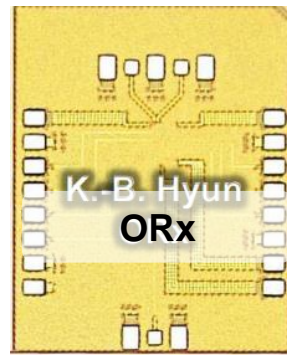
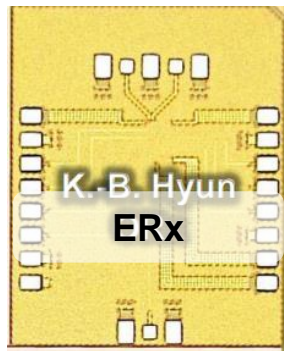
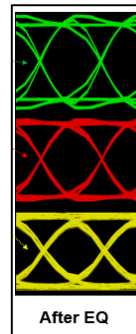
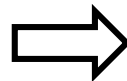
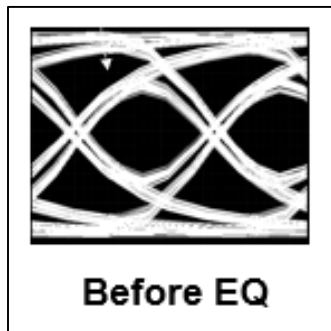
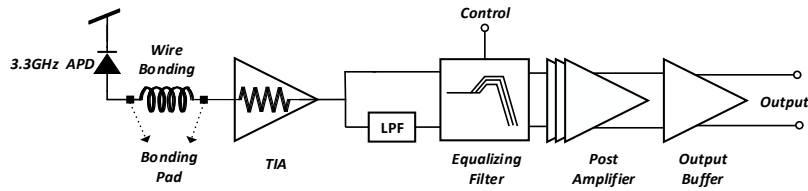
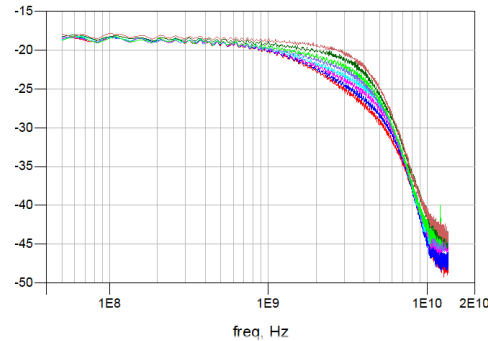


Optical Receiver with Low Speed APD

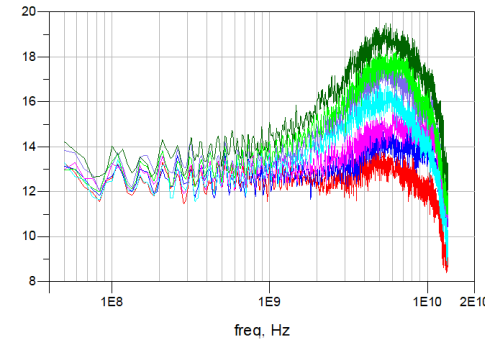
- 8Gb/s Optical Receiver Front-End using CTLE



<Measurement>

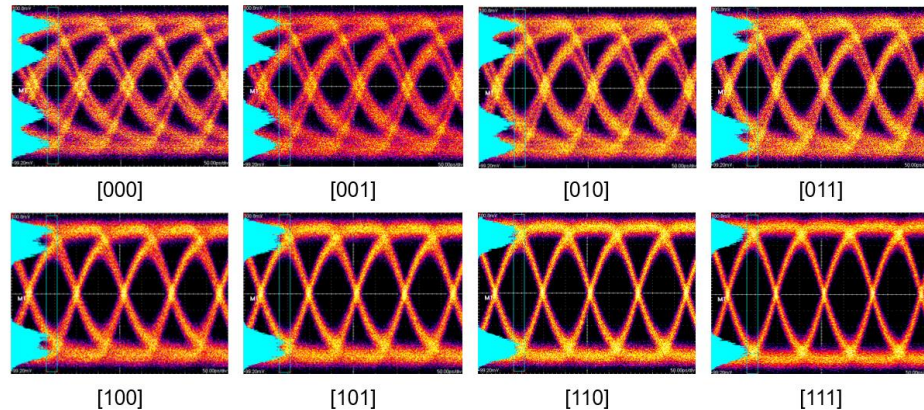


ERx S21



ORx S21

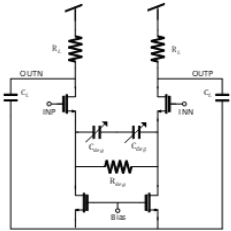
[8Gb/s, PRBS-31]



Performance Analysis of CTLE

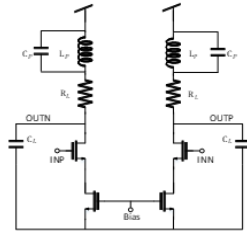
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• Source degeneration



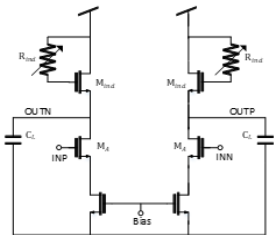
- ☺ Pros
 - Size efficiency
 - Real Pole
- ☹ Cons
 - DC gain degradation
 - Hard to boost to High freq
 - Thermal noise from R_{sdeg}

• Bridged Shunt peaking(passive inductor)



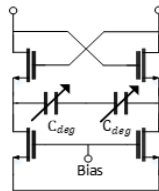
- ☺ Pros
 - Easy to boosting high frequency
- ☹ Cons
 - Large size
 - Complex Pole

• Shunt peaking(active inductor)



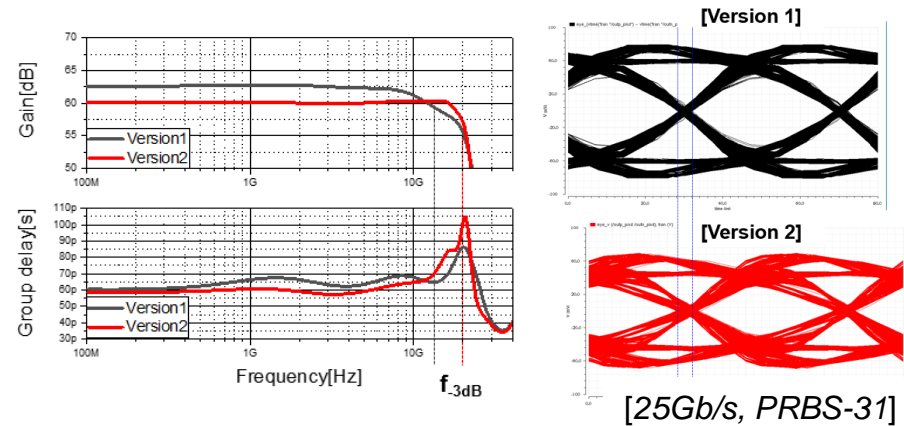
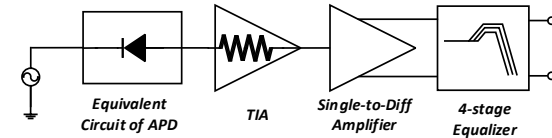
- ☺ Pros
 - Size efficiency
 - Easy to boosting high frequency
- ☹ Cons
 - Large headroom swing
 - DC gain degradation
 - Noise from MOS and R_{ind}

• Negative Capacitance(NC)



- ☺ Pros
 - Size efficiency
 - RF peaking
- ☹ Cons
 - DC gain degradation
 - Power consumption
 - Noise from MOS

<Effect of Group delay variation>



<EYE Diagram Opening Estimation>

