ABSTRACT

A semiconductor device may include a substrate including an active pattern, a channel pattern on the active pattern, a source/drain pattern, a gate electrode, and an insulation pattern. The channel pattern may include semiconductor patterns that are spaced apart from each other and vertically stacked. A lowermost one of the semiconductor patterns may be a first semiconductor pattern. The source/drain pattern may be connected to the semiconductor patterns. The gate electrode may be on the semiconductor patterns and may include a plurality of inner electrodes below the semiconductor patterns except the first semiconductor pattern. The insulation pattern may be between the first semiconductor pattern and the active pattern. The insulation pattern may include a dielectric pattern and a protection layer. The protection layer may be between the dielectric pattern and the first semiconductor pattern. The protection layer may be between the dielectric pattern and the active pattern.

FIG. 6