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Performance optimization of a free space optical interconnect system with a metal-semiconductor-metal detector

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Abstract: In this paper we study the possibility and the potentiality of using metal semiconductor-metal photodetector (MSM-PD) in three-dimensional parallel free space optical interconnect (FSOI) systems. The signal-to-noise ratio (SNR) and time response are used as performance measures to optimize the geometry of MSM-PD used in FSOI systems. Both SNR and time response are evaluated, analyzed, and their dependence on feature parameters of the MSM-PD, including finger size, spacing, and number of fingers, are considered. Based on the results obtained, we show that the use of MSM-PD in FSOI improves the interconnect speed at a given acceptable SNR.