

Abstract

A DAMASCENE STRUCTURE WITH REDUCED CAPACITANCE USING A CARBON NITRIDE, BORON NITRIDE, OR BORON CARBON NITRIDE PASSIVATION LAYER, ETCH STOP LAYER, AND/OR CAP LAYER

A method and structure for forming a damascene structure with reduced capacitance by forming one or more of: the passivation layer, the etch stop layer, and the cap layer using a low dielectric constant material comprising carbon nitride, boron nitride, or boron carbon nitride. The method begins by providing a semiconductor structure having a first conductive layer thereover. A passivation layer is formed on the first conductive layer. A first dielectric layer is formed over the passivation layer, and an etch stop layer is formed over the first dielectric layer. A second dielectric layer is formed over the etch stop layer, and an optional cap layer can be formed over the second dielectric layer. The cap layer, the second dielectric layer, the etch stop layer, and the first dielectric layer are patterned to form a via opening stopping on said passivation layer and a trench opening stopping on the first conductive layer. A carbon nitride passivation layer, etch stop layer, or cap layer can be formed by magnetron sputtering from a graphite target in a nitrogen atmosphere. A boron nitride passivation layer, etch stop layer, or cap layer can be formed by PECVD using B_2H_6 , ammonia, and nitrogen. A boron carbon nitride passivation layer, etch stop layer, or cap layer can be formed by magnetron sputtering from a graphite target in a nitrogen and B_2H_6 atmosphere.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)