Method of Forming $CoSi_x$

ABSTRACT OF THE DISCLOSURE

A method of forming $CoSi_x$ includes depositing a thin titanium layer over a silicon region, and then depositing a cobalt layer and a TiN layer over the cobalt layer. The thin titanium layer reacts with any native oxide residing on the silicon region surface to reduce the native oxide, forming a layer of $Ti_xSi_yO_z$ on the top surface of the silicon region. The semiconductor device is annealed, and the cobalt diffuses through the $Ti_xSi_yO_z$ layer to form a $CoSi_x$ layer on the top surface of the silicon region. The TiN layer, $Ti_xSi_yO_z$ layer, and unreacted cobalt are removed from over the $CoSi_x$ layer formed. The semiconductor device is then annealed again to convert the $CoSi_x$ layer to a low resistance phase material.

(FIG. 3)