performance capabilities, and allows the Young's modulus and the thermal expansion coefficient of the SiC substrate to be brought closer to those of the metal substrate.

However, mechanical etching is relatively expensive and difficult to implement due to the hardness of SiC, and the remaining part of the substrate may not be perfectly flat. Therefore, methods need to be established for obtaining a thin semiconductor substrate with even flatness, while reducing the costs and the time required to implement such methods.

DISCLOSURE OF THE INVENTION

An aim of the invention is to overcome the aforementioned disadvantages.

To this end, according to a first aspect of the invention, an intermediate substrate for manufacturing a semiconductor substrate is provided, successively comprising:

a. a first semiconductive layer;
b. a first thermal barrier layer;
c. a support comprising an absorption layer configured to absorb laser radiation in a determined wavelength range, with the temperature of the absorption layer increasing during absorption, and a separation layer comprising a separation zone adjacent to the absorption layer and being configured to thermally degrade under the effect of the increase in temperature of the absorption layer, so as to separate at least part of the support from the rest of the intermediate substrate, with the degradation of the separation zone occuring when the absorption layer reaches a threshold temperature ; a second thermal barrier layer; and a support layer, with the support layer being a second semiconductive layer of lower quality than the first semiconductive layer.

Thus, once the front-end processes have been completed, the invention allows the semiconductor substrate to be separated into two distinct parts without mechanical etching, so that only the desired thickness of the semiconductive layer remains before it is integrated into the metal support without compromising the flatness of the semiconductive layer. Using a laser to divide the semiconductor substrate into two parts, and thus isolate the desired thickness of this substrate, allows it to be obtained more quickly and at a lower cost than by mechanical etching. Using a thermal barrier layer limits the propagation of heat to the rest of the substrate and therefore promotes the separation with reduced laser power and/or exposure time.

According to one embodiment, the support comprises:

a. a separation assembly comprising:
    i. the absorption layer; and

According to one implementation, the method comprises, after applying the laser radiation, a step of removing residual layers located on a face of the first semiconductive layer opposite the monocrystalline semiconductive layer, with the residual layers originating from the step of applying the laser radiation.

There is also disclosed an intermediate substrate for manufacturing a semiconductor substrate, successively comprising:

- a first semiconductive layer made up of polycrystalline silicon carbide (pSiC);
- a first thermal barrier layer made up of titanium dioxide (TiO_2);
- an absorption layer made up of 3C type polycrystalline silicon carbide (3C-pSiC);
- a separation layer made up of silicon nitride (Si_3N_4);
- a second thermal barrier layer made up of titanium dioxide (TiO_2);
- a support layer made up of 4H type polycrystalline silicon carbide (4H-pSiC).

There is also disclosed an intermediate substrate for manufacturing a semiconductor substrate, successively comprising:

- a first semiconductive layer made up of polycrystalline silicon carbide (pSiC);
- a first thermal barrier layer made up of titanium dioxide (TiO_2);
- an absorption layer made up of titanium nitride (TiN);
- a separation layer made up of silicon nitride (Si_3N_4);
- a second thermal barrier layer made up of titanium dioxide (TiO_2);
- a support layer made up of 4H type polycrystalline silicon carbide (4H-pSiC).

DESCRIPTION OF THE FIGURES

Further features, aims and advantages of the invention will become apparent from the following description, which is purely illustrative and non-limiting, and which should be read with reference to the drawings, in which:

[Figure 1], [Figure 2], [Figure 3] and [Figure 4] schematically illustrate intermediate substrates for manufacturing a semiconductor substrate, according to various embodiments of a first aspect of the invention;

[Figure 5], [Figure 6] and [Figure 7] illustrate methods for manufacturing an intermediate substrate for subsequently manufacturing a semiconductor substrate, according to various embodiments of a second aspect of the invention;