



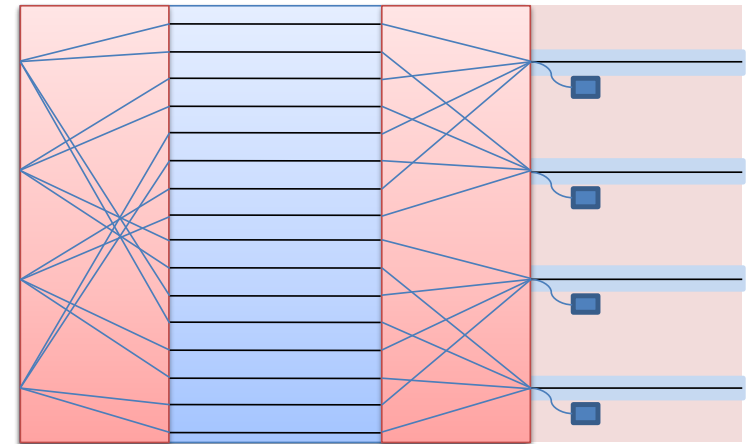
European
manufacturing platform
for Photonic Integrated Circuits

Packaging Requirements for Fast Optical Switch

University of Cambridge

4x4 port optical switch

- Small port-count switch used as building block to larger switch
- 1.55 μm semiconductor optical amplifier based switch
- Tree structure
- Active switching elements with passive waveguide shuffle networks
- Nanosecond switching time



Passive
Shuffle
Network

Active
SOA
Gates

Passive
Shuffle
Network

Power
Boost
SOAs
+
Monitor
PD

Simple schematic



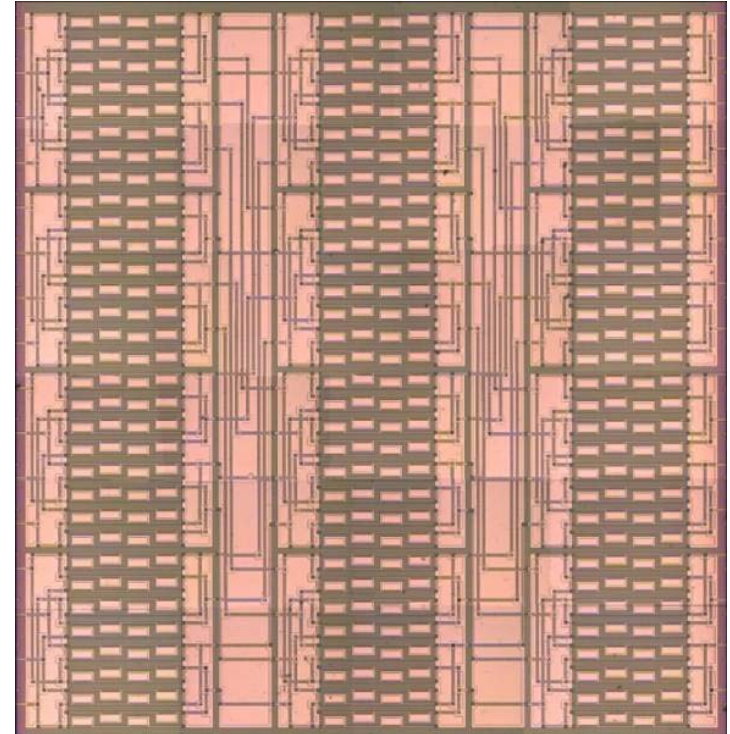
Mask layout

- 4 x 500 μ m spaced input and output waveguides
- Chips for testing expected any day...

- 8 optical interfaces, could all be on the same side of chip if necessary
- 4 low bandwidth electrical connections to SOAs and monitor photodiodes
- 16 medium bandwidth electrical connections
 - 1ns risetime
- Next run adds
- 3 x10Gb/s RF connections (modulator and fast detector)

What we really need

- Have 16 x 16 port switch
- 192 x 1ns electrical connections
- 4 d.c. electrical connections
- 32 optical connections
 - could be 32 on one facet
 - or 16 on each facet
- Strong industrial interest shown already



Photograph of switch

A. Wonfor et al., JOCN August 2011