ABSTRACT

A METHOD FOR MAKING A METAL-INSULATOR-METAL (MIM) CAPACITOR AND METAL RESISTOR FOR A COPPERBACK-END-OF-LINE (BEOL) TECHNOLOGY

A method for making concurrently metal-insulator-metal (MIM) capacitors and a metal resistors in a Cu damascene back-end-of-line process is achieved. The method forms a Cu capacitor bottom metal plate using a dual-damascene process. A Si_3N_4 or SiC is deposited to form a capacitor dielectric layer on the Cu bottom plate. A metal layer having an upper etch-stop layer is deposited and patterned to form concurrently capacitor top plates and metal resistors. The patterning is terminated in the capacitor dielectric layer to prevent Cu particle contamination. An insulating layer is deposited and via holes are etched to the capacitor top plates and the metal resistors using the upper etch-stop layer to prevent overetching and damage. The method provides a MIM capacitor using only one additional photoresist mask while improving process yield.

Figure 7