Vertical Cavity Surface Emitting Laser - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-04-28 | 195 pages | Mordor Intelligence

AVAILABLE LICENSES:

- Single User License $4750.00
- Team License (1-7 Users) $5250.00
- Site License $6500.00
- Corporate License $8750.00

Report description:

The Vertical Cavity Surface Emitting Laser Market size is estimated at USD 2.49 billion in 2025, and is expected to reach USD 5.84 billion by 2030, at a CAGR of 18.6% during the forecast period (2025-2030). In terms of shipment volume, the market is expected to grow from 5.14 billion units in 2025 to 16.06 billion units by 2030, at a CAGR of 25.60% during the forecast period (2025-2030).

The vertical-cavity surface-emitting laser (VCSEL) is a semiconductor whose laser is emitted perpendicular to the top surface. It differs from an edge-fired laser, which emits the laser from the edge. VCSELs offer precision, high efficiency, reliability, and high speed with a cost-effective solution, and these are the most promising new technological developments in laser physics. VCSELs offer various advantages, such as lower power consumption, beam quality, modulation speeds, and manufacturing costs.

Key Highlights
- The VCSEL market is anticipated to witness robust growth during the forecast period owing to several factors like increasing requirements for transmitting data over long distances with high speed and efficiency, rising demand for these lasers in automotive LiDAR applications, and industrial applications. In August 2023, Innoviz Technologies and the BMW Group are expanding their collaboration by starting a B-sample development phase on a new generation of LiDAR.
- Over the past few years, optical interconnect infrastructures in the data centers have advanced to the next-generation 400 Gbit/s data rate from 100 Gbit/s. This is primarily driven by the ever-increasing data traffic in data centers due to the rapid market growth of emerging technologies, such as AI, VR/AR, and the Internet of Things (IoT), and the introduction of 5G mobile network systems.
- The increasing adoption of VCSELs in smartphones by smartphone manufacturers for 3D sensing or proximity sensing applications is one of the primary factors driving the market growth. The growth of 3D sensing was propelled by the introduction of face ID modules in iPhones. Since then, there have been significant developments in 3D sensing. Slowly, there was a transition

of 3D sensing from front-side face ID modules to the rear side for photography applications.
- InP-based VCSELs are typically preferred for applications such as optical communication due to their low dispersion and low fiber loss. However, InP-based VSCELs cannot provide large ?n DBR mirrors, owing to the high reflectivity and low penetration depth. The effective cavity length limits the tuning range and the confinement factor.
- The COVID-19 pandemic had a remarkable impact on the market studied, with several end-user industries that deploy VCSEL facing several difficulties. The industries were stuck with nationwide lockdowns, which brought them to a standstill, but after Q2 of 2020, they gradually started their operation. Since the raw materials are bought in China, the sourcing has been affected by the tariffs imposed by the United States.
- Geopolitical tensions and conflicts worldwide drive the demand for military spending. According to the Stockholm International Peace Research Institute (SIPRI), the United States led the ranking of countries with the highest military expenditure in 2022, with USD 877 billion dedicated to the military. That constituted nearly 40 percent of the total military spending worldwide that year, which amounted to USD 2.2 trillion. This amounted to 3.5 percent of the US gross domestic product.

Vertical Cavity Surface Emitting Laser Market Trends

ADAS and LiDAR to be the Fastest-growing Application

- The automotive industry is one of the major emerging markets for the VCSEL manufacturers, owing to trends like autonomous vehicles and high-end interior features in vehicles. Although the automotive industry has been witnessing a recession in recent years, the growing number of sensors per vehicle is mainly motivating the market vendors. Most of the market vendors are expanding their scope for the automotive market (interior and exterior applications).
- LiDAR is a critical component of ADAS, and highly efficient VCSELs, with their tiny footprint, attractive pricing, and remarkable reliability and performance, are making them suitable for ADAS LIDAR. VCSELs are used in LiDAR systems for object detection and mapping distances, exterior sensing technologies for ADAS and autonomous driving, and automotive 3D sensing for in-cabin and outside the vehicle, among others.
- In order to achieve LEVEL 4 autonomy, most of the developed and developing regions have mandated or are planning to mandate ADAS in new vehicles, which is expected to create massive growth opportunities for the market vendors. For instance, 80-90% of new vehicles in the United States have at least one ADAS feature.
- According to the National Safety Council, by 2026, approximately 71% of registered vehicles will be equipped with rear cameras, while 60% will have rear parking sensors. Such increasing adoption of ADAS would aid the growth of the market studied.?
- The increasing adoption of self-driving or autonomous vehicles is a primary growth factor for the ADAS market. For instance, according to Intel, global car sales are expected to reach over 101.4 million units in 2030, and autonomous vehicles are expected to account for about 12% of car registrations by 2030. ?

Asia-Pacific Expected to Witness Significant Growth with China Dominating the Market

- China is expected to grow substantially in the Asia-Pacific region due to the increasing adoption of VCSEL in the automotive, healthcare, and consumer electronics industries.
- China is one of the prominent consumer electronics producers across the world. The manufacturing industry is rapidly growing in the region and is witnessing the deployment of various manufacturing and telecommunications technologies, which is expected to aid in the market's growth.?
- Due to the continued flow of global, diversified electronics equipment into China, the consumption of semiconductors in China is growing faster than in others. Three of the world's top five most prominent mobile phone companies are based in this country,

which presents enormous opportunities for adopting semiconductors.
- The Chinese government is also working to create a techno-authoritarian state powered by artificial intelligence and sensors to track and monitor its citizens. The demand for market studied in the country is expected to grow with such programs. The Chinese government's "Made in China 2025" initiative aims to make its semiconductor industry reach USD 305 billion in output by 2030 and meet 80% of domestic demand. Such instances are estimated to boost the market's growth in the country.
- Major players focus on developing innovative products to strengthen their market positions. For instance, in September 2023, Berxel Photonics, a pioneer in VCSEL semiconductor R&D and manufacturer of high-speed optical communications VCSELs and 3D depth cameras, announced a live demo of its 106 Gbps VCSEL-powered 800G transceiver in China International Optoelectronic Exposition in Shenzhen, China.
- Another factor contributing to the growth of VCSEL is the growing adoption of electric vehicles. For example, this technology is anticipated to be used in the vehicle industry for applications like recognition of gestures, driver monitoring, and autonomous driving sensors. In this region, the auto industry is growing at an excellent rate. The demand for custom semiconductors and sensors is increasing in the area. Therefore, VCSEL technology is expected to play a significant role in the region. As per CAAM, 589,000 battery-electric vehicles were made in China in August 2023, with 551,000 passenger BEVs and 38,000 business BEVs. In the same month, 254,000 PHEVs were produced in China, of which 253,000 were passenger PHEVs, and 1,000 were commercial PHEVs.
- The Chinese government views its automotive industry, including the auto parts sector, as one of its pillar industries. The government expects China's automobile output to reach 35 million units by 2025. ?Such instances show that the market is anticipated to grow over the forecast period.

Vertical Cavity Surface Emitting Laser Industry Overview

The VCSEL market is fragmented with the presence of major players like Coherent Corporation, Lumentum Operations LLC, Vixar Inc (OSRAM AG), Hamamatsu Photonics KK, and TRUMPF Group. Players in the market are adopting strategies such as partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

- October 2023 - TRUMPF Photonic Components, a global player in high-speed VCSEL and photodiode solutions for data communication, and KDPOF, an expert in high-speed optical networking solutions based in Spain, showcased its first 980nm multi-gigabit interconnect system for automotive systems at the European Conference for Optical Communication (ECOC), held in Glasgow.
- June 2023 - AMS Osram, the world's significant supplier of optical solutions, announced the launch of the TARA2000-AUT-SAFE family of vertical cavity surface emitting lasers (VCSELs), Reliable and more robust eye safety features while enhancing the portfolio of infrared laser modules for automotive in-cabin sensing. The new TARA2000-AUT-SAFE generates a tightly controlled beam of infrared light at a peak wavelength of 940nm. It suits the same application scenarios as the existing TARA2000-AUT series: driver monitoring, gesture sensing, and in-cabin monitoring. The compact module contains an ams Osram VCSEL chip and a microlens array (MLA).

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

Table of Contents:

SCOTTS INTERNATIONAL

Vertical Cavity Surface Emitting Laser - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-04-28 | 195 pages | Mordor Intelligence

To place an Order with Scotts International:

- - Print this form
- - Complete the relevant blank fields and sign
- - Send as a scanned email to support@scotts-international.com

ORDER FORM:

Select license	License	Price
	Single User License	$4750.00
	Team License (1-7 Users)	$5250.00
	Site License	$6500.00
	Corporate License	$8750.00
	VAT	
	Total	

*Please circle the relevant license option. For any questions please contact support@scotts-international.com or 0048 603 394 346.

** VAT will be added at 23% for Polish based companies, individuals and EU based companies who are unable to provide a valid EU Vat Numbers.

Email*		Phone*	
First Name*		Last Name*	
Job title*			
Company Name*		EU Vat / Tax ID / NIP number*	
Address*		City*	
Zip Code*		Country*	
		Date	2026-02-27
		Signature