Index

1 – Company Overview
2 – R&D Activities
3 – Our Products
   _Sol DPSS
   _Onda DPSS
   _Wedge DPSS
   _BDL and BFP Diode Lasers
   _Microchip lasers
   _Custom products
4 – Worldwide Presence
5 – Sales and Financial Highlights

©Property of Bright Solutions srl
1 – Company Overview

Bright Solutions S.r.l was founded in 1998 by group of laser scientists and industry experts with significant experience in diode-pumped solid state laser engineering. From the origin the Company’s activity was oriented towards the development of the state-of-the-art DPSS laser sources with a goals of superior efficiency, compactness and reliability.

Bright Solutions has many experience veterans of the laser industry, with strengths in setting up industrial production and testing, and in guiding professionally skilled personnel in the manufacture of diode-pumped solid-state lasers. Laser sources for aerospace and scientific applications are also a considerable part of Bright Solutions capabilities. Bright Solutions has strong relationships with many experienced commercial Partners, thus securing a worldwide presence for the Company and diffusion of its products.

Bright Solutions is an ISO certified Company (ISO 9001:2008)

©Property of Bright Solutions srl
Bright Solutions set up a **new facility** - closed to the headquarter - for allowing to optimize the organization of the existing departments and for defining new specific business units:

- **Bright Aerospace** dedicated to custom projects and programs involving our DPSS laser sources specifically designed for airborne and satellite applications

- **Bright Microlaser** for developing and manufacturing microchip lasers after we acquired the assets of CRC Ltd.

- **Bright System**, the Advanced **sub-systems division and application lab** for investigating about special applications of our DPSS laser sources for micro-machining and material processing and for assisting our customers in applications

- **Bright Electron** for designing proprietary electronics

Bright Solutions grown up in the last years and currently **more than 60 people** are working full time as employees.
2 – R&D Activities

Industrial
- Development of high efficiency high peak power air cooled Q-switched ns and sub-ns DPSS Lasers
- Development of high power fiber coupled diode laser modules and systems
- Fiber laser pumping
- High power optical fiber manufacturing

Aerospace
- Development of DPSS laser sources for LIDAR and Bathimetry
- Development of eye safe range finders transmitter
- High power diode pumped laser oscillators for UV Lidar
- Laser module development activities and subcontractor in aerospace and military programs.

Scientific
- Development of a laser source for minimally invasive neurosurgery (MIRSURG EU Project - 7th Framework Programme)
- Development of ps mode locked laser, ns Q-switched lasers and tunable OPOs for non linear optics applications.

©Property of Bright Solutions srl
3 – Our Products

- Sol DPSS
- Onda DPSS
- Wedge DPSS

- Microchip lasers
- Custom lasers
- BFP and BDL Diode Lasers
3 – Sol DPSS

Sol is the most compact Q-switched DPSS laser available in the power range 6W to 40W. Sol lasers are offered in a *rugged and lightweight* module, designed to allow easy and reliable integration in micro-machining and marking applications.

Due to the single enclosure design, optical fibers and other delicate cable connections will not be necessary for system integration.

**Compactness**, insensitivity to environmental conditions and ease of handling guarantee superior operation flexibility and performance/cost ratio. The high **peak power and the excellent beam quality** of SOL lasers make them the ideal source for the most demanding industrial and scientific applications.

Fast pulse energy modulator, red aiming beam, beam expander and thermostatic fans are always included in the configuration for industrial and laser marking applications.

23 x 10 x 9 cm$^3$ – 4.5 kg

©Property of Bright Solutions srl
3 – Sol DPSS

Up to 40 W @ 1064 nm
Up to 10 W @ 532 nm
200 kW Peak Power
Up to 100 kHz repetition rate
Electronic Pulse Energy Modulation
Sealed and rugged
Monolithic Design
Air Cooling
24 Vdc

More than 3000 lasers on the field
Failure rate < 2%

120,000 hours MTBF of Pumping Diodes

Options available

Beam expanding and collimating optics
Red aiming beam
Extended frequency range
(Single Shot to 200 kHz)
Circular Polarization
Monitoring Photodiode
AC-DC Power Supply

©Property of Bright Solutions srl
# 3 – Sol 1064 nm Features Summary

<table>
<thead>
<tr>
<th>SOL</th>
<th>6W</th>
<th>10W</th>
<th>20W</th>
<th>30W</th>
<th>40W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wavelength</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1064 nm</td>
</tr>
</tbody>
</table>
| **Rep.rate** | | | | | 10 kHz to 100 kHz  
(option: Single Shot to 200 kHz) |
| **CW mode** | | | | | yes |
| **Pulsewidth** | | | | | 6 to 60 ns |
| **Beam Diameter** | < 8 mm (integrated beam expander) | | | | |
| **Beam Quality** | < 1.5 | < 2 | < 2 | | < 2.5 |
| **Electrical Requirements** | | | | | 24 V DC  
(6A to 20A according to the models) |
| **Cooling** | | | | | Air cooled – integrated thermostatic fan  
(option: water cooling or contact cooling) |
| **Weight** | | | | | < 4.5 kg |
### 3 – Sol 532 nm Features Summary

<table>
<thead>
<tr>
<th>SOL</th>
<th>3W</th>
<th>5W</th>
<th>10W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>532 nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rep.rate</td>
<td>10 kHz to 100 kHz (option: Single Shot to 100 kHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CW mode</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulsewidth</td>
<td>6 to 60 ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Diameter</td>
<td>&lt; 8 mm (integrated beam expander)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Quality</td>
<td>&lt; 1.3</td>
<td>&lt; 1.5</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>Electrical Requirements</td>
<td>24 V DC (6A to 14A according to the models)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Air cooled – integrated thermostatic fan (option: water cooling or contact cooling)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>&lt; 4.5 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Developed as a high-energy seeder for advanced MOPA systems, Onda is the new DPSS ns-laser platform aimed to high-end applications requiring both excellent beam quality and high peak power in order to process metals, glass, plastics, delicate and hard materials.

Onda is available at four different wavelengths: 266, 355, 532 and 1064nm.

The internal optical layout and the accurate temperature management allow to get relevant pulse energy performances without compromising the lifetime of the THG and FHG stages.
All of Onda models can work from single shot to 50 kHz or up to 100 kHz with a pulsewidth between 2 and 10 ns and share the same mechanical footprint and electronic interface.
Compactness, insensitivity to environmental conditions and ease of handling allow superior operation flexibility and performance / cost ratio.

©Property of Bright Solutions srl
3 – Onda DPSS

800 uJ @ 1064 nm
400 uJ @ 532 nm
180 uJ @ 355 nm
80 uJ @ 266 nm

Single Shot to 100 kHz
Electronic Pulse Energy Modulation
Sealed and rugged
Field replaceable THG and FHG stages
Air Cooling
24 Vdc

Options available

Beam expanding and collimating optics
Red aiming beam
Circular Polarization
Monitoring Photodiode
Air cooled
AC-DC Power Supply

Glass engraving

©Property of Bright Solutions srl
## INDUSTRIAL APPLICATIONS

<table>
<thead>
<tr>
<th>Ablation</th>
<th>Micromachining</th>
<th>Policrystaline Sylicon Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Ablation Image" /></td>
<td><img src="image2" alt="Micromachining Image" /></td>
<td><img src="image3" alt="Processing Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3D Engraving</th>
<th>Hard Material Machining</th>
<th>Surface Contrast &amp; Material Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="3D Engraving Image" /></td>
<td><img src="image5" alt="Hard Material Image" /></td>
<td><img src="image6" alt="Surface Contrast Image" /></td>
</tr>
</tbody>
</table>

©Property of Bright Solutions srl
INDUSTRIAL APPLICATIONS

Grey Scale Images obtained using Pulse Energy Modulation
3 – Wedge Family DPSS

WEDGE family has been recently redesigned in order to offer wider performance ranges and add some new models.

Wedge HB is available both at 1064nm and at 532 nm; pulse energy reaches 2 mJ in less than 1.5 ns. The air-cooled unit measures only 26 x 22 x 8 cm. A higher energy model, the Wedge XB, is also available in a slightly larger footprint both at 1064nm and 532nm. Maximum pulse energy is 4 mJ @ 1 kHz with a pulsewidth of 1 ns.

Wedge HF and Wedge XF models are provided in a very compact single unit laser source, only 8 x 9 x 19 cm, both at 1064nm and 532nm. Repetition rate can reach 100 kHz and pulses can be shorter than 500 ps, achieving a remarkably high peak power suitable for processing glass and special materials.
3 – Wedge HB DPSS

Up to 2 mJ Pulse Energy
2 MW Peak Power
< 1.5 ns Pulse Width
Single Shot to 2 kHz
Monolithic Design
Air Cooling
Low heat waste
@1064 @532 @355 @266 nm

Options available

Single Longitudinal Mode
Beam Expanding and collimation optics
Red aiming beam
Low jitter option
Circular Polarization
AC-DC Power Supply
Parametric generation at 1.5 um and 3 um

WEDGE HB: 26 x 22 x 8 cm³ – 7 kg
3 – Wedge XB DPSS

Up to 4 mJ Pulse Energy
4 MW Peak Power
< 1.5 ns Pulse Width
Single Shot to 1 kHz
Monolithic Design
Air Cooling
Low heat waste
@1064 @532 @355 @266 nm

WEDGE XB: 26 x 25 x 10 cm³ – 10 kg

Options available

Single Longitudinal Mode
Beam Expanding and collimation optics
Red aiming beam
Low jitter option
Circular Polarization
AC-DC Power Supply
Parametric generation at 1.5 um and 3 um

©Property of Bright Solutions srl
3 – Wedge HF DPSS

Up to 180 uJ Pulse Energy
$M^2 < 1.3$
700 ps to 3 ns Pulse Width
10 kHz to 100 kHz repetition rate

Aerospace qualified Design
Air Cooling
Low heat waste
@1064 @532 @355 @266 nm

8 x 9 x 19 cm$^3$ – 2 kg

©Property of Bright Solutions srl
3 – Wedge XF DPSS

Up to 60 uJ Pulse Energy
M² < 1.2
450 ps to 1 ns Pulse Width
10 kHz to 100 kHz repetition rate
Aerospace qualified Design
Air Cooling
Low heat waste
@1064 @532 @355 @266 nm

8 x 9 x 19 cm³ – 2 kg

<500 ps @ 10 kHz

Options:
- Third and fourth harmonic generation
- Parametric generation at 1..5 um and 3 um
- Single Shot to 10 kHz Extended Rep.Rate range
- Beam Expanding and collimation optics
- Red aiming beam
- Circular Polarization
- AC-DC Power Supply

©Property of Bright Solutions srl
3 – pWedge Platform

Flexible platform for customized configurations

Example of a possible configuration:
up to 1 mJ Pulse Energy
500 ps Pulse Width
Up to 10 kHz repetition rate
Air cooling and Water Cooling versions
@1064 @532 @355 @266 nm
Parametric generation at 1.5 um and 3 um

Earth image realized using pWedge @ 532 nm

©Property of Bright Solutions srl
### 3 – Wedge HB and XB Features Summary

<table>
<thead>
<tr>
<th>WEDGE</th>
<th>HB 1064</th>
<th>HB 532</th>
<th>XB 1064</th>
<th>XB 532</th>
<th>pWedge (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>1064 nm</td>
<td>532 nm</td>
<td>1064 nm</td>
<td>532 nm</td>
<td>1064 nm</td>
</tr>
<tr>
<td>Pulsewidth</td>
<td>&lt; 1.5 ns</td>
<td>&lt; 1.3 ns</td>
<td>500 ps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Energy</td>
<td>up to 2 mJ</td>
<td>up to 1 mJ</td>
<td>up to 4 mJ</td>
<td>up to 2 mJ</td>
<td>1 mJ</td>
</tr>
<tr>
<td>Peak Power</td>
<td>up to 2 MW</td>
<td>up to 1 MW</td>
<td>up to 4 MW</td>
<td>up to 2 MW</td>
<td>2 MW</td>
</tr>
<tr>
<td>Rep. Rate</td>
<td>Single Shot to 2 kHz</td>
<td>Single Shot to 1 kHz</td>
<td>SS to 10 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear (100:1)</td>
<td>(option: circular polarization)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Diameter</td>
<td>&lt; 2 mm</td>
<td>(option: beam expander)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Quality</td>
<td>&lt; 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Air cooled</td>
<td>(option: water cooling)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>8.5 kg</td>
<td>10 kg</td>
<td>12 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) example of a possible configuration

©Property of Bright Solutions srl
## 3 – Wedge HF and XF Features Summary

<table>
<thead>
<tr>
<th>WEDGE</th>
<th>HF 1064</th>
<th>HF 532</th>
<th>XF 1064</th>
<th>XF 532</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>1064 nm</td>
<td>532 nm</td>
<td>1064 nm</td>
<td>532 nm</td>
</tr>
<tr>
<td>Pulsewidth</td>
<td>&lt;700 ps to 3 ns</td>
<td></td>
<td>&lt;450 ps to 1 ns</td>
<td></td>
</tr>
<tr>
<td>Pulse Energy</td>
<td>up to 180 uJ</td>
<td>up to 80 uJ</td>
<td>up to 60 uJ</td>
<td>up to 25 uJ</td>
</tr>
<tr>
<td>Peak Power</td>
<td>up to 250kW</td>
<td>up to 100kW</td>
<td>up to 150 kW</td>
<td>up to 55 kW</td>
</tr>
<tr>
<td>Rep. Rate</td>
<td>Single Shot to 100 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear (100:1) (option: circular polarization)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Diameter</td>
<td>&lt; 4 mm (integrated beam expander)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Quality</td>
<td>&lt; 1.5</td>
<td></td>
<td>&lt; 1.3</td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Air cooled (option: water cooling)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>2 kg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

©Property of Bright Solutions srl
3 - WEDGE Applications

INDUSTRIAL APPLICATIONS

Glass Engraving

2D Glass Marking

3D Glass Marking

©Property of Bright Solutions srl
3 – WEDGE Applications

Special marking on sensitive material

Surface engraving on glass

Thin-film removal

LIDAR – LIBS

Non-Linear Spectroscopy

©Property of Bright Solutions srl
3 – Comparison between ns and sub-ns DPSSL

ns laser marking effect on sensitive material

sub-ns laser marking effect on the same sensitive material

©Property of Bright Solutions srl
3 – Comparison between ns and sub-ns DPSSL

ns laser cutting of ceramic film

sub-ns laser cutting of ceramic film

©Property of Bright Solutions srl
<table>
<thead>
<tr>
<th>Parameter @ 1064</th>
<th>Sol</th>
<th>Onda</th>
<th>Wedge HF</th>
<th>Wedge XF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average power</td>
<td>6W to 40W</td>
<td>15W</td>
<td>4W</td>
<td>1W</td>
</tr>
<tr>
<td>Pulsewidth range</td>
<td>5 – 50 ns</td>
<td>2 – 10 ns</td>
<td>0.7 – 3 ns</td>
<td>0.4 – 1 ns</td>
</tr>
<tr>
<td>Pulse Energy</td>
<td>up to 1500 uJ</td>
<td>up to 800 uJ</td>
<td>up to 180 uJ</td>
<td>up to 60 uJ</td>
</tr>
<tr>
<td>Peak Power</td>
<td>Up to 230 kW</td>
<td>up to 400 kW</td>
<td>up to 250 kW</td>
<td>up to 150 kW</td>
</tr>
<tr>
<td>Rep. Rate</td>
<td></td>
<td></td>
<td>10 to 100 kHz with SS option</td>
<td></td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear (100:1)</td>
<td></td>
<td>(option: circular polarization)</td>
<td></td>
</tr>
<tr>
<td>Beam Diameter</td>
<td>2 – 4 – 6 – 8 mm with integrated BEX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam quality (M2)</td>
<td>1.5 to 2.5</td>
<td>&lt; 1.5</td>
<td>&lt; 1.3</td>
<td>&lt; 1.3</td>
</tr>
<tr>
<td>Cooling</td>
<td>Air cooled</td>
<td></td>
<td>(option: water cooling)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>4.5 kg</td>
<td>4 kg</td>
<td>2 kg</td>
<td>2 kg</td>
</tr>
</tbody>
</table>
3 – BDL and BFP Diode Lasers

The BDL line of fiber-coupled diode lasers is available in various sizes from 5W to 400W. The integrated optical design, accurate test and selection of high quality semiconductor materials and efficient thermal management make these devices the ideal choice for applications requiring reliability, long lifetime and simple conductive cooling in a small footprint.

The BFP line of high power fiber coupled diode lasers is also available in different sizes from few Watts to 400W of output power. Based on an integrated multi-single emitter design, they are particularly suited for pumping applications and medical applications, ensuring long lifetime, low current operation and the highest brightness in a miniaturized package. BFP packages can be coupled to standard optical connectors like SMA and FC and can include a variety of accessories from aiming beam to integrated controllers, aimed to medical, industrial, scientific and aerospace direct applications. Multi-wavelength solutions (MDL) are well suited for a variety of medical applications; up to 4 different wavelengths can be available in one module.
5 W to 400 W
793 nm to 1550 nm
200 to 600 um fiber coupled
CW and QCW modules
Contact cooling
Sealed and rugged
Deteachable optical fiber

Available in 3 different packages

Options available

- Monitoring photodiode
- Red aiming beam
- Fiber presence sensor
- TEC cooler
- Flat Top or Gaussian beam profile
- Integrated Current and Temperature controller
- Custom solutions
3 – BFP

- 5 W to 400 W
- 635 nm to 1550 nm
- 100 to 600 um fiber coupled
- Low operating current
- Multiwavelength
- Contact cooling
- Deteachable optical fiber

High flexibility in wavelength and power configurations

Options available

- Monitoring photodiode
- Red aiming beam
- Fiber presence sensor
- TEC cooler
- Flat Top or Gaussian beam profile
- Integrated Current and Temperature controller
- Custom solutions

©Property of Bright Solutions srl
### 3 – BDL and BFP

Both BDL and BFP product families are available in many configurations and specific datasheets are available on request. Hereafter a general table is represented.

<table>
<thead>
<tr>
<th>BDL and BFP General Specification</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW Output Power</td>
<td>5 to 400</td>
<td>W</td>
</tr>
<tr>
<td>CW and/or Pulsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Wavelength</td>
<td>793 - 808 - 88x - 915 - 940 - 976 - 980 - 1064 - 1470 - 1550</td>
<td>nm</td>
</tr>
<tr>
<td>Central Wavelength Tolerance</td>
<td>1 to 10</td>
<td>nm</td>
</tr>
<tr>
<td>Spectral Width (FWHM)</td>
<td>1 to 5</td>
<td>nm</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>15 : 35 (extended range up to -40: +60)</td>
<td>°C</td>
</tr>
<tr>
<td>Wavelength Temp. Coefficient</td>
<td>0.3 (temp. stabilized wavelength)</td>
<td>nm / °C</td>
</tr>
<tr>
<td>Fiber Connector</td>
<td>SMA 905 (FC-ST- Custom Patch Cable and Pigtail)</td>
<td></td>
</tr>
<tr>
<td>Fiber Core Diameter</td>
<td>100 - 200 - 400 - 600</td>
<td>μm</td>
</tr>
<tr>
<td>Fiber NA</td>
<td>0.22 or 0.15</td>
<td></td>
</tr>
<tr>
<td>Built-in Thermistor</td>
<td>NTC – 10kOhm – 25 °C</td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Conductive (water cooled option)</td>
<td></td>
</tr>
<tr>
<td>Electro-Optical Efficiency</td>
<td>Up to 45%</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20: 60 (extended range -55: +85)</td>
<td>°C</td>
</tr>
</tbody>
</table>

©Property of Bright Solutions srl
3 – BDL and BFP Applications - Industrial

DIRECT APPLICATIONS

Soldering
- Copper
- Brazing alloy
- P = 30 – 200 W
- λ ~ 800 – 980 nm

Plastic Welding
- P > 30 W
- λ = 800 – 980 nm

Fiber laser pumping
- Solid state laser pumping
3 – BDL and BFP Applications

MEDICAL APPLICATIONS

- Physiotherapy
- Photodynamic therapy
- Vascular
- Dental
- Biostimulation
- Surgical
- Aesthetic Treatment
- Veterinary

AEROSPACE and MILITARY APPLICATIONS

- Target illumination and designation
- Ranging
3 – microchip lasers

Nowadays many applications, such as unmanned aerial vehicle (UAV) LiDAR, biophotonics instruments, automotive and handheld LIBS demand high performance solutions with reduced size, weight and power consumption (SWaP).

This is exactly what Bright Microlaser is pursuing while launching a new laser package for UV microchip lasers (P4 package) and the new smart laser driver which is more user friendly than previous versions, yet still compatible with older models.

Excellent beam quality, spectral properties and long-term stability have been tested and proven in all application environments, from research labs to industrial, automotive and airborne.

The new laser driver is meant for smarter laser operation, offering OEM integrators a higher degree of monitoring and control capabilities of key laser parameters, real time feedback with a remote-control connection and new and improved GUI software.

©Property of Bright Solutions srl
3 – microchip lasers

Bright Solutions has acquired the inventory and technology assets of Concepts Research Corporation (CRC), a leading US manufacturer of microchip lasers.

Typical features:

- pulsewidth: down to 300 ps
- repetition rate: up to 100 kHz
- available wavelength: 1064, 532, 355, 266 nm, 946, 473, 315, 213 nm
- single frequency – narrow line
- pulse energy: up to 60 uJ @ 1064 nm
- low noise operation: <1% pulse instability at all wavelengths

Options:

- drivers
- photodiode
- heatsink

2uJ- 1kHz - 266nm model

©Property of Bright Solutions srl
### 3 – microchip lasers

<table>
<thead>
<tr>
<th></th>
<th><strong>Nanoseconds</strong></th>
<th><strong>Picoseconds</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pulsewidth Ranges</strong></td>
<td>&lt; 2.5 ns</td>
<td>&lt; 1.3 ns</td>
</tr>
<tr>
<td><strong>Pulse Energy</strong></td>
<td>up to 35 µJ</td>
<td>up to 40 µJ</td>
</tr>
<tr>
<td><strong>Repetition Rates</strong></td>
<td>up to 5 kHz</td>
<td>up to 15 kHz</td>
</tr>
<tr>
<td></td>
<td>internal and external triggered</td>
<td></td>
</tr>
<tr>
<td><strong>Output Peak Power</strong></td>
<td>up to 15 kW</td>
<td>up to 30 kW</td>
</tr>
<tr>
<td><strong>Package</strong></td>
<td>FP3, FP4</td>
<td>FP3, FP4</td>
</tr>
<tr>
<td><strong>Output Wavelengths</strong></td>
<td>1064, 946, 532, 473, 355, 315, 266, 236.5, 213 nm</td>
<td></td>
</tr>
<tr>
<td><strong>Beam Quality (M²)</strong></td>
<td>&lt;1.2</td>
<td></td>
</tr>
<tr>
<td><strong>Electrical Requirements</strong></td>
<td>DC power supply 5 V, &lt;25 VA</td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>35×50×16 mm³ (*)</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>&lt; 0.15 Kg (*)</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>+10 to +40 ºC</td>
<td></td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td>-20 to +60 ºC</td>
<td></td>
</tr>
</tbody>
</table>

*FP3 package

**Options Available:**
- Internal photo-diode
- Beam Expanding and Collimating optics
- Circular Polarization
- Cooling: Heat Sink
- AC DC Power Supply
- Custom packaging

**VISIT THE SPECIFIC WEBSITE:** WWW.BRIGHTMICROLASER.COM

©Property of Bright Solutions srl
2004  **E.S.A. Project: ALADIN** (Atmospheric Laser Doppler Instrument), **ADM-Aeolus Satellite**. Development of laser oscillator and THG for the LIDAR transmitter prototype: 
>100 mJ @355nm, stabilized SLM.

2005  **E.S.A. Project: WALES** (Water Vapour Lidar Experiment in Space). Development of a high energy **Ti:Sa tunable narrow-band** laser source operating in the range 920-950nm, 150 mJ, 10 ns, injection seeded stabilized SLM.
3 – Lasers for atmospheric LIDAR

Custom laser source with 4mJ pulse energy in 1.5ns 1kHz.

Three laser output beams at 355nm, 532nm and 1064nm are individually selectable

LIDAR for monitoring atmospheric pollution, volcanic activity, aerosol, etc.
2010 CZMIL US Program (Coastal Zone Mapping and Imaging Lidar)
Development of a custom laser source with 6mJ pulse energy in 2ns (3 MW) at 10 kHz.
Two collinear laser beams, 35W at 532nm and 25W at 1064nm, are provided at laser output.
The beam at 532nm detects the sea bottom, radiation at 1064nm detects the sea surface.
Several rugged units have been delivered, accumulating hundreds of flight hours each.
3 – Custom products - aerospace

2W @ 1064 nm
20 kHz - 600 ps
< 200 ps pulse jitter
M² < 1.2
Rugged and sealed
MIL compliant
Application: OPTICAL RADAR
Actual size: 18 x 9 x 7 cm³

400uJ @ 10 kHz @ 532 nm
600 ps - 200 ps pulse jitter
Rugged and sealed
Qualified for flight
Water cooled
Applications:

  PRECISION BATHYMETRY
  THz GENERATION

C-WHF-2W-1064-M
(picture does not represent exactly the module realized)

PW090402-0.4mJ-532-10kHz

©Property of Bright Solutions srl
3 – Custom products - military

5W @ 808nm @ 100um fiber
Built-in integrated driver and temperature control
Customized RS422 interface
Rugged and sealed
Operating temperature: - 40 to +60 °C
Airborne, MIL qualified
Actual size: 13 x 6 x 4 cm³

C-BFP-5W-808nm-F1
(picture does not represent exactly the module realized)

1 mJ @ 1534nm
Repetition rate: 1 Hz
Pulsewidth: 8 ns
Operating temperature: - 40 to +60 °C
2 x 3 x 4 cm³ ≤50 g
MIL compliant

BLM-1534-1mJ-1 Hz
2010  **Widely Tunable Ti:Sa, 1W, 10 kHz, 10 ns**

750-900 nm

10 kHz

0.5 – 1 W

10 ns

Application: In Vivo Medical Diagnostics (University of Arkansas for Medical Sciences).

©Property of Bright Solutions srl
3 – Custom products – XHP 250W 1064nm

- 250W @ 1064nm
- 100W @ 532nm
- 10 – 50 kHz rep. rate range
- Flat top beam profile
- Water cooled
- RS-232 interface

Square spot beam shaper

Power Supply module (dimensions in mm)
The main objective of MIRSURG is to develop advanced table-top solid-state laser sources for a specific wavelength in the mid-IR spectral range, as a practical, reliable and cost effective alternative to large scale FELs, for application in minimally invasive surgery. The target is a pulse energy of **10 mJ @ 6.45 μm** at a repetition rate of 100 Hz (an average power of 1 W).

The program has been coordinated by the **Max Born Institute** in Berlin and involved several European photonic companies and research institutes. **Bright Solutions** has been the laser group coordinator and developed the **ps-macro-pulse** DPSSL source, emitting equalized bursts of **8 ps** pulses at **455 MHz** rep rate with **50 mJ** total energy in 1 us burst.
A new, compact and cost-efficient concept for underwater range-gated imaging system

UTOFIA, a H2020 project (633098) started in February 2015, will offer a compact and cost-effective underwater imaging system for turbid environments. Using range-gated imaging, the system will extend the imaging range by factor 2 to 3 over conventional video systems. At the same time, the system will provide video-rate 3D information.

This will fill the current gap between short-range, high-resolution conventional video and long-range low-resolution sonar systems. UTOFIA offers a new modus operandi for the main targeted domains of application: marine life monitoring, harbor and ocean litter detection, fisheries and aquaculture stock assessment, and seabed mapping.

http://www.utofia.eu
3 – Custom products - industrial

Industrial Laser CLEANER
LUCE and Sol based system
Up to 30 W output power @ 1064nm
Air-cooled or water-cooled

Anylox Printing Cylinder

Customized electronic interface
Automatic fast scanning module
Telescopic objective and focusing head
Rugged and sealed
4 – Worldwide presence
5 – Sales and Financial Highlights

Market Share in Revenues in 2018

- INDUSTRIAL
- AEROSPACE / INSTRUMENTATION
- MEDICAL

©Property of Bright Solutions srl
5 – Sales and Financial Highlights

Market Share in Revenues in 2018

©Property of Bright Solutions srl
5 – Sales and Financial Highlights

Worldwide Sales Distribution in 2018

©Property of Bright Solutions srl
THANK YOU