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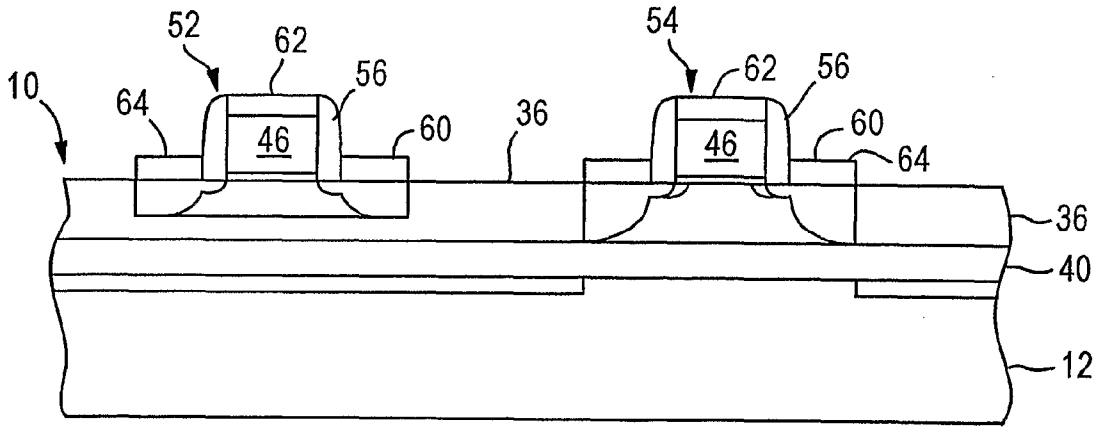
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(54) **Title:** SILICON-ON-INSULATOR SEMICONDUCTOR DEVICE WITH SILICON LAYER HAVING DEFFERENT CRYSTAL ORIENTATIONS AND METHOD OF FORMING THE SILICON-ON-INSULATOR SEMICONDUCTOR DEVICE



(57) **Abstract:** A semiconductor device comprising a substrate 12 having a first crystal orientation and an insulating layer 40 overlying the substrate 12 is provided. A plurality of silicon layers 16, 30 are formed overlying the insulating layer 40. A first silicon layer 16 comprises silicon having the first crystal orientation and a second silicon layer 30 comprises silicon having a second crystal orientation. In addition, a method of forming a semiconductor device providing a silicon-on-insulator structure comprising a substrate 12 with a silicon layer 16 overlying the substrate 12 and a first insulating layer 14 interposed therebetween is provided. An opening 22 is formed in a first region of the silicon-on-insulator structure by removing a portion of the silicon layer 16 and the first insulating layer 14 to expose a portion 24 of the substrate layer 12. Selective epitaxial silicon 30 is grown in the opening. A second insulating layer 40 is formed in the silicon 30 grown in the opening 22 to provide an insulating layer 40 between the grown silicon 30 in the opening 22 and the substrate 12.

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