

ABSTRACT

FORMATION OF STRAINED Si CHANNEL AND $\text{Si}_{1-x}\text{Ge}_x$ SOURCE/DRAIN STRUCTURES USING LASER ANNEALING

A process for forming a strained channel region for a MOSFET device via formation of adjacent silicon - germanium source/drain regions, has been developed. The process features either blanket deposition of a silicon - germanium layer, or selective growth of a silicon - germanium layer on exposed portions of a source/drain extension region. A laser anneal procedure results in formation of a silicon - germanium source/drain region via consumption of a bottom portion of the silicon - germanium layer and a top portion of the underlying source/drain region. Optimization of the formation of the silicon - germanium source/drain region via laser annealing can be achieved via a pre-amorphization implantation (PAI) procedure applied to exposed portions of the source/drain region prior to deposition of the silicon - germanium layer. Un-reacted top portions of the silicon - germanium layer are selectively removed after the laser anneal procedure.

Figure 5