SPECIFICATION

BURN-IN BOARD

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to a burn-in board for use in a burn-in test of electronic devices.

2. Related Art:

In a conventional burn-in test, a test burn-in apparatus has been employed for applying a thermal load to a device under test (hereinafter referred to as DUT) to decide whether it is good or bad. A burn-in board having a printed board to which DUTs are attached has been normally set onto this test burn-in apparatus.

An example of a burn-in board of this type is now described with reference to Fig. 3. In Fig. 3, a burn-in board comprises a printed board 13 to which a plurality of IC sockets 3 (a part thereof is illustrated) are mounted by soldering wherein a plurality of DUTs 2 are respectively set onto the IC sockets 3.

Fig. 4 is a schematic view showing the construction of a wave jetting type soldering unit 4 for soldering the IC sockets 3 onto the printed board 13.

The wave jetting type soldering unit 4 incorporates therein a flux coating mechanism 5, a pre-heating heater 6, and a solder jetting mechanism 7 for soldering the IC sockets 3 onto the printed board 13 when the printed boards 13 are traveled in succession. The solder jetting mechanism 7 jets molten solder 8 in a wave shape and a trapezoidal shape through two jetting ports.

Fig. 5 is a view showing the detail of the solder jetting mechanism 7.

The solder jetting mechanism 7 comprises a primary solder jetting mechanism 9 for jetting a wave-shaped solder 8a and a secondary solder jetting mechanism 10 for jetting a trapezoidal solder 8b. The printed board 13 mounted thereon the IC sockets 3 is conveyed (traveled) along the advancing direction in the order of the flux coating mechanism 5, the pre-

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heating heater 6, and the solder jetting mechanism 7, then the molten solder 8a is jetted in a wave shape in the primary solder jetting mechanism 9 of the solder jetting mechanism 7 so as to attach the molten solder 8a onto socket pins 11. Thereafter, the printed board 13 passes over the molten trapezoidal solder 8b in the secondary solder jetting mechanism 10 to shape the solder, thereby generating solder fillets 12.

Flows of the molten solders 8a and 8b are denoted by arrows in Fig. 5. The printed board 13 passes through the secondary solder jetting mechanism 10 with an angle so that the front part thereof is directed upward in the traveling direction, thereby generating the solder fillets 12 owing to the induction effect of solder. Fig. 6 shows the socket pins 11 and neighborhood thereof when the solder fillets 12 are generated by the performance of normal soldering.

However, there are following problems in the conventional burn-in board.

Recently, many IC sockets 3 are manufactured to have the socket pins 11 each having the interval of 1mm or less. Accordingly, it is difficult to generate the solder fillets 12 between the socket pins 11 provided at the rear part of the printed board 13 in the traveling direction where induction effect of solder hardly works, particularly between the socket pin 11 provided at the rear end of the printed board 13 and its adjoining pins 11, leading to the frequent generation of solder bridges 12a caused by the connection between the adjoining socket pins 11. As a result, it causes a problem that DUTs 2 can not be subjected to a given test.

Further, since each interval between the socket pins 11 is small, it causes a problem that if the solder bridges 12a are generated, correction of the solder bridges 12a is very difficult.

SUMMARY OF THE INVENTION

The present invention has been made to solve the foregoing problems, and it is an object of the present invention to provide a burn-in board capable of restraining the generation of solder bridges when soldering socket pins onto a printed board.

To achieve the above object, a burn-in board according to the first aspect of the present invention comprises a plurality of lands provided on one surface of a printed board and each arranged at a given interval along one direction thereof, wherein the lands are soldered onto and connected to the printed board, a plurality of through holes each defined in the printed board and opened to each land, a plurality of terminals of holding sockets inserted into each through hole to protrude toward one surface of the printed board and through which DUTs are mounted, characterized in further comprising induction lands provided on one surface of the printed board along the extension line of the one direction at the same interval as each interval of the lands relative to said lands (17) provided at the rear end of the printed board (15), wherein each induction land has a length which is twice or more as long as each length of the land for inducing the solder.

Accordingly, in the burn-in board of the present invention, when soldering the terminals of holding sockets protruding toward one side of the printed board having through holes therein while the printed board is traveled along one direction, solders to be soldered onto and connected to terminals which are inserted into the through holes at the end of the printed board in one direction are induced backward by the induction lands provided at the rear end of the printed board in the traveling direction. Since each induction land has a length which is twice or more as long as each land, the induction effect becomes strong, thereby hardly generating solder bridges between induction lands and terminals provided at the end of the printed board.

The burn-in board according to the second aspect of the invention is characterized in further comprising a plurality of induction terminals protruded from the induction lands in accordance with a length of each induction land.

Accordingly, since the induction terminal as well as the induction lands produce an induction effect, solder connected to terminals inserted into through holes at the rear end of the printed board in one direction is strongly induced backward.

The burn-in board according to the third aspect of the invention is characterized in that the induction terminals are dummy pins.

Accordingly, since the dummy pins as well as the induction lands produce an induction effect, solder connected to terminals inserted into through holes at the rear end of the printed board in one direction is strongly induced backward.

The burn-in board according to the fourth aspect of the invention is characterized in that the induction lands are grounded.

Accordingly, it is possible to prevent the induction lands from adversely affecting other signals.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing an outer appearance of a burn-in board having dummy lands at the rear of a printed board in a traveling direction of the printed board;

Fig. 2 is a front view of the burn-in board of the present invention which is soldered;

Fig. 3 is a perspective view showing an outer appearance of an example of a conventional burn-in board;

Fig. 4 is a schematic view showing a wave jetting type soldering unit for soldering onto the burn-in board;

Fig. 5 is a view explaining the jetting of solder according to the wave jetting type soldering unit in Fig. 4;

Fig. 6 is a is a front view of the burn-in board having solder fillets generated thereon; and

Fig. 7 is a is a front view of the burn-in board having solder fillets and solder bridges respectively generated thereon.

PREFERRED EMBODIMENT OF THE INVENTION

A burn-in board according to a preferred embodiment of the invention is now described with reference to Figs. 1 and 2.

Components which are the same as those described with reference to Figs. 3 to 7 are depicted as the same reference numerals and the explanation thereof is omitted.

Fig. 1 is a perspective view of a burn-in board 14. The burn-in board 14 comprises mainly a printed board 15 and an IC socket (holder socket) 16 attached on the back of the printed board 15 for mounting DUTs thereon, not shown.

A plurality of lands 17 are formed on the printed board 15 in the longitudinal direction (one-way direction) of the printed board 15 respectively at a given interval P and also they are arranged in the width direction of the printed board 15 with a plurality of columns (3 columns in Fig. 1). The printed board 15 has through holes 18 each opening to each land 17 (only one through hole is shown in Fig. 1). Sockets pins (terminals) 19 of the IC socket 16 are inserted in the through holes 18 to protrude toward a surface (one surface) 20 of the printed board 15.

Dummy lands (induction lands) 21 are formed on the surface 20 of the printed board 15 and positioned along the extension line in the longitudinal direction at every column where the lands 17 are arranged. Each dummy land 21 is formed to have the interval P between one end thereof and each land located at each column end in the longitudinal direction and a length extending from one end to the other end thereof in the longitudinal direction which is twice as long as two lands.

Two dummy pins (induction terminals) 22 are protruded from each dummy land 21 corresponding to the length of each dummy land 21. One of the dummy pins 22 is arranged at the interval P relative to the through holes 18 each positioned at column end, namely, relative to the socket pins 19 inserted into the through holes 18. An interval between respective dummy pins 22 is narrower than the interval P between the lands 17. Further, each dummy land 21 is grounded while connected to ground, i.e., GND (not shown) through a through hole 23 and patterns 24.

A procedure for soldering the burn-in board having the foregoing construction is now described.

The burn-in board 14 is traveled, as shown in the arrow in Fig. 1, along the longitudinal direction of the printed board 15 while the dummy lands 21 are positioned at the rear side relative to the lands 17. Further, the burn-in board 14 is traveled to oppose the solder jetting mechanism 7 at its surface

and to direct upward at its front side as shown in Fig. 5.

After the burn-in board 14 passed through the flux coating mechanism 5 and the pre-heating heater 6, the molten solder 8a is jetted to the burn-in board 14 in the wave-shape at the primary solder jetting mechanism 9 of the solder jetting mechanism 7, then the molten trapezoidal solder 8b is jetted to the burn-in board 14 at the secondary solder jetting mechanism 10, whereby the shape of solder is shaped to generate the solder fillets 12 as shown in Fig. 2.

Meanwhile, since the dummy lands 21 and the dummy pins 22 are also soldered, an induction effect is produced in the solder connected between the lands 17 and the socket pins 19 provided on the surface 20 at the rear end of the printed board 15 in the traveling direction of the printed board 15 so that the solder fillets 12 are generated between the adjoining socket pins 19 without any trouble and without generating the solder bridges. Further, since the interval between the dummy pins 22 is narrower than the interval P between the lands 17, the solder bridges 12a are liable to generate between the dummy pins 22. However, since the solder bridges 12a are not connected between the socket pins 19, they do not affect the testing of the DUTs.

In the burn-in board of the present invention, since the dummy lands 21 each having the length twice as large as the lands 17 are formed on the printed board 15 and positioned at the rear side relative to the lands 17 in the traveling direction of the printed board 15, an induction effect can be produced when soldering the socket pins 19 which are arranged at a narrow pitch, thereby restraining the generation of solder fillets 12 between the adjoining socket pins 19. Further, since the dummy pins 22 protrude from the dummy lands 21 at a pitch smaller than the interval P between the lands 17, the solder bridges 12a are easily generate between the dummy pins 22, thereby enhancing the induction effect of the solder to be supplied to the socket pins 19, so that the generation of the solder fillets 12 between the socket pins 19 is more restrained.

Still further, since in the burn-in board of the present invention, the dummy lands 21 are connected to the GND and grounded, it is possible to

prevent in advance the dummy pins 22 and the solder bridges 12a from adversely affecting other signals.

Although the dummy lands 21 have the lengths twice as long as the lands 17 in this embodiment, the dummy lands 21 may have the lengths twice or more as long as the lands 17. Further, the dummy pins 22 are not always necessary, but the dummy lands 21 alone may obtain a sufficient induction effect.

As the GND, GND patterns, GND layers or the like may be appropriately selected.

As mentioned in detail above, the burn-in board according to the first aspect of the invention, there are provided the induction lands for inducing solder at the same interval as the lands and each having the length twice or more as long as each land.

As a result, when soldering terminals provided at small pitches using the solder jetting unit, an induction effect can be produced in the terminals provided at the rear end of the printed board in the traveling direction thereof, so that generation of solder bridges is restrained, leading to the excellent effect that the DUTs can be tested without any trouble.

In the burn-in board according to the second aspect of the invention, a plurality of induction terminals protrude from the induction lands.

As a result, the solder bridges are easily generated between induction terminals, so that the induction effect relative to the terminals provided at the rear ends in the traveling direction of the printed board becomes strong, leading to the effect that the generation of solder bridges is more restrained.

In the burn-in board according to the third aspect of the invention, the induction terminals are dummy pins.

As a result, the solder bridges are easily generated between the dummy pins, the induction effect relative to the terminals provided at the rear ends becomes strong, leading an effect that the generation of solder bridges can be further restrained.

In the burn-in board according to the fourth aspect of the invention, the induction lands are grounded.

As a result, it is possible to prevent both the induction lands and induction terminals from adversely affecting the other signals.

What is claimed is:

1. A burn-in board comprising:

a plurality of lands provided on one surface of a printed board and each arranged at a given interval along one direction thereof, wherein said lands are soldered onto and connected to said printed board;

a plurality of through holes each defined in the printed board and opened to each land;

a plurality of terminals of holding sockets inserted into each through hole to protrude toward one surface of the printed board and through which DUTs are mounted; and

induction lands provided on one surface of said printed board along the extension line of said one direction at the same interval as each interval of said lands relative to said lands provided at the rear end of the printed board, each induction land having a length which is twice or more as long as each length of said land for inducing the solder.

2. The burn-in board according to Claim 1, further comprising a plurality of induction terminals protruded from the induction lands in accordance with a length of each induction land.

3. The burn-in board according to Claim 2, wherein said induction terminals are dummy pins.

4. The burn-in board according to any of Claims 1 to 3, wherein the induction lands are grounded.