

Global Echelle Grating Photonic Chip Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Echelle Grating Photonic Chip market size is expected to reach \$ 127 million by 2032, rising at a market growth of 23.4% CAGR during the forecast period (2026-2032).

An Echelle grating photonic chip is a passive wavelength selective chip that integrates a reflective high order diffraction grating, free propagation region, input and output waveguides, and on chip coupling structures on a photonic integrated platform. Its core function is to combine, split, filter, and spectrally disperse multiwavelength optical signals within a micrometer to millimeter scale chip footprint, addressing the large size, complex alignment, limited batch consistency, and system integration challenges of conventional bulk optical gratings. These chips are typically implemented on silicon, silicon nitride, silica PLC, or indium phosphide platforms, and are manufactured through lithography, etching, reflector formation, waveguide coupling, wafer level testing, and fiber array packaging. They can be configured for the O band, C band, L band, and visible wavelength ranges with different channel counts, channel spacings, insertion loss, crosstalk, and thermal stability specifications. Typical applications include data center optical interconnects, communication wavelength division multiplexing, on chip spectrometers, biomedical detection, LiDAR wavelength processing, microwave photonic signal processing, and quantum photonic circuits. Product delivery commonly takes the form of custom PIC dies, MPW prototype chips, dedicated tape out chips, fiber array packaged devices, and system level photonic modules.

Echelle grating photonic chips occupy a critical position in the transition of photonic integrated circuits from individual devices to system level integration. Their role is not to replace every type of optical filter, but to provide compact, reproducible, wafer manufacturable wavelength selection in multiwavelength systems. Compared with

conventional bulk Echelle gratings, on chip Echelle structures fix the free propagation region, concave reflective grating, input waveguides, and output waveguides within the chip layout, reducing alignment complexity and improving geometric consistency in volume manufacturing. Compared with AWGs, Echelle gratings are attractive in selected low channel count, low to medium resolution, area sensitive WDM and on chip spectroscopy applications, while still competing with AWGs, cascaded MZIs, microring arrays, and inverse designed filters in ultra high resolution, ultra low crosstalk, and large channel count scenarios.

From the perspective of materials and manufacturing platforms, silicon, silicon nitride, silica PLC, and indium phosphide will form a complementary industrial landscape. Silicon platforms are well suited to integration with high speed modulators, photodetectors, and electronic chips, serving high capacity applications such as data center optical interconnects, WDM transceivers, and co packaged optics. Silicon nitride platforms offer low loss, high optical power handling, and broad wavelength coverage, making them more suitable for visible light, near infrared, quantum, biosensing, and on chip spectroscopy applications. Silica PLC platforms have deep accumulation in low loss, stable, communication grade passive optical devices. Indium phosphide platforms have advantages in active light sources, SOAs, and fully integrated transmitters. The industrialization of Echelle grating chips will not follow a single material route, but will be selected according to wavelength band, channel count, insertion loss, packaging method, and customer system architecture.

Downstream growth will be jointly driven by high bandwidth interconnects and miniaturized spectroscopy. AI data centers are pushing optical interconnects from pluggable modules toward near packaged and co packaged optics, requiring wavelength division devices to combine and split more channels within smaller chip areas. This creates opportunities for Echelle grating chips in on chip WDM links. At the same time, life science, industrial inspection, environmental monitoring, LiDAR, and quantum photonic systems require more compact on chip spectral processing, expanding Echelle structures from communication passive devices into sensing and instrumentation components. Over the medium and long term, as silicon photonics and silicon nitride photonics manufacturing platforms expand, Echelle grating chips are expected to gain clearer productization paths in multiwavelength optical engines, on chip spectrometers, medical diagnostics, quantum interconnects, and microwave photonic signal processing.

This report studies the global Echelle Grating Photonic Chip production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Echelle Grating Photonic Chip and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Echelle Grating Photonic Chip that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Echelle Grating Photonic Chip total production and demand, 2021-2032, (K Wafers)

Global Echelle Grating Photonic Chip total production value, 2021-2032, (USD Million)

Global Echelle Grating Photonic Chip production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (K Wafers), (based on production site)

Global Echelle Grating Photonic Chip consumption by region & country, CAGR, 2021-2032 & (K Wafers)

U.S. VS China: Echelle Grating Photonic Chip domestic production, consumption, key domestic manufacturers and share

Global Echelle Grating Photonic Chip production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (K Wafers)

Global Echelle Grating Photonic Chip production by Channel Specification, production, value, CAGR, 2021-2032, (USD Million) & (K Wafers)

Global Echelle Grating Photonic Chip production by Application, production, value, CAGR, 2021-2032, (USD Million) & (K Wafers)

This report profiles key players in the global Echelle Grating Photonic Chip market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include LIGENTEC, SMART Photonics, imec, GlobalFoundries, AIM Photonics, LioniX International, CORNERSTONE, New Origin, VTT, Intel, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Echelle Grating Photonic Chip market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (K Wafers) and average price (US\$/Wafer) by manufacturer, by Channel Specification, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Echelle Grating Photonic Chip Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Echelle Grating Photonic Chip Market, Segmentation by Channel Specification:

Four-Channel Echelle Grating Chip

Eight-Channel Echelle Grating Chip

Sixteen-Channel Echelle Grating Chip

High-Channel-Count Echelle Grating Chip

Global Echelle Grating Photonic Chip Market, Segmentation by Thermal Control Method:

Fixed-Temperature-Control Echelle Grating Chip

Athermal-Compensated Echelle Grating Chip

On-Chip Thermally Tuned Echelle Grating Chip

Externally Temperature-Controlled Echelle Grating Chip

Other

Global Echelle Grating Photonic Chip Market, Segmentation by Delivery Form:

Bare-Die Echelle Grating Chip

Fiber-Array-Coupled Echelle Grating Chip

Board-Level Packaged Echelle Grating Chip

Hybrid-Integrated Echelle Grating Chip

Other

Global Echelle Grating Photonic Chip Market, Segmentation by Application:

Optical Communication WDM

Data Center Optical Interconnect

On-Chip Spectroscopy

Biomedical Sensing

LiDAR Wavelength Processing

Quantum Photonic Circuit

Other

Companies Profiled:

LIGENTEC

SMART Photonics

imec

GlobalFoundries

AIM Photonics

LioniX International

CORNERSTONE

New Origin

VTT

Intel

STMicroelectronics

NTT Innovative Devices

OKI

Shijia Photons

VLC Photonics

Key Questions Answered:

1. How big is the global Echelle Grating Photonic Chip market?
2. What is the demand of the global Echelle Grating Photonic Chip market?
3. What is the year over year growth of the global Echelle Grating Photonic Chip

market?

4. What is the production and production value of the global Echelle Grating Photonic Chip market?
5. Who are the key producers in the global Echelle Grating Photonic Chip market?
6. What are the growth factors driving the market demand?

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