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(54) **AREA EFFICIENT LV NMOS TWL CHARGE PUMP**

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ABSTRACT

The application generally discloses systems and methods of generating a voltage waveform having an amplitude three times an input voltage amplitude using a plurality of low voltage (LV) triple well (TWL) N-type field effect devices. The method includes: receiving a first input voltage at a first input of a double switch charge transfer switch (CTS) circuit; applying a 2× kick voltage to a first capacitor coupled to a first portion of the double switch CTS circuit, the first capacitor configured to discharge a kick voltage to a source of a first LV TWL N-type field effect device; and applying a 1× kick voltage to a second capacitor coupled a second portion of the double switch CTS circuit, the second capacitor configured to discharge a kick voltage to a source of a second LV TWL N-type field effect device.

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