Claims

What is claimed is:

1. A semiconductor structure, comprising:

a semiconductor substrate;

a via extending through the semiconductor substrate; and

a planar capacitive structure surrounding at least a portion of the via;

wherein the planar capacitive structure comprises one of a Schottky contact, a p-n diode contact and a metal-oxide-semiconductor contact, and comprises a metal layer formed on the semiconductor substrate.

2. The semiconductor structure of claim 1,

wherein the planar capacitive structure comprises ~~a~~ the Schottky contact formed by the metal layer and a region of the semiconductor substrate under the metal layer.

3. The semiconductor structure of claim 2,

wherein the semiconductor substrate has a doping of a predetermined concentration and of a predetermined dopant type, and the region of the semiconductor substrate comprised in the Schottky contact has a doping of the predetermined concentration and of the predetermined dopant type.

4. The semiconductor structure of claim 3, wherein

the semiconductor substrate having the doping of the predetermined concentration forms an extrinsic semiconductor substrate.

5. The semiconductor structure of claim 1,

wherein the planar capacitive structure comprises the p-n diode contact including the metal layer and a p-n junction formed in the semiconductor substrate,

wherein the p-n junction comprises a first region of the semiconductor substrate having the doping of a first concentration and of a first dopant type, and a second region of the semiconductor substrate have a doping of a second concentration and of a second dopant type, the second dopant type being opposite to the first dopant type;

wherein the second region of the semiconductor substrate is arranged inbetween the metal layer and the first region of the semiconductor substrate.

6. The semiconductor structure of claim 5,

wherein the second concentration is higher than the first concentration.

7. The semiconductor structure of claim 5,

wherein the second concentration is at least one hundred times higher than the first concentration.

8. The semiconductor structure of claim 5,

wherein the first region is a p-doped region, and the second region is a n^+-doped region.

9. The semiconductor substrate of claim 1,

wherein the planar capacitive structure comprises ~~a~~ the metal-oxide-semiconductor contact,

wherein the planar capacitive structure comprises the metal layer, a region of the semiconductor substrate under the metal layer, and an oxide layer arranged inbetween the metal layer and the region of the semiconductor substrate.

10. The semiconductor structure of claim 9,

wherein the oxide layer is deposited on the surface of the semiconductor substrate.

11. The semiconductor structure of claim 9,

wherein the oxide layer is formed in a further region of the semiconductor substrate inbetween the metal layer and the region of the semiconductor substrate.

12. The semiconductor structure of claim 9,

wherein the semiconductor substrate and the region of the semiconductor substrate under the metal layer have a doping of a predetermined concentration and of a predetermined dopant type.

13. The semiconductor structure of claim 1,

wherein the via is formed within an opening through the semiconductor substrate.

14. The semiconductor structure of claim 13, wherein the via comprises:

an insulating layer formed at a wall of the opening; and

a conductive fill formed within the opening with the insulating layer surrounding the conductive fill.

15. The semiconductor structure of claim 14, wherein the metal layer is formed at a distance away from the insulating layer.

16. The semiconductor structure of claim 1, wherein the metal layer is formed as one of an annular layer, a rectangular layer, or a square layer surrounding the via on the surface of the semiconductor substrate, and is formed at a distance away from the via.

17. A through silicon interposer comprising the semiconductor structure of claim 1.

18. A three dimensional integrated circuit device comprising the semiconductor structure of claim 1.