ABSTRACT

A METHOD TO FORM SELF-SEALING AIR GAPS BETWEEN METAL INTERCONNECTS

A new method of forming metal interconnects with air gaps between adjacent interconnects in the manufacture of an integrated circuit device is achieved. A semiconductor substrate is provided. The metal interconnects are formed overlying the semiconductor substrate. A silicon nitride liner layer is deposited. A gap filling oxide layer is deposited to fill gaps between adjacent metal interconnects. The gap filling oxide layer is polished down to the silicon nitride liner layer. A silicon nitride thin layer is deposited. The silicon nitride thin layer is patterned using an oversized, reverse mask of the metal interconnects. The patterning of the silicon nitride thin layer creates openings to thereby expose a portion of the gap filling oxide. The gap filling oxide layer is etched away. A self-sealing oxide layer is deposited overlying the silicon nitride thin layer and the silicon nitride liner layer. The self-sealing oxide layer seals over the gaps between the silicon nitride thin layer and the silicon nitride liner layer to thereby form permanent air gaps between the adjacent metal interconnects, and the integrated circuit is completed.

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