CLAIMS

1. A semiconductor display device comprising:

a panel including a pixel portion and a driver circuit, the driver circuit being configured to input an image signal to the pixel portion when a driving signal and a power supply potential are supplied, and being configured to stop an input of the image signal to the pixel portion when supply of the driving signal and the power supply potential is stopped;

a touch panel overlapping with the pixel portion;

a CPU configured to select whether or not the driving signal and the power supply potential are supplied to the driver circuit in accordance with an operation signal from the touch panel; and

a display control circuit configured to control the supply of the driving signal and the power supply potential to the driver circuit in accordance with an instruction from the CPU,

wherein the pixel portion comprises a display element configured to perform display in accordance with voltage of the image signal, and a transistor configured to control retention of the voltage, and

wherein the transistor includes a semiconductor material whose band gap is wider than a band gap of silicon and whose intrinsic carrier density is lower than intrinsic carrier density of silicon in a channel formation region.

2. The semiconductor display device according to claim 1,

wherein the driver circuit comprises a shift register, and

wherein the driving signal is a start signal and a clock signal.

3. The semiconductor display device according to claim 1, wherein the semiconductor material is an oxide semiconductor.

4. The semiconductor display device according to claim 3, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

5. The semiconductor display device according to claim 3, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

6. The semiconductor display device according to claim 1, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

7. A semiconductor display device comprising:

a panel including a pixel, a pixel portion including a photosensor, and a driver circuit, the driver circuit being configured to input an image signal to the pixel portion when a driving signal and a power supply potential are supplied, and being configured to stop an input of the image signal to the pixel portion when supply of the driving signal and the power supply potential is stopped;

a CPU configured to select whether or not the driving signal and the power supply potential are supplied to the driver circuit in accordance with an operation signal from the photosensor; and

a display control circuit configured to control the supply of the driving signal and the power supply potential to the driver circuit in accordance with an instruction from the CPU,

wherein the pixel comprises a display element configured to perform display in accordance with voltage of the image signal, and a transistor configured to control retention of the voltage, and

wherein the transistor includes a semiconductor material whose band gap is wider than a band gap of silicon and whose intrinsic carrier density is lower than intrinsic carrier density of silicon in a channel formation region.

8. The semiconductor display device according to claim 7,

wherein the driver circuit comprises a shift register, and

wherein the driving signal is a start signal and a clock signal.

9. The semiconductor display device according to claim 7, wherein the

semiconductor material is an oxide semiconductor.

10. The semiconductor display device according to claim 9, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

11. The semiconductor display device according to claim 9, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

12. The semiconductor display device according to claim 7, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

13. A driving method of a semiconductor display device, comprising the steps of:

changing the number of writing operations of an image signal to a pixel portion for a certain period in accordance with an operation signal from a touch panel;

performing display by a display element in accordance with voltage of the image signal when the image signal is written to the pixel portion; and

maintaining the display of the display element by holding the voltage of the image signal by a transistor including a semiconductor material whose band gap is wider than a band gap of silicon and whose intrinsic carrier density is lower than intrinsic carrier density of silicon in a channel formation region.

14. The driving method of the semiconductor display device, according to claim 13, wherein the semiconductor material is an oxide semiconductor.

15. The driving method of the semiconductor display device, according to claim 14, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

16. The driving method of the semiconductor display device, according to

claim 14, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

17. The driving method of the semiconductor display device, according to claim 13, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

18. A driving method of a semiconductor display device, comprising the steps of:

changing the number of writing operations of an image signal to a pixel portion for a certain period in accordance with an operation signal from a photosensor;

performing display by a display element in accordance with voltage of the image signal when the image signal is written to the pixel portion; and

maintaining the display of the display element by holding the voltage of the image signal by a transistor including a semiconductor material whose band gap is wider than a band gap of silicon and whose intrinsic carrier density is lower than intrinsic carrier density of silicon in a channel formation region.

19. The driving method of the semiconductor display device, according to claim 18, wherein the semiconductor material is an oxide semiconductor.

20. The driving method of the semiconductor display device, according to claim 19, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

21. The driving method of the semiconductor display device, according to claim 19, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

22. The driving method of the semiconductor display device, according to claim 18, wherein off-state current density of the transistor is less than or equal to 100

zA/μm.

CLAIMS

1. A semiconductor display device comprising:

a panel including a pixel portion and a driver circuit, the driver circuit being configured to input an image signal to the pixel portion in a first period when a driving signal and a power supply potential are supplied to the driver circuit, and being configured to stop an input of the image signal to the pixel portion in a second period when supply of the driving signal and the power supply potential to the driver circuit is stopped;

a touch panel overlapping with the pixel portion;

a CPU configured to select whether or not the driving signal and the power supply potential are supplied to the driver circuit in accordance with an operation signal supplied from the touch panel; and

a display control circuit configured to control the supply of the driving signal and the power supply potential to the driver circuit in accordance with an instruction supplied from the CPU,

wherein the pixel portion comprises a display element configured to perform display in accordance with voltage of the image signal, and a transistor configured to control retention of the voltage,

wherein the transistor comprises an oxide semiconductor,

wherein a driving frequency of the driver circuit is changed whether an image displayed in the pixel portion is a still image or a moving image,

wherein the pixel portion displays the still image in the first period and the second period, and

wherein a length of the second period is changed in accordance with the operation signal supplied from the touch panel.

2. The semiconductor display device according to claim 1,

wherein the driver circuit comprises a shift register, and

wherein the driving signal is a start signal and a clock signal.

3. The semiconductor display device according to claim 1, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

4. The semiconductor display device according to claim 1, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to $5 \times 10^{19}/cm^3$.

5. The semiconductor display device according to claim 1, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

6. A semiconductor display device comprising:

a panel including a pixel portion which includes a pixel and a photosensor, and a driver circuit, the driver circuit being configured to input an image signal to the pixel portion in a first period when a driving signal and a power supply potential are supplied to the driver circuit, and being configured to stop an input of the image signal to the pixel portion in a second period when supply of the driving signal and the power supply potential to the driver circuit is stopped;

a CPU configured to select whether or not the driving signal and the power supply potential are supplied to the driver circuit in accordance with an operation signal supplied from the photosensor; and

a display control circuit configured to control the supply of the driving signal and the power supply potential to the driver circuit in accordance with an instruction supplied from the CPU,

wherein the pixel comprises a display element configured to perform display in accordance with voltage of the image signal, and a transistor configured to control retention of the voltage,

wherein the transistor comprises an oxide semiconductor,

wherein a driving frequency of the driver circuit is changed whether an image displayed in the pixel portion is a still image or a moving image,

wherein the pixel portion displays the still image in the first period and the second period, and

wherein a length of the second period is changed in accordance with the operation signal supplied from the photosensor.

7. The semiconductor display device according to claim 6,

wherein the driver circuit comprises a shift register, and

wherein the driving signal is a start signal and a clock signal.

8. The semiconductor display device according to claim 6, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

9. The semiconductor display device according to claim 6, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

10. The semiconductor display device according to claim 6, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

11. A driving method of a semiconductor display device comprising a pixel portion, a driver circuit and a touch panel or a photosensor, comprising the steps of:

changing a number of writing operations of an image signal to the pixel portion for a certain period whether an image displayed in the pixel portion is a still image or a moving image;

performing display by a display element in accordance with voltage of the image signal when the image signal is written to the pixel portion by the driver circuit in a first period; and

maintaining the display of the display element by holding the voltage of the image signal by a transistor while supply of a driving signal and a power supply potential to the driver circuit is stopped in a second period,

wherein the transistor comprises an oxide semiconductor,

wherein the pixel portion displays the still image in the first period and the second period, and

wherein a length of the second period is changed in accordance with an operation signal supplied from the touch panel or the photosensor.

12. The driving method of the semiconductor display device, according to claim 11, wherein the oxide semiconductor is an In-Ga-Zn-O-based oxide semiconductor.

13. The driving method of the semiconductor display device, according to claim 11, wherein concentration of hydrogen in the oxide semiconductor is less than or equal to 5×10^{19} /cm^3.

14. The driving method of the semiconductor display device, according to claim 11, wherein off-state current density of the transistor is less than or equal to 100 zA/μm.

15. The semiconductor display device according to claim 1, wherein the driving frequency of the driver circuit when the still image is displayed in the pixel portion is lower than the driving frequency of the driver circuit when the moving image is displayed in the pixel portion.

16. The semiconductor display device according to claim 6, wherein the driving frequency of the driver circuit when the still image is displayed in the pixel portion is lower than the driving frequency of the driver circuit when the moving image is displayed in the pixel portion.

17. The driving method of the semiconductor display device according to claim 11, wherein the number of writing operations of the image signal when the still

image is displayed in the pixel portion is lower than the number of writing operations of the image signal when the moving image is displayed in the pixel portion.

18. The semiconductor display device according to claim 1,

wherein the first period and the second period appear alternately and repeatedly when the pixel portion displays the still image, and

wherein a length of the first period is shorter than the length of the second period.

19. The semiconductor display device according to claim 6,

wherein the first period and the second period appear alternately and repeatedly when the pixel portion displays the still image, and

wherein a length of the first period is shorter than the length of the second period.

20. The driving method of the semiconductor display device according to claim 11,

wherein the first period and the second period appear alternately and repeatedly when the pixel portion displays the still image, and

wherein a length of the first period is shorter than the length of the second period.