CLAIMS

1. A display device comprising:

a power supply line;

a light-emitting element configured to receive power from the power supply line;

a first thin film transistor for electrically connecting the power supply line and the light-emitting element;

a signal line for supplying a video signal;

a second thin film transistor for electrically connecting the signal line and a gate of the first thin film transistor;

wherein a channel formation region in the second thin film transistor comprises an oxide semiconductor layer having a band gap of greater than or equal to 2 eV and a hydrogen concentration of less than or equal to 5×10^{19} /cm^3, and

wherein the second thin film transistor in which off-state current per a channel width of 1 μm is suppressed to less than or equal to 1×10^{-16} A/μm is configured to hold the first thin film transistor in an on state and connect the power supply line to the light-emitting element to display a still image.

2. The display device according to claim 1, wherein the power supply line is configured to supply a pulsed DC power.

3. The display device according to claim 1, wherein a carrier concentration of the oxide semiconductor layer is less than 1×10^{14} /cm^3.

4. The display device according to claim 1, wherein a period in which the still image is displayed includes a period in which output of a scan line signal is stopped.

5. The display device according to claim 1,

wherein the light-emitting element comprising:

a pair of electrodes; and

a layer containing a light-emitting organic substance between the pair of electrodes.

6. The display device according to claim 1, wherein a light-storing layer is included.

7. An electronic device comprising the display device according to claim 1.

8. The display device according to claim 1, wherein the display device is lighting device.

9. A display device comprising;

a signal line;

a scan line;

a power supply line to which pulsed DC power is supplied; and

a pixel portion, the pixel portion comprising:

a first thin film transistor;

a second thin film transistor; and

a light-emitting element,

wherein a gate of the second thin film transistor is electrically connected to the scan line, a first electrode of the second thin film transistor is electrically connected to the signal line, and a second electrode of the second thin film transistor is electrically connected to a gate of the first thin film transistor,

wherein a first electrode of the first thin film transistor is electrically connected to the power supply line, and the second electrode of the first thin film transistor is electrically connected to a first electrode of the light-emitting element,

wherein a channel formation region in the second thin film transistor comprises an oxide semiconductor layer having a band gap of greater than or equal to 2 eV and a hydrogen concentration of less than or equal to 5×10^{19} /cm^3, and

wherein the second thin film transistor in which off-state current per a channel width of 1 μm is suppressed to less than or equal to 1×10^{-16} A/μm is configured to hold the first thin film transistor in an on state and connects the power supply line to the light-emitting element to display a still image.

10. The display device according to claim 9, wherein a carrier concentration of the oxide semiconductor layer is less than 1×10^{14} /cm^3.

11. The display device according to claim 9, wherein a period in which the still image is displayed includes a period in which output of a scan line signal is stopped.

12. The display device according to claim 9,

wherein the light-emitting element comprising:

a pair of electrodes; and

a layer containing a light-emitting organic substance between the pair of electrodes.

13. The display device according to claim 9, wherein a light-storing layer is included.

14. An electronic device comprising the display device according to claim 9.

15. The display device according to claim 9, wherein the display device is an electronic paper.

CLAIMS

1. A display device comprising:

a power supply line;

a light-emitting element configured to receive power from the power supply line;

a first transistor for electrically connecting the power supply line and the light-emitting element;

a signal line for supplying a video signal;

a second transistor for electrically connecting the signal line and a gate of the first transistor;

wherein a channel formation region in the second transistor comprises an oxide semiconductor layer having a band gap of greater than or equal to 2 eV and a hydrogen concentration of less than or equal to 5×10^{19} /cm^3, and

wherein when the second transistor is off state, a drain current of the second transistor is less than or equal to 1×10^{-16} A/μm, and the second transistor is configured to hold the first transistor in an on state and connect the power supply line to the light-emitting element to display a still image.

2. The display device according to claim 1, wherein the power supply line is configured to supply a pulsed DC power.

3. The display device according to claim 1, wherein a carrier concentration of the oxide semiconductor layer is less than 1×10^{14} /cm^3.

4. The display device according to claim 1, wherein a period in which the still image is displayed includes a period in which output of a scan line signal is stopped.

5. The display device according to claim 1,

wherein the light-emitting element comprising:

a pair of electrodes; and

a layer containing a light-emitting organic substance between the pair of electrodes.

6. The display device according to claim 1, wherein a light-storing layer is included.

7. An electronic device comprising the display device according to claim 1.

8. The display device according to claim 1, wherein the display device is lighting device.

9. A display device comprising;

a signal line;

a scan line;

a power supply line to which pulsed DC power is supplied; and

a pixel portion, the pixel portion comprising:

a first transistor;

a second transistor; and

a light-emitting element,

wherein a gate of the second transistor is electrically connected to the scan line, a first electrode of the second transistor is electrically connected to the signal line, and a second electrode of the second transistor is electrically connected to a gate of the first transistor,

wherein a first electrode of the first transistor is electrically connected to the power supply line, and the second electrode of the first transistor is electrically connected to a first electrode of the light-emitting element,

wherein a channel formation region in the second transistor comprises an oxide semiconductor layer having a band gap of greater than or equal to 2 eV and a hydrogen concentration of less than or equal to 5×10^{19} /cm^3, and

wherein when the second transistor is off state, a drain current of the second transistor is less than or equal to 1×10^{-16} A/μm, and the second transistor is configured to hold the first transistor in an on state and connect the power supply line to the light-emitting element to display a still image.

10. The display device according to claim 9, wherein a carrier concentration of the oxide semiconductor layer is less than 1×10^{14} /cm^3.

11. The display device according to claim 9, wherein a period in which the still image is displayed includes a period in which output of a scan line signal is stopped.

12. The display device according to claim 9,
wherein the light-emitting element comprising:
a pair of electrodes; and
a layer containing a light-emitting organic substance between the pair of electrodes.

13. The display device according to claim 9, wherein a light-storing layer is included.

14. An electronic device comprising the display device according to claim 9.

15. The display device according to claim 9, wherein the display device is an electronic paper.

16. A display device comprising;
a power supply line;
a light-emitting element configured to receive power from the power supply line;
a first transistor for electrically connecting the power supply line and the light-emitting element;

a signal line for supplying a video signal;

a second transistor for electrically connecting the signal line and a gate of the first transistor;

wherein a channel formation region in the second transistor comprises an oxide semiconductor layer having a band gap of greater than or equal to 2 eV and a hydrogen concentration of less than or equal to 5×10^{19} /cm^3,

wherein when the second transistor is off state, a drain current of the second transistor is less than or equal to 1×10^{-16} A/μm, and the second transistor is configured to hold the first transistor in an on state and connect the power supply line to the light-emitting element to display a still image, and

wherein the oxide semiconductor layer comprises micro crystalline portion.

17. The display device according to claim 16, wherein grain diameter of the micro crystalline portion is greater than or equal to 1 nm and equal to or less than 20 nm.