

Socket for testing an electrical component

Technical Field

5 The present application relates to the technical field for testing an electrical component, in particular to a socket for testing an electrical component.

Background

10 In the production of an electrical component, such as an integrated circuit (IC) package, it is necessary to use a relevant test device to test its performance. The test device typically includes a socket that is electrically connected to another electrical component, such as a wiring substrate.

15 In the relevant art, a socket comprises a socket body and a contact probe, wherein the socket body is formed with a receiver which can receive a first electrical component, and the contact probe is provided inside the socket body. One end of the contact probe is configured for connection to the first electrical component, and the other end of the contact probe is provided with a plunger, one end of the plunger is provided with a protrusion, and the top of the protrusion is configured for contact with a second electrical component. During the electrical test, the first electrical component is placed in the receiver, and one end of the contact probe is in contact with a terminal of the first electrical component and the other end of the contact probe is in contact with the second electrical component, and thus an electrical connection between the first electrical component and the second electrical component is established.

20 The process of establishing the electrical connection between the contact probe and the second electrical component is as follows: the contact probe, under the pressure of the first electrical component above it, moves downward relative to the socket body, so that the plunger is in contact with the second electrical component located at the bottom of the socket, and in this process, the spring inside the contact probe is compressed, and finally, under the action of the spring, the plunger abuts tightly against the second electrical component. In the process from contact with the second electrical component to tight abutment against the second electrical component, the plunger will inevitably rotate around its axis. In addition, the plunger is subjected to the pressure of the spring. With the increase of the number of tests, the top of the protrusion of

the plunger is worn, resulting in the change of the resistance value of the contact probe, and thereby resulting in an adverse impact on the electrical test results and the worse reliability of the electrical test.

Summary

5 The purpose of the embodiments of the present application is to provide a socket for testing an electrical component to reduce the wear on the surface of the plunger and thus improve the reliability of the electrical test. Specifically, the technical solutions are as follows.

10 An embodiment of the present application provides a socket for testing an electrical component, comprising: a socket body, inside which a probe receiving hole is provided; a contact probe, which is received in the probe receiving hole, wherein one end of the contact probe is provided with a plunger, one end of the plunger is provided with a protrusion; and a flexible plate, which is provided on one side of the socket body for contact with a second electrical component, wherein the flexible plate comprises an insulation layer and a through-electrode installed on the insulation layer, and one end of the through-electrode is
15 configured to contact the second electrical component, and the other end of the through-electrode is configured to contact the one end of the plunger; wherein, in a case that the through-electrode contacts the one end of the plunger, the through-electrode is at least not in contact with a top of the protrusion.

20 The socket for testing an electrical component according to the embodiments of the present application includes a flexible plate, on which a through-electrode is provided. One end of the through-electrode is in contact with the second electrical component, and the other end of the through-electrode is in contact with the plunger. The electrical connection between the contact probe and the second electrical component is realized with the electrical conductivity of the through-electrode. Compared with the prior art, the socket according to the embodiments of the
25 present application increases the contact area between the through-electrode and the plunger by contacting the other end of the through-electrode with one end of the plunger and without contacting the through-electrode with the top of the protrusion at least, so that when the plunger is subjected to the same pressing force, the pressure on the contact surface between the plunger and the through-electrode decreases, thereby reducing the possibility of wear on the surface of
30 the plunger, and maintaining a stable resistance value of the plunger. For the plunger with a

coating provided on the surface, the stability of the resistance value of the plunger can be significantly improved by reducing the possibility of wear on the surface of the plunger, thus improving the reliability of the electrical test. In the case that the through-electrode contacts one end of the plunger, the through-electrode is not in contact with the top of the protrusion at least, 5 which means that the top of the protrusion is not in contact with other components during the electrical test, thus the wear on the top of the protrusion can be avoided. In addition, since the through-electrode is fixed on the insulation layer, the through-electrode cannot move or rotate relative to the second electrical component, so that there is no wear generated by a relative movement between the through-electrode and the second electrical component, thus further 10 ensuring the reliability of the electrical test.

In addition, the socket for testing an electrical component according to the embodiments of the present application can also have the following additional technical features:

In some embodiments of the present application, an end face of the one end of the plunger is a plane, and is provided with a bulge which forms the protrusion, and the other end of the 15 through-electrode is configured to contact the end face of the one end of the plunger; wherein, in a case that the through-electrode contacts the end face of the one end of the plunger, the through-electrode is not in contact with the protrusion.

In some embodiments of the present application, the one end of the plunger is a cone which forms the protrusion, and the other end of the through-electrode is configured to contact the 20 protrusion of the plunger; wherein, in a case that the through-electrode contacts the protrusion of the plunger, the through-electrode is not in contact with the top of the protrusion.

In some embodiments of the present application, the through-electrode comprises a support, a first contact and a second contact, the support is fixedly installed on the insulation layer, the first contact is provided at one end of the support away from the contact probe, and the second 25 contact is provided at one end of the support close to the contact probe.

In some embodiments of the present application, the support comprises a first flat plate, a second flat plate and a conductive connector, the first flat plate is provided on one side of the insulation layer away from the contact probe, the second flat plate is provided on one side of the insulation layer close to the contact probe, and the conductive connector penetrates the insulation

layer and connects the first flat plate and the second flat plate.

In some embodiments of the present application, the first flat plate, the second flat plate and the conductive connector are formed in one piece.

5 In some embodiments of the present application, the first contact comprises a plurality of first contact blocks which are uniformly distributed and are configured to contact the second electrical component.

10 In some embodiments of the present application, the second contact comprises a plurality of second contact blocks which are uniformly distributed; in the case that the through-electrode contacts the one end of the plunger, the plurality of second contact blocks surround the protrusion and are at least not in contact with the top of the protrusion

In some embodiments of the present application, the second contact blocks are cylinders, cones, spheres or frustums.

15 In some embodiments of the present application, in the case that the through-electrode contacts the one end of the plunger, the second contact blocks are equidistant from the top of the protrusion.

In some embodiments of the present application, a receiving groove is provided at the one end of the support close to the contact probe, and in a case that the second contact blocks contact the one end of the plunger, at least the top of the protrusion is located within the receiving groove.

20 In some embodiments of the present application, the through-electrode comprises a first flat plate portion, a second flat plate portion and a conductive connection structure, the first flat plate portion is provided on one side of the insulation layer away from the contact probe, the second flat plate portion is provided on one side of the insulation layer close to the contact probe, and the conductive connection structure penetrates the insulation layer and connects the first flat
25 plate portion and the second flat plate portion, a groove is provided in the second flat plate portion; in the case that the through-electrode contacts the one end of the plunger, the second flat plate portion abuts against the one end of the plunger, and at least the top of the protrusion is located in the groove.

In some embodiments of the present application, connection holes are provided in the flexible plate, and the flexible plate is connected to the socket body by connectors penetrating the connection holes.

5 **Brief Description of the Drawings**

In order to more clearly describe the technical solution of the embodiments of the application or that of the prior art, drawings needed in the description of the embodiments and the prior art will be briefly introduced below. Obviously, the drawings described below are for only some embodiments of the present application, those ordinary skilled in the art can also
10 obtain other embodiments on the basis of these drawings.

FIG. 1 is a schematic diagram illustrating the structure of a socket according to an embodiment of the present application;

FIG. 2 is a bottom view of the socket according to the embodiment of the present application;

15 FIG. 3 is a partial sectional view of a socket according to the first embodiment of the present application;

FIG. 4 is a partial schematic diagram I of a flexible plate according to the first embodiment of the present application;

20 FIG. 5 is a partial schematic diagram II of the flexible plate according to the first embodiment of the present application;

FIG. 6 is a partial sectional view of a socket according to the second embodiment of the present application (an insulation layer is not shown);

Fig. 7 is an enlarged schematic diagram of the part A of Fig. 6 (the insulation layer is not shown);

25 FIG. 8 is a partial sectional view of a socket according to the third embodiment of the present application (the insulation layer is not shown);

FIG. 9 is a partial sectional view of a socket according to the fourth embodiment of the present application (the insulation layer is not shown);

Fig. 10 is an enlarged schematic diagram of the part B of Fig. 9 (the insulation layer is not shown);

FIG. 11 is a partial schematic diagram I of a flexible plate according to the fourth embodiment of the present application;

5 FIG. 12 is a partial schematic diagram II of the flexible plate according to the fourth embodiment of the present application.

Detailed Description

The technical solution in the embodiments of the application will be described clearly in detail with reference to the drawings in the embodiments of the present application. Obviously,
10 the embodiments described herein are only some instead of all of the embodiments of the present application. Based on the embodiments of the present application, all other embodiments obtained by those ordinary skilled in the art based on of the present application fall within the scope of the present application.

As described in the background, in the relevant technology, the socket for testing an
15 electrical component includes a socket body and a contact probe, one end of the contact probe is provided with a plunger, one end of the plunger is provided with a protrusion, and the top of the protrusion is configured to contact a second electrical component. In the process of the electrical connection between the contact probe and the second electrical component, the plunger will inevitably rotate around its axis. In addition, the plunger is subjected to the pressure of the
20 spring. With the increase of the number of tests, the top of the protrusion of the plunger will be worn, resulting in the change of the resistance value of the contact probe, and thereby resulting in an adverse impact on the electrical test results and the worse reliability of the electrical test.

To solve this technical problem, the embodiments of the present application provide a
socket for testing an electrical component to reduce the wear on the plunger surface and thus
25 improve the reliability of the electrical test.

In the embodiments of the present application, the electrical component includes but is not limited to an IC package or a semiconductor package, and the electrical test includes but is not limited to an electrical performance test (such as a voltage test, a current test, a frequency test, etc.) and an electrical reliability test (such as an anti-magnetic test, a high and low temperature

durability test, an early failure level test, etc.), etc.

As shown in Fig. 1-Fig. 3, Fig. 6, Fig. 8 and Fig. 9, the embodiments of the present application provide a socket 10 for testing an electrical component. The socket 10 includes a socket body 100, a contact probe 200 and a flexible plate 300. Specifically, a probe receiving hole 110 is provided inside the socket body 100, and the contact probe 200 is received in the probe receiving hole 110. One end of the contact probe 200 is provided with a plunger 210, one end of the plunger is provided with a protrusion 211. The flexible plate 300 is provided on one side of the socket body 100 for contact with the second electrical component. The flexible plate 300 includes an insulation layer 320 and a through-electrode 310 installed on the insulation layer 320. One end of the through-electrode 310 is configured to contact the second electrical component, and the other end of the through-electrode 310 is configured to contact one end of the plunger 210. Wherein, in the case that the through-electrode 310 contacts one end of the plunger 210, the through-electrode 310 is at least not in contact with the top of the protrusion 211.

The socket 10 for testing an electrical component according to the embodiments of the present application includes a flexible plate 300, on which a through-electrode 310 is provided. One end of the through-electrode 310 is in contact with the second electrical component, and the other end of the through-electrode is in contact with the plunger 210. The electrical connection between the contact probe 200 and the second electrical component is realized with the electrical conductivity of the through-electrode 310. Compared with the prior art, the socket 10 according to the embodiments of the present application increases the contact area between the through-electrode 310 and the plunger 210 by contacting the other end of the through-electrode 310 with one end of the plunger 210 and without contacting the through-electrode 310 with the top of the protrusion 211 at least, so that when the plunger 210 is subjected to the same pressing force, the pressure on the contact surface between the plunger 210 and the through-electrode 310 decreases, thereby reducing the possibility of wear on the surface of the plunger 210, and maintaining a stable resistance value of the plunger 210. For the plunger 210 provided with a coating on the surface, the stability of the resistance value of the plunger 210 can be significantly improved by reducing the possibility of wear on the surface of the plunger 210, thus improving the reliability of the electrical test. In the case that the through-electrode 310 contacts one end of

the plunger 210, the through-electrode 310 is not in contact with the top of the protrusion 211 at least, which means that the top of the protrusion 211 is not in contact with other components during the electrical test, thus the wear on the top of the protrusion 211 can be avoided.

5 In addition, since the through-electrode 310 is fixed on the insulation layer 320, the through-electrode 310 cannot move or rotate relative to the second electrical component, so that there is no wear generated by a relative movement between the through-electrode 310 and the second electrical component, thus further ensuring the reliability of the electrical test.

10 In some embodiments of the present application, as shown in Figs. 3, 6 and 9, the end face of the one end of the plunger 210 is a plane, and is provided with a bulge which forms the protrusion 211, and the other end of the through-electrode 310 is configured to contact the end face of the one end of the plunger 210. Wherein, in the case that the through-electrode 310 contacts the end face of the one end of the plunger 210, the through-electrode 310 is not in contact with the protrusion 211. In the embodiments of the present application, the end face of the one end of the plunger 210 is a plane. By contacting the other end of the through-electrode 15 310 with the end face of the one end of the plunger 210, the contact area between the plunger 210 and the through-electrode 310 can be further increased, and the pressure on the contact surface between the plunger 210 and the through-electrode 310 can be decreased, thus significantly reducing the possibility of wear on the surface of the plunger 210, maintaining a stable resistance value of the plunger 210, and improving the reliability of the electrical test.

20 In other embodiments of the present application, as shown in Fig. 8, the one end of the plunger 210 is a cone which forms the protrusion 211, and the other end of the through-electrode 310 is configured to contact the protrusion 211 of the plunger 210. Wherein, in the case that the through-electrode 310 contacts the protrusion 211 of the plunger 210, the through-electrode 310 is not in contact with the top of the protrusion 211. In the embodiments of the present 25 application, the through-electrode 310 is in contact with the protrusion 211 of the plunger 210 and is not in contact with the top of the protrusion 211, so that the contact area between the plunger 210 and the through-electrode 310 can be further increased, and the pressure on the contact surface between the plunger 210 and the through-electrode 310 can be decreased, thus reducing the possibility of the wear on the surface coating of the plunger 210, maintaining a 30 stable resistance value of the plunger 210, and improving the reliability of the electrical test. In

addition, the through-electrode 310 is not in contact with the top of the protrusion 211, thus avoiding the wear on the top of the protrusion 211 and further improving the stability of the resistance value of the plunger 210.

5 In some embodiments of the present application, as shown in Figs. 3 to 7, the through-electrode 310 includes a support 311, a first contact 312 and a second contact 313. The support 311 is fixedly installed on the insulation layer 320, the first contact 312 is provided at one end of the support 311 away from the contact probe 200, and the second contact 313 is provided at one end of the support 311 close to the contact probe 200. In the embodiments of the present application, the support 311 is provided to facilitate the installation of the through-electrode 310 and the insulation layer 320, and the first contact 312 is provided at the end of the support 311 away from the contact probe 200 to contact the first contact 312 with the second electrical component; the second contact 313 is provided at the end of the support 311 close to the contact probe 200 to contact the second contact 313 with the one end of the plunger 210, thus realizing the electrical connection between the plunger 210 and the second electrical component. It can be understood that the support 311, the first contact 312 and the second contact 313 of the through-electrode 310 are all made of conductive materials. Preferably, the support 311, the first contact 312 and the second contact 313 of the through-electrode 310 are all made of copper, and a gold or nickel coating is provided on the surfaces of the first contact 312 and the second contact 313.

20 In some embodiments of the present application, as shown in Fig. 3, the support 311 includes a first flat plate 3111, a second flat plate 3112 and a conductive connector 3113. The first flat plate 3111 is provided on one side of the insulation layer 320 away from the contact probe 200, the second flat plate 3112 is provided on one side of the insulation layer 320 close to the contact probe 200, and the conductive connector 3113 penetrates the insulation layer 320 and connects the first flat plate 3111 and the second flat plate 3112. Therefore, by clamping the insulation layer 320 by the first flat plate 3111 and the second flat plate 3112, the support 311 can be firmly installed on the insulation layer 320.

Specifically, as shown in Fig. 4, the first flat plate 3111 can be a circular plate, and the first flat plate 3111 is configured for connection to the first contact 312. As shown in Fig. 5, the second flat plate 3112 can be a circular plate, and the second flat plate 3112 is configured for

connection to the second contact 313. As shown in Fig. 3, the conductive connector 3113 is a cylinder. The two ends of the conductive connector 3113 are connected to the first flat plate 3111 and the second flat plate 3112, respectively, and the conductive connector 3113, the first flat plate 3111 and the second flat plate 3112 are coaxial. The outer circumferential surface of the conductive connector 3113 is fixedly connected to the insulation layer 320. Therefore, the support 311 is simple in structure and easy to process and manufacture. In addition, by arranging the first flat plate 3111 and the second flat plate 3112 as circular plates, the volume of the first flat plate 3111 and the second flat plate 3112 is smaller, and more through-electrodes 310 can be provided on the flexible plate 300 to meet the requirements of the electrical test.

In some embodiments of the present application, the first flat plate 3111, the second flat plate 3112 and the conductive connector 3113 are formed in one piece. Therefore, it can not only reduce the number of assembly parts, facilitate the assembly of the through-electrode 310, but also stabilize the structure of the support 311, and ensure the electrical connection effect between the plunger 210 and the second electrical component.

In some embodiments of the present application, as shown in Fig. 4, the first contact 312 includes a plurality of first contact blocks 3121 which are uniformly distributed. The first contact blocks 3121 are configured to contact the second electrical component. The first contact 312 is provided as the first contact blocks 3121, which can be configured to contact the second electrical component, so that the contact area between the through-electrode 310 and the second electrical component is small. Therefore, the friction between the through-electrode 310 and the second electrical component is appropriately increased, so as to ensure the stable contact between the through-electrode 310 and the second electrical component without a relative displacement. In addition, since the through-electrode 310 and the second electrical component do not rotate relative to each other during installation, there is no wear problem.

Preferably, each of the first contact blocks 3121 is a cylinder, and is fixedly connected to the first flat plate 3111, the number of the first contact blocks 3121 can be three, four or five, etc., and the plurality of first contact blocks 3121 are equidistant from the center of the first flat plate 3111.

In some embodiments of the present application, as shown in Fig. 3, the second contact 313 includes a plurality of second contact blocks 3131 which are uniformly distributed. In the case

that the through-electrode 310 contacts the one end of the plunger 210, the plurality of second contact blocks 3131 surround the protrusion 211 and are at least not in contact with the top of the protrusion 211. In the embodiments of the present application, each second contact block 3131 is arranged to be in contact with the one end of the plunger 210. In the case that the second contact
5 block 3131 contacts the one end of the plunger 210, the second contact block 3131 is not in contact with the top of the protrusion 211, thus avoiding the wear on the top of the protrusion 211. In addition, by arranging a plurality of second contact blocks 3131, the contact area between each second contact block 3131 and one end of the plunger 210 is increased, and the pressure between the second contact block 3131 and the plunger 210 is decreased, so that the
10 wear of the second contact block 3131 and the plunger 210 is small, thus stabilizing the resistance values of the through-electrode 310 and the plunger 210, further ensuring the reliability of the electrical test. In addition, the plurality of second contact blocks 3131 are uniformly distributed, so that the supporting force provided by the through-electrode 310 on the plunger 210 is uniformly distributed, which advantageously prevents the damage of the contact
15 probe 200 and improves the servicelife of the contact probe 200.

In some embodiments of the present application, as shown in Figs. 3 and 7, the second contact blocks 3131 are cylinders, cones, spheres or frustums. Therefore, it facilitates to process the second contact blocks 3131 by the existing tools, thus reducing the processing cost of the through-electrode 310.

20 In some embodiments of the present application, as shown in Fig. 5, the second contact blocks 3131 are cylinders and are fixed on the second flat plate 3112, the number of the second contact blocks 3131 can be three, four or five, etc., and the plurality of second contact blocks 3131 are provided around the protrusion 211. Therefore, the second contact 313 is simple in structure and easy to process and manufacture.

25 In other embodiments of the present application, as shown in Fig. 7, the second contact blocks 3131 are hemispheres and are fixed on the second flat plate 3112, the number of the second contact blocks 3131 can be three, four or five, etc., and the plurality of second contact blocks 3131 are provided around the protrusion 211.

In some embodiments of the present application, in the case that the through-electrode 310
30 contacts the one end of the plunger 210, as shown in Fig. 3, the second contact blocks 3121 are

equidistant from the top of the protrusion 211. Thus, the force uniformity between the plunger 210 and the through-electrode 310 can be further improved.

In some embodiments of the present application, as shown in Fig. 3, in the case that the end face of the one end of the plunger 210 is a plane and the through-electrode 310 contacts the end face of the one end of the plunger 210, the sizes of the second contact blocks 3131 in the axis direction of the contact probe 200 are larger than the size of the protrusion 211 in the axis direction. Therefore, when the second contact blocks 3131 are in contact with the one end of the plunger 210, the protrusion 211 is not in contact with the through-electrode 310, so as to avoid the wear on the surface of the protrusion 211, ensuring the stability of the resistance value of the plunger 210, and improving the reliability of the electrical test.

In other embodiments of the present application, as shown in Figs. 6 and 7, a receiving groove 3114 is provided at one end of the support 311 close to the contact probe 200. In the case that the second contact blocks 3131 contacts the one end of the plunger 210, at least the top of the protrusion 211 is located within the receiving groove 3114. In the embodiments of the present application, by arranging the receiving groove 3114 and placing the top of the protrusion 211 within the receiving groove 3114, the contact between the top of protrusion 211 and the through-electrode 310 is avoided. Therefore, the sizes of the second contact blocks 3131 in the axis direction of the contact probe 200 can be smaller, which allows a more compact connection between the through-electrode 310 and the plunger 210, and a more miniaturized socket 10, thus facilitating the use of the socket 10. Specifically, the receiving groove 3114 penetrates the second flat plate 3112 and extends to the conductive connector 3113. Therefore, the sizes of the second contact blocks 3131 in the axis direction of the contact probe 200 can be further reduced while ensuring that the top of the protrusion 211 is not in contact with the through-electrode 310.

In other embodiments of the present application, as shown in Figs. 9 to 12, the through-electrode 310 includes a first flat plate portion 314, a second flat plate portion 315 and a conductive connection structure 316. The first flat plate portion 314 is provided on one side of the insulation layer 320 away from the contact probe 200, the second flat plate portion 315 is provided on one side of the insulation layer 320 close to the contact probe 200, and the conductive connection structure 316 penetrates the insulation layer 320 and connects the first flat plate portion 314 and the second flat plate portion 315, a groove 3151 is provided in the second

flat plate portion 315; in the case that the through-electrode 310 contacts the one end of the plunger 210, the second flat plate portion 315 abuts against the one end of the plunger 210, and at least the top of the protrusion 211 is located in the groove 3151. In the embodiments of the present application, a groove 3151 is provided at the center of the second flat plate portion 315.

5 When the second flat plate portion 315 abuts against the one end of the plunger 210, at least the top of the protrusion 211 is located in the groove 3151, so that the top of the protrusion 211 is not in contact with the second flat plate portion 315. By abutting the second flat plate portion 315 against the one end of the plunger 210, the contact area between the plunger 210 and the through-electrode 310 is increased, and the pressure on the contact surface between the plunger
10 210 and the through-electrode 310 is decreased, thus reducing the wear of the plunger 210 and the through-electrode 310, stabilizing the resistance values of the plunger 210 and the through-electrode 310, and improving the reliability of the electrical test. Specifically, as shown in Fig. 11, contact posts 3141 are provided on the first flat plate portion 314, and are configured to contact the second electrical component. There can be multiple contact posts 3141 which are
15 uniformly distributed.

Further, in the case that the end face of the one end of the plunger 210 is a plane, and the through-electrode 310 contacts the end face of the one end of the plunger 210, the protrusion 211 is located within the groove 3151, and the size of the groove 3151 in the axis direction of the contact probe 200 is larger than the size of the protrusion 211 in the axis direction of the contact
20 probe 200, so that the contact between the protrusion 211 and the second flat plate portion 315 can be avoided.

In some embodiments of the present application, the conductive connection structure 316 is a cylinder. The conductive connection structure 316 has one end connected to the first flat plate portion 314, and the other end connected to the second flat plate portion 315. The outer
25 circumferential surface of the conductive connection structure 316 is configured for fixed connection to the insulation layer 320, thus realizing the fixation of the through-electrode 310 and the insulation layer 320. The conductive connection structure 316 is simple in structure and easy to process and manufacture.

In some embodiments of the present application, as shown in Fig. 10, the groove 3151 of
30 the second flat plate portion 315 penetrates the second flat plate portion 315 and extends to the

conductive connection structure 316. Therefore, when the thickness of the second flat plate portion 315 is thinner, it is ensured that the top of the protrusion 211 is not in contact with the second flat plate portion 315, to avoid wear on the surface caused by the contact between the top of the protrusion 211 and the second flat plate portion 315, and ensure the stability of the resistance value of the plunger 210. In addition, the thickness of the second flat plate portion 315 is thinner, which allows a more compact connection between the through-electrode 310 and the plunger 210, and a more miniaturized socket 10, thus facilitating the use of the socket 10.

In some embodiments of the present application, as shown in Figs. 1 and 2, connection holes are provided in the flexible plate 300, and the flexible plate 300 is connected to the socket body 100 by connectors 400 penetrating the connection holes. Specifically, four connection lugs 321 are provided at the edge of the insulation layer 320, and the connection holes are located on the connection lugs 321. In the embodiments of the present application, the connectors 400 are bolts. By the bolts penetrating the connection holes, the flexible plate 300 is fixed on the side of the socket body 100 in contact with the second electrical component. Therefore, the connection mode between the flexible plate 300 and the socket body 100 is simple and the assemble is convenient.

In some embodiments of the present application, as shown in Figs.1 and 2, there are a plurality of through-electrodes 310, the through-electrodes 310 and the contact probes 200 are provided in one-to-one correspondences, and the plurality of through-electrodes 310 are provided in a matrix.

It should be noted that the relationship terms herein such as "first", "second", and the like are only used for distinguishing one entity or operation from another entity or operation, but do not necessarily require or imply that there is any actual relationship or order between these entities or operations. Moreover, the terms "include", "comprise" or any other variants thereof are intended to cover non-exclusive inclusions, so that processes, methods, articles or devices including a series of elements include not only those elements listed but also those not specifically listed or the elements intrinsic to these processes, methods, articles, or devices. Without further limitations, elements defined by the sentences "comprise(s) a ..." do not exclude that there are other identical elements in the processes, methods, articles, or devices which include these elements.

All the embodiments in this specification are described in relevant ways, and the same or similar parts in each of the embodiments can be referred to one another, and the parts emphasized are differences to other embodiments. Especially for embodiments of a system, since they are similar to embodiments of a method, the description thereof is relatively simple; the
5 similar parts could refer to the parts in the description of embodiments of the method.

The embodiments described above are merely preferred embodiments of the present application, and not intended to limit the scope of the present application. Any modifications, equivalents, improvements or the like within the spirit and principle of the application should be included in the scope of the application.

CLAIMS

What is claimed is:

1. A socket for testing an electrical component, comprising:

a socket body, inside which a probe receiving hole is provided;

5 a contact probe, which is received in the probe receiving hole, wherein one end of the contact probe is provided with a plunger, one end of the plunger is provided with a protrusion; and

10 a flexible plate, which is provided on one side of the socket body for contacting a second electrical component, wherein the flexible plate comprises an insulation layer and a through-electrode installed on the insulation layer, and one end of the through-electrode is configured to contact the second electrical component, and the other end of the through-electrode is configured to contact the one end of the plunger; wherein, in a case that the through-electrode contacts the one end of the plunger, the through-electrode is at least not in contact with a top of the protrusion.

15 2. The socket for testing an electrical component according to claim 1, wherein an end face of the one end of the plunger is a plane, and is provided with a bulge which forms the protrusion, and the other end of the through-electrode is configured to contact the end face of the one end of the plunger; wherein, in a case that the through-electrode contacts the end face of the one end of the plunger, the through-electrode is not in contact with the protrusion.

20 3. The socket for testing an electrical component according to claim 1, wherein the one end of the plunger is a cone which forms the protrusion, and the other end of the through-electrode is configured to contact the protrusion of the plunger; wherein, in a case that the through-electrode contacts the protrusion of the plunger, the through-electrode is not in contact with the top of the protrusion.

25 4. The socket for testing an electrical component according to any one of claims 1-3, wherein the through-electrode comprises a support, a first contact and a second contact, the support is fixedly installed on the insulation layer, the first contact is provided at one end of the support away from the contact probe, and the second contact is provided at one end of the support close to the contact probe.

5 5. The socket for testing an electrical component according to claim 4, wherein the support comprises a first flat plate, a second flat plate and a conductive connector, the first flat plate is provided on one side of the insulation layer away from the contact probe, the second flat plate is provided on one side of the insulation layer close to the contact probe, and the conductive connector penetrates the insulation layer and connects the first flat plate and the second flat plate.

6. The socket for testing an electrical component according to claim 5, wherein the first flat plate, the second flat plate and the conductive connector are formed in one piece.

10 7. The socket for testing an electrical component according to claim 4, wherein the first contact comprises a plurality of first contact blocks which are uniformly distributed and are configured to contact the second electrical component.

8. The socket for testing an electrical component according to claim 4, wherein the second contact comprises a plurality of second contact blocks which are uniformly distributed;

15 in the case that the through-electrode contacts the one end of the plunger, the plurality of second contact blocks surround the protrusion and are at least not in contact with the top of the protrusion.

9. The socket for testing an electrical component according to claim 8, wherein the second contact blocks are cylinders, cones, spheres or frustums.

20 10. The socket for testing an electrical component according to claim 8, wherein in the case that the through-electrode contacts the one end of the plunger, the second contact blocks are equidistant from the top of the protrusion.

11. The socket for testing an electrical component according to claim 8, wherein a receiving groove is provided at the one end of the support close to the contact probe, and in a case that the second contact blocks contacts the one end of the plunger, at least the top of the protrusion is located within the receiving groove.

25 12. The socket for testing an electrical component according to claim 1 or 2 or 3, wherein the through-electrode comprises a first flat plate portion, a second flat plate portion and a conductive connection structure, the first flat plate portion is provided on one side of the insulation layer away from the contact probe, the second flat plate portion is provided on one

side of the insulation layer close to the contact probe, and the conductive connection structure penetrates the insulation layer and connects the first flat plate portion and the second flat plate portion, a groove is provided in the second flat plate portion;

5 in the case that the through-electrode contacts the one end of the plunger, the second flat plate portion abuts against the one end of the plunger, and at least the top of the protrusion is located in the groove.

13. The socket for testing an electrical component according to any one of claims 1 to 12, wherein connection holes are provided in the flexible plate, and the flexible plate is connected to the socket body by connectors penetrating the connection holes.