Schematic and Topological Elements Optimization of Transfer Signals Circuits for Analytical Microsystems-on-Chip

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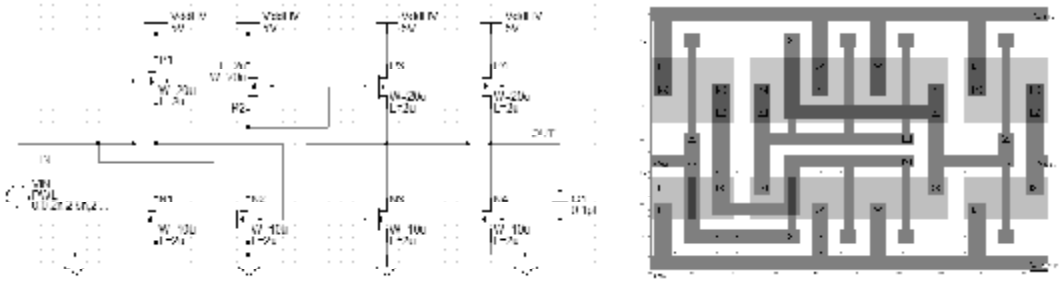
When designing the elements of integrated circuits (ICs) and specialized in integrated realizations analytical microsystems-on-chip based on silicon-on-insulator (SOI) MOS transistors is necessary to consider such parameters as speed, signals delay in information channels, power consumption and area on chip [1]. These parameters are particularly important in analytical microsystems-on-chip, which are, for example, systems for investigated non-silicon's elements monolithically integrated directly into the crystal of specialized chips.

The optimal base for such systems for constructively-technological realizations, possibilities of creating in the short term, and improved characteristics are specialized CMOS gate array with SOI-structures.

In this paper the results of schematic, layouts design and computers simulation of signals generators with using trigger elements in the information transferring channels for integrated circuits to select the optimal power and time characteristics circuit solutions are presented. Also, level shifters with two levels of signal voltage was designed and investigated. Such level shifter can be effective signals generator with good delay parameters and power consumption at the same voltage.

Trigger element with dual controls, which has much steeper amplitude-transmitting characteristics comparatively with series-connected inverters, is taken as a basis for such converters. For example, is represented electrical circuit (a) and designed CMOS SOI gate array layout (b) for this generator of signals is shown on Fig.1.



a) b)

Fig.1 Signals generator on trigger element: a) electrical circuit; b) layout.

The obtained results can be used in the design of integrated circuits and microsystems-on-chip.

1. Kogut I.T., Dovhij V.V. Research outputs cascades of CMOS gate array with silicon on insulator structure // Modern problems of Radio Engineering, telecommunications and Computer Science Proc. of the 10th Inter. Conf., TCSET"2010.