

ABSTRACT

A three-dimensional semiconductor device includes a first gate group on a lower structure and a second gate group on the first gate group. The first gate group includes first pad regions that are: (1) lowered in a first direction that is parallel to an upper surface of the lower structure and (2) raised in a second direction that is parallel to an upper surface of the lower structure and perpendicular to the first direction. The second gate group includes second pad regions that are sequentially raised in the first direction and raised in the second direction.

FIG. 6A