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(54) SEMICONDUCTOR DEVICES

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(57)ABSTRACT

A semiconductor device includes a substrate including a plurality of active patterns and a bit line intersecting at least one of the plurality of active patterns on the substrate and extending in a first direction. The bit line includes a first conductive pattern extending in the first direction, a bit line capping pattern extending in the first direction on the first conductive pattern, and a graphene pattern extending in the first direction between the first conductive pattern and the bit line capping pattern. The first conductive pattern may include ruthenium (Ru). The semiconductor device may also include one or more bit line contacts arranged in the first direction under the bit line, the one or more bit line contacts electrically connected to a respective one of the plurality of active patterns.

