What is a DBR laser diode



Overview

Distributed Bragg reflector laser A distributed Bragg reflector laser (DBR) is a type of single frequency laser diode. Other practical types of single freq.

Key Takeaways

A DBR (Distributed Bragg Reflector) laser diode is a single-frequency semiconductor laser with a wavelength-selective Bragg grating providing stable, narrow-linewidth output.

Structure and Operation

A DB

R laser diode consists of two main sections: a gain section where the laser light is generated, and a DBR section containing a Bragg grating that acts as a wavelength-selective reflector. The grating provides feedback only for a specific longitudinal mode, ensuring single-frequency operation. The resonator is typically formed by the DBR mirror on one end and a low-reflectivity cleaved facet on the other, with the laser emitting from the exit facet opposite the DBR.

The device may also include a phase section to enable mode-hop-free tuning. Key CharacteristicsSingle-frequency output: DBR lasers operate on a single spatial and longitudinal mode, producing a diffraction-limited beam. Narrow linewidth: Typical linewidths are a few megahertz, making them suitable for high-precision applications.

Tuning: Wavelength tuning is possible by adjusting the current or temperature of the gain or DBR section. The tuning range is usually a few nanometers, with temperature coefficients around 0. 07 nm/K and current coefficients about 0.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

003 nm/mA. More advanced designs, like SG-DBR lasers, can achieve wider tuning ranges using Vernier effects. Output power: Standard DBR diodes provide moderate power, but MOPA (Master Oscillator Power Amplifier) configurations can exceed 100 mW, and broad-area diodes can reach several watts.

Comparison with Other Single-Frequency LasersDBR lasers are similar to DFB (Distributed Feedback) lasers in providing single-frequency output, but the grating in a DBR is external to the gain region, whereas in DFB lasers it is embedded within the active region.

DB

R lasers may exhibit periodic mode hops during tuning, unlike DFB lasers which can maintain mode-hop-free operation over their tuning range. Compared to external cavity lasers, DBR diodes are more compact but have slightly broader linewidths. ApplicationsDBR laser diodes are widely used in: Spectroscopy and high-resolution sensingLaser cooling and atomic physics experimentsGas detection and environmental monitoringTunable coherent sources for telecommunications and terahertz generation Their combination of narrow linewidth, tunability, and stable single-mode operation makes them ideal for precision optical systems.

Article Content

Distributed Bragg reflector laser

A distributed Bragg reflector laser (DBR) is a type of single frequency laser diode. Other practical types of single frequency laser diodes include DFB lasers and external cavity diode lasers.

Distributed Bragg Reflector Lasers – laser diodes,

The most common types are DBR laser diodes, which are semiconductor lasers, and DBR fiber lasers, which use an active optical fiber and fiber Bragg gratings

Distributed Bragg Reflector Lasers – Principles and Applications

In this post we explore the operating principles of DBR lasers, how they differ from other diode lasers, and why they have become a critical tool in high-performance photonic systems.

Distributed Bragg Reflector (DBR) Laser Diodes | Modulight

Distributed Bragg Reflector (DBR) laser diodes are versatile, high-performance laser sources that find applications e.g. in quantum applications, sensing, and spectroscopy.

DBR Laser

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

A DBR (distributed Bragg reflector) laser is typically defined as one where the internal grating sections are passive (do not provide optical gain) and are located at one or both output facets in an edge emitter.

Micron Laser (DFB/DBR) » Distributed Feedback Laser » Laser

Distributed Bragg Reflector (DBR) Diode Lasers are available with up to 100mW at 1063nm and 80mW at 1083nm. These diode lasers are longitudinally and spatially single mode.

DBR vs DFB Diode Lasers: A Technical Comparison

Learn the technical differences, performance metrics, and applications of DBR and DFB diode lasers and which architecture fits your needs.

What are Distributed Bragg Reflector (DBR) Lasers?

A Distributed Bragg Reflector (DBR) Laser is a semiconductor laser with a p-n junction as an active medium and contains one or two Bragg reflectors on each side of the active region.

Distributed Bragg Reflector Lasers

DBR laser diodes are a prevalent form of these lasers, often used in applications requiring single-frequency operation. They incorporate a corrugated waveguide structure that provides wavelength

Power of Distributed Bragg Reflector Lasers

Structure and Operation: DBR laser diodes are the stalwarts of precision and tunability in the laser realm. These diodes feature a corrugated waveguide structure (grating section) that provides

LD-PD PTE. LTD.

LTD''S PL-DBR-1530-PA Distributed Bragg Reflector (DBR) laser is a single-frequency laser diode that is well-suited for low-noise pump applications, second harmonic generation and time-resolved

Diode laser pump sources for future fusion power plants

Meanwhile, Jenoptik is developing processes for diode bars optimised for a stable emission wavelength at 880 or 940 nm, by implementing a surface grating in a part of the emitters,

48 Laser Diode Manufacturers in 2026

48 Laser Diode Manufacturers in 2026 This section provides an overview for laser diodes as well as their applications and principles. Also, please take a look at the list of 48 laser diode manufacturers and

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Narrow-linewidth Lasers – single-frequency, fiber laser, DFB, DBR

Narrow-linewidth lasers are single-frequency lasers with a narrow optical emission spectrum. They are used in optical frequency metrology, for example.

DFB/DBR Laser Diodes | Interlab

1 DFB/DBR Laser Diodes 1 Fabry-Perot Laser Diodes (SML) 1 Comb Lasers 1 FBG Lasers 1 Pulsed Lasers (SM-BTF / ps) 2 Broad-Area Lasers 1 Cameras & Imaging 76 Advanced Imaging 39

Laser Diodes » Home | Sacher Lasertechnik Group

Sacher Lasertechnik is technology leader for tunable high power external cavity diode lasers. Applications incl. Absorption and Raman spectroscopy, environmental analysis, process control,

Understanding Optical Modules: Types and Troubleshooting Guide

It is processed by an internal driver chip, which drives a semiconductor Laser Diode (LD) or Light Emitting Diode (LED) to emit a modulated optical signal at the corresponding rate. Reception (Rx):

VERTICAL EXTERNAL CAVITY SURFACE EMITTING LASER AND

A vertical external cavity surface emitting laser (“VECSEL”). The VECSEL includes a light-emitting device, a second harmonic generation (“SHG”) crystal and an external cavity mirror.

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Contact Us

Continue your research online:

Website: https://fdsoluciones.es
Technical inquiry: https://fdsoluciones.es/project-enquiry.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved