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[54] **ELECTRONIC COMPONENT SUPPORT FOR MEMORY CARD AND PRODUCT OBTAINED THEREBY**

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Related U.S. Patent Documents

Reissue of:

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[63] Continuation of application No. 07/919,047, Jul. 23, 1992, abandoned.

[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **428/76**; 428/209; 428/210; 428/323; 428/446; 428/457; 428/901; 428/450; 428/212; 174/52.2; 361/684; 361/748; 361/737

[58] **Field of Search** 428/76, 209, 210, 428/323, 446, 457, 901, 450, 212; 174/52.2; 361/684, 748, 737, 767, 771, 783

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[57] **ABSTRACT**

The disclosure relates to memory cards having an electronic component housed in a cavity. The electronic support has a first base made of silicon, with a small thickness (between 50 and 100 microns) and a thicker (between 200 and 300 microns) second base, which is deposited on the first base and is formed by a material which is harder than silicon, such as cobalt, vanadium, titanium or ceramic.

28 Claims, 1 Drawing Sheet

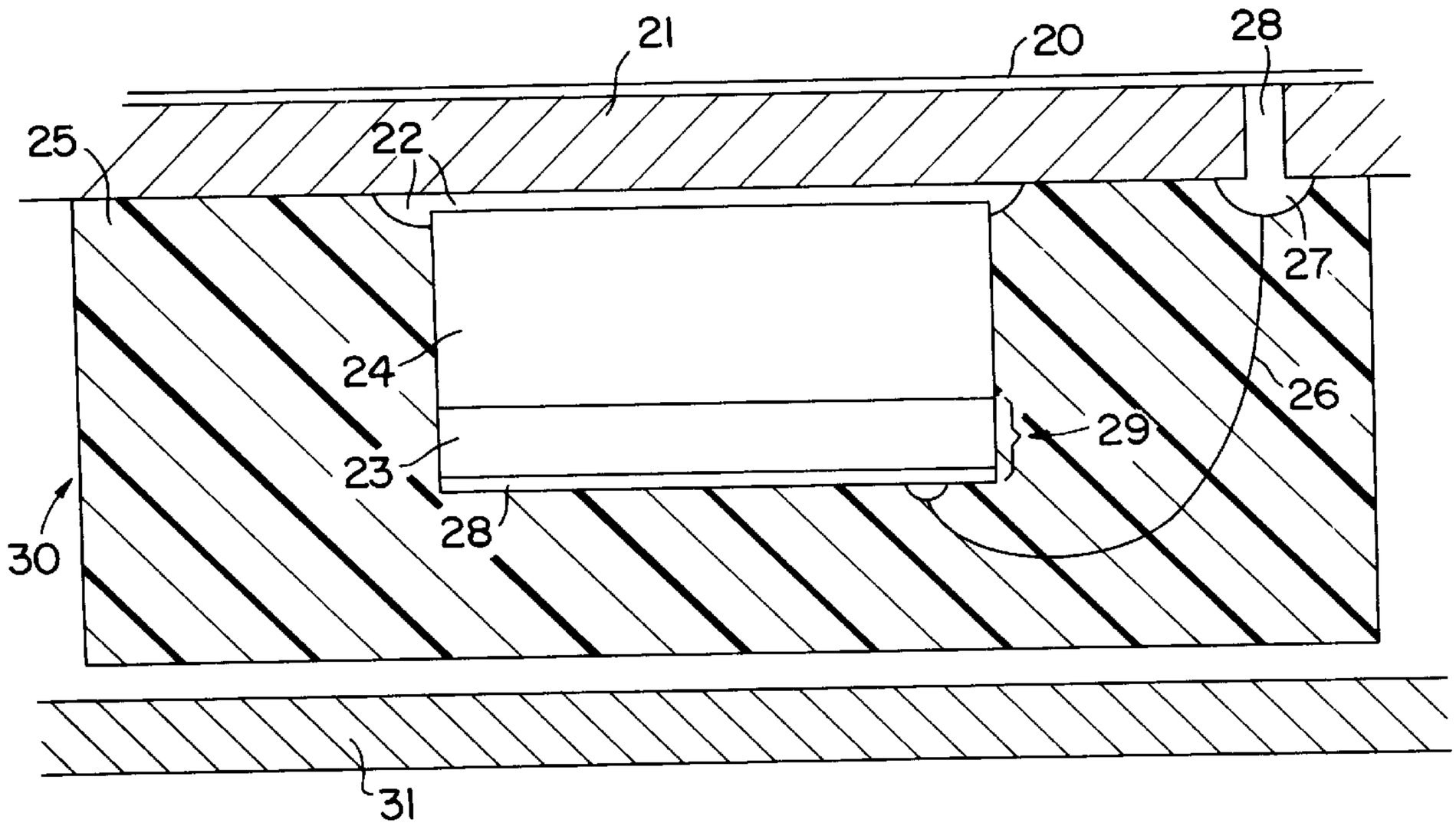

FIG. 1
PRIOR ART

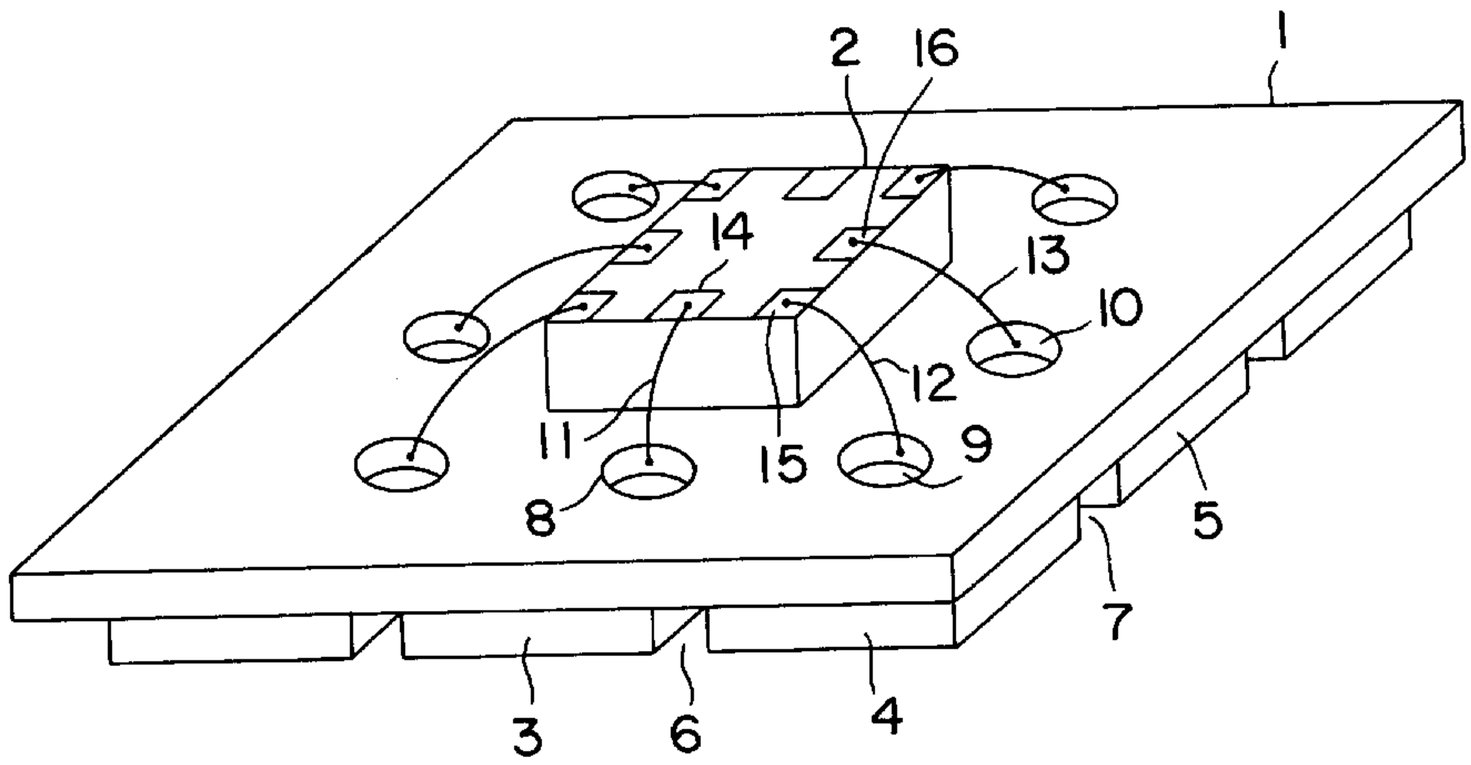

FIG. 2

ELECTRONIC COMPONENT SUPPORT FOR MEMORY CARD AND PRODUCT OBTAINED THEREBY

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This is a continuation of application Ser. No. 07/919,047 (REISSUE), filed Jul. 23, 1992, now abandoned, which is a reissue of application Ser. No. 07/278,979, filed Dec. 1, 1988, now U.S. Pat. No. 4,943,464.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention concerns generally speaking, memory cards having at least one active electronic component housed in a cavity of said card and, more particularly, a support for a component of this type.

2. Description of the Prior Art

Identification cards used in many fields, especially in the field of bank cards or credit cares. However, for a long time, art from an identification number and the bearer's number, these cards have had only a magnetic recording enabling identification by magnetic reading. For many years now, these cards have been used for other functions than for identifying the bearer and, especially, for prepayment and protection against fraudulent activities. To this end, the card has an active electronic component which may consist of an electronic memory which may or may be associated with a microprocessor, this enabling its use notably for bank type applications.

Credit cards made with this technology, which have an electronic component, are manufactured in various ways. According to a first method, a cavity is made in the thickness of the card to accommodate the electronic component. According to another method, known as "co-lamination", thin layers of plastic material, such as polyepoxy, polyethylene, polyvinyl chloride etc. are laminated around the component. During the implementation of these methods, various other operations are further performed to electrically connect the terminal of the electronic component with metallizations placed on the surface of the card.

One of the methods used to install the electronic component in the cavity made in the card and to place metallizations on the card, as well as to make the connections between the terminals of the card and the metallizations consists, as shown in FIG. **1**, in the use of a non-conductive film **1**, made of polyepoxy for example. This film has, on one side, the electronic component in the form of a chip **2** and, on the other side, metallized surfaces such as those marked **3**, **4** and **5**, separated from one another by spaces **6** and **7** without metallization. These metallized surfaces **3**, **4** and **5** communicate with the other side of the film **1** by means of holes **8**, **9** and **10** through which the ends of the conducting wires **11**, **12** and **13** are connected with the corresponding metallized surfaces by any known means such as a conductive bonder. The other end of each conducting wire is connected to an output terminal **14**, **15** or **16** of the chip **2**.

These operations are then followed by the coating of the chip **2** with resin and curing of the resin, by heat, to encapsulate the chip. The chip can then be installed in the cavity of the card and the metallizations can be placed at the edge of the cavity by simply fitting in the chip and bonding the support film **1** to the card after it bas been cut out to the requisite dimensions.

A method of this type results in a structure in which the chip **2** is bonded to the frame **1**, to which adheres a layer of metallic zones. The set formed by the film and the metallic layer is relatively flexible. It is more flexible than the card made of polyepoxy, while the chip, the base of which is a silicon base or substrate which is several hundreds of microns thick (for example, 280 microns thick) is rigid, hard and brittle. This results in strains, particularly when the identification or identity card is handled without precautions. These strains cause breaks in the silicon substrate and, hence, the destruction of the chip.

One solution to this problem consists in increasing the thickness of the silicon substrate, but this approach is limited by the depth of the card. Moreover, a greater thickness naturally increases the overall mechanical strength of the chip, but the chip remains fragile with respect to shocks.

The object of the present invention, therefore, is to make an electronic component support **[**the**]** *which* overcomes the above-mentioned drawbacks, without any increase in the thickness of the final component, and which protects the electronic component from mechanical damage which may be caused, in particular, by violent handling of the card in which the component is housed.

SUMMARY OF THE INVENTION

The invention therefore relates to an electronic component support for a memory card which has a cavity to house said component, said support comprising a first silicon socket of small thickness, one side of which is used a the substrate for the manufacture of the different elements of the electronic component, and comprising a second socket made of a harder material than silicon which is fixed to the other side of the first socket.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will emerge from the following description of a particular embodiment, said description being made with reference to the appended drawings, of which:

FIG. **1** shows a perspective view of a supporting film for electronic components and its electrical connections according to the prior art;

FIG. **2** shows a partial sectional view of an identification card having a cavity in which the electronic component according to the invention is housed.

FIG. **1** corresponds to the prior art and has been described in the introduction.

DESCRIPTION OF A PREFERRED EMBODIMENT

The schematic view of FIG. **2** shows an electronic component **29** with a silicon base or substrate on which are made the various layers **28** to obtain the different components of the circuit.

According to the prior a, the base **23** is about 300 microns thick and this base is fixed to a supporting film **21** by a layer of bonder. The side of the film **21**, which is opposite the electronic component side, carries a metallic layer **20** which is divided into contact zones, such as those marked **3** and **4** in FIG. **1**.

This prior an structure is fragile for the silicon substrate is in direct contact with the flexible film **21**, via the layer of bonder. This may result in breaks in the substrate and, hence, in total damage to the electronic component. An obvious solution to this problem is to increase the thickness of the

substrate, but this approach is limited because the component and its shielding capsule **25** cannot, together, exceed a thickness of about 600 microns which is the depth of the cavity of the supporting card.

Thus, according to the present invention, it is proposed to substantially reduce the thickness of the silicon substrate or base **23** and to replace the removed thickness by a second base made of a material having greater mechanical strength than silicon. More precisely, the thickness of the silicon is reduced to 50 microns and the rest of the base (200 to 250 microns) consists of materials such as titanium, cobalt, vanadium, a ceramic or, again, a fiber-glass charged plastic.

To make this new base, the method starts with a 50-micron thick silicon substrate on which the structure hardening mate is deposited by any prior art method (for example by vacuum deposition). It is with this new substrate that all the diffusion and deposition operations are performed in the silicon layer **23** to obtain the electronic component. The electonic component is then fixed by its base **24**, made of hardening material, to the film **21**, by means of a layer of bonder **22**. Each output terminal of the component on the silicon side is then connected by a conducting wire **26** and a solder **27** to a contact zone of the metallic layer **20** through a hole **28** of the film **21**. In the next operation, the electronic component and the conducting wires are encapsulated in a resin **25** so as to protect the set. After this operation, the entire unit (formed by the encapsulated component, the supporting film and the metallic layer) is installed in the cavity **30** of the card provided for this purpose, this cavity being closed by a bottom cover **31** which is an integral part of the card. This second base **24**, made of a hard material, is used to protect the first base **23**, made of silicon, without increasing the thickness of the structure.

The invention has been described on the assumption that the electonic component is fixed on a supporting film, but it can also be applied to cases where the supporting film is not used.

What is claimed is:

1. An electronic component support for a memory card which as a cavity to house sad component, said support comprising a first silicon base of 50 to 100 microns thickness one side of which is used as the substrate for the manufacture of the different elements of the electronic component, and comprising a second base of 100 to 300 microns thickness made of a harder material than silicon, and selecting from the group consisting of titanium, cobalt, vanadium, ceramic, and fiber-glass-charged plastic, which is fixed to the other side of the fist base, the second base being fixed to a film which acts as an element to close the cavity.

2. An electronic component support according to claim **1**, wherein the material of the second base is titanium.

3. An electronic component support according to claim **1**, wherein the material of the second base is cobalt.

4. An electronic component support for identification cards according to claim **1**, wherein the material of the second base is vanadium.

5. An electronic component support according to claim **1**, wherein the material of the second base is of ceramic.

6. An electronic component support according to claim **1**, wherein the material of the second base is fiber-glass-charged plastic.

7. An electronic component support according to claim **1**, wherein the thickness of the first base is about 50 microns.

8. An electronic component support according to claim **1**, wherein the thickness of the second base ranges between 200 and 250 microns.

9. A memory card provided with a cavity to house an electronic component, wherein a said component lies on a support according to claim **1**.

10. An electronic component support for a memory card, which has a cavity to house an electronic component, said support comprising: a first silicon base, one side of which is used as the substrate for the manufacture of the different elements of the electronic component, and a second base which is thicker than said first base and which is made of a material having a greater mechanical strength than silicon, said second base being fixed to the other side of said first base, said second base being fixed to a film which acts as an element to close the cavity.

11. An electronic component support according to claim 10, wherein the second base is made of a material selected from the group consisting of titanium, cobalt, vanadium, ceramic, and fiberglass-charged plastic.

12. An electronic component support according to claim 11, wherein the material of the second base comprises titanium.

13. An electronic component support according to claim 11, wherein the material of the second base comprises cobalt.

14. An electronic component support according to claim 11, wherein the material of the second base comprises vanadium.

15. An electronic component support according to claim 11, wherein the material of the second base comprises ceramic.

16. An electronic component support according to claim 11, wherein the material of the second base comprises fiberglass-charged plastic.

17. An electronic component support according to claim 10, wherein the thickness of the first base is between approximately 50 to 100 microns.

18. An electronic component support according to claim 17, wherein the thickness of the first base is about 50 microns.

19. An electronic component support according to claim 10, wherein the thickness of the second base ranges between approximately 100 to 300 microns.

20. An electronic component support according to claim 19, wherein the thickness of the second base ranges between 200 and 250 microns.

21. An electronic component support module for a memory card having a cavity to house an electronic component, said support module comprising:

a chip having an electronic component manufactured on a first side of said chip;

a material having a greater mechanical strength than silicon on a second side of said chip, opposite to said first side;

a resin material encapsulating exposed surfaces of said electronic component and said material having a greater mechanical strength than silicon;

wherein said electronic component support module has a thickness not exceeding about 600 microns.

22. An electronic component support module as in claim 21, wherein said chip consists essentially of silicon.

23. An electronic component support module as in claim 21, wherein said material having a greater mechanical strength than silicon comprises titanium.

24. An electronic component support module as in claim 21, wherein said material having a greater mechanical strength than silicon comprises cobalt.

25. An electronic component support module as in claim 21, wherein said material having a greater mechanical strength than silicon comprises vanadium.

26. An electronic component support module as in claim 21, wherein said material having a greater mechanical strength than silicon comprises ceramic.

27. An electronic component support module as in claim 21, wherein said material having a greater mechanical strength than silicon comprises fiberglass-charged plastic.

28. An electronic component support module as in claim 21, wherein the thickness of said material having a greater mechanical strength than silicon ranges between approximately 200 to 250 microns.

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