ABSTRACT

A REVERSED DAMASCENE PROCESS FOR MULTIPLE LEVEL METAL INTERCONNECTS

A new method of forming metal interconnect levels containing damascene interconnects and via plugs in the manufacture of an integrated circuit device has been achieved. The method creates a reversed dual damascene structure. A first dielectric layer is provided overlying a semiconductor substrate. The dielectric layer is patterned to form trenches for planned damascene interconnects. Insulating spacers may optionally be formed on the trench sidewalls. A conductive barrier layer is deposited overlying the dielectric layer and lining the trenches. A metal layer, preferably comprising copper, is deposited overlying the conductive barrier layer and filling the trenches. The metal layer and the conductive barrier layer are polished down to thereby form the damascene interconnects. A passivation layer may optionally be deposited. The damascene interconnects are patterned to form via plugs overlying the damascene interconnects. The patterning comprises partially etching down the damascene interconnects using a via mask overlying and protecting portions of the damascene interconnects. A trench mask also overlies and protects the first dielectric layer from metal contamination during the etching down.

Figure 2