

■ 绕线型片式铁氧体电感器

Wire Wound Chip Ferrite Inductors

◆ 特征 Feature

- * 体积小，适合高密度表面贴装
Small Size For SMT.
- * 采用端电极结构，很好地抑制了引线引起的寄生元件效应，具有高可靠性
Using Terminal Electrode Structure To Restrain The Parasitic Component Effect Quite Caused By Lead.
- * 低电阻、高电流和高电感量
Low DC Resistance , High Current And High Inductance.
- * 优良的焊接性和耐焊性
Excellent In Solder Ability And Heat Resistance.



◆ 应用 Application

- * 视听设备、无线通讯设备和各类通用电子设备
Wireless Communication Equipment And Various Types Of General Electronic Equipment.
- * 蓝牙模块, 音频电路
Bluetooth Audio Circuit.
- * 其它电子设备
Other Electronic Equipment.

◆ 型号表示法 Part Number

FHD	0402	IF	R68	J	S	T
①	②	③	④	⑤	⑥	⑦

① 产品类型 Product Type:

FHD: 绕线型片式电感器系列

FHD: Wire Wound Inductor Series

② 尺寸 Dimensions: 0402(1.0×0.5mm)、0603(1.6×0.8mm)

③ 材料代号 Material Code: PF/IF---铁氧体芯 Ferrite core

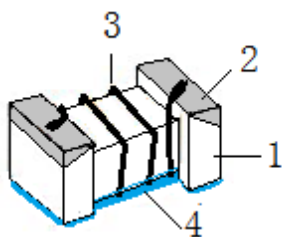
④ 标称电感量 Inductance: 010=10nH、R10=100nH、1R0=1.0μH、100=10μH

⑤ 标称电感值偏差 Tolerance: J---±5%; K---±10%; M---±20%

⑥ 电极表面镀层材料 Terminal: S---锡端头 Tin

⑦ 包装 Packaging: T: 编带包装 Tape & Reel

◆ 产品结构 Product Structure

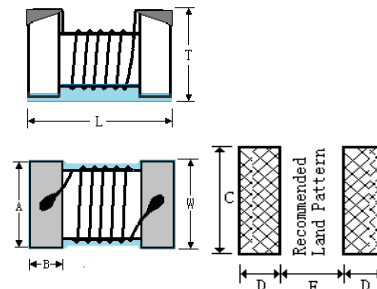


序号 No.	部位 Component	材料 Material
1	磁芯 Core	镍锌铁氧体 Ni-Zn ferrite
2	电极 Electrode	锡 Sn
3	漆包线 wire	铜 Cu
4	封装层 encapsulation layer	树脂 UV Adhesive

◆规格尺寸 Dimension

单位 Unit: mm (inch)

Size	L (Max)	W (Max)	T (Max)	A(typ)	B(typ)	C(typ)	D(typ)	E(typ)
FHD04021F	1.19 (0.047)	0.66 (0.026)	0.60 (0.024)	0.50 (0.020)	0.23 (0.009)	0.66 (0.026)	0.36 (0.014)	0.46 (0.018)
FHD06031F	1.80 (0.071)	1.20 (0.047)	1.10 (0.039)	0.90 (0.035)	0.35 (0.014)	1.02 (0.040)	0.64 (0.025)	0.70 (0.028)
FHD0603PF	1.80 (0.071)	1.20 (0.047)	1.10 (0.039)	0.90 (0.035)	0.35 (0.014)	1.02 (0.040)	0.64 (0.025)	0.70 (0.028)



◆工作温度范围 Operating Temperature Range

工作温度范围: -40℃~+85℃

Operating Temperature Range: -40℃~+85℃

◆电性能参数 ELECTRICAL CHARACTERISTICS

* 测试条件 Testing conditions

电感量/Q 值 Inductance/ Q: HP4286A 或 E4982A 电桥或等同测量仪器, 测试电压 500mV。HP4286A or E4982A bridge or equivalent measuring instrument, test voltage 500mV.

直流电阻 Rdc: HP4286A、RM3542 或等同测量仪器。HP4286A、RM3542 or equivalent measuring instrument.

额定电流 Rated current: 施加额定电流, 04021F/06031F 系列产品表面温升不超过 20℃, 0603PF 系列产品表面温升不超过 40℃。使用直流电流源、LCR 测试仪与温表测试。Apply rated current, the surface temperature rise of 04021F/06031F series products shall not exceed 20℃, and the surface temperature rise of 0603PF series products shall not exceed 40℃. Use a DC current source, LCR tester, and temperature gauge for testing.

04021F Type

型号 Part NO	电感量 Inductance (nH)	偏差范围 Tolerance	自谐振频率 SRF (MHZ) Min	最大直流电阻 Rdc (Ω) Max	额定电流 Idc(mA) Max
FHD04021FR16□ST	160@100MHz	J,K	900	0.33	480
FHD04021FR18□ST	180@100MHz	J,K	1000	0.312	560
FHD04021FR22□ST	220@100MHz	J,K	1400	0.47	450
FHD04021FR27□ST	270@100MHz	J,K	730	0.52	420
FHD04021FR33□ST	330@100MHz	J,K	520	0.56	390
FHD04021FR39□ST	390@100MHz	J,K	450	0.62	370
FHD04021FR47□ST	470@10MHz	J,K	380	0.66	350
FHD04021FR56□ST	560@10MHz	J,K	300	0.71	300

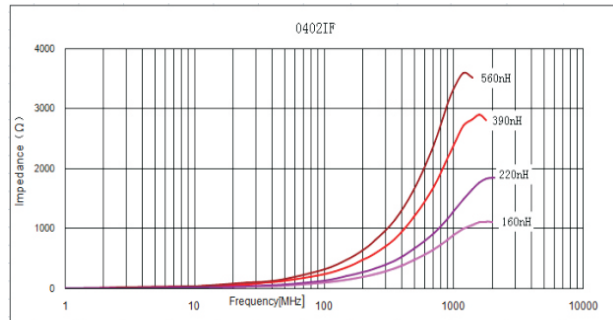
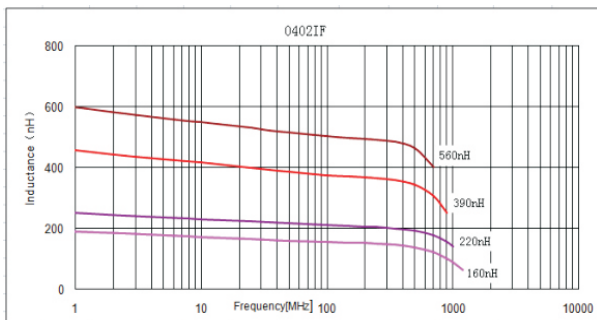
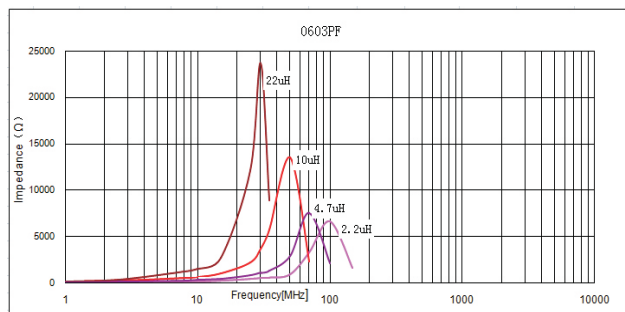
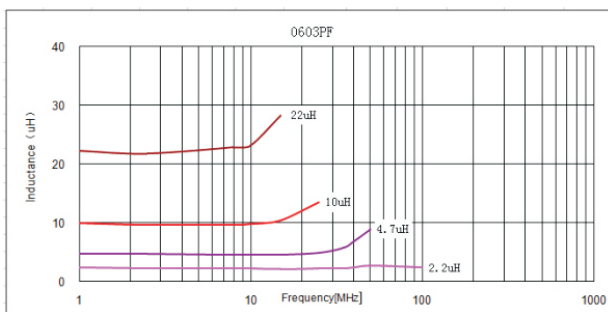
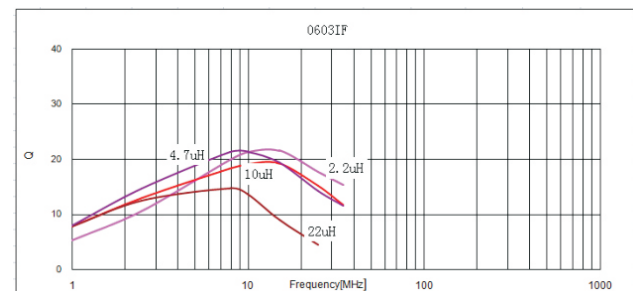
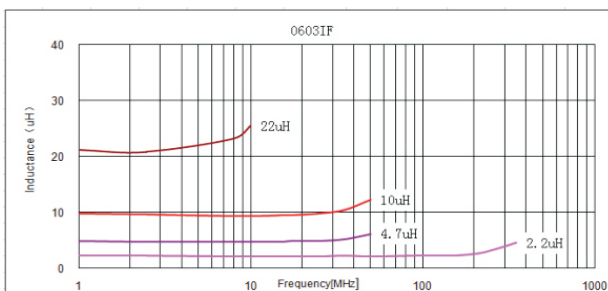
06031F Type

型号 Part NO	电感量 Inductance (μH)	偏差范围 Tolerance	Q 值 Q (Min)	自谐振频率 SRF (MHZ) Min	最大直流电阻 Rdc (Ω) Max	额定电流 Idc(mA) Max
FHD06031F2R2□ST	2.2@7.9MHz	J,K	12	180	2.3	280
FHD06031F4R7□ST	4.7@7.9MHz	J,K	12	80	4.0	200
FHD06031F6R8□ST	6.8@7.9MHz	J,K	10	28	3.9	200
FHD06031F100□ST	10@2.5MHz	J,K	10	25	4.8	180
FHD06031F150□ST	15@2.5MHz	J,K	9	18	8.5	150
FHD06031F220□ST	22@2.5MHz	J,K	9	10	12.0	100

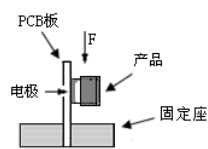
0603PF Type

型号 Part NO	电感量 Inductance (μ H)	偏差范围 Tolerance	自谐振频率 SRF (MHZ) Min	最大直流电阻 Rdc (Ω) Max	额定电流 Idc(mA) Max
FHD0603PF1R0□ST	1.0@7.9MHz	K,M	200	0.32	860
FHD0603PF1R5□ST	1.5@7.9MHz	K,M	100	0.40	720
FHD0603PF1R8□ST	1.8@7.9MHz	K,M	95	0.56	640
FHD0603PF2R2□ST	2.2@7.9MHz	K,M	80	0.73	600
FHD0603PF4R7□ST	4.7@7.9MHz	K,M	40	1.26	400
FHD0603PF5R6□ST	5.6@7.9MHz	K,M	37	1.70	380
FHD0603PF6R8□ST	6.8@7.9MHz	K,M	34	1.95	340
FHD0603PF100□ST	10@2.5MHz	K,M	25	2.40	280
FHD0603PF150□ST	15@2.5MHz	K,M	23	3.40	240
FHD0603PF220□ST	22@2.5MHz	K,M	19	4.70	200

注：可根据客户需求做定制产品。 Note: Customized products can be made according to customer needs.

◆ 产品特性曲线图 Product Characteristic Curve
FHD0402 Type

FHD0603PF Type

FHD0603IF Type


◆可靠性测试方法 Reliability Test Method

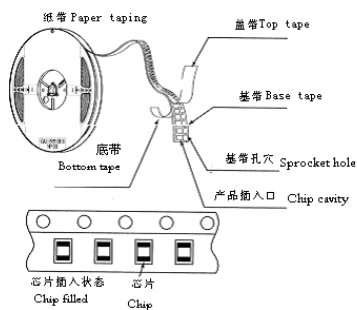
序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks								
1	可焊性 Solder Ability	①外观无可见损伤痕迹; No visible mechanical damage. ②端电极表面焊锡覆盖率（不包含焊点）。 Electrode surface solder coverage （Except exposed wire）. FHD-PF/IF series: ≥80%。	在 245±3℃熔融的焊锡（96.5%Sn/3.0%Ag/0.5%Cu）中浸置 3±0.3s。 Dip pads in flux and dip in solder pot(96.5Sn/3.0Ag/0.5Cu)at 245±3℃ for 3±0.3s.								
2	耐焊接热 Resistance To Soldering	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过±5%； 0603PF 系列: 感量变化不超过±10%； 0402IF/0603IF:Inductance shall not change more than ±5%; 0603PF:Inductance shall not change more than ±10%; ③0603IF 系列: Q 值变化不超过±20%。 0603IF series:Q shall not change more than±20%。	在 260±5℃熔融的焊锡（96.5%Sn/3.0%Ag/0.5%Cu）中浸置 10±1s。 Dip pads in flux and dip in solder pot(96.5Sn/3.0Ag/0.5Cu)at 260±5℃ for 10±1s.								
3	振动 Vibration	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过±5%； 0603PF 系列: 感量变化不超过±10%； 0402IF/0603IF:Inductance shall not change more than ±5%; 0603PF:Inductance shall not change more than ±10%; ③0603IF 系列: Q 值变化不超过±20%。 0603IF series:Q shall not change more than±20%。	振幅 1.5mm，频率 10Hz ~55Hz~10Hz（1 min.），每个方向(X、Y、Z)保持 2 小时。 Frequency 10Hz to 55Hz to 10Hz in a period of 1 minute.for 2h in each of three(X、Y、Z) axes.								
4	端电极强度 Adhesion Of Electrode	①试验后端电极无脱落; The end electrode did not fall off after the test. ②外观无可见损伤痕迹。 No visible mechanical damage.	将产品焊在 PCB 板上，按下图、表所示方向及要求施加作用力。Weld the product on the PCB board, and apply force as shown in the diagram, direction and requirement. <div></div> <table><tr><th>尺寸规格 Size</th><th>施加力要求</th></tr><tr><td>0402IF Series</td><td>3 N</td></tr><tr><td>0603PF/IF Series</td><td>7 N</td></tr><tr><td colspan="2">Keep time: (10±1)s</td></tr></table>	尺寸规格 Size	施加力要求	0402IF Series	3 N	0603PF/IF Series	7 N	Keep time: (10±1)s	
尺寸规格 Size	施加力要求										
0402IF Series	3 N										
0603PF/IF Series	7 N										
Keep time: (10±1)s											

5	耐低温 Low Temperature Resistance	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过 $\pm 5\%$; 0603PF 系列: 感量变化不超过 $\pm 10\%$; 0402IF/0603IF: Inductance shall not change more than $\pm 5\%$; 0603PF: Inductance shall not change more than $\pm 10\%$; ③0603IF 系列: Q 值变化不超过 $\pm 20\%$ 。 0603IF series: Q shall not change more than $\pm 20\%$.	产品放置于温度 $-40\pm 2^{\circ}\text{C}$ 的环境中存放 1000h Shall be subjected to $-40\pm 2^{\circ}\text{C}$ for 1000h
6	耐高温 High Temperature Resistance	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过 $\pm 5\%$; 0603PF 系列: 感量变化不超过 $\pm 10\%$; 0402IF/0603IF: Inductance shall not change more than $\pm 5\%$; 0603PF: Inductance shall not change more than $\pm 10\%$; ③0603IF 系列: Q 值变化不超过 $\pm 20\%$ 。 0603IF series: Q shall not change more than $\pm 20\%$.	产品放置于温度 $+85\pm 5^{\circ}\text{C}$ 的环境中存放 1000h Shall be subjected to $+85\pm 5^{\circ}\text{C}$ for 1000h
7	温度冲击 Temperature Shock	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过 $\pm 5\%$; 0603PF 系列: 感量变化不超过 $\pm 10\%$; 0402IF/0603IF: Inductance shall not change more than $\pm 5\%$; 0603PF: Inductance shall not change more than $\pm 10\%$; ③0603IF 系列: Q 值变化不超过 $\pm 20\%$ 。 0603IF series: Q shall not change more than $\pm 20\%$.	$+85^{\circ}\text{C}$ 30 分钟 \longleftrightarrow -40°C 30 分钟, 循环 100 次; $+85^{\circ}\text{C}$ 30minutes \longleftrightarrow -40°C 30minutes 100 Cycles.
8	高温负载 High Temperature Load	①外观无可见损伤痕迹; No visible mechanical damage. ②0402IF/0603IF: 感量变化不超过 $\pm 5\%$; 0603PF 系列: 感量变化不超过 $\pm 10\%$; 0402IF/0603IF: Inductance shall not change more than $\pm 5\%$; 0603PF: Inductance shall not change more than $\pm 10\%$; ③0603IF 系列: Q 值变化不超过 $\pm 20\%$ 。 0603IF series: Q shall not change more than $\pm 20\%$.	产品加额定电流在 $85\pm 2^{\circ}\text{C}$ 温度条件下存放 1000h shall be store at $85\pm 2^{\circ}\text{C}$ for 1000h with rated current applied.

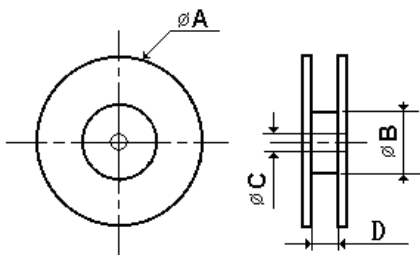
9	恒定湿热 Static Humidity	①外观无可见损伤痕迹; No visible mechanical damage. ②04021F/06031F: 感量变化不超过 $\pm 5\%$; 0603PF 系列: 感量变化不超过 $\pm 10\%$; 04021F/06031F: Inductance shall not change more than $\pm 5\%$; 0603PF: Inductance shall not change more than $\pm 10\%$; ③06031F 系列: Q 值变化不超过 $\pm 20\%$ 。 06031F series: Q shall not change more than $\pm 20\%$.	将电感器放置于湿度 90%~95%, 温度 $60 \pm 2^\circ\text{C}$ 的环境中存放 1000h Inductors shall be subjected to 90%~95%RH. at $60 \pm 2^\circ\text{C}$ for 1000h
10	抗弯强度 Bending Strength	外观无可见损伤痕迹; No visible mechanical damage.	①将电感器安装于试验基板上; 在垂直方向施加力。Install the inductor on the test substrate; Apply force in the vertical direction. ②该板应在 (1 ± 0.5) mm/s 的弯曲速率向下弯曲 (2 ± 0.2) mm, 保持时间 (30 ± 1) s。The epoxy plate should bend down to (2 ± 0.2) mm at the bending rate of (1 ± 0.5) mm/s, Keep time (30 ± 1) sec.

◆包装 Packaging

* 编带图 Taping drawings

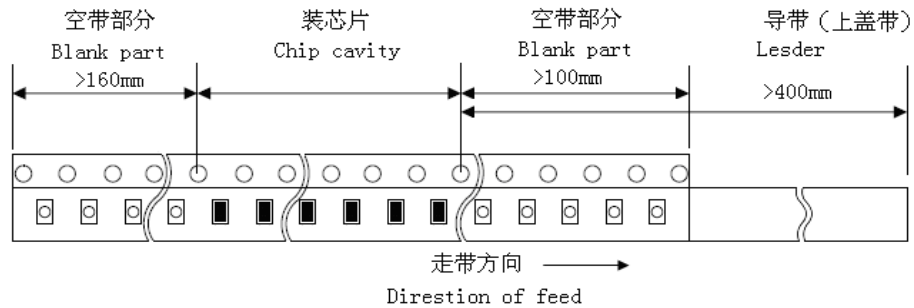


* 卷盘尺寸 Reel dimensions (Unit:mm)



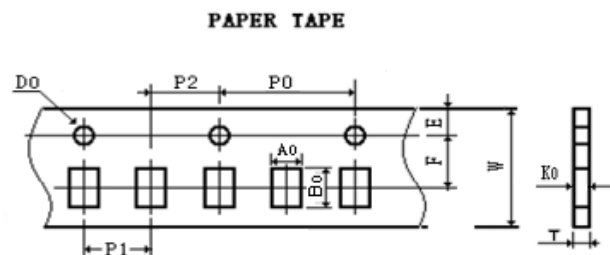
Part NO.	ΦA typ.	ΦB typ.	ΦC typ.	D typ.
0402-0603	178	60	13	8.4

* 导带及空格部分 Leader and blank portion



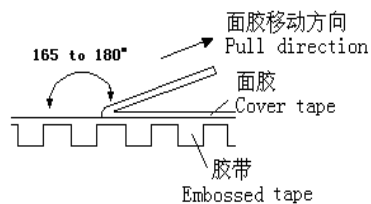
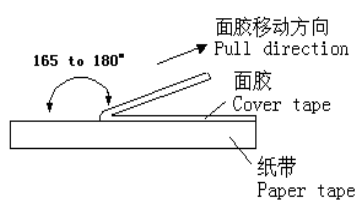
* 编带尺寸 Taping dimensions (Unit: mm)

纸带 Paper tape



Part NO.	W	E	F	D0	P0	P1	P2	P0×10	A0	B0	K0	T
0402	8.00	1.75	3.50	1.55	4	2	2	40	0.66	1.20	0.60	0.75
0603	8.00	1.75	3.50	1.55	4	4	2	40	1.20	1.90	1.05	1.15

* 剥离力检验 Peeling off force



盖带的剥离力要求 Peeling required

0402~0603 series : 10g~80g

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°

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

尺寸 Size		0402	0603
每卷数量 Per Reel		5000	4000
每盒数量 Per Box	3 卷盒	15000	12000
	5 卷盒	25000	20000
	10 卷盒	50000	40000
每箱数量 Per Case	1.5 盒箱	75000	60000
	2 盒箱	100000	80000
	3 盒箱	150000	120000
	4 盒箱	200000	160000
	6 盒箱	300000	240000

◆ 推荐焊接条件 Recommended Soldering Conditions

* 焊接条件 Soldering Conditions

本产品使用回流焊接法。

Applicable soldering process to the products is reflow soldering.

* 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)。

* 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.

* 回流焊曲线 Reflow soldering profile

预热条件: 150~200℃/60~120 秒

Preheat condition: 150 ~200℃/60~120sec

最大温度: 260℃

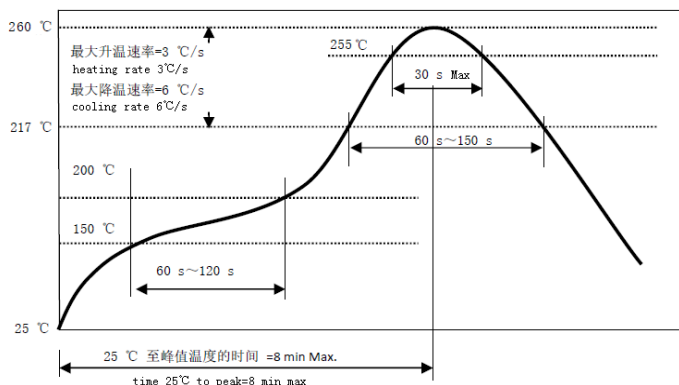
max temp: 260 °C

最高温的最大时间: 10 秒

max time at max temp: 10 sec

回流焊次数: 最多 3 次

Allowed Reflow time: 3x max



* 手工焊接 Iron soldering

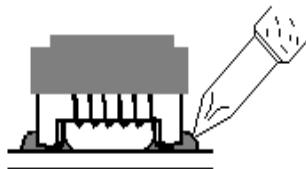
烙铁温度: 350℃ (Max)

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℃ on 30W max.

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



◆ 贮存方法 Storage Methods

* 存储期限 Storage period

距电感公司出厂检验时间 1 年内正常使用。若时间超过 1 年, 应检查焊接性能后方可使用。

Please use the products within 1 year since the factory inspection before the delivery, the welding performance should be checked before use if the storage time exceeds 1 year.

* 存储条件 Storage conditions

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

Products should be storage in the warehouse on the following conditions:

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

* 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。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.

* 为了避免受潮气、灰尘等物质的影响, 产品应保管于货架上。

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

* 产品保管在库房中, 应避免热冲击、振动以及直接光照等等。

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

* 产品应密封包装。

Products should be stored under the airtight packaged condition.

◆ 使用注意事项 Precautions For Use

* 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.

* 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.

* 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.

<p>正确方法 Correct method</p> <p>(夹端头两端 Tweezers should support on both sides of the chip)</p>	<p>错误方法 Wrongly method</p> <p>(夹到产品线圈 Tweezers should not support on enameled wire of the chip)</p>
 	     

[illegible]

Note: The above content is the specification of products, Fenghua reserves the right to modify this content without prior notice, and any product changes will be notified to customers via PCN.