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METAL SANDWICH STRUCTURE FOR MIM CAPACITOR ONTO DUAL DAMASCENE

ABSTRACT

A new method is provided for the creation of a MIM capacitor. The invention starts with a semiconductor surface. A first copper damascene process is applied for the creation of a first and a second damascene copper interconnect plug through a first layer of dielectric deposited over the surface of the substrate. A first layer of tantalum is deposited (for the bottom plate of a capacitor) over which is deposited a first layer of silicon nitride (for capacitor dielectric) over which is deposited a second layer of tantalum (for the top plate of a capacitor). A one time etch of the three deposited layers forms a MIM capacitor. A second layer of silicon nitride is deposited followed by the deposition of a second layer of dielectric. Third and fourth dual damascene openings are created through the second layer of dielectric and the second layer of silicon nitride. The third dual damascene opening aligns with MIM capacitor. The fourth dual damascene opening aligns with the second dual damascene plug. The dual damascene openings created through the second layer of dielectric are filled with copper, creating an access plug contacting the top plate of the capacitor and an access plug contacting the second dual damascene access plug.

FIGURE 5

