Considerations for Embedded Optical Module Implementation: Suppliers

- Benefits of embedded optics
- Overcoming barriers to adoption of embedded optics
- Establishing an ecosystem to support embedded optics
Benefits of Using Embedded Optics

On-board optics gaining mainstream appeal

Why Use Embedded Optics?

• Increased Port Density
• Fabric Interconnect
  • Chassis to Chassis for Clustering
• Optical Backplane interconnect
  • Overcome routing distance challenges
  • Meet cooling performance needs
  • Alternative to copper cable bulk, weight
Designing in Embedded Optics

Applications beginning to proliferate for embedded optics

On-Board Optics Requirements:
- Low power consumption (< 2W/100G)
- Small footprint
- Flexible placement and routing
- High reliability
- Integrated on-board components
- Multi-rate, multi-protocol
- Multi-sourcing

Primarily used for intra-system optical interconnects today
Overcoming Barriers to Adoption

“I have to pull the whole board to replace a module”

“How do I route the fibers?”

“How do I process my boards through SMT?”

“How do I manage all the heat?”

“Optics is too expensive”
Embedded Optics Create Unique Packaging Challenges & Opportunities

- Custom heat sinks
- Optical interface choice
- No through holes on host board
- Aligning fiber management with air flow strategy
- Getting heat out of optical engine
- Getting electrical signal out
- Ensuring electrical contact with interposer/socket
Random FIT Estimate - MBOM

All new 25G devices require significant life testing at die and module level

Data based on:
- VCSELs > 19000 channels to date for 4000 hr
- ICs = Scaled FIT estimate from foundry process
- Standard component models SR-332 or field data for other module components
- From 2017 onwards, field data will supersede large-scale direct testing
Establishing an Ecosystem to Support Embedded Optics

OFC and DesignCon 2016 Demonstrations

- Socket intermate-ability
- MBOM intermate-ability
EVERY CONNECTION COUNTS

www.te.com