



QUANTUMVEST

Photonics & Silicon Photonics: A Sector Investment Thesis

A high growth sector spanning datacom optics, silicon photonics, sensing and lidar, and industrial lasers

August 2026

Table of Contents

The Big Picture	3	Why We Are Overweight	11
What Photonics Is, and Its Sub-Segments	4	What Is Priced In, and What the Market Misses	12
Market Size and Growth	5	Where the Moats Actually Are	13
The Copper Wall: an Energy Problem	6	Earnings and Margin Drivers	14
How a Silicon Photonics Chip Works	7	Technology Roadmap and Catalyst Calendar	15
Why This Matters Beyond the Data Center	8	Ranking Scorecard	16
Where the Margin Sits in the Value Chain	9	Comparable Valuation	17
Key Players and Market Structure	10	Risks and What Would Change Our Mind	18

The Big Picture

SECTOR RATING

OVERWEIGHT

12-month view, vs. NDX-100 and S&P 500

Preferred: COHR, LITE, GFS, AVGO

ONE-LINE THESIS

AI has broken the economics of how data moves inside a data center. Just connecting the chips together now burns close to a third of the power, and today's copper wiring cannot go much faster. So the hyperscalers, the giant cloud operators, are rebuilding that wiring out of light instead of electricity. Silicon photonics is the technology that makes that switch cheap and mass-producible. We expect these companies to grow earnings faster than the market as the shift plays out.

~27%

Silicon-photonics revenue CAGR, 2026 to 2030E

\$16B

2025 market for the optics inside data centers, up 60 percent

~38x

Median forward P/E across our coverage names



KEY CATALYST

The next-generation optical switches from Broadcom and Nvidia start shipping in volume across 2026 and 2027. That pulls the whole supply chain forward.



KEY RISK

The group is now a leveraged bet on AI spending. A pause, or a delay in the new optics, would knock these rich valuations down fast.

What Photonics Is, and Its Sub-Segments

Photonics means using light to do jobs we normally give to electricity, like carrying information, sensing the world, and delivering energy. It is about a 1.0 trillion dollar base today, and silicon photonics, the version built onto computer chips, is its fastest-growing corner.



Datacom & Telecom

Fiber and the optical parts that move data. This is the growth engine, driven by AI data centers and 5G.



Industrial Lasers

Cutting, welding, and 3D printing. Mature, cyclical, and cash generative.



Sensing & LiDAR

Laser-based 3D sensing for self-driving and robots, plus environmental and defense uses.



Displays & Imaging

Screens, camera sensors, and 3D depth like Face ID. A large share of the total market.



Biophotonics & Medical

Medical imaging, endoscopy, bedside diagnostic tests, and DNA sequencing.



Emerging Frontier

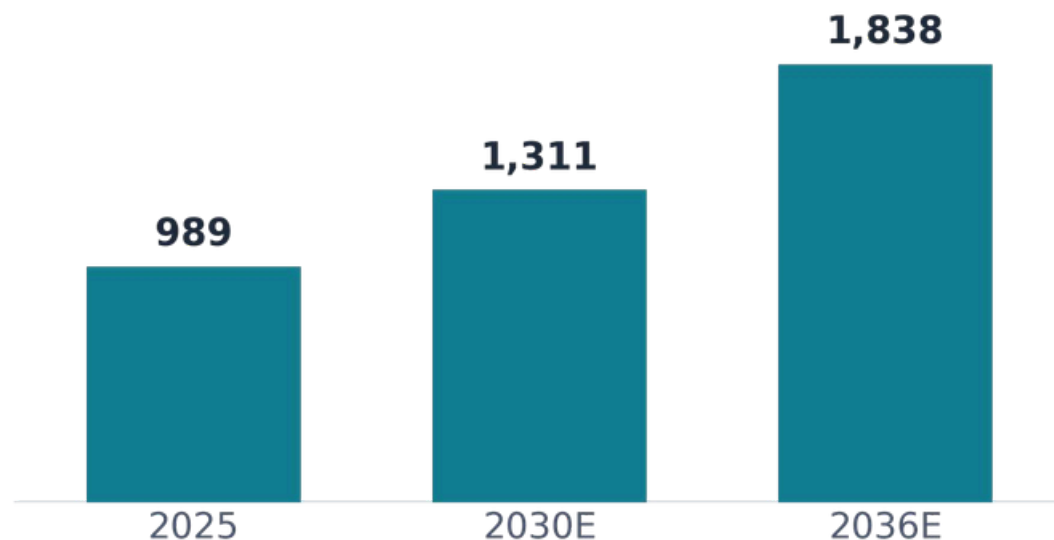
Computers that calculate with light, plus light-based quantum machines. The highest ceiling and longest wait.

ABOUT THE SECTOR

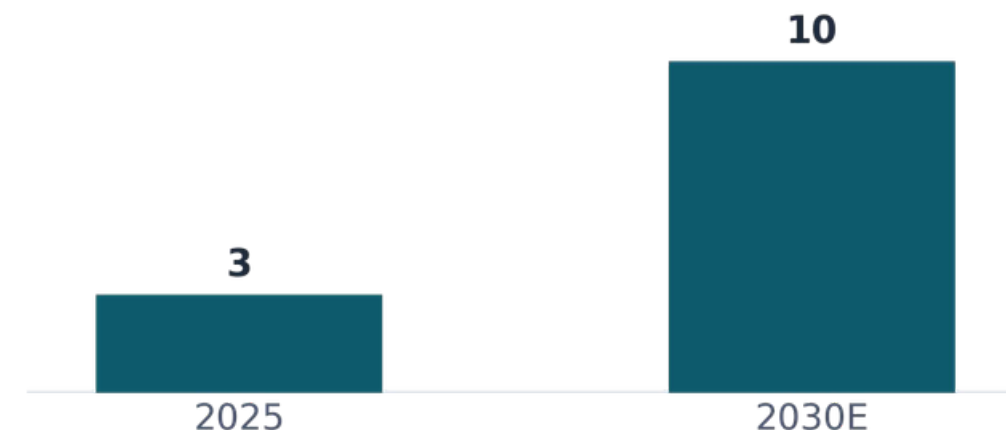
Market Size and Growth

Total photonics market (\$B)

2025 to 2036, about 5.8 percent CAGR. Estimates vary by forecaster.



Silicon photonics revenue (\$B)



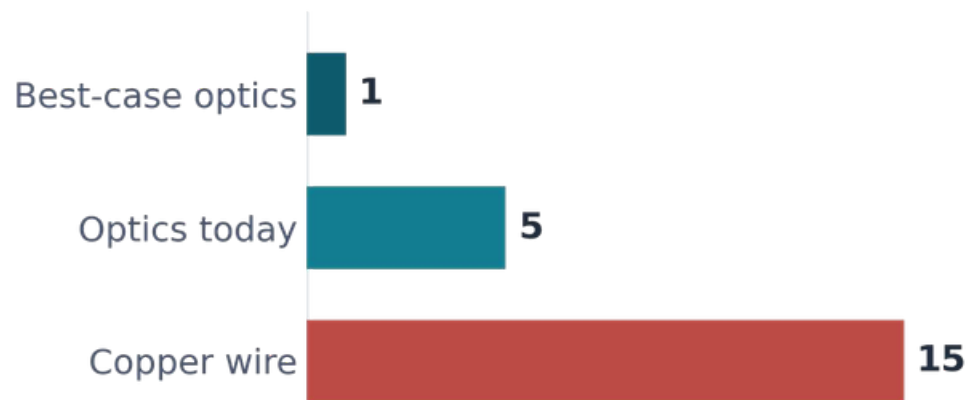
About 27 percent a year, roughly 4 to 5 times the pace of the broader market. The parts that connect AI chips are where the growth, and the shortages, sit.

\$16B market in 2025 for the optics inside data centers, up 60 percent. Each new generation of gear runs faster and uses more optical parts, so the dollars of optics per system keep climbing.

The Copper Wall: an Energy Problem

Every time the data rate doubles, the copper wiring runs hotter and wastes more power. Past a certain speed and distance, it simply cannot keep up with what an AI chip produces, no matter how much power you throw at it. This is a hard physical limit. It is also the core reason the shift to light looks so promising.

Energy used to move data (approximate)



Optics cuts the energy per unit of data by more than 70 percent, and up to about 15 times at the cutting edge.



~30%

of an AI cluster's power now goes just to moving data between chips



~180 MW

the power just to move data in a 1-million-chip cluster, at 6 optical links per chip and about 30W each



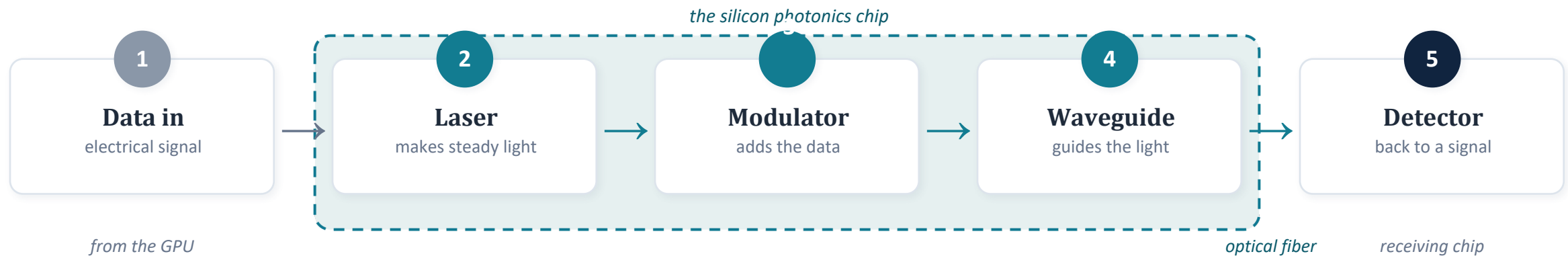
>80%

of the longer links between server racks already use light today

Once moving data eats a third of the power, optics decides how big an AI model a data center can physically train.

HOW IT WORKS

How a Silicon Photonics Chip Works



The big idea. A silicon photonics chip is a normal-looking chip with tiny lasers and light guides built into it. It turns electrical data into pulses of light, sends that light down a glass fiber, and turns it back into data at the far end. Because it is made in standard chip factories, it is cheap enough to put everywhere, which is what makes the optical shift possible at scale.

Why This Matters Beyond the Data Center

Photonics used to be a quiet corner of the tech supply chain, but that is changing fast. As light takes over work once done by electronics, it starts to move where money, power, and value flow. Five areas already show the ripple effects.



AI Compute Economics

Optics resets the cost and power limits of training AI. How big a system you can build now depends on the optics, not just the chips.



Data-Center Spending Mix

A bigger share of data-center budgets shifts away from copper and switches toward lasers and light-based chips.



Autonomy & Robotics

Cheap laser-based 3D sensing finally hits car-level prices. That opens the door to mass-market driver assist and the sensors used in humanoid robots.



Healthcare Delivery

Light-based sensors push medical tests out of central labs. Testing gets cheaper, faster, and less invasive at real scale.



The Compute Frontier

Computers that do the math with light, including light-based quantum machines. The longest-dated prize, and the biggest.

Where the Margin Sits in the Value Chain

The profits in this value chain sit at the two ends: the scarce parts at the start and the specialized chips at the end. The crowded middle, where the modules get assembled, is where prices get competed away.

Layer	What it is	Who plays here	Profit pool
1 • Lasers & light parts	The EML lasers and other light-handling parts	Coherent, Lumentum	High • scarce
2 • Modules	The plug-in units that send and receive the light	InnoLight, Fabrinet, AAOI	Thin • crowded
3 • Specialized chips	The traffic-control and signal-cleaning chips	Broadcom, Marvell, Nvidia	High • scale
4 • Hyperscalers	Amazon, Microsoft, Google, Meta	About two thirds of all demand	Sets the pace

Key Players and Market Structure

Market concentration, 2025



Share of 2025 revenue for optical parts

- Top 5 by revenue: Coherent, Lumentum, Broadcom, Accelink, and InnoLight.
- InnoLight leads in data-center modules. Coherent leads in telecom gear and key parts.
- Chinese firms hold 7 of the top 10 spots in modules.



Fragmented middle, concentrated ends

No single firm dominates the modules. The real power sits with the EML laser makers and the specialized-chip owners.



Chip factories scaling fast

GlobalFoundries, after buying AMF in late 2025, is now the largest chip factory dedicated to silicon photonics. TSMC is pushing its own competing platform.



Nvidia orchestrates demand

About 4 billion dollars into Coherent and Lumentum in March 2026, plus supply agreements. This secures supply and reinforces the broader thesis.

Vendor shares vary by definition. Module and component leadership differ, so we show concentration and roles rather than precise per-vendor percentages.

Why We Are Overweight

We expect these stocks to beat the Nasdaq-100 over the next 6 to 12 months, as the shift to optical wiring turns from a story into real, shipped revenue. We expect earnings growth, rather than multiple expansion, to drive the return.



1 • Demand is cycle-proof

Because physics forces the switch, orders track how many AI clusters get built, not the economy. As a result, the group has unusually high revenue visibility, and demand is difficult to derail.



2 • The supply ceiling is lifting

Supply has been the binding constraint here, more than demand. GlobalFoundries roughly doubling its silicon-photonics output in 2026 turns that bottleneck into a growth lever, on cost curves that keep falling.



3 • Follow the capital, not the noise

Nvidia has put about 4 billion dollars into its optical suppliers, and Marvell and Astera bought optical startups. When buyers and rivals both pay to lock in supply, it's a strong signal that moving data with light is no longer optional.

Horizon and proof points: 6 to 12 months. We watch for the next speed generation ramping, the first co-packaged optics shipping in volume, factories running full, and steady spending guidance from the hyperscalers. The call weakens if orders stall, or if co-packaged optics slips past 2027.

What Is Priced In, and What the Market Misses



Already in the price

- The broad idea that AI needs optics. Generalist investors already own it after the 2026 rally.
- Nvidia's 4 billion dollar halo and the headline product launches.
- Rich headline valuations on the momentum names.
- Near-term strength in the current generation of gear.



What we think the market misses

- The amount of optics in each system keeps rising. The dollars per rack climb with every new generation, on top of selling more units.
- New factory capacity is a good sign, not just a cost. Supply was the real limit, and it is being removed.
- Demand beyond data centers. Laser sensing and medical uses are a second wave the AI focus tends to ignore.
- Scarce parts like EML lasers hold pricing power longer than a normal hardware cycle.

Our edge: the market counts units well but underrates how much optics goes into each system, and how long the parts stay scarce. Those two levers keep earnings compounding.

Where the Moats Actually Are



Entry barriers

Making the EML lasers, packaging the optics, and building factory relationships take years and serious money. The manufacturing know-how is as scarce as the patents.



Pricing power

It concentrates where supply is tight, in the EMLs and the light-based chips. Basic, older modules get commoditized as new entrants pile in.



Consolidation

A clear land grab is underway. Marvell bought Celestial AI for up to 5.5 billion dollars, Astera bought a photonics startup, and Nvidia took equity stakes. Companies are buying their way into scale instead of building it from scratch.



Competitive intensity

It runs high in modules, where Chinese suppliers like InnoLight hold big share with the hyperscalers. Winning increasingly needs an edge in the scarce parts or the chips.

Earnings and Margin Drivers

Demand drivers, top-line pull

- AI spending by the hyperscalers, and bigger systems.
- Each new, faster generation packs in more optics, lifting the dollars per system.
- The shift to co-packaged optics, where the optics move onto the main chip.
- A second wave in car sensors, medical, and 5G.

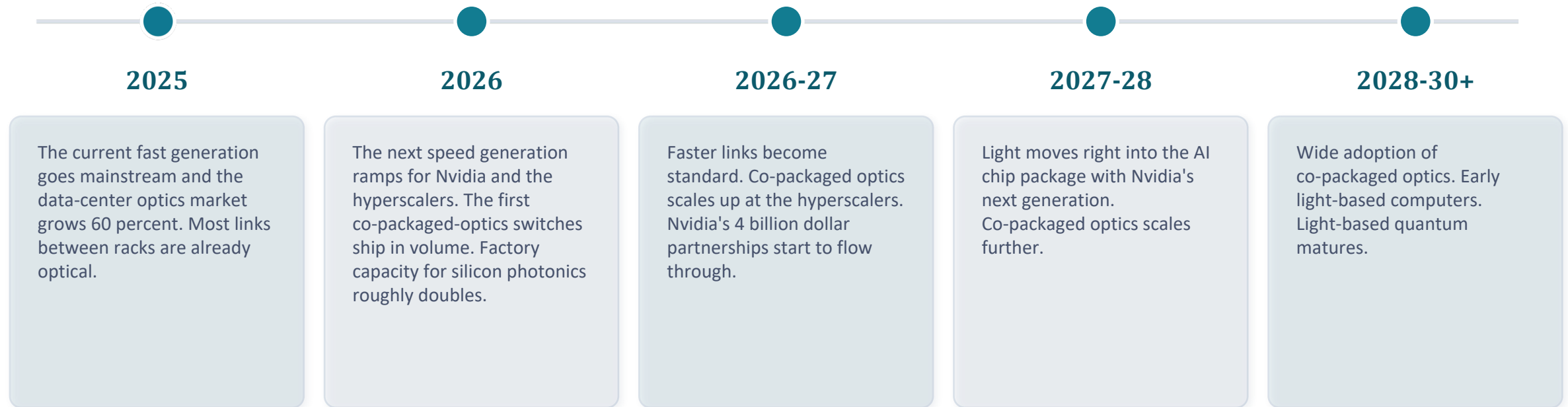
Cost drivers, margin pressure

- The EML lasers in short supply, the main limit on how much can be built.
- Specialty materials and wafer costs.
- Assembly and testing labor, plus currency swings for makers like Fabrinet.
- Getting new production lines up to speed, and falling prices in modules.



Margin trajectory: we expect profit margins to widen for firms that make their own scarce parts, since tight supply keeps prices firm. A shift toward high-volume, lower-margin modules offsets some of that. Margins also improve as factories fill up and R&D spreads over more sales. The firms that make their own parts, plus the chip factory, look best.

Technology Roadmap and Catalyst Calendar



Near-term watch, next two quarters: Earnings and order books from Coherent, Lumentum, and Fabrinet. Progress on the next speed generation. News on co-packaged-optics wins. GlobalFoundries capacity updates. Spending guidance from the hyperscalers.

Ranking Scorecard

Company	Optical Exposure	Rev Growth	Valuation Appeal	Moat	Balance Sheet	Composite
Coherent (COHR)	H	M	M	H	M	H
Lumentum (LITE)	H	H	M	M	M	H
GlobalFoundries (GFS)	M	M	H	M	M	H
Broadcom (AVGO)	M	M	H	H	H	H
Fabrinet (FN)	H	M	M	M	H	M
Marvell (MRVL)	M	H	L	H	M	M
Credo (CRDO)	H	H	M	M	H	M
Astera Labs (ALAB)	M	H	L	M	H	M
Applied Optoelectronics (AAOI)	M	H	L	L	L	L

 H = favourable

 M = neutral

 L = unfavourable

Composite favours positive Street upside, defensible moats, and reasonable valuation. It penalises the most expensive names.

Comparable Valuation

Company	Role	Mkt Cap	Fwd P/E	Rev CAGR '25 to '27E	Rating	12-mo Upside*
★ Coherent (COHR)	Pure-play optics	~\$55B	~38x	~18%	Overweight	+40%
★ Lumentum (LITE)	Lasers and optical modules	~\$56B	~45x	~22%	Overweight	+57%
★ GlobalFoundries (GFS)	Silicon-photonics factory	~\$32B	~29x	~12%	Overweight	+41%
★ Broadcom (AVGO)	Network chips and optics	~\$1.81T	~25x	~20%	Overweight	+38%
Fabrinet (FN)	Optical manufacturing	~\$17B	~29x	~15%	Neutral	+60%
Marvell (MRVL)	Custom chips	~\$168B	~42x	~25%	Neutral	+37%
Credo (CRDO)	Connectivity	~\$39B	~34x	~40%	Neutral	+37%
Astera Labs (ALAB)	Connectivity chips	~\$56B	~96x	~45%	Neutral	-6%
Applied Optoelectronics (AAOI)	Modules	~\$8B	~56x	~30%	Neutral	+70%

*12-mo upside is the TradingView consensus price target versus current price, as of 16 Jul 2026, intraday, during a broad optical-stock selloff, so consensus targets sit above spot across most names. Market cap and forward P/E from S&P Global via stockanalysis.com. Figures are approximate and rounded. Rev CAGR runs 2025 to 2027E and is estimated. Internal view, not a recommendation to trade.

Risks and What Would Change Our Mind



Sector-level, breaks the call

- An AI spending air pocket. A pause by the hyperscalers would hit the whole group first and hardest.
- Valuation. Multiples of roughly 25x to 96x leave little room for a growth miss.
- Technology substitution. Better copper, or a cheaper optics approach, could delay co-packaged optics.
- Customer concentration. Demand runs through a handful of hyperscalers and Nvidia.
- Geopolitics. Export controls, China supply like InnoLight, and tariffs all matter.



Stock-specific, top picks

- COHR. Integration and debt load, plus execution on the Nvidia ramp.
- LITE. A narrow lead in the newest EMLs, and reliance on one product line.
- GFS. Its broader chip-factory ups and downs can mask the silicon-photonics upside.
- AVGO. Size means optics is only one driver among many.



Downgrade triggers, to Neutral

Two straight quarters of slowing orders. Co-packaged optics slipping past 2027. Or a cut to spending guidance from the hyperscalers.