Low Power Dissipation 10Gb/s FDDI Fiber Interconnections Using 1310nm VCSELs

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Picolight

Cost Effective 10G FDDI Solution

- **Serial optics, minimal burden on EDC chip**

  1310nm wavelength for maximum modal bandwidth

  Controlled, definable launch for maximum MBW

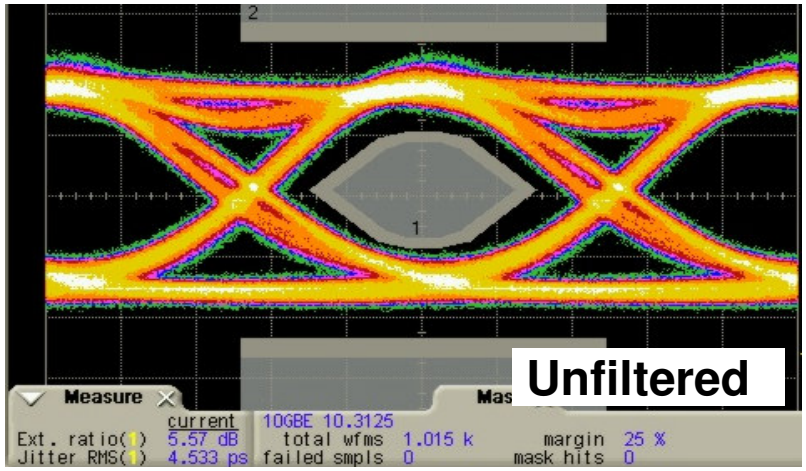
  Single spatial mode

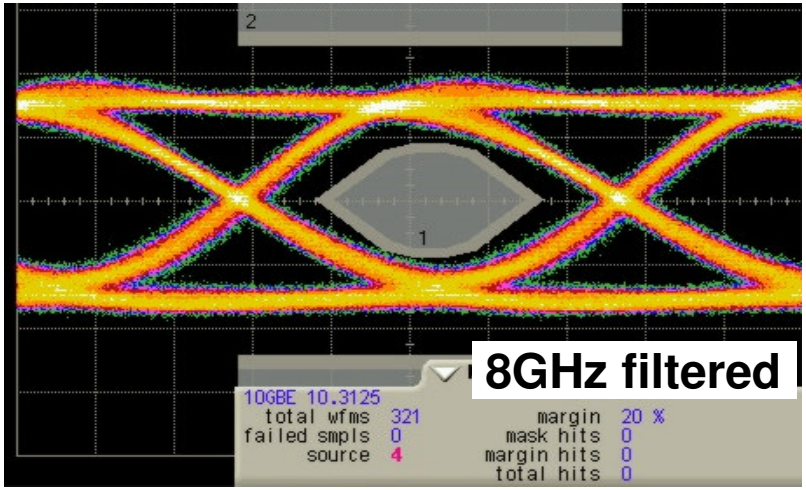
  Minimize RIN, MPN, etc

  Minimize power dissipation

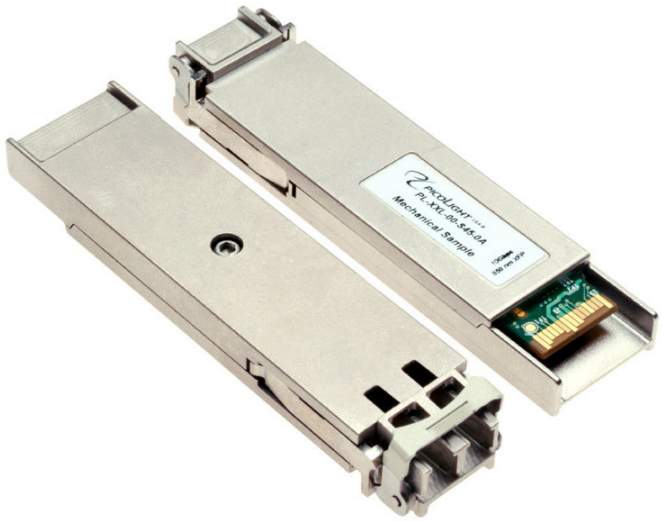
1310nm VCSEL XFP Transceiver Output

<1.5mW module power dissipation (no EDC)





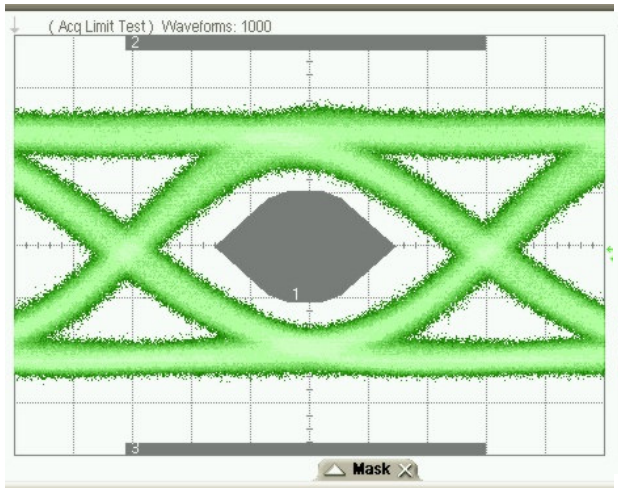
10Gig Ethernet speed
5mA bias current - VCSEL driver
Extinction Ratio = 5.6
20-25% Mask Margin - no hits



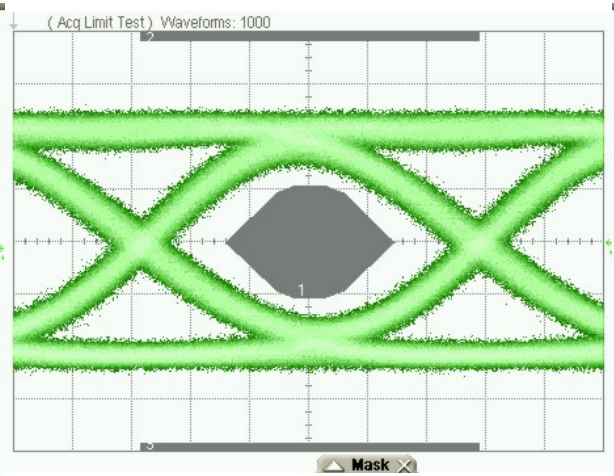
1310nm VCSEL Eyes over Temperature

From XFP module
–30°C, +30°C, +70°C - transceiver ambient temp

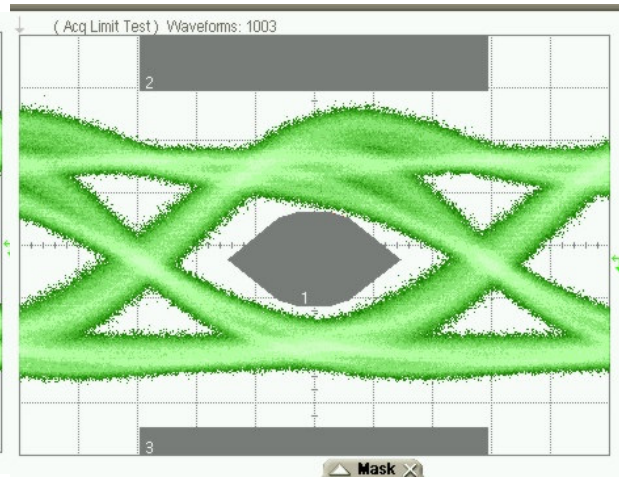
-30°C
$P_{coupled}$ = -4.6dBm
ER = 6.16dB



+30°C
$P_{coupled}$ = -4.2dBm
ER = 6.13dB

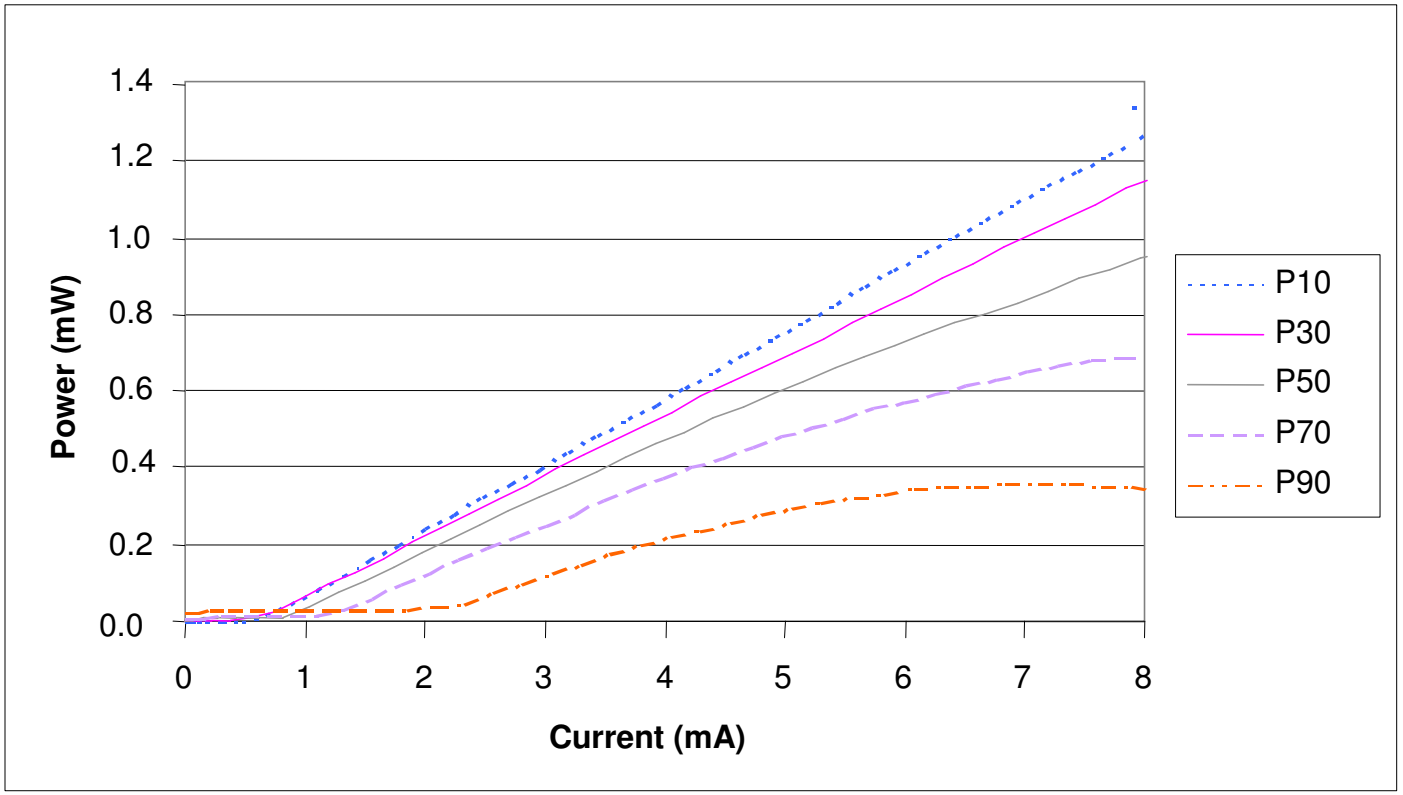


+70°C
$P_{coupled}$ = -5.5dBm
ER = 6.3dB



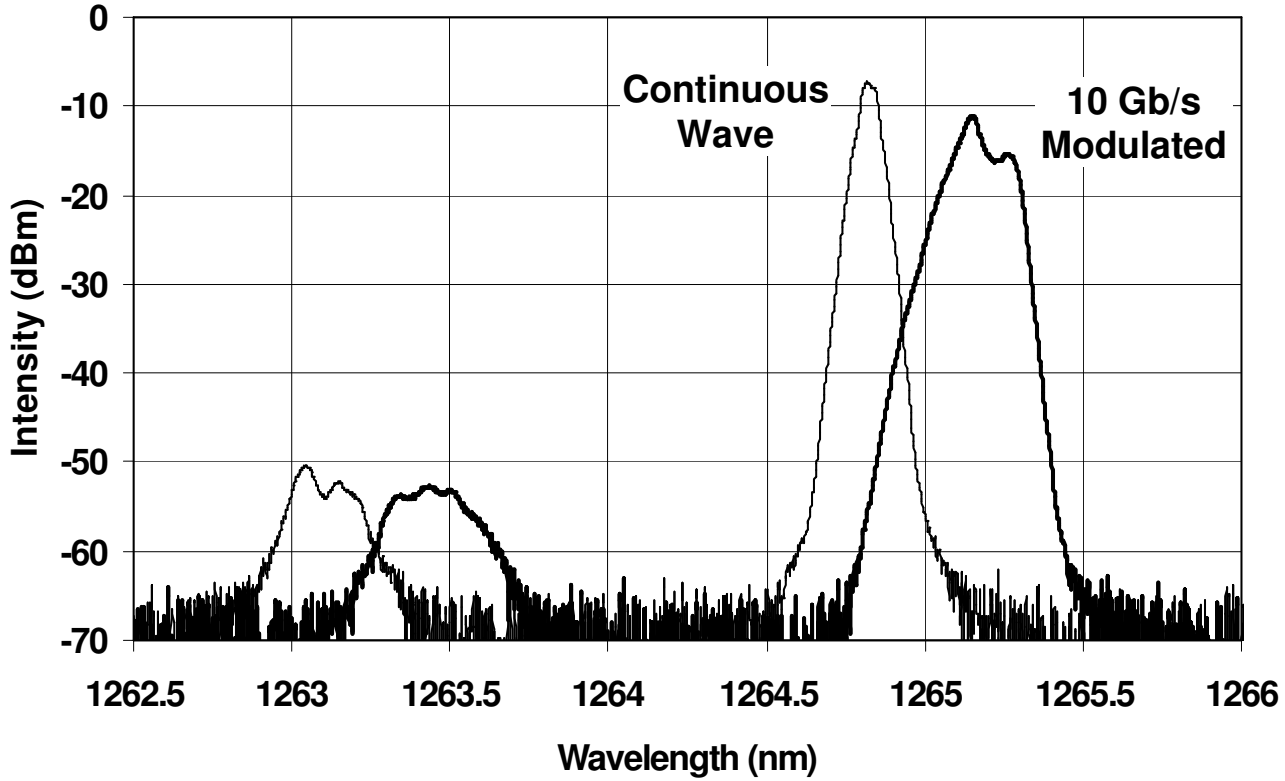
Light Output: 1310nm VCSEL

Single-mode emission
Gain offset too low
High-temperature performance can be improved



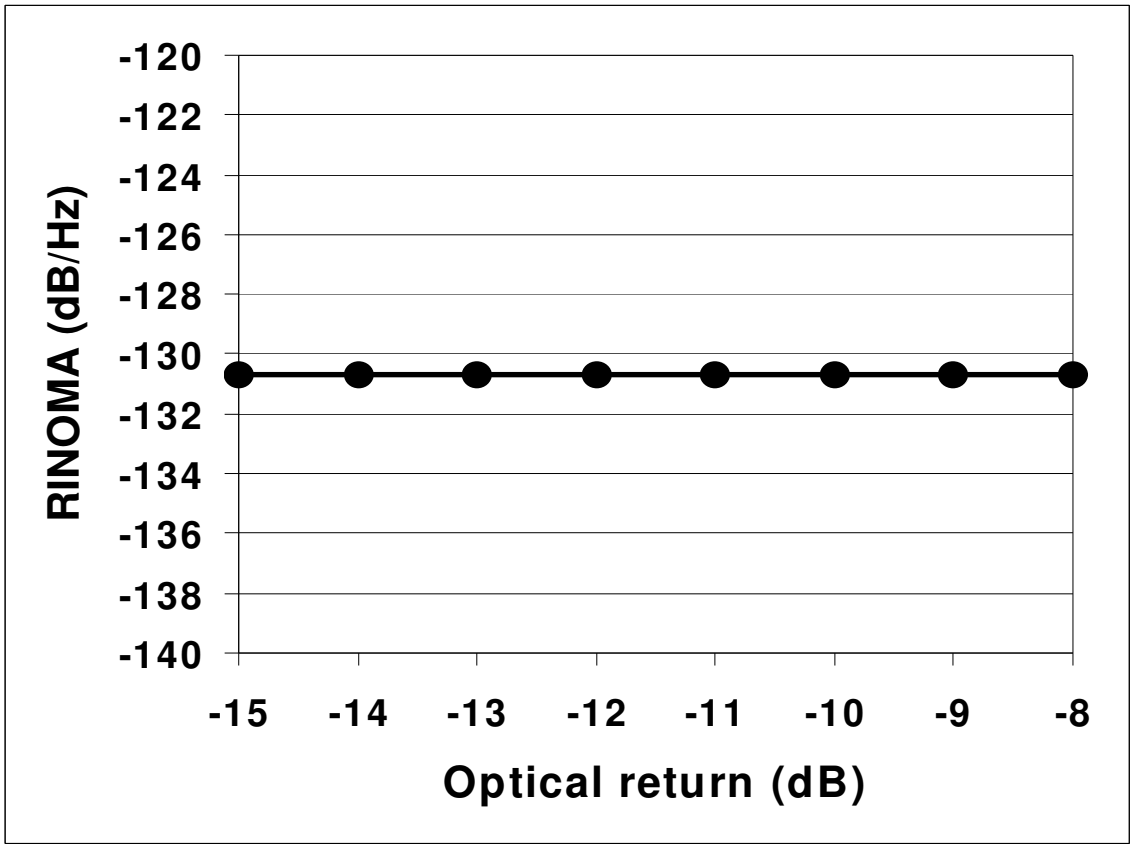
10G Modulated Spectrum: 1310nm VCSEL

Full width at –20dB <0.4nm; SMSR >40dB
Zero Modal Partition Noise
Suitable for 10GBASE-L



Noise: 1310nm VCSEL

Low noise at low bias current
Measurement performed per 802.3ae



Conclusions

- **VCSEL-based solution has:**

  Lowest power dissipation

  Zero MPN (single longitudinal mode)

  Minimal load on EDC (low RIN)

  802.3aq specs should accommodate 1310nm VCSEL