

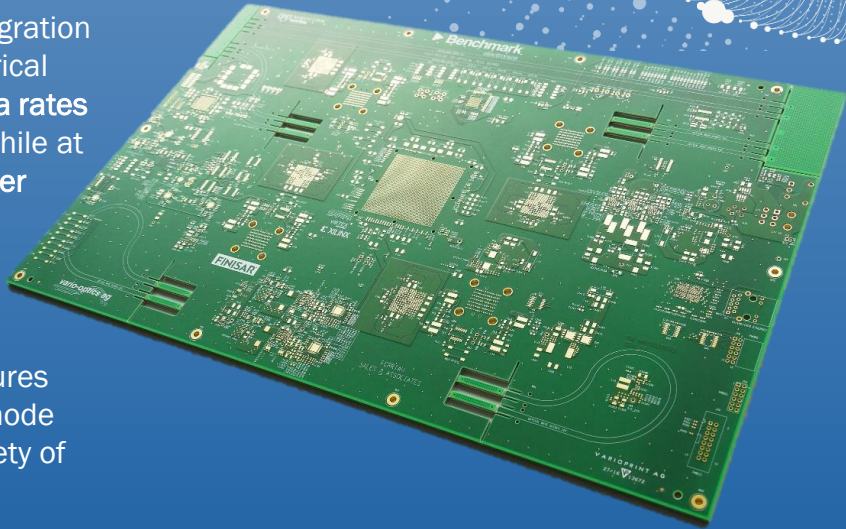
Optical PCB

Embedded Waveguide Technology

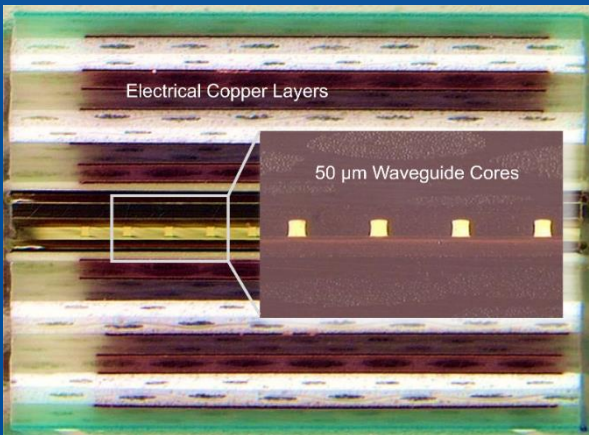
Polymer Waveguide technology combined with PCB enables much higher integration densities compared to purely electrical boards. This allows to **increase data rates** for high-speed data transmission while at the same time achieving **lower power consumption**.

vario-optics designs and manufactures planar waveguides for both singlemode and multimode operation on a variety of substrates.

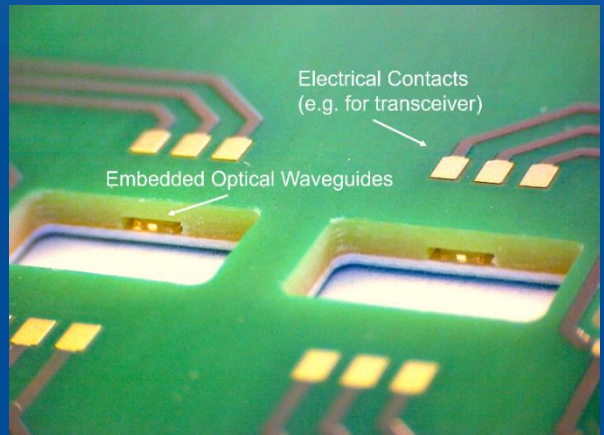
Combination with electrical PCBs and versatile coupling solutions enable next generation electro-optical systems.



Cross-section with 50 μm optical waveguides in the center.



Embedded waveguides and 90-degree mirrors for out-of-plane light coupling.



Electro-Optical Polymer Waveguide Demoboard for On-Board Optics

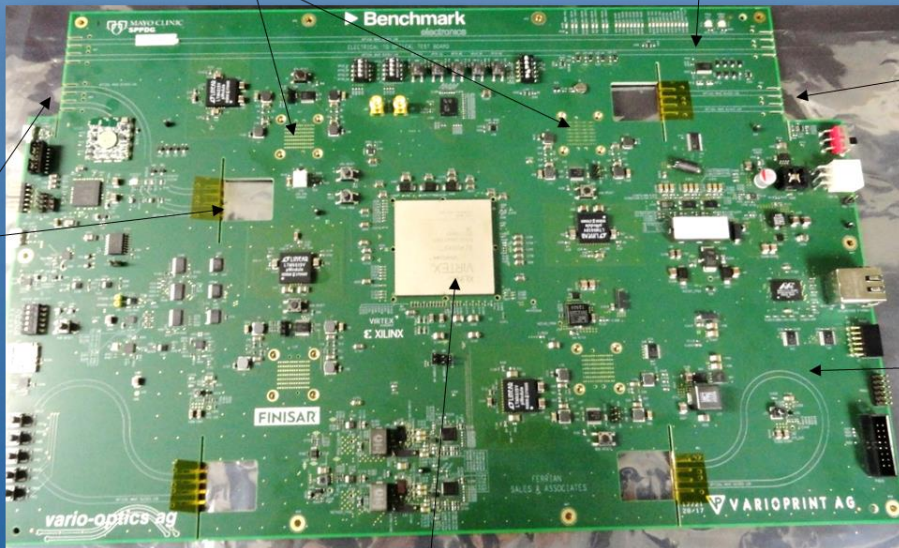
Finisar Transceiver (25 Gb/s) Footprint

Straight Waveguides edge-to-edge
(embedded - highlighted by silkscreen)

In-Board Waveguides to
Board Edge Connections

In-Board
Waveguide
Facets

Waveguide Loopbacks
with In-Board
Connections



Xilinx Virtex FPGA



Specifications of Polymer Waveguide Demo-Board:

- High-speed PCB and optical circuit design
 - 20 electrical layers, optical center layer with 8x12 channel multimode polymer waveguides, low-loss (IL 0.05 dB/cm)
 - Board size: 420mm x 265mm, waveguide edge connectors
- Reflow soldering compatible, Telcordia tested (2000h @ 85 °C/85% rel.H.)

Performance:

- 1.2 Tbit/s total optical on-board throughput
 - 48 channels @ 25 Gbit/s (limited by transceivers)
 - Low bit error rate < 10^{-15}
 - Low power consumption (pj/bit)
- Low-loss optical transmission (< 0.05 dB/cm @ 850 nm)

