

LEADLESS CHIP CARRIER SOCKET

This invention relates to a socket for a leadless integrated circuit or chip carriers.

During the last several years integrated circuits (IC's) have completely revolutionized the electronics industry. An IC in its minaturized form is made into a chip which is normally mounted to a carrier. Recently, leadless chip carriers, which are of relatively thin plate forms having multiple leads formed upon their surfaces, have become popular due to their compactness in relation to the dual-in-line carrier package. Leadless chip carriers take up less space on the printed circuit board which is important in modern compact circuit design.

Leadless chip carriers are formed of ceramic materials which have a thermal coefficient of expansion which is not ideally suited for the epoxy/glass material from which printed circuit boards are normally constructed. Therefore, in order to utilize a leadless chip carrier, a receiving device is used to connect the carrier onto a printed circuit board. These receiving devices or sockets are designed to accommodate the differential in thermal expansion of the carriers and printed circuit boards. Sockets are also utilized in testing chip carriers and have been developed to accommodate such carriers for burn-in and similar testing.

U.S. Patent 4, 491, 377 discloses a socket having conductive elongated contacts for holding the carrier within the socket. A spreader cams the inner edge of the

contacts outwardly to allow insertion of the carrier. The contacts are then released to hold the carrier firmly within the socket.

An object of this invention is to provide an improved electrical connector of socket for an IC carrier which is of simple and reliable construction.

According to the invention there is provided a socket for a leadless chip carrier; said socket including a base member having a central opening therein, a plurality of conductive contacts positioned on at least two side edges of said base member opening, each contact being anchored in said base member and including an upwardly extending part with a cantilevered platform projecting from its said upwardly extending part outwardly of said base member opening and a top overlying said base member, said top including an abutment means which can be brought into contact with each contact platform for flexing said contacts in an outward direction relative to said base member opening to space said contacts from said carrier when the latter is being positioned within said socket; wherein the contacts are free and are only engageable with the abutments means of the top and with the carrier.

The upper platform of each contact is conveniently of diving board form and configured so that when the platforms are depressed, the contacts are flexed outwardly to allow insertion of the

carrier. By releasing pressure on the platforms, the contacts close to secure the carrier within the socket.

In a preferred construction each contact includes a lead anchored in said base member, said contact upwardly

extending part including an integral curved neck extending from said contact lead, and a head integrally formed atop said neck having inner and outer edges, said cantilevered platform projecting outwardly from said head outer edge, 5 said head inner edge being bevelled and terminating in a lower chin part offset from said contact neck.

The invention may be understood more readily and various other features of the invention may become apparent from consideration of the following description.

10 An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein;

Figure 1 is a perspective view of a socket constructed in accordance with the invention;

15 Figure 2 is an exploded view of the components of the socket;

Figure 3 is a top plan view of the socket with an integrated circuit device inserted therein;

20 Figure 4 is a side view of the socket taken in one direction;

Figure 5 is a side view of the socket taken in another direction;

Figure 6 is a bottom view of the socket;

25 Figure 7 is a sectional side view of the socket showing a integrated circuit carrier being inserted;

Figure 8 is a sectional view taken along the line 8-8 of Figure 3 and showing the carrier in its clamped position; and

Figure 9 is a sectional view taken along the live line 9-9 of Figure 1.

The socket 10 shown in the drawings includes a base member 12 having a top face 14 and bottom face 16. Base member 12 includes a central opening 18 and a plurality of peripheral bores 20 about opening 18 which extend through faces 14 and 16. A plurality of grooves 22 are cut in base member face 14. A raised table section 24 extends about central opening 18 and includes grooves 26 which are aligned with grooves 22. Base member 12 also includes two pairs of opposed finger latches 30 each of which is flexible and includes an upper camming face 32 and lock tab 34.

Socket 10 also provides a plurality of contact 36. Each contact 36 is constructed of resilient electrically conductive material and is of the general cross-sectional configuration shown in Figures 7 - 8. Each contact 36 has lower leads 38 which extend through base member bores 20. An integral curved neck 40 of each contact 36 is fitted into aligned grooves 22 and 26. Each contact 36 includes an integral upper head 42 having a bevelled inner edge 44 which terminates in a chin part 46 offset from the contact's neck 40 as seen in Figure 8 and an outwardly extending integral platform 48.

Socket 10 also includes a top 50 having the general configuration shown in Figure 2 and includes shoulder parts 58. Top 50 includes a central opening 60 to allow for the insertion of an integrated circuit carrier 62 into

socket 10 and an abutment part 64 at each of its sides 54. As seen in Figures 4 and 5, top 50 includes an open channel 66 at each of its die faces 54 into center opening 60 below abutment parts 64. A plurality of grooves 72 are
5 formed in the top next to abutment parts 64 and over channels 66.

With contacts 36 positioned in grooves 22, 26 of base member 12 and with leads 38 extending through base member bores 20, top 50 is placed over and pushed downwardly upon
10 base member 12 until finger latches 30 of the base member engage shoulder parts 58 to secure the top to the base member. The heads 42 of contacts 36 fit into top grooves 72 with each contact platform 48 bearing against a top abutment part 64 to urge the top into its upper position
15 as seen in Figure 1.

To operate socket 10, top 50 is pushed downwardly towards base member 12 into its lower position as seen in Figure 7. Abutment parts 64 urge contact platforms 48 downwardly, as shown by arrows 51 in Figure 7. This
20 creates a moment about contact necks 40 which causes contact heads 42 to shift outwardly so as to allow integrated circuit carrier 62 when inserted into top opening 60 to be supported atop table section 28 of the base member. Top 50 is then released. Contact platforms
25 48, under the influence of flexed contacts 36, urge the top upwardly away from base member 12 to allow contact chin parts 46 to compressively contact the leads 76 of the carrier 62 as shown by arrows 75 in Figure 8. Carrier 62

is released from clamping engagement with contacts 36 by pushing top 50 downwardly upon top 50. This is accomplished by simply pushing the carrier downwardly against the bevelled inner edges 44 of the contacts which in turn cams the contacts outwardly until the carrier leads engage the contact chin parts 46. The carrier is then released.

The preferred embodiment herebefore described is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described to explain the principles of the invention, its applications and its practical use to enable others skilled in the art to utilize the invention.



CLAIMS

1. A socket for a leadless chip carrier; said socket including a base member having a central opening therein, a plurality of conductive resilient contacts positioned on at least two side edges of said base member opening, each contact being anchored in said base member and including an upwardly extending part with a cantilevered platform projecting from its said base member opening, and a top overlying said base member, said top including an abutment means which can be brought into contact with each contact platform for flexing said contacts in an outward direction relative to said base member opening to space said contacts from said carrier when the latter is being positioned within said socket; wherein the contacts are free and are only engageable with the abutments means of the top and with the carrier.

2. The socket of claim 1 wherein said base support includes finger latches extending toward said top, each finger latch including a tab, said top including a shoulder for accepting said tabs and securing said finger latches whereby said top is secured to said base support.

3. The socket of claim 1 or 2 wherein the contacts have leads projecting downwardly positioned at each side of said base support central opening.

4. The socket of claim 1 or 2 wherein each contact



includes a lead anchored in said base member, said contact upwardly extending part including an integral curved neck extending from said contact lead, and a head integrally formed atop said neck having inner and outer edges, said cantilevered platform projecting outwardly from said outer edge, said head inner edge being bevelled and terminating in a lower chin part from said contact neck.

5. A socket according to any one of claims 1 to 4 wherein the top is of one-piece construction.

6. A socket according to any one of claims 1 to 5, wherein the abutment means is an abutment part extending from an outer peripheral edge of said top towards said base.

7. A socket substantially as described with reference to, and as illustrated in any one or more of the figures of the accompanying drawings.
