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ABSTRACT

METHOD FOR MANUFACTURING SEMICONDUCTOR SINGLE CRYSTAL BY CZOCHRALSKI TECHNOLOGY, AND SINGLE CRYSTAL INGOT AND WAFER MANUFACTURED USING THE SAME

A method for manufacturing a semiconductor single crystal uses a Czochralski (CZ) process in which a seed crystal is dip into a melt of semiconductor raw material and dopant received in a crucible, and the seed crystal is slowly pulled upward while rotated to grow a semiconductor single crystal. Here, a cusp-type asymmetric magnetic field having different upper and lower magnetic field intensities based on ZGP (Zero Gauss Plane) where a vertical component of the magnetic field is 0 is applied to the crucible such that a specific resistance profile, theoretically calculated in a length direction of crystal, is expanded in a length direction of crystal. Thus, thickness of a diffusion boundary layer near a solid-liquid interface is increased to increase an effective segregation coefficient of dopant, thereby expanding a specific resistance profile in a length direction of crystal, increasing a prime length of the single crystal, and improving productivity.

FIG. 1