ABSTRACT

METHOD TO FORM SELF-ALIGNED, L-SHAPED SIDEWALL SPACERS

A new method of forming silicon nitride sidewall spacers has been achieved. In addition, a new device profile for a silicon nitride sidewall spacer has been achieved. An isolation region is provided overlying a semiconductor substrate. Polysilicon traces are provided. A liner oxide layer is formed overlying the polysilicon traces and the insulator layer. A silicon nitride layer is formed overlying the liner oxide layer. A polysilicon or amorphous silicon layer is deposited overlying the silicon nitride layer. The polysilicon or amorphous silicon layer is completely oxidized to form a temporary silicon dioxide layer. The temporary silicon dioxide layer is rounded in the corners due to volume expansion during the oxidation step. The temporary silicon dioxide layer is anisotropically etched through to expose horizontal surfaces of the silicon nitride layer while leaving vertical sidewalls of the temporary silicon dioxide layer. The silicon nitride layer is anisotropically etched to form silicon nitride sidewall spacers with an L-shaped profile. The integrated circuit device is completed.

Figure 4