

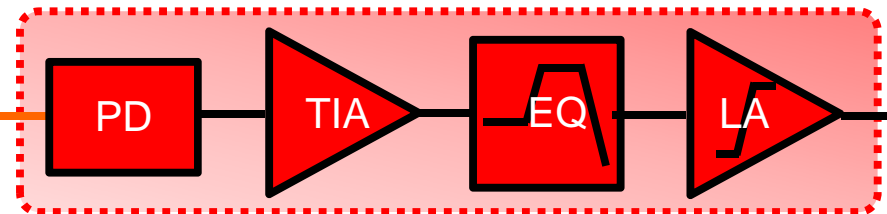
# CMOS/BiCMOS Optoelectronic Receiver

❖ Silicon-based optoelectronic Rx for optical interconnect applications

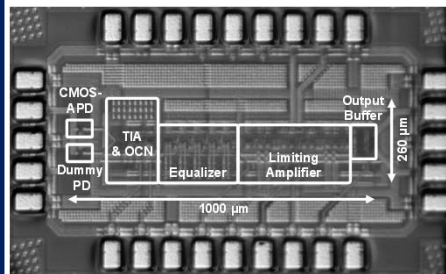
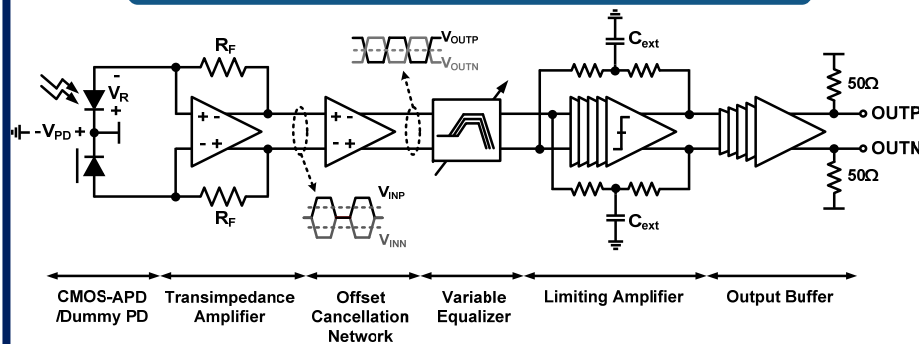
## Transmitter



## Receiver (This work)

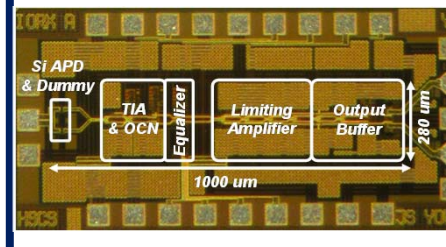
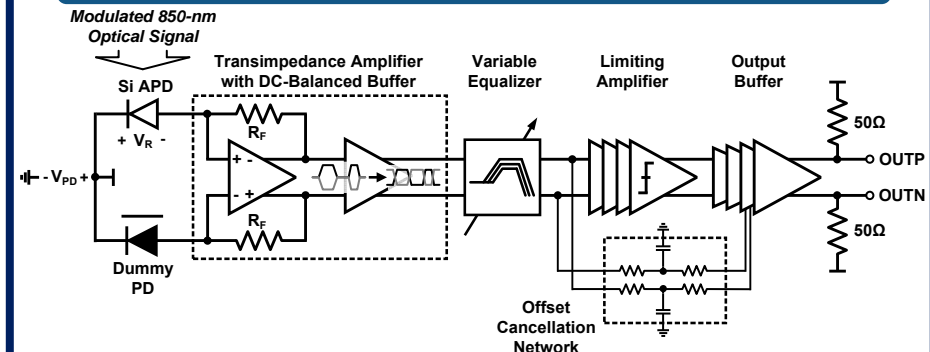


## CMOS Optoelectronic Receiver



Process	Standard CMOS 0.13- $\mu\text{m}$ technology
Data	Up to 10-Gb/s (2 <sup>7</sup> -1 PRBS)
Chip area	0.26 mm <sup>2</sup> (core)
Power consumption	66.8 mW (Circuit: 1.2 V, APD: 10.5 V)

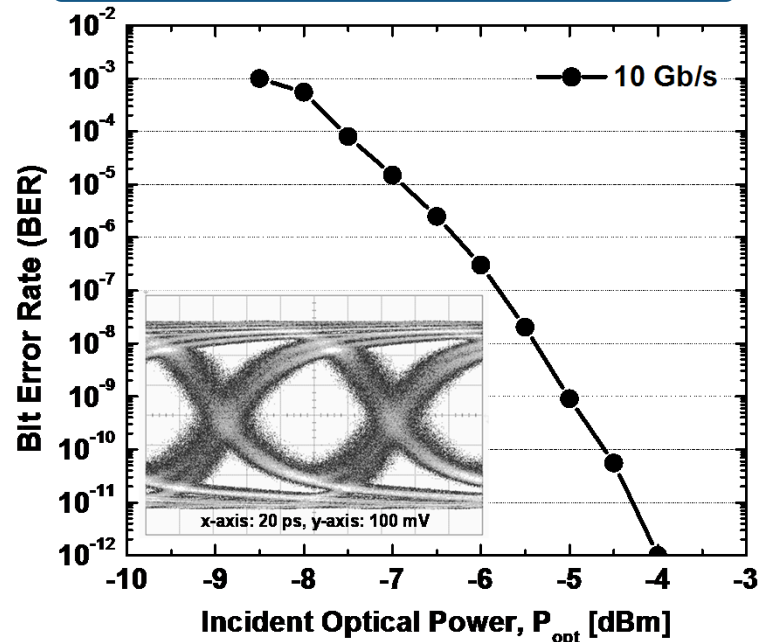
## SiGe BiCMOS Optoelectronic Receiver



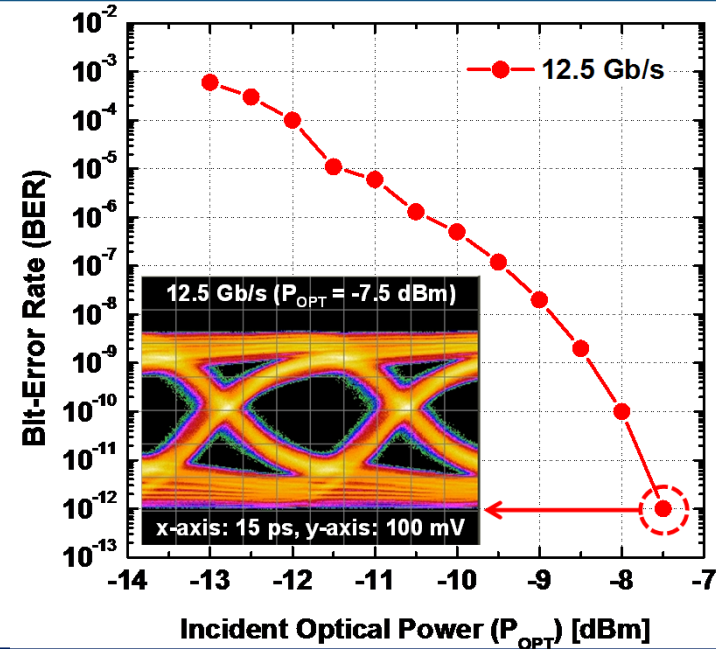
Process	Standard BiCMOS 0.25- $\mu\text{m}$ technology
Data	Up to 12.5-Gb/s (2 <sup>7</sup> -1 PRBS)
Chip area	0.28 mm <sup>2</sup> (core)
Power consumption	59 mW (Circuit: 2.5 V, APD: 14 V)

# CMOS/BiCMOS Optoelectronic Receiver

## CMOS Optoelectronic Receiver



## SiGe BiCMOS Optoelectronic Receiver



- **CMOS optoelectronic receiver**

- 10-Gb/s optical data transmission at sensitivity of -4 dBm with BER <  $10^{-12}$
- To be published in *Journal of Quantum Electronics (JQE)* in March 2012 (10-Gb/s 850-nm CMOS OEIC Receiver with a Silicon Avalanche Photodetector)

- **SiGe BiCMOS optoelectronic receiver**

- 12.5-Gb/s optical data transmission at sensitivity of -7.5 dBm with BER <  $10^{-12}$
- To be presented in *Optical Fiber Communication (OFC) Conference 2012* (A 12.5-Gb/s SiGe BiCMOS Optical Receiver with a Monolithically Integrated 850-nm Avalanche Photodetector)