Patent Document 1 : Japanese Patent No. 5995953

SUMMARY OF THE INVENTION

TECHNICAL PROBLEM

[0007]

Like the probe pin which is shown in the Patent Document 1, there is a case where a plurality of conductors, each having a different resistivity, are arranged side by side, having a space in between. Even in such a case, however, a low resistance conductor generates heat to expand and contacts with a high resistance conductor. Heat is transferred to the high resistance conductor, and thereby, a problem may be caused that the mechanical strength is decreased.

Moreover, in the case of a probe pin which is arranged perpendicularly, a probe card is pushed down against a semiconductor wafer, until the probe pin carries out buckling, in order to ensure the contact of the probe pin with the electrode of an electronic circuit. For this reason, when conductors each having a different electric conduction rate are aligned in the buckling direction, a problem may be caused that those conductors come into contact with each other, due to thermal expansion and the displacement by buckling.

[0008]

Embodiments of the present disclosure aim at achieving a probe pin and a probe card which enable the preservation of mechanical strength and a high allowable current value.

SOLUTION TO PROBLEM

[0009]

According to a first aspect of the present disclosure , there is provided a probe pin, which has a contact part at one end of a longitudinal direction, for contacting an electrode of a test object, and has a terminal part at the other end of the longitudinal direction, for contacting a circuit board. The probe pin includes: a low resistance member consisting of a first metal with a first conductivity, and a high resistance member consisting of a second metal with a second conductivity, the second metal having a resistivity higher than that of the low resistance member, wherein the probe pin has a multi layered part between the contact part and the terminal part, where the multi layered part is configured in an order of the high resistance member, a slit of air gap, and the low resistance member, in a first direction different from a buckling direction of the probe pin at the time of inspection of the test object, and the low resistance member and the high resistance member are arranged so as not to overlap with each other, when the multi layered part is viewed from the buckling direction.

[0009a]

According to a second aspect of the present disclosure, there is provided a probe card including a plurality of the above probe pins.

[0009b]

According to a third aspect of the present disclosure, there is provided a probe card including a plurality of the above probe pins, and a first guide and a second guide, both having a plurality of guide holes, each for accepting the insertion of a probe pin and guiding the probe pin, wherein the first guide-inside storage part is inserted into the first guide hole, and the second guide-inside storage part is inserted into the second first guide hole.

ADVANTAGEOUS EFFECTS OF THE INVENTION

[0010]

According to the probe pin and the probe card as per the present disclosure, it becomes possible to achieve the probe pin and the probe card which enable the preservation of mechanical strength and a high allowable current value.

BRIEF EXPLANATION OF THE DRAWINGS

[0011]

Fig. 1 is a diagram showing schematically the state of inspection of an electronic circuit, by the use of a probe card in accordance with the Embodiment 1.

Fig. 2A is an enlarged view of the main part of Fig. 1. Fig. 2B is a perspective view of a probe pin. Fig. 2C is a cross sectional view of Fig. 2B taken along the line A1 - A1, and taken along the line A2 - A2. Fig. 2D is a cross sectional view of Fig. 2B taken along the line B1 - B1, and taken along the line B2 - B2. Fig. 2E is a cross sectional view of Fig. 2B taken along the line C - C.

Fig. 3 is a diagram showing the acceptable range in the arrangement of a five layered part, in accordance with the Embodiment 1.

Fig. 4A is a diagram showing the configuration of the low resistance member of a probe pin in accordance with the Embodiment 2. Fig. 4B is a diagram showing the probe pin in accordance with the Embodiment 2, where the probe pin is viewed from a buckling direction Z. Fig. 4C is a cross sectional view of Fig. 4B taken along the line D - D. Fig. 4D is a cross sectional view of Fig. 4B taken along the line E1 - E1, and taken along the line E2 - E2. Fig. 4E is a cross sectional view of Fig. 4B taken along the line F - F.

Fig. 5 is a cross sectional view of the five layered part of a probe pin in accordance with the Embodiment 3, where the view is perpendicular to the longitudinal direction.

Fig. 6A is a diagram showing the probe pin in accordance with the Embodiment 4, where the probe pin is viewed from a buckling direction Z. Fig. 6B is a cross sectional view of Fig. 6A taken along the line D - D. Fig. 6C is a cross sectional view of Fig. 6A taken along the line E1 - E1, taken along the line E2 - E2, and taken along the line G - G.