CLAIMS

WHAT IS CLAIMED IS:

1. A semiconductor device, comprising:

a substrate comprising an active pattern;

a cell region on the substrate, the cell region comprising a cell circuit; and

a core region on the substrate, the core region comprising a peripheral circuit,

wherein, in plan view, the active pattern on the core region comprises a plurality of corners,

wherein each of the corners has a rounding index that is equal to or less than 15 nm, wherein the rounding index indicates a distance between a respective tip of the each of the corners and a right-angled corner, and

wherein the active pattern on the core region comprises:

a first active pattern that has a tetragonal shape;

a second active pattern that has a dumbbell shape; and

a third active pattern that has a comb shape.

2. The semiconductor device of claim 1, wherein the rounding index of the each of the corners is in a range of 5 nm to 15 nm.

3. The semiconductor device of claim 1, wherein the rounding index of the each of the corners is zero.

4. The semiconductor device of any one of claims 1 to 3, wherein the core region comprises:

a first core region on at least one side of the cell region; and

a second core region on at least one other side of the cell region,

wherein the active pattern is on at least one of the first and second core regions.

5. The semiconductor device of claim 4, wherein one of the first and second core regions comprises a sense amplifier circuit, and another of the first and second core regions comprises a sub-word line driver circuit.

6. The semiconductor device of any one of claims 1 to 5, wherein the each of the corners has a corner angle of 90°.

7. The semiconductor device of any one of claims 1 to 6, wherein the peripheral circuit is a first peripheral circuit, and further comprising a peripheral region on the substrate, the peripheral region comprising a second peripheral circuit,

wherein a density of the active pattern on the core region is greater than a density of the active pattern on the peripheral region.

8. The semiconductor device of claim 1, wherein the peripheral circuit comprises first and second peripheral circuits, and wherein the core region comprises:

a plurality of first core regions comprising the first peripheral circuits on opposite sides of the cell region; and

a plurality of second core regions comprising the second peripheral circuits on other opposite sides of the cell region,

wherein at least one of the first and second core regions comprises:

the active pattern comprising the plurality of corners, wherein the rounding index is zero; or

the active pattern comprising the plurality of corners, wherein the rounding index is equal to or less than 15 nm.

9. The semiconductor device of claim 8, wherein

the cell circuit comprises a memory circuit,

the first peripheral circuits comprise a sense amplifier circuit, and

the second peripheral circuits comprise a sub-word line driver circuit.

10. A semiconductor device, comprising:

a substrate comprising a cell region and a core region; and

active patterns on the cell region and on the core region,

wherein

the core region is divided into a plurality of regions,

wherein, in plan view, ones of the active patterns on each of the plurality of regions respectively comprise a plurality of corners, and

each of the corners has a rounding index that is equal to or less than 15 nm, wherein the rounding index indicates a distance between a respective tip of the each of the corners and a right-angled corner, and

wherein the active patterns on the core region comprise:

a first active pattern that has a tetragonal shape;

a second active pattern that has a dumbbell shape; and

a third active pattern that has a comb shape.

11. The semiconductor device of claim 10, wherein one or more of the first, second, or third active patterns are provided in plural.

12. The semiconductor device of claim 10 or claim 11, wherein each of the plurality of regions comprises one or more of the first, second, or third active patterns.

13. The semiconductor device of any one of claims 10 to 12, wherein at least one of the plurality of regions comprises two or more of the first, second, or third active patterns,

wherein the two or more of the first, second, or third active patterns have a same shape or different shapes from each other.

14. The semiconductor device of any one of claims 10 to 13, wherein neighboring ones of the first, second, or third active patterns are spaced apart from each other in a first direction and are spaced apart from each other in a second direction intersecting the first direction.

15. The semiconductor device of claim 14, wherein the active patterns on the cell region comprise a plurality of cell active patterns,

wherein each of the cell active patterns extends discontinuously or continuously in at least one of the first direction, the second direction, or a third direction intersecting the first and second directions.

16. The semiconductor device of claim 15, wherein each of the cell active patterns has an island shape that extends along the third direction intersecting the first and second directions.

17. A semiconductor device, comprising:

a semiconductor substrate comprising a cell region on which a memory circuit is provided and a core region on which a peripheral circuit is provided;

a plurality of cell active patterns on the cell region, the cell active patterns having a same shape and arranged spaced apart from one another; and

a plurality of peripheral active patterns on the core region,

wherein, in plan view, each of the peripheral active patterns has a plurality of corners,

wherein each of the corners has a rounding index that is equal to or less than 15 nm, wherein the rounding index indicates a distance between a respective tip of the each of the corners and a right-angled corner, and

wherein the peripheral active patterns comprise:

a plurality of first peripheral active patterns, each of which has a tetragonal shape;

a plurality of second peripheral active patterns, each of which has a dumbbell shape; and

a plurality of third peripheral active patterns, each of which has a comb shape.

18. The semiconductor device of claim 17, wherein

the same shape of the cell active patterns comprises an island shape, and

the peripheral active patterns have respective shapes that are different from the island shape.

19. The semiconductor device of claim 17,

wherein the first, second, and third peripheral active patterns are arranged along a first direction or a second direction perpendicular to the first direction, and

wherein each of the cell active patterns has an island shape that extends along a third direction intersecting the first and second directions.