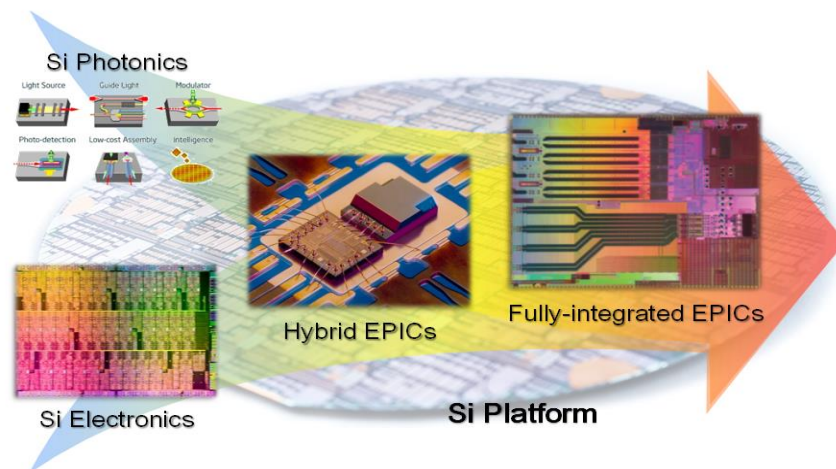
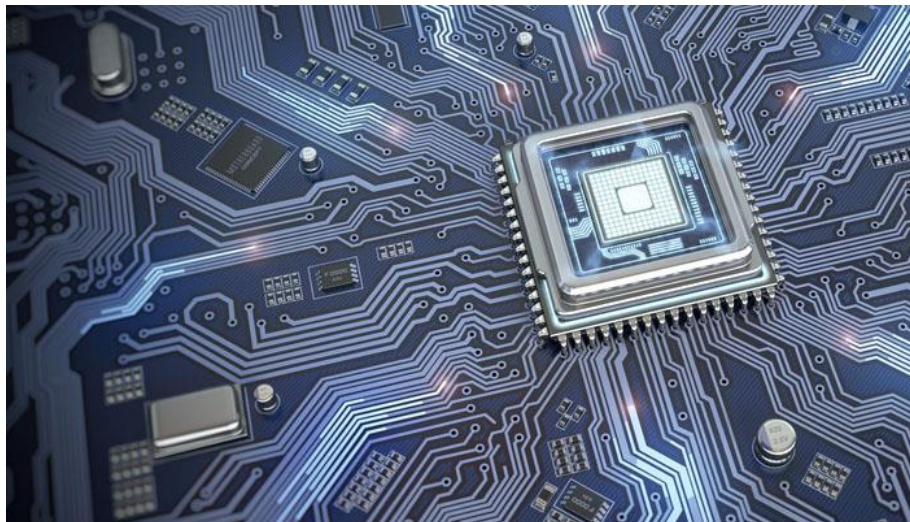
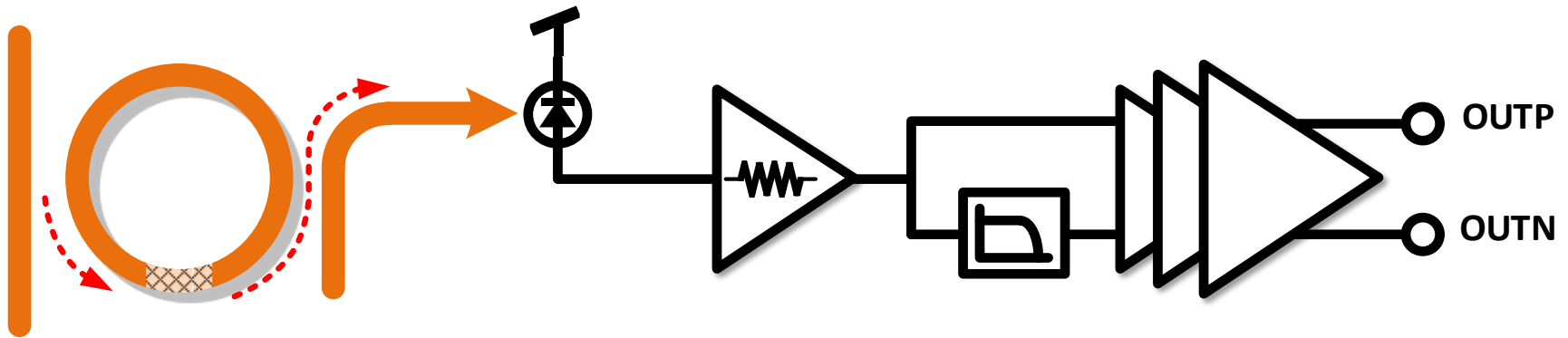


Demands of High-Performance Computing



- Using the existing platform of electronics industry
➔ ***Si Photonics technology***
- High enough integration to be used in HPC
➔ ***Fully Integrated EPIC (Electronic-Photonic IC)***
- Using well-known optical communication method
➔ ***WDM (Wavelength Division Multiplexing)***

Ring-resonator based WDM receiver



● Design considerations

- ✓ Filter insertion loss
- ✓ Filter bandwidth
- ✓ Filter FSR
- ✓ Filter channel isolation
- ✓ PD responsivity
- ✓ Receiver circuit bandwidth
- ✓ Receiver circuit noise

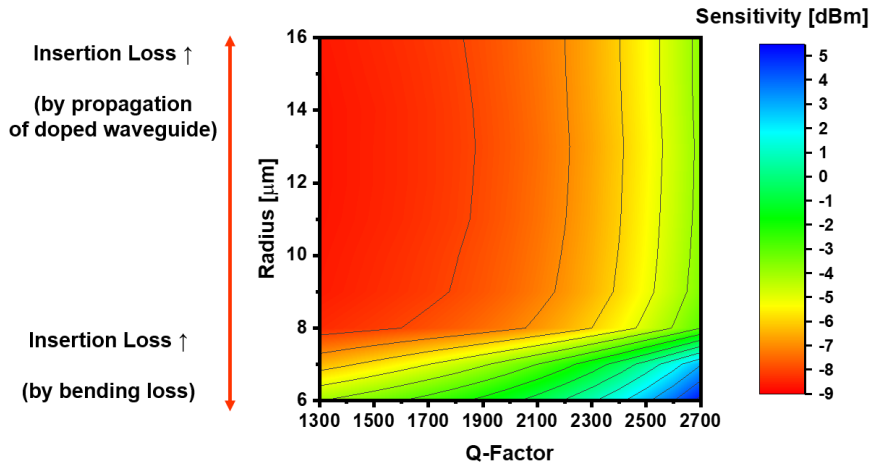


● Considering performances

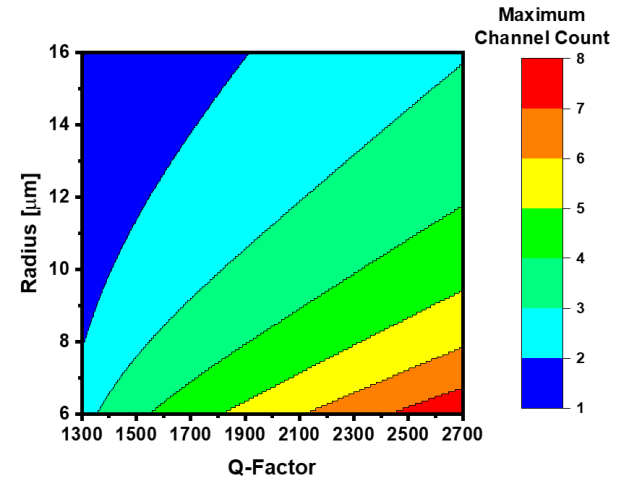
- ✓ Data rate
- ✓ Sensitivity
- ✓ Channel count

Performance optimization of WDM receiver

● Filter characteristics vs Rx sensitivity

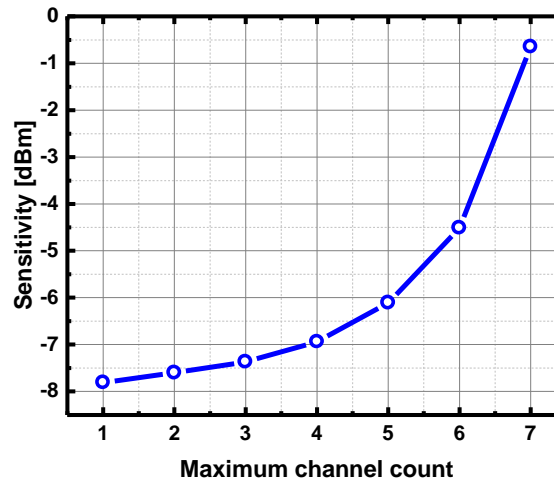


● Filter characteristics vs channel count



Insertion Loss, Circuit Noise \uparrow

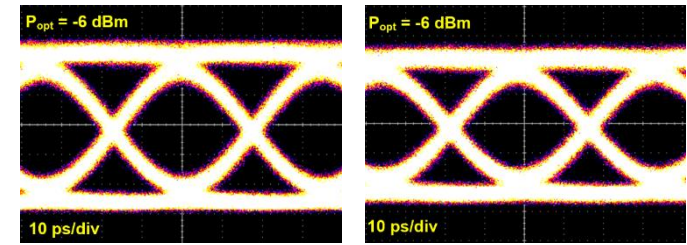
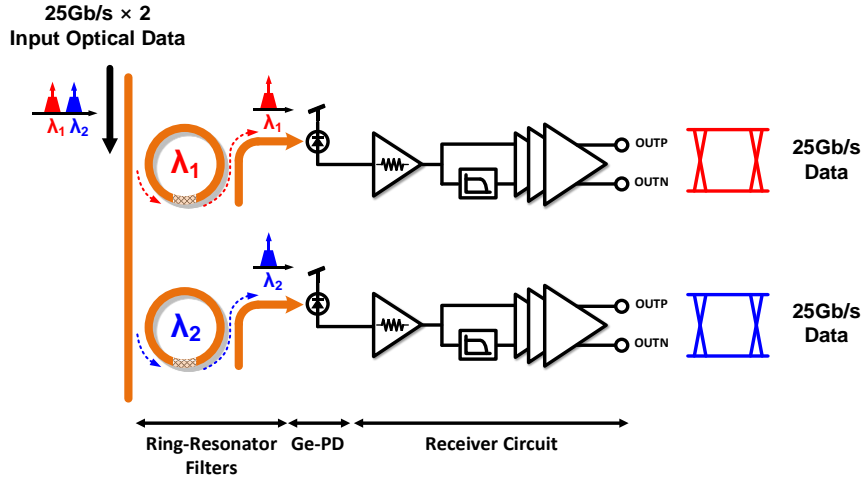
Minimum channel spacing \downarrow



➔ Relationship between sensitivity and maximum channel count

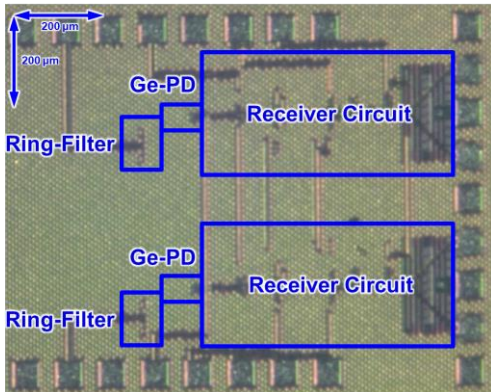
Performance optimization of WDM receiver

● 2 x 25 Gb/s WDM Receiver using Ring-Resonator Filters

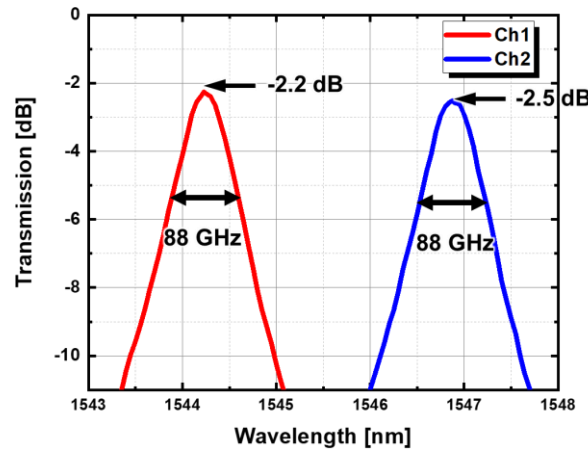


< Ch1 >

< Ch2 >

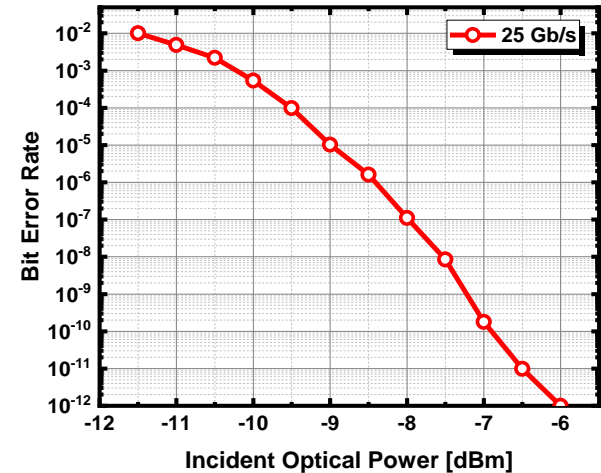


< Chip Microphotograph >



< WDM Filter Characteristics >

→ 140 pm/mW Tunability



< BER Measurement >