ABSTRACT

SILICON SINGLE CRYSTAL WAFER FOR IGBT AND METHOD FOR MANUFACTURING SILICON SINGLE CRYSTAL WAFER FOR IGBT

In this silicon single crystal wafer for IGBT, COP defects and dislocation clusters are eliminated from the entire region in the radial direction of the crystal, the interstitial oxygen concentration is 8.5×10^{17} atoms/cm^3 or less, and variation in resistivity within the wafer surface is 5% or less. This method for manufacturing a silicon single crystal wafer for IGBT includes introducing a hydrogen atom-containing substance into an atmospheric gas at a hydrogen gas equivalent partial pressure of 40 to 400 Pa, and growing a single crystal having an interstitial oxygen concentration of 8.5×10^{17} atoms/cm^3 or less at a silicon single crystal pulling speed enabling pulling of a silicon single crystal free of grown-in defects. The pulled silicon single crystal is irradiated with neutrons so as to dope with phosphorous; or an n-type dopant is added to the silicon melt; or phosphorous is added to the silicon melt so that the phosphorous concentration in the silicon single crystal is 2.9×10^{13} to 2.9×10^{15} atoms/cm^3 and a p-type dopant having a segregation coefficient smaller than that of the phosphorous is added to the silicon melt so that the concentration in the silicon single crystals is 1×10^{13} to 1×10^{15} atoms/cm^3 corresponding to the segregation coefficient thereof.

Figure 1