CLAIMS

1. A device analysis apparatus for determining a quality of a power semiconductor device, the device analysis apparatus comprising:

an application unit that applies a voltage signal to the power semiconductor device;

a light detection unit that detects light from the power semiconductor device at a plurality of detection positions and outputs detection signals based on detection results; and

a determination unit that determines the quality of the power semiconductor device based on temporal changes of the detection signals,

wherein the device analysis apparatus further comprises a comparison unit that compares the temporal changes of the detection signals, and

the determination unit determines the quality of the power semiconductor device based on a comparison result in the comparison unit.

2. The device analysis apparatus according to claim 1, wherein the light detection unit detects light from the power semiconductor device at a plurality of detection positions including a peripheral portion of the power semiconductor device.

3. The device analysis apparatus according to claim 1 or 2, wherein the light detection unit simultaneously detects light from the power semiconductor device at the plurality of detection positions.

4. The device analysis apparatus according to any one of claims 1 to 3, wherein the light detection unit individually detects light from the power semiconductor device at the plurality of detection positions.

5. The device analysis apparatus according to any one of claims 1 to 4, wherein the application unit applies a voltage signal causing avalanche breakdown to the power semiconductor device.

6. The device analysis apparatus according to claim 5, wherein the light detection unit detects light emission occurring in the power semiconductor device due to the avalanche breakdown.

7. The device analysis apparatus according to any one of claims 1 to 6, wherein a time resolution of the light detection unit is 1 μs or less.

8. A device analysis method of determining a quality of a power semiconductor device, the device analysis method comprising:

an application step of applying a voltage signal to the power semiconductor device;

a light detection step of detecting light from the power semiconductor device at a plurality of detection positions and outputting detection signals based on detection results; and

a determination step of determining the quality of the power semiconductor device based on temporal changes of the detection signals,

wherein the device analysis method further comprises a comparison step of comparing the temporal changes of the detection signals, and

the quality of the power semiconductor device is determined in the determination step based on a comparison result in the comparison step.

9. The device analysis method according to claim 8, wherein light from the power semiconductor device is detected at a plurality of detection positions including a peripheral portion of the power semiconductor device in the light detection step.

10. The device analysis method according to claim 8 or 9, wherein light from the power semiconductor device is simultaneously detected at the plurality of detection positions in the light detection step.

11. The device analysis method according to any one of claims 8 to 10, wherein light from the power semiconductor device is individually detected at the plurality of detection positions in the light detection step.

12. The device analysis method according to any one of claims 8 to 11, wherein a voltage signal causing avalanche breakdown is applied to the power semiconductor device in the application step.

13. The device analysis method according to claim 12, wherein light emission occurring in the power semiconductor device due to the avalanche breakdown is detected in the light detection step.