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(54) **STACKABLE SEMICONDUCTOR DEVICE  
WITH 2D MATERIAL LAYER AND  
METHODS OF MANUFACTURING  
THEREOF**

(52) **U.S. Cl.**

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**ABSTRACT**

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Example implementations can include a device with a core including a first dielectric material, the core having a mesa structure, a first layer disposed over opposite faces of the mesa structure of the core, the first layer including a metal material, and a second layer disposed over the mesa structure of the core and the first layer, the second layer including a two-dimensional material. Example implementations can include a method of manufacturing a stackable semiconductor device with a two-dimensional material layer, by depositing, over a substrate, a base layer including a first dielectric material, forming, on the base layer, at least one core having a mesa structure, forming sidewalls on opposite vertical surfaces of the mesa structure of the core, depositing, over the core and the sidewalls, a semiconductor layer including a two-dimensional material, and encapsulating the core, the sidewalls, and the semiconductor layer.

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