WHAT IS CLAIMED IS:

1. A wire shape measurement device for a semiconductor device, which comprises:

a substrate;

a semiconductor element mounted on the substrate; and

a wire connecting an electrode of the semiconductor element and an electrode of the substrate, or connecting one electrode of the semiconductor element and another electrode of the semiconductor element,

the wire shape measurement device comprising:

a plurality of cameras capturing two-dimensional images of the semiconductor device; and

a control unit measuring a shape of the wire based on the two-dimensional images of the semiconductor device acquired by the cameras,

wherein the control unit:

respectively captures the two-dimensional images of the semiconductor device with the plurality of cameras,

sets two-dimensional coordinate detection regions at predetermined intervals in a region that connects a start point and a terminal point of connection of the wire with the substrate or the semiconductor element in each of the two-dimensional images, searches the two-dimensional coordinate detection regions for a linear image corresponding to a diameter of the wire by pattern matching ~~that superimposes a reference pattern and a detected image~~, repeats a plurality of times an operation of taking a center position of the linear image corresponding to the diameter of the wire as two-dimensional coordinates of the wire in the two-dimensional coordinate detection region, and respectively extracts two-dimensional coordinates corresponding to a portion of the wire from the two-dimensional images of the semiconductor device acquired by the cameras,

calculates respective three-dimensional coordinates of a plurality of portions of the wire based on the two-dimensional coordinates respectively extracted and a position of each of the cameras,

generates a three-dimensional image of the wire based on the three-dimensional coordinates calculated, and

measures the shape of the wire based on the three-dimensional image of the wire generated.

2. The wire shape measurement device according to claim 1, wherein the cameras are respectively arranged on both sides of the wire so that optical axes of the cameras intersect a direction in which the wire extends.

3. The wire shape measurement device according to claim 1, wherein the control unit inspects the shape of the wire based on the three-dimensional image of the wire generated.

4. The wire shape measurement device according to claim 3, wherein the control unit inspects the shape of the wire by comparing the three-dimensional image of the wire generated with a reference shape of the wire.

5. The wire shape measurement device according to claim 4, wherein the control unit:

extracts a shape parameter of the wire from the three-dimensional image of the wire generated, and

inspects the shape of the wire by comparing the shape parameter extracted with a reference value of the shape parameter.

6. A wire three-dimensional image generation method for a semiconductor device, which comprises:

a substrate;

a semiconductor element mounted on the substrate; and

a wire connecting an electrode of the semiconductor element and an electrode of the substrate, or connecting one electrode of the semiconductor element and another electrode of the semiconductor element,

the wire three-dimensional image generation method comprising:

an image capturing step of respectively capturing two-dimensional images of the semiconductor device with a plurality of cameras;

a two-dimensional coordinate extraction step of setting two-dimensional coordinate detection regions at predetermined intervals in a region that connects a start point and a terminal point of connection of the wire with the substrate or the semiconductor element in each of the two-dimensional images, searching the two-dimensional coordinate detection regions for a linear image corresponding to a diameter of the wire by pattern matching ~~that superimposes a reference pattern and a detected image~~, repeating a plurality of times an operation of taking a center position of the linear image corresponding to the diameter of the wire as two-dimensional coordinates of the wire in the two-dimensional coordinate detection region, and respectively extracting two-dimensional coordinates corresponding to a portion of the wire from the two-dimensional images of the semiconductor device acquired by the cameras;

a three-dimensional coordinate calculation step of calculating respective three-dimensional coordinates of a plurality of portions of the wire based on the two-dimensional coordinates respectively extracted and a position of each of the cameras; and

a three-dimensional image generation step of generating a three-dimensional image of the wire based on the three-dimensional coordinates calculated.

7. A wire shape measurement method for a semiconductor device, which comprises:

a substrate;

a semiconductor element mounted on the substrate; and

a wire connecting an electrode of the semiconductor element and an electrode of the substrate, or connecting one electrode of the semiconductor element and another electrode of the semiconductor element,

the wire shape measurement method comprising:

an image capturing step of respectively capturing two-dimensional images of the semiconductor device with a plurality of cameras;

a two-dimensional coordinate extraction step of setting two-dimensional coordinate detection regions at predetermined intervals in a region that connects a start point and a terminal point of

connection of the wire with the substrate or the semiconductor element in each of the two-dimensional images, searching the two-dimensional coordinate detection regions for a linear image corresponding to a diameter of the wire by pattern matching ~~that superimposes a reference pattern and a detected image~~, repeating a plurality of times an operation of taking a center position of the linear image corresponding to the diameter of the wire as two-dimensional coordinates of the wire in the two-dimensional coordinate detection region, and respectively extracting two-dimensional coordinates corresponding to a portion of the wire from the two-dimensional images of the semiconductor device acquired by the cameras;

a three-dimensional coordinate calculation step of calculating respective three-dimensional coordinates of a plurality of portions of the wire based on the two-dimensional coordinates respectively extracted and a position of each of the cameras; a three-dimensional image generation step of generating a three-dimensional image of the wire based on the three-dimensional coordinates calculated; and

a measurement step of measuring a shape of the wire based on the three-dimensional image of the wire generated.

8. The wire shape measurement method according to claim 7, comprising an inspection step of inspecting the shape of the wire based on the three-dimensional image of the wire generated.

9. The wire shape measurement method according to claim 8, wherein the inspection step inspects the shape of the wire by comparing the three-dimensional image of the wire generated with a reference shape of the wire.

10. The wire shape measurement method according to claim 9, wherein the inspection step extracts a shape parameter of the wire from the three-dimensional image of the wire generated, and inspects the shape of the wire by comparing the shape parameter extracted with a reference value of the shape parameter.