WHAT IS CLAIMED IS:

1. A method for fabricating a vertical semiconductor device, comprising:

forming an alternating stack that includes a lower multi-layered stack and an upper multi-layered stack by alternately stacking a dielectric layer and a sacrificial layer over a substrate; and

forming a vertical trench that divides the upper multi-layered stack into dummy stacks, and forming an asymmetric stepped trench that is extended downward from the vertical trench to divide the lower multi-layered stack into a pad stack and a dummy pad stack, wherein the forming of the asymmetric stepped trench includes:

forming a first stepped sidewall that is defined at an edge of the pad stack; and

forming a second stepped sidewall that is defined at an edge of the dummy pad stack and occupies less area than the first stepped sidewall, wherein the forming of the vertical trench that divides the upper multi-layered stack into the dummy stacks, and the forming of the asymmetric stepped trench that is extended downward from the vertical trench to divide the lower multi-layered stack into the pad stack and the dummy pad stack includes:

forming a symmetric stepped trench by etching the upper multi-layered stack;

patterning the symmetric stepped trench into an initial asymmetric stepped trench;

forming a mask including an opening that exposes the initial asymmetric stepped trench; and

etching the initial asymmetric stepped trench and the lower multi-layered stack to form the asymmetric stepped trench in the lower multi-layered stack.

2. The method of claim 1, wherein the second stepped sidewall is formed to have a steeper tilt than the first stepped sidewall.

3. The method of claim 1, wherein the first stepped sidewall includes a plurality of first steps, and the second stepped sidewall includes a plurality of second steps, and the second steps are formed to have a greater height than the first steps.

4. The method of claim 1, wherein the first stepped sidewall and the second stepped sidewall have the same height.

5. The method of claim 4, wherein the first stepped sidewall includes a plurality of first steps, and the second stepped sidewall includes a plurality of second steps, and the number of the second steps is smaller than the number of the first steps.

6. The method of claim 5, wherein each of the first steps and the second steps includes a dielectric layer and sacrificial layer stack where a dielectric layer and a sacrificial layer are stacked, and the first steps include a stack of a pair of a dielectric layer and a sacrificial layer, and the second steps include a stack of at least two pairs of a dielectric layer and a sacrificial layer.

7. The method of claim 1, further comprising:

forming an inter-layer dielectric layer filling the vertical trench and the asymmetric stepped trench, after the forming of the asymmetric stepped trench;

planarizing the inter-layer dielectric layer to expose upper surfaces of the dummy stacks;

replacing each of sacrificial layers of the dummy stacks, the pad stack, and the dummy pad stack with a conductive layer; and

forming contact plugs that are coupled to the conductive layers of the pad stack by penetrating through the inter-layer dielectric layer.

8. The method of claim 1, wherein the asymmetric stepped trench has the same shape as a shape of the initial asymmetric stepped trench.

9. The method of claim 1, wherein the initial asymmetric stepped trench and the lower multi-layered stack are etched by an etch-back process using the mask as an etch barrier, and the initial asymmetric stepped trench is etched and patterned into the vertical trench during the etch-back process.

10 The method of claim 1, wherein in the forming of the mask including the opening that exposes the initial asymmetric stepped trench, the opening includes:

a first sidewall that exposes one side of an uppermost step of the initial stepped trench through a first width, and

a second sidewall that exposes another side of the uppermost step of the initial stepped trench through a second width, which is smaller than the first width.

11. The method of claim 1, wherein the forming of the symmetric stepped trench by etching the upper multi-layered stack includes:

repeatedly performing an etch process of the upper multi-layered stack using a first slim mask, and a slimming process of the first slim mask.

12. The method of claim 1, wherein the patterning of the symmetric stepped trench into the initial asymmetric stepped trench includes:

repeatedly performing an etch process of the upper multi-layered stack using a second slim mask and a slimming process of the second slim mask.

13. The method of claim 12, wherein the second slim mask includes an opening, and the opening includes:

a first sidewall that covers one side of the symmetric stepped trench; and

a second sidewall that is self-aligned to a lowermost step of the symmetric stepped trench.

14. A method for forming a semiconductor device, the method comprising:

forming an alternating stack over a substrate that extends from a cell region to a peripheral region of the semiconductor device, the alternating stack including sacrificial layers and dielectric layers, each of the sacrificial layers alternating with one of the dielectric layers;

forming a first trench in the alternating stack, the first trench having symmetric stepped sidewalls; and

etching the first trench to form a second trench with a first stepped sidewall and a second stepped sidewall that is asymmetric to the first stepped sidewall, wherein the second stepped sidewall occupies less surface area of the substrate than the first stepped sidewall.

15. The method of claim 14, wherein etching the first trench to form a second trench comprises:

depositing a mask layer over the symmetric stepped sidewalls;

etching the mask layer to form an opening in the first trench that exposes a first base of the first trench, the opening being closer to the second sidewall than the first sidewall; and

etching the first base of the first trench through the opening to expose a second base of the first trench.

16. The method of claim 14, wherein the first trench divides an upper portion of the alternating stack into dummy stacks, and the second trench is extended downward from the first trench to divide a lower portion of the alternating stack into a pad stack and a dummy pad stack.

17. The method of claim 14, wherein etching the first trench to form a second trench comprises forming a plurality of first steps on the first sidewall and forming a plurality of

second steps on the second sidewall, wherein a height of each of the second steps is greater than a height of each of the first steps.

18. The method of claim 17, wherein the plurality of first steps and the plurality of second steps occupy a same height in a vertical direction.