

DBR laser diode



AI Overview

A DBR (Distributed Bragg Reflector) laser diode is a single-frequency semiconductor laser with a wavelength-selective Bragg grating outside the gain region, offering narrow linewidth, tunability, and stable single-mode operation.

Structure and Operation A DBR laser diode consists of a gain section (active region) and one or more Bragg reflector sections (gratings) outside the gain medium, which act as wavelength-selective mirrors to define the emission wavelength. The Bragg grating provides feedback for a single longitudinal mode, while the gain section amplifies light. This separation of grating and gain distinguishes DBR lasers from DFB lasers, where the grating is distributed along the gain region. The laser emits from the facet opposite the DBR mirror, producing a single spatial and longitudinal mode.

Performance Characteristics DBR laser diodes are known for:

- Narrow linewidths, typically a few MHz up to 10 MHz.
- Single-frequency operation with high side-mode suppression ratios (~50 dB typical).
- Wavelength tunability, achieved by adjusting current or temperature, with typical tuning ranges of a few nanometers for standard DBRs and up to tens of nanometers for advanced designs like SG-DBR lasers.
- High output power, often several hundred milliwatts, with MOPA configurations enabling >100 mW or even multi-watt outputs.
- Diffraction-limited, near-Gaussian beam profiles with low M^2 values.

Tuning and Stability The emission wavelength can be tuned via:

- Temperature control of the gain or grating section.
- Current modulation, which slightly shifts the wavelength.
- Phase section adjustments or Vernier-effect designs for broader mode-hop-free tuning.

DBR lasers are highly stable and immune to vibrations due to their short cavity design, making them suitable for atomic and molecular spectroscopy and precision metrology.

Practical Implementations Commercial DBR laser diodes are often packaged in butterfly modules with integrated thermoelectric coolers, photodiodes, and optical isolators t...

Article Content

LD-PD PTE. LTD.

LD-PD PTE. LTD'S PL-DBR-1530-30-1-SA-14BF Distributed Bragg Reflector (DBR) laser is a single-frequency laser diode that is well-suited for low-noise pump applications, second harmonic

DFB & DBR Laser Diodes

Distributed Feedback (DFB) and Distributed Bragg Reflector (DBR) laser diodes feature a frequency-selective structure within the laser chip, which restricts the laser emission to a single longitudinal mode.

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. They can be tuned up to

1550nm DBR laser diode-LD-PD PTE. LTD.

LD-PD PTE. LTD'S PL-DBR-1550-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

Distributed Bragg Reflector (DBR) Laser Diodes | Modulight

In a well-designed DBR laser diode, the photolithographically defined and etched horizontal waveguide and the vertical waveguide defined by the epitaxially deposited thin

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

Distributed Bragg Reflector (DBR) Diode Lasers are tunable single mode diode lasers. Typical geometrical sizes of the laser chip are 1000µm x 500µm x 200µm (length x width x height). The laser

Resonator-enhanced distributed Bragg reflector lasers

Here, we introduce and experimentally demonstrate a new class of integrated lasers—resonator-enhanced distributed Bragg reflector (RE-DBR) lasers—that overcome these

Frontmatter

Historically, these components were primarily analyzed with this theory. However, in this text grating-based DFB and DBR lasers are first analyzed in Chapter 3 using exact matrix multiplication

Single-Frequency Lasers Tutorial

In the world of diode lasers, there are currently four main configurations to obtain a single-frequency output: external cavity laser (ECL), distributed feedback (DFB),

High Power Narrow Spectrum Second-Order DBR Laser Diode

High Power Narrow Spectrum Second-Order DBR Laser Diode Operating Over a Wide Temperature Range Abstract: Distributed Bragg Reflector laser diode (DBR-LD) plays a crucial role

Distributed Bragg Reflector Lasers – Principles and

This blog article is about Distributed Bragg Reflector (DBR) lasers and their applications. In this post we explore the operating principles of DBR

866.214DBRH-MHF-TOSA

This laser diode is based on Photodigm's proprietary Distributed Bragg Reflector (DBR) design. It is augmented by the High Power laser diode architecture, a product designed to push the limits of

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.

Distributed Bragg Reflector Lasers

A DBR laser diode contains some corrugated waveguide structure (a grating section) providing wavelength -dependent feedback to define the emission

Frequency-Stabilized Diode Lasers | Ferdinand-Braun

A narrow linewidth of the emitted laser radiation is of interest for a variety of applications. These include frequency-stabilized diode lasers used in

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.

Experimental setup developed for the rubidium CPT

In this study, we demonstrate a clock in which we directly modulate a distributed Bragg reflector (DBR) laser diode and apply it to the simplest CPT configuration,

1036DBRL-MHF-TO8

Photodigm's T8 Mount provides easy connections between our TO-8 packaged DBR, an external laser diode controller, and an external thermoelectric cooler controller.

Photodigm | High-Performance DBR Laser Diodes

Photodigm designs, tests, and manufactures high-performance DBR laser diodes from 730–1090 nm for precision applications including spectroscopy, sensing, biomedical, and quantum systems.

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 laser

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

High Performance GaSb-Based DBR Laser with On

We reported on a single-longitudinal-mode operated distributed Bragg reflector laser diode emitting at 1950 nm with an on-chip integrated power

794.978DBRHOT-L-CS

This laser diode is based on Photodigm's proprietary Distributed Bragg Reflector (DBR) design. It is augmented by the HOT laser diode architecture, a product specifically optimized for high operating

Distributed Bragg Reflector Lasers – Principles and

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

DBR Laser

The DBR laser consists of a grating on each side of the active region (Figure 5); these gratings act as mirrors having a reflectivity that is optimized at one particular wavelength, in addition to narrowing

866.214DBRH-MHFL-TO8

Photodigm's T8 Mount provides easy connections between our TO-8 packaged DBR, an external laser diode controller, and an external thermoelectric cooler controller.

DFB & DBR laser diodes

Distributed feedback (DFB) laser diodes feature a grating structure within the semiconductor and thus operate in both longitudinal and transverse single mode.

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

Contact Us

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