CLAIMS

1. A semiconductor device comprising:

a first photosensor in a first row over a substrate, the first photosensor comprising:

a light-receiving element;

a first transistor; and

a second transistor comprising an oxide semiconductor film;

a second photosensor in the first row over the substrate;

a third photosensor in a second row over the substrate; and

a fourth photosensor in the second row over the substrate,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform a reset operation simultaneously,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform an accumulation operation simultaneously,

wherein the first photosensor and the second photosensor are configured to perform a first selection operation after the accumulation operation of the first photosensor and the second photosensor,

wherein the third photosensor and the fourth photosensor are configured to perform a second selection operation after the first selection operation,

wherein the oxide semiconductor film comprises a channel region,

wherein one electrode of the light-receiving element is electrically connected to one of a source and a drain of the second transistor,

wherein the other of the source and the drain of the second transistor is electrically connected to a gate of the first transistor, and

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform the accumulation operation, the first selection operation and the second selection operation a plurality of times repeatedly in a period between the reset operation and a next reset operation.

2. The semiconductor device according to claim 1,

wherein the light-receiving element and the first transistor are formed over the same surface,

wherein the second transistor is formed over the light-receiving element and the first transistor with an insulating film interposed therebetween, and

wherein the second transistor overlaps with the light-receiving element at least partly.

3. The semiconductor device according to claim 1, further comprising a third transistor,

wherein one of a source and a drain of the third transistor is electrically connected to one of a source and a drain of the first transistor, and

wherein the other of the source and the drain of the third transistor is electrically connected to the gate of the first transistor.

4. The semiconductor device according to claim 1, further comprising a light source of a certain color,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to simultaneously perform the reset operation for the certain color, simultaneously perform the accumulation operation for the certain color, and sequentially perform the first selection operation and the second selection operation.

5. The semiconductor device according to claim 1, further comprising a light source of a plurality of colors including at least a first color and a second color,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to simultaneously perform the reset operation for each color, simultaneously perform the accumulation operation for each color, and sequentially perform the first selection operation and the second selection operation for each color.

6. The semiconductor device according to claim 1,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform the accumulation operation, the first selection operation and the second selection operation a plurality of times repeatedly, after the reset operation, in a period required for one imaging.

7. The semiconductor device according to claim 6, wherein a total time for the first selection operation and the second selection operation is longer than a time from the starting of the accumulation operation to an end of the accumulation operation.

8. The semiconductor device according to claim 1, wherein the light-receiving element is a photodiode.

9. The semiconductor device according to claim 1, wherein an off-current of the second transistor is 1×10^{-17} A/μm or less.

10. The semiconductor device according to claim 1, wherein the first transistor comprises a silicon semiconductor film comprising a channel region.

11. A semiconductor device comprising:

a display element over a substrate;

a first photosensor in a first row over the substrate, the first photosensor comprising:

a light-receiving element;

a first transistor; and

a second transistor comprising an oxide semiconductor film;

a second photosensor in the first row over the substrate;

a third photosensor in a second row over the substrate; and

a fourth photosensor in the second row over the substrate,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform a reset operation simultaneously,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform an accumulation operation simultaneously,

wherein the first photosensor and the second photosensor are configured to perform a first selection operation after the accumulation operation of the first photosensor and the second photosensor,

wherein the third photosensor and the fourth photosensor are configured to perform a second selection operation after the first selection operation,

wherein the oxide semiconductor film comprises a channel region,

wherein one electrode of the light-receiving element is electrically connected to one of a source and a drain of the second transistor,

wherein the other of the source and the drain of the second transistor is electrically connected to a gate of the first transistor, and

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform the accumulation operation, the first selection operation and the second selection operation a plurality of times repeatedly in a period between the reset operation and a next reset operation.

12. The semiconductor device according to claim 11,

wherein the light-receiving element and the first transistor are formed over the same surface,

wherein the second transistor is formed over the light-receiving element and the first transistor with an insulating film interposed therebetween, and

wherein the second transistor overlaps with the light-receiving element at least partly.

13. The semiconductor device according to claim 11, further comprising a third transistor,

wherein one of a source and a drain of the third transistor is electrically connected to one of a source and a drain of the first transistor, and

wherein the other of the source and the drain of the third transistor is electrically connected to the gate of the first transistor.

14. The semiconductor device according to claim 11, further comprising a light source of a certain color,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to simultaneously perform the reset operation for the certain color, simultaneously perform the accumulation operation for the certain color, and sequentially perform the first selection operation and the second selection operation.

15. The semiconductor device according to claim 11, further comprising a light source of a plurality of colors including at least a first color and a second color,

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to simultaneously perform the reset operation for each color, simultaneously perform the accumulation operation for each color, and sequentially perform the first selection operation and the second selection operation for each color.

16. The semiconductor device according to claim 11, wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform the accumulation operation, the first selection operation and the second selection operation a plurality of times repeatedly, after the reset operation, in a period required for one imaging.

17. The semiconductor device according to claim 16, wherein a total time for the first selection operation and the second selection operation is longer than a time from the starting of the accumulation operation to an end of the accumulation operation.

18. The semiconductor device according to claim 11, wherein the display element comprises a liquid crystal element.

19. The semiconductor device according to claim 11, wherein the light-receiving element is a photodiode.

20. The semiconductor device according to claim 11, wherein an off-current of the second transistor is 1×10^{-17} A/μm or less.

21. The semiconductor device according to claim 11, wherein the first transistor comprises a silicon semiconductor film comprising a channel region.

22. A method for driving a semiconductor device, the semiconductor device comprising a first photosensor, a second photosensor, a third photosensor, and a fourth photosensor each including a light-receiving element, a first transistor, and a second transistor, comprising:

performing a reset operation of the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor simultaneously;

performing an accumulation operation of the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor simultaneously;

performing a first selection operation of the first photosensor and the second photosensor after the accumulation operation of the first photosensor and the second photosensor; and

performing a second selection operation of the third photosensor and the fourth photosensor after the first selection operation,

wherein the first photosensor and the second photosensor are in a first row,

wherein the third photosensor and the fourth photosensor are in a second row,

wherein the second transistor comprises an oxide semiconductor film,

wherein the oxide semiconductor film comprises a channel region, and

wherein the first photosensor, the second photosensor, the third photosensor, and the fourth photosensor are configured to perform the accumulation operation, the first selection operation and the second selection operation a plurality of times repeatedly in a period between the reset operation and a next reset operation.

23. The method for driving the semiconductor device according to claim 22,

wherein the light-receiving element has a function of supplying a charge corresponding to incident light to a gate of the first transistor,

wherein the first transistor has a function of accumulating the charge supplied to the gate, and

wherein the second transistor has a function of retaining the charge accumulated in the gate of the first transistor.

24. The method for driving the semiconductor device according to claim 23,

wherein the first transistor has a function of converting the accumulated charge into an output signal.

25. The method for driving the semiconductor device according to claim 22, wherein the light-receiving element is a photodiode.

26. The method for driving the semiconductor device according to claim 22, wherein an off-current of the second transistor is 1×10^{-17} A/μm or less.

27. The method for driving the semiconductor device according to claim 22, wherein the first transistor comprises a silicon semiconductor film comprising a channel region.