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Patent Application

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Procedure for the Fixation of Chip Carriers

The present invention concerns a procedure for the non-contacting fixation of chip carriers on metal foils, in which tracks are punched from a metal foil and the chip is then applied to the resulting track system and bonded to bond wires and sealed,.

It is common in the production of non-contacting chip cards to punch tracks from a metal foil. By providing the metal foil in the form of an elongated strip of foil with a repetitive arrangement of identical track patterns, the integrated circuits can be applied and bonded by the use of a machine. Usually, the contacts are formed through the use of bond wires before the chip is coated with a sealing compound. Subsequently, the integrated circuits and the surrounding track pattern (the chip carriers) are punched from the strip of metal foil in one piece and inserted into the corresponding parts of the chip cards (compare DE 198 16 066).

For the purposes of process technology, it may be desired to test the electronics of the chip while the chip still resides on the foil. Some tests can be conducted successfully with the chip being held in position by two bridges (ground bridges) formed from the metal foil. For certain tests, though, it is indispensable that all conductive connections to the metal foil are severed. However, the chip is no longer held in position once all connections including the two bridges are severed.

Consequently, it is the task of the invention to provide some means of support for the chip carrier for the conduction of electrical system tests with all conductive connections being severed.

This task is solved by the features of Claim 1. To hold the chip carrier in position after the punching step the present invention proposes to apply an insulating supporting layer over the chip, said layer extending beyond the chip and being connected to the surrounding strip of foil. It is preferable to use the sealing compound described above for this purpose and to apply the compound as a liquid, especially in the form of a viscous curable material. Moreover, it is preferable to provide anchoring orifices or undercuts at the edges of the metal foil adjacent to the chip carrier, such that the material can flow into said orifices and undercuts to enhance the stability.

Alternatively, the adhesive effect of the insulating layer may be utilised as the only means.

Subsequently, the conductive connection including the ground bridges are severed – preferably by punching (clear punching, punching off) – and the chip carrier is held in position by its connection to the insulating layer. After these steps, the desired electrical system tests can be conducted.

Therefore, the present invention concerns a procedure for the fixation of chip carriers, in which tracks are punched from a metal foil and the chip is then applied to the resulting track system and bonded to bond wires and sealed, characterized in that the chip carrier bearing the chip is coated with an electrically insulating layer, this layer preferably being the sealing compound, such that the layer extends beyond the chip carrier such that the chip carrier is held in position at the metal foil through this insulating layer if all metallic contacts between metal foil and chip carrier are severed.

Preferably, the insulating layer is applied in the form of a liquid curable material by casting and curing. Anchoring orifices may be provided in the metal foil for penetration of the liquid material.

Suitable metal foils and sealing compounds are known to the expert in the field.

In the following, one possible embodiment of the invention is illustrated on the basis of the figures. The figures depict:

Fig. 1 – a part of a metal foil bearing a chip carrier,

Fig. 2 – a section along line A-A in Fig. 1, and

Fig. 3 – a part of a strip of metal foil bearing several chip carriers.

Fig. 1 depicts a metal foil with pre-punched tracks (1) which is punched off at the positions indicated by hatching. The dashed line (2) shows the outline of the applied insulating layer. The outline of the chip is indicated by the square (4). The bond wires are not shown. The dashed lines (3) indicate the positions of undercuts, if any. The squares at the lower edge represent the transport orifices of the strip.

Fig. 2 depicts a section along line A-A, showing the chip (4) [depicted in black; the bond wires are not shown in the drawing] and the sealant compound coating (cross-hatched) that is applied inside the dashed line (2) of Fig. 1 prior to punching off. The undercut is depicted as a step in the left part of the metal foil with single hatching. It is possible to provide the undercuts on the metal foil by embossing. Alternatively, anchoring orifices may be provided which may also be provided with undercuts at their lower edge. Anchoring orifices of this type are not shown in Fig. 1 or Fig. 2.

Fig. 3 shows a section of the whole strip or band of foil with a repetitive arrangement of the wiring pattern of Fig. 1. The square transport orifices of the band are depicted at the edge.

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Patent Claims

1. Procedure for the fixation of chip carriers, in which tracks are punched from a metal foil and the chip is then applied to the resulting track system and bonded to bond wires and sealed, characterized in that the chip carrier bearing the chip is coated with an electrically insulating layer, this layer preferably being the sealing compound, that the layer extends beyond the chip carrier such that the chip carrier is held in position at the metal foil through this insulating layer if all metallic contacts between metal foil and chip carrier are severed.
2. Procedure according to Claim 1, characterised in that the insulating layer is applied in the form of a liquid curable material by casting and curing.
3. Procedure according to Claim 1 or 2, characterised in that the metal foil is provided with anchoring orifices for penetration of the liquid material.
4. Procedure according to Claim 1 or 2, characterised in that the edges of the metal foil adjacent to the chip carrier are provided with one or several undercut(s).
5. Procedure according to Claim 4, characterised in that the undercut(s) is(are) provided on the metal foil by embossing.
6. Procedure according to Claim 3, characterised in that the anchoring orifices are provided with undercuts.