inducing a deformation of the assembly formed of said layer and the support substrate at room temperature (room temperature being defined as a temperature comprised between 20 and 25°C). This state of mechanical stress is due notably to a difference in coefficient of thermal expansion between said layer and the support substrate.

According to a preferred embodiment, the active layer is a silicon-germanium layer.

Advantageously, the germanium content of the active layer is less than or equal to 10%.

Preferably, the thickness of the active layer is less than a critical thickness defined as being a thickness beyond which relaxation of the material of the active layer takes place.

According to one embodiment, the structure further comprises a silicon layer between the electrically insulating layer and the active layer.

According to one embodiment, the electrically insulating layer is made of silicon oxide.

The thickness of said electrically insulating layer is typically comprised between 10 and 200 nm.

The thickness of the silicon oxide layer situated on the rear side of the substrate is advantageously comprised between 0.5 µm and 4 µm.

Embodiments of the invention also relate to a front side imager comprising such a structure and a matrix array of photodiodes in the active layer of said structure.

Another aspect of the invention provides a method of manufacturing such a semiconductor on insulator type structure successively comprising from its rear side to its front side a semiconductor support substrate, an electrically insulating layer, and a monocrystalline semiconductor layer called active layer. Said method comprises the following steps:

- supplying a donor substrate comprising a semiconductor material suitable for the epitaxial growth of the material of the active layer;
- supplying the support substrate;

wherein the electrically insulating layer is formed on the donor substrate or on the support substrate,

- bonding the donor substrate on the support substrate, the electrically insulating layer being at the bonding interface;
- after said bonding, thinning the donor substrate so as to transfer a layer of the semiconductor material onto the front side of the support substrate;
- after said thinning, depositing a silicon oxide layer on the rear side of the support substrate,
- after said deposition of the silicon oxide layer, epitaxially growing, on the transferred layer of semiconductor material, the active layer, at a temperature greater than the deposition temperature of the oxide layer,

wherein the silicon oxide layer has a thickness chosen to compensate a bow induced by mechanical stress between the active layer and the support layer during cooling of the structure after the epitaxal growth of the active layer on the support substrate.

CLAIMS

1. Method of manufacturing a semiconductor on insulator type structure successively comprising from its rear side to its front side a semiconductor support substrate, an electrically insulating layer, and a monocrystalline semiconductor layer called active layer, the method comprising the following steps:

- supplying a donor substrate comprising a semiconductor material suitable for the epitaxial growth of the material of the active layer;

- supplying the support substrate;

wherein the electrically insulating layer is formed on the donor substrate or on the support substrate,

- bonding the donor substrate on the support substrate, the electrically insulating layer being at the bonding interface;

- after said bonding, thinning the donor substrate so as to transfer a layer of the semiconductor material onto the front side of the support substrate;

- after said thinning, depositing a silicon oxide layer on the rear side of the support substrate,

- after said deposition of the silicon oxide layer, epitaxially growing the active layer on the transferred layer of semiconductor material, at a temperature greater than the deposition temperature of the oxide layer,

wherein the silicon oxide layer has a thickness chosen to compensate a bow induced by mechanical stress between the active layer and the support layer during cooling of the structure after the epitaxal growth of the active layer on the support substrate.

2. Method according to claim 1, wherein the active layer is made of silicon-germanium.

3. Method according to claim 2, wherein the semiconductor material of the donor substrate suitable for the epitaxial growth of silicon-germanium is silicon-germanium.

4. Method according to claim 3, wherein said semiconductor material is formed by epitaxy on a base substrate, said semiconductor material and the base substrate together forming the donor substrate.

5. Method according to claim 2, wherein the semiconductor material of the donor substrate suitable for the epitaxial growth of silicon-germanium is silicon.

6. Method according to claim 5, wherein the thickness of the silicon layer transferred onto the support substrate is less than or equal to 400 nm.

7. Method according to one of claims 5 or 6, wherein, at the end of the epitaxial growth of silicon-germanium, the silicon layer is kept between the electrically insulating layer and the silicon-germanium layer.

8. Method according to one of claims 5 or 6, further comprising a step of condensation of the silicon-germanium of the active layer so as to convert the silicon layer from which the epitaxial growth of silicon-germanium has been carried out into a silicon-germanium layer.

9. Method according to one of claims 1 to 8, comprising a step of forming an embrittlement zone in the donor substrate so as to delimit a layer of the semiconductor material suitable for the epitaxial growth of the material of the active layer, and wherein the thinning of the donor substrate comprises a detachment along said embrittlement zone.

10. Method according to claim 8, wherein the formation of the embrittlement zone comprises an implantation of atomic species in the donor substrate.

11. Method according to one of claims 1 to 10, wherein the epitaxy temperature of the active layer is comprised between 600 and 1100°C.

12. Method according to one of claims 1 to 11, wherein the deposition temperature of the silicon oxide layer is comprised between 100 and 400°C.

13. Method according to one of claims 1 to 12, wherein the thickness of the silicon oxide layer is selected such that the stress generated during cooling of the structure after the deposition of said layer due to the difference in thermal expansion coefficient with the support substrate causes a bow less than a limit value.