

# 规格承认书

## Product acknowledgment

产品名称：涂覆型无胶单面挠性覆铜板

Products name: 2-layer FCCL

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产品规格：SL 0503SEL250A SMC

Product Code:

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供应商名称：广东生益科技股份有限公司

地址：广东省东莞市松山湖高新技术产业开发区工业西路 5 号，邮编 523808。

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## 一、产品说明 Product description

本产品主要以 IPC-4204/25 标准进行品质管控，系用作挠性印制电路的基材。产品所有之检测方法主要参照 IPC-TM-650 标准相应章节。本产品承认书没有纳入的性能规范和测试方法等项目，以行业公认的 IPC 标准为依据。

Quality controlled of this product is mainly according to IPC-4204/25 standards, which used for flexible printed circuit Base material . All the test methods of product are reference to IPC-TM-650 corresponding chapter. The projects such as property specifications and test methods which not included in this specification, based on the industry recognized IPC standards.

## 二、产品介绍 Product introduce

### 1、产品结构 Product structure

|                     |
|---------------------|
| 载体铜箔 Carrier Copper |
| 3um 电解铜箔 Copper     |
| 12.5um 聚酰亚胺 PI      |

### 2、编码说明 Code description

例如：

|           |           |           |          |          |          |             |          |          |          |
|-----------|-----------|-----------|----------|----------|----------|-------------|----------|----------|----------|
| <u>SL</u> | <u>05</u> | <u>03</u> | <u>S</u> | <u>E</u> | <u>L</u> | <u>250A</u> | <u>S</u> | <u>M</u> | <u>C</u> |
| ①         | ②         | ③         | ④        | ⑤        | ⑥        | ⑦           | ⑧        | ⑨        | ⑩        |

|   |                                                         |
|---|---------------------------------------------------------|
| ① | SL-涂覆型无胶单面挠性覆铜板系列编码 Casting Type Single Side 2L-FCCL    |
| ② | PI 层厚度 PI Thickness: 02-0.2mil, 05-1/2mil, 10-1mil..... |
| ③ | 铜箔厚度 Copper Thickness: 03-3μm(载体铜箔)                     |
| ④ | 板子类型 FCCL Type: S-Single side;D-Double side 双面板         |
| ⑤ | 铜箔类型 Copper Type: E-电解铜箔                                |
| ⑥ | 配方版本                                                    |
| ⑦ | 幅宽 Width: 250-250mm, 500-500mm<br>等级 grade: A-A 级       |
| ⑧ | PI 厂家 PI Supplier: S-ShengYi 生益自制                       |
| ⑨ | 铜箔厂家 Copper Supplier: M-Mitsue 三井                       |
| ⑩ | 铜箔特性 Copper Feature: C-载体铜箔                             |

### 三、产品品质 Product quality

#### 1、外观品质 Appearance quality

无胶单面覆铜板外观平整，不应有孔洞、撕裂和缺胶；PI 膜内不允许有金属性夹杂物，非金属性夹杂物在任何方向的尺寸应不大于 0.50mm。PI 层应没有影响使用的条纹、胶粒、色斑和脏污。

2-layer FCCL should be smooth, no holes, tears and lack of adhesive; PI film does not allow metallic inclusions, the size of non-metallic inclusions in any direction shall less than 0.50mm. PI layer should be no stripes, particles, stains and dirt which affecting use.

#### 2、物理性能 Physical Property

| Test Items<br>检测项目                | Treatment<br>Condition<br>实验条件         | Units<br>单位   | Index of<br>quality<br>品质标准 | Typical<br>Value<br>实测值 | Test method<br>测试方法    |
|-----------------------------------|----------------------------------------|---------------|-----------------------------|-------------------------|------------------------|
| Thickness<br>厚度                   | A                                      | $\mu\text{m}$ | $\pm 10\%$                  | 15.5                    | 生益企标<br>Shengyi method |
| Length<br>长度                      | A                                      | %             | + 2/ - 0%                   | \                       | 生益企标<br>Shengyi method |
| Width<br>宽度                       | A                                      | mm            | + 2/ - 0                    | + 2/ - 0                | 生益企标<br>Shengyi method |
| Peel strength<br>剥离强度             | A                                      | N/mm          | —                           | —                       | IPC-TM-650<br>2.4.9    |
| Solder<br>resistance<br>耐热性       | 288°C, >10s                            | —             | 无分层起泡<br>No delaminate      | PASS                    | IPC-TM-650<br>2.4.13   |
| Dimensional<br>stability<br>尺寸稳定性 | 蚀刻后<br>After etch                      | %             | —                           | —                       | 生益企标<br>Shengyi method |
| Chemical<br>resistance<br>耐化学性    | After chemical<br>exposure<br>暴露在化学品中后 | %             | $\geq 80$                   | —                       | IPC-TM-650<br>2.3.2    |

#### 3、电气性能 Electrical Property

| Test Items<br>检测项目                        | Treatment<br>Condition<br>实验处理条件 | Units<br>单位                      | Index of<br>quality<br>品质标准 | Typical<br>Value<br>实测值 | Test method<br>测试方法   |
|-------------------------------------------|----------------------------------|----------------------------------|-----------------------------|-------------------------|-----------------------|
| Dielectric<br>constant (1.1GHz)<br>介电常数   | RH50%, 23°C, 24h                 | —                                | $\leq 3.8$                  | 3.35                    | IPC-TM-650<br>2.5.5.3 |
| Dissipation<br>factor (1.1GHz)<br>介质损耗角正切 | RH50%, 23°C, 24h                 | —                                | $\leq 0.01$                 | 0.005                   | IPC-TM-650<br>2.5.5.3 |
| Volume<br>resistivity<br>体积电阻率            | RH90%, 35°C, 96h                 | $\text{M}\Omega \cdot \text{cm}$ | $> 10^6$                    | —                       | IPC-TM-650<br>2.5.17  |
| Surface<br>resistance<br>表面电阻             | RH90%, 35°C, 96h                 | $\text{M}\Omega$                 | $> 10^5$                    | —                       | IPC-TM-650<br>2.5.17  |

#### 四、保存条件 Storage condition

挠性覆铜板应密封包装在干燥、无紫外光照射的环境下，在此条件下自生产日期开始可存放 12 个月；

FCCL should be stored in sealed packaging at dry environment without UV irradiation, in this condition it can be stored for 12 months since the date of manufacture.

#### 五、使用说明 Using instructions

1、请以原包装形式放在平台上或适宜的架上，防止存放方式不当而引起的挠性覆铜板形变。

Please put the FCCL of original packaging on the platform or a suitable frame, to prevent deformation caused by improper storage

2、请勿采用将箱子正面向下倒出产品的做法，以免造成材料的受损；请保持箱子的正面向上，采用从箱子里面小心拿出材料的做法。

Do not pour out product from the face down box, so as to avoid damage to the material; Please keep the box face up, take the product out from the box carefully.

3、请戴无尘手套小心地操作 FCCL。碰撞、滑动等会损伤材料；裸手操作会污染 FCCL，这些缺陷都可能会对 FCCL 的使用造成不良的影响。

Please wear clean gloves and be carefully while operate the FCCL. Collision, sliding and so on will damage the material; bare-handed operation will pollute the FCCL, these defects may be adverse effects on the use of FCCL.

4、PI 遇碱性药水容易出现咬噬，因此请尽可能避免或减少 PI 接触碱性药水的时间。PI 膜更容易吸潮，请谨防吸潮。

Because of PI is easy etched by the alkaline potion , so please avoid or reduce the time contact with alkaline potion as possible. PI film is easy to absorb moisture, please prevent of moisture absorption.

5、由于挠性材料在生产加工过程中会产生一定的涨缩，因此在批量生产之前需结合板子结构及实际情况整理出 FCCL 合适的补偿参数，以免造成后续对位不良现象。

Because the FPCB process will bring some expansion and contraction, so need to make a suitable compensation parameters of FCCL before mass production according to FPCB structure and the actual process situation, in order to avoid misalignments.

6、FCCL 在常温或者空调环境下打开包装后请尽快使用，以免由于储存条件不当造成吸潮等带来的不良缺陷。投料剩余的尾数，若暂时不用，请及时密封包装送回冷库存放。

Please use the FCCL as soon as possible after opening the package at room temperature or air-conditioned environment, in order to avoid defects such as absorb moisture, which caused by

wrong storage conditions. If no need for the remaining mantissa, please return to cold storage with sealed package.

## 六、测试方法 Test method

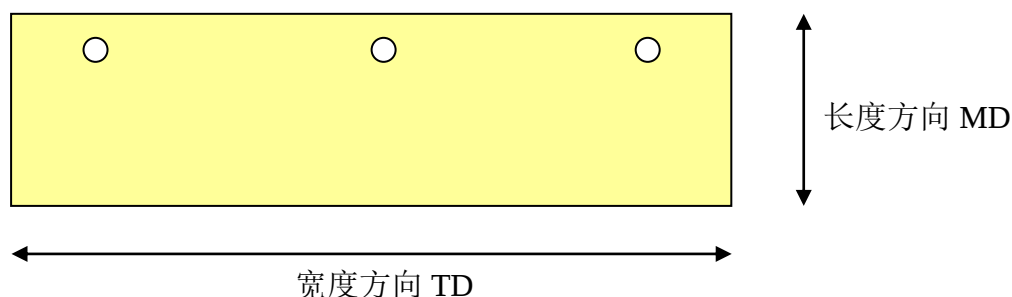
此承认书所列测试项目仅为行业内 IQC 对 FCCL 进行测试之常规项目，如剥离强度、耐热性、尺寸稳定性等。对 FCCL 的其它测试项目，如电气特性测试方法、阻燃性测试方法等不再单独列出。

The test items of this specification are normal IQC test items for FCCL, such as the peel strength, heat resistance, dimensional stability. Other tests items such as the electrical property, flame-resistant test methods are no longer listed separately.

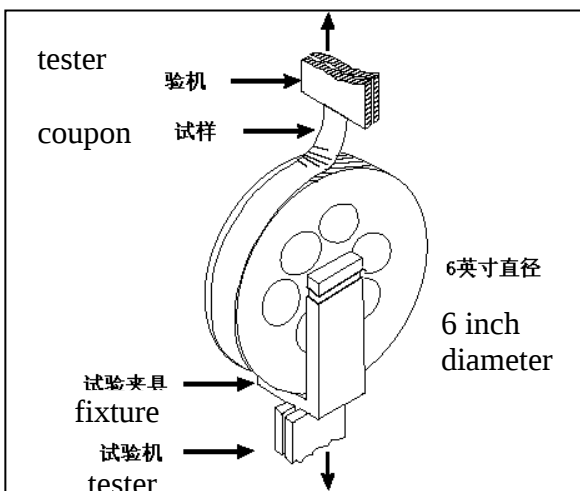
### 1、厚度 Thickness

用千分尺测量 FCCL 宽度方向左、中、右 3 个位置的厚度值（如下图所示），取 3 个值的平均值为产品的厚度值。

Use a micrometer to measure the thickness of three positions (width direction of the left, middle and right), which is the FCCL, as shown below. Take the average of three data for the thickness of product.



### 2、剥离强度 Peel strength



## 2.1 样品制作 coupon prepare:

①、采用蚀刻方法制作尺寸为  $3.0 \pm 1\text{mm} \times 100\text{mm}$  的试样。

etching a sample with size of  $3.0 \pm 1\text{mm} \times 100\text{mm}$ .

②、试样数量为 2 块试样，纵向和横向各一块。如果测试过程中试样断裂，应重新制样进行测试。

Make the sample of MD and TD each piece. If the sample broken down in the test, should re-prepare the samples to test.

## 2.2 测试方法 Test method:

①、将试样用双面胶带、胶粘剂和/或机械夹具固定在试验夹具上。

Take the sample stickup to the test fixture with double sided adhesive tape and / or with mechanical clamps

②、剥离长度为 50mm 范围内，最初剥起固定入夹具的 10mm 不计入。以 50mm/min 的速度（滑块速度）剥离试样。剥离负载应在试验机量程的 15-85% 范围内。至少剥离 50mm，最初的 6mm 可忽略。

In the peel length of 50mm range, the first 10mm begin to peel which fix in the fixture is not included. Peel the sample with speed of 50 mm/min (crosshead speed). Peel load should be in 15-85% of test machine range. Peel length should at least 50mm, the initially 6mm can be ignored.

③、观察并记录剥离过程中的最小拉力。测量试样条的实际宽度，准确至 0.02mm。

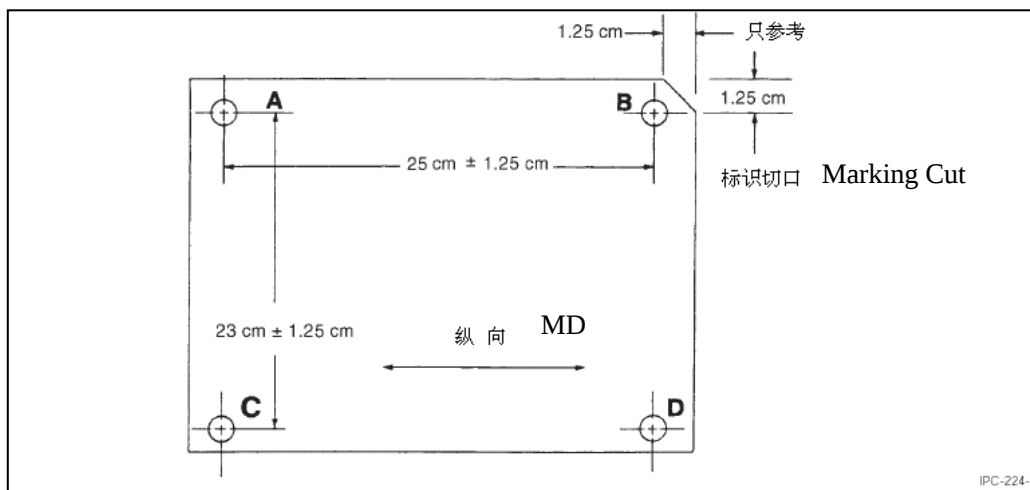
Observe and record the minimum tensile strength of the stripping process. Measure the actual wire width of sample, accurate to 0.02mm.

2.3 计算方法 calculating method : 剥离强度 (N/mm) = 最小拉力 (N) / 试样导线宽度 (mm)。

Peel strength (N / mm) = minimum tensile strength (N) / sample wire width (mm).

### 3、尺寸稳定性 Dimensional stability

#### 3.1 样品图形 coupon pattern



#### 3.2 测试方法 Test method

- ①、按以上样品图形制备样品，测量各孔间或各线间的中心距，记作初始测量值（I）

Samples were prepared according to the above sample graph, measure the center distance between the lines or the wells, referred as the initial data (I).

- ②、用化学方法蚀刻去挠性覆铜板的铜箔。

The FCCL is etched by chemical method.

- ③、重新测量各孔间或各线间的中心距，记作最终测量值（F）。

Measure the center distance of each hole or each line again, referred as the final measured data (F).

#### 3.3 计算方法 Calculating method

$$M.D.(%) = \frac{\frac{(A-B)_F - (A-B)_I}{(A-B)_I} + \frac{(C-D)_F - (C-D)_I}{(C-D)_I}}{2} \times 100$$

$$T.D.(%) = \frac{\frac{(A-C)_F - (A-C)_I}{(A-C)_I} + \frac{(B-D)_F - (B-D)_I}{(B-D)_I}}{2} \times 100$$

### 4、浸锡耐热性 Solder resistance

#### 4.1 样品制作 Coupon prepare:

Cut the sample into the size of 5cm square, 3 coupons were prepared.

#### 4.2 测试方法 Test method:

样品进行 135℃烘烤 1h 除湿处理后浸入温度为 288℃的高温锡炉，浸入 10s 后取出观察；

The coupon were baked at 135 °C for 1h to dehumidify, then dipped into the solder of 288 °C for 10s, removed and observation;

#### 4.3 测试评判 Pass judgment:

样品无分层起泡等不良。

No delaminate and blister

## 七、技术反馈 Technical feedback

贵司在使用我司产品过程中，若有任何疑问和建议，请随时直接或通过贵司采购联系我们的技术或业务人员，我们将在第一时间给贵司提供技术服务。

If you have any doubts and suggestions while using our products, please contact our technical engineer and seller directly or through the purchaser at any time. We will provide technical services to your company in the first time.

对产品特殊案例中无法满足使用要求或有疑问的情况，双方依据行业相关标准和具体情况秉持真诚合作的原则进行协商处理。

If the products could not meet the requirements or have any questions in special cases, we will deal the problem with principle of sincere cooperation, and base on the correlative industry standards and actual situation.