

ABSTRACT

A semiconductor device includes a substrate having first and second regions; a first stack structure including lower gate electrodes stacked in a first direction in the first region; a first channel structure penetrating through the first stack structure; a second stack structure on the first stack structure and the first channel structure and including upper gate electrodes stacked in the first direction; a second channel structure penetrating through the second stack structure; a first mold structure including lower horizontal sacrificial layers stacked in the second region; an alignment structure penetrating through the first mold structure; and a second mold structure on the first mold structure and the alignment structure and including upper horizontal sacrificial layers stacked, wherein the number of the lower horizontal sacrificial layers is less than the number of the lower gate electrodes.

FIG. 2