



# DFB Interband Cascade Lasers from 4000 nm to 4600 nm



760 - 830 nm
830 - 920 nm
920 - 1100 nm
1100 - 1300 nm
1300 - 1450 nm
1450 - 1650 nm
1650 - 1850 nm
1850 - 1900 nm
1900 - 2200 nm
2200 - 2600 nm
2900 - 4000 nm
<b>4000 - 4600 nm</b>
4600 - 5300 nm
6000 - 14000 nm

## nanoplus single mode IC lasers

nanoplus is the only manufacturer world-wide routinely providing single- and multi-mode lasers at any wavelength from 760 to 6000 nm. At wavelengths up to 14  $\mu\text{m}$ , QCLs complete nanoplus' laser portfolio.

Our IC lasers deliver single mode emission with well defined optical properties enabling a wide range of applications.

nanoplus lasers operate reliably in tens of thousands of installations worldwide, including chemical and metallurgical industries, gas pipelines, power plants, medical systems, airborne and satellite applications.

### key features

- ✓ very high spectral purity
- ✓ narrow linewidth
- ✓ excellent reliability
- ✓ wide variety of packaging options
- ✓ customer-specific designs available

### application areas

- ✓ high performance gas sensing for process and environmental control
- ✓ precision metrology
- ✓ spectroscopy
- ✓ space technology

nanoplus lasers with excellent performance are specifically designed and characterized to fit your needs. This data sheet summarizes typical properties of nanoplus DFB lasers in the range from 4000 nm to 4600 nm. In this wavelength regime e. g.  $\text{SO}_2$ ,  $\text{CO}_2$  and  $\text{NO}_x$  can be detected with particularly high sensitivity, since the detection sensitivity typically increases at long wavelengths. Overleaf data for DFB lasers optimized for  $\text{NO}_x$  detection is shown as an example.

general ratings	symbol	unit	typical
optical output power	$P_{\text{out}}$	mW	> 3
typical maximum operating voltage	$V_{\text{op}}$	V	4 - 6
forward current	$I_f$	mA	70
side mode suppression ratio (SMSR)		dB	> 35

On request, lasers with specifically optimized properties, such as higher output power, are available.

laser packaging options
TO66 with TEC and NTC, sealed
other packaging options will follow soon, or may be discussed on request

For dimensions and accessories, please see [www.nanoplus.us](http://www.nanoplus.us) Further packaging options are available on request.

device protected by  
US patent 6.671.306  
US patent 6.846.689  
EU patent EP0984535

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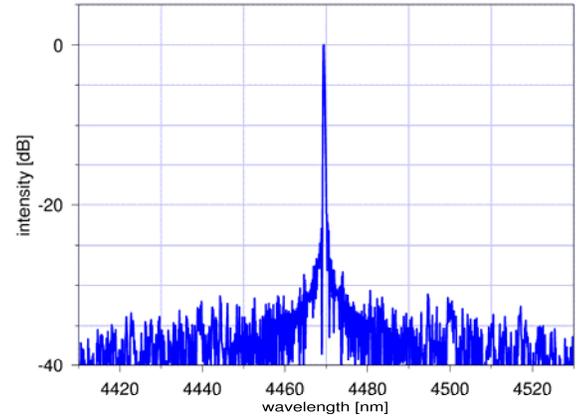


# nanoplus DFB ICL at 4470 nm

A wide variety of gas molecules exhibit characteristic absorption lines in the near infrared. DFB lasers emitting at 4470 nm are e. g. suited for highly sensitive detection of small NO<sub>x</sub> concentrations. For this application, highly stable laterally and longitudinally single mode lasers are required.

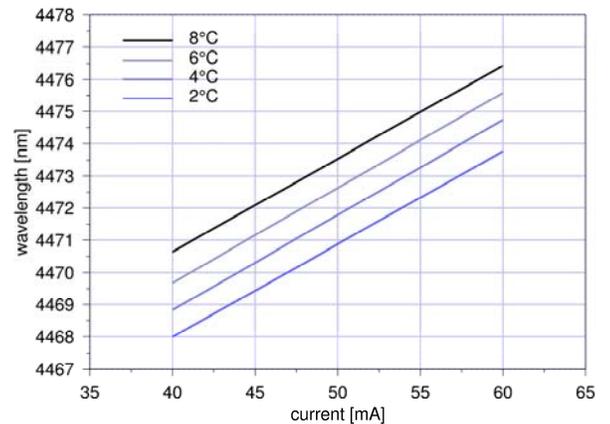
This data sheet reports performance data of nanoplus DFB lasers at this wavelength. Similar performance data are obtained in the entire wavelength range from 4000 nm to 4600 nm.

For examples of performance data of nanoplus lasers in other wavelength ranges, please see [www.nanoplus.us](http://www.nanoplus.us) or contact [victor.perez@nanoplus.com](mailto:victor.perez@nanoplus.com).



*Fig. 1*  
Room temperature cw spectrum of a nanoplus interband cascade DFB laser operating at 4470 nm

In many applications, temperature and / or current variations are used to adjust the laser emission precisely to the target wavelength.



*Fig. 2*  
Mode hop free tuning of a nanoplus 4470 nm DFB laser by current variation at different temperatures

electro-optical characteristics	symbol	unit	typ
peak wavelength	$\lambda$	nm	4470
threshold current	$I_{th}$	mA	20
temperature tuning coefficient	$C_T$	nm / K	0.35
current tuning coefficient	$C_I$	nm / mA	0.2
slow axis (FWHM)		degrees	35
fast axis (FWHM)		degrees	55
storage temperatures	$T_S$	°C	+ 20
operational temperature at case	$T_c$	°C	+ 20
chip operation temperature	$T_{op}$	°C	- 5

We will be happy to answer further questions. Please contact us at [victor.perez@nanoplus.com](mailto:victor.perez@nanoplus.com)

