

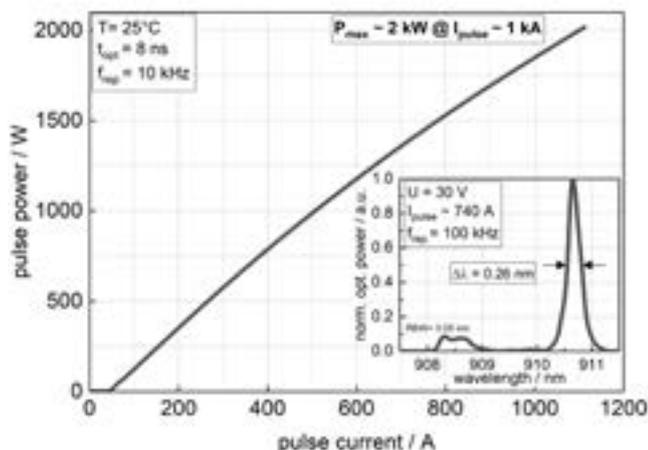
Pulse laser source for long range line-scanning LiDAR systems

Lasers generating short optical pulses with widths in the range from 200 ps to 20 ns are key components for a broad range of applications including LiDAR (Light Detection and Ranging) for, e.g., autonomous driving, 3D object detection, laser scanning (airborne, satellite, and terrestrial) as well as fluorescence spectroscopy and micro-machining systems.

FBH's high-power pulse laser source features an on-chip wavelength-stabilized 48 emitter laser bar. This laser is integrated jointly with optimized high peak pulse current electronic drivers and thus ideally suited for 3D object detection in automotive LiDAR systems. The tailored design of both diode laser technology as well as optimized RF components from microwave electronics are core competencies of the FBH. The pulse source is optimized for high peak current, short optical pulse width, high repetition rate, and high power efficiency.

Specifications for line scanning LiDAR

- 48 emitter laser bars with single or multiple epitaxially stacked active regions
- wavelengths: 620 nm – 1180 nm
- wavelength stabilization with integrated DBR grating providing spectral bandwidth <0.3 nm & temperature-dependent wavelength shift ~0.06 nm/K
- pulse peak power: up to 2 kW
- temperature range: -40°C - +85°C
- laser driver with 4 GaN transistors in final stages with current pulses up to ~ 1 kA
- pulse amplitude & width independently controllable
- current and optical pulse width: 3 ns – 20 ns



➤ Optical pulse power vs. driver pulse current for a 48 emitter laser bar. Inset: Optical spectrum at 740 A at 100 kHz.



➤ FBH high current driver with integrated 48 emitter laser bar.

Applications

- autonomous driving
- 3D object detection
- laser scanning (airborne, satellite & terrestrial)
- fluorescence spectroscopy
- micro-machining systems

Profile

The Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. In the field of III-V electronics, it manufactures high-frequency devices and circuits for communications, power electronics, and sensor technology. Moreover, FBH develops light sources from the visible to the UV spectral range: high-power diode lasers, UV light sources, and hybrid laser systems. Applications range from medical technology, materials processing and sensors to optical communications in space and integrated quantum technology. In close cooperation with industry, its research results lead to cutting-edge products.

The institute is a member of the Leibniz Association and part of Research Fab Microelectronics Germany (FMD).