

IMPROVEMENTS IN OR RELATING TO METHODS OF SOLDERING
SEMICONDUCTOR CHIPS ON SUPPORTS OF NON-NOBLE METAL

The present invention relates to a method of soldering a semiconductor chip to a support of non-noble metal.

A method presently of widespread use in the semiconductor field provides that a metallic support of non-noble material (preferably copper or its alloys) is submitted to a plating of noble metal (gold or silver) before the application of the so called "preform", that is of a tablet of metallic soldering material which is superimposed on the metallic support after heating to the melting temperature of the "preform" and which, in its turn, is destined to receive the semiconductor chip.

The noble metal plating, necessary to avoid the oxidation of the underneath non-noble metal which prevents good soldering from being obtained, represents a non-negligible cost, which inevitably reflects on the cost of the finished component.

According to the invention, there is provided a method of soldering a semiconductor chip to a support of

non-noble metal, comprising applying a tablet of soldering material to a face of a support of non-noble metal pre-heated to the melting temperature of the tablet followed by depositing the semiconductor chip on the tablet, wherein, immediately before and during the application of the tablet of soldering material, the face of the metallic support to which the tablet is applied is engaged by a reducing gas flame.

It is thus possible to provide a soldering method which avoids the use of the above mentioned plating of noble metal, assuring at the same time soldering of very good quality.

Such a method allows the anti-oxide function previously provided by the noble metal plating to be performed by a gas reducing flame which, by engaging the soldering area before and during the application of the "preform", causes the elimination of any oxidation products and thus permits substantially perfect soldering. The final technical result is therefore unchanged, but, since the use of an expensive noble metal is avoided, the process cost is reduced, as is the cost of the finished component.

It is necessary to choose with care both the kind of gas and the flame temperature, the first in order to

assure the best reducing effect and the second in order to avoid possible contamination of the semiconductor chip. It is present, preferred to use a gas based on hydrogen (for example, 20% hydrogen and 80% nitrogen) at a flame temperature lower than 570°C.

With the correct choice, such a method can therefore be considered applicable to semiconductor chips of various kinds, both of integrated and discrete kind, such as a transistor.

Such a method can also be used for the production of both single components and strips of components separable from each other at the end of the process.

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CLAIMS

1. A method of soldering a semiconductor chip to a support of non-noble metal, comprising applying a tablet of soldering material to a face of a support^{of} non-noble metal pre-heated to the melting temperature of the tablet followed by depositing the semiconductor chip on the tablet, wherein, immediately before and during the application of the tablet of soldering material, the face of the metallic support to which the tablet is applied is engaged by a reducing gas flame.

2. A method as claimed in claim 1, in which the flame is kept at a temperature lower than 570°C.

3. A method as claimed in claim 1 or 2, in which the reducing gas is based on hydrogen.

4. A method as claimed in claim 3, in which the reducing gas is formed by 20% hydrogen and 80% nitrogen.

5. A method of soldering a semiconductor chip on a support of non-noble metal substantially as hereinbefore described.
