chemical etching of the layer of material that covers said buried circuit layer becomes truly problematic. Specifically, the chemical solutions used (for example sulfuric acid (H_2SO_4), phosphoric acid (H_3PO_4) or hydrofluoric acid (HF) in the case of the etching of silicon) are particularly aggressive with respect to metals and therefore with respect to the layer comprising said circuits.

This results in a lateral etching of this buried circuit layer which may reach a centimeter or more from the edge. The BSI sensors manufactured in the vicinity of this damaged zone are then unusable.

A process is already known from document EP 1 962 325 for manufacturing a bonded substrate, by transfer of layers, which comprises steps of producing a peripheral groove on the front side of a donor substrate, of thermal oxidation of this substrate, of bonding a receiver substrate to said front side and of thinning said donor substrate from its back side, until the bottom of said groove is reached.

Such a process makes it possible to transfer to the receiver substrate only the central portion of the donor substrate and to remove the poorly bonded peripheral portion thereof.

However, this document absolutely does not describe the treatment of donor substrates comprising a buried circuit layer and furthermore such a layer would not withstand the thermal oxidation carried out, or the thermal treatment after bonding at more than 1000°C, which are described in this document.

Embodiments of the invention seek to propose a process for transferring a buried circuit layer which may resolve the aforementioned drawbacks of the prior art and in particular which may avoid damaging these circuits.

According to an aspect, the invention provides a process for transferring a buried circuit layer to a receiver substrate.

The process comprises the following steps:

- providing a donor substrate comprising an internal etch stop zone and covered on a front side of the donor substrate, with a circuit layer,
- producing over the entire circumference of said donor substrate, on the front side covered with the circuit layer, either a peripheral trench that extends at a distance from a lateral edge of the donor substrate, or a peripheral routing, this routing or this trench being produced over a depth such that the routing or the trench passes entirely through the circuit layer and extend into the donor substrate,
- depositing on an exposed side of said circuit layer and on the routed side or on the walls of said trench, a second stop layer comprising a stop material that is selective with respect to the etching of said circuit layerwithout filling said trench,
- bonding a receiver substrate to said donor substrate on the side covered by said second stop layer,
- thinning the donor substrate by chemical etching of a back side of the donor substrate, until said etch stop zone is reached, so as to obtain the transfer of said buried circuit layer to said receiver substrate.

According to other advantageous and nonlimiting features of the invention, taken alone or in combination:

- said etch stop zone is a layer, referred to as a "first stop layer", of a material that is selective with respect to the etching of the material of the back portion of the donor substrate;

CLAIMS

1. A process for transferring a buried circuit layer to a receiver substrate, the process comprising:

providing a donor substrate comprising an internal etch stop zone and covered on a front side of the donor substrate with a circuit layer;

producing over an entire circumference of the donor substrate, on the front side covered with the circuit layer, either a peripheral trench that extends at a distance from a lateral edge of the donor substrate, or a peripheral routing, the routing or the trench being produced over a depth such that the routing or the trench passes entirely through the circuit layer and extend into the donor substrate;

depositing on an exposed side of the circuit layer and on the routed side or on the walls of the trench, a second stop layer comprising a stop material that is selective with respect to etching of the circuit layer without filling the trench;

bonding the receiver substrate to the donor substrate on the side of the donor substrate covered by the second stop layer; and

thinning the donor substrate by chemical etching of a back side of the donor substrate, until the etch stop zone is reached, so as to obtain transfer of the buried circuit layer to the receiver substrate.

2. The process of claim 1, wherein the etch stop zone comprises a first stop layer including a material that is selective with respect to etching of the material of the of the donor substrate.

3. The process of claim 2, wherein the peripheral routing or the

peripheral trench has a depth such that it passes through the etch stop zone without penetrating into a back portion or a back layer of the donor substrate.

4. The process of claim 1, wherein the donor substrate includes a doped front layer and a non-doped back layer, and wherein the etch stop zone comprises an interface between the doped front layer and the non-doped back layer of the donor substrate.

5. The process of claim 4, wherein the peripheral routing or the peripheral trench has a depth such that it passes through the etch stop zone without penetrating into a back portion or a back layer of the donor substrate.

6. The process of claim 1, wherein the peripheral routing or the peripheral trench has a depth such that it passes through the etch stop zone without penetrating into a back portion or a back layer of the donor substrate.

7. The process of claim 1, wherein the peripheral routing or the peripheral trench is produced over a depth such that it does not pass through the etch stop zone and wherein, after the chemical etching of the back side of the donor substrate, an additional step of mechanical removal of a residual peripheral ring of the donor substrate is carried out.

8. The process of claim 7, wherein the mechanical removal of the residual peripheral ring of the donor substrate is carried out by grinding or chemical mechanical polishing (CMP).

9. The process of claim 1, wherein the peripheral routing or the peripheral trench has a depth such that it passes through the

etch stop zone and extends into a back portion or a back layer of the donor substrate and wherein, after the chemical etching of the back side of the donor substrate, an additional step of mechanical removal of a residue of the second stop layer is carried out.

10. The process of claim 9, wherein the mechanical removal of the residue of the second stop layer is carried out by grinding or chemical mechanical polishing (CMP).

11. The process of claim 1, wherein the second stop layer is deposited by chemical vapor deposition (CVD) or spin coating.

12. The process of claim 1, wherein the peripheral trench is produced with the aid of at least one of laser etching, dry etching and wet etching.

13. The process of claim 1, wherein the peripheral trench is located at a distance from the lateral edge of the donor substrate of less than or equal to 5 mm.

14. The process of claim 1, wherein a width of the trench is between 10 μm and 500 μm.

15. The process of claim 1, wherein the materials of the first stop layer and the second stop layer are oxides or nitrides.

16. The process of claim 15, wherein the materials of the first stop layer and the second stop layer are individually selected from the group consisting of silicon oxide (SiO_2), silicon oxynitride (SiO_xN_y) and silicon oxycarbide (SiO_xC_y).

17. The process of claim 1, wherein the materials of the first stop layer and the second stop layer are identical.

18. The process of claim 1, wherein the donor substrate comprises a semiconductor material.

19. The process of claim 1, wherein the bonding of the donor substrate and the receiver substrate takes place by molecular adhesion.