

ABSTRACT

The present application belongs to the field of semiconductor technology, and particularly discloses a semiconductor device manufacturing method, including: forming
5 a first stacked structure and a second stacked structure spaced apart from each other on a substrate, each of the first stacked structure and the second stacked structure including first semiconductor layers and second semiconductor layers which are alternately stacked; filling a dielectric wall and sacrificial layers between the first stacked structure and the second stacked structure, the sacrificial layers being located on both sides of the
10 dielectric wall to respectively separate the dielectric wall from the first stacked structure and separate the dielectric wall from the second stacked structure, and the sacrificial layers having a high etch selectivity relative to the first semiconductor layers or the second semiconductor layers; removing one of the first semiconductor layers and the second semiconductor layers and the sacrificial layers; and forming a gate structure
15 around the other of the first semiconductor layers and the second semiconductor layers. With the semiconductor device manufacturing method according to the present application, by forming the dielectric wall and the sacrificial layers in an isolation trench, and removing the sacrificial layers by a subsequent etching process, the gate structure surrounding entire channel regions can be formed, which can reduce Drain
20 Induced Barrier Lowering (DIBL) and achieve better control on a leakage current of a semiconductor device.

FIG.8