

WHAT IS CLAIMED IS:

1. An integrated circuit device, comprising:
 - a pair of line structures including
 - a pair of conductive lines extending over a substrate in a first horizontal direction, and
 - a pair of insulating capping patterns respectively covering the pair of conductive lines;
 - a conductive plug between the pair of line structures, the conductive plug having a first width between the pair of conductive lines and a second width between the pair of insulating capping patterns, the first width and the second width in a second horizontal direction perpendicular to the first horizontal direction, the second width greater than the first width; and
 - a metal silicide film contacting a top surface of the conductive plug between the pair of insulating capping patterns;wherein the conductive plug includes
 - a lower conductive plug between the pair of conductive lines, the lower conductive plug having a top surface isolated from direct contact with the metal silicide film, and
 - an enlarged conductive plug between the pair of insulating capping patterns, the enlarged conductive plug having
 - a bottom surface contacting the top surface of the lower conductive plug, and
 - a top surface contacting the metal silicide film.
2. The integrated circuit device according to claim 1, wherein the conductive plug has a third width between the pair of conductive lines and a fourth width between the pair of insulating capping patterns, the third width and the fourth width in the first horizontal direction, the fourth width smaller than the third width.
3. The integrated circuit device according to claim 1 or claim 2, wherein, among sidewalls of the conductive plug, each of a first sidewall and a second sidewall, which are both sidewalls opposite to each other in the first horizontal direction, extends flat without a step, from a region between the pair of conductive lines to a region between the pair of insulating capping patterns.
4. The integrated circuit device according to claim 1 or claim 2, wherein

the top surface of the conductive plug contacts the metal silicide film, and
the conductive plug integrally extends from a space between the pair of conductive lines
to a space between the pair of insulating capping patterns.

5. The integrated circuit device according to any one of claims 1 to 4, further comprising:
a lower insulating spacer between each conductive line and the conductive plug; and
an upper insulating spacer between each insulating capping pattern and the conductive
plug,

wherein a width of the upper insulating spacer in the second horizontal direction is
smaller than a width of the lower insulating spacer in the second horizontal direction.

6. The integrated circuit device according to claim 5, wherein
the lower insulating spacer has a line shape extending side by side with the pair of
conductive lines in the first horizontal direction, and
the upper insulating spacer has a ring shape surrounding the conductive plug.

7. The integrated circuit device according to claim 5, wherein each of the lower insulating
spacer and the upper insulating spacer has a line shape extending side by side with the pair of
conductive lines in the first horizontal direction.

8. The integrated circuit device according to any one of claims 5 to 7, wherein
the lower insulating spacer includes a lower air spacer,
the upper insulating spacer includes an upper air spacer communicating with the lower
air spacer, and

a width of the upper air spacer in the second horizontal direction is smaller than a width
of the lower air spacer in the second horizontal direction.

9. The integrated circuit device according to any one of claims 1 to 8, further comprising:
a pair of insulating fences between the pair of conductive lines, the pair of insulating
fences respectively contacting a first sidewall and a second sidewall opposite to each other in
the first horizontal direction among sidewalls of the conductive plug.

10. An integrated circuit device comprising:
a pair of line structures including
a pair of conductive lines extending over a substrate in a first horizontal direction, and
a pair of insulating capping patterns respectively covering the pair of conductive lines;
a plurality of contact structures arranged in a line between the pair of line structures;
and
a plurality of insulating fences arranged sequentially between adjacent contact structures of the plurality of contact structures between the pair of line structures,
wherein each contact structure of the plurality of contact structures includes
a conductive plug having a first width between the pair of conductive lines in a second horizontal direction and a second width between the pair of insulating capping patterns in the second horizontal direction, the second horizontal direction perpendicular to the first horizontal direction, the second width greater than the first width; and
a metal silicide film contacting a top surface of the conductive plug;
wherein the conductive plug includes
a lower conductive plug isolated from direct contact with the metal silicide film; and
an enlarged conductive plug contacting the metal silicide film and having a width greater than a width of the lower conductive plug in the second horizontal direction.
11. The integrated circuit device according to claim 10, wherein a width of a top surface of the enlarged conductive plug in the second horizontal direction is greater than a width of a top surface of the lower conductive plug in the second horizontal direction.
12. The integrated circuit device according to any one of claims 10 to 11, wherein
the conductive plug includes two sidewalls contacting two adjacent insulating fences among the plurality of insulating fences, and
each sidewall of the two sidewalls extends flat from a region between the pair of conductive lines to a region between the pair of insulating capping patterns.

13. The integrated circuit device according to any one of claims 10 to 12, wherein the conductive plug integrally extends from a space between the pair of conductive lines to a space between the pair of insulating capping patterns.
14. The integrated circuit device according to any one of claims 10 to 13, further comprising:
- a lower insulating spacer between each conductive line and each of the plurality of contact structures, the lower insulating spacer having a line shape extending side by side with each conductive line; and
 - a plurality of upper insulating spacers, each upper insulating spacer of the plurality of upper insulating spacers having a ring shape configured to surround the conductive plug of each contact structure of the plurality of contact structures and having a width smaller than a width of the lower insulating spacer in the second horizontal direction.
15. The integrated circuit device according to any one of claims 10 to 13, further comprising:
- a lower insulating spacer between each conductive line and each contact structure of the plurality of contact structures, the lower insulating spacer having a line shape extending side by side with each conductive line; and
 - an upper insulating spacer between each insulating capping pattern and each contact structure of the plurality of contact structures, the upper insulating spacer having a line shape configured to extend side by side with each conductive line and having a width smaller than a width of the lower insulating spacer in the second horizontal direction.
16. The integrated circuit device according to claim 15, wherein
- the lower insulating spacer includes an insulating liner, an air spacer, a second insulating spacer, and a third insulating spacer,
 - the insulating liner, the air spacer, the second insulating spacer, and the third insulating spacer sequentially located in a space between a sidewall of each conductive line and the conductive plug along the second horizontal direction,
 - the third insulating spacer includes a bottom portion horizontally extending to contact the insulating liner in a vicinity of a bottom surface of each conductive line, and

an end of the air spacer in a vicinity of the bottom surface of each conductive line is surrounded by the insulating liner, the second insulating spacer, and the bottom portion of the third insulating spacer.

17. The integrated circuit device according to claim 15, wherein
the lower insulating spacer includes a lower air spacer having a line shape extending side by side with each conductive line,
the upper insulating spacer includes an upper air spacer having a ring shape configured to surround the conductive plug and communicating with the lower air spacer, and
a width of the upper air spacer in the second horizontal direction is smaller than a width of the lower air spacer in the second horizontal direction.

18. The integrated circuit device according to claim 15, wherein
the lower insulating spacer includes a lower air spacer having a line shape extending side by side with each conductive line,
the upper insulating spacer includes an upper air spacer having a line shape configured to extend side by side with each conductive line and communicating with the lower air spacer, and
a width of the upper air spacer in the second horizontal direction is smaller than a width of the lower air spacer in the second horizontal direction.