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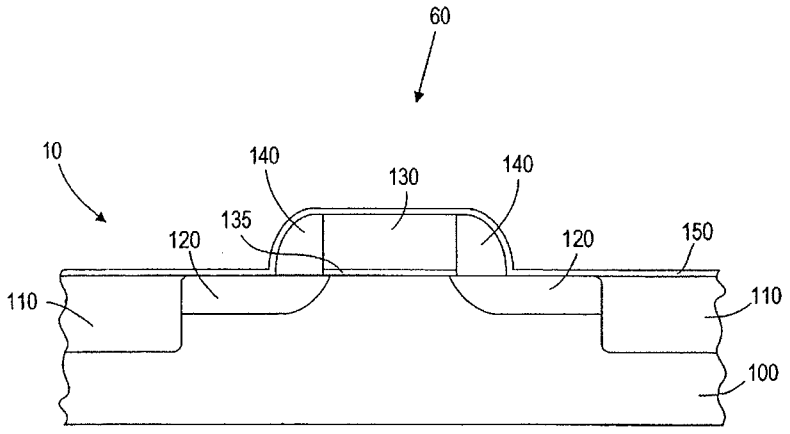
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(54) Title: METHOD USING SILICIDE CONTACTS FOR SEMICONDUCTOR PROCESSING



(57) Abstract: A method for forming silicide contacts includes forming a layer on silicon-containing active device regions such as source, drain, and gate regions. The layer contains a metal (such as nickel) that is capable of forming one or more metal silicides and a material (such as Ge, Ti, Re, Ta, N, V, Jr, Cr, Zr if the metal is nickel) that is soluble in a first metal silicide (such as NiSi) but not soluble in a second metal silicide (such as $NiSi_2$), or is more soluble in the first metal silicide than in the second metal silicide. The layer may be formed by vapor deposition methods such as physical vapor deposition, chemical vapor deposition, evaporation, laser ablation, or other deposition method. A method for forming silicide contacts includes forming a metal layer, then implanting the metal layer and/or underlying silicon layer with a material such as that described above. The material may be implanted in the silicon layer prior to formation of the metal layer. Contacts formed include a first metal silicide and a material that is more soluble in a first metal silicide than in a second metal silicide. The contacts may be part of a semiconductor device including a substrate, active region containing silicon, and silicide contacts disposed over the active region and capable of electrically coupling the active region to other regions such as metallization lines.

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