认。若时间超过 6 个月，应检查焊接性能后方可使用。

Products which inspected in INDUCTOR COMPANY over 6 months ago should be examined and used, which can be Confirmed with inspection No. marked on the container. Solder ability should be checked if this period is exceeded.

### 2) 存储条件 Storage conditions

(1) 存放货物的库房应满足以下条件：温度：-10 ~ +40°C，相对湿度：30 ~ 70%。

(2) 禁止将产品保管在腐蚀性物质中，如硫磺、氯气或酸，否则将引起端头氧化，导致降低焊接性。

(3) 为了避免受潮气、灰尘等物质的影响，产品应保管于货架上。

(4) 产品保管在库房中，应避免热冲击、振动以及直接光照等等。

(5) 产品应密封包装。



(1) Products should be storage in the warehouse on the following conditions:

Temperature : -10~+40°C      Humidity: 30~70% relative humidity

(2) Don't keep products in corrosive gases such as sulfur, chlorine gas or acid , or it may case oxidization of Electrodes resulting in poor solder ability.

(3) Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.

(4) Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.

(5) Products should be stored under the airtight packaged condition.

## 10 ODS（消耗臭氧层物质）的使用情况 Usage Of ODS

对于以下所列物质，我公司在生产过程中绝不使用。

ODS: CCl<sub>4</sub>（四氯化碳）、HCFC 等。

For ODS listed below , we don't use in process。

ODS: CCl<sub>4</sub>, HCFC, etc.

## 11 注意事项 Notes

(1) RoHS 指令 Response to RoHS directive

本公司产品符合 RoHS 指令。

Our products are RoHS compliance.

(2) 本承诺书保证我司产品作为一个单体时的质量情况，当我司产品被安装到贵司产品上时请保证贵司的产品已根据贵司的规范进行了有效评价和确认。

This product specification guarantees the quality of our product as a single unit, Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.

(3) 如果贵司对我司产品的试用已超过了本测试规范所界定的产品功能，对于此所引发的失效我司将不予保证。

We can't warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.

(4) 为防止断线，请不要使用锋利的物体接触线圈，如镊子。

Do not touch wire with sharp objects such as tweezers to prevent wire breakage.