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(56) Documents cited
GB 1265375
GB 1125897
US 4054484A
US 3890177A
DE 2734176A
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(54) Self-registered Formation of Conductor Cross-overs

(57) Insulated crossings (9) in a system of two-level conductor tracks having a high packing density are obtained by self registration when an intermediate layer (14) is present between the upper tracks (6,7,8) and the lower tracks (3,4,5) and recesses (11) are formed between the intermediate layer and the lower tracks. During an etching treatment the upper conductor tracks mask against the etchant so that the intermediate layer is etched not only from the upper surface between the tracks but also by the etchant in the recesses as shown by the arrows (18). The intermediate layer is completely removed at the area where the tracks cross to form the insulated crossing but at other places the intermediate layer remains as supporting pillars (12) or connections (10) between different track levels.

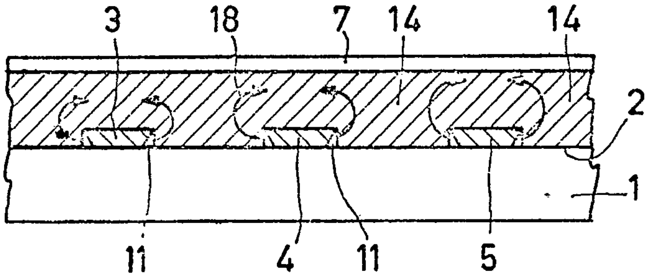

FIG.7

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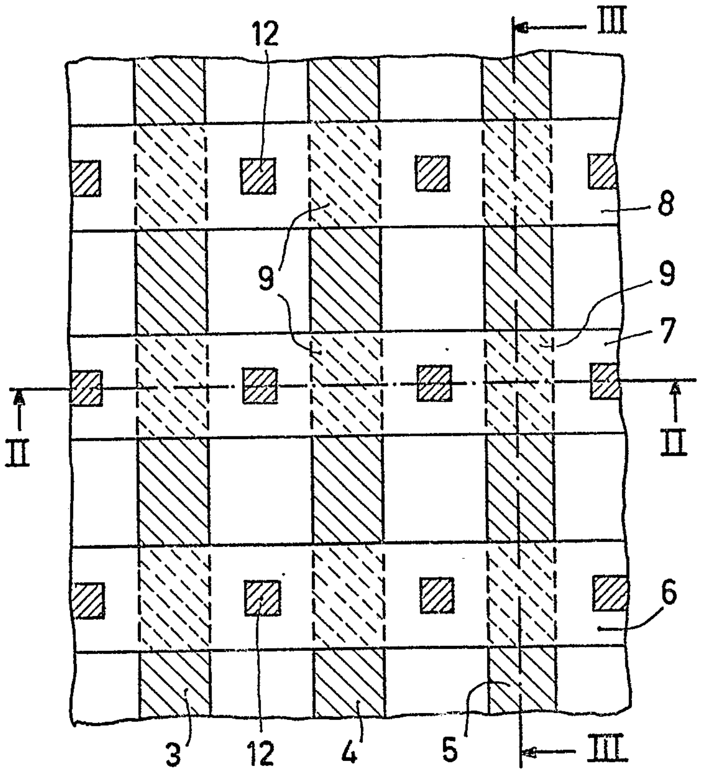


FIG. 1

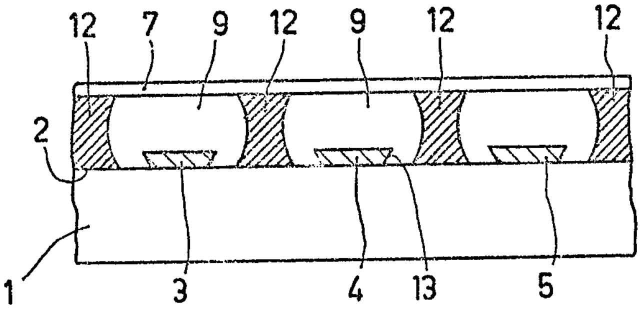


FIG.2

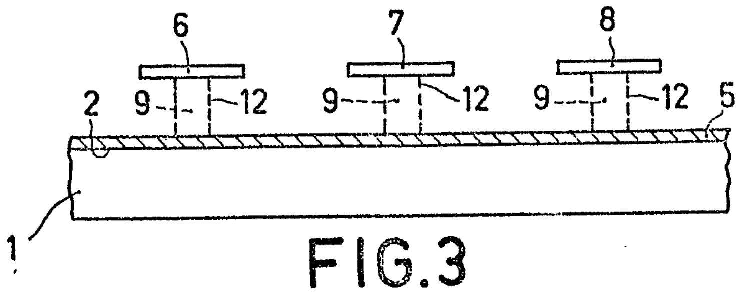


FIG.3

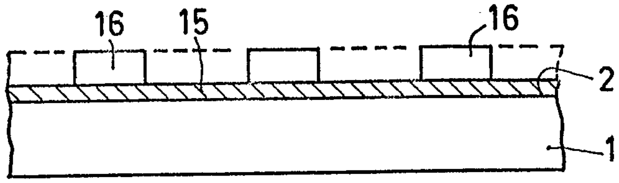


FIG.4

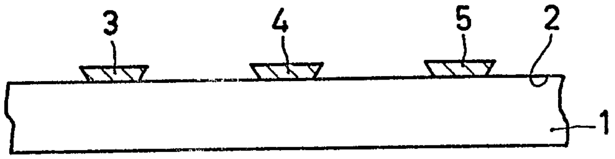


FIG.5

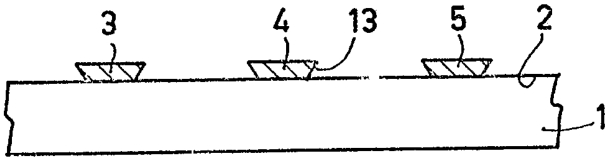


FIG.6

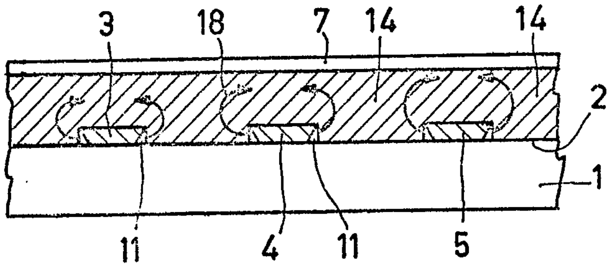


FIG.7

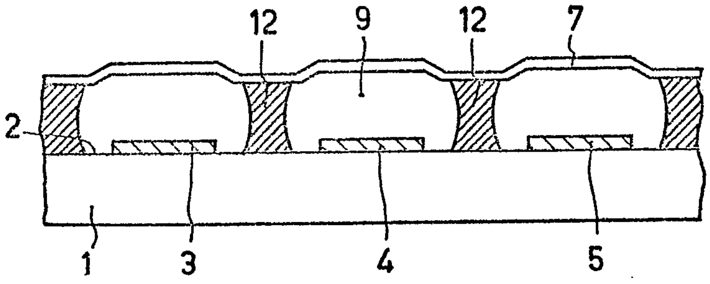


FIG.8

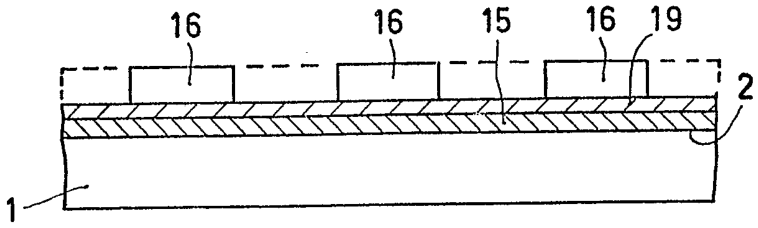


FIG.9

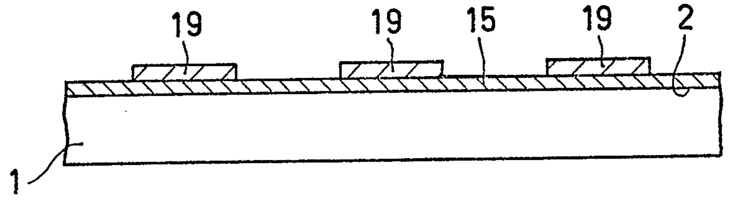


FIG.10

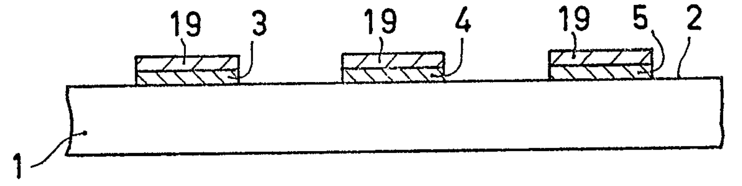


FIG.11

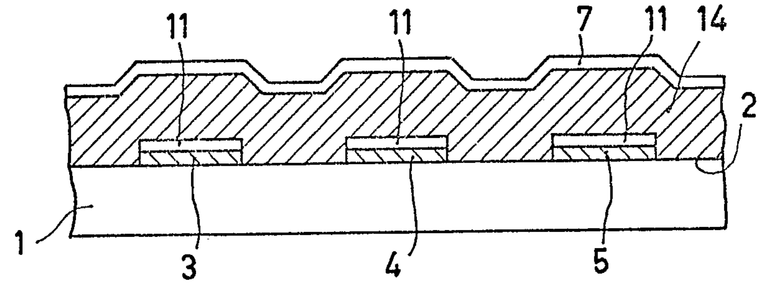


FIG.12

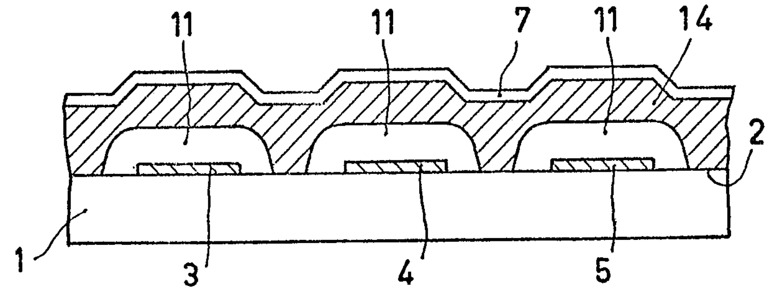


FIG.13

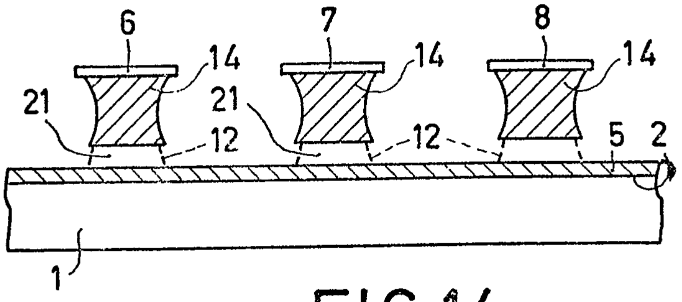
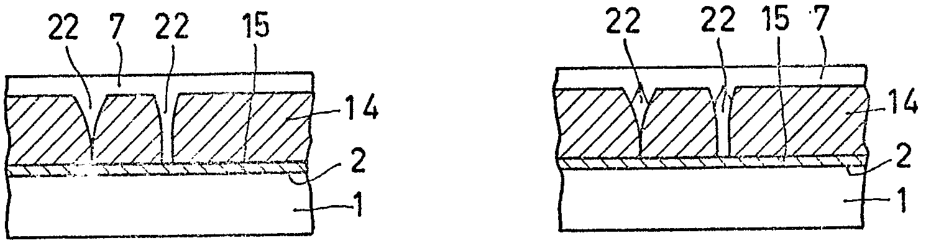


FIG.14



15A

15B

FIG.15

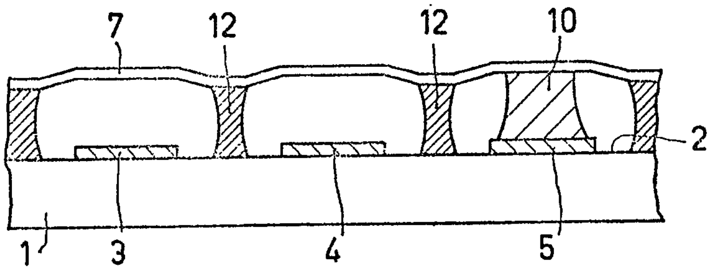


FIG.16

SPECIFICATION

Conductor Track Systems and Their Manufacture

The invention relates to a method of manufacturing on a supporting body a system of conductor tracks comprising a first pattern of electrically conductive material provided at at least one surface and a second pattern of electrically conductive material having at least one track crossing at least one track of the first pattern, in which after providing the first pattern an intermediate layer of a material which can be etched selectively with respect to the materials of the first and the second pattern is provided over substantially the whole surface, and the layer is subjected to a selective etching treatment while using the second pattern as an etching mask, so that at the area of the crossing the intermediate layer is removed over at least a part of its thickness and supporting parts are formed from the intermediate layer beyond the crossing below the second pattern, which supporting parts extend over the whole distance between the second pattern and the surface of the supporting body or between the second and the first pattern.

The invention relates in addition to a system of conductor tracks manufactured using such a method, and to semiconductor devices having such a system of conductor tracks.

Multilayer track systems having insulated crossings are known and are generally used in integrated circuits. They increase the freedom of design, in particular when very many circuit elements (transistors, resistors) are integrated in one semiconductor body.

A crossing as described above is generally insulated by air (or, if desired, vacuum or a filling gas, for example nitrogen). Since the dielectric constant of air (vacuum) is considerably smaller than that of silicon oxide, the parasitic capacitances of such crossings are generally very small compared with those of the usual crossings in which the conductor patterns are insulated by silicon oxide. In addition, short-circuits *via* so-called pinholes are avoided.

A method as described above is disclosed in Applicants' Netherlands Patent Application No. 7,608,901.

In this method an air-insulated crossing is obtained by entirely etching away the intermediate layer below the crossing part of the uppermost conductive pattern. This means that the etching treatment has to be continued until the intermediate layer below said crossing part has been removed by lateral etching.

As is also described in the said Patent Application, remaining parts of the intermediate layer serve as supporting parts for the second conductive layer. At the location of such a supporting part, the intermediate layer may therefore not be removed entirely during the said etching step. In order to prevent this, the tracks of the second conductive pattern at the area of the supporting part are therefore chosen to be wider than at the area of the crossing so that the intermediate layer below wider parts beyond the crossing is maintained at least partly and locally supports the second pattern of conductive material.

However, this measure causes loss of space in that locally more space is necessary for the conductor tracks. Moreover, for the mutual alignment of the masks defining said wider parts at the area of the crossings, alignment tolerances must be observed.

One of the objects of the invention is to provide a method with which a greater packing density can be achieved. Another object of the invention is to increase the amount of etching of the intermediate layer at the area of the crossings and hence to accelerate the manufacture of conductor track systems. This can be achieved by causing the etching to take place more effectively and more rapidly at the area of the crossing than elsewhere by causing the intermediate layer at the area of the crossing to be etched from at least two sides.

A method according to a first aspect of the invention is characterized in that recesses are formed between the first pattern and the intermediate layer, which recesses extend at least below the crossing so that at the area of the crossing the intermediate layer is etched also from the lower side by etchant in the recesses during said etching treatment while at the area of the supporting parts the material of the intermediate layer is etched only laterally, the etching treatment being continued at least until the intermediate layer is entirely removed at the area of the crossing.

Since at the area of the crossing the etchant attacks from at least two sides, the intermediate layer will be selectively etched rapidly. This means that the intermediate layer below the crossing can be removed over a substantial part of its thickness so rapidly that beyond the crossing only a small part of the intermediate layer below the edges of conductor tracks of the second pattern has been etched away by underetching, while centrally below said tracks the intermediate layer is still present as a supporting part.

In principle the removal of the intermediate layer from the first pattern will suffice so that at the area of the crossing material of the intermediate layer remains present on the lower side of the second pattern of conductive material. Although this is sufficient for good insulation, the intermediate layer at the area of the crossing is preferably etched throughout its thickness. As a result of this, both the capacitive coupling and the possibility of a short-circuit are reduced at the area of the crossing.

The conductor tracks of the second pattern are preferably continuous tracks having a substantially uniform width. This makes it possible to give said tracks a minimum track width independently of aligning tolerances, which, notably when used as systems of conductor tracks for integrated circuits, results in high packing densities.

A preferred example of a method in accordance with the invention is characterized in that the material of the second pattern of conductive material is provided by means of electroless deposition.

Consequently the material of the second patterns grows only in one direction. In fact, pinholes may be present in the intermediate layer depending on the material used and the way in which it is provided. If the material of the second pattern should be deposited on the intermediate layer, for example, by known methods, such as vapour deposition or sputtering, there is the possibility that the pinholes are filled with the material of the second pattern. Because this material can withstand etching during the removal of the intermediate layer, a short-circuit may be formed between the first and the second conductor pattern. Since during the electroless deposition the material of the second conductor pattern grows only in one direction, the filling of the pinholes and hence the occurrence of short-circuits is avoided.

One method in accordance with the invention is characterized in that the first pattern of conductive material is provided in the form of tracks the upper surface of which is wider than the lower surface, so that a shadow effect occurs at the edges of said tracks as a result of which the material of the intermediate layer is not deposited below these edges and the recesses are obtained.

The etchant has access along the lower conductor track and may remove the parts of the intermediate layer situated above the lower conductor tracks from the recesses. Simultaneously, the intermediate layer is etched from above from the edges of the material of the second pattern of conductive material. In this case the tracks of the second pattern of conductive material are wider than those of the first pattern of conductive material. Hence, when at the area of the crossing the intermediate layer above the lowermost conductor is etched away entirely, the intermediate layer in other places below the second pattern is removed only partly and parts of the intermediate layer will remain there as supporting parts.

A second method in accordance with the invention is characterized in that parts of the first pattern are provided with an auxiliary layer of substantially the same shape before the intermediate layer is provided and that after providing the second pattern of conductive material the intermediate layer is subjected to a first selective etching treatment in which the intermediate layer outside the area of the tracks of the second pattern is removed substantially over its whole thickness, after which the auxiliary layer on the lower pattern is removed by means of a selective etching treatment so that the recesses are obtained after which the intermediate layer is subjected to a second selective etching treatment in which the intermediate layer is removed at the area of the crossings where recesses are present and the supporting parts are formed from the intermediate layer in other places.

First a layer of material of which the first pattern consists may be provided. A layer of material of which the auxiliary layer consists may be provided thereon after which tracks in the form of the first pattern can be etched in both layers.

Different metals or semiconductor materials, for example polycrystalline silicon, may be used for the various patterns and layers.

In certain cases an insulator may be used for the intermediate layer. Alternatively, it may be preferable to use a metal which can be etched selectively with respect to the materials of the first and second patterns and which in addition is etched rapidly, for example, aluminium.

The same applies to the auxiliary layer which may be an insulating material or a metal, for example, chromium.

The system of conductor tracks which is obtained with any of the above-described methods may be provided on various supporting bodies and the field of application thus is very wide. To be included are, for example, picture display devices as described in Applicants' Netherlands Patent Application No. 7,510,103.

The invention furthermore relates to a system of conductor tracks provided on a supporting body which is provided at at least one surface with a first pattern of electrically conductive material and with a second pattern of electrically conductive material having at least one track which crosses at least one track of the first pattern and which at the area of the crossing of the first pattern is separated by a vacuum or gas, in which beyond the crossing supporting parts are present below the second pattern which extend over the whole distance between the body and the second pattern or between the first and the second pattern.

According to a second aspect of the invention a system of conductor tracks is characterized in that the tracks of the second pattern have a width which at the area of the crossing is substantially equal to the width at the area of the supporting parts. Very compact structures can be realized with such a system of conductor tracks as the tracks can be chosen to be as narrow as the application allows.

The invention is of particular importance for integrated circuits in which, as is known, multilayer systems of conductor tracks are frequency used in so-called VLSI circuits.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a part of a semiconductor device having a system of conductor tracks manufactured using a method in accordance with the invention;

Figure 2 is a cross-sectional view of this device taken on the line II—II of Figure 1;

Figure 3 is a sectional view of the same device taken on the line III—III of Figure 1;

Figures 4 to 7 are sectional views of the device taken on the line II—II of Figure 1 during various stages of the manufacture thereof;

Figure 8 is a sectional view taken on the line II—II of a system of conductor tracks with the same plan view as Figure 1 manufactured by using a different method in accordance with the invention;

Figures 9 to 13 show the device of Figure 8 during various stages of the manufacture thereof,

Figure 14 is a cross-sectional view taken on the line III—III in Figure 1 during the manufacture,

Figure 15A and 15B are sectional views of the device during its manufacture and

Figure 16 is a sectional view of an interconnection or via between conductor tracks.

It is to be noted that the figures are diagrammatic only and are not drawn to scale. Corresponding parts are generally referred to by the same reference numerals.

Figures 1 to 3 show a semiconductor device having a semiconductor body provided with a system of crossing conductor tracks. The device comprises a supporting body 1, in this example a semiconductor body, in which a number of circuit elements, for example, transistors, diodes, resistors and so on, may be provided. Said circuit elements which form no part of the invention are not shown in the figures and may be provided in the semiconductor body by means of generally known methods of manufacturing integrated circuits. As is usually the case, the semiconductor body 1 is of silicon, although other semiconductor materials may also be used. The circuit elements are situated near a surface 2 which, as is known, usually is passivated with an insulating layer of, for example, silicon oxide. For clarity the passivating layer is not shown in the figures.

In order to connect the circuit elements together and to external supply conductors, the semiconductor body 1 has conductors at its surface 2. In the present example these are divided into a first conductive pattern which is situated directly on the semiconductor body 1 and to which the tracks 3 to 5 belong. As is known, these tracks may be connected to the various zones of the underlying circuit elements through contact windows in the said passivating layer.

Above this lower first conductive pattern a second conductive pattern is present including the tracks 6 to 8 which in this example cross the tracks 3 to 5 of the first pattern at right angles.

The second pattern of conductive material is supported between the crossings 9 by supporting parts 12, in this example of aluminium. If desired, said supporting parts 12 may also be connected to underlying zones of the circuit elements through contact holes in the passivating layer. Although, of course, the supporting parts 12 are not visible in the plan view of Figure 1, their position in Figure 1 is denoted for clarity by the shaded areas 12. They do not occur in the plane of the cross-sectional view shown in Figure 3; therefore their location is shown diagrammatically by means of broken lines.

The manufacture of the device shown in Figures 1 to 3 will be described in greater detail with reference to Figures 4 to 7 which are sectional views corresponding to the sectional view shown in Figure 2 and taken on the line II—II of Figure 1 during various stages of the manufacture of the device.

The starting material (Figure 4) is a semiconductor body 1 in which the various zones of the circuit have been provided by means of known methods, for example, by masked diffusion or implantation of suitable impurities, and which is provided at its surface 2 with a passivating layer or with passivating layers in which contact holes are formed. Through these contact holes the tracks 3 to 5 to be formed can contact the various zones in the semiconductor body. After providing the tracks 3 to 5 an intermediate layer 14 of a material which can be etched selectively with respect to the first pattern and the second pattern (6, 7, 8) of conductive material to be provided afterwards, is provided over substantially the whole surface (Figure 7). Using the second pattern as a mask, the intermediate layer 14 is removed over a substantial part of its thickness at the area of the crossings, while beyond the crossings 9 supporting parts 12 are formed from the intermediate layer.

In accordance with the invention, the intermediate layer 14 at the area of the crossings 9 is in addition etched away on the lower side by providing between the first pattern of conductive material and the intermediate layer 14 recesses11 for supplying the etchant, the etching treatment being continued at least until the intermediate layer is removed entirely from the first pattern at the area of the crossing.

The recesses can be obtained in various manners. In the present example the tracks 3 to 5 have undercut edges (see Figure 2) so that a shadow effect occurs upon depositing the intermediate layer 14, as a result of which the said recesses 11 are formed (Figure 7).

In order to form the tracks 3 to 5, the semiconductor body 1 is first covered over its whole surface with a layer 15 (Figure 4), in this exaple of chromium. This layer has a thickness of approximately 0.05 micrometre and can be provided by means of sputtering or vapour deposition.

The device is then coated with a layer 16 of photosensitive material in which a pattern is provided in a generally known manner which corresponds to the pattern of the conductor tracks 3 to 5 to be provided (Figure 4). Using this pattern of photoconductive material as a mask, the chromium layer 15 is then etched away on the parts of the surface 2 not protected by the mask. As an etchant is used, for example, a solution of 50 gram of cerium ammonium nitrate ($Ce(NH_4)_2(NO_3)_6$) and 100 cm^3 of nitric acid (HNO_3) in one litre of water, while a generally known photolacquer, for example AZ2400 Shipley, is used as the photosensitive material of the mask. It has been found experimentally that, as a result of a better adhesion of the chromium to the photolacquer than to the surface 2 which is covered with silicon oxide, this combination upon etching provides the desired undercutting of the edges of the tracks 3 to 5. So after termination of this etching treatment the tracks 3 to 5 have been obtained which have an upper surface which is wider than the lower surface (Figure 5).

Thus the first pattern of electrically conductive material has been provided. In order to manufacture a crossing connection, an intermediate layer 14 of a material which can be etched selectively with respect to the materials of the first and the second pattern, in this example aluminium having a thickness of approximately 0.2—1 micrometre, is then provided over the whole surface.

The second pattern of conductive material is then provided on the intermediate layer 14. This is done, for example, by vapour-depositing a suitable conductive material and then etching it into a pattern, or by masked deposition.

However, the material of the second pattern is preferably provided by electroless deposition, in this example of nickel to a thickness of 0.05—0.8 micrometre, dependent on the use (Figure 7). As will be explained in detail hereinafter, possible shortcircuits between the first and the second pattern of conductive material are prevented by the said electroless deposition.

Since the edges 13 of the tracks 3 to 5 are undercut the recesses 11 in the intermediate layer have remained free from aluminium along the edges of the first pattern as a result of shadow effect upon depositing the intermediate layer 14. In accordance with the invention, these recesses serve to transport the etchant everywhere along the lower pattern in a subsequent step of the manufacture in which the intermediate layer of aluminium is etched, so that this etches the aluminium layer both from below and from above (using the tracks of the second pattern as an etching mask). As an etchant is used, for example, a 10% NaOH solution which does etch away the aluminium rapidly but does not hardly attack the chromium and the nickel.

As denoted by the arrows 8 in Figure 7 the etchant should etch away the intermediate layer 14 from the recesses 11 over a distance which is equal to half the width of the tracks 3 to 5. This means that on the one hand the separation between two of these tracks in this method must be larger than the track width so as to maintain supporting parts 12, while on the other hand the tracks of the second pattern must be wider than those of the first pattern of conductive material.

After the etching treatment the devce shown in Figure 2 is obtained.

A pattern providing the desired shadow effect can also be obtained by manufacturing the first pattern of conductive material from a double layer, in which the lower layer can be etched more rapidly than the upper layer so that upon depositing the intermediate layer recesses remain.

Another embodiment of a method in accordance with the invention in which the above-mentioned restriction with regard to the mutual distance between two tracks does not apply is shown in Figures 9 to 13 which show various stages of the manufacture of a device having the same plan view as in Figure 1 and a cross-sectional view taken on the line II—II of Figure 1 according to Figure 8.

The device shown in Figure 8 comprises a supporting body 1 which at its surface 2 has a system of conductor tracks having crossings 9 manufactured using a method in accordance with the invention. Beyond the places 9 where the tracks of the lower and upper patterns cross each other, the upper pattern is supported by supporting parts 12.

The manufacture of the device shown in Figure 8 will be explained in greater detail with reference to Figures 9 to 13 which are sectional views corresponding to the sectional views shown in Figure 9 taken on the line II—II of Figure 8 during various stages of the manufacture of the device.

A first layer 15 of conductive material is provided on the supporting body 1, for example, by sputtering or vapour deposition. This first conductive layer 15 is then covered with an auxiliary layer 19 again by sputtering or vapour deposition. In this example the first conductive layer 15 consists of titanium, while the auxiliary layer 19 consists of chromium. Both layers have a thickness of 0.05—1 micrometre.

A layer 16 of photosensitive material is then provided over the whole surface and a mask is defined therein in a conventional manner which is to protect the chromium in a subsequent etching step (Figure 10). This photomask has the same shape as the first pattern of conductive material to be formed and in this example comprises parallel tracks having a width of from 5 to 10 micrometres and a mutual distance of 10 to 20 micrometres.

The chromium is then etched away in the places not protected by the photomask using as an etchant a solution of 50 gram of cerium ammonium nitrate ($Ce(NH_4)_2(NO_3)_6$) and 100 cm^3 of nitric acid (NHO_3) in 1 litre of water. In this manner the auxiliary layer 19 of chromium obtains the same pattern as that of the first lower pattern of conductive material to be formed (Figure 10). In a subsequent step the titanium on the non-protected parts is etched away with, for example, a 5% hydrofluoric acid solution.

The surface 2 is then coated with a double layer of titanium-chromium in the form of the first pattern, in this example the parallel tracks 3 to 5.

The intermediate layer 14 is then provided of a material, for example aluminium, which can be etched selectively with respect to the titanium and the nickel to be used for the second pattern. This intermediate layer 14 has a thickness of approximately 0.15 micrometre. A layer of nickel is deposited by electroless deposition on said intermediate layer, after which the second upper pattern is etched in the nickel layer by means of

10% nitric acid solution, after a short dip etch (10 seconds in 50% hydrochloric acid) so as to make the surface chemically active. As a result of this etching treatment the tracks 6 to 8 are obtained. The aluminium is then etched away between the tracks 6 to 8 as a result of which the lower pattern with the tracks 3 to 5 with the layer 19 is substantially exposed everywhere beyond the crossings (Figure 11)

The chromium 19 is then etched away by means of the said solution of cerium ammonium nitrate and nitric acid.

Said etching is carried out in a short period of time, namely in the order of a few minutes. As a result of this, recesses 11 for supplying etchant to etch the remaining aluminium (Figure 12) are formed in the device above the first pattern.

Figures 13 and 14 show an intermediate stage during the etching process as a cross-sectional view taken on the line II—II and the line III—III in the plan view of Figure 1, respectively.

From the recesses 11 the etchant, in this example sodium hydroxide solution (NaOH), has access to the lower side of the intermediate layer 14, so that said recesses 11 expand rapidly (Figure 13). A recess 11 was present above the track 5. From said recess 11 the etchant attacks the lower side of the intermediate layer 14, so that openings 21 are formed above said recesses 11 so that the etchant can penetrate even farther and more easily (Figure 14). Ultimately the etching process results in the device shown in the (diagrammatic) sectional view of Figure 8.

As already noted, the provision of the nickel layer is done by electroless deposition so as to avoid short-circuits. It has been found that the aluminium which is used as an intermediate layer 14 usually comprises so-called pin holes 22 which, when the nickel is deposited by sputtering, can be filled with nickel (Figure 15A). In the above-described etching steps which remove the intermediate layer, said nickel is not attacked so that the possibility of short-circuit at the area of the pin holes 22 is present.

As is known, in electroless deposition the growth takes place in one direction only due to the action of the electric field used so that pin holes 22, if any, are not filled but are closed on their upper sides by the growing layer of nickel. The possibility of short-circuit is hence excluded (Figure 15B).

Figure 16 shows a conductive connection or via formed between the first and the second pattern. At the area of the via to be provided the auxiliary layer 19 of chromium is removed. As a result of this, upon providing the aluminium intermediate layer 14 at the area of the crossing this is provided immediately on the lowermost pattern. Since the auxiliary layer is absent, no recess 11 is obtained in this area so that the etchant attacks the intermediate layer only laterally during the second etching treatment of the intermediate layer so that a supporting part 10 is obtained which also connects the first pattern conductively to the second pattern.

It will be obvious that the invention is not restricted to the examples described but that many variations are possible to those skilled in the art without departing from the scope of this invention. It has already been noted, for example, that the material of the intermediate layer need not be removed entirely in all applications. Nor is the invention, of course, restricted to perpendicular crossings of parallel tracks, but any feasible configuration is possible for both the lowermost and the uppermost pattern of conductive material.

In a specific application, crossings obtained by means of the method described may be used as electrostatically controlled switches. Such an application may take place in a programmable read-only memory (PROM) in which the lower pattern of conductors is provided, for example, in a form in which, in cooperation with the upper pattern a matrix of switches is obtained which are coupled to the matrix of circuit elements (for example, diodes) provided in the semiconductor body and which can be closed at will during programming.

Finally, of course, etchants other than those mentioned may be used and the etching may be carried out, for example, by plasma etching. Other materials for the various patterns and layers are possible. If desired, the space between two crossing tracks may afterwards be filled again with a protecting insulating resin.

Claims

1. A method of manufacturing on a supporting body a system of conductor tracks comprising a first pattern of electrically conductive material provided at at least one surface and a second pattern of electrically conductive material having at least one track crossing at least one track of the first pattern, in which after providing the first pattern an intermediate layer of a material which can be etched selectively with respect to the materials of the first and second pattern is provided over substantially the whole surface, and the layer is subjected to a selective etching treatment while using the second pattern as an etching mask, so that at the area of the crossing the intermediate layer is removed over at least a part of its thickness and supporting parts are formed from the intermediate layer beyond the crossing below the second pattern, which supporting parts extend over the whole distance between the second pattern and the surface of the supporting body or between the second and the first pattern characterized in that recesses are formed between the first pattern and the intermediate layer, which recesses extend at least below the crossing so that at the area of the crossing the intermediate layer is etched also from the lower side by etchant in the recesses during said etching treatment, while at the area of the supporting parts the material of the intermediate layer is etched only laterally, the etching treatment being continued at least until

the intermediate layer is removed entirely from the first pattern at the area of the crossing.

2. A method as claimed in Claim 1, characterized in that the intermediate layer is etched away throughout its thickness at the area of the crossing.

3. A method as claimed in any of the preceding claims, characterized in that the conductor tracks of the second pattern comprise continuous paths having a substantially uniform width.

4. A method as claimed in any of the preceding claims, characterized in that the material of the second pattern of conductive material is provided by means of electroless deposition.

5. A method as claimed in any of the preceding claims, characterized in that the first pattern of conductive material is provided in the form of tracks the upper surface of which is wider than the lower surface so that a shadow effect occurs at the edges of said tracks as a result of which the material of the intermediate layer is not deposited below these edges and the said recesses are obtained.

6. A method as claimed in Claim 5, characterized in that the first pattern of conductive material is manufactured from a double layer the lower layer of which etches more rapidly than the uppermost layer.

7. A method as claimed in any of the Claims 1 to 4, characterized in that parts of the first pattern are provided with an auxiliary layer of the same shape before the intermediate layer is provided and that after providing the second pattern of conductive material the intermediate layer is subjected to a first selective etching treatment in which the intermediate layer outside the area of the tracks of the second pattern is removed substantially over its whole thickness, after which the auxiliary layer on the lower pattern is removed by means of a selective etching treatment so that the recesses are obtained, after which the intermediate layer is subjected to a second selective etching treatment in which the intermediate layer is removed at the area of the crossing where recesses are present and the supporting parts are formed from the intermediate layer in other places.

8. A method as claimed in Claim 7, characterized in that before providing the intermediate layer in the form of a conductive layer, the said auxiliary layer above the first pattern is removed locally so that upon providing the intermediate layer it is provided directly on the lower conductor track and upon etching the intermediate layer a conductive supporting part is obtained at said lower conductor track and forms a conductive connection between a track of the second pattern and a track of the said first pattern.

9. A method of manufacturing a system of conductor tracks substantially as herein described with reference to Figures 1 to 7 of the accompanying drawings.

10. A method of manufacturing a system of conductor tracks substantially as herein described with reference to Figure 1 and Figures 9 to 14 of the accompanying drawings.

11. A method of manufacturing a system of conductor tracks substantially as herein described with reference to Figure 15B or Figure 16 of the accompanying drawings.

12. A system of conductor tracks manufactured by means of a method as claimed in any of the preceding claims.

13. A system of conductor tracks provided on a supporting body which is provided at at least one surface with a first pattern of electrically conductive material and with a second pattern of electrically conductive material having at least one track crossing at least one track of the first pattern and being separated from the first pattern by a vacuum or gas at the area of the crossing, in which beyond the crossing supporting parts are present below the second pattern and extend over the whole distance between the body and the second pattern or between tracks of the first and the second pattern, characterized in that the tracks of the second pattern have a width which at the area of the crossing is substantially equal to the width at the area of the supporting parts.

14. A system of conductor tracks as claimed in Claim 13, characterized in that the tracks of the first pattern are narrower at the lower surface than at the upper surface and said tracks are narrower than those of the tracks of the second pattern, the minimum separation of the tracks of the first pattern being larger than the width of the tracks of the first pattern.

15. A system of conductor tracks on a supporting body substantially as herein described with reference to Figure 1, and Figure 2 or Figure 8 or Figure 16 of the accompanying drawings.

16. A semiconductor device having a semiconductor body provided with a system of conductor tracks as claimed in any of the Claims 12 to 15.

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