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Optical Communication Photodiode with Increased Bandwidth

Track Code: 2016-JUNG-67268

Categories:
- Electrical Engineering
- Mechanical Engineering

Keywords:
- Electrical Engineering
- Mechanical Engineering
- Optical Communication
- Photodiodes

Optical interconnects are progressively penetrating into short reach data communications due to their high bandwidth, low crosstalk, and negligible channel loss characteristics. The speed of the photodiode is crucial in achieving high data rate optical receivers. For photodiodes used in optical communication links, its operation speed must be high to support high data rate.

Researchers at Purdue University have developed a distributed photodiode with finite impulse response (FIR) filtering enabled by a lumped transmission line. The electrical bandwidth due to the junction parasitic capacitance of the photodiode is increased as the parasitic capacitance is absorbed into the transmission line structure. This technology integrates segmented photodiodes into transmission lines that absorb the intrinsic capacitance, significantly improving the bandwidth of the photodiode and hence, the data rate. This technology can be applied to silicon photodiodes to enhance their bandwidth close to that of non-silicon photodiodes, allowing the use of low-cost, easy-to-integrate silicon photodiodes for high speed applications.

Advantages:
-Enhanced data rate
-Enhanced bandwidth
-Built-in equalization support

Potential Applications:
-Silicon photodiodes

People:
- Jung, Byunghoo (Project leader)
- Kim, Bongchan

Intellectual Property:

Application Date: October 16, 2017
Type: Utility Patent
Country of Filing: United States
Patent Number: 10,340,406
Issue Date: July 2, 2019

Application Date: October 14, 2016
Type: Provisional-Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

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