

关于晶片电阻两端电极外观说明

About the Appearance of the Electrodes at both Terminals of the Chip Resistor

§0.摘要 Description

晶片电阻器正面两端电极不会完全覆盖，会有一定的缺口，属于正常现象，不会影响电极可焊性以及电阻性能问题，具体形成原因如下。

The top electrodes on both sides of the chip resistor will not be completely covered and there will be a certain gap, which is a normal phenomenon and will not affect the electrode solderability and resistance performance. The specific causes are as follows

§1.电阻两端电极缺失原因 Causes of missing electrodes at both ends of the resistors

1.1 电阻正面电极印刷的照片(如下图 1)可以看出，正面电极为粒状印刷。

As can be seen from the printing image of top electrodes (as shown in picture 1), top electrodes are printed in the way of granular printing.

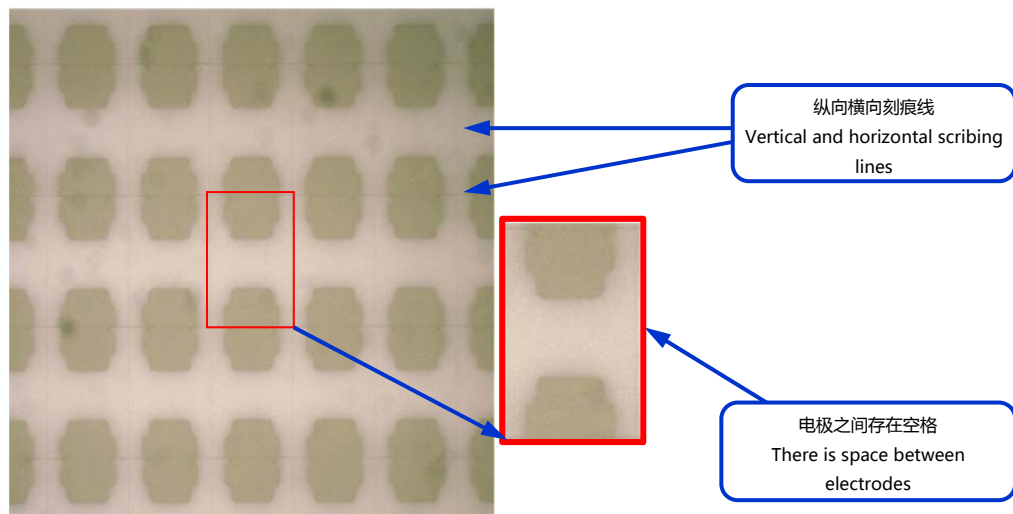


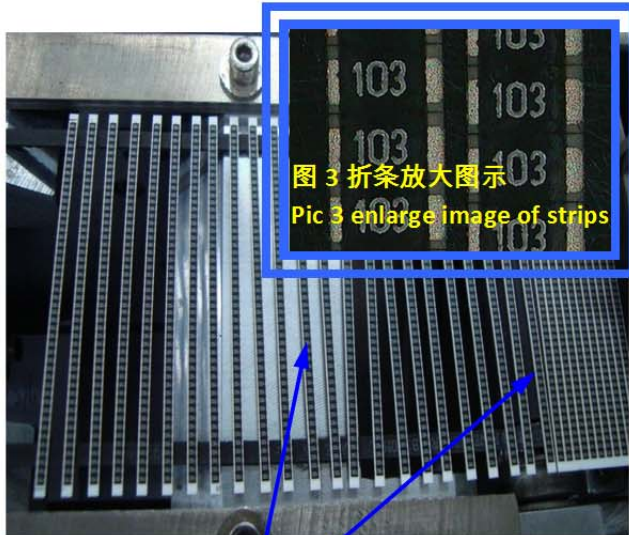
图 1 正电极印刷图片

1.2 电阻在折成条状后会放入溅射治具中，条状后外观可以明显看出正面电极粒状，粒与粒之间的电极是有空隙的(如图 3)，折条后产品会放入溅射治具，半成品堆叠在一起形成一定的间隙(如图 4)

After the substrates are broken into strips, they will be put into the sputtering cartridges. By observing the strips in the cartridges, it can be seen that the top electrodes are granular shape, and there are gaps between the chips (picture 3). When substrates are broken into strips and put into the sputtering cartridge, there are gaps between stacked semi-finished products (picture 4).

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基板通过设备折成条状
Substrates are broken into strips by the machine

图 2 折条图示
Pic 2 Breaking into strips



仓夹
Strip cartridge

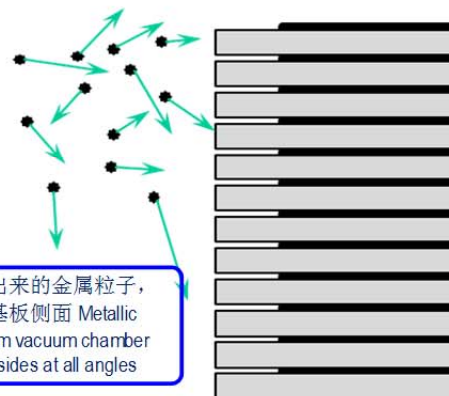
条状半成品堆叠，在仓夹中溅射侧电极
Strips are stacked in cartridge for sputtering

图 4 堆叠图示
Pic 4 Stacking

1.3 真空溅射炉如下 Vacuum sputtering chamber :



图 5 真空溅射炉图示
Pic.5 Vacuum sputtering chamber



真空仓中被激发出来的金属粒子，
不同角度溅射在基板侧面 Metallic
particles sprayed from vacuum chamber
sputter on substrate sides at all angles

图 6 堆叠示意图
Pic 6 Stacking

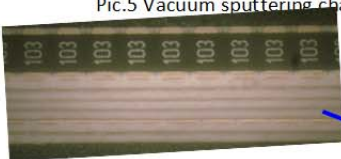


图 7 堆叠实物图示
Pic 7 Stacked strips

堆叠在一起的半成品之间存在间隙
There are gaps between
stacked semi-finished
products

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1.4 溅射前、后示意图如下 Before and after sputtering :



图 8 真空溅射前图示
Pic 8 before vacuum sputtering

1.5 电镀后如下 After electroplating :



图 10 电镀后电极图示
Pic 10 Electrodes after electroplating

1.6 结论 Conclusion :

1.6.1 在真空溅射炉中进行侧面电极底层材料溅射, 因为印有导电层、保护层及字码的半成品存在一定的膜厚, 半成品堆叠在一起形成一定的间隙, 而不同产品之间膜厚会存在不一样, 因此, 在溅射最终形成的侧电极底层材料深度和多少都存在差异; 有的溅射深度深, 形成的材料厚度略厚, 有的溅射深度浅, 甚至没有。

As there is a certain film thickness of semi-finished products printed with conductive layer, protective layer and marking; thus, there will be certain gaps between semi-finished products when stacked up, and the film thickness will be different between different products. Therefore,

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there will be difference in the depth and the amount of sputtered layer on the top electrodes: some sputtering depth is deep, the thickness of the material is slightly thick, some sputtering depth is shallow, or even no sputtered layer on the top electrodes.

1.6.2 在溅射侧面电极之后，进行电镀过程中，会在底层材料上镀上镍层和锡层，最终形成如样品图片上两端电极外观，属于正常现象，不会影响电极可焊性不良以及电阻性能问题，此类外观现象在同行产品中也有出现不影响客户使用。

After sputtering the terminal electrodes; electroplating process will be carried out, nickel layer and tin layer are plated on the materials and finally form the end electrode appearance the same as that of the product shown in the image, which is the normal phenomenon and won't affect solderability and resistor performance. This phenomenon also exists in products of competitors and won't affect customer application.

§2. 电阻正面两端电极外观缺失标准 Standard for the blank area at both sides of electrodes

电阻正面电极缺失面不能大于基板总宽 W 的 50% (指每个单边 A 或 B)，如下图 11 所示。

The blank area of the top electrodes of the resistor shall not be greater than 50% of the total width of the substrate W (referring to terminal A or terminal B), please refer to pic 11 as follows.



图 11 电镀后电极图示

Pic 11 image of the electrodes after electroplating