

Ultra-Shallow Junction MOSFET having a High-k Gate Dielectric and In-Situ Doped Selective Epitaxy Source/Drain Extensions and a Method of Making Same

ABSTRACT OF THE DISCLOSURE

A MOSFET includes a gate having a high-k gate dielectric on a substrate and a gate electrode on the gate dielectric. The gate dielectric protrudes beyond the gate electrode. A deep source and drain having shallow extensions are formed on either side of the gate. The deep source and drain are formed by selective in-situ doped epitaxy or by ion implantation and the extensions are formed by selective, in-situ doped epitaxy. The extensions lie beneath the gate in contact with the gate dielectric. The material of the gate dielectric and the amount of its protrusion beyond the gate electrode are selected so that epitaxial procedures and related procedures do not cause bridging between the gate electrode and the source/drain extensions.

Methods of fabricating the MOSFET are described.
(FIG. 2)