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(54) **SILICON-ON-INSULATOR (SOI) SEMICONDUCTOR STRUCTURE WITH ADDITIONAL TRENCH INCLUDING A CONDUCTIVE LAYER**

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(51) **Int. Cl.**⁷ **H01L 27/01**

(57) **ABSTRACT**

(52) **U.S. Cl.** **257/347; 257/349; 257/532**

A semiconductor device comprising a silicon-on-insulator (SOI) substrate including a base substrate, an insulator layer, and a silicon layer, and a trench capacitor including at least one trench formed in the silicon-on-insulator substrate and extending through the base substrate, the insulator layer and the silicon layer, wherein the at least one trench includes at least one layer of silicon dioxide formed therein. In a preferred embodiment, semiconductor material disposed in the at least one trench forms a first electrode of a semiconductor capacitor, and semiconductor material of the SOI substrate which lies adjacent to the at least one trench forms a second electrode of the capacitor.

(58) **Field of Search** 257/311, 301, 257/304, 305, 347, 349, 350, 532; 438/311, 386, 243, 245, 248, 388, 391

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17 Claims, 11 Drawing Sheets

