

Claims

1. A semiconductor storage device comprising:
 - a first stacked body comprising a plurality of first electrode layers and a plurality of first insulating layers that are alternately stacked on a substrate in a first direction perpendicular to the substrate;
 - a plurality of semiconductor films penetrating the first stacked body in the first direction;
 - a second stacked body comprising a plurality of second electrode layers and a plurality of second insulating layers that are alternately stacked on the first stacked body in the first direction; and
 - a plurality of contact plugs penetrating the second stacked body in the first direction and separately connected to the respective plurality of semiconductor films and the respective plurality of second electrode layers.
- ~~2. The semiconductor storage device according to claim 1,~~
 - wherein the plurality of contact plugs each comprise a first columnar portion and a second columnar portion having a larger diameter than the first columnar portion, ~~the each~~ first columnar portion having a lower end connected to ~~the each~~ semiconductor film, the first columnar portion having an upper end connected to a lower end of the second columnar portion, the second electrode layers each being connected to ~~the each~~ contact plug at a boundary portion between the first columnar portion and the second columnar portion.
- ~~32. The semiconductor storage device according to claim 21,~~
 - wherein a side surface of the first columnar portion and a side surface of the second columnar portion are each covered with an insulating film.

43. The semiconductor storage device according to claim 1, wherein a material of uppermost one of the second electrode layers and a material of one of the contact plugs connected to the uppermost one of the second electrode layers are same as each other.

54. The semiconductor storage device according to ~~any one of~~ claims 1 ~~or to~~ 32, wherein
the plurality of semiconductor films ~~is~~are arranged in a second direction orthogonal to the first direction, and
the plurality of second electrode layers are provided for a row of the semiconductor films.

65. The semiconductor storage device according to ~~any one of~~ claims 1 ~~or to~~ 32, wherein
the plurality of semiconductor films ~~is~~are arranged in a second direction orthogonal to the first direction, and
the plurality of second electrode layers are provided in common for a plurality of rows of the semiconductor films adjacent to each other in a third direction orthogonal to the first direction and the second direction.

76. The semiconductor storage device according to any one of claims 1 to 54, further comprising a memory film provided between the plurality of first electrode layers and the plurality of semiconductor films.

87. The semiconductor storage device according to any one of claims 1 to 65, wherein the plurality of first electrode layers are each a word line and the plurality of second electrode layers are each a bit line.

98. A manufacturing method of a semiconductor storage device, the method comprising:

forming a first stacked body and a plurality of semiconductor films on a substrate, the first stacked body comprising a plurality of first electrode layers and a plurality of first insulating layers that are alternately stacked in a first direction, the plurality of semiconductor films penetrating the first stacked body in the first direction;

forming a second stacked body on the first stacked body, the second stacked body comprising a plurality of second electrode layers and a plurality of second insulating layers that are alternately stacked in the first direction;

forming a plurality of contact holes penetrating the second stacked body in the first direction; and

forming, in the plurality of contact holes, a plurality of contact plugs separately connecting the plurality of semiconductor films and the plurality of second electrode layers.

~~10. The manufacturing method of a semiconductor storage device according to claim 9, wherein the forming the plurality of contact holes comprises forming a plurality of first contact holes with respective different depths, forming a sacrificial layer on a side surface of each of the first contact holes, and forming second contact holes that are in communication with the respective first contact holes by using the sacrificial layer as a mask.~~

~~119. The A manufacturing method of a semiconductor storage device according to claim 9, the method comprising:~~

forming a first stacked body and a plurality of semiconductor films on a substrate, the first stacked body comprising a plurality of first electrode layers and a plurality of first insulating layers that are alternately stacked in a first direction, the plurality of semiconductor films penetrating the first stacked body in the first direction;

forming a second stacked body on the first stacked body, the second stacked body comprising a plurality of second electrode

layers and a plurality of second insulating layers that are alternately stacked in the first direction;

forming a plurality of contact holes penetrating the second stacked body in the first direction; and

5 forming, in the plurality of contact holes, a plurality of contact plugs separately connecting the plurality of semiconductor films and the plurality of second electrode layers,

wherein

10 the forming the plurality of contact holes comprises forming a plurality of first contact holes with respective different opening diameters, forming a sacrificial layer on a side surface of each of the first contact holes, and forming second contact holes that are in communication with the respective first contact holes by using the sacrificial layer as a mask, and

15 uppermost one of the second electrode layers and one of the contact plugs connected to the uppermost one of the second electrode layers are simultaneously formed.