

VCSEL for 3D Sensing & LiDAR

The **vertical-cavity surface-emitting laser** (VCSEL) is a type of semiconductor laser diode with laser beam emission perpendicular from the top surface, contrary to the conventional edge-emitting semiconductor lasers (also in-plane lasers) which emit from surfaces formed by cleaving the individual chip out of a wafer. **VCSELs** are used in various products application field, such as: 3D sensing, data communication, laser radar (LiDAR), and other fields.

Features

Compared with **EEL** (edge emitter) and LED light source, **VCSEL** has a different structure and has unique characteristics and advantages, as shown in the figure below. The vertical structure of **VCSEL** is more suitable for water-level manufacturing, packaging and testing.

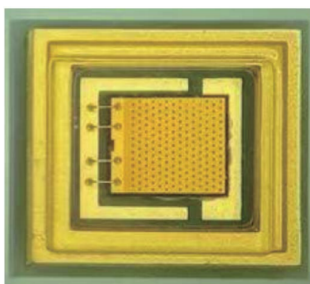
Compared with side-emitting LEDs, the cost after mass production has advantages and high reliability. The **VCSEL** has some significant advantages than LEDs, such as high spectral quality and fast response speed.

Product Description

940nm band chip: Multiple product series with power from mW level to W level

850nm band chip: Multiple product series with power from mW level to W level

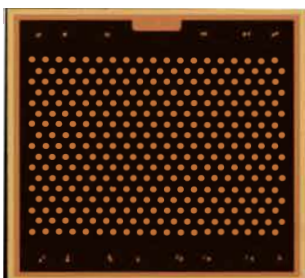
VCSEL module series: The product involve various packaging modes such as SMD and TO



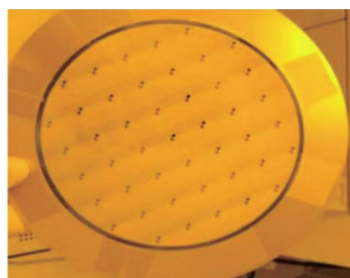
Integrated Sensor



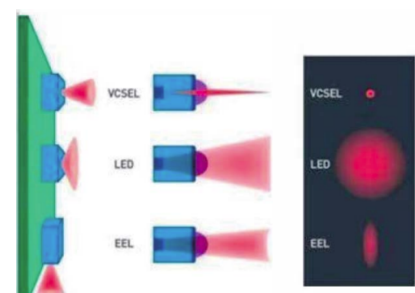
VCSEL Module



Bare Chip



Wafer



Lens Options

3D sensing

3D sensing is usually composed of a camera and a depth sensor, and obtains the depth information of an object by projecting a specific wavelength band to calculate the time difference between light emission and reflection. 3D sensing technology realizes the acquisition of real-time three-dimensional information of objects, which provides key features for later image analysis. Smart devices can restore the real three-dimensional world based on 3D sensing and realize subsequent intelligent interactions. The current Market are face recognition, lidar, AR/VR, etc.



LiDAR

Compared with traditional radar, lidar has become an advanced active remote sensing tool with the characteristics of precise time resolution, precise spatial resolution, and ultra-long detection distance. Its high-precision measurement function enables it to achieve accurate distance measurements and speed measurements, tracking, detection, etc., have been widely used in civilian and military fields. KT Photonics provides VCSEL chips in LiDAR.

The most popular application for LiDAR is autonomous driving (perceive the road environment through the on-board sensor system, automatically plan the driving route and control the vehicle to reach the predetermined target)