

Selection Guide for New Security-Grade DFB Distributed Feedback Lasers

Article Overview

Security-grade DFB lasers require narrow linewidth, single-frequency operation, precise wavelength stability, and robust packaging for reliable performance in sensitive applications.

Key Features of DFB Lasers

DFB lasers are single longitudinal mode lasers with high spectral purity, achieved through a Bragg grating integrated into the active region, which provides distributed optical feedback along the cavity rather than relying on end mirrors like Fabry-Perot lasers. This structure ensures mode-hop-free operation, narrow linewidths (from MHz to kHz), and excellent wavelength stability, making them ideal for telecommunications, gas sensing, spectroscopy, and quantum applications.

Critical Specifications for Selection

o Center Wavelength and Tolerance

- o Choose a wavelength aligned with your application, e.g., 1310 nm or 1550 nm for telecom, or 760-2340 nm for sensing.
- o High-precision systems require wavelength accuracy within ± 0.5 nm or better.
- o Consider tuning range: DFB lasers can be tuned 1-5 nm via temperature (slow, wide range) or injection current (fast, narrow range).

o Linewidth and Spectral Purity

- o Narrow linewidth ensures high spectral resolution and minimal crosstalk.
- o Semiconductor DFBs typically have MHz linewidths, while fiber DFBs can reach kHz linewidths.
- o Check side mode suppression ratio (SMSR); values ≥ 50 dB indicate strong single-mode operation.

o Output Power

- o Typical output powers range from 5 mW to 130 mW, depending on the package and application.
- o Ensure the power level meets the requirements for signal-to-noise ratio in sensing or communication systems.

o Tuning and Stability

- o Temperature tuning: ~ 0.1 nm/K for telecom wavelengths; allows wide-range adjustments.
- o Current tuning: fast modulation (MHz-GHz) but smaller wavelength shift; important for frequency modulation.
- o Verify mode-hop-free tuning over the desired range for secure and stable operation.

o Packaging Options

Selection Guide for New Security-Grade DFB Distributed Feedback Lasers

- o TO-can: compact, cost-effective, may require external stabilization.
 - o Butterfly package: includes TEC, thermistor, monitor photodiode, and often an internal optical isolator; best for high stability .
 - o Chip-on-submount (CoS): smallest footprint for OEM integration; requires careful handling and wire-bonding.
-
- o Integration Considerations
 - o For fiber-coupled applications, ensure compatibility with SMF-28e+ or other single-mode fibers.
 - o Consider optical isolators to prevent back reflections that can destabilize the laser .
 - o Evaluate thermal management and environmental robustness for security-grade deployments.

Practical Buying Tips

- o Confirm the wavelength stability over temperature and current variations.
- o Ask for linewidth measurement conditions (integration time, Lorentzian/Gaussian components).
- o Ensure the laser meets application-specific standards, such as ITU grid compliance for DWDM systems or absorption line matching for gas sensing .
- o Compare fiber DFB vs. semiconductor DFB: fiber DFBs offer lower noise and narrower linewidths but lower output power.

Summary

When selecting a security-grade DFB laser, prioritize single-frequency operation, narrow linewidth, precise wavelength control, and robust packaging. Match the center wavelength, tuning range, and output power to your application, and ensure the device maintains mode-hop-free operation under expected environmental conditions. Proper selection ensures reliable performance in telecom, sensing, spectroscopy, and quantum systems .

Wavelength Selectability o Compared with Fabry-Perot lasers, DFB or DBR laser is easy to achieve single-longitudinal-mode

This guide outlines the key specifications, data sheet parameters, and practical buying considerations to help you

The acronym DFB laser stands for distributed feedback laser. Their key features relative to

A distributed-feedback laser (DFB) is a type of laser diode, quantum-cascade laser or optical-fiber laser where the active region of

Selection Guide for New Security-Grade DFB Distributed Feedback Lasers

Photonic integrated circuits (PICs) play a leading role in modern information and communications technology. Among

Distributed-Feedback Lasers Most of the lasers that have been described so are depend on optical feedback from acs, which form a

Lasers have revolutionized numerous fields, from telecommunications and manufacturing to medicine and scientific

Special attention is given to two new chapters on wavelength tunable DFB laser diodes and bistable and unstable DFB laser diodes.

FLC - Frankfurt Laser Company GmbH is a world leading supplier of FP, DFB and DBR laser diodes, SM individually addressable

For professional purchasing, our buyer"s guide for distributed feedback lasers explains additional buyer

nanoplus uses a unique and patented technology for DFB laser manufacturing. We apply a lateral metal

optical feedback needed for laser operation. In DFB lasers, a corrugation, usually called grating, is introduced in one of the cladding

Abstract Surface emitting distributed feedback (SE-DFB) semiconductor lasers with second-order grating have

Our complete selection of laser diodes is available on the LD Selection Guide tab.

This buyer"s guide for distributed feedback lasers provides technical background, comparison of major

A distributed feedback laser is a type of semiconductor laser diode designed to emit coherent, narrow-bandwidth light with precise

Web: <https://www.kremgroup.co.za>

