



# APD based 25/100G PON module solution (IEEE 802.3ca meeting)

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# APD ROSA on 25G PON module test setup

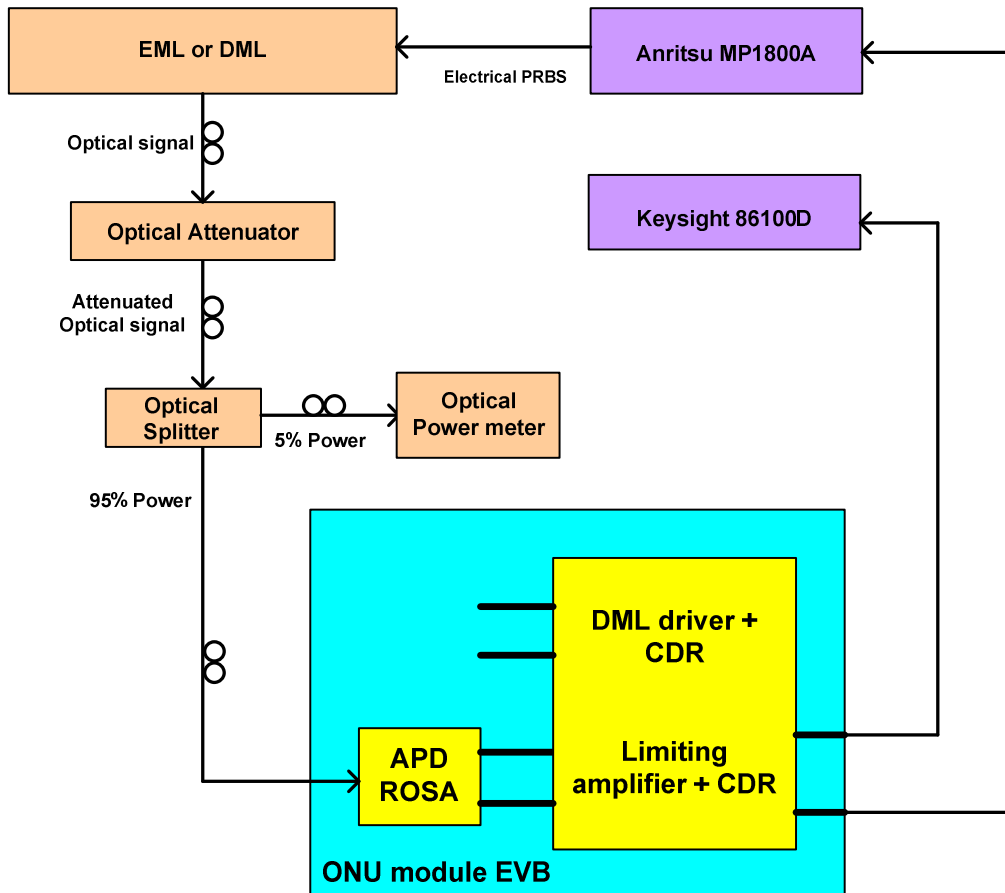
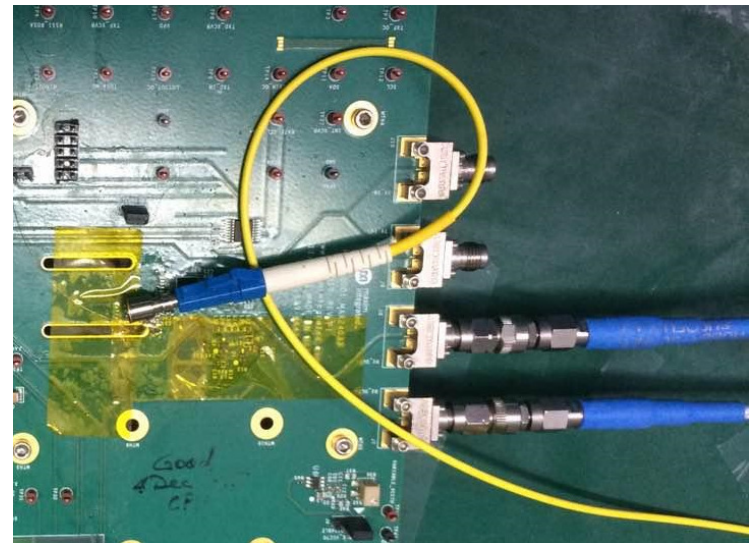


Image of APD on PON module EVB

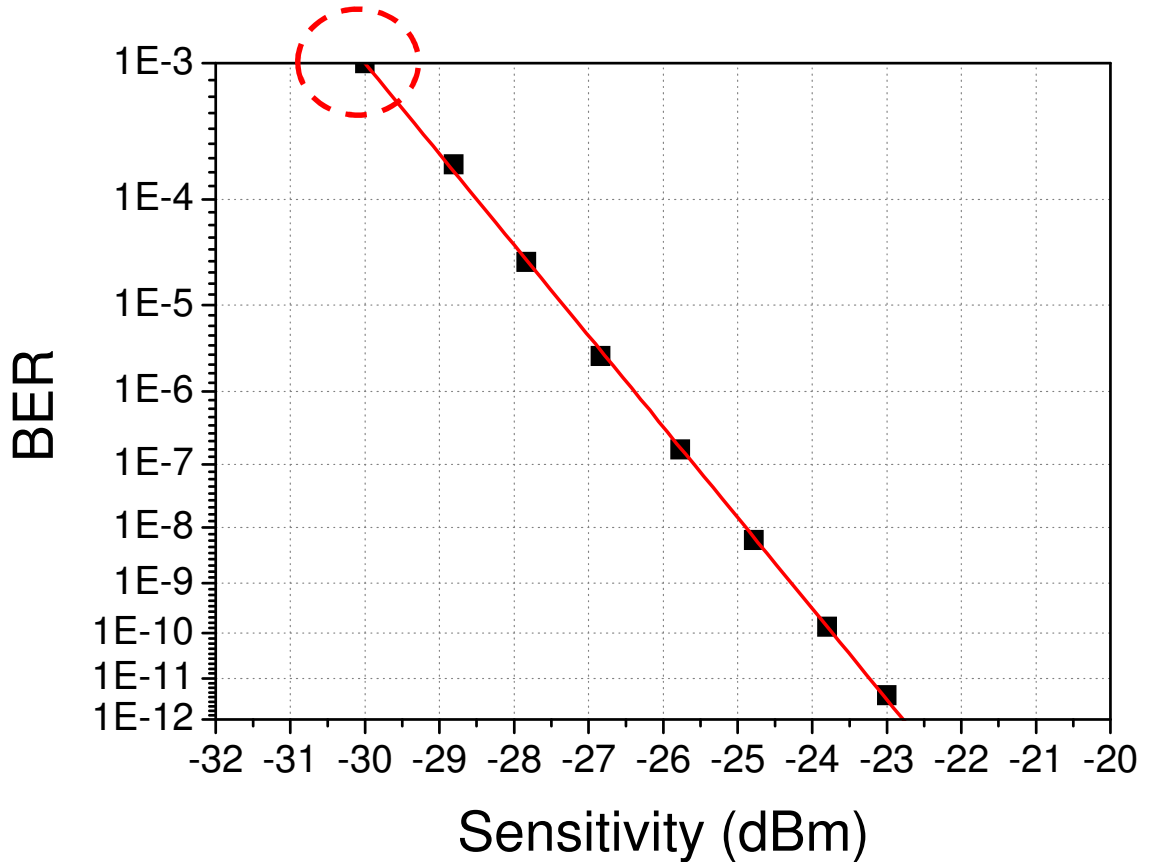
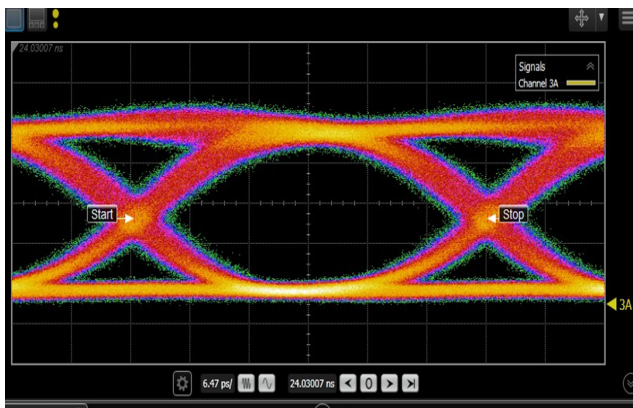




# APD module sensitivity (EML Tx ER=10dB)

Module level sensitivity of TO-can APD ROSA can reach **-30dBm**

EML optical eye-diagram



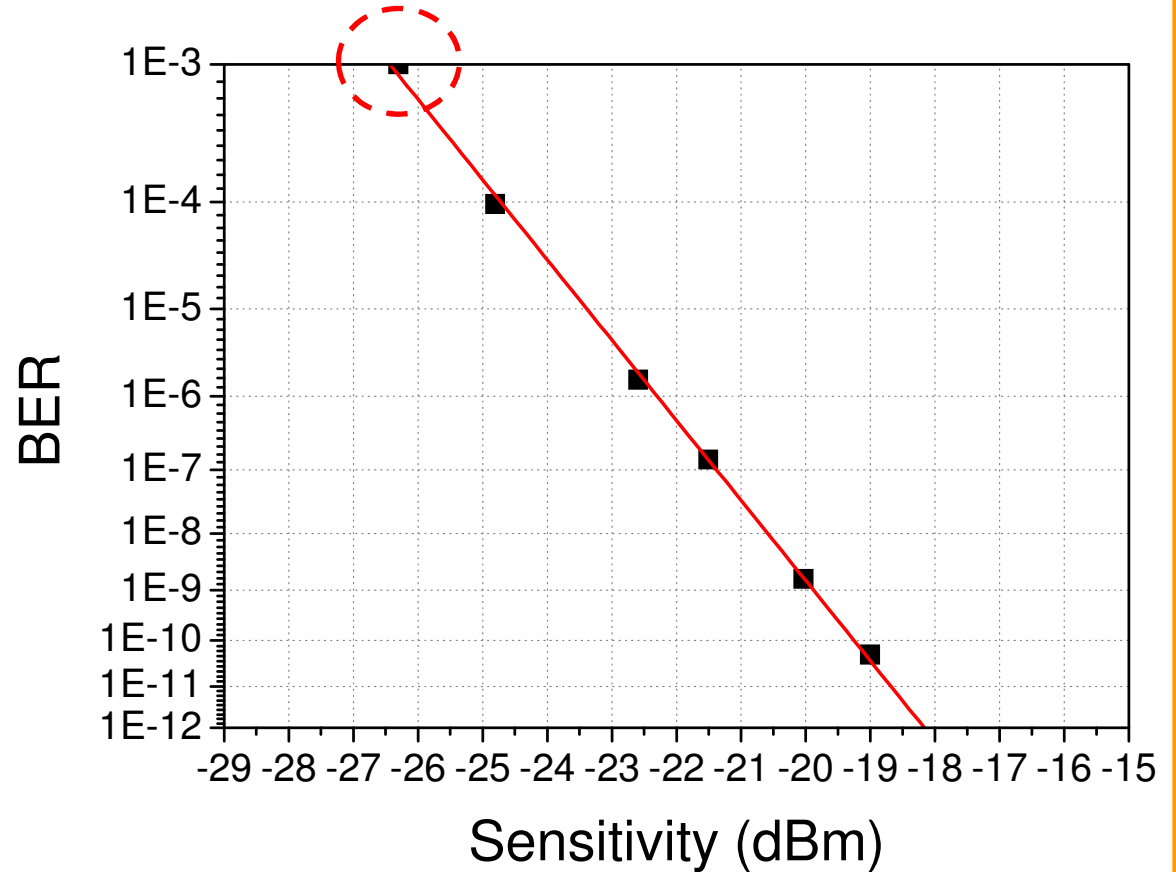
Test conditions: 1304nm, ER=10dB, 25.78Gb/s, NRZ, PRBS=2<sup>31</sup>-1, EQ & CDR on, back-to-back, RT



# APD module sensitivity (DML Tx ER=4dB)

Module level sensitivity of TO-can APD ROSA can reach **-26.3dBm**

DML optical eye-diagram

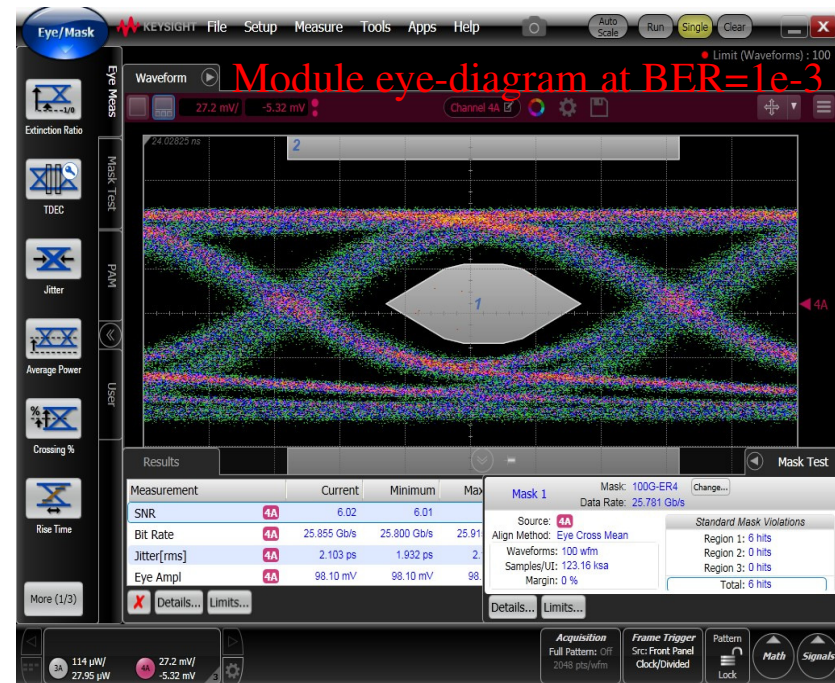
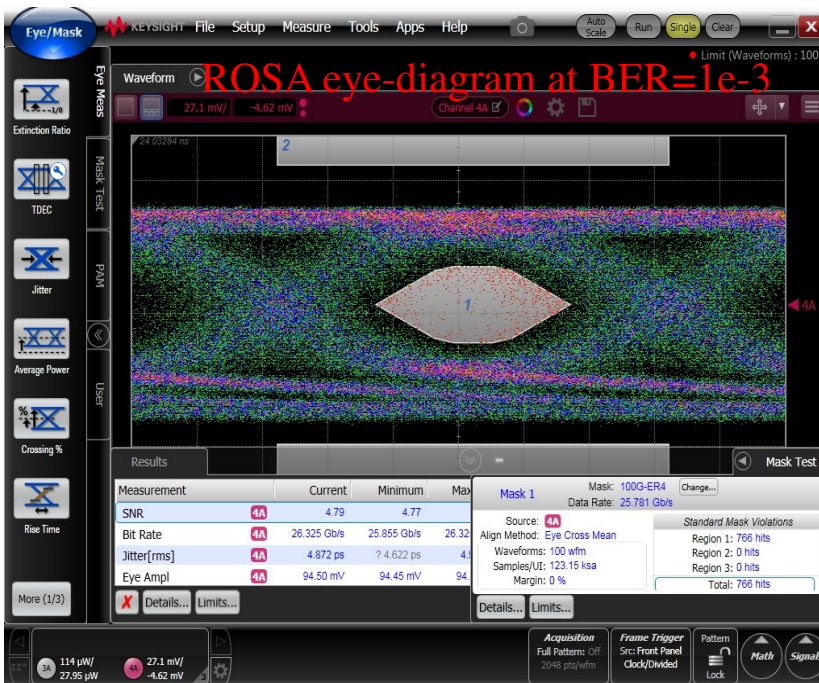


Test conditions: 1310nm, ER=4dB, 25.78Gb/s, NRZ, PRBS=2<sup>31</sup>-1, EQ & CDR on, back-to-back, RT



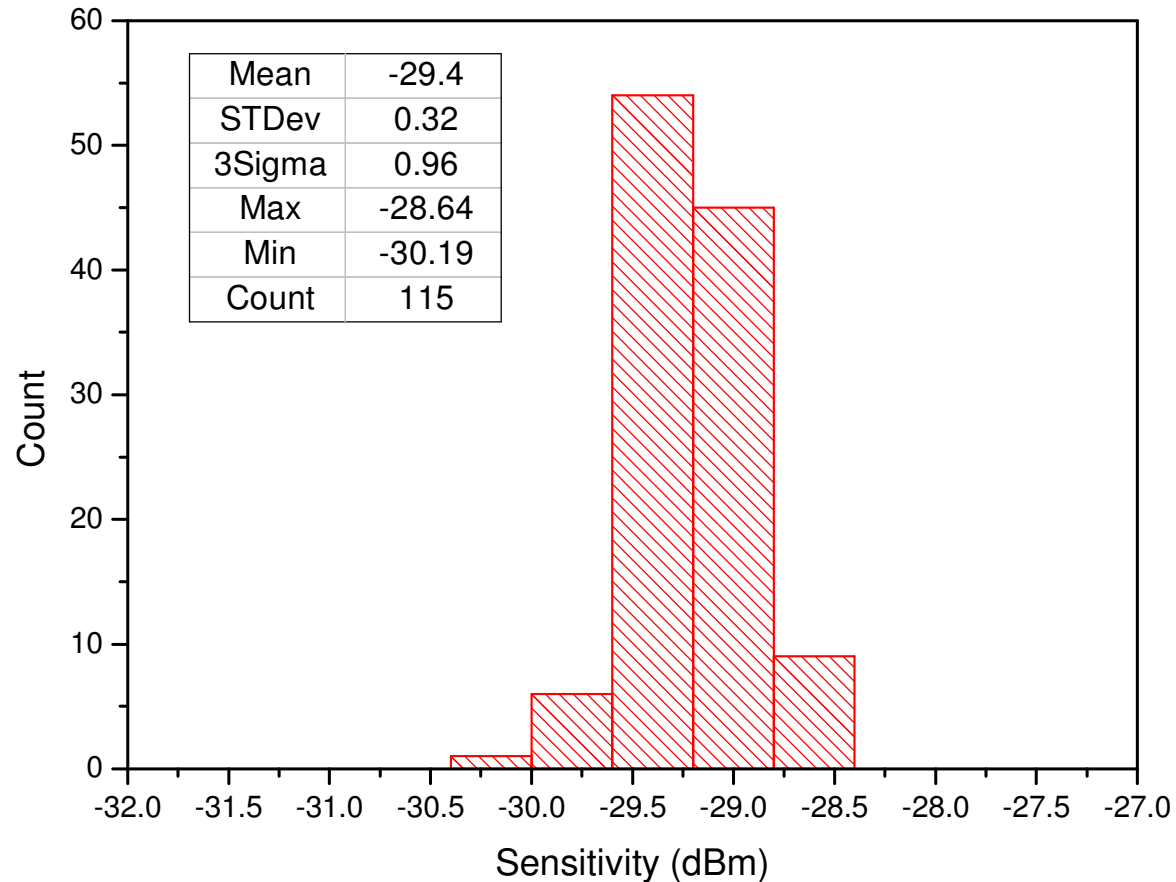
# Module output electrical eye-diagram

- Module output eye-diagram (EQ&CDR on) become more clean





# Statistical data of Ge/Si APD ROSA performance on module



Test conditions: 1304nm, ER=10dB, 25.78Gb/s, NRZ, PRBS=2<sup>31</sup>-1, EQ & CDR on, back-to-back, RT



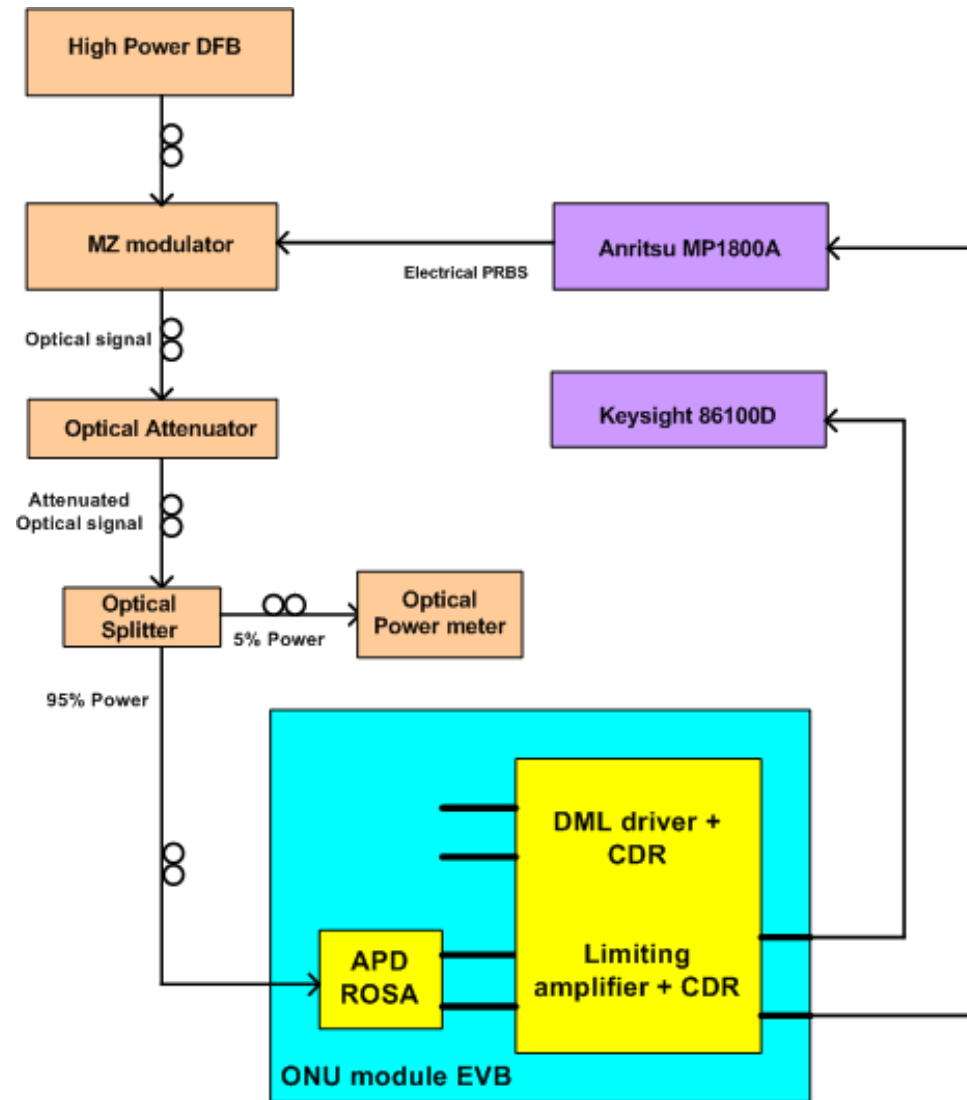
# Summary of APD for 25G PON PR30

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- Our 25G APD ROSAs on module show 1~1.5dB improvement at sensitivity of BER=1e-3
  - With EML Tx, the sensitivity reached -30dBm
  - With DML Tx, the sensitivity reached -26.3dBm
- With implementation of 25G APD ROSA, 25GBASE PR30 link budget could be met by currently available EML and DML



# Test setup for 100G PON PR30

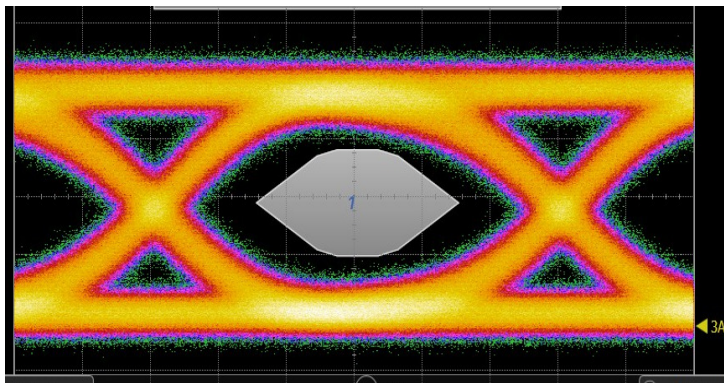




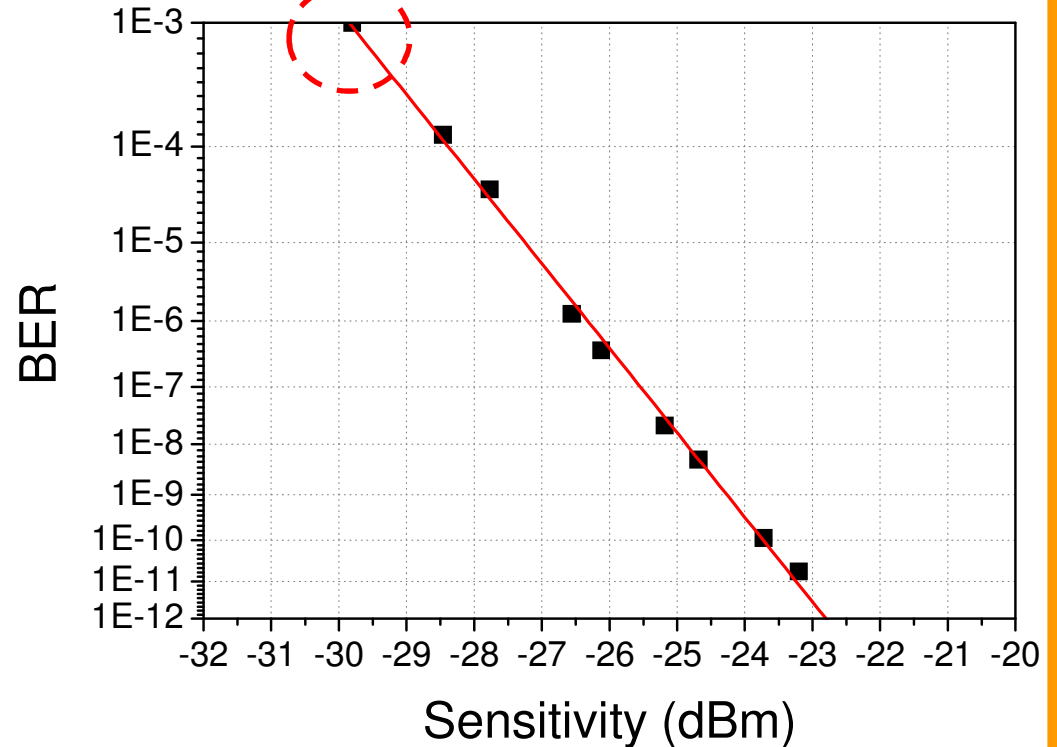


# HP DFB + MZM + APD link budget: 39dB

MZM optical eye-diagram



Packaged DFB laser output power: +14dBm  
MZ modulator output power: +9.2dBm  
APD sensitivity: -29.8dBm



Test conditions: 1310nm, ER=10dB, 25.78Gb/s, NRZ,  
PRBS=2<sup>31</sup>-1, EQ & CDR on, back-to-back, RT



## Summary of APD for 100G PON PR30

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- With implementation of 25G APD ROSA, high power DFB and LiNbO<sub>3</sub> MZM, a 39dB solution is achievable for meeting the link budget requirements of 100G PON PR30
- In future, with the improvement of insertion loss and coupling loss, Si based modulator could demonstrate close performance as current LiNbO<sub>3</sub> MZ modulator, which will be a great low cost solution for 100G PON