

ABSTRACT

The semiconductor device includes a first channel structure; a first air layer surrounding a side surface of the first channel structure; a first bitline contacting the side surface of the first channel structure; a first wordline contacting a lower portion of the first channel structure; a storage node having one end contacting an upper portion of the first channel structure; a second channel structure contacting an upper portion of the storage node; a second air layer surrounding a side surface of the second channel structure; a second bitline contacting the side surface of the second channel structure; and a second wordline contacting an upper portion of the second channel structure. The first bitline extends in a direction perpendicular to a direction in which the first channel structure extends. The second wordline extends in a direction perpendicular to a direction in which the second channel structure extends.

FIG. 1