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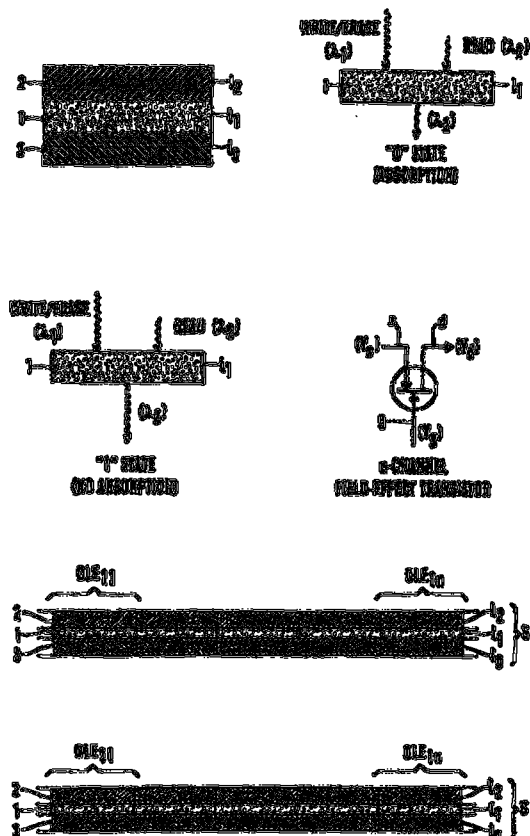
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(54) Title: OPTICAL LOGIC ELEMENT AND OPTICAL LOGIC DEVICE

(57) Abstract

An optical logic element (OLE), particularly a multistate, multistable optical logic element, and even more particularly a proximity-addressable optical logic element, comprises an optical memory substance (1), which can transfer from one physical or chemical state to a second physical or chemical state. The memory substance (1) is provided in or on a layer-like structure, and an activator (2) which generates a magnetic, electromagnetic or electrical field or supplies energy to the memory substance (1) and an optical detector for detection of the memory substance's optical response conditional on the memory substance's physical or chemical state, is provided in or adjacent to the layer-like structure, the optical logic element (OLE) thus forming an integrated component. An optical logic device (OLD) comprises at least one structure (S) composed of the optical logic elements, where the optical memory substance (1), the activator (2) and the detector (3) in each optical logic element (OLE) in the structure (S) merges into and is connected to the memory substance, the activator and the detector in the surrounding logic elements (OLEs) in the structure (S). Each logic element (OLE) in the structure (S) has an unambiguous assignment between the memory substance (1) and the activator (2) and an assignment between the memory substance (1) and the optical detector (3) for unambiguous detection and can be accessed and addressed individually. The structures (S) in the optical logic device (OLD) may be entirely or partly configured as optical memories, logic and arithmetic circuits and registers respectively or in a combination of these, as an optical data processor.



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