CLAIMS

The invention claimed is:

1. A method of forming an electrically conductive contact, comprising:

forming an opening through an electrically insulative material to an electrically conductive structure;

forming an electrically conductive plug within a bottom region of the opening;

forming a spacer to line a lateral periphery of an upper region of the opening; the spacer being over an outer portion of an upper surface of the electrically conductive plug and leaving an inner portion of the upper surface exposed;

forming an electrically conductive material within the lined upper region of the opening and directly against the inner portion of the upper surface of the electrically conductive plug; and

forming an electrically conductive line to extend across the electrically insulative material and the electrically conductive material within the opening, and to be electrically coupled with the electrically conductive material within the opening.

2. The method of claim 1 wherein the electrically conductive line is a bitline or a wordline, and is incorporated into a memory array.

3. The method of claim 2 wherein the memory array is an RRAM array.

4. The method of claim 1 wherein the electrically conductive plug consists of a single metal-containing material.

5. The method of claim 1 wherein the electrically conductive plug consists of titanium nitride, and is directly against copper of the electrically conductive structure.

6. The method of claim 1 wherein the electrically conductive plug comprises two or more metal-containing materials.

7. The method of claim 1 wherein the electrically conductive material consists of a single electrically conductive composition.

8. The method of claim 1 wherein the electrically conductive material comprises two or more electrically conductive compositions.

9. The method of claim 1 wherein the electrically conductive plug comprises titanium nitride directly against copper of the electrically conductive structure, and comprises tungsten directly against the titanium nitride.

10. The method of claim 9 wherein the electrically conductive material comprises tungsten.

11. The method of claim 1 wherein the narrowed upper region of the opening comprises a first width, and wherein the electrically conductive line comprises a second width that is larger than the first width.

12. A method of forming an electrically conductive contact, comprising

providing a stack over a copper-containing material, the stack comprising an electrically insulative material over an electrically insulative copper barrier material;

forming an opening through the stack to the copper-containing material;

forming an electrically conductive plug within a bottom region of the opening;

forming a spacer to line a lateral periphery of an upper region of the opening; the spacer being over an outer portion of an upper surface of the electrically conductive plug and leaving an inner portion of the upper surface exposed; and

forming an electrically conductive material within the lined upper region of the opening and directly against the inner portion of the upper surface of the electrically conductive plug.

13. The method of claim 12 wherein the electrically conductive plug consists of a single metal-containing material.

14. The method of claim 12 wherein the electrically conductive plug consists of titanium nitride.

15. The method of claim 12 wherein the electrically conductive plug comprises two or more metal-containing materials.

16. The method of claim 12 wherein the electrically conductive plug comprises titanium nitride directly against the copper-containing material, and comprises tungsten directly against the titanium nitride.

17. The method of claim 12 wherein the forming of the electrically conductive material within the opening comprises forming the electrically conductive material over the stack and within the opening, and further comprising removing the electrically conductive material from over the stack while leaving the electrically conductive material within the opening.

18. The method of claim 12 wherein the forming of the electrically conductive material within the opening comprises forming the electrically conductive material over the stack and within the opening, and further comprising patterning the electrically conductive material into a line that extends across the stack and across a region of the electrically conductive material within the opening.

19. A method of forming an electrically conductive contact, comprising

forming an opening through an electrically insulative material to an electrically conductive material;

forming an electrically conductive plug within a bottom region of the opening;

forming a spacer along a lateral periphery of an upper region of the opening to narrow the upper region of the opening; the spacer being over an outer portion of an upper surface of the electrically conductive plug and leaving an inner portion of the upper surface exposed;

forming an electrically conductive material over the electrically insulative material and within the narrowed upper region of the opening; the electrically conductive material being directly against the inner portion of the upper surface of the electrically conductive plug; and

patterning the electrically conductive material into a line that extends across the stack and across a region of the electrically conductive material within the opening.

20. The method of claim 19 wherein the narrowed upper region of the opening comprises a first width, and wherein the patterning of the electrically conductive material into a line comprises patterning the line to have a second width that is larger than the first width.

21. The method of claim 19 wherein the electrically conductive line is a bitline or a wordline, and is incorporated into a memory array; and wherein the memory array is an RRAM array.

22. A method of forming an electrically conductive contact, comprising

forming an opening through an electrically insulative material to an electrically conductive material;

forming an electrically conductive plug within a bottom region of the opening;

forming a spacer along a lateral periphery of an upper region of the opening to narrow the upper region of the opening; the spacer being over an outer portion of an upper surface of the electrically conductive plug and leaving an inner portion of the upper surface exposed;

forming an electrically conductive material over the electrically insulative material and within the narrowed upper region of the opening; the electrically conductive material being directly against the inner portion of the upper surface of the electrically conductive plug; and

forming a planarized surface extending across the electrically conductive material and the electrically insulative material.

23. The method of claim 22 wherein the electrically conductive plug is formed by filling the opening with titanium nitride, and then removing the titanium nitride from the upper region of the opening.

24. The method of claim 22 wherein the electrically conductive plug is formed by:

lining the opening with titanium nitride,

filling the lined opening with tungsten, and

removing the titanium nitride and tungsten from the upper region of the opening.

25. The method of claim 22 wherein the electrically conductive material comprises copper, the electrically conductive plug comprises titanium nitride, and the electrically conductive material comprises tungsten.

26. A semiconductor construction, comprising:

an electrically conductive plug over and directly against an electrically conductive structure, the electrically conductive plug having a first width along a cross-section;

an electrically insulative spacer over and directly against the electrically conductive plug; the spacer being directly above an outer portion of an upper surface of the electrically conductive plug and not directly above an inner portion of the upper surface of the electrically conductive plug; the inner portion having a second width along the cross-section, the second width being less than the first width; the spacer and electrically conductive plug having outer lateral surfaces against an electrically insulative material;

an electrically conductive material over and directly against the inner portion of the upper surface of the electrically conductive plug, and directly against an inner lateral surface of the spacer; and

an electrically conductive line extending across the electrically insulative material and the electrically conductive material, and being electrically coupled to the electrically conductive structure through the electrically conductive material and the electrically conductive plug.

27. The construction of claim 26 wherein the second width is smaller than a third width corresponding to a width of the electrically conductive line.

28. The construction of claim 26 wherein the electrically conductive line is a bitline or a wordline, and extends into a memory array.

29. The construction of claim 26 wherein the electrically conductive material consists of a single electrically conductive composition.

30. The construction of claim 26 wherein the electrically conductive material comprises two or more electrically conductive compositions.

31. A semiconductor construction, comprising

a stack over a copper-containing material, the stack comprising an electrically insulative material over an electrically insulative copper barrier material;

an electrically conductive plug within the stack and directly against the copper-containing material;

an electrically insulative spacer within the stack; the electrically insulative spacer being over and directly against an outer portion of an upper surface of the electrically conductive plug and not directly above an inner portion of the upper surface; and

an electrically conductive material over and directly against the inner portion of the upper surface of the electrically conductive plug; the electrically conductive material being directly against an inner lateral surface of the spacer.

32. The construction of claim 31 wherein the electrically conductive plug consists of a single metal-containing material.

33. The construction of claim 31 wherein the electrically conductive plug consists of titanium nitride.

34. The construction of claim 31 wherein the electrically conductive plug comprises two or more metal-containing materials.

35. The construction of claim 31 wherein the electrically conductive plug comprises titanium nitride directly against the copper-containing material, and comprises tungsten directly against the titanium nitride.

Claims

Claim 1: A semiconductor construction, comprising:

a stack over a copper-containing material, the stack comprising a first insulative material over an insulative copper barrier material;

a conductive plug within the stack and directly against the copper-containing material;

an insulative spacer within the stack; the insulative spacer being over and directly against an outer portion of an upper surface of the conductive plug and not directly above an inner portion of the upper surface;

a conductive material over and directly against the inner portion of the upper surface of the conductive plug; the conductive material being directly against an inner lateral surface of the spacer; and

wherein the conductive plug comprises titanium nitride directly against the copper-containing material, and comprises tungsten directly against the titanium nitride.

Claim 2: The semiconductor construction of claim 1 wherein the copper-containing material supported by a silicon-containing base.

Claim 3: The semiconductor construction of claim 1 wherein the insulative spacer comprises silicon dioxide.

Claim 4: The semiconductor construction of claim 1 wherein the insulative spacer comprises silicon nitride.

Claim 5: The semiconductor construction of claim 1 wherein the conductive material comprises metal.

Claim 6: A semiconductor construction, comprising:

a stack over a first conductive material, the stack comprising a second insulative material over a first insulative material; the first and second insulative materials being compositionally different from one another;

a conductive plug within the stack and on the first conductive material, the conductive plug having a lateral sidewall directly against both the first and second insulative materials;

an insulative spacer over and directly against an outer portion of an upper surface of the conductive plug and not directly above an inner portion of the upper surface, the insulative spacer having an outer lateral surface directly against the second insulative material of the stack and not directly against the first insulative material of the stack;

a second conductive material over and directly against the inner portion of the upper surface of the conductive plug; the second conductive material being directly against an inner lateral surface of the spacer;

the second conductive material extending along an upper surface of the stack and forming a lower part of a conductive line; and

a third conductive material directly over and along the second conductive material and forming an upper part of the conductive line, the second and third conductive materials being compositionally different from one another.

Claim 7: The semiconductor construction of claim 6 wherein the first conductive material is a copper-containing material, and wherein the first insulative material of the stack is a copper barrier material.

Claim 8: The semiconductor construction of claim 6 wherein the conductive plug comprises only a single conductive material.

Claim 9: The semiconductor construction of claim 6 wherein the conductive plug comprises two or more conductive materials.

Claim 10: The semiconductor construction of claim 6 wherein the conductive plug comprises one or both of tungsten and titanium.

Claim 11: The semiconductor construction of claim 6 wherein the conductive plug comprises one or more of metal nitride, metal silicide and metal carbide.

Claim 12: The semiconductor construction of claim 6 wherein the conductive plug comprises conductively-doped semiconductor material.

Claim 13: A method of forming a conductive contact, comprising:

forming an opening through an insulative material to a conductive structure;

forming a conductive plug within a bottom region of the opening and directly against the conductive structure;

forming a spacer to line a lateral periphery of an upper region of the opening; the spacer being over and directly against an outer portion of an upper surface of the conductive plug and leaving an inner portion of the upper surface exposed;

forming a conductive material within the lined upper region of the opening and directly against the inner portion of the upper surface of the conductive plug;

forming a conductive line which extends across the insulative material and which is electrically coupled with the conductive structure through the conductive material within the opening; and

wherein the conductive plug comprises titanium nitride directly against copper of the conductive structure, and comprises tungsten directly against the titanium nitride.

Claim 14: The method of claim 13 wherein the conductive material comprises metal.

Claim 15: The method of claim 13 wherein the conductive line is a bitline or a wordline, and is incorporated into a memory array.

Claim 16: The method of claim 15 wherein the memory array is an RRAM array.