WHAT IS CLAIMED IS:

1. A manufacturing method of a grooved wafer, comprising:

a preparation step of preparing a wafer that includes a substrate and a stacked body disposed on a front surface side of the substrate and that has a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged to intersect each other, the outer circumferential surplus region surrounding the device region; and

a laser processed groove forming step of forming laser processed grooves along the planned dividing lines through executing irradiation with a first laser beam with a wavelength having absorbability with respect to the stacked body, along the planned dividing lines from a side of the stacked body of the wafer, wherein

an irradiation condition of the first laser beam is set to cause melting of the stacked body to occur more readily in the outer circumferential surplus region than in the device region,

the laser processed grooves with a depth that does not reach the substrate are formed in the device region,

and

the laser processed grooves are formed in the outer circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

2. The manufacturing method of a grooved wafer according to claim 1, wherein

energy density of the first laser beam with which the outer circumferential surplus region is irradiated is higher than energy density of the first laser beam with which the device region is irradiated.

3. The manufacturing method of a grooved wafer according to claim 1, wherein

peak power of the first laser beam with which the outer circumferential surplus region is irradiated is higher than peak power of the first laser beam with which

the device region is irradiated.

4. The manufacturing method of a grooved wafer according to claim 1, wherein

an overlap rate of the first laser beam with which the outer circumferential surplus region is irradiated is higher than an overlap rate of the first laser beam with which the device region is irradiated.

5. The manufacturing method of a grooved wafer according to claim 1, wherein

the laser processed grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

6~~5~~. A manufacturing method of a grooved wafer, comprising:

a preparation step of preparing a wafer that includes a substrate and a stacked body disposed on a front surface side of the substrate and that has a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged to intersect each other, the outer circumferential surplus region surrounding the device region; and

a laser processed groove forming step of forming

laser processed grooves along the planned dividing lines through executing irradiation with a first laser beam with a wavelength having absorbability with respect to the stacked body, along the planned dividing lines from a side of the stacked body of the wafer, wherein

the laser processed grooves formed in the outer circumferential surplus region are deeper than the laser processed grooves formed in the device region,

the laser processed grooves with a depth that does not reach the substrate are formed in the device region, and

the laser processed grooves are formed in the outer circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

7. The manufacturing method of a grooved wafer

according to claim 6, wherein

the laser processed grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

~~6. The manufacturing method of a wafer according to claim 1, wherein~~

~~the laser processed grooves with a depth that does not reach the substrate are formed in the device region, and~~

~~the laser processed grooves with a depth that reaches the substrate are formed in the outer circumferential surplus region.~~

8~~7~~. A manufacturing method of chips, comprising:

a preparation step of preparing a wafer that includes a substrate and a stacked body disposed on a front surface side of the substrate and that has a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged to intersect each other, the outer circumferential surplus region surrounding the device region;

a laser processed groove forming step of forming laser processed grooves along the planned dividing lines

through executing irradiation with a first laser beam with a wavelength having absorbability with respect to the stacked body, along the planned dividing lines from a side of the stacked body of the wafer;

a modified layer forming step of forming, after executing the laser processed groove forming step, modified layers along the planned dividing lines through positioning a focusing position of a second laser beam with a wavelength having transmissibility with respect to the substrate, to inside of the substrate, and executing irradiation with the second laser beam along the planned dividing lines from a back surface side of the substrate; and

a dividing step of giving, after executing the modified layer forming step, an external force to the wafer and dividing the wafer along the planned dividing lines, wherein

an irradiation condition of the first laser beam is set to cause melting of the stacked body to occur more readily in the outer circumferential surplus region than in the device region,

the laser processed grooves with a depth that does not reach the substrate are formed in the device region, and

the laser processed grooves are formed in the outer circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

9. The manufacturing method of chips according to claim 8, wherein

the laser processed grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

10~~8~~. The manufacturing method of chips according to claim 8~~7~~, wherein

energy density of the first laser beam with which the outer circumferential surplus region is irradiated is higher than energy density of the first laser beam with which the device region is irradiated.

11~~9~~. The manufacturing method of chips according

to claim 87, wherein

peak power of the first laser beam with which the outer circumferential surplus region is irradiated is higher than peak power of the first laser beam with which the device region is irradiated.

1210. The manufacturing method of chips according to claim 87, wherein

an overlap rate of the first laser beam with which the outer circumferential surplus region is irradiated is higher than an overlap rate of the first laser beam with which the device region is irradiated.

1311. A manufacturing method of chips, comprising:

a preparation step of preparing a wafer that includes a substrate and a stacked body disposed on a front surface side of the substrate and that has a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged to intersect each other, the outer circumferential surplus region surrounding the device region;

a laser processed groove forming step of forming laser processed grooves along the planned dividing lines through executing irradiation with a first laser beam

with a wavelength having absorbability with respect to the stacked body, along the planned dividing lines from a side of the stacked body of the wafer;

a modified layer forming step of forming, after executing the laser processed groove forming step, modified layers along the planned dividing lines through positioning a focusing position of a second laser beam with a wavelength having transmissibility with respect to the substrate, to inside of the substrate, and executing irradiation with the second laser beam along the planned dividing lines from a back surface side of the substrate; and

a dividing step of giving, after executing the modified layer forming step, an external force to the wafer and dividing the wafer along the planned dividing lines, wherein

the laser processed grooves formed in the outer circumferential surplus region are deeper than the laser processed grooves formed in the device region,

the laser processed grooves with a depth that does not reach the substrate are formed in the device region, and

the laser processed grooves are formed in the outer

circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

14. The manufacturing method of chips according to claim 13, wherein the laser processed grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

~~12. The manufacturing method of chips according to claim 7, wherein~~

~~the laser processed grooves with a depth that does not reach the substrate are formed in the device region, and~~

~~the laser processed grooves with a depth that reaches the substrate are formed in the outer circumferential surplus region.~~

15~~13~~. The manufacturing method of chips according

to claim 87, further comprising:

a position adjustment step of observing, after executing the laser processed groove forming step but before executing the modified layer forming step, the laser processed groove formed in the outer circumferential surplus region from the back surface side of the substrate and adjusting a positional relation between the wafer and the second laser beam to cause a region that overlaps with the laser processed groove, to be irradiated with the second laser beam.

1614. A grooved wafer comprising:

a substrate; and

a stacked body disposed on a front surface side of the substrate,

the wafer having a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged in a lattice manner, the outer circumferential surplus region surrounding the device region, wherein

grooves along the planned dividing lines are formed in the stacked body, and

the grooves formed in the outer circumferential surplus region are deeper than the grooves formed in the

device region,

the grooves with a depth that does not reach the substrate are formed in the device region, and

the laser processed grooves are formed in the outer circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

17. The grooved wafer according to claim 16, wherein the grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

~~15. The wafer according to claim 14, wherein~~

~~the grooves with a depth that does not reach the substrate are formed in the device region, and~~

~~the grooves with a depth that reaches the substrate~~

~~are formed in the outer circumferential surplus region.~~

~~18~~16. A position adjustment method of a laser beam, comprising:

a grooved wafer preparation step of preparing a wafer that includes a substrate and a stacked body disposed on a front surface side of the substrate and that has a device region and an outer circumferential surplus region, the device region having a plurality of devices disposed in a plurality of regions marked out by a plurality of planned dividing lines arranged to intersect each other, the outer circumferential surplus region surrounding the device region, the stacked body having grooves formed therein along the planned dividing lines; and

a position adjustment step of observing the groove formed in the outer circumferential surplus region from a back surface side of the substrate and adjusting a positional relation between the wafer and the laser beam to cause a region that overlaps with the groove, to be irradiated with the laser beam, wherein

the grooves formed in the outer circumferential surplus region are deeper than the grooves formed in the device region,

the grooves with a depth that does not reach the substrate are formed in the device region, and

the laser processed grooves are formed in the outer circumferential surplus region:

with a depth equal to the thickness of the stacked body, when the stacked body is removed, and the front surface side of the substrate is exposed, or

with a depth smaller than the thickness of the stacked body, when the stacked body is removed such that a part of the stacked body remains between the front surface side of the substrate and the laser processed grooves, said part is of a thickness to enable light to transmit through said part.

19. The position adjustment method of a laser beam according to claim 18, wherein the grooves formed in the outer circumferential surplus region are formed only in partial regions on the planned dividing lines.

~~17. The position adjustment method of a laser beam according to claim 16, wherein~~

~~the grooves with a depth that does not reach the substrate are formed in the device region, and~~

~~the grooves with a depth that reaches the substrate are formed in the outer circumferential surplus region.~~