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(54) **SEMICONDUCTOR DEVICE, INTEGRATED
CIRCUIT AND METHODS OF
MANUFACTURING THE SAME**

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ABSTRACT

A semiconductor device includes a gate layer, a channel material layer, a first dielectric layer and source/drain terminals. The gate layer is disposed over a substrate. The channel material layer is disposed over the gate layer, where a material of the channel material layer includes a first low dimensional material. The first dielectric layer is between the gate layer and the channel material layer. The source/drain terminals are in contact with the channel material layer, where the channel material layer is at least partially disposed between the source/drain terminals and over the gate layer, and the gate layer is disposed between the substrate and the source/drain terminals.

