

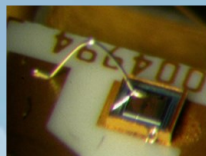
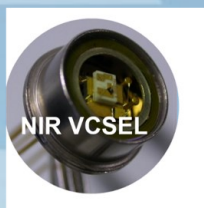
NIR VCSELs: Very High Performance – Ultra Low Power Consumption

NIR Lasers (VCSEL) for Optical Communications, Sensing and 3D Sensing

VERTILAS GmbH, headquartered in Unterschleissheim (near Munich), Germany, develops, produces and markets innovative laser diodes for optical communications and tunable diode laser spectroscopy (TDLS).

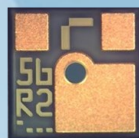


VERTILAS' unique Buried Tunnel Junction (BTJ) laser diode technology offers a wavelength range of 1.3 µm to 2.3 µm. VERTILAS is one of the leading global providers in the field of **long wavelength Vertical Cavity Surface Emitting Laser diodes (VCSEL)**, deploying reliable and cost efficient production methods. VERTILAS' VCSEL technology has been proven in several applications, including a variety of demanding spectroscopy and communications applications. Furthermore, VERTILAS has excelled in a range of core competencies for components development and manufacturing, including wafer processing, assembly and test and package design.



NIR VCSEL Gas Sensing

- Lasers from 1.3 µm to 2.3 µm
- Gases: HF, H₂O, NH₃, CH₄, HCl, CO₂, CO and more
- Cooled and uncooled TO packaging
- Fiber pigtail package



VCSEL Optical Communications

- Lasers for 1.3 µm, 1.49 µm, 1.55 µm
- Single mode and multi mode
- VCSEL arrays
- Cooled and uncooled TO packaging
- Fiber pigtail and LC TOSA package

The company is **ISO 9001** certified and has developed a wide range of product solutions to address various markets.

Contact Information

VERTILAS GmbH

Christian Neumeyr, Chief Executive Officer

Gutenbergstr. 5

Phone: +49.89.37156018-0, Fax: +49.89. 37156018-19

85716 Unterschleissheim

neumeyr@vertilas.com

Germany

www.vertilas.com



NIR VCSELs: Very High Performance – Ultra Low Power Consumption

NIR Lasers (VCSELs) for Sensing from 1.27 μm to 2.3 μm

VERTILAS offers a unique product portfolio to address the fast growing market need for tunable diode laser spectroscopy (TDLS). This portfolio includes both standard and applications specific products and provides lasers to detect gases such as **H₂O, NH₃, CO, CO₂, H₂S, CH₄, HCl and many more**. VERTILAS has developed a wide range of packaging solutions that include a peltier (TEC) and thermistor, hermetically sealed caps and fiber coupled connectors.

NIR VCSEL for Sensing: Tunable diode laser spectroscopy can be deployed in a broad range of applications to measure many gas species. These gas detection systems require tunable lasers to scan the absorption lines of the various gases. The electrical and optical characteristics of a Vertilas laser for methane (CH₄) detection are shown in the graphs below. This class 1 laser features an extremely low power consumption of typ. 10mW (Fig. 2a), an optical power of max. 2 mW (Fig. 2a) and a wide current tuning range of 4 nm (Fig. 2b).

Key Characteristics

- Tunable 1.3 μm to 2.3 μm single mode lasers
- Significantly reduce system cost and size
- Reduce module power consumption by up to 50%
- Accomplish sensitivity in the ppm and ppb range
- Low operating expenditure, long lifetime

Applications

- Tunable Diode Laser Absorption Spectroscopy
TDLAS / NIR Gas Analysis
- Industrial, Safety and Environmental Applications
- Air Quality, Agriculture and Food Storage
- Test and Measurement

Standard and Application Specific Wavelengths

Wavelengths	Gases	Wavelengths	Gases
1280nm	HF	1560nm	CO
1392nm	H2O	1645nm	Ethylene Oxide
1512nm	NH3	1800/1877nm	H2O
1579/1590nm	H2S	1960nm	N2O
1654nm	CH4	2012nm	CO2
1680nm	Combustables		
1730/1742nm	HCl		
1854nm	H2O		
2004/2008nm	CO2		

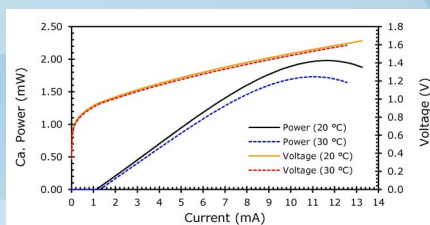
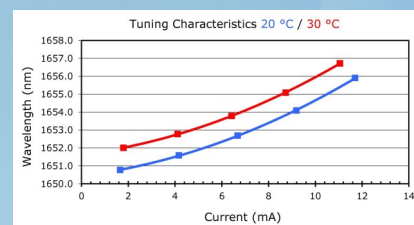


Fig. 2: a) LIV curves of 1654 nm VCSEL



b) bias current tuning range of 1654 nm VCSEL

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Germany

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VERTILAS GmbH Gutenbergstr. 5, 85716 Unterschleissheim, Germany

Tel: +49-89-37156018-0 Fax: +49-89-37156018-19 sales@vertilas.com www.vertilas.com