

BURN-IN BOARD AND BURN-IN TEST EQUIPMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The invention relates to a burn-in board and a burn-in test equipment for use in performing a burn-in test of a semiconductor device such as a large-scale integrated circuit (hereinafter referred to as LSI), an integrated circuit (hereinafter referred to as IC), and the like.

2. Prior Art:

There is a screening system for testing a semiconductor device such as an LSI or an IC to remove a semiconductor device having a potential failure or fault by a test adapted for a failure mechanism so as to obtain a high level of quality and reliability of the semiconductor device.

A burn-in test, for example, using a burn-in test equipment is known as the screening system or test of this type. The burn-in test is aimed to remove infant failure or fault of a semiconductor device such as an IC having a cell structure therein which is susceptible to heat, wherein a high voltage with high capacitance is applied to semiconductor devices in a lump which devices range from an infant failure rate period to an incidental failure rate under high temperature, thereby evaluating as to whether the semiconductor devices are up

to a given standard.

Meanwhile, in the burn-in test, the semiconductor device is inserted into and mounted on a plurality of sockets provided on the burn-in board serving as a testing circuit in its pre-process. The burn-in test is performed while the burn-in board is connected to a burn-in test equipment body.

As shown in detail with reference to Figs. 3 and 4, the connection between the burn-in board and the burn-in test equipment body is generally performed by connecting a card edge 3 to a card edge connector 5 provided on the burn-in test equipment body 4 so as to supply signals to the burn-in board 1.

However, there are following drawbacks in the conventional burn-in board and burn-in test equipment.

That is, the number of pins of the card edge 3 can not help increasing for increasing the amount of signals, resulting in increasing a force involved in inserting into the card edge 3 or removing the card edge 3 from the burn-in test equipment body 4 increases.

That is, when the card edge 3 is inserted in the card edge connector 5, the tip end of the card edge 3 is inserted into a groove 5a of the card edge connector 5 to render the card edge 3 into a guiding state, thereafter the card edge 3 is completely inserted into the card edge connector 5. At this time, a large force is required for inserting the tip end of the card edge 3 into the groove 5a or remove the former from the latter. This force is referred to as insertion/removal force. That is, if the number of pins of the card edge 3 increases, a large

insertion/removal force is required.

Further, there occurs another problem that if the number of pins of the card edge 3 increases, the shape of the card edge 3 is deformed, and hence a conventional burn-in board can not be employed in a burn-in test equipment body coping with such a burn-in board.

Still further, there is another problem that since there is only one kind of signal supplying means, different kind of signals (in speed, voltage, current, etc.) cannot help being supplied by the same means.

SUMMARY OF THE INVENTION

In view of the drawbacks of the conventional burn-in board and burn-in test equipment, the present invention is to provide a burn-in board and a burn-in test equipment capable of increasing the amount of signals to be supplied to the burn-in board while keeping compatible between itself and the conventional burn-in board, and capable of employing signal supplying means adapted for respective signals by realizing plural kind of signal supplying means.

To achieve the above object, a first aspect of the invention is to provide a burn-in board comprising a substrate and a card edge extended from the substrate and connectable to a burn-in test equipment body, wherein the burn-in board further comprises an expansion connector provided on the substrate and connectable to the burn-in test equipment body.

Since a new expansion connector is fixed to the substrate of the burn-in

board of the first aspect of the invention, the amount of signals to be supplied to the burn-in board increases without increasing the number of pins of the card edge. Further, the burn-in test equipment can be connected to the conventional burn-in board, thereby keeping compatible between the burn-in board of the present invention and the conventional burn-in board.

A second aspect of the invention is to provide a burn-in board characterized in that the expansion connector is provided on the substrate at a specific position which is posterior to the card edge, wherein the specific position is a position where the tip end of the card edge is inserted into the burn-in test equipment body to render the card edge into a guiding state when the burn-in board is connected to the burn-in test equipment body, to complete positioning of the burn-in board 1 relative to the burn-in test equipment body so that the expansion connector is inserted into the burn-in test equipment body.

In the burn-in board of the second aspect of the invention, the burn-in board can be connected to the burn-in test equipment body while the insertion/removal force is distributed into the card edge and the expansion connector.

That is, the card edge and the expansion connector are connected to the connector and the like at the side of the burn-in test equipment body. At this time, when the card edge is connected to the burn-in test equipment body, the tip end of the card edge is struck against and inserted into the connector of the burn-in test equipment body to render the card edge into a guiding state to complete

positioning of the burn-in board. Thereafter, the expansion connector is also inserted into the corresponding connector before the card edge is completely engaged into the connector.

That is, when the tip end of the card edge is first inserted into the connector, a largest insertion force is required, so that the connection of the burn-in board is performed while the insertion/removal force is distributed.

A third aspect of the invention is to provide a burn-in board characterized in further comprising a casing which is fixed to the substrate at the back thereof opposite to the front thereof where the expansion connector is fixed, wherein the electronic devices are built in the casing.

In the burn-in board of the third aspect of the invention, the substrate is fixed to the casing and the expansion connector is provided immediately over the casing. That is, since the burn-in board is fixed by the casing by way of the substrate, the burn-in board can be inserted into or removed from the burn-in test equipment body without applying an external force to deform the substrate when the burn-in board is inserted into and removed from the burn-in test equipment body.

A fourth aspect of the invention is to provide a burn-in board characterized in that the burn-in test equipment body has a first connector for engaging with the card edge and a second connector for engaging with the expansion connector.

In the burn-in board of the fourth aspect of the invention, the conventional

burn-in board is connected only to the first connector while the burn-in board having the expansion connector is connected to both the first and second connectors.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view showing the construction of a burn-in board to which a signal expansion connector, which is employed in a preferred embodiment of the invention, is fixed;

Fig. 2 is a view showing a state where the burn-in board is engaged with a burn-in test equipment body;

Fig. 3 is a view showing a conventional burn-in board; and

Fig. 4 is a view showing a state where the conventional burn-in board in Fig. 3 is engaged with a conventional burn-in test equipment body.

PREFERRED EMBODIMENT OF THE INVENTION

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

As shown in Figs. 1 and 2, a burn-in board 1 is to be connected to a burn-in test equipment body 4. The burn-in board 1 and burn-in test equipment body 4 constitute a burn-in test equipment 6. The burn-in board 1 has a casing 7 and a substrate 2 fixed onto the upper surface of the casing 7. Electronic devices such as a memory, a control device and the like are built in the casing 7.

A card edge 3 extends from the substrate 2 so as to protrude from the casing 7. As shown in Fig. 2, a card edge connector (first connector) 5 for engaging with the card edge 3 is provided on the burn-in test equipment body 4. The shapes of the these card edge 3 and card edge connector 5 are the same as those on the conventional burn-in board and burn-in test equipment body.

An expansion connector (male box connector) 8 for supplying signals to the burn-in test equipment body 4 is fixed onto the substrate 2 at a specific position which is posterior to the card edge 3. A female connector (second connector) 9 is provided on the burn-in test equipment body 4. The expansion connector 8 has a body 8a which is fixed onto the substrate 2 and terminals 8b wired on the substrate 2.

When the burn-in board 1 is connected to the burn-in test equipment body 4, the tip end of the card edge 3 is inserted into a groove 5a of the card edge connector 5 to render the card edge 3 into a guiding state, so that positioning of the burn-in board 1 is completed. Thereafter, the positional relation between the card edge 3 and the expansion connector 8 is adjusted so that pins 8c of the expansion connector 8 can be inserted into holes 9a of the female connector 9.

The connection between the burn-in board 1 and the burn-in test equipment body 4 is now described.

The tip end of the card edge 3 is inserted into the groove 5a of the card edge connector 5 while the former strikes against the latter when the card edge 3 is inserted into the card edge connector 5. At this time, a large insertion force is

required in a state where the card edge 3 is first forced to strike against the groove 5a. When the card edge 3 is inserted into the card edge connector 5, the former is ready to be inserted into the latter (i.e., in a guiding state) so that the positioning of the burn-in board 1 is completed, wherein pins 8c of the expansion connector 8 are engaged with and guided by holes 9a of the female connector 9. The card edge 3 and the pins 8c are pushed into the groove 5a of the card edge connector 5 and the holes 9a of the female connector 9 until the burn-in board 1 is completely inserted into the burn-in test equipment body 4.

That is, the burn-in board 1 is easily inserted into or removed from the burn-in test equipment body 4 while the insertion/removal force is distributed into the card edge 3 and the expansion connector 8, so that the burn-in board 1 can be easily connected to the burn-in test equipment 6.

Since the casing 7 is provided on the back of the substrate 2 opposite to the expansion connector 8, no burden is applied to the substrate 2 by the insertion/removal force.

Further, since the card edge 3 and the expansion connector 8, namely, two components are provided as the signal supply means, it is possible to select either of these components, namely, card edge 3 or expansion connector 8 depending on the kind of signals.

Still further, in the case of connecting the conventional burn-in board 1 to the burn-in test equipment body 4, only the card edge 3 and the card edge connector 5 are engaged with each other to supply the signals to the burn-in board

1. At this time, the female connector 9 is not used. That is, in the burn-in test equipment body 4 to be connected to the burn-in board 1 of the present invention, the conventional burn-in board 1 can be connected to the burn-in test equipment body 4 so that the burn-in board 1 of the present invention is compatible with the conventional burn-in board 1.

It is needless to say that the expansion connector is not limited to the box connector as set forth in the preferred embodiment of the invention.

As set forth in detail above, according to the burn-in board and the burn-in test equipment, the insertion/removal force can be restrained from increasing, and the amount of signals to be supplied to the burn-in board can increase while keeping compatible between the burn-in board of the present invention and the conventional burn-in board, and also the signal supply means adapted for the kind of signals (in speed, in current, in capacitance) can be selected.



What is claimed is:

1. A burn-in board comprising a substrate and a card edge extended from the substrate and connectable to a burn-in test equipment body, wherein the burn-in board further comprises an expansion connector provided on the substrate and connectable to the burn-in test equipment body.

2. The burn-in board according to Claim 1, wherein the expansion connector is provided on the substrate at a specific position which is posterior to the card edge, wherein the specific position is a position where the tip end of the card edge is inserted into the burn-in test equipment body to render the card edge into a guiding state when the burn-in board is connected to the burn-in test equipment body, to complete positioning of the burn-in board relative to the burn-in test equipment body so that the expansion connector is inserted into the burn-in test equipment body.

3. The burn-in board according to Claim 1 or 2, further comprising a casing which is fixed to the substrate at the back thereof opposite to the front thereof where the expansion connector is fixed, wherein the electronic devices are built in the casing.

4. The burn-in board according to any of Claims 1 to 3, wherein the burn-in test equipment body has a first connector for engaging with the card edge and a second connector for engaging with the expansion connector.