



Global AI Trend Tracker

Global Markets Research

15 April 2026

EQUITY: TECHNOLOGY

Optical circuit switch at center of AI network

China component players likely to benefit from this rising AI trend

Optical circuit switch (OCS) may play a more crucial role in global AI networks, and optical component makers could enjoy a growing OCS market

An optical circuit switch (OCS) is a full-optics switch which can establish an end-to-end optical network and does not require optical-electronic signal conversion. Compared with a traditional electronic switch, an OCS has several key advantages such as low latency, low power consumption, and high bandwidth. First adopted by Google (GOOG US, Not rated) in its TPU v4 network, OCS' development has accelerated in recent years, with multiple vendors across the **US [i.e., Lumentum (LITE US, Not rated), and Coherent (COHR US, Not rated)] and China [i.e., InnoLight (300308 CH, Buy) and Eoptolink (300502 CH, Not rated)] involved in its development**. Recently, in the OFC (Optical Fiber Communication) 2026 conference, **NVIDIA (NVDA US, Not rated) discussed the next-gen Dragonfly architecture**, and noted that OCS can be deployed for cross-cabinet and cross-cluster networking. According to Signal AI, the OCS market was dominated by Google in 2025, and has an **overall market size of about USD400mn, which may exceed USD2.5bn in 2029E, exhibiting a CAGR of ~58% over four years**. We think the OCS market may see a tipping point for accelerated adoption in the near future, as multiple hyperscalers other than Google are now in the trail stage. We think early movers such as InnoLight could benefit from this growing market.

OCS vs CPO vs pluggable: complimentary to each other in scale-up, scale-out, and scale-across networks

Optical communication solutions are gaining traction across all AI networks, including scale-up, scale-out and scale-across networks. In our previous report (*GTC & OFC 2026 preview*), we noted that pluggable transceivers + electronic switches may continue to be the major solutions in the scale-out network, while CPO (co-package optics) may become the key solution in the scale-up network. For OCS, currently, Google has adopted to build a large TPU node (4096 TPU or more) in the scale-up network, but we believe it can also be potentially used in scale-out and scale-across networks. We think it is most applicable to the AI data networks that require dynamic or flexible data routing, which is primarily a complimentary solution to CPO and pluggable solutions.

Key components in OCS value chain and major suppliers to benefit from OCS?

There are four main OCS solutions under development now, including: 1) MEMS (Micro-Electro-Mechanical Systems), which is mainly being developed by Google and Lumentum; 2) DLC (Digital Liquid Crystal) solution, which is mainly being developed by Coherent; 3) Direct Light Beam Steering (DLBS), which is mainly being developed by Polatis (unlisted); 4) SiPh-based solution, which is mainly being developed by iPrionics (unlisted), and InnoLight's subsidiary TeraHop (unlisted) is also working on SiPh-based OCS solutions. We think the total solution providers, as well as key component makers (including MEMS array/units, lens, and fiber array) such as InnoLight and Suzhou TFC (300394 CH, Buy) could benefit from the adoption of OCS products in the next 2-3 years.

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Introduction of OCS: likely a core component in future AI networks

An optical circuit switch (OCS) is a full-optics switching device that provides data routing and forwarding through pure optical signal path switching. An OCS establishes an end-to-end optical network by dynamically adjusting the optical path, eliminating the need for optical-electrical-optical conversion through traditional electrical switches. As all the data in traditional switches need to go through the switching chip, the SerDes (Serializer/Deserializer) rate becomes the core bottleneck of the switch's transmission rate. A high-speed SerDes (224G and above) faces more severe signal integrity and power consumption challenges, while an OCS eliminates the need for packet processing and reduces electrical signal delay through all-optical paths, leading to significant low latency, low power consumption, and high reliability.

OCS is not a new technology, it has been developed by many companies in the 1990s, and was initially applied to telecommunications networks in the form of automated wiring panels. In recent years, Google has been adopting OCS technology for its AI network, and has proved its various advantages such as cost reduction and efficiencies when it was used in a large-scale TPU network.

In addition to Google's development of OCS, the Open Compute Project Foundation (OCP) has also announced the establishment of an OCS subproject to promote collaboration on open optical switching technologies. The project is jointly led by OCP member companies iPrionics, Lumentum, and Coherent, with Google, NVIDIA, etc., as founding members. In China, China Mobile (941 HK, Buy), in its "Cloud Computing Optical Interconnection Development Report," pointed out that Mobile Cloud may consider using OCS to replace the existing Super Spine at the scale-out level in the future. In October 2025, the Ministry of Industry and Information Technology (MIIT) launched the "Millisecond-Level Computing" special action in metropolitan areas, promoting the application and deployment of technologies such as OCS and optoelectronic converged networking in computing centers to improve network performance. Recently, MIIT has identified OCS as the standard underlying technology of computing power networks. At the OFC 2026, Chinese optical communication companies, such as Innolight, Eoptolink (300502 CH, Not rated), and Accelink all released OCS products.

Key advantages and limitations of OCS

Key advantages of OCS include:

1. Ultra-low latency: no optical-electric conversion is required, and the delay is reduced to nanoseconds (10-100ns), which is only 1/100th of an electrical switch;
2. Low power consumption: only the driver module consumes power, no switching chip and supporting optical module, and is only 1/5th of the same bandwidth electrical switch, and;
3. High bandwidth: the protocol is transparent, compatible with various transmission rates and modulation formats, and has strong bandwidth scalability.

Currently, there are still a few obstacles for the deployment of OCS in large-scale AI clusters, and OCS solution providers need to close gaps in the following aspects:

1. Link budget: the insertion loss of existing OCS devices is too high to meet the link budget of existing standard optical transceivers, and so it is necessary to develop a lower-loss OCS device and connector solution;
2. Integration density: the port density of existing OCS devices is insufficient, and the density and performance of connectors cannot match the high-density cabling requirements of AI clusters;
3. Reliability: the failure mode of existing OCS devices is unclear, and there is a lack of redundancy design and hot-swappable capabilities to meet the high availability requirements of AI clusters;
4. Cost: the overall cost of OCS technology is too high to meet the large-scale deployment needs of AI clusters.

NVIDIA mentioned in its OFC 2026 speech that reducing the number of devices and improving chip integration is the core technology roadmap for its OCS solutions; while the collaborative design of optical devices and AI systems is the key prerequisite for filling all technical gaps and realizing the large-scale implementation of OCS.

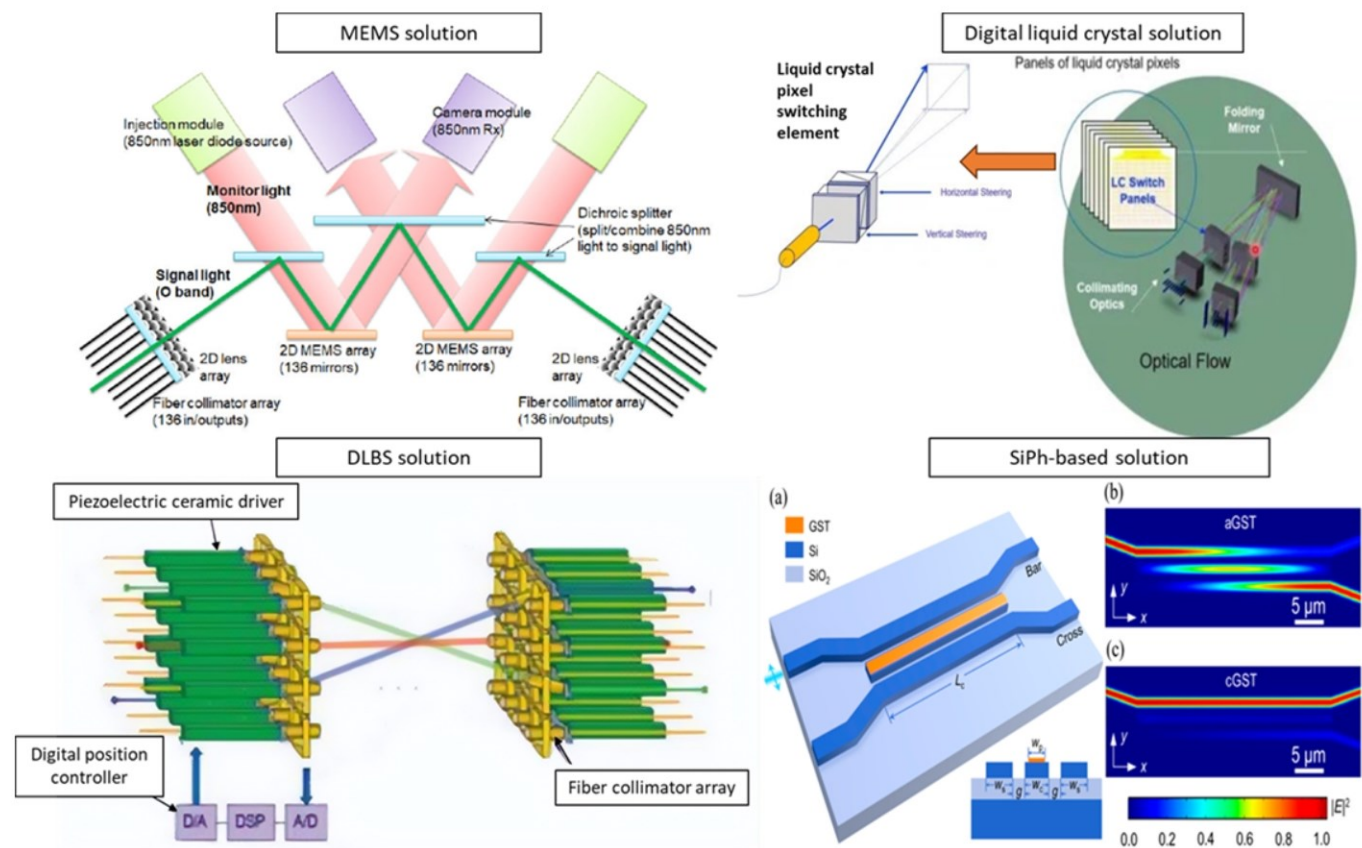
OCS technology roadmap

Main OCS solutions include:

1. **MEMS solution (represented by Google and Lumentum):** MEMS (Micro-Electro-Mechanical Systems) technology requires etching a micro-mirror array on a silicon wafer. Electrostatic or magnetic actuators drive the mirrors to tilt, precisely changing the direction of light propagation. This is currently the most widely used OCS technology. According to Google, its "Apollo" OCS platform, built on MEMS, directly achieves a 30% cost reduction and a 40% power consumption reduction;
2. **Digital Liquid Crystal solution (represented by Coherent):** unlike the "mechanical actuation" of MEMS, DLC (Digital Liquid Crystal) is a purely non-mechanical solution. It relies on an external electric field to change the refractive index of the liquid crystal material, achieving precise control of the optical path. Its biggest advantage is "low voltage + high reliability," with a driving voltage below 10V, making it suitable for scenarios with stringent stability requirements, such as submarine networks;
3. **Direct Light Beam Steering (DLBS) solution (represented by Polatis):** DLBS consists of an optical fiber collimator, a two-dimensional piezoelectric actuator, and a precise position sensor. It relies on the electromechanical coupling effect of piezoelectric ceramics to drive the collimator to tilt and achieve rapid beam alignment. Compared to MEMS architectures, piezoelectric ceramic-based technology has inherent advantages in terms of insertion loss and return loss, and;
4. **SiPh-based solution (represented by iPrionics):** it utilizes silicon-based materials to transmit optical signals via waveguides, eliminating the need for photoelectric conversion and directly reconstructing the optical path. Theoretically, switching speeds can reach the microsecond or even nanosecond level. However, current silicon optical waveguide solution faces challenges such as high power loss and crosstalk and reliability issues in multi-channel scenarios.

Currently, MEMS is the most mature technology for OCS, as its optical path is relatively simple and the supply chain is stable. The liquid crystal solution has superior physical features in terms of latency and switching speed, but faces greater challenges in mass production and yield improvement.

Fig. 1: OCS technology roadmap



Source: Google, Coherent, ODCC, "Review of 2x2 Silicon Photonic Switches", Nomura research

Fig. 2: Comparison of four main solutions of OCS

Solution	Manufacturer	No. of ports	Cost per port	Optical insertion loss	Switch time	Crosstalk	Reliability
Electrical switch for IB	Mellanox	Medium	High	-	Extreme fast (ns)	-	High
MEMS	Lumentum, Jabil, Bright silicon, Dicon fiberoptics, Accelink, Eoptolink, Triple-stone	Large	High	Low (<3dB)	Medium (25ms)	Low	Low
DLC	Coherent	Large	High	Low (<3dB)	Slow (100ms)	Low	High
DLBS	Polatis	Small	High	Low (<3dB)	Medium	High	High
SiPh-based	iPronics, nEye, Terahop, Taclink	Small	Low	High (6dB)	Fast (1ms)	High	High

Source: SignalAI, Nomura research

OCS application scenarios in scale-up/scale-out/scale-across

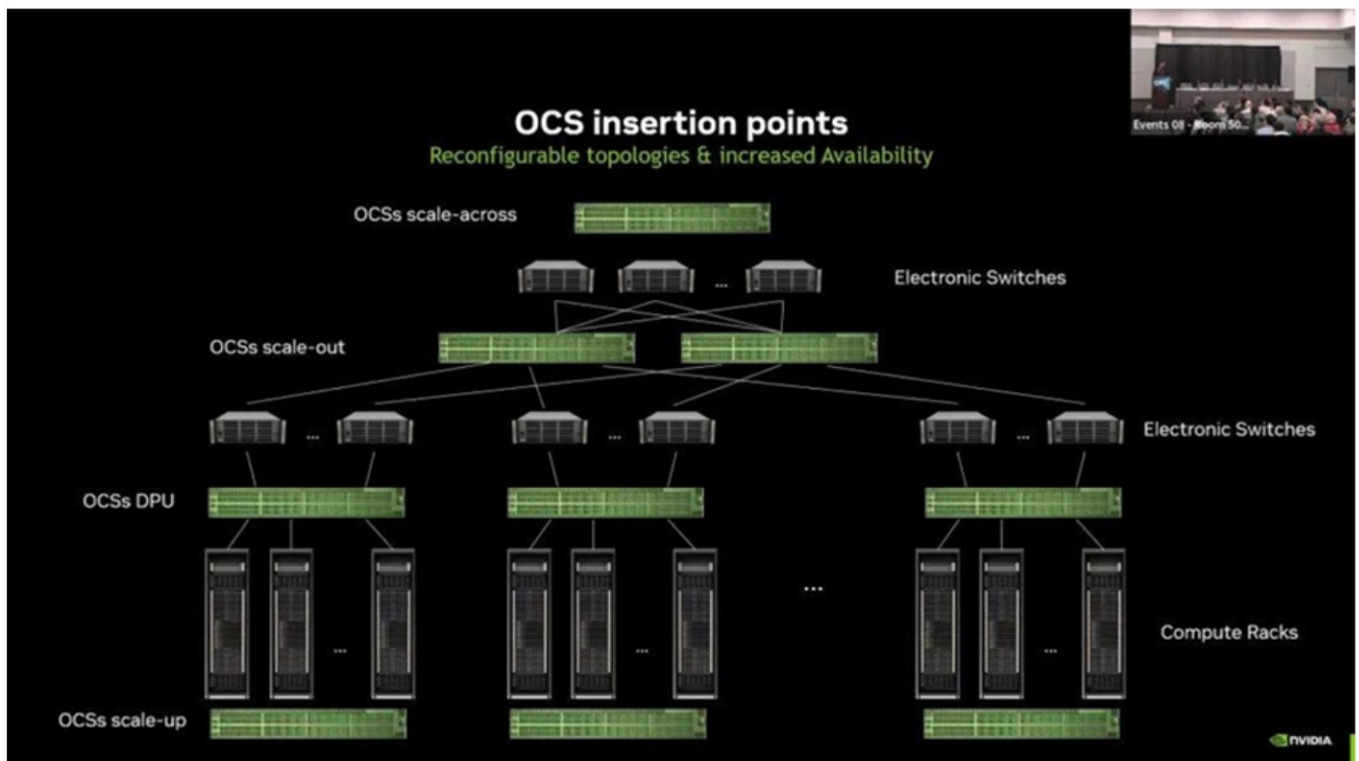
Scale-up: In Google TPU interconnects, the 3D Torus topology relies on OCS to reconstruct the optical path. Using OCS switches, Google is building a unified TPU resource pool, which can allocate computing resources on demand and effectively utilize fragmented computing resources.

Scale-out: OCS can be used in the scale-out network to replace Layer 1-2 electrical switches, which may potentially reduce the use of electrical switching chips and optical modules, shortening the data forwarding path, reducing network latency, and achieving more efficient and low-power scale-out networking. According to Google's study, OCS can reduce power consumption by 40%, cost by 30%, and increase throughput by 30%.

Scale-across: OCS can be used for cluster interconnection between multiple buildings or multiple sites across different locations, which can realize flexible networking over long distances and high bandwidth, and meet the needs of ultra-large-scale AI clusters at the multi-campus level. NVIDIA has proposed the next-gen Dragonfly architecture, and noted that OCS is responsible for cross-cabinet and cross-cluster all-optical switching at the

scale-across network.

Fig. 3: NVIDIA's OCS network topology



Source: NVIDIA, Nomura research

OCS vs CPO switch vs traditional switch

CPO and OCS are mostly complementary and can be used in different segments of an AI network, in our view. CPO is primarily used for high-speed, short-distance switching (Rack/TOR/Leaf), while OCS is responsible for topology reconstruction, spine layer, and DCI. NVIDIA is developing a combined solution using both CPO and OCS. At the OCP EMEA SUMMIT held in April 2025, NVIDIA shared a solution for using CPOs with OCS in AIDC. In the second-layer fat-tree network, the power consumption performance of four combinations: pluggable, pluggable+OCS, CPO, and CPO+OCS is compared. The total power consumption of the four solutions is 83 pJ/b, 50 pJ/b, 48 pJ/b, and 31 pJ/b, respectively. The introduction of OCS can reduce data center network power consumption by 30%-40%, and the combination of CPO+OCS can reduce power consumption by 2.6x compared to traditional pluggable solutions, according to NVIDIA.

Fig. 4: Power consumption comparison between different networking solutions

Networking solution	Power consumption
Pluggable switch	83 pJ/bit
Pluggable switch + OCS	50 pJ/bit
CPO	48 pJ/bit
CPO + OCS	31 pJ/bit

Source: NVIDIA, Nomura research

Fig. 5: Traditional switch vs CPO switch vs OCS in scale-up network

	Traditional switch	CPO switch	OCS
Application Position	Hardly applicable	Main choice in the medium-long term	Another choice in the medium-long term
Bandwidth Capability	Limited by SerDes rate and power consumption	A single OE bandwidth can reach 3.2T–6.4T	Provides ultra-large switching capacity and supports 100-card to 1000-card-level super-node interconnection
Latency Performance	Photoelectric conversion + packet switching introduces high latency	Electrical signal path is shortened to millimeters, and the delay is significantly reduced	Pure optical signal is directly reached, and the transmission delay is extremely low. However, there is millisecond-level setup overhead
Power Consumption	High	5–6x lower than traditional switch	Extreme low
Commercialization progress	N/A	It is greatly affected by the supply side (yield, packaging, etc.), and is limited by production capacity and cost	It has been deployed on the scale of 10,000-card-level AI clusters
Core Bottlenecks	Bandwidth density and power consumption are approaching physical limits	Yield climbing, complex thermal management, and high difficulty in repair	The switching time is long (ms-level), and it is not suitable for frequent adjustment scenario

Source: ICCSZ, Nomura research

OCS TAM and supply chain analysis

According to Signal AI's forecasts, the OCS market was dominated by Google in 2025, with an overall market size of about USD400mn, which may exceed USD2.5bn in 2029, exhibiting a CAGR of ~58% over four years. In 2026, other hyperscale tech companies such as Microsoft (MSFT US, Not rated), META (META US, Not rated), and NVIDIA have expressed interest in introducing OCS for deployment, which is currently in the small-batch testing stage, in our view. In addition, NVIDIA may use the OCS solution in its next-generation Feynman architecture with the DragonFly network topology, to establish a 100,000-card-level AI cluster.

Besides global major players such as Coherent and Lumentum, more China-based players have been entering the competitive landscape of complete manufacturing of OCS in 2026, rather than only supplying optical components. Accelink, Eoptolink, and Innolight have all showcased their OCS products at the OFC 2026.

Fig. 6: OCS – latest products and commercialization progress

Company	Latest OCS product and commercialization
Coherent	Coherent OCS currently supports up to 512 port sizes . A DLC-based OCS performs well in terms of reliability and service life, requires low drive voltage, but its optical path switching time is usually a few hundred milliseconds.
Lumentum	Lumentum launched its high-radix 300×300 OCS for dense, scalable interconnect fabrics in front-end and back-end data center networks at the OFC 2025. Management noted that the company's OCS order backlog has surpassed USD400mn , with the majority of shipments scheduled in 2H26E . OCS' revenue run rate will exceed USD1bn in 2027E , and the CAGR of shipments will exceed 150% over 2025-28E , according to management.
iPrionics	iPrionics launched its ONE series of OCS, including ONE32 (sent samples to customers in 2Q25), ONE64 (2026), ONE128, and ONE256 , with programmable silicon photonics chip design. A 32-port OCS contains 2,080 hexagonal tuning units, 4,093 drivers, about 10,000 components, and a waveguide length of 3cm. It supports multiple platforms and formats, can connect to different networks, and is based on 1U rack products.
Advanced Fiber Resources and Calient.AI	Advanced Fiber Resources and its partners Calient.AI jointly showcased Calient OCS products at the OFC 2026.
Taclink	The first generation of silicon-based OCS products launched a 32×32-port specification and received a prototype order of CNY10mn in 2024 . Currently, the company is accelerating the R&D of its second-generation high-dimensional OCS, aiming for 128×128 port specifications and planning to launch prototypes in the 1H26E . The " photon routing engine " jointly developed by the company and NVIDIA is the core technology of OCS.
Innolight	The 64×64 OCS of the SiPh platform was demonstrated at the OFC 2025 and was developed by Innolight's subsidiary, Terahop.
Aceelink	A live demo of a 320×320 OCS was showcased at the OFC 2026. The array coupling debugging system independently developed by Aceelink can support the precise coupling of high-density optical fiber arrays and microlens arrays, as well as FAU and MEMS mirror array chips. Aceelink's cumulative shipments of optical device products such as VOA, Switch, and TOF has exceeded 10mn .
Eoptolink	Eoptolink showcased the OCS switches NX200 and NX300 that supports 140 ports and 320 ports, respectively , at the OFC 2026, and the core of both products uses the MEMS mirror array independently developed by Eoptolink.
Triple-stone Technology	At the OFC 2026, the 512×512 OCS was showcased, which can achieve nanosecond-level ultra-low latency based on MEMS technology and is compatible with multiple bands such as O, C, and L. The company's 2D collimator fiber array provides high-density, reliable beam guidance capabilities for all-optical networks and is a critical component in OCS. Its configuration can be flexibly expanded from 16 to 1,000 channels.

Source: Company data, Nomura research

The upstream components of an OCS switch mainly include precision optical components and crystal materials such as MEMS microscopes, FAUs, and optical chips. The midstream is mainly responsible for OCS machine manufacturing and system integration.

Fig. 7: OCS industry supply chain

MEMS				
Core components	MEMS array	Optical filter	Fiber collimator array	Lens array
Global supplier	Silex		Corning	
Domestic supplier	Yitao Intelligent	Optowide Technologies, DOTI Micro	TFC, T&S, EverProX, Optowide Technologies	Focuslight Technologies
OCS manufacturer/foundry	Lumentum, Accelink, Eoptolink, Triple-stone, Calient, Advanced Fiber Resources (foundry), Taclink (foundry)			
DLC				
Core components	Liquid crystal light module	Fiber collimator array	YVO ₄ crystal	
Global supplier	Coherent	Corning		
Domestic supplier		TFC, T&S, EverProX, Optowide Technologies	Castech, Optowide Technologies	
OCS manufacturer/foundry	Coherent, Celestica (foundry)			
DLBS				
Core components	Piezoelectric Ceramics module	Fiber collimator array		
Global supplier	Polatis	Corning		
Domestic supplier	Luster	TFC, T&S, EverProX, Optowide Technologies		
OCS manufacturer/foundry	Polatis, Luster			
SiPh-based solution				
Core components	SiPh chip	PIC	MPO	PCB
Global supplier	iPronic		Corning	
Domestic supplier			T&S, EverProX	
OCS manufacturer/foundry	iPronic, Taclink			

Source: Company data, Nomura research

Fig. 8: Latest OCS-related progress of Chinese manufacturers

Company	OCS progress
Sai Microelectronics	Its main related business is MEMS chip process development and wafer manufacturing. Its subsidiary Sweden Silex is the world's leading pure MEMS foundry, serving the world's leading manufacturers in various fields, and is continuously expanding its production capacity in Sweden. Meanwhile, the company's holding subsidiary Silex Beijing has started operations and continues to ramp-up production capacity.
Optowide Technologies	Its main business is the R&D, production, and sales of various precision optical components, optical fiber devices, and optical test instruments. Its yttrium vanadium materials (spectroscopic arrays and crystal optical wedges, rings for liquid crystal solutions) and collimators have had orders related to OCS.
Focuslight Technologies	It mainly produces and sells high-power semiconductor laser components and raw materials, laser optical components, and lays out OCS-related lenses, precision-designed V-slots, fiber couplers and collimators , as well as other products.
Taclink	The company's main products include optical transceivers, optical fiber amplifiers, transmission subsystems, optical passive modules, etc. Silicon-based OCS has received overseas sample orders, and the company has accelerated the R&D of its second-generation high-dimensional OCS, with the goal of launching a prototype in 1H26E .
Innolight	Innolight's overseas subsidiary TeraHop showcased its SiPh-based 64×64 and 300×300 OCS switches at the OFC 2026.
Advanced Fiber Resources	Acquired Wuhan Jabil, products covering OCS, high-speed optical modules and lidar components. At CLOE 2025, the company showcased 320×320 OCS products in collaboration with Calient.
Luster	The company has laid out next-generation optical communication products and solutions such as OCS, automatic photonic lead bonding, and optical IO solutions. It has established a long-term cooperative relationship with Polatis , a manufacturer of DLBS solutions OCS.
Accelink	Accelink has the ability of key links such as design, packaging, and testing of MEMS mirror array chips . Based on the customized development of multiple array chips, it can support the full range of OCS products covering ports from 64×64 to 384×384 ports. It showcased a live demo of its 320×320 OCS at the OFC 2026.
Eoptolink	Eoptolink first time showcased its OCS switches NX200 and NX300 that supports 140 ports and 320 ports , respectively, at the OFC 2026.

Source: Company data, Nomura research

Appendix A-1

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Materially mentioned issuers

Issuer	Ticker	Price	Price date	Stock rating	Sector rating	Disclosures
Zhongji InnoLight	300308 CH	CNY 779.98	15-Apr-2026	Buy	N/A	
Suzhou TFC Optical Communication	300394 CH	CNY 330.66	15-Apr-2026	Buy	N/A	

Zhongji InnoLight (300308 CH)

CNY 779.98 (15-Apr-2026) Buy (Sector rating: N/A)

Rating and target price chart (three year history)



For explanation of ratings refer to the stock rating keys located after chart(s)

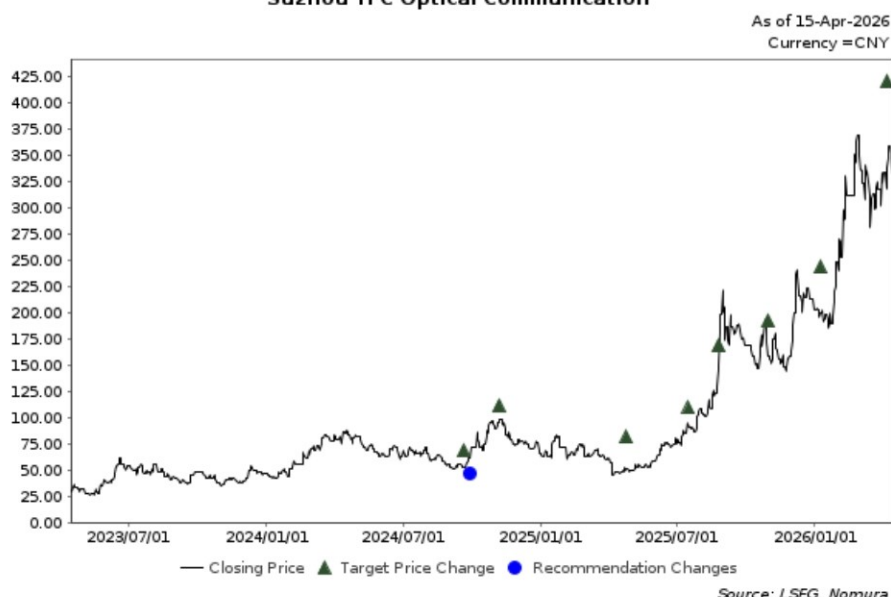
Valuation Methodology Our TP of CNY799.00 is based on 35x 2026F EPS of CNY22.84, in line with the WIND China's A/H share optical communication sector median P/E range. The benchmark index is CSI300.

Risks that may impede the achievement of the target price Downside risks: 1) weaker-than-expected demand for high-end optical modules in both the datacom and telecom markets; 2) fierce competition in the 400G and 800G optical modules segments; 3) slower-than-expected product upgrades (i.e., 800G, 1.6T); and 4) escalated price war which may affect company's export to global customers.

Suzhou TFC Optical Communication (300394 CH)

CNY 330.66 (15-Apr-2026) Buy (Sector rating: N/A)

Rating and target price chart (three year history)

Suzhou TFC Optical Communication

Date	Rating	Target price	Closing price
08-Apr-26		420.00	337.00
09-Jan-26		243.00	199.00
31-Oct-25		192.00	158.01
26-Aug-25		169.00	144.78
17-Jul-25		109.00	92.78
25-Apr-25		81.16	50.17
06-Nov-24		111.33	94.65
20-Sep-24	Buy		52.43
20-Sep-24		68.23	52.43

For explanation of ratings refer to the stock rating keys located after chart(s)

Valuation Methodology Our TP of CNY420.00 is based on 50x 2026F EPS of CNY8.40, in line with WIND China A share CPO sector median P/E. The benchmark index is CSI300.

Risks that may impede the achievement of the target price Downside risks include: (1) weaker-than-expected demand for optical component/module market; (2) technology changes in optical communication market which dampens company's competitiveness; (3) top customer's change of strategy or supply chain diversification; and (4) geopolitical risks.

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As at 31 March 2026.

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