Nanosystems and Technologies GmbH
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DFB Interband Cascade Lasers (ICL): 2800 nm - 4000 nm

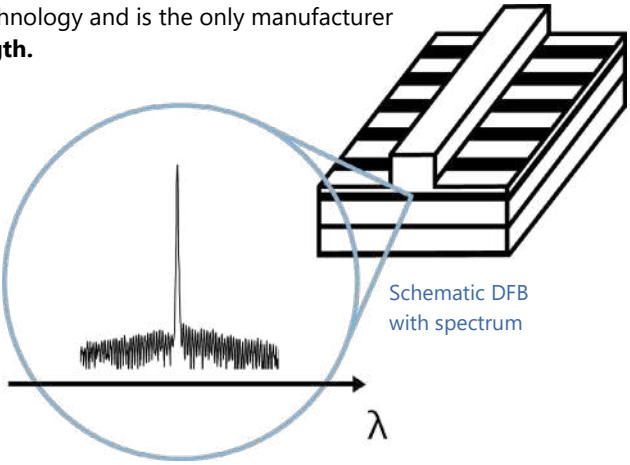
WAVELENGTH

- 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

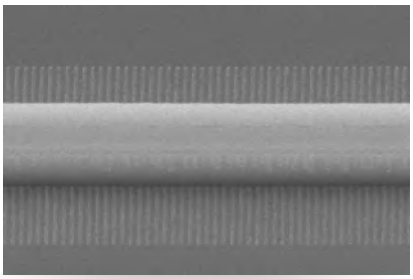
nanoplus Distributed Feedback Lasers **(DFB)** are specifically designed for high-precision gas detection using tunable diode laser absorption spectroscopy **(TDLAS)**. Our devices operate **reliably** in more than 30,000 installations worldwide. For more than 20 years nanoplus has set the standard for 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



Schematic DFB with spectrum



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 µm.**

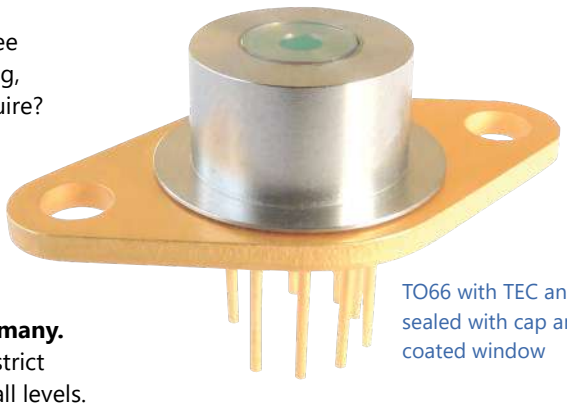
Our excellent **spectral purity** is characterized by a large side mode suppression ratio **(SMSR)** of **> 35 dB,** giving your system a low signal to noise ratio against crossinterference.

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?



TO66 with TEC and NTC, sealed with cap and AR coated window

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!**

REGISTERED COMPANY ISO 9001 14001

CLASS 3B LASER PRODUCT (DIN EN 60825-1:2015-07) DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

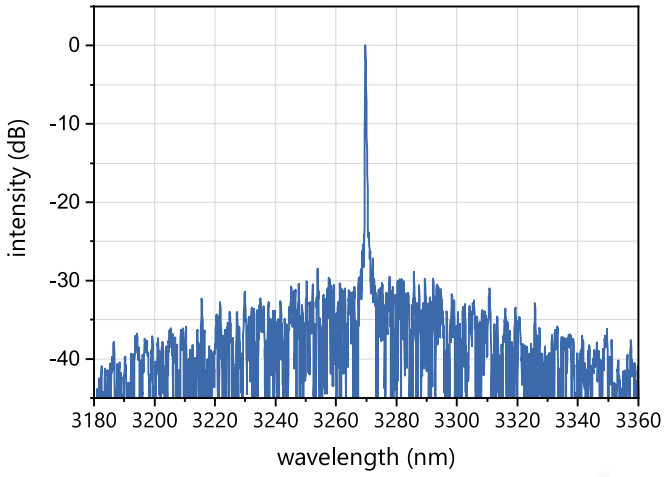
ATTENTION OBSERVE PRECAUTION FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

DANGER LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

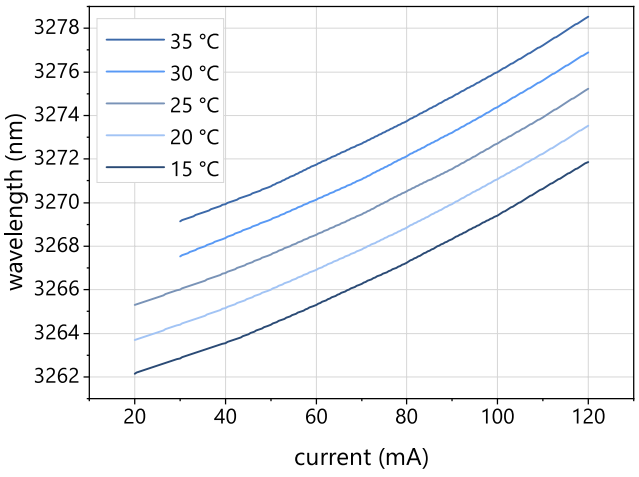
Nanosystems and Technologies GmbH
nanoplus

Typical Specifications: 2800 nm - 4000 nm

This data sheet reports performance data of a **sample DFB ICL at 3270 nm,** which is representative for the entire wavelength range. We offer enhanced specifications for 3270 nm, 3345 nm and 3375 nm. Please refer to our TOP Wavelengths for further details: https://nanoplus.com/top-wavelengths.



Typical room temperature cw spectrum of a nanoplus DFB ICL at 3270 nm



Typical mode hop free tuning of a nanoplus DFB ICL at 3270 nm by current and temperature

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at T_{op}, I_{op})	λ_{op}	nm		Please specify to 0.1 nm.	
optical output power (at λ_{op})	P_{op}	mW		10	
operating current	I_{op}	mA		120	
operating voltage	V_{op}	V		5	
threshold current	I_{th}	mA	15	30	50
side mode suppression ratio	SMSR	dB		> 35	
current tuning coefficient	C_I	nm / mA		0.10	
temperature tuning coefficient	C_T	nm / K		0.35	
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://nanoplus.com/packaging-options

Please contact sales@nanoplus.com for customized specifications, quotes and further questions.
Visit our website for technical notes, application samples or literature referrals.

Rev.ICL3270.0

nanoplus Nanosystems and Technologies GmbH, www.nanoplus.com, phone: +49 (0) 3693 50 5000-0, email: sales@nanoplus.com

Nanosystems and Technologies GmbH
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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

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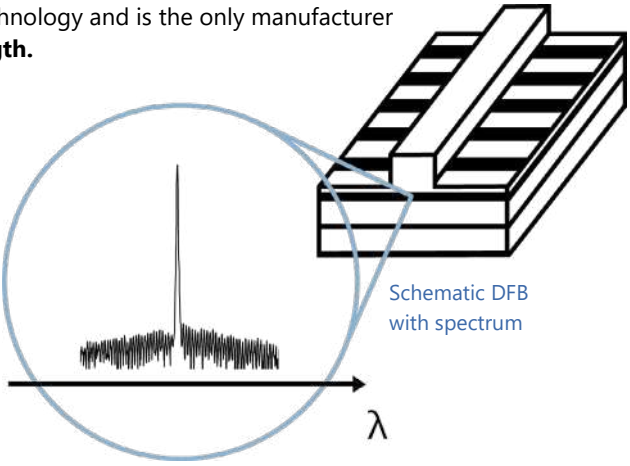
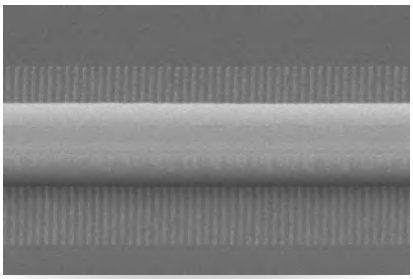
Key features:

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



Schematic DFB with spectrum



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 µm.**

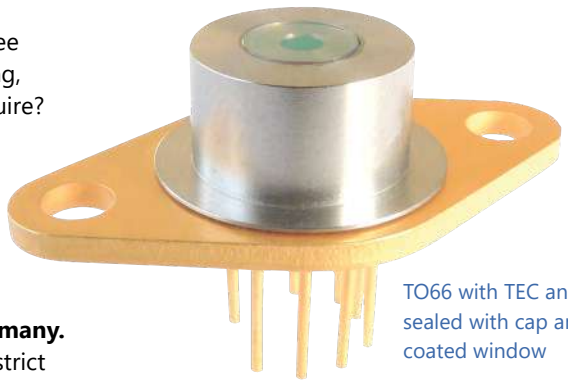
Our excellent **spectral purity** is characterized by a large side mode suppression ratio **(SMSR)** of **> 35 dB,** giving your system a low signal to noise ratio against crossinterference.

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?



TO66 with TEC and NTC, sealed with cap and AR coated window

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REGISTERED COMPANY ISO 9001 14001

CLASS 3B LASER PRODUCT (DIN EN 60825-1:2015-07) DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

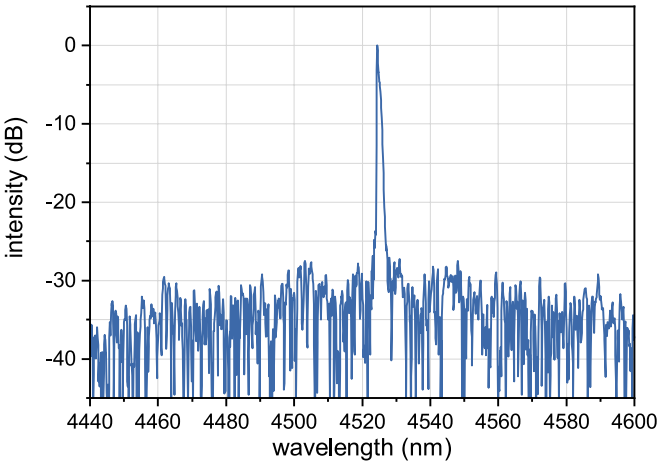
ATTENTION OBSERVE PRECAUTION FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

DANGER LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

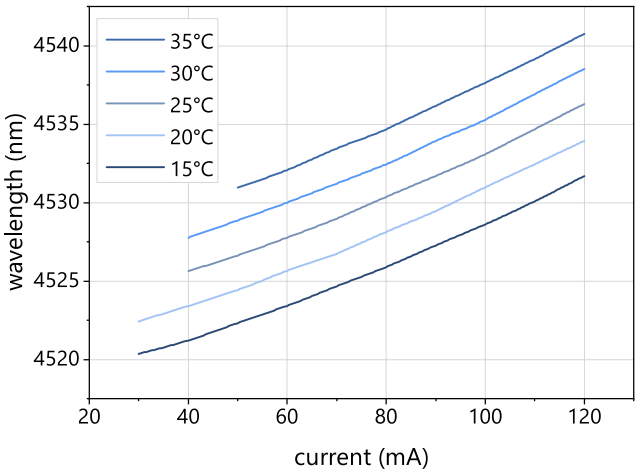
Nanosystems and Technologies GmbH
nanoplus

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 for further details: https://nanoplus.com/top-wavelengths/4524nm.



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



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

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at T_{op}, I_{op})	λ_{op}	nm		Please specify to 0.1 nm.	
optical output power (at λ_{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	
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://nanoplus.com/packaging-options

Please contact sales@nanoplus.com for customized specifications, quotes and further questions.
Visit our website for technical notes, application samples or literature referrals.

Rev.ICL4524.00

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Nanosystems and Technologies GmbH
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DFB Interband Cascade Lasers (ICL): 4600 nm - 5300 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

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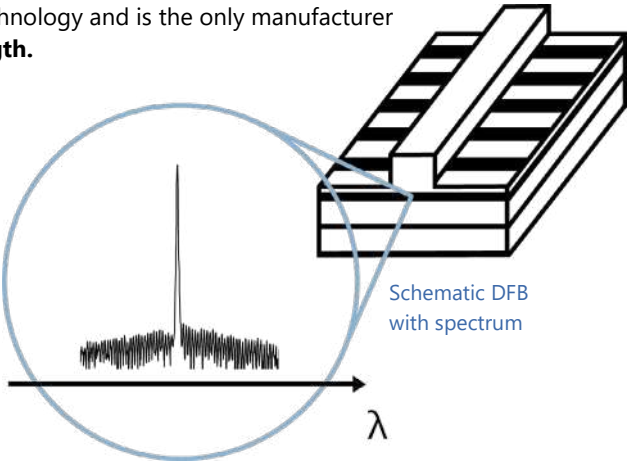
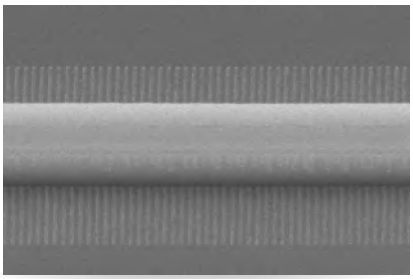
Key features:

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



Schematic DFB with spectrum



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 µm.**

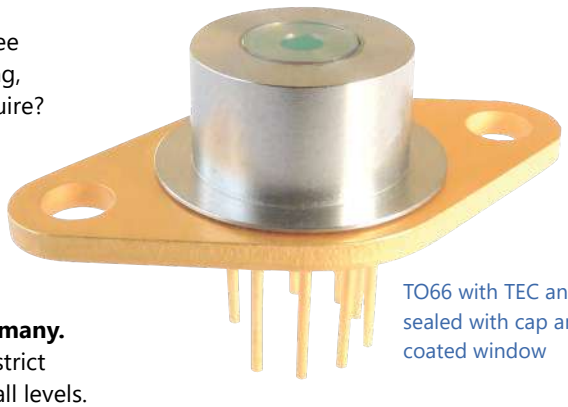
Our excellent **spectral purity** is characterized by a large side mode suppression ratio **(SMSR)** of **> 35 dB,** giving your system a low signal to noise ratio against crossinterference.

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?



TO66 with TEC and NTC, sealed with cap and AR coated window

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REGISTERED COMPANY ISO 9001 14001

CLASS 3B LASER PRODUCT (DIN EN 60825-1:2015-07) DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

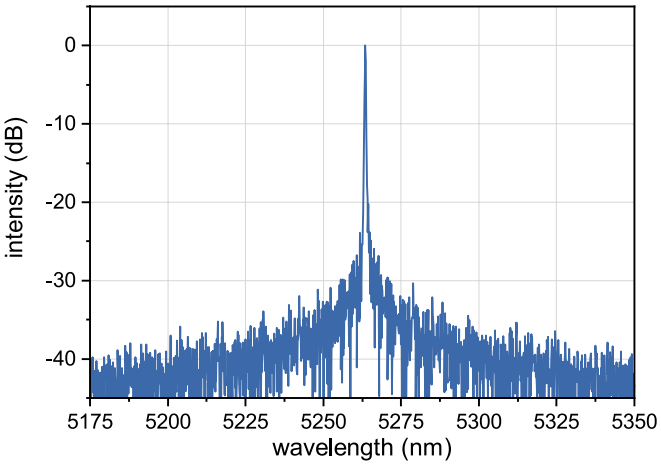
ATTENTION OBSERVE PRECAUTION FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

DANGER LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

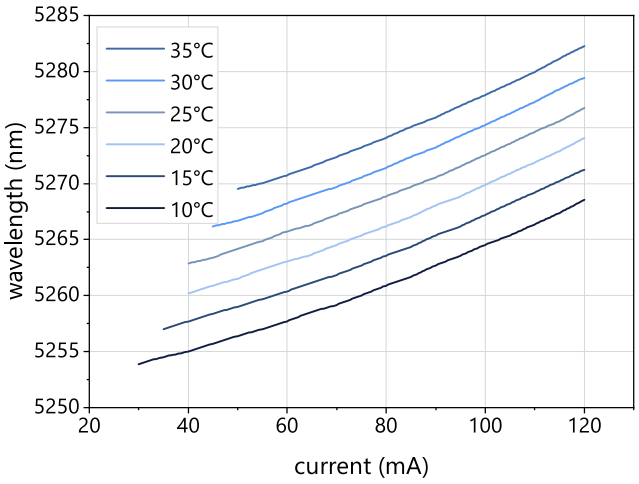
Nanosystems and Technologies GmbH
nanoplus

Typical Specifications: 4600 nm - 5300 nm

This data sheet reports performance data of a **sample DFB ICL at 5263 nm,** which is representative for the entire wavelength range. We offer enhanced specifications for 5184nm and 5263 nm. Please refer to our TOP Wavelengths for further details: https://nanoplus.com/top-wavelengths/5263nm.



Typical room temperature cw spectrum of a nanoplus DFB ICL at 5263 nm



Typical mode hop free tuning of a nanoplus DFB ICL at 5263 nm by current and temperature

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at T_{op}, I_{op})	λ_{op}	nm		Please specify to 0.1 nm.	
optical output power (at λ_{op})	P_{op}	mW		3	
operating current	I_{op}	mA		120	
operating voltage	V_{op}	V		5	
threshold current	I_{th}	mA	30	40	70
side mode suppression ratio	SMSR	dB		> 35	
current tuning coefficient	C_I	nm / mA		0.14	
temperature tuning coefficient	C_T	nm / K		0.48	
operating chip temperature	T_{op}	°C	+10	+20	+50
operating case temperature*	T_c	°C	-20	+25	+50

* non-condensing

laser packaging options

TO66 with TEC and NTC, sealed, AR coated window

Other packaging options may be discussed on request.

Technical drawings & accessories are available at: https://nanoplus.com/packaging-options

Please contact sales@nanoplus.com for customized specifications, quotes and further questions.
Visit our website for technical notes, application samples or literature referrals.

Rev.ICL5263.00

nanoplus Nanosystems and Technologies GmbH, www.nanoplus.com, phone: +49 (0) 3693 50 5000-0, email: sales@nanoplus.com

Nanosystems and Technologies GmbH
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DFB Interband Cascade Lasers (ICL): 5300 nm - 5800 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

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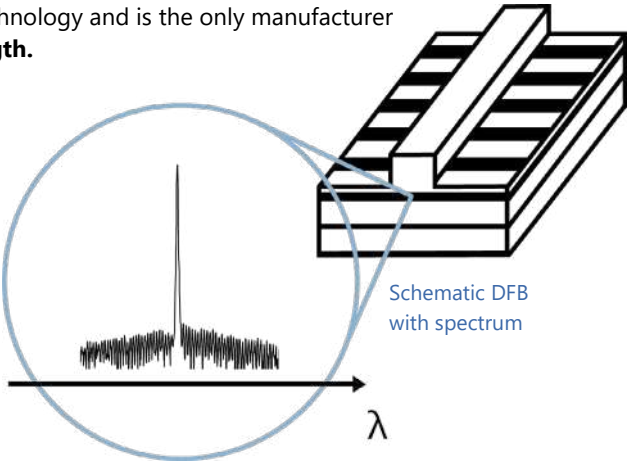
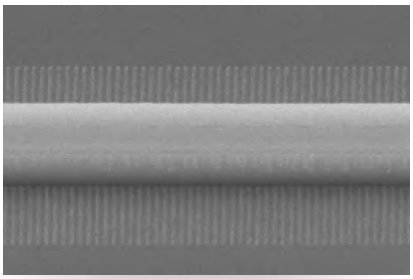
Key features:

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



Schematic DFB with spectrum



Overgrowth-free DFB device processing

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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.

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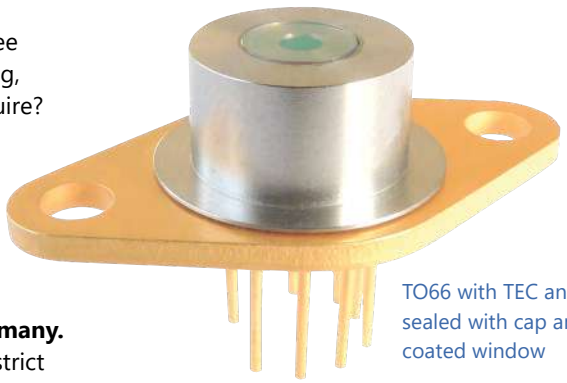

TO66 with TEC and NTC, sealed with cap and AR coated window

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REGISTERED COMPANY ISO 9001 14001

CLASS 3B LASER PRODUCT (DIN EN 60825-1:2015-07) DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

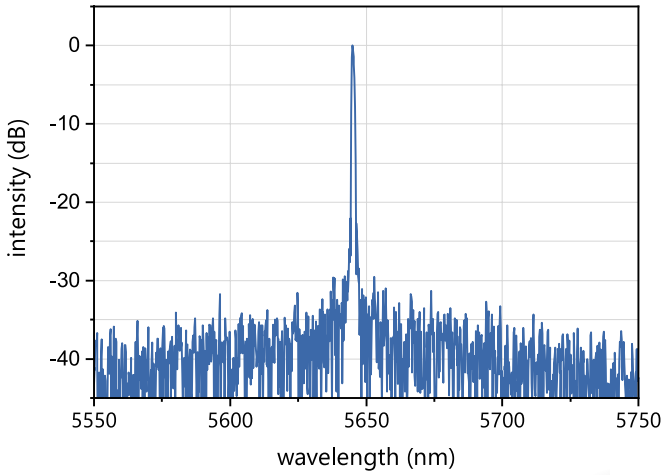
ATTENTION OBSERVE PRECAUTION FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

DANGER LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

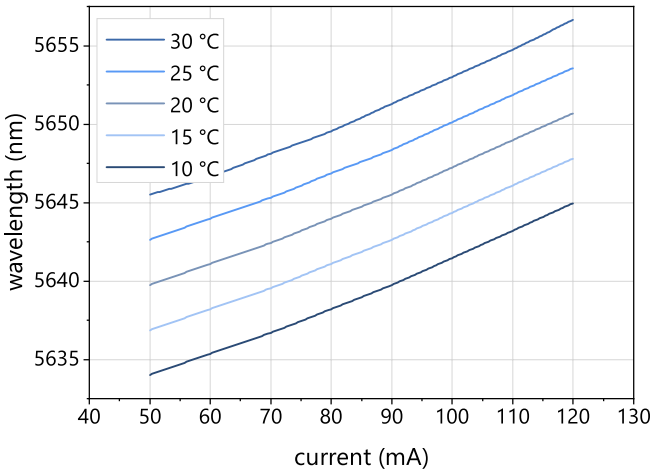
Nanosystems and Technologies GmbH
nanoplus

Typical Specifications: 5300 nm - 5800 nm

This data sheet reports performance data of a **sample DFB ICL at 5645 nm,** which is representative for the entire wavelength range.



Typical room temperature cw spectrum of a nanoplus DFB ICL at 5645 nm



Typical mode hop free tuning of a nanoplus DFB ICL at 5645 nm by current and temperature

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at T_{op}, I_{op})	λ_{op}	nm		Please specify to 0.1 nm.	
optical output power (at λ_{op})	P_{op}	mW		1	
operating current	I_{op}	mA		120	
operating voltage	V_{op}	V		5	
threshold current	I_{th}	mA	30	40	70
side mode suppression ratio	SMSR	dB		> 35	
current tuning coefficient	C_I	nm / mA		0.15	
temperature tuning coefficient	C_T	nm / K		0.5	
operating chip temperature	T_{op}	°C	+5	+20	+50
operating case temperature*	T_c	°C	-20	+25	+45
storage temperature*	T_S	°C	-30	+20	+70

* non-condensing

laser packaging options

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

Other packaging options may be discussed on request.

Technical drawings & accessories are available at: https://nanoplus.com/packaging-options

Please contact sales@nanoplus.com for customized specifications, quotes and further questions.
Visit our website for technical notes, application samples or literature referrals.

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Nanosystems and Technologies GmbH
nanoplus

DFB Interband Cascade Lasers (ICL): 5800 nm - 6500 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

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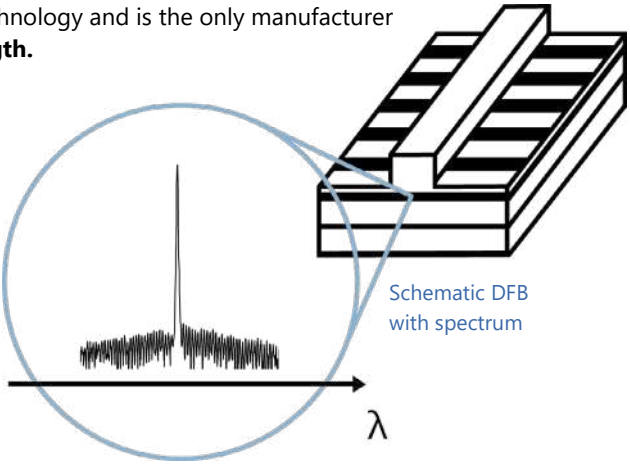
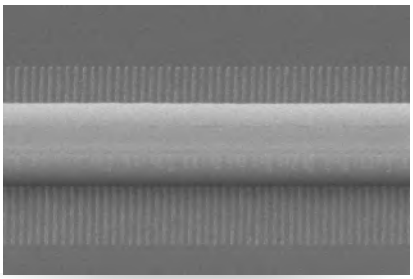
Key features:

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



Schematic DFB with spectrum



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 µm.**

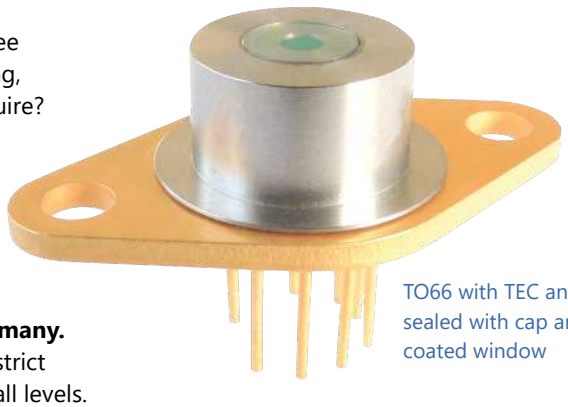
Our excellent **spectral purity** is characterized by a large side mode suppression ratio **(SMSR)** of **> 35 dB,** giving your system a low signal to noise ratio against crossinterference.

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?



TO66 with TEC and NTC, sealed with cap and AR coated window

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!**

REGISTERED COMPANY ISO 9001 14001

CLASS 3B LASER PRODUCT (DIN EN 60825-1:2015-07) DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

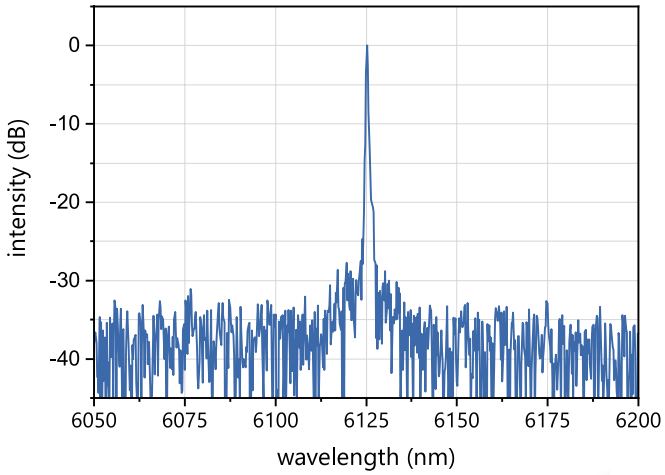
ATTENTION OBSERVE PRECAUTION FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

DANGER LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

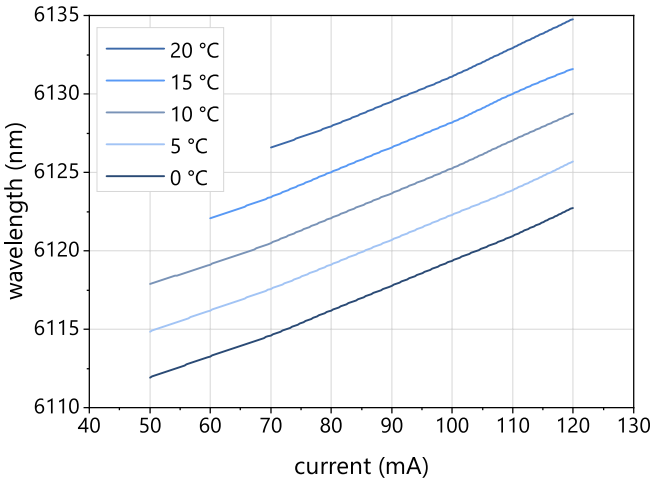
Nanosystems and Technologies GmbH
nanoplus

Typical Specifications: 5800 nm - 6500 nm

This data sheet reports performance data of a **sample DFB ICL at 6125 nm,** which is representative for the entire wavelength range.



Typical room temperature cw spectrum of a nanoplus DFB ICL at 6125 nm



Typical mode hop free tuning of a nanoplus DFB ICL at 6125 nm by current and temperature

electro-optical characteristics	symbol	unit	min.	typ	max.
operating wavelength (at T_{op}, I_{op})	λ_{op}	nm		Please specify to 0.1 nm.	
optical output power (at λ_{op})	P_{op}	mW		1	
operating current	I_{op}	mA		120	
operating voltage	V_{op}	V		5	
threshold current	I_{th}	mA	30	40	70
side mode suppression ratio	SMSR	dB		> 35	
current tuning coefficient	C_I	nm / mA		0.15	
temperature tuning coefficient	C_T	nm / K		0.5	
operating chip temperature	T_{op}	°C	-10	+5	+15
operating case temperature*	T_c	°C	-20	+25	+40
storage temperature*	T_S	°C	-30	+20	+70

* non-condensing

laser packaging options

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

Other packaging options may be discussed on request.

Technical drawings & accessories are available at: https://nanoplus.com/packaging-options

Please contact sales@nanoplus.com for customized specifications, quotes and further questions.
Visit our website for technical notes, application samples or literature referrals.

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