Capacitor with Improved Capacitance Density and Method of Manufacture

ABSTRACT OF THE DISCLOSURE

A decoupling capacitor is formed on a semiconductor substrate that includes a silicon surface layer. A substantially flat bottom electrode is formed in a portion of the semiconductor surface layer. A capacitor dielectric overlies the bottom electrode. The capacitor dielectric is formed from a high permittivity dielectric with a relative permittivity, preferably greater than about 5. The capacitor also includes a substantially flat top electrode that overlies the capacitor dielectric. In the preferred application, the top electrode is connected to a first reference voltage line and the bottom electrode is connected to a second reference voltage line.

(FIG. 2)