Description

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to an IC socket for supporting an IC on its supporting platform so that the IC is readily contacted with contacts.

2. BRIEF DESCRIPTION OF THE PRIOR ART

Figs. 5 through 7 show a conventional IC socket including an IC supporting platform.

An IC supporting platform 2 has leg portions 3 extending downward in parallel relation. The leg portions 3 are inserted into a guide hole 4 formed in a socket body 1 and at the same time, outwardly facing retaining claws 3a each formed on a lower end of each of the leg portions 3 is retained in the wall of the guide hole 4 in order to prevent the IC supporting platform 2 from escaping upwardly. Furthermore, the leg portions 3 also serve to allow vertical and horizontal movements of the supporting platform against a spring 5 in association with the spring 5 urging the supporting platform 2 upwardly while holding the supporting platform 2 in its uppermost position. The supporting platform 2 and the leg portions 3 are comprised of a unitary number of component parts integrally formed of a synthetic resin material. When an IC is placed on the supporting platform 2 and pushed down by a cover (not shown) mounted on the socket body 1, or by a robot, the supporting platform 2 is moved in the horizontal direction while being lowered integrally together with the leg portions 3 against the spring 5.

On the other hand, contact portions 7 of contacts 6 are in engagement with positioning holes 8 formed in a marginal portion of the supporting platform 2 and orderly arranged in a row. When the supporting platform 2 is moved in the horizontal direction integrally together with the leg portions 3 in order to be brought into correspondence with the IC, the contact portions 7 are also displaced following the movement of the supporting platform 2. As a result, a correct correspondence between each contact portion 7 and each IC lead can be obtained.

However, in the above-mentioned conventional IC socket, if a gap formed between the guide hole 4 formed in the socket body 1 and each of the leg portions 3 is small as shown in Fig. 5, the range of a horizontal movement of the supporting platform 2 is extremely limited. On the contrary, if the gap between the guide hole 4 and each of the leg portions 3 is designed to be large in order to obtain a large amount of movement of the supporting platform 9 as shown in Fig. 6, there is such inconveniences as that the retaining claw 3a of the leg portion 3 is escaped from the guide hole 4 as shown in Fig. 7 when the supporting platform 2 is moved in the horizontal direction. If the retaining claw 3a is designed to be large in order to prevent the aforementioned undesirable incident, the spring stroke of the leg portion 3 is required to be set long in view of necessity for pushing the leg portion 3 into the guide hole 4 and retained at the wall of the guide hole 4. As a result, an increased bulk of the socket as a whole is resulted.

Furthermore, it has also such inconveniences as that the horizontal movement of the supporting platform with the IC placed thereon lacks smoothness and reliability due to elastic resistance of the leg portions and retaining resistance of the retaining claws, and as a result, proper contact relations between IC leads and the contacts arranged at micro pitches become difficult to obtain.

US-A-4,887,969 illustrates an IC socket having the features of the preamble of Claim 1.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide, in order to obviate the above inconveniences, an IC socket in which a supporting platform can, smoothly and reliably, be horizontally moved into a position correctly corresponding to an IC mounted thereon, without increasing the bulk of the IC socket.

Another object of the invention is to provide an IC socket in which an IC is stably supported both on a lead supporting platform and on an IC body supporting platform, so that deformation of the IC leads can effectively be prevented, and both vertical and horizontal movements can surely be effected without increasing the bulk of the IC socket.

The invention provides an IC socket in accordance with Claim 1.

Moreover, the second supporting platform is also resiliently held on the socket body for vertical movement and anchored thereto in such a manner as to be able to move in the horizontal direction as in the first supporting platform.

According to the present invention, when the IC is placed on the supporting platform and pushed down, the supporting platform is lowered while being moved in the horizontal direction against the resilient contacting force at the loosely engaging portion between the supporting platform and the anchoring member. As a result, a relative position between the IC and the supporting platform, and relative positions between the IC leads and the contacts are properly secured. A horizontal movement of the supporting platform can be secured at the loosely engaging portion between the supporting platform and the anchoring member. The anchoring member may be formed in a length long enough for anchoring the supporting platform. As a result, the above-mentioned effects can be obtained without increasing the bulk of the

socket.

Furthermore, according to the present invention, when the IC is placed on the socket and pushed down, the IC leads are supported on the first supporting platform and the IC body is supported on the second supporting platform. As a result, the IC can stably be supported for the purpose of contact. In addition, deformation of the IC leads can be prevented at the time the IC is placed on the socket and brought into contact under pressure. As in the above-mentioned case, a sufficient amount of horizontal movement of the first supporting platform is secured at the loosely inserted portion between the leg portion of the second supporting platform and the first supporting platform. Accordingly, it is no more required to form the leg portion long in order to increase the amount of horizontal movement. As a result, an increased bulk of the socket is not resulted.

Moreover, since the second supporting platform is resiliently moved only following the resilient movement of the first supporting platform, the IC can be more reliably supported and properly contacted.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view of an IC socket according to the present invention;

Fig. 2 is a sectional view of the IC socket of Fig. 1, showing IC leads supported on a first supporting platform;

Fig. 3 is likewise a sectional view of the IC socket of Fig. 2, showing an IC body placed on a second supporting platform;

Fig. 4 is also a sectional view of the IC socket of Fig. 3, but showing the IC pressed against a radiating plate by the second supporting platform;

Fig. 5 is a sectional view of a conventional IC socket; and

Figs. 6 and 7 are likewise sectional views of a similar conventional IC socket to that of Fig. 8, but showing a comparatively large space formed between a guide hole and each leg portion.

DETAILED DESCRIPTION OF THE EMBODIMENTS

While describing an embodiment of the present invention, reference will be made to Figs. 1 - 4. The reference numerals used herein are irrespective of those of the conventional IC socket.

The numeral 1 denotes a socket body formed of a generally rectangular insulated base member. The socket body 1 includes a first supporting platform 2 vertically movably disposed on a central portion of its upper surface. A plurality of contacts are arranged in parallel relation along four sides or two sides of the outer periphery of the first supporting platform 2. The first supporting platform 2 has a second supporting platform 4 disposed at its central portion.

The second supporting platform 4 has resilient leg portions 4a extending downward in parallel relation. Each of the leg portions 4a has an engaging claw 4b formed on its free end in such a manner as to be vertically spaced apart and adapted to engage with the socket body 1 in order to prevent the second supporting platform 4 from being escaped. The socket body 1 is provided with an opening 1a formed in a central portion immediately under the first supporting platform 2. The retaining claw 4b facing outward is inserted into the central opening 1a against the elasticity of the leg portion 4a and engaged with a peripheral edge of the opening 1a by the restoring force of the retaining claw 4b. A spring 5 is disposed between, for example, the first supporting platform 2 and the socket body 1 in order to resiliently support the first supporting platform upwardly. As a result, the first supporting platform 2 is lowered against the spring 5 and raised in accordance with the spring 5. Also, by virtue of the foregoing arrangement, a horizontal movement and an inclining movement as will be described hereinafter are obtainable. That is, the first supporting platform 2 is provided with a central opening 2a formed in a central portion thereof and permitting the leg portion 4a of the second supporting platform 4 to be loosely inserted therein. Upon engagement of the retaining claw 4b of the second supporting platform 4 passed through the central opening 2a and restored, with the peripheral wall of the central opening 1a of the socket body 1, the second supporting platform 4 is anchored by the socket body 1. As a result, the first supporting platform 2 is held in its uppermost position against the spring 5 and able to effect the above-mentioned vertical and horizontal movements and an inclining movement. The first supporting platform 2 is provided with IC positioning portions 2b projecting from the area around the central opening 2a.

The second supporting platform 4 and the leg portion 4a form anchor member for anchoring the first supporting platform 2 against the resiliency of the spring 5. At that time, the second supporting platform 4 is retained to the first supporting platform 2 in order to act as retaining means for preventing the first supporting platform 2 from moving upward. In the anchor member, the leg portion 4a is loosely fitted into the central opening 2a of the first supporting platform 2 for permitting the first supporting platform from moving horizontally. The anchoring member is disposed on the socket body 1 in such a manner as to be able to move in the vertical direction (upward and downward) by the leg portion 4a. A plurality of positioning holes 6 are arranged in parallel relation in marginal portions of four sides or two sides of the outer peripheral portion of the first supporting platform 2 at contact pitches, and therefore, at the equal pitches to those of the IC leads 7a. The holes 6 are adapted to

receive contact portions 3b at distal ends of the corresponding contacts 3 in order to correctly position the contacts 3.

The contacts 3 are implanted in the socket body portion at the outer peripheral portion of the first supporting platform 2. Each of the contacts 3 has an elastic contact element 3a extending toward the first supporting platform 2 from the implanted portion, and the contact portion 3b of the elastic contact element 3a is inserted into the corresponding positioning hole 6 as mentioned. The elastic contact element 3a is restricted the sideward displacement of the contact portion 3b in the positioning hole 6, to thereby establishing a relative position between the first supporting platform 2 and the contact 3. When the first supporting platform 2 is horizontally moved either forwardly and backwardly or rightwardly and leftwardly, the elastic contact element 3a of the contact 3 is also displaced following thereto in order to maintain its relative position to the first supporting platform 2.

In this way, the first supporting platform 2 can be moved forwardly and backwardly, rightwardly and leftwardly, and upwardly and downwardly, and is engaged with the second supporting platform 4 to restrict is raised position.

The second supporting platform 4 is resiliently supported upwardly on the socket body 1 through a spring 8 interposed therebetween. The second supporting platform 4 is lowered against the spring 8 and raised in accordance with the spring 8. It is held in its uppermost position against the spring 8.

When a flat type IC 7 is placed on the first supporting platform 2, the first supporting platform 2 is moved at the loosely engaged portion between the central opening 2a and the leg portion 4a in association with the movement of the flat type IC 7, and the elastic element 3a of each contact is also displaced following the movement thereof. As a result, relative positions between the IC leads 7a and the contact portions 3b of the contacts are maintained. At that time, the first supporting platform 2 is operated to correctly position the side edge of the IC body 7b through its IC positioning portion 2b, and support the IC lead 7a on an upper surface of the positioning portion. At the same time, the IC body 7b is supported by the second supporting platform 4 so that the former is brought into contact with the contact portion 3b of the contact 3. It may be designed such that the IC is originally not placed on the supporting platform but held in a state floating over the supporting platform. In that state, the IC lead 7a is placed on the contact portion 3b of the contact 3. When pushed down, the IC is supported on the first supporting platform, and the IC body is likewise supported on the second supporting platform 2.

As is shown in Fig. 4, when a presser plate 10 including a radiating plate 9 is shut on the base member of the socket, the lead 7a of the IC 7 or the IC body 7b is pressed together with the first supporting platform 2 so that it is moved downward against the spring 5. As a reaction, the contact portion 3b of the contact 3 is brought into abutment with the IC lead 7a and bent in that state in order to obtain a contact pressure by its restoring force. Further, irrespective of the lower position of the first supporting platform 2, the second supporting platform 4 urges the IC 7 against the radiating plate 9 to secure a reliable contact between the IC 7 and the radiating plate 9. As a result, favorable radiating effects can be obtained.

According to the present invention, the relative position between the IC and supporting platform and the relative positions between the IC leads and contacts can be correctly corresponded with each other by smoothly and reliably moving the supporting platform in the horizontal direction at the loosely engaging portion between the supporting platform and the anchoring member. As a result, a highly reliable contact relation can be obtained.

Furthermore, a stable contact relation can be obtained by supporting the IC both by the supporting platform for supporting the IC leads and by another supporting platform for supporting the IC body. Also, deformation of IC leads can effectively be prevented when they are brought into contact.

Moreover, according to the present invention, it is no more required to make the elastic stroke of the leg portions as in the past in order to obtain a proper amount of horizontal movement of the first supporting platform. As a result, an initially intended object can be achieved without increasing the bulk of the IC socket.

Claims

1. An IC socket comprising a first supporting platform (2) for supporting the leads (7a) of an IC and being upwardly resiliently held on a socket body (1) for vertical movement and adapted to engage with contacts (3a) provided on said socket body (1), a second supporting platform (4) disposed at a central portion of said first supporting platform (2) and adapted to support the body (7b) of the IC, and anchor means (4a) extending downward from said second supporting platform (4) and implanted in said socket body (1), said anchor means being loosely inserted into a central opening formed in said first supporting platform (2), said second supporting platform (4) being brought into engagement with said first supporting platform (2) in order to playably anchor said first supporting platform to said socket body against the action of a spring (5) which resiliently urges the first supporting platform away from the socket body, characterized in that said anchor means are in the form of leg portions (4a) extend-

receive contact portions 3b at distal ends of the corresponding contacts 3 in order to correctly position the contacts 3.

The contacts 3 are implanted in the socket body portion at the outer peripheral portion of the first supporting platform 2. Each of the contacts 3 has an elastic contact element 3a extending toward the first supporting platform 2 from the implanted portion, and the contact portion 3b of the elastic contact element 3a is inserted into the corresponding positioning hole 6 as mentioned. The elastic contact element 3a is restricted the sideward displacement of the contact portion 3b in the positioning hole 6, to thereby establishing a relative position between the first supporting platform 2 and the contact 3. When the first supporting platform 2 is horizontally moved either forwardly and backwardly or rightwardly and leftwardly, the elastic contact element 3a of the contact 3 is also displaced following thereto in order to maintain its relative position to the first supporting platform 2.

In this way, the first supporting platform 2 can be moved forwardly and backwardly, rightwardly and leftwardly, and upwardly and downwardly, and is engaged with the second supporting platform 4 to restrict is raised position.

The second supporting platform 4 is resiliently supported upwardly on the socket body 1 through a spring 8 interposed therebetween. The second supporting platform 4 is lowered against the spring 8 and raised in accordance with the spring 8. It is held in its uppermost position against the spring 8.

When a flat type IC 7 is placed on the first supporting platform 2, the first supporting platform 2 is moved at the loosely engaged portion between the central opening 2a and the leg portion 4a in association with the movement of the flat type IC 7, and the elastic element 3a of each contact is also displaced following the movement thereof. As a result, relative positions between the IC leads 7a and the contact portions 3b of the contacts are maintained. At that time, the first supporting platform 2 is operated to correctly position the side edge of the IC body 7b through its IC positioning portion 2b, and support the IC lead 7a on an upper surface of the positioning portion. At the same time, the IC body 7b is supported by the second supporting platform 4 so that the former is brought into contact with the contact portion 3b of the contact 3. It may be designed such that the IC is originally not placed on the supporting platform but held in a state floating over the supporting platform. In that state, the IC lead 7a is placed on the contact portion 3b of the contact 3. When pushed down, the IC is supported on the first supporting platform, and the IC body is likewise supported on the second supporting platform 2.

As is shown in Fig. 4, when a presser plate 10 including a radiating plate 9 is shut on the base member of the socket, the lead 7a of the IC 7 or the IC body 7b is pressed together with the first supporting platform 2 so that it is moved downward against the spring 5. As a reaction, the contact portion 3b of the contact 3 is brought into abutment with the IC lead 7a and bent in that state in order to obtain a contact pressure by its restoring force. Further, irrespective of the lower position of the first supporting platform 2, the second supporting platform 4 urges the IC 7 against the radiating plate 9 to secure a reliable contact between the IC 7 and the radiating plate 9. As a result, favorable radiating effects can be obtained.

According to the present invention, the relative position between the IC and supporting platform and the relative positions between the IC leads and contacts can be correctly corresponded with each other by smoothly and reliably moving the supporting platform in the horizontal direction at the loosely engaging portion between the supporting platform and the anchoring member. As a result, a highly reliable contact relation can be obtained.

Furthermore, a stable contact relation can be obtained by supporting the IC both by the supporting platform for supporting the IC leads and by another supporting platform for supporting the IC body. Also, deformation of IC leads can effectively be prevented when they are brought into contact.

Moreover, according to the present invention, it is no more required to make the elastic stroke of the leg portions as in the past in order to obtain a proper amount of horizontal movement of the first supporting platform. As a result, an initially intended object can be achieved without increasing the bulk of the IC socket.

Claims

1. An IC socket comprising a first supporting platform (2) for supporting the leads (7a) of an IC and being upwardly resiliently held on a socket body (1) for vertical movement and adapted to engage with contacts (3a) provided on said socket body (1), a second supporting platform (4) disposed at a central portion of said first supporting platform (2) and adapted to support the body (7b) of the IC, and anchor means (4a) extending downward from said second supporting platform (4) and implanted in said socket body (1), said anchor means being loosely inserted into a central opening formed in said first supporting platform (2), said second supporting platform (4) being brought into engagement with said first supporting platform (2) in order to playably anchor said first supporting platform to said socket body against the action of a spring (5) which resiliently urges the first supporting platform away from the socket body, characterized in that said anchor means are in the form of leg portions (4a) extend-

* C L M S *

ing downwards from said second supporting platform (4) and said second supporting platform (4) is vertically movably mounted on said socket body (1) by said leg portions (4a) and resiliently biassed upwardly by a further spring (8).

Patentansprüche

1. Sockel für integrierten Schaltkreis, der eine erste Trageplattform (2) für die Abstützung der Leitungen (7a) eines integrierten Schaltkreises umfaßt, nach oben hin zur Durchführung einer vertikalen Bewegung in elastischer Weise von einem Sockelkörper (1) gehalten wird und so ausgeführt ist, daß er in am genannten Sockelkörper (1) vorgesehene Kontakte (3a) eingreifen kann, wobei eine zweite Trageplattform (4) in einem zentralen Abschnitt der genannten ersten Trageplattform (2) angeordnet und so ausgeführt ist, daß sie den Körper (7b) des integrierten Schaltkreises abstützt, und von der genannten zweiten Trageplattform (4) aus nach unten verlaufende und im genannten Sockelkörper (1) fest eingesetzte Verankerungsmittel (4a) vorgesehen sind, wobei die genannten Verankerungsmittel in eine in der genannten ersten Trageplattform (2) ausgebildete zentrale Öffnung lose eingesetzt sind, und wobei die genannte zweite Trageplattform (4) in Eingriff mit der genannten ersten Trageplattform (2) gebracht wird, um die genannte erste Trageplattform gegenüber dem genannten Sockelkörper mit Spiel gegen die Wirkung einer Feder (5) zu verankern, die die erste Trageplattform in elastischer Weise vom Sockelkörper wegdrückt, dadurch gekennzeichnet, daß die genannten Verankerungsmittel in Form von Schenkelabschnitten (4a) vorgesehen sind, die von der genannten zweiten Trageplattform (4) aus nach unten verlaufen, und die genannte zweite Trageplattform (4) durch die genannten Schenkelabschnitte (4a) vertikal bewegbar am genannten Sockelkörper (1) montiert und durch eine weitere Feder (8) in elastischer Weise nach oben vorgespannt ist.

Revendications

1. Un adaptateur pour circuit intégré comprenant une première plate-forme de support (2) pour supporter les conducteurs (7a) d'un circuit intégré qui est maintenu vers le haut de façon élastique sur un corps d'adaptateur (1) pour un mouvement vertical et qui est apte à toucher des contacts (3a) prévus sur ledit corps d'adaptateur (1), une deuxième plate-forme de support (4) située dans une partie centrale de ladite première plate-forme de support (2) et apte à supporter le corps (7b) du circuit intégré, et des moyens d'ancrage (4a) s'étendant vers le bas à partir de ladite deuxième plate-forme de support (4) et implantés dans ledit corps d'adaptateur (1), lesdits moyens d'ancrage étant insérés avec du jeu dans une ouverture centrale formée dans ladite première plate-forme de support (2), ladite deuxième plate-forme de support (4) étant amenée en contact avec ladite première plate-forme de support (2) dans le but d'ancrer avec du jeu ladite première plate-forme de support audit corps d'adaptateur contre l'action d'un ressort (5) qui repousse de façon élastique la première plate-forme de support à l'écart du corps d'adaptateur, caractérisé en ce que lesdits moyens d'ancrage ont la forme de parties de jambe (4a) s'étendant vers le bas à partir de ladite deuxième plate-forme de support (4) et ladite deuxième plate-forme de support (4) est montée de façon mobile verticalement sur ledit corps d'adaptateur (1) par lesdites parties de jambe (4a) et est repoussée de façon élastique par un ressort supplémentaire (8).