

# DFB Interband Cascade Lasers (ICL) 4000 nm - 4600 nm

## WAVELENGTH

760–830 nm

830–920 nm

920–1100 nm

1100–1300 nm

1300–1650 nm

1650–1850 nm

1850–2200 nm

2200–2600 nm

2600–2900 nm

2800–4000 nm

**4000–4600 nm**

4600–5300 nm

5300–5800 nm

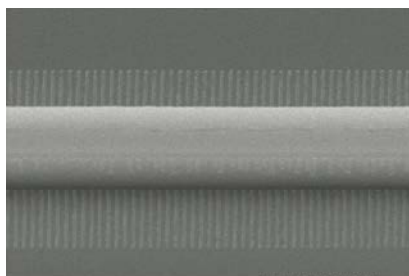
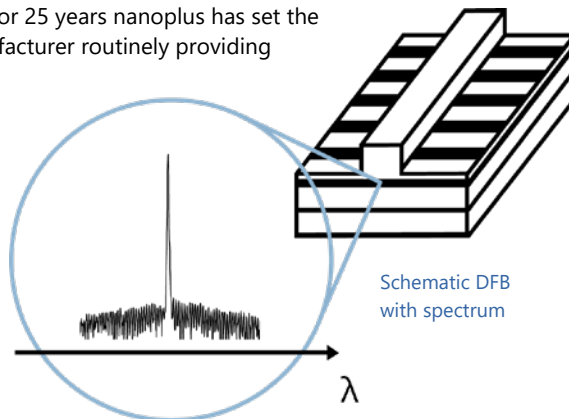
5800–6500 nm

6000–14000 nm

nanoplus Distributed Feedback Lasers (**DFB**) are specifically designed for high-precision gas detection using tunable diode laser absorption spectroscopy (**TDLAS**). Our devices operate **reliably** in more than 100,000 installations worldwide. For 25 years nanoplus has set the standard for DFB laser technology and is the only manufacturer routinely providing DFB lasers at **any wavelength**.

## Key features:

- MONOMODE
- CONTINUOUS WAVE
- ROOM TEMPERATURE
- MODE HOP FREE TUNING



Overgrowth-free DFB device processing

Any **custom wavelength** is possible: You tell us what you need and we deliver it. With our patented DFB technology we design any wavelength **between 760 nm and 14  $\mu$ m**.

Our excellent **spectral purity** is characterized by a large side mode suppression ratio (**SMSR**) of **> 35 dB**, giving your system a low signal to noise ratio against crossinterference.

A **narrow linewidth below 3 MHz** guarantees ultra-precise scanning of the absorption line feature. The **high output power** of **several mW** yields a stronger signal and increases your measurement precision.

**Fast and wide wavelength tuning** is required for in situ systems. Most customers use a scan rate of 10 kHz and benefit from our very **large tuning coefficient**.

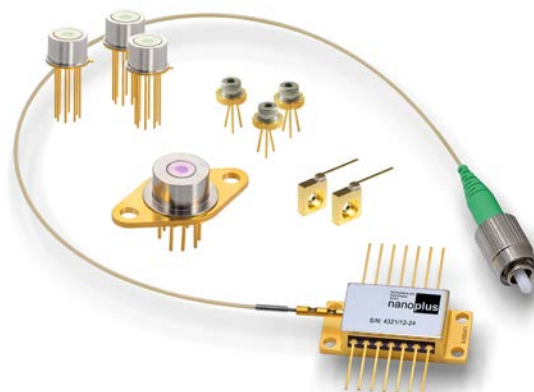
**"Do not change your ideas, let us deliver a laser that fits your application."**

We offer **various packaging options**, e.g. several free space housings including TEC and NTC, fiber coupling, **collimation** and **custom designs**. What do you require?

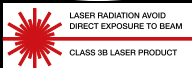
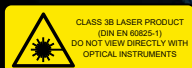
If you require **custom specifications**, please contact us. Nearly 80 % of our devices are more or less customer-specific. As nanoplus is a **fully vertically integrated company**, we control the entire process chain from design to packaging. Both nanoplus production facilities are based in **Germany**. To guarantee consistent product quality we apply a strict and **ISO certified quality management system** at all levels.

Our sales and R&D teams have long-standing experience in developing lasers. They will advise you in your design and realization phase as well as after-sales:

**We make market leaders!**

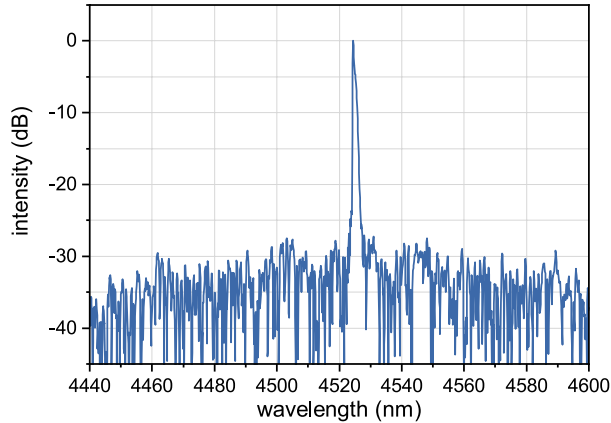


nanoplus DFB lasers on TO66, TO5, TO5.6, c-mount and SM-BTF

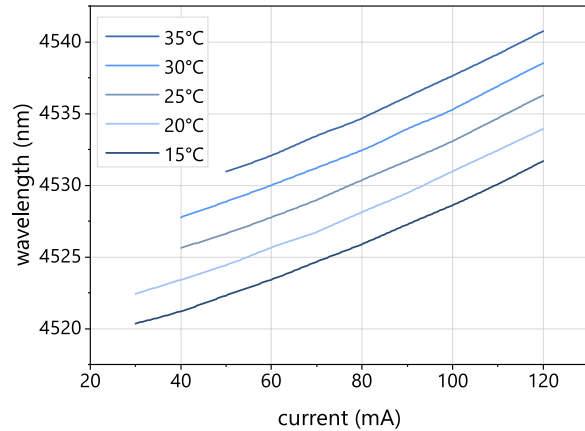


# Typical Specifications: 4000 nm - 4600 nm

This data sheet reports performance data of a **sample DFB ICL at 4524 nm**, which is representative for the entire wavelength range. We offer enhanced specifications for 4524 nm and 4534 nm. Please refer to our [TOP Wavelengths](https://nanoplus-usa.com/products/dfb-laser) for further details:  
<https://nanoplus-usa.com/products/dfb-laser>.



Typical room temperature cw spectrum of a nanoplus DFB laser at 4524 nm



Typical mode hop free tuning of a nanoplus DFB laser at 4524 nm by current and temperature

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at $T_{op}$ , $I_{op}$ )	$\lambda_{op}$	nm	Please specify to 0.1 nm.		
optical output power (at $\lambda_{op}$ )	$P_{op}$	mW		5	
operating current	$I_{op}$	mA			120
operating voltage	$V_{op}$	V		5	
threshold current	$I_{th}$	mA	20	40	60
side mode suppression ratio	SMSR	dB		> 35	
current tuning coefficient	$C_I$	nm / mA		0.12	
temperature tuning coefficient	$C_T$	nm / K		0.45	
beam divergency slow/fast-axis	FWHM	°		45/65	
operating chip temperature	$T_{op}$	°C	+10	+20	+50
operating case temperature*	$T_c$	°C	-20	+25	+50
storage temperature*	$T_s$	°C	-30	+20	+70

\* non-condensing

## laser packaging options

**TO66 with TEC and NTC, black cap, AR coated window**

**Other packaging options may be discussed on request.**

**Technical drawings & accessories are available at:** <https://www.nanoplus-usa.com/products/packaging>

Please contact [victor.perez@nanoplus.com](mailto:victor.perez@nanoplus.com) for customized specifications, quotes and further questions. Visit the [nanoplus website](https://www.nanoplus.com) for technical notes, application samples or literature referrals.

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