Claims

[Claim 1] A method of producing an epitaxial wafer, comprising:
a step of preparing a semiconductor wafer having a beveled portion formed on its end portion, a first surface, a second surface opposite to the first surface, and edges on both of the first surface and the second surface, the each edge is boundary with the beveled portion;
a step of processing of rolling off an outer peripheral portion of the first surface to form a roll-off region, the outer peripheral portion is extending outward of the wafer from a predetermined position inner than the position of the edge on the first surface; and
a step of forming a first epitaxial film on the second surface.

[Claim 2] The method of producing an epitaxial wafer according to claim 1, wherein a roll-off amount of the outer peripheral portion is determined based on a film thickness of a second epitaxial film which attaches to the outer peripheral portion of the first surface when the first epitaxial film is formed on the second surface.

[Claim 3] The method of producing an epitaxial wafer according to claim 1 or claim 2, wherein the rolling-off step is performed by a process of polishing the outer peripheral portion.

[Claim 4] The method of producing an epitaxial wafer according to claim 3, further comprising:
a step of rough-polishing at least one of the first surface and the second surface of the semiconductor wafer,
wherein the process of polishing the outer peripheral portion is performed after the rough-polishing step.

[Claim 5] The method of producing an epitaxial wafer according to claim 3 or claim 4, further comprising:
a step of finish-polishing at least the second surface of the semiconductor wafer before the step of forming the first epitaxial film,
wherein the process of polishing the outer peripheral portion is performed before the finish-polishing step.

[Claim 6] The method of producing an epitaxial wafer according to any one of claims 3 to claim 5, wherein the process of polishing the outer peripheral portion is performed by using a ring-shaped polishing cloth having a size corresponding to the outer peripheral portion of the first surface.

[Claim 7] The method of producing an epitaxial wafer according to claim 3,

further comprising:

a step of rough-polishing at least one of the first surface and the second surface of the semiconductor wafer, and

a step of finish-polishing at least one of the first surface and the second surface of the semiconductor wafer before the step of forming the first epitaxial film,

wherein a process of mirror-polishing of the beveled portion and the process of polishing the outer peripheral portion are performed in parallel between the rough-polishing step and the finish-polishing step.

[Claim8]

An epitaxial wafer comprising:

a semiconductor wafer having a beveled portion formed on its end portion, a first surface, a second surface opposite to the first surface, and edges on both of the first surface and the second surface, the each edge is boundary with the beveled portion;

a first epitaxial film with a thickness of 3 μm or more formed on the second surface of the semiconductor wafer; and

a second epitaxial film formed on an outer peripheral portion of the first surface,

wherein an ESFQRmean value which represents the flatness of a surface including at least a surface of the second epitaxial film on the first surface is 100 nm or less.

Claims

[Claim 1]

A method of producing an epitaxial wafer, comprising:

a step of preparing a semiconductor wafer having a beveled portion formed on its end portion, a first surface, a second surface opposite to the first surface, and edges on both of the first surface and the second surface, the each edge is boundary with the beveled portion;

a step of processing of rolling off an outer peripheral portion of the first surface to form a roll-off region, the outer peripheral portion is extending outward of the wafer from a predetermined position inner than the position of the edge on the first surface; and

a step of forming a first epitaxial film on the second surface,

wherein a roll-off amount of the outer peripheral portion is determined based on a film thickness of a second epitaxial film which attaches to the outer peripheral portion of the first surface when the first epitaxial film is formed on the second surface,

wherein the first epitaxial film formed on the second surface has a thickness of 3 μm or more,

wherein an ESFQRmean value which represents the flatness of a surface including at least a surface of the second epitaxial film on the first surface is 100 nm or less.

[Claim 2]

The method of producing an epitaxial wafer according to claim 1, wherein the rolling-off step is performed by a process of polishing the outer peripheral portion.

[Claim 3]

The method of producing an epitaxial wafer according to claim 2, further comprising:

a step of rough-polishing at least one of the first surface and the second surface of the semiconductor wafer,

wherein the process of polishing the outer peripheral portion is performed after the rough-polishing step.

[Claim 4]

The method of producing an epitaxial wafer according to claim 2 or claim 3, further comprising:

a step of finish-polishing at least the second surface of the semiconductor wafer before the step of forming the first epitaxial film,

wherein the process of polishing the outer peripheral portion is performed before the finish-polishing step.

[Claim 5]

The method of producing an epitaxial wafer according to any one of claims 2 to 4, wherein the process of polishing the outer peripheral portion is performed by using a ring-shaped polishing cloth having a size corresponding to the outer peripheral portion of the first surface.

[Claim 6]

The method of producing an epitaxial wafer according to claim 2, further comprising:

a step of rough-polishing at least one of the first surface and the second surface of the semiconductor wafer, and

a step of finish-polishing at least one of the first surface and the second surface of the semiconductor wafer before the step of forming the first epitaxial film,

wherein a process of mirror-polishing of the beveled portion and the process of polishing the outer peripheral portion are performed in parallel between the rough-polishing step and the finish-polishing step.

[Claim 7]

An epitaxial wafer comprising:

a semiconductor wafer having a beveled portion formed on its end portion, a first surface, a second surface opposite to the first surface, and edges on both of the first surface and the second surface, the each edge is boundary with the beveled portion;

a first epitaxial film with a thickness of 3 μm or more formed on the second surface of the semiconductor wafer; and

a second epitaxial film formed on an outer peripheral portion of the first surface,

wherein an ESFQRmean value which represents the flatness of a surface including at least a surface of the second epitaxial film on the first surface is 100 nm or less.