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ABSTRACT

METHOD OF FABRICATING SHORT CHANNEL MOS TRANSISTORS WITH SOURCE/DRAIN EXTENSIONS

A novel method for forming short channel MOS transistors is described. A hard mask stack is formed over a substrate. A first opening is formed through a top portion of the hard mask stack. Oxide spacers are formed on sidewalls of the first opening thereby forming a second opening smaller than the first opening. The second opening is filled with a polysilicon layer. Thereafter, the oxide spacers are removed. First ions are implanted into the substrate underlying the removed oxide spacers to form source/drain extensions. Then, the polysilicon layer is removed wherein the first opening remains and wherein the substrate is exposed in a channel region. A gate dielectric layer is formed over the channel region. The first opening is filled with a gate electrode material that is polished back to form a gate electrode. The hard mask stack is removed using the gate electrode as a mask. Second ions are implanted to form source/drain regions within the substrate adjacent to the gate electrode to complete the formation of a short channel MOS transistor in the fabrication of an integrated circuit device.

FIGURE 14