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(54) THREE-DIMENSIONAL SEMICONDUCTOR MEMORY DEVICES

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(57)ABSTRACT

Three-dimensional (3D) semiconductor memory devices are provided. A 3D semiconductor memory device includes an electrode structure on a substrate. The electrode structure includes gate electrodes stacked on the substrate. The gate electrodes include electrode pad regions. The 3D semiconductor memory device includes a dummy vertical structure penetrating one of the electrode pad regions. The dummy vertical structure includes a dummy vertical semiconductor pattern and a contact pattern extending from a portion of the dummy vertical semiconductor pattern toward the substrate.

