LIGHTWAVELOGIC®

Investor Presentation

September 2025

Forward Looking Statements

LIGHTWAVELOGIC®

This slide presentation contains “forward-looking statements” and “forward-looking information” within the meaning of the Private Securities Litigation Reform Act of 1995. This information and these statements, which can be identified by the fact that they do not relate strictly to historical or current facts, are made as of the date of this presentation or as of the date of the effective date of information described in this presentation, as applicable. The forward-looking statements herein relate to predictions, expectations, beliefs, plans, projections, objectives, assumptions or future events or performance (often, but not always, using words or phrases such as “expects”, “anticipates”, “plans”, “projects”, “estimates”, “envisages”, “assumes”, “intends”, “strategy”, “goals”, “objectives” or variations thereof or stating that certain actions, events or results “may”, “can”, “could”, “would”, “might” or “will” be taken, occur or be achieved, or the negative of any of these terms and similar expressions) and include, without limitation, statements with respect to projected financial targets that the company is looking to achieve.

All forward-looking statements are based on current beliefs as well as various assumptions made by, and information currently available to the company’s management team. A more detailed description of the risks presented by those assumptions and other risks are more fully described by the company under the caption “Risk Factors” included in our SEC filings and other risks to which our company is subject, and various other factors beyond the company’s control.

By their very nature, forward-looking statements involve inherent risks and uncertainties, both general and specific, and risks exist that estimates, forecasts, projections and other forward-looking statements will not be achieved or that assumptions do not reflect future experience. We caution any person reviewing this presentation not to place undue reliance on these forward-looking statements as a number of important factors could cause the actual outcomes to differ materially from the beliefs, plans, objectives, expectations, anticipations, estimates assumptions and intentions expressed in such forward-looking statements.

The company does not undertake to update any forward-looking statement, whether written or oral, that may be made from time to time by company or on behalf of the company except as may be required by law.

LWLG At A Glance

LIGHTWAVELOGIC®

Strong platform + favorable market dynamics to enable utilization of electro-optic polymers for high speed, low power AI and data center applications.

Unprecedented Accelerating Demand

- TAM of $24B and SAM of $1-2.5B by 2028 are growing quickly
- Driven by CapEx to address AI, quantum, datacomm & space comm requirements

Innovative EO Polymer Technology

- Disruptive technology enabler for future speed upgrades in data bandwidth
- Relieves key bottlenecks in AI infrastructure

Strong Patent Portfolio

- Protected by broad IP portfolio with over 70 patents
- Numerous patents pending

Deeply Experienced Leadership

- Management, Board of Directors, Advisory Board have 200+ years conceiving and launching products

Robust Balance Sheet

- Critical for execution
- $22M+ cash position provides significant optionality and execution runway *(as of 6/30/25)*

Business Model

LIGHTWAVELOGIC®

Materials and IP licensing/royalty dual-model for attractive blended gross margin

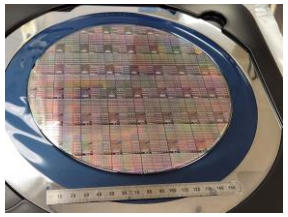
We are a Material + IP/Royalty Licensing Company

Foundational E/O Polymer R&D…

…For Creating Next-Gen Optical Modulators

…And Generating High Margin Revenues

E/O Polymer Composition & IP → **E/O Polymer Production** → **Material Sales**



Reference Designs & Polymer "PDK" IP → **IP & "PDK" Licensing & "Co-Design" Capability** → **Licensing &/or Royalty Fees**

60%+

Gross Margin at Scale

AI Infrastructure Challenges Addressed by Lightwave Logic EO Polymers

BANDWIDTH

CONNECTIVITY

POWER

INTEGRATION

AI Cluster Opportunity

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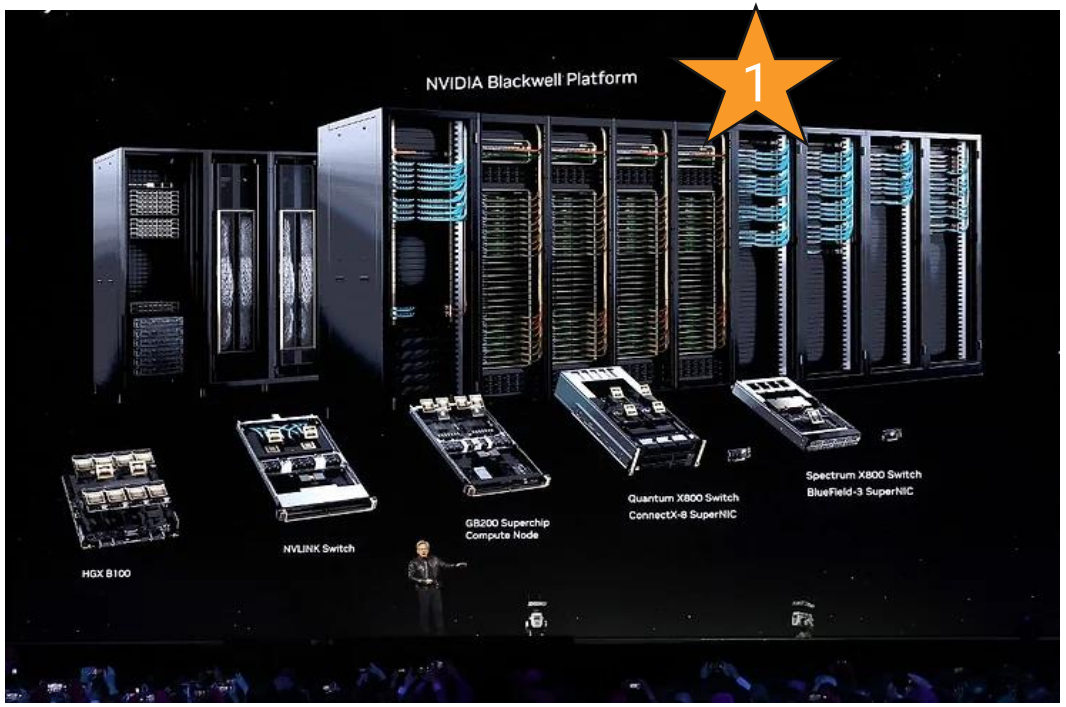
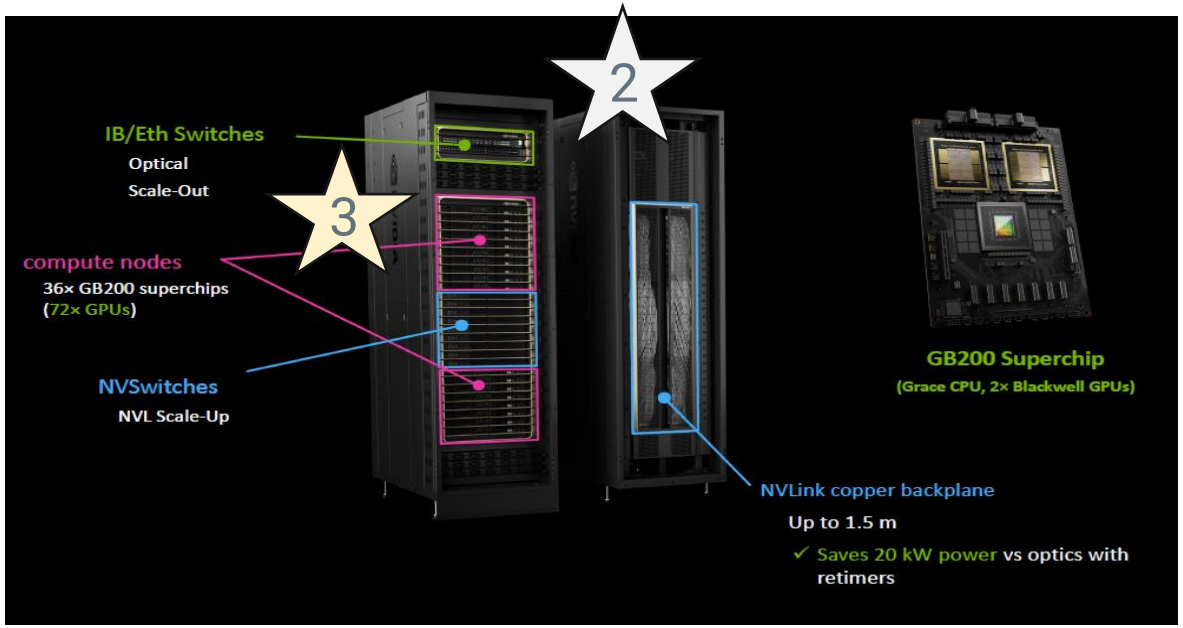
Scale Out – Switch Rack to Switch Rack interconnect using optics (transceiver based)





Scale Out – GPU rack to Switch rack connectivity – migrating to optical cables/CPO

Scale Up – GPU to GPU connectivity – PCB traces migrating to CPO/optical chiplets

Source: Nvidia

AI & Data Center Market Opportunity

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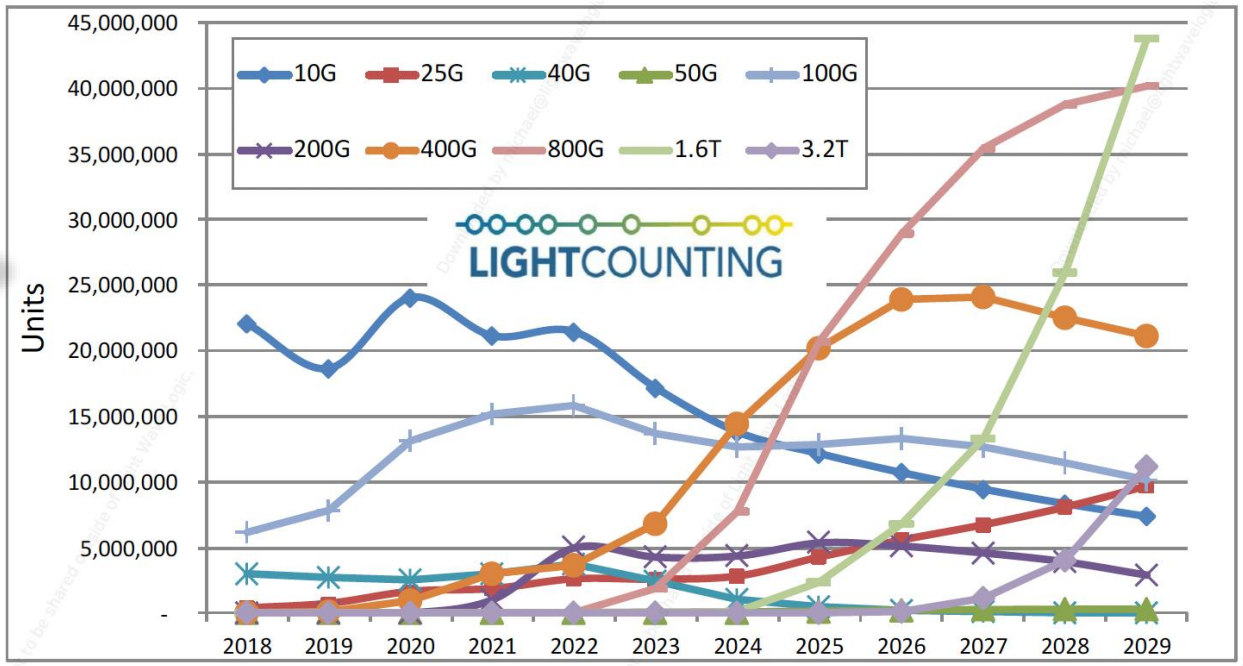
Unprecedented Growth + Opportunity from Global AI Demands and Adoption

>10X

Growth in 800G since 2022

>20X

Forecast growth for 1.6T since 2023



Source: LightCounting

1.6T

800G

3.2T

800G

1.6T & 3.2T

Largest opportunity for LWLG

AI/Datacenter and Telecom Opportunity for Ultra High-Speed Modulators

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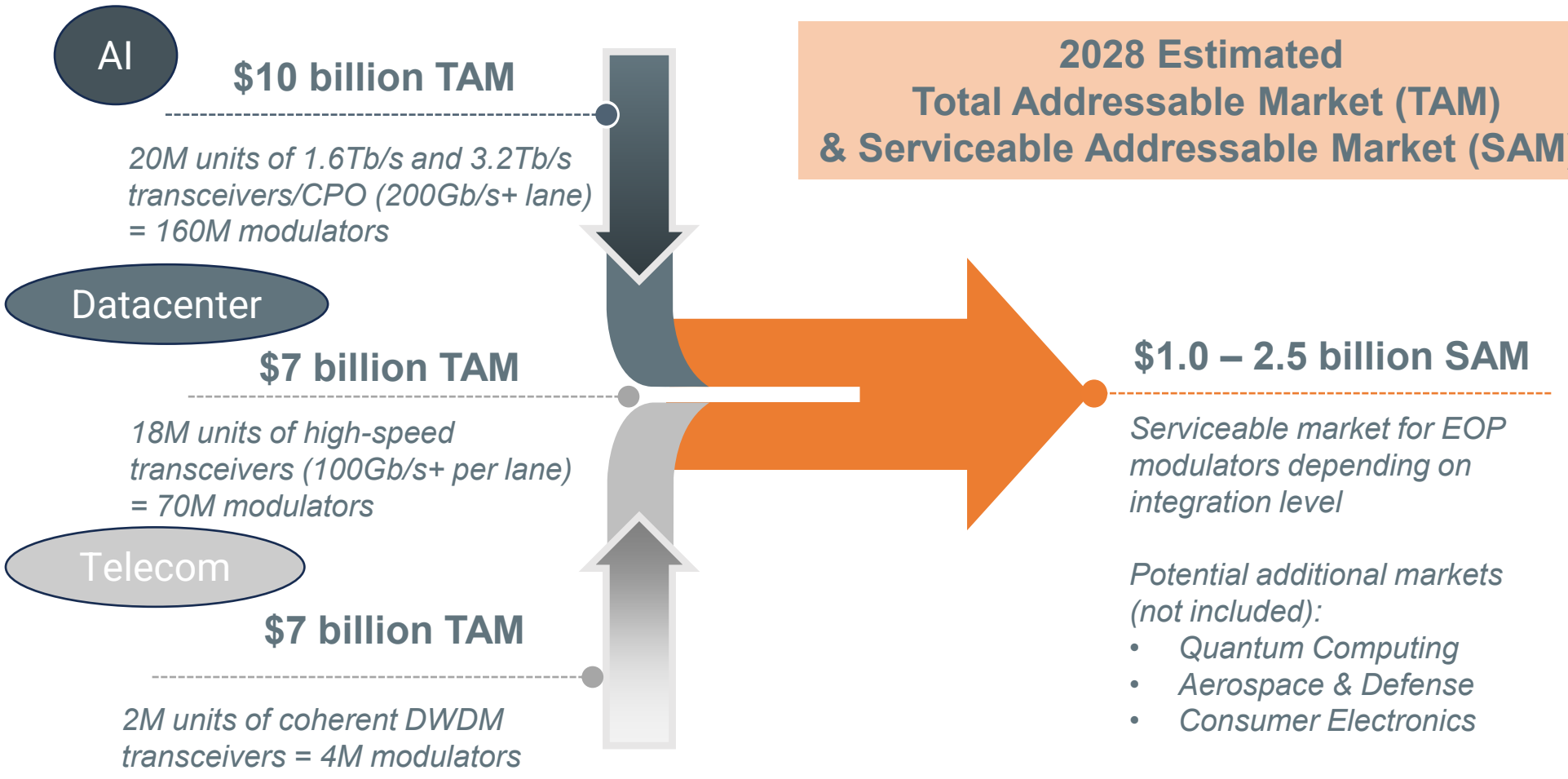

Critical Milestones For LWLG

- Multiple major design wins by 2028 with Tier 1 transceiver and SiPho design houses
- Majority market share for 400Gb/s lane designs
- Technology capable of addressing future customer needs

** Source: LightCounting, internal company estimates*

The Emergence of CPO (Co-Packaged Optics)

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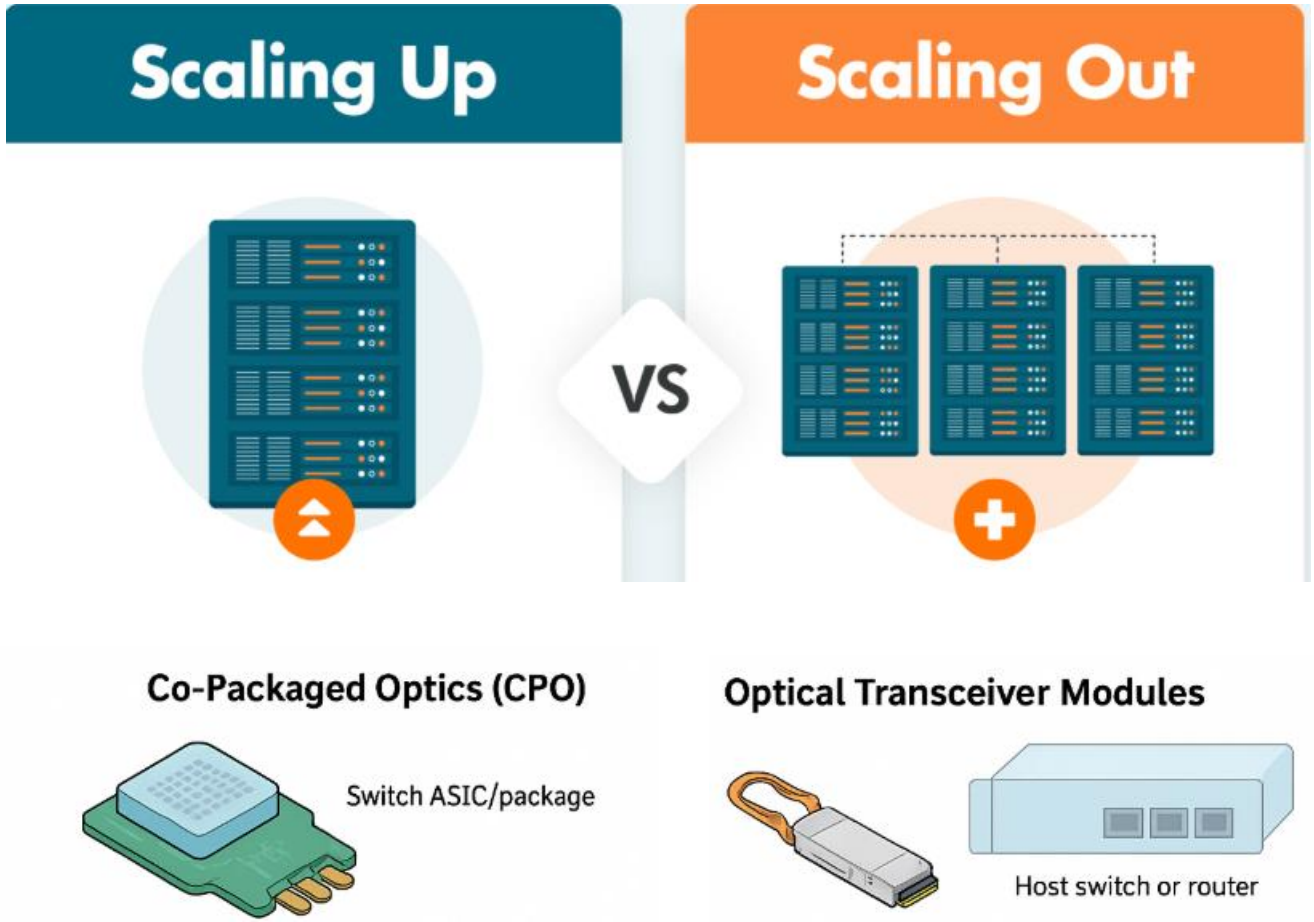
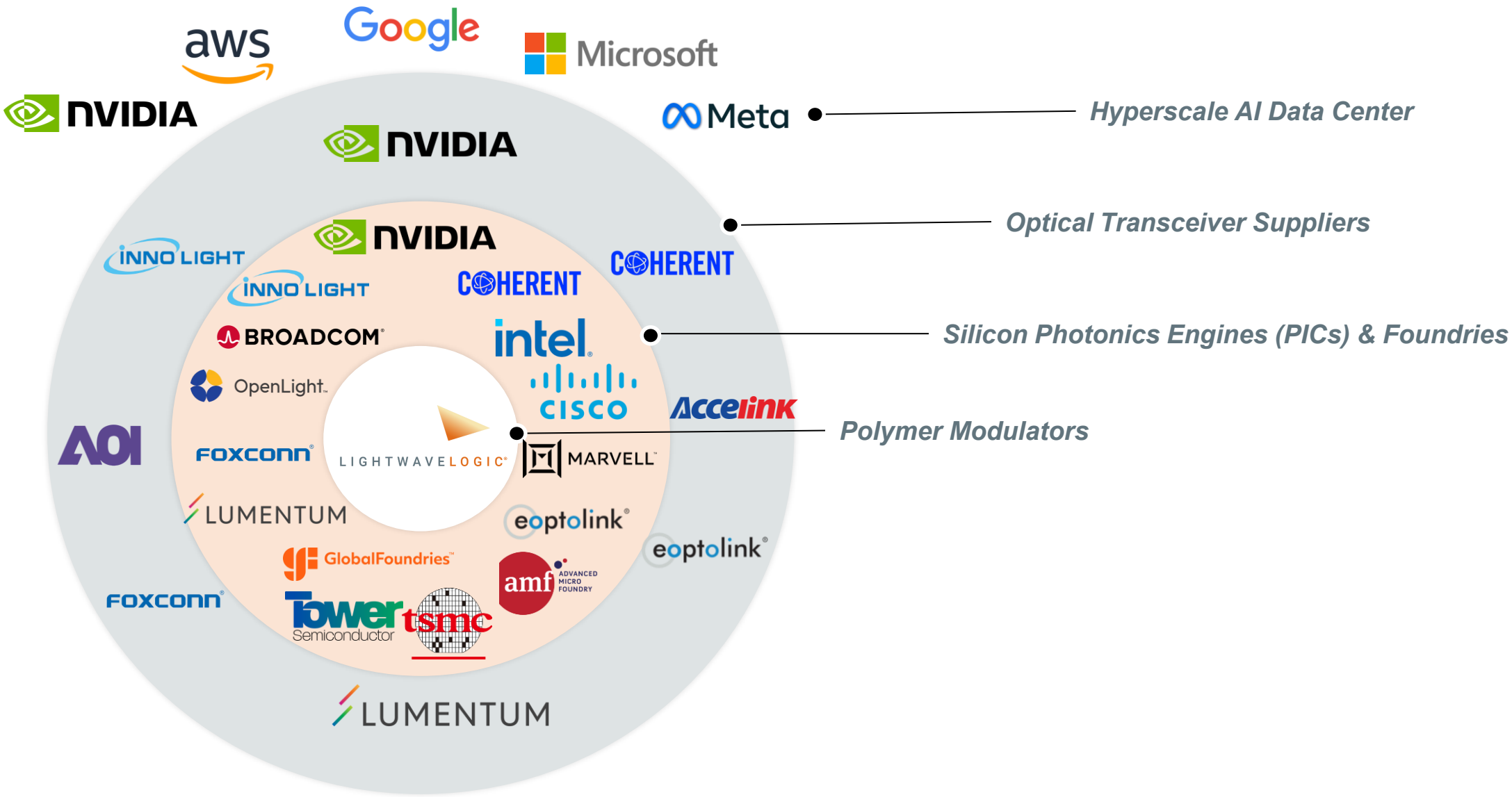


- New market emerging to replace very short electrical copper connections with optical links
- Requires high density ports (size becomes critical), high bandwidth (400G+), low power and ability to integrate with silicon chips

Excellent fit for Perkinamine®; future proof technology unlike legacy material alternatives

Source: LightCounting

Enabling AI Connectivity Ecosystem



Note: Companies represent examples of established entities per segment only.

Entering a New Stage for Lightwave Logic

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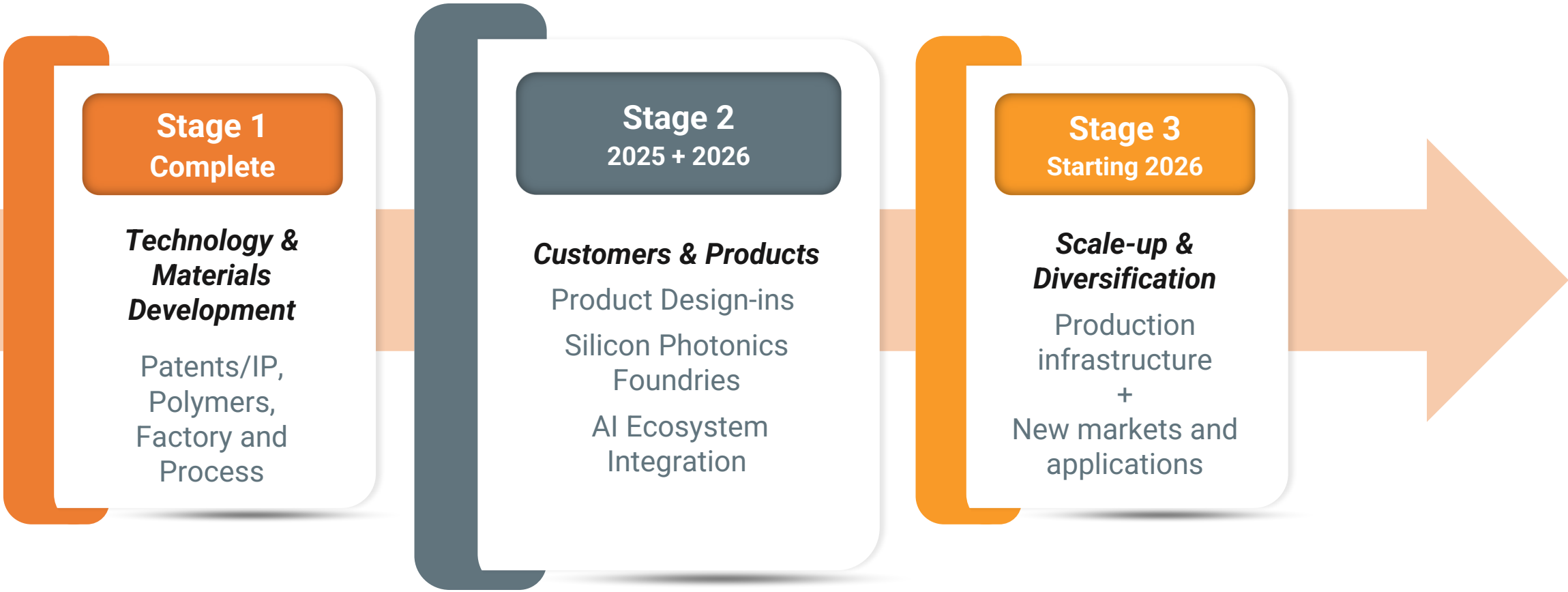
Seizing growth opportunities presented by AI



Design Win Cycle

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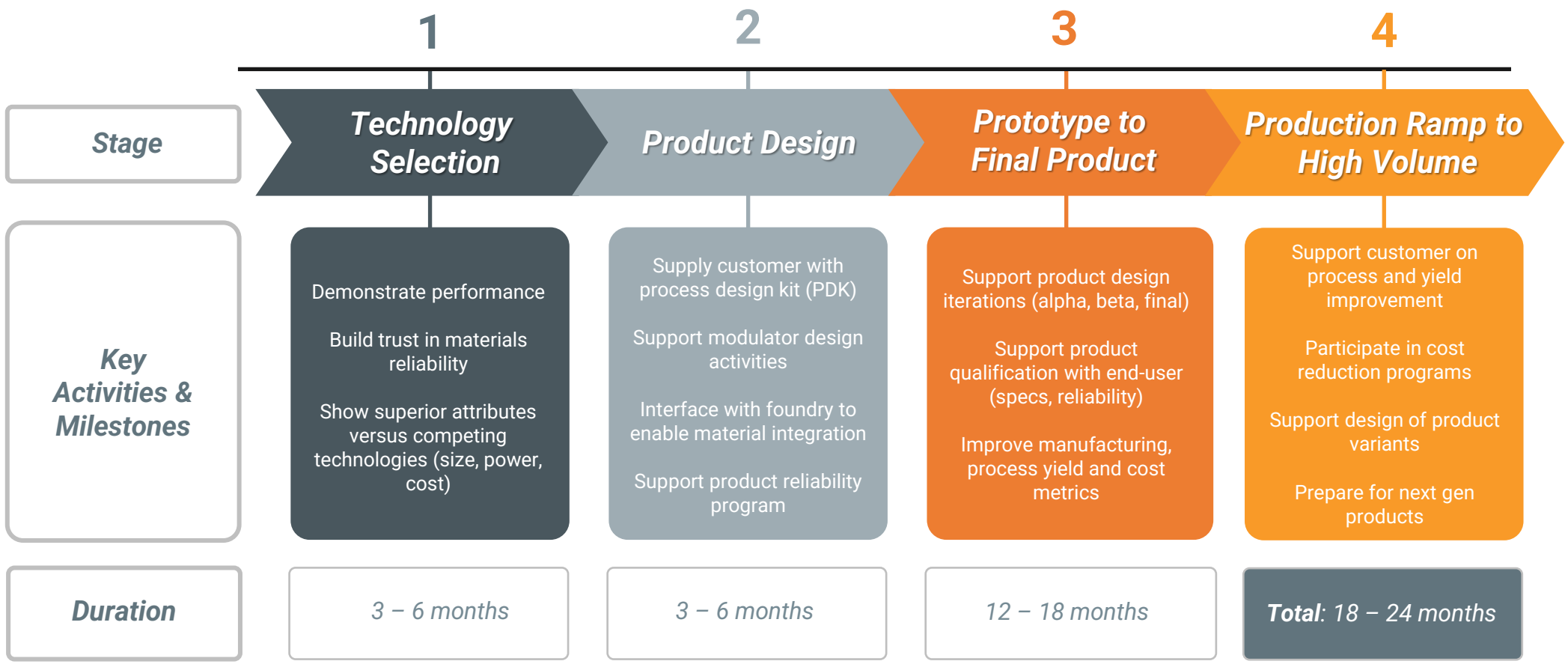

Reaffirming expectation to have 3-5 customers in Stage 3 by year-end 2025

SiPho Meeting its Physical Limits

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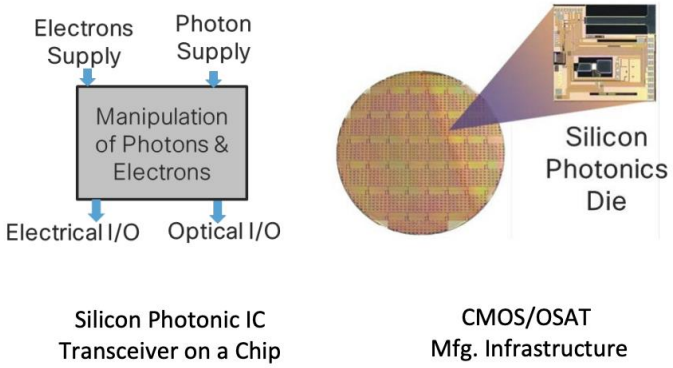
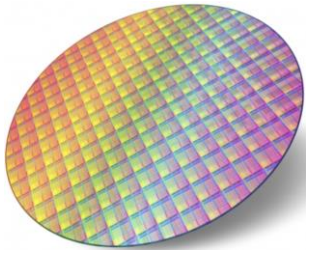
EOP can leverage and supercharge the innovation, scale and infrastructure of SiPho for next gen data speeds

Silicon photonics has enabled the revolution so far…

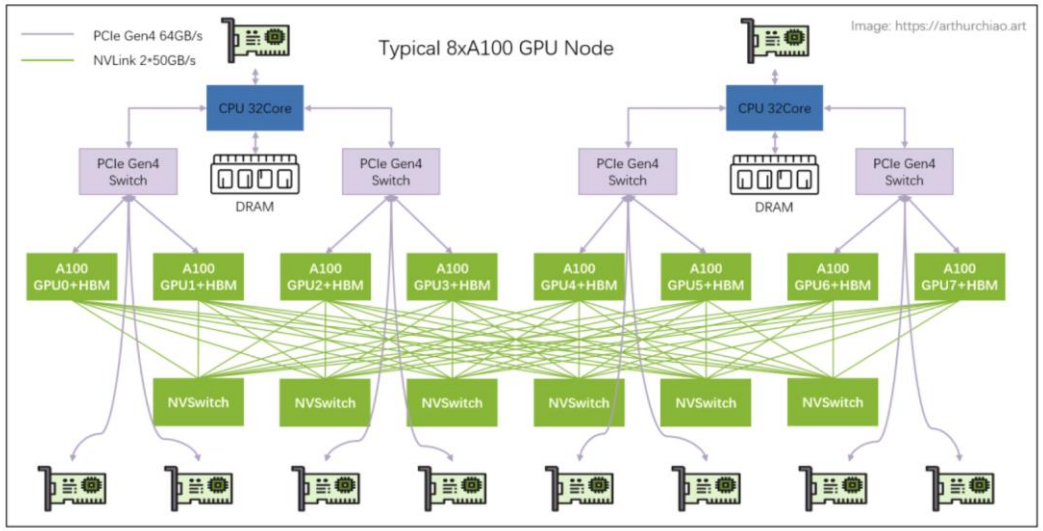


Silicon Photonic IC
Transceiver on a Chip

CMOS/OSAT
Mfg. Infrastructure



But AI Clusters are increasing demand for datacom 10x…



… with optical interconnects growing ∝10x cluster size

Silicon Photonics cannot meet bandwidth requirements; Our material is the key difference maker

Lightwave Logic Edge

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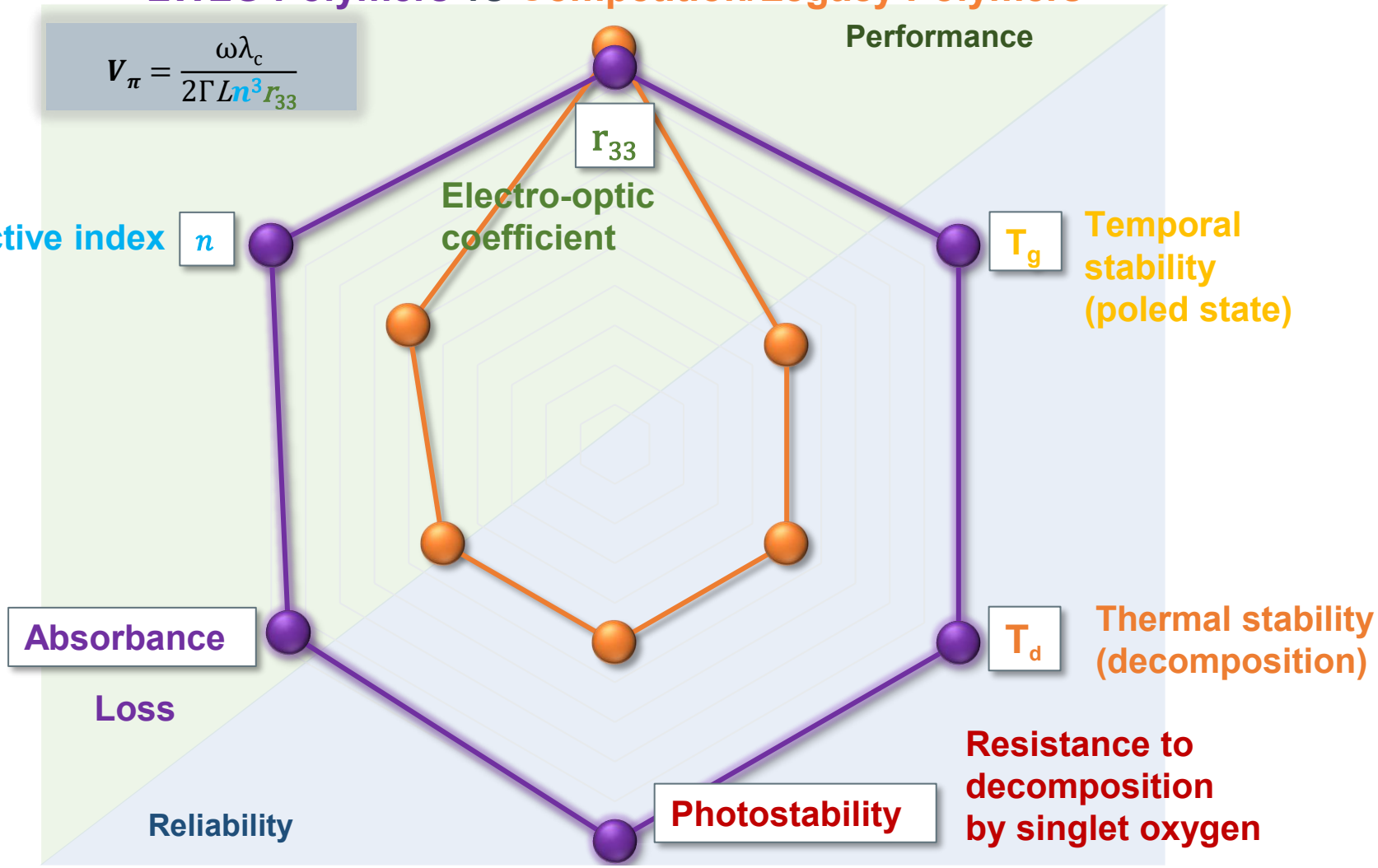
LWLG EO polymers are world-class in every parameter and designed for reliability

LWLG Polymers vs Competition/Legacy Polymers

$$V_\pi = \frac{\omega\lambda_c}{2\Gamma L n^3 r_{33}}$$



EOP Performance vs. Alternative Technology

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LWLG EO polymers have inherently high performance and are fully Si-foundry compatible

Thin-Film LiNbO3 (TFLN)		Electro-optic Polymers
r_{33} intrinsically capped at ~ 31 pm/V at 1310 nm n = 2.2, ε_r = 30 (high dispersion across frequencies)	**Performance**	No intrinsic cap on r_{33} (> 200 pm/V at 1310 nm easily achieved) n ≈ 1.9, ε_r ≈ 3-6 (low dispersion across frequencies)
Integration with Si/SiN very low yielding & basically still in R&D stage Limited wafer size (150 mm) Large device footprint (sub-cm scale) High material cost w/ only one supplier (NanoLN)	**Integration**	Fully Si compatible Easily scalable to 300 (+) mm wafer Very small device footprint (sub-mm scale) Low material cost
Thin film uniformity becomes difficult as wafer size scales up Specialized processing/tools needed – leads to higher costs associated with processing, QC, etc.	**Processing**	Spin-coating produces films with high uniformity No specialized processing/tools needed (completely compatible with existing Si foundry processes/tools) – reduces costs associated with processing, QC, etc.

EOP Reliability

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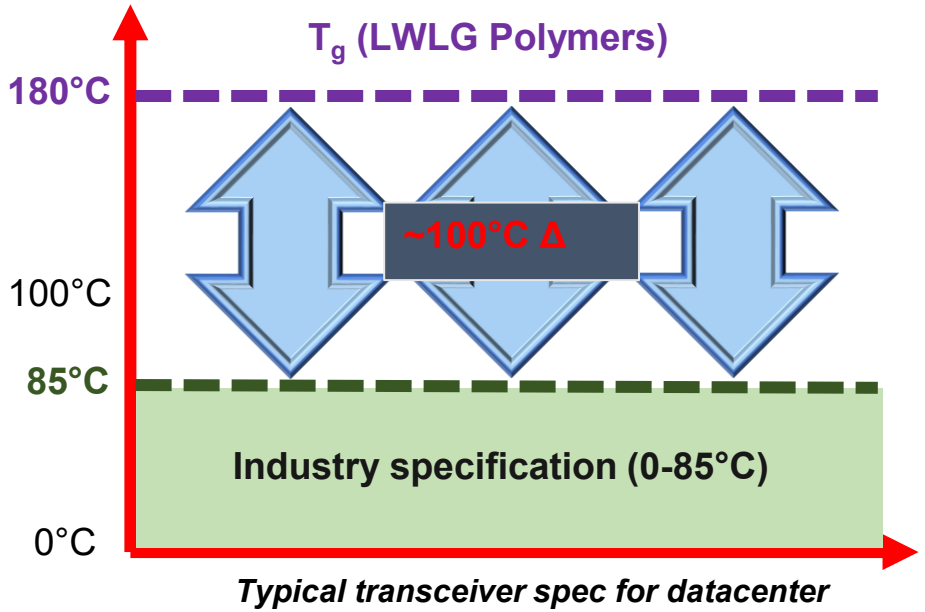
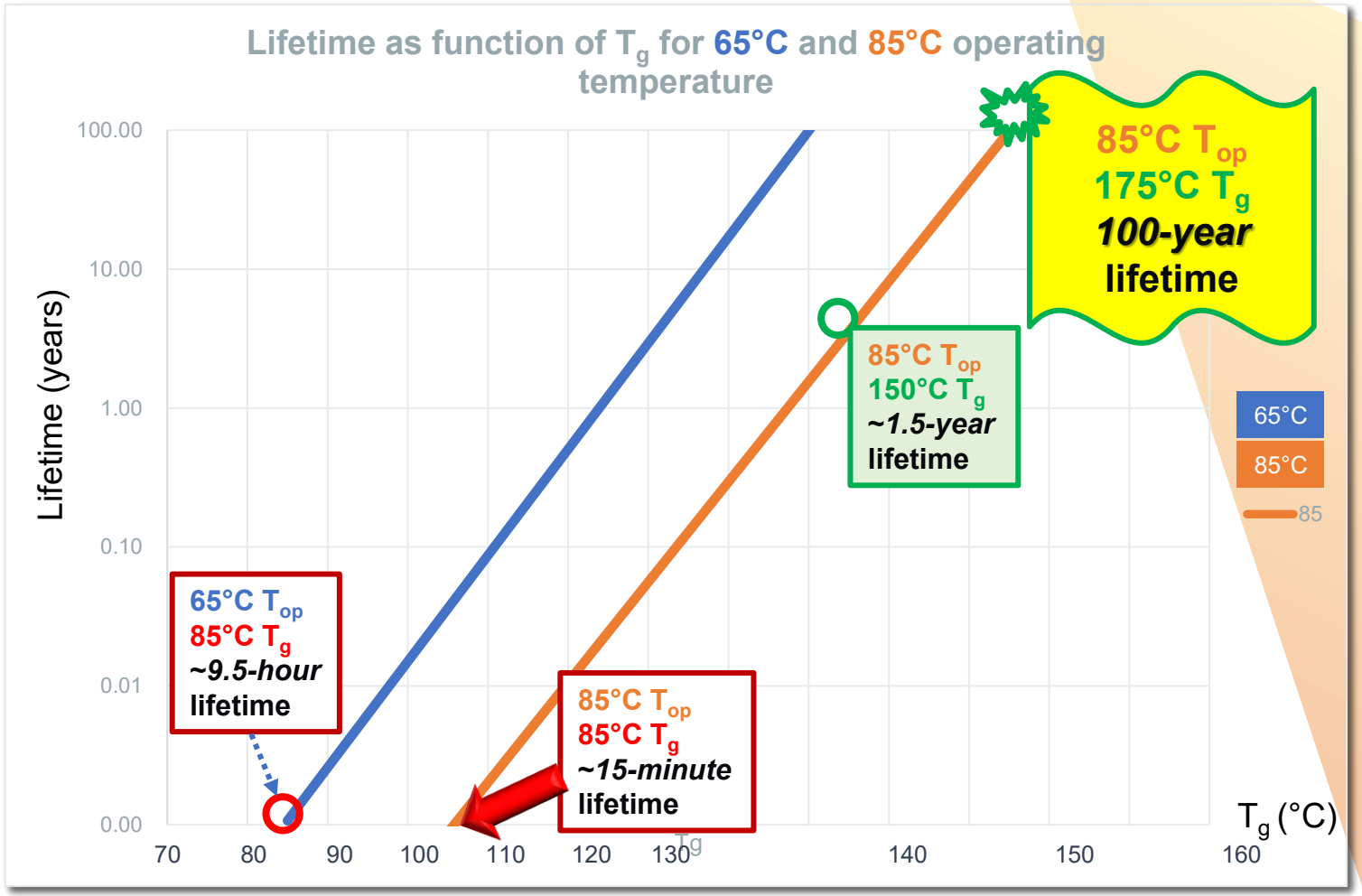
LWLG EO polymers are uniquely resistant to de-poling due to high Tg

Temporal Stability = Orientational Stability of Poled State

- Lifetime = 10% loss of poled state
- Increasing T_g of material increases lifetime (protects from loss of performance due to depoling)
- *LWLG materials designed for high T_g*





Data adapted from: Martin Bösch, Diss. ETH No. 14192, Electro-Optic Polymers: Photochemical Stability and In-Line Modulator, page 21 (https://www.research-collection.ethz.ch/handle/20.500.11850/145319)

CMOS Compatible Process Flow

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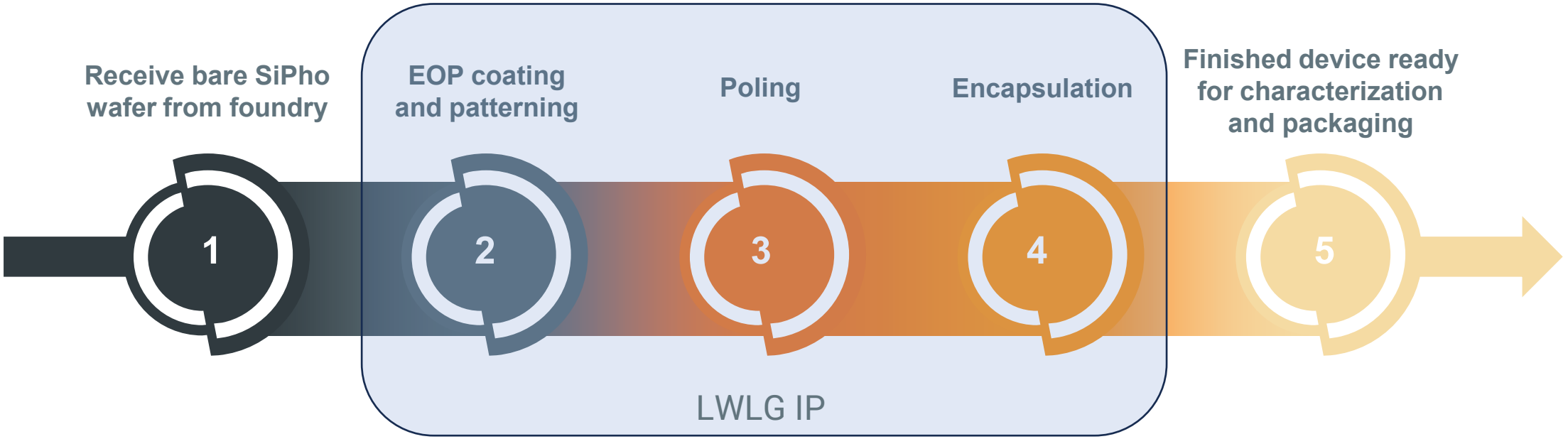
Fully compatible and integrable with SiPho foundry process

LWLG Backend/Encapsulation Process:

Currently performed in-house; fully documented and ready for transfer to the foundry



Perkinamine® Reliability Breakthrough

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Successful passing of Telcordia GR-468 85/85 environmental stress test validates long-term reliability

1

Sample Selection

- Thin-film devices with second-generation proprietary encapsulation barrier

2

Stress Conditions

- 85 °C and 85 % relative humidity for 1,000 hours
  - **Industry standard rigorous conditions**

3

Performance

- Change in absorbance measurements showed **only 1.6% average loss** after 1,000 hours

4

Pass Rate

- More than 11 samples **exceeded Telcordia GR-468 requirements** by a wide margin

✓ *Confirmation that our EO polymer materials can **maintain performance** over time in harsh operating conditions*

✓ *Similarities with the **trajectory of Organic LEDs** before deployment in real-world applications*

✓ *Robust **protection against moisture and oxygen***

✓ *Significant breakthrough with **fourth-generation atomic layer deposition** (ALD) encapsulation material*

Proof of reliability is critical to convince customers to proceed in design win cycle

Commercial Impact & Next Steps

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Critical milestone for Stage 1 & 2 customers, preparing material for on-device reliability

1

Results have been shared with key customers

- Very positive reception and increasing industry's confidence on materials readiness

2

85/85 Success

- Demonstrates we can protect from oxygen/moisture even with second generation encapsulation addressing historical challenges of EO polymers

3

Fourth-generation atomic layer deposition (ALD) encapsulation for future requirements

- Oxygen transmission rate (OTR) of 1.4×10^{-6} g/m²/day-approaching the measurement limit of state-of-the-art OTR instrumentation
- This performance far exceeds the "gold-box" standard of 7×10^{-6} g/m²/day for lifetime reliability
- Preparing this fourth-generation encapsulation material for its next-release back-end-of-line (BEOL) Process Design Kit (PDK) for integration into silicon photonics foundries

4

Next step is to demonstrate reliability *on devices in partnership with customers*

- Focused on continuous improvement of materials, process and encapsulation

Enhance Operational Excellence to Benefit Tier 1s and Foundries

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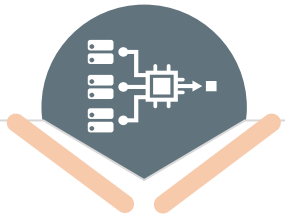
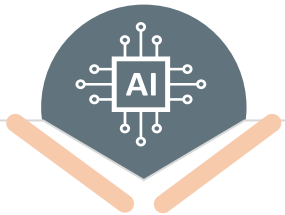
Key Focus Areas:

Materials Production



Backend Semiconductor Process

Reliability + Qualification Toolkit



High-Speed RF Electronics Expertise

Internal Business Processes + People

Adding rigor to our commercialization efforts

Enabling the Utilization of Polymers for Industry Applications

Preparing for commercialization

1

Reliability Testing

- Successful passing of Telcordia GR-468 85/85 environmental stress test validates long-term reliability
- Conducting photosensitivity testing for high optical power
- Deployed infrastructure for co-testing customer chips for reliability

2

Scaling Up for Repeatability

- Ramping polymer production equipment for mass production
  - Purchased flow process machine
  - Adding photochemistry processor

3

Developing Next Generation Polymer/Chromophore for:

- Heterogeneous packaging applications
- Quantum Computing, Aerospace & Defense, and Consumer Electronics applications

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Customer and Application Support

One of our great values is our expertise in integration and processing

1

Integration Efforts

- Continuing collaboration on enhancing plasmonic modulators for multi-terabit applications
- Initiating customer-led program to co-design polymer-based SiPH based customer modulators for transceiver applications

2

Back End of Line (BEOL) Expertise

- Developed polymer “PDK” to seamlessly integrate with Outsourced Semiconductor Assembly and Test (OSAT) and fab “ADK” and related processes for manufacturing modulators

3

RF Engineering

- Program to assist customer RF teams to model terabit modulators in concert with optical modeling

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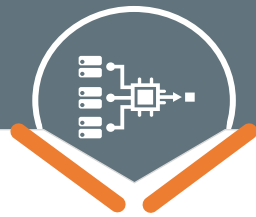

Backend Semiconductor Process

High-Speed RF Electronics Expertise

Company Infrastructure Improvement

Positioning company infrastructure for growth and scalability

LIGHTWAVELOGIC®

1

Drive Operational Excellence

- Completed review of all policies and procedures
- Adding rigor to our technology commercialization process

2

People

- Optimizing and improving teams across Engineering, Marketing, Reliability, IT and HR
- New Senior VP of Sales & Marketing and new VP of Engineering
- Established sales and distribution channels in Asia via partnership with Photonteck

3

Facility

- Continuous improvements to in-house BEOL processes with infrastructure transferable to semiconductor foundries
- Enhanced state-of-the-art test and verification lab with improvements to 110 GHz testbed
- “Stress tested” ability to utilize 25,000 square foot facility to scale volume production as required

Internal Business Processes + People

LIGHTWAVELOGIC®

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