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POF transceiver: new concepts for 510 nm transmission

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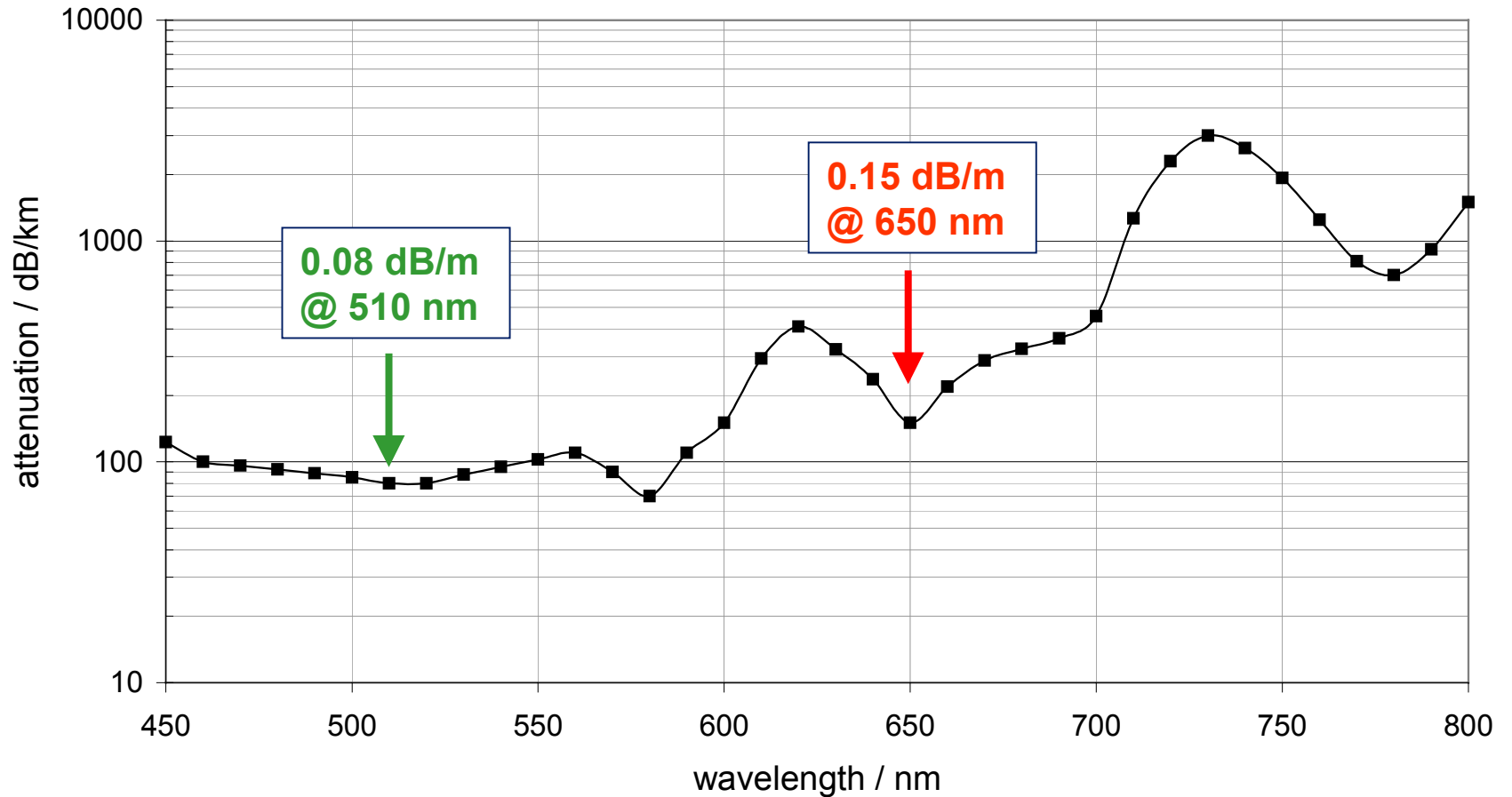
1. Transmission behaviour of PMMA POF systems at 510 nm and 650 nm
2. Presentation of a new 510 nm transmitter
3. 125 Mbit/s-transmission over 100 m N.A. 0.3 POF
4. Packaging concepts
5. SMD-packaging
6. Summary

Infineon
goes green

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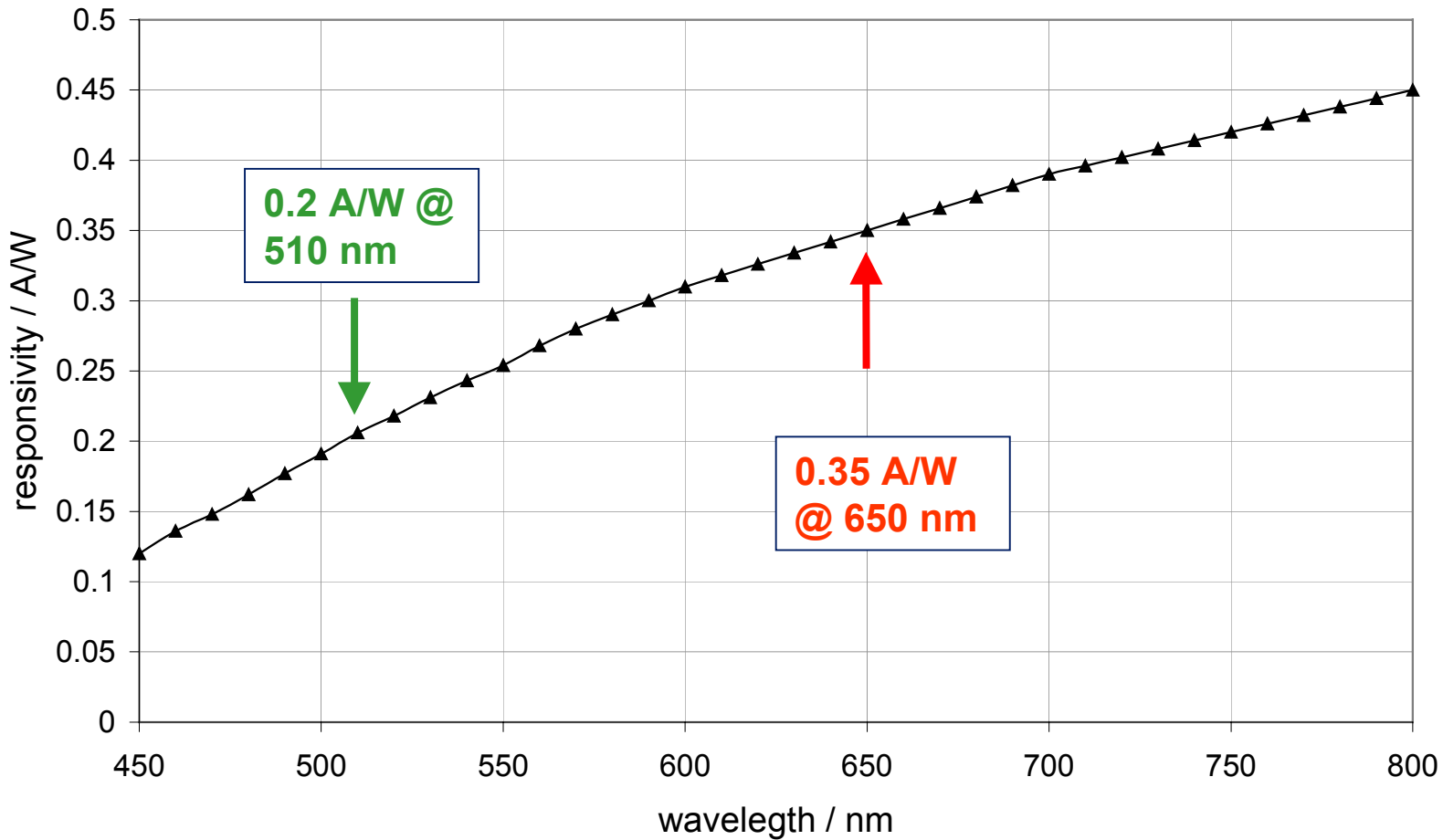
Attenuation of PMMA Fiber

lower attenuation at 510nm (0.08 dB/m) compared to 650nm (0.15 dB/m)

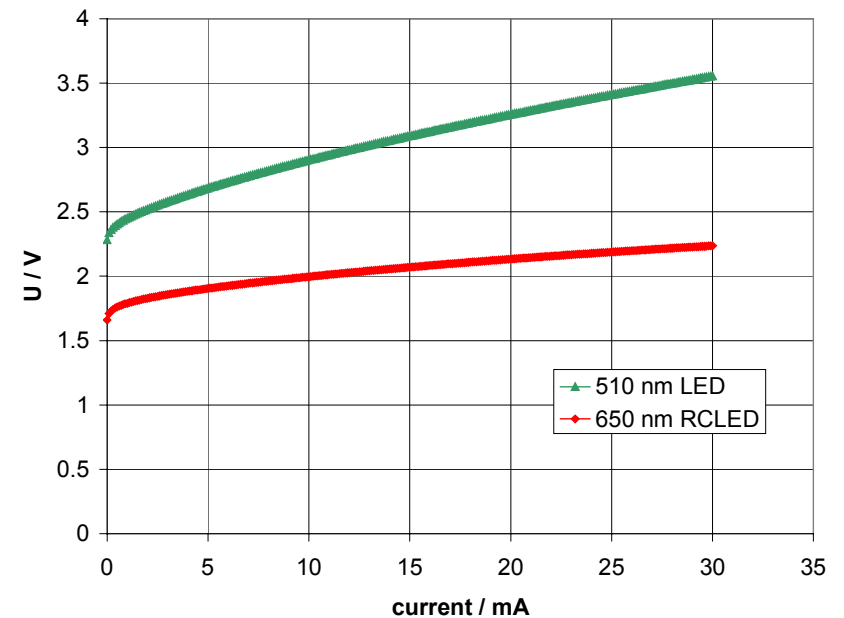
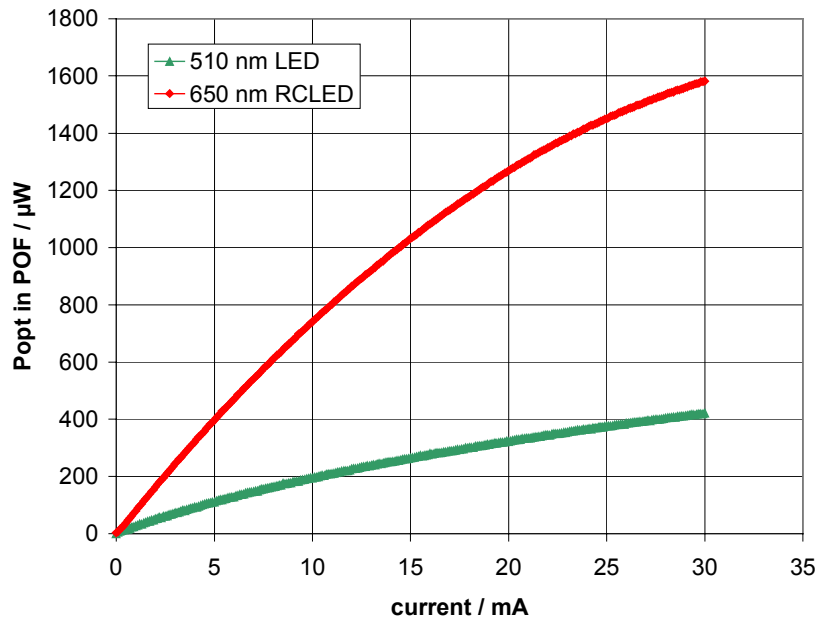


Responsivity of Silicon Photodiode

lower sensitivity at 510nm (0.2 A/W) compared to 650nm (0.35 A/W)



New 510 nm Transmitter: Comparison to a 650 nm RCLED



optical power at 10 mA, coupled in N.A. 0.5 POF (1m):

740 μW for the 650 nm device compared to

200 μW for the 510 nm device

forward voltage at 10 mA:

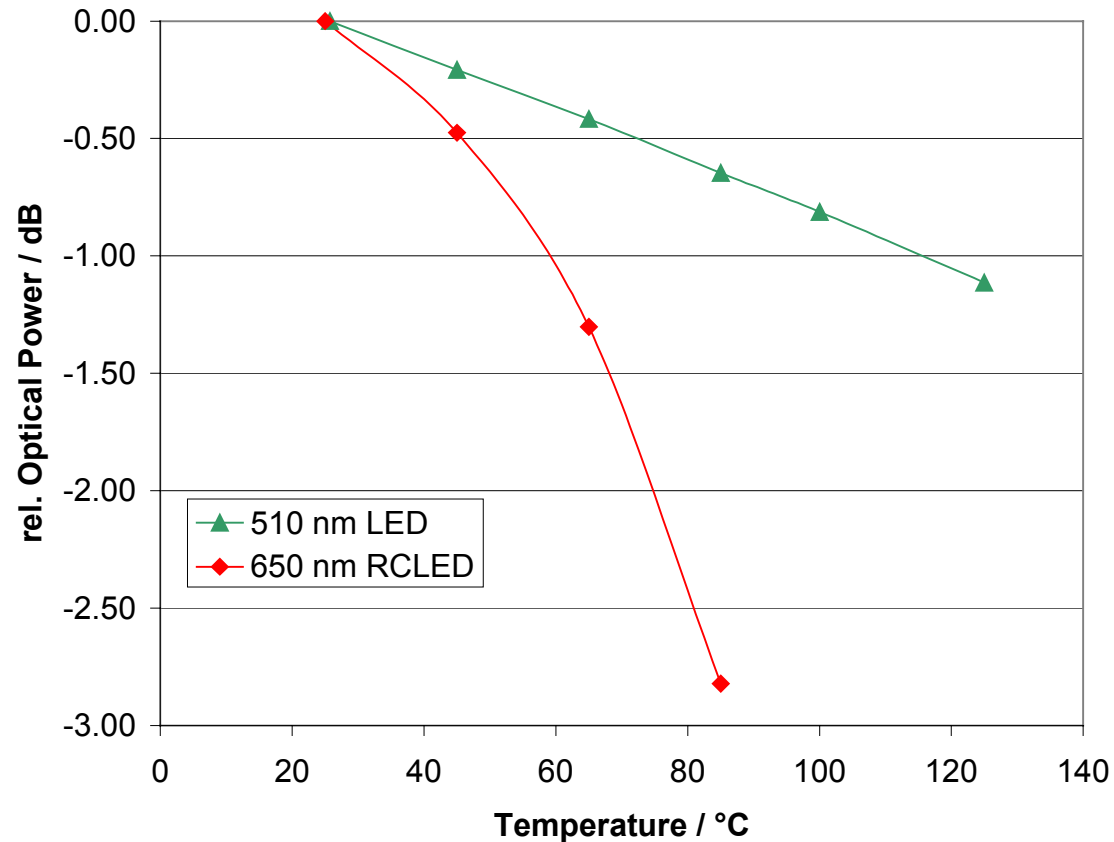
2.0 V for the 650 nm device compared to

2.9 V for the 510 nm device

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New 510 nm Transmitter: Comparison to a 650 nm RCLED



temperature coefficient at 10mA:

0.80 %/K for the 650nm device compared to

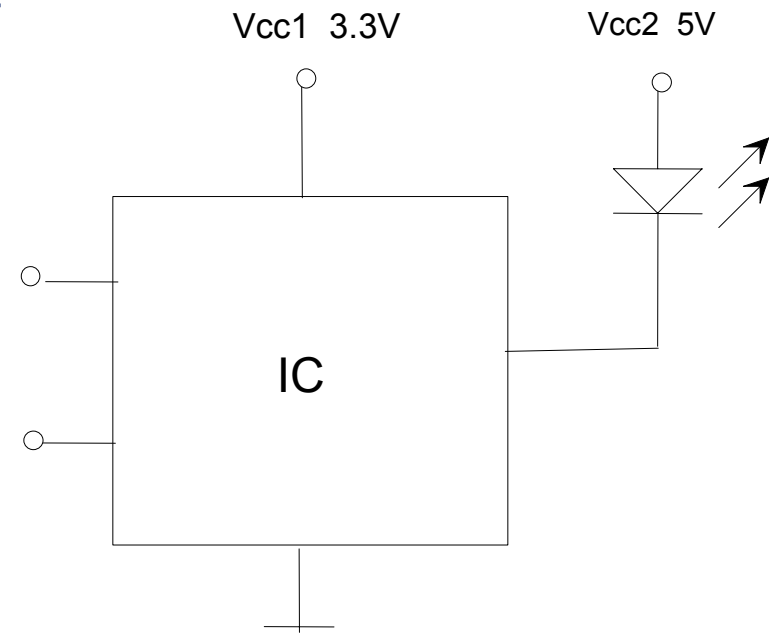
0.23 %/K for the 510nm device

-1.1dB drop in optical power between 25°C and 125°C

BER-Measurement over 100 m Standard POF

BER-measurement:

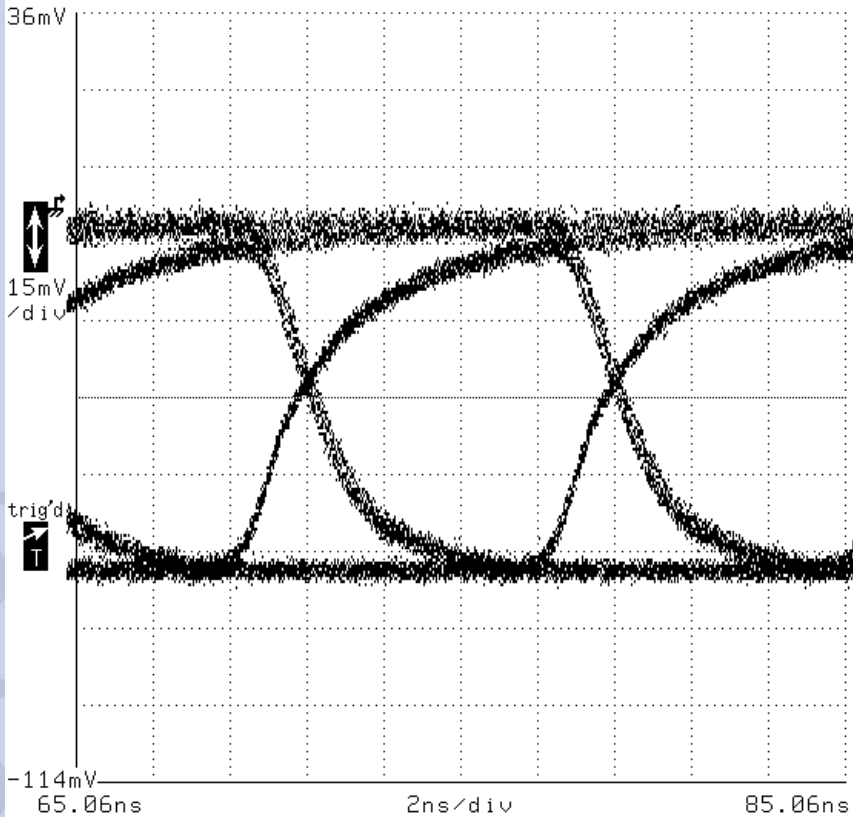
- 125 Mbit/s
- 650 nm RCLED: IC with peaking
- 510 nm LED: IC with additional voltage source (5V) and without peaking
- 100 m Eskamega (N.A. 0.3) POF
- Infineon Photodiode
- Infineon Receiver IC



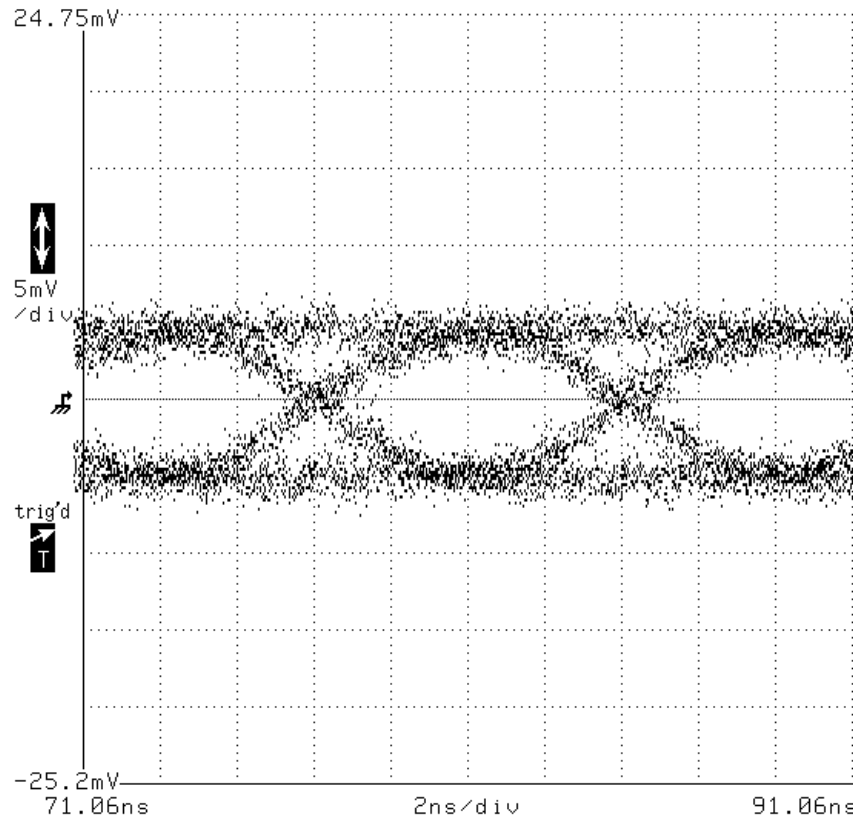
Eye-Diagram after 30 cm and 100 m Eskamega POF (inverted)

510 nm LED: IC with additional voltage source (5V)

125 Mbit/s after 30 cm POF



125 Mbit/s after 100 m N.A. 0.3 POF

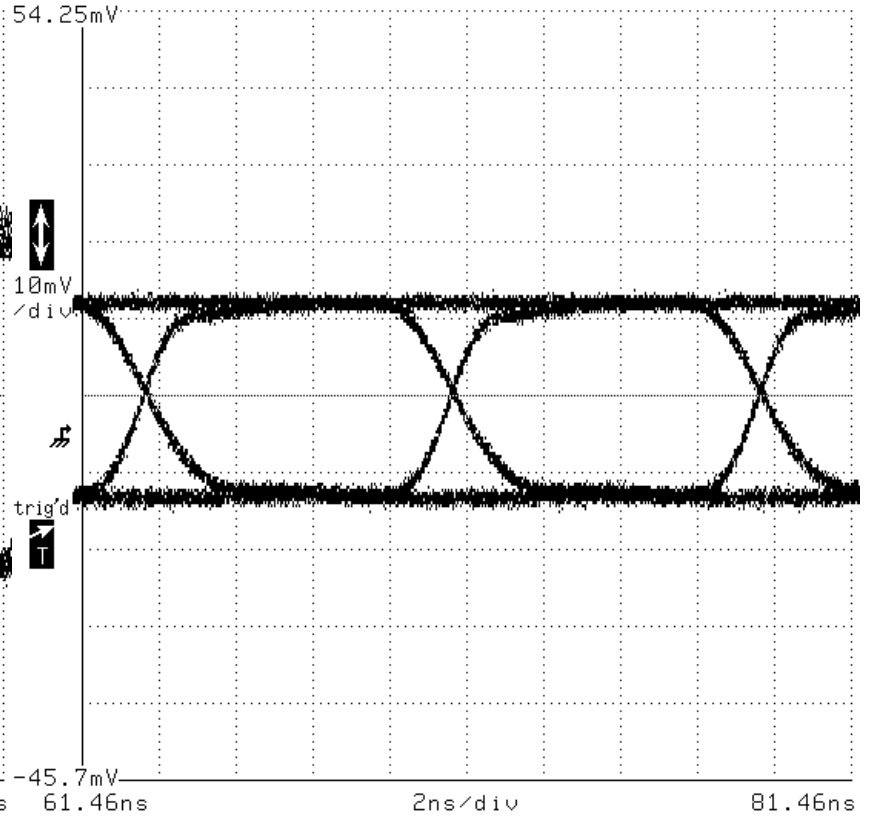
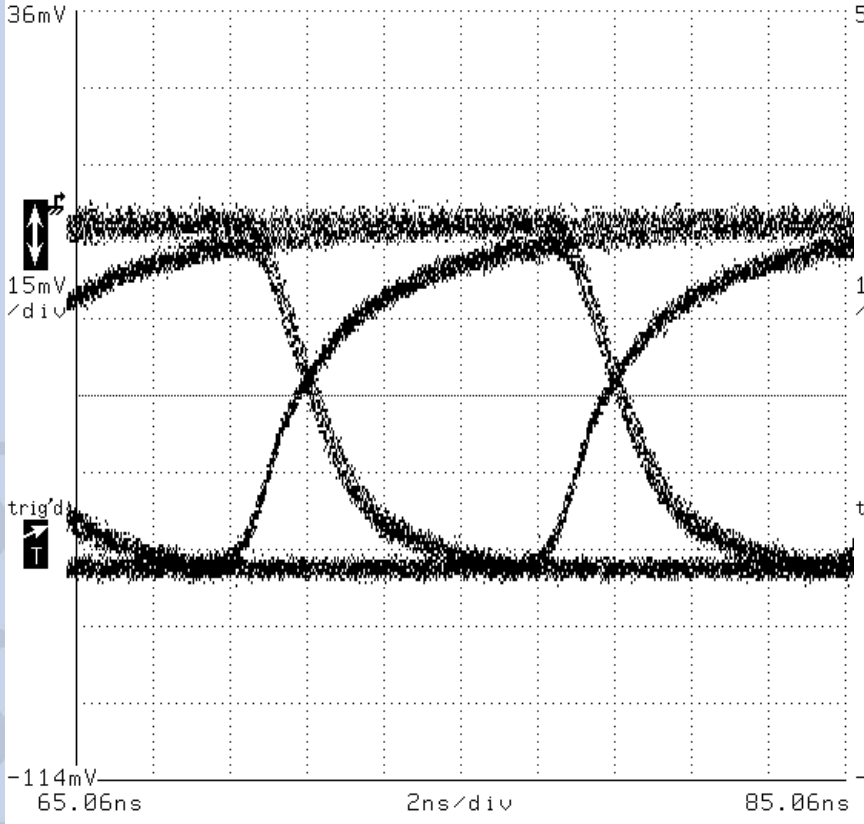


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Eye-Diagram after 30 cm POF (inverted)

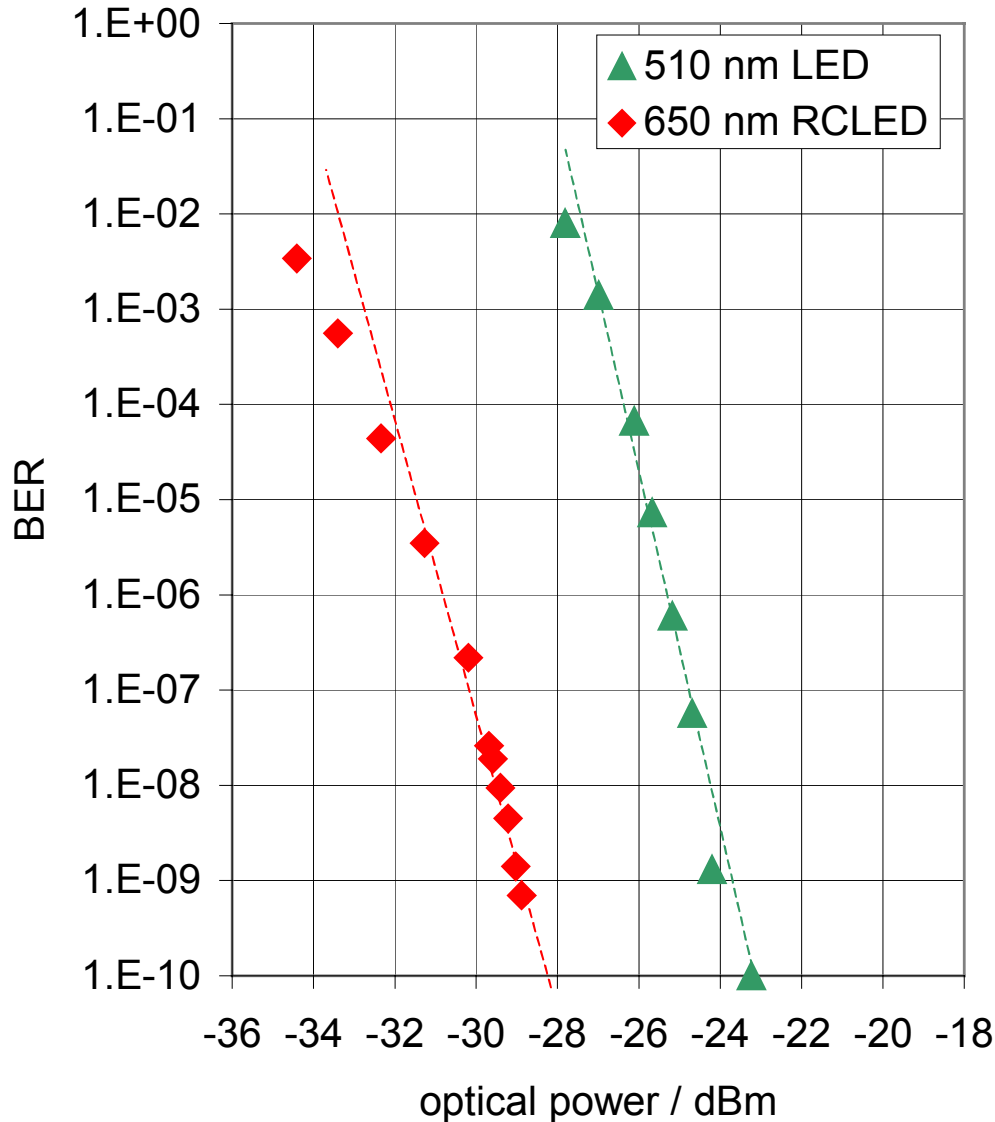
510 nm LED:
125 Mbit/s without peaking
and with additional voltage source (5V)

650 nm RCLED:
125 Mbit/s with peaking



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BER-measurement after 100 m Eskamega POF



receiver sensitivity:

-28 dBm for the 650nm device

compared to

-23 dBm for the 510nm device

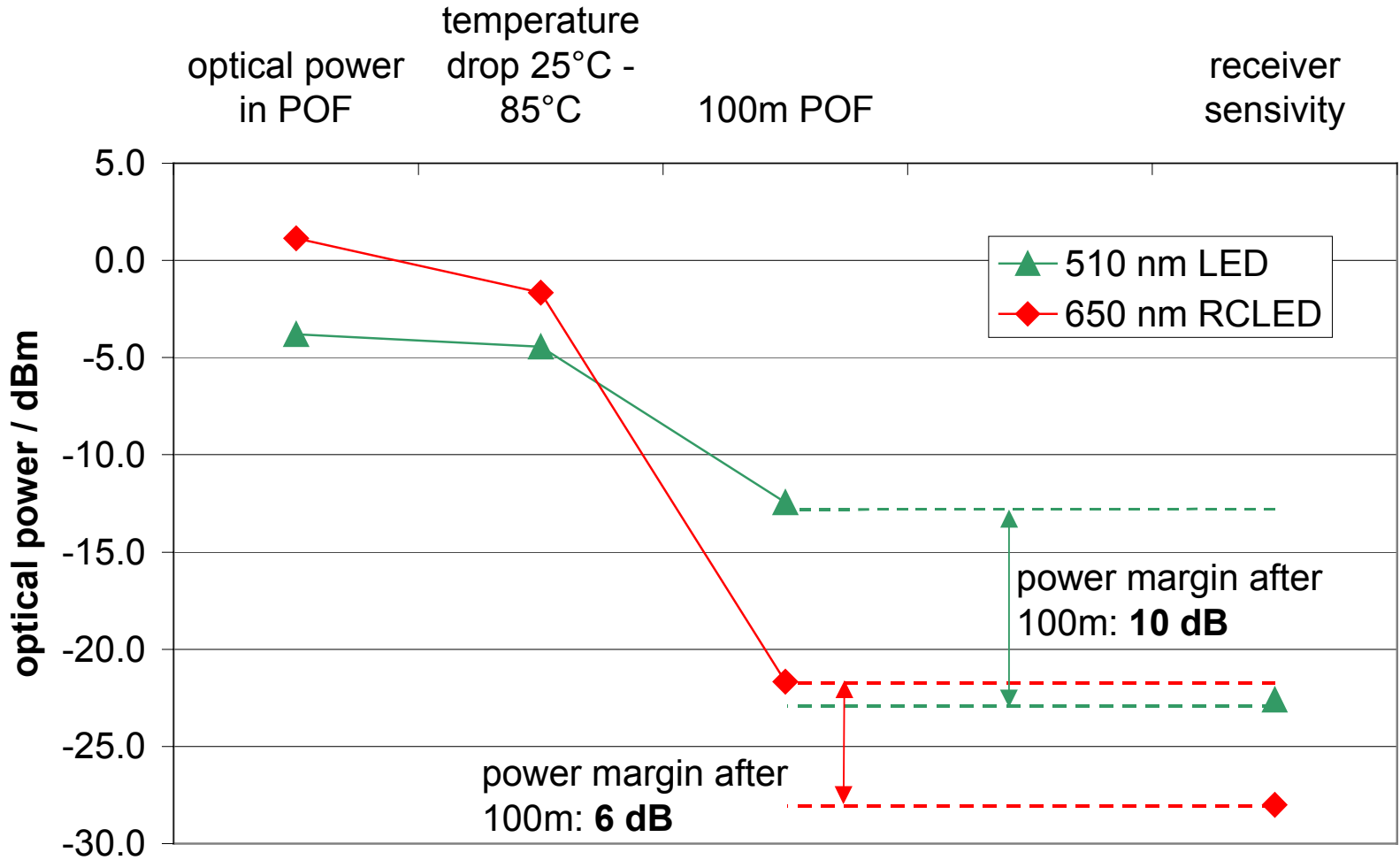
due to lower receiver

sensitivity and lack of peaking

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Power Budget



⇒ 125 Mbit/s over 100m Eskamega (N.A. 0.3) POF with 10 dB power margin after 100m

possible application: Fast Ethernet

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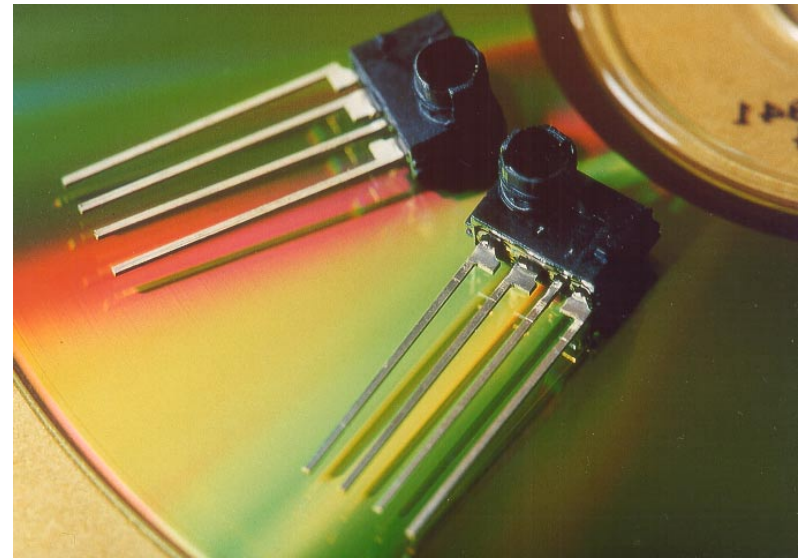
Packaging Concepts

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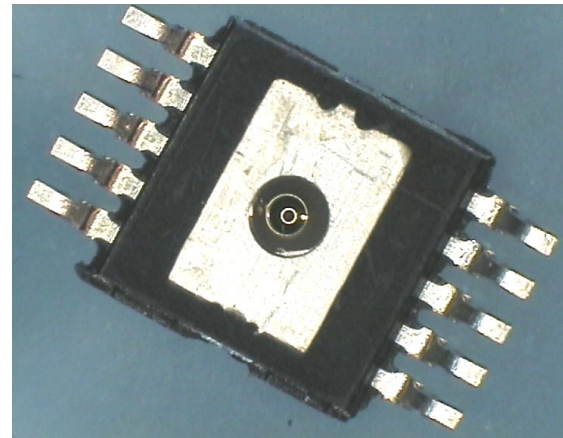
Plastic package with hole
for POF



Sidelooker with IC

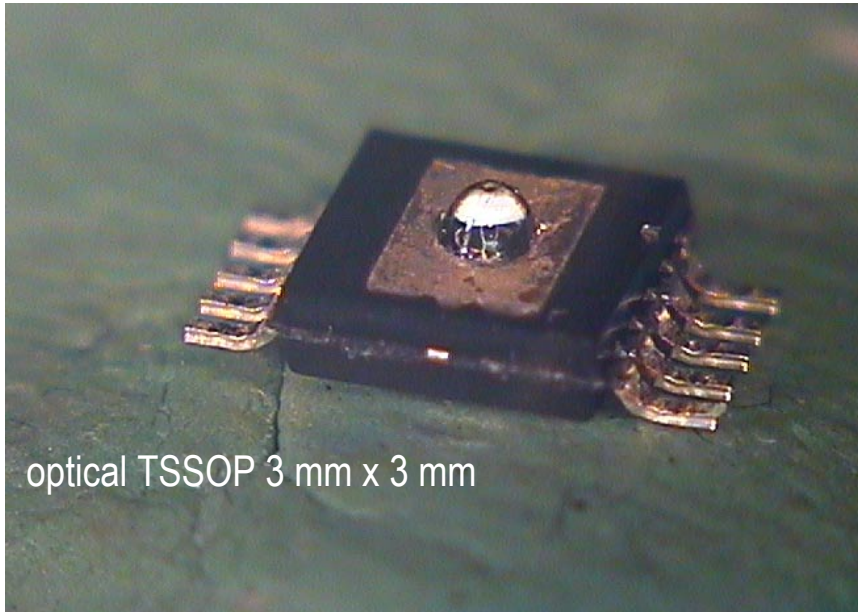


SMD-Package

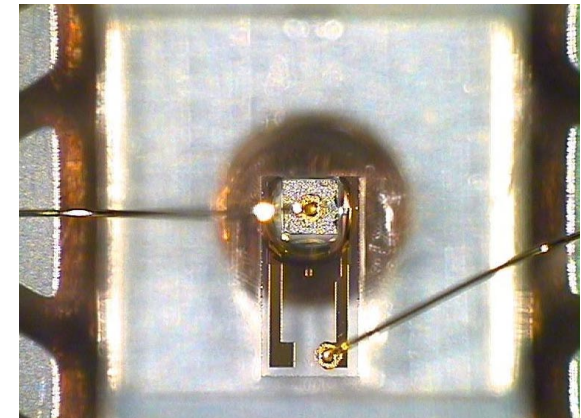


SMD-Packaging

510 nm top-emitting LED in optical TSSOP-Package with aspherical lens
TSSOP is a high volume, low cost package



LED mounted on
structured submount



Summary

- new 510 nm transmitter shows
 - high power (200 μ W at 10 mA)
 - low temperature coefficient (-0.23 %/K) up to 125 °C
 - low forward voltage (2.9 V at 10 mA)
 - high speed (125 MBit/s without peaking)
- 125 Mbit/s over 100 m Eskamega (N.A. 0.3) POF with
 - 6 dB power margin after 100 m at 650 nm
 - 10 dB power margin after 100 m at 510 nm
- possible application: Fast Ethernet
- high volume, low-cost SMD-package for both transmitters