

3D Silicon Photonic Structures Based on Avalanche LED with Interconnections through Optical Interposer

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Abstract: Design and manufacturing technology of 3D silicon photonic structures with optical interconnections through microchannel vias interposers were developed. Silicon chips placed over each other were separated by the silicon microchannel vias interposer served as a light waveguide. Light emitting diodes and photodiodes were formed at the inner surfaces of silicon chips from nanostructured silicon clusters embedded into alumina matrix. The developed structure is characterized by the current conversion efficiency of 0.1% and can operate in the GHz frequency range.

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