CLAIMS

1. A sense amplifier, comprising:

an amplification module, configured to: when the sense amplifier is at an amplification stage, amplify a voltage difference between a bit line and a reference bit line; and

a controlled power supply module, connected to the amplification module, and configured to: determine a drive parameter according to a first rated pull rate range and a second rated pull rate range, and supply power to the amplification module according to the drive parameter, to control the amplification module to pull a voltage of the bit line or a voltage of the reference bit line to a first preset value at a first rated pull rate at the amplification stage and pull the voltage of the reference bit line or the voltage of the bit line to a second preset value at a second rated pull rate at the amplification stage, wherein

the first rated pull rate is within the first rated pull rate range, and the second rated pull rate is within the second rated pull rate range.

2. The sense amplifier according to claim 1, wherein the controlled power supply module comprises:

a first controlled power supply unit, connected to a first terminal of the amplification module, and configured to supply power to the amplification module;

a second controlled power supply unit, connected to a second terminal of the amplification module, and configured to supply power to the amplification module; and

a control unit, connected to the first controlled power supply unit, further connected to the second controlled power supply unit, and configured to: determine the drive parameter according to the first rated pull rate range and the second rated pull rate range, and control, according to the drive parameter, one or more first controlled current sources and one or more second controlled

current sources to supply power to the amplification module.

3. The sense amplifier according to claim 2, wherein the first controlled power supply unit comprises:

N first controlled current sources, wherein each of the first controlled current sources is provided with a control terminal, a first terminal, and a second terminal, the first terminal of the first controlled current source is connected to a first power supply terminal, the second terminal of the first controlled current source is connected to the first terminal of the amplification module, and the control terminal of the first controlled current source is connected to the control unit, wherein N is a positive integer.

4. The sense amplifier according to claim 3, wherein the second controlled power supply unit comprises:

N second controlled current sources, wherein each of the second controlled current sources is provided with a control terminal, a first terminal, and a second terminal, the first terminal of the second controlled current source is connected to a second power supply terminal, the second terminal of the second controlled current source is connected to the second terminal of the amplification module, and the control terminal of the second controlled current source is connected to the control unit.

5. The sense amplifier according to claim 4, wherein the control unit is configured to:

determine a first drive current range according to the first rated pull rate range, and determine a second drive current range according to the second rated pull rate range;

select at least one first target current source in the N first controlled current sources, and select at least one second target current source in the N second controlled current sources, wherein a total current provided by the at least one first target current source is within the first drive current range, and a total current provided by the at least one second target current source is within the second drive current range; and

generate a first control signal used to control the first target current source to work, and generate a second control signal used to control the second target current source to work, such that the first controlled power supply unit controls the amplification module to pull the voltage of the bit line to the first preset value at the first rated pull rate at the amplification stage, and the second controlled power supply unit controls the amplification module to pull the voltage of the reference bit line to the second preset value at the second rated pull rate at the amplification stage.

6. The sense amplifier according to claim 4, wherein the control unit is configured to:

determine a first drive current range according to the first rated pull rate range, and determine a second drive current range according to the second rated pull rate range;

select at least one first target current source in the N first controlled current sources, and select at least one second target current source in the N second controlled current sources, wherein a total current provided by the at least one first target current source is within the second drive current range, and a total current provided by the at least one second target current source is within the first drive current range; and

generate a third control signal used to control the first target current source to work, and generate a fourth control signal used to control the second target current source to work, such that the first controlled power supply unit controls the amplification module to pull the voltage of the reference bit line to the first preset value at the first rated pull rate at the amplification stage, and the second controlled power supply unit controls the amplification module to pull the voltage of the bit line to the second preset value at the second rated pull rate at the amplification stage.

7. The sense amplifier according to any one of claims 4~~3~~ to 6, wherein a drive current provided by an i^{th} first controlled current source is $2^{i-1} \times I_b$, a

drive current provided by a j^{th} second controlled current source is $2^{j-1} \times I_b$, and I_b represents a unit current.

8. The sense amplifier according to any one of claims 4~~3~~ to 6, wherein

the first controlled current source is a P-type transistor, and the second controlled current source is an N-type transistor; or

the first controlled current source and the second controlled current source are both N-type transistors.

9. The sense amplifier according to any one of claims 2 to 6, wherein the amplification module comprises:

at least one cross-coupled amplifier circuit, wherein the cross-coupled amplifier circuit is provided with a first terminal, a second terminal, a third terminal, and a fourth terminal, the first terminal of the cross-coupled amplifier circuit is connected to an output terminal of the first controlled power supply unit, the second terminal of the cross-coupled amplifier circuit is connected to an output terminal of the second controlled power supply unit, the third terminal of the cross-coupled amplifier circuit is connected to the bit line, and the fourth terminal of the cross-coupled amplifier circuit is connected to the reference bit line.

10. The sense amplifier according to claim 9, wherein the cross-coupled amplifier circuit comprises: a first transistor, a second transistor, a third transistor, and a fourth transistor;

a first terminal of the first transistor is the first terminal of the cross-coupled amplifier circuit, a second terminal of the second transistor is the second terminal of the cross-coupled amplifier circuit, a second terminal of the first transistor is the third terminal of the cross-coupled amplifier circuit, and a second terminal of the third transistor is the fourth terminal of the cross-coupled amplifier circuit;

the second terminal of the first transistor is connected to a first terminal of the second transistor, the second terminal of the third transistor is connected to a first terminal of the fourth transistor, the first terminal of the first transistor is

connected to a first terminal of the third transistor, and the second terminal of the second transistor is connected to a second terminal of the fourth transistor; and

a control terminal of the first transistor is connected to the second terminal of the third transistor, a control terminal of the second transistor is connected to the second terminal of the third transistor, a control terminal of the third transistor is connected to the second terminal of the first transistor, and a control terminal of the fourth transistor is connected to the second terminal of the first transistor.

11. The sense amplifier according to claim 9, wherein the cross-coupled amplifier circuit comprises: a fifth transistor, a sixth transistor, a seventh transistor, an eighth transistor, a first switch, a second switch, a third switch, and a fourth switch;

a first terminal of the fifth transistor is the first terminal of the cross-coupled amplifier circuit, a second terminal of the sixth transistor is the second terminal of the cross-coupled amplifier circuit, a second terminal of the fifth transistor is the third terminal of the cross-coupled amplifier circuit, and a second terminal of the seventh transistor is the fourth terminal of the cross-coupled amplifier circuit;

the second terminal of the fifth transistor is connected to a first terminal of the sixth transistor, the second terminal of the seventh transistor is connected to a first terminal of the eighth transistor, the first terminal of the fifth transistor is connected to a first terminal of the seventh transistor, and the second terminal of the sixth transistor is connected to a second terminal of the eighth transistor;

a control terminal of the fifth transistor is connected to the second terminal of the seventh transistor, a control terminal of the sixth transistor is connected to the second terminal of the seventh transistor through the first switch, and the control terminal of the sixth transistor is connected to the first terminal of the sixth transistor through the third switch; and

a control terminal of the seventh transistor is connected to the second terminal of the fifth transistor, a control terminal of the eighth transistor is connected to the second terminal of the fifth transistor through the second switch, and the control terminal of the eighth transistor is connected to the first terminal of the eighth transistor through the fourth switch.

12. A memory, comprising the sense amplifier according to any one of claims 1 to 11 and memory cells, wherein

a plurality of memory cells constitute a first storage array, a plurality of memory cells constitute a second storage array, the sense amplifier is located between the first storage array and the second storage array, a third terminal of the sense amplifier is connected to a bit line of the first storage array, and a fourth terminal of the sense amplifier is connected to a bit line of the second storage array.

13. A control method of a sense amplifier, wherein the sense amplifier comprises an amplification module and a controlled power supply module; and the method comprises:

obtaining a first rated pull rate range and a second rated pull rate range;

determining a drive parameter of the controlled power supply module according to the first rated pull rate range and the second rated pull rate range; and

generating, according to the drive parameter, a control signal used to control the controlled power supply module, such that the controlled power supply module controls the amplification module to pull a voltage of a bit line or a voltage of a reference bit line to a first preset value at a first rated pull rate at an amplification stage and pull the voltage of the reference bit line or the voltage of the bit line to a second preset value at a second rated pull rate at an amplification stage, wherein

the first rated pull rate is within the first rated pull rate range, and the second rated pull rate is within the second rated pull rate range.

14. The method according to claim 13, wherein the controlled power

supply module comprises a first controlled power supply unit and a second controlled power supply unit, the first controlled power supply unit comprises N first controlled current sources, and the second controlled power supply unit comprises N second controlled current sources; and

the determining a drive parameter of the controlled power supply module according to the first rated pull rate range and the second rated pull rate range comprises:

determining a first drive current range according to the first rated pull rate range, and determining a second drive current range according to the second rated pull rate range.

15. The method according to claim 14, wherein the generating, according to the drive parameter, a control signal used to control the controlled power supply module comprises:

selecting at least one first target current source in the N first controlled current sources, and selecting at least one second target current source in the N second controlled current sources, wherein a total current provided by the at least one first target current source is within the first drive current range, and a total current provided by the at least one second target current source is within the second drive current range; and

generating a first control signal used to control the first target current source to work, and generating a second control signal used to control the second target current source to work, such that the first controlled power supply unit controls the amplification module to pull the voltage of the bit line to the first preset value at the first rated pull rate at the amplification stage, and the second controlled power supply unit controls the amplification module to pull the voltage of the reference bit line to the second preset value at the second rated pull rate at the amplification stage.

16. The method according to claim 14, wherein the generating, according to the drive parameter, a control signal used to control the controlled power supply module comprises:

selecting at least one first target current source in the N first controlled current sources, and selecting at least one second target current source in the N second controlled current sources, wherein a total current provided by the at least one first target current source is within the first drive current range, and a total current provided by the at least one second target current source is within the second drive current range; and

generating a third control signal used to control the first target current source to work, and generating a fourth control signal used to control the second target current source to work, such that the first controlled power supply unit controls the amplification module to pull the voltage of the reference bit line to the first preset value at the first rated pull rate at the amplification stage, and the second controlled power supply unit controls the amplification module to pull the voltage of the bit line to the second preset value at the second rated pull rate at the amplification stage.