## Claims

What is claimed is:

1. A switching device comprising:

   a substrate comprising a contact region;

   a vertical layer arrangement extending from the substrate next to the contact region, the vertical layer arrangement comprising a control layer;

   a freestanding silicon cantilever extending vertically from the contact region.

2. The switching device of claim 1,

   wherein the vertical layer arrangement further comprises a contact layer and the cantilever extends vertically next to the control layer and the contact layer of the layer arrangement.

3. The switching device of claim 2, wherein the cantilever is adapted such that it can be brought into contact electrostatically with the contact layer by applying a voltage difference between the contact region and the control layer.

4. The switching device of claim 3, wherein the cantilever is adapted such that when it has been brought into contact with the contact layer it stays in contact with the contact layer when the voltage is no longer applied.

5. The switching device of claim 4, wherein the cantilever is adapted such that it stays in contact by means of van der Waals force and/or Casimir effect.

6. The switching device of any one of claims 1 to 5, wherein the substrate is silicon.

7. The switching device of any one of claims 1 to 6, wherein the cantilever is electrically connected and mechanically fixed to the contact region.

8. The switching device of any one of claims 1 to 7, comprising a further vertical layer arrangement formed on the substrate next to the contact region opposite the vertical layer arrangement, the further vertical layer arrangement comprising a further contact layer and further control layer such that the cantilever extends between the vertical layer arrangement and the further vertical layer arrangement.

9. The switching device of claim 8, wherein the cantilever is adapted such that it can be brought electrostatically in contact with the further contact layer by applying a voltage difference between the contact region and the further control layer.

10. A method for forming a switching device on a substrate, the method comprising:
forming a fin on the substrate;
covering the fin with covering material;
forming a vertical layer arrangement adjacent to the covered fin;

removing the covering material such that at least a part of the fin remains as freestanding cantilever next to the vertical layer arrangement.

11. The method for forming a switching device according to claim 10, wherein the vertical layer arrangement is abutting the covered fin.

12. The method for forming a switching device according to claim 10 or 11, further comprising forming a further vertical layer arrangement adjacent to the covered fin and removing the covering material such that the part of the fin remains as a freestanding cantilever between the vertical layer arrangement and the further vertical layer arrangement.

13. The method for forming a switching device according to any one of claims 10 to 12, further comprising processing the fin before covering the fin with covering material, wherein processing the fin includes masking the part of the fin which is to remain freestanding to withstand oxidation .

14. The method for forming a switching device according to claim 13, wherein removing the covering material includes removing oxidated parts of the fin such that the masked part of the fin remains freestanding.

15. The method for forming a switching device according to any one of claims 10 to 14, wherein the covering material is an oxide material.

16. The method for forming a switching device according to any one of claims 10 to 15, wherein the fin is formed from silicon.

17. The method for forming a switching device according to any one of claims 10 to 16, wherein the fin is at least partly formed on a contact region of the substrate and the vertical layer arrangement is formed to comprise a contact layer and a control layer.

18. The method for forming a switching device according to claim17, wherein at least one of the contact region, the contact layer, and the control layer is formed of silicon.

19. The method for forming a switching device according to claim17 or 18, wherein the vertical layer arrangement is formed such that the contact layer and the control layer are isolated by an isolating layer.

20. The method for forming a switching device according to claim 19, wherein the isolating layer is an oxide layer.

## Claims

What is claimed is:

1. A switching device comprising:

a substrate comprising a contact region;

a vertical layer arrangement extending from the substrate next to the contact region, the vertical layer arrangement comprising a control layer; and

a freestanding silicon cantilever extending vertically from the contact region;

wherein the vertical layer arrangement further comprises a contact layer and the cantilever extends vertically next to the control layer and the contact layer of the layer arrangement;

wherein the vertical layer arrangement further comprises an isolating layer, the contact layer is isolated from the control layer by the isolating layer;

wherein the cantilever and the contact layer are configured to be maintained at the same potential upon contact of the cantilever with the contact layer when a voltage difference between the contact region and the control layer is applied.

2. The switching device of claim 1, wherein the cantilever is adapted such that it can be brought into contact electrostatically with the contact layer by applying the voltage difference between the contact region and the control layer.

3. The switching device of claim 2, wherein the cantilever is adapted such that when it has been brought into contact with the contact layer it stays in contact with the contact layer when the voltage is no longer applied.

4. The switching device of claim 3, wherein the cantilever is adapted such that it stays in contact by means of van der Waals force and/or Casimir effect.

5. The switching device of claim 1, wherein the substrate is silicon.

6. The switching device of claim 1, wherein the cantilever is electrically connected and mechanically fixed to the contact region.

7. The switching device of claim 1, comprising a further vertical layer arrangement formed on the substrate next to the contact region opposite the vertical layer arrangement, the further vertical layer arrangement comprising a further contact layer and further control layer such that the cantilever extends between the vertical layer arrangement and the further vertical layer arrangement.

8. The switching device of claim 7, wherein the cantilever is adapted such that it can be brought electrostatically in contact with the further contact layer by

applying a voltage difference between the contact region and the further control layer.