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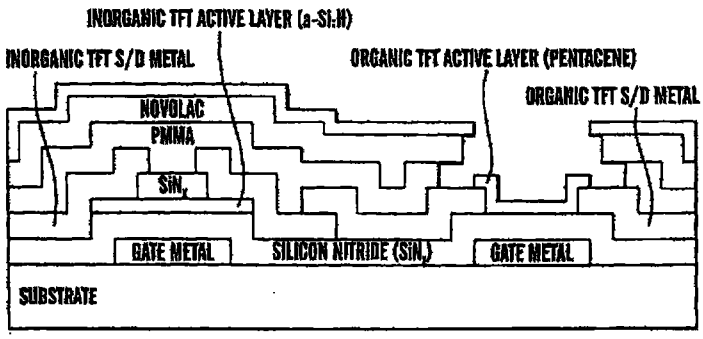
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(54) Title: INTEGRATED INORGANIC/ORGANIC COMPLEMENTARY THIN–FILM TRANSISTOR CIRCUIT



(57) Abstract

An integrated organic/inorganic complementary thin–film transistor circuit comprises a first and a second transistor which are operatively connected on a common substrate, wherein the first transistor is an inorganic thin–film transistor and the second an organic thin–film transistor. The inorganic thin–film transistor is an n–channel transistor and the organic thin–film transistor is a p–channel transistor or vice versa. Each of the transistors has a separate gate electrode and the organic active semiconductor material is in the case of a p–channel semiconductor in the organic thin–film transistor electrically isolated from the inorganic thin–film transistor. In a first method for fabricating a transistor circuit of this kind separate gate electrodes are deposited for each transistor on a common substrate, the material for the source and the drain electrode of the organic thin–film transistor are deposited on the same layer level in the thin–film structure of the organic thin–film transistor and in each case the organic active semiconductor material in an organic p–channel transistor is provided electrically isolated from the inorganic n–channel transistor, and the organic active semiconductor material in an organic n–channel transistor optionally electrically isolated from the inorganic p–channel transistor. In a more specific method for fabricating a complementary transistor circuit the inorganic active semiconductor is deposited in the form of hydrogenated amorphous silicon and an n^+ doped layer of a silicon material is deposited as respectively source and drain areas in the organic transistor. A layer of pentacene is deposited over an isolated layer which is patterned such that the pentacene which forms the active semiconductor in the organic thin–film transistor is isolated electrically from the inorganic thin–film transistor.