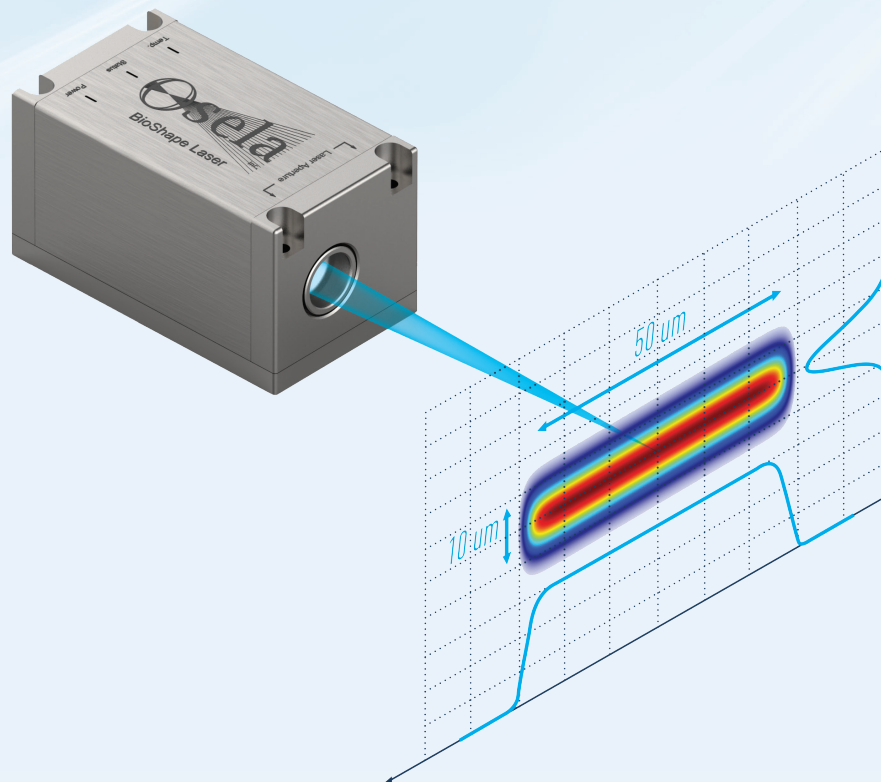




# STRUCTURED LIGHT AND LASER BEAM SHAPING SOLUTIONS

## BIOSHAPE LASER

Fully integrated laser Top Hat illumination system for life sciences, environmental and scientific applications.



### FEATURES

- Industry standard dimensions
- Easy to integrate into existing analytical instruments
- Temperature stabilized optical train
- Low noise electronics (<0.2% RMS)
- Integrated communication
- Fast analog and digital modulation

### APPLICATIONS

- DNA sequencing
- Flow cytometry
- Environmental monitoring
- Medical instrumentation
- Microscopy
- Laser induced fluorescence and scatter

# BEAM SHAPING FOR USER'S APPLICATION

Osela's BioShape laser is an OEM ready laser source that allows for easy system integration and for which beam shaping is customized specifically to the user's application. Our flexible optical platform efficiently creates a Top Hat beam profile with high uniformity (U) and no high frequency noise as required in many analytical instruments. The Top Hat beam can be created directly at customer's target plane (ITH option) or at the focal plane of an existing optical system (DTH option).

## KEY FEATURES OF OSELA'S TOP HAT BEAM SHAPING TECHNOLOGY

- Highly uniform profiles (CV down to 1%)
- All glass AR coated optics providing high transmission efficiency
- Smooth and slow variations with no high frequency noise
- Steep edges profile with maximized contained power
- Flexible Top Hat to Gaussian aspect ratio

### TOP HAT AXIS PROFILE

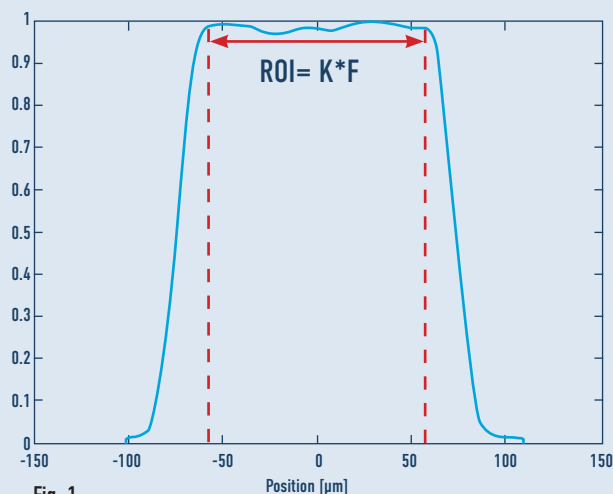


Fig. 1

The Top Hat dimension is a function of the Top Hat constant (K) and is directly proportional to the focal length of the imaging lens system (F). Osela offers a wide variety of Top Hat constants and integrated imaging lenses to choose from.

### GAUSSIAN AXIS PROFILE

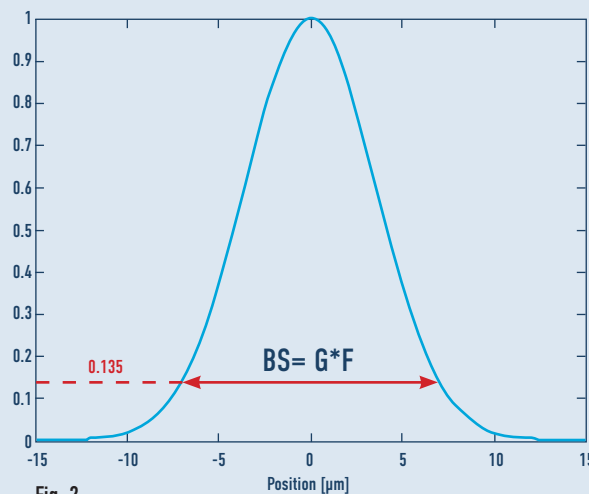


Fig. 2

The Gaussian dimension is a function of the constant (G) which is dependent on the model and is directly proportional to the focal length of the imaging lens system (F). Osela offers a wide variety of G constants and integrated imaging lenses to choose from.

## OPTICAL SPECIFICATIONS

SYMBOL	PARAMETER	VALUE	UNIT	ADDITIONAL INFORMATION
ROI	Top Hat Dimension	$K * F$	μm	See below for K and F available values. See Fig. 1.
U	Uniformity Over ROI	Down to 1	%	Coefficient of Variation
CP	Contained Power Over ROI	>80	%	Typical
BS	Gaussian Axis Dimension	$G * F$	μm @ $1/e^2$	See F values below and the "Available models" section for G values. See fig. 2.
M2	Beam Quality Factor	<1.2		Along Gaussian Axis
K <sup>1</sup>	Top Hat Constant	1, 1.5, 2, 2.5, 3, 3.5, 5, 6, 8, 10, 15, 20, 30, 40, 50, 70, 90	μm/mm	See Fig. 1, 3 & 4. Custom options available.
F	Imaging Lens Focal Length	15, 20, 25, 30, 40, 50, 75, 100	mm	See Fig. 1, 3 & 4. Custom options available.

<sup>1</sup> K/G values must be  $\geq 10$

# IMAGING CONFIGURATIONS

## ITH

### FULLY INTEGRATED BIOSHAPE LASER

Osela's ITH option is a fully integrated, OEM ready laser that creates a Top Hat profile of desired dimension at the focal plane of its integrated imaging lens system. The Top Hat dimension is directly proportional to the focal length of the imaging lens (F) and the Top Hat constant (K), with no additional optical system required.

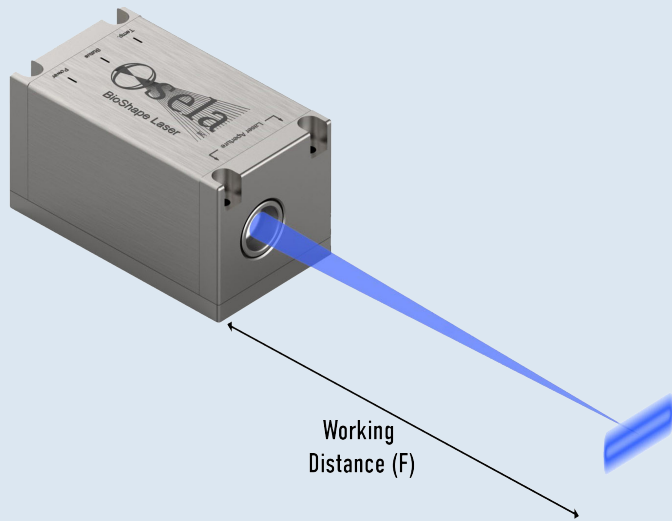


Fig. 3

## DTH

### FLEXIBLE BIOSHAPE LASER

Osela's DTH option is designed to create a Top Hat profile at the focal plane of a customer's existing optical system. The Top Hat dimension and Gaussian axis are flexible and scale with the effective focal length of the system. This option has the advantage of being independent of distance between the laser and the imaging system.

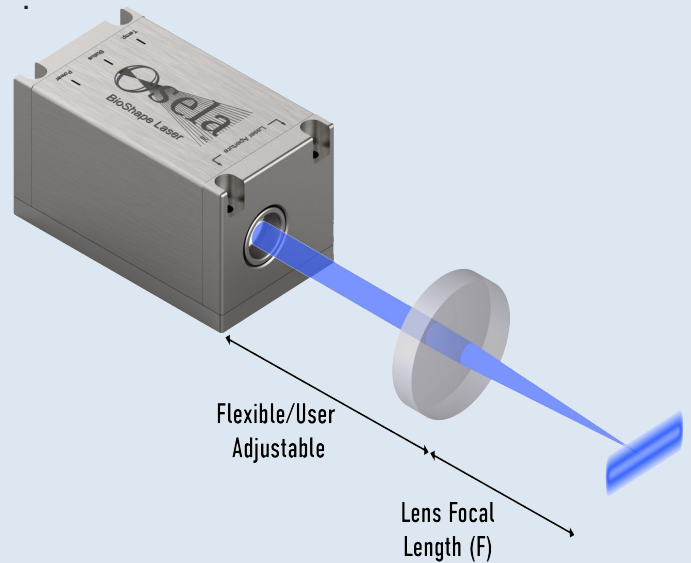


Fig. 4

## AVAILABLE MODELS

MODEL <sup>2</sup>	375	395	405	420	445	450	455	460	473	488	505	515	520	633	640	660	685	785	830
Wavelength (nm)	375	395	405	422	445	450	455	460	473	488	505	515	521	633	640	660	685	785	827
Tolerance (nm)	±5	±5	±5	±3	±5	±10	±5	±5	±5	±5	±2	±5	±10	±3	±5	±6	±10	±10	±10
Diode Power (mW)	70	120	120 150 300	120	100	80	100	100	100	60 200	80	80 150	50 520	100	150 200	50 100 200	50	50 120	50 100 250
Gaussing Axis Dimension Constant (G) <sup>1,3</sup> (µm/mm)	0.28	0.30	0.32	0.40	0.32	0.32	0.34	0.34	0.34	0.36	0.41	0.40	0.39	0.60	0.71	0.77	0.59	0.55	0.79
	0.19	0.20	0.22	0.27	0.22	0.22	0.23	0.23	0.23	0.24	0.28	0.28	0.27	0.41	0.49	0.53	0.40	0.38	0.54
	0.13	0.13	0.14	0.18	0.14	0.14	0.15	0.15	0.15	0.16	0.18	0.18	0.17	0.27	0.31	0.34	0.26	0.24	0.35
	0.10	0.10	0.11	0.14	0.11	0.11	0.12	0.12	0.12	0.12	0.14	0.14	0.13	0.21	0.24	0.27	0.20	0.19	0.27

<sup>2</sup>Additional models (wavelengths & optical powers) available upon request.

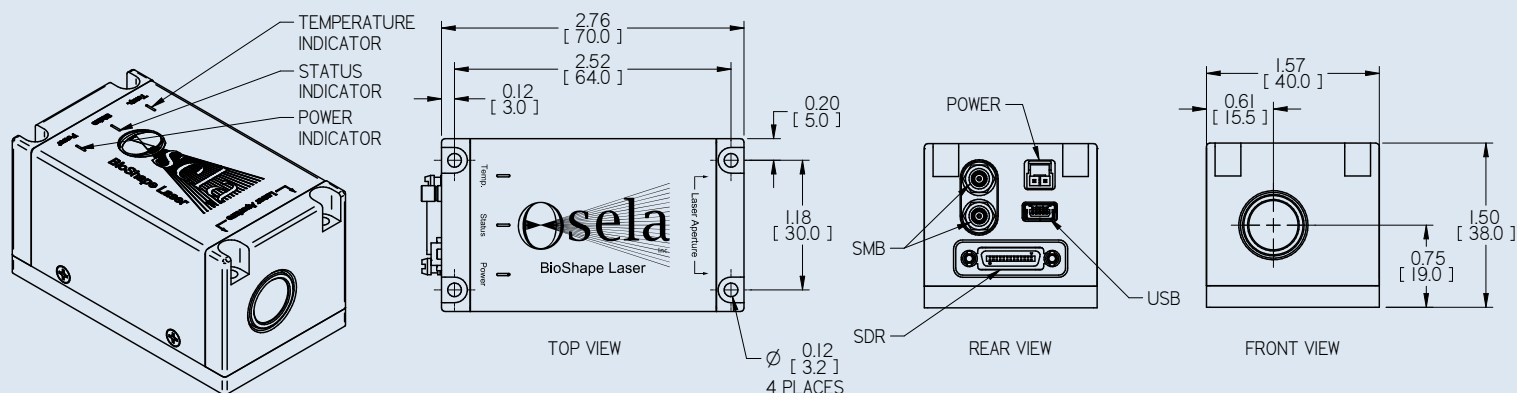
<sup>3</sup>Typical values are presented as reference only. A +/-15% variation is to be expected. Custom G values available upon request.

Osela's many years of beam shaping expertise and our flexible platforms allows us to readily adapt to customer requirements. Many beam shaping options are not listed, please do not hesitate to call our application engineers with your custom beam shaping requirements. Ask for our TOP HAT FUNDAMENTALS APP NOTE for more detailed information on our technology.

# LASER SPECIFICATIONS

Power Stability	<2% (drift over 48h at room temperature $\pm 3^{\circ}\text{C}$ )
RMS Noise	<0.2% (20 Hz - 20 MHz)
Pointing Stability	< 5 $\mu\text{rad} / \text{C}$
Analog Modulation	500 KHz max., <0.7 us Rise/Fall time (10% - 90%)
Digital Modulation	5V TTL or LVDS signal levels, < 5 ns Rise/Fall time (10% - 90%), 70 MHz
Communication	RS232, RS485, USB, no external device required.
DC Input	12 V DC, 2A
Power Consumption	< 25W
Heat Dissipation	< 12 W (baseplate @ 50°C)
Warm-Up Time	< 5 min
Temperature	15°C - 40°C (operation), -10°C - 60°C (storage)
Relative Humidity	< 90% (non-condensing)
Qualification	CE marked, Class IIIb qualification, Level 4 ESD protection

# MECHANICAL SPECIFICATIONS



# ORDERING CODE

BSL	-	WAVELENGTH	-	POWER	-	Option	-	TOP HAT CONSTANT (K)	-	IMAGING LENS (F)	-	GAUSSIAN AXIS (G)
		See Models Table				ITH DTH		See Specifications Table		See Specifications Table Customer's focal length		See Table

Example 1: ITH option (fully integrated Bioshape Laser) at 60mm working distance

EX: BSL-405-100-ITH-1.5-60-0.17

Osele's Bioshape Laser, imaged Top Hat option, 405nm wavelength, 100mW diode power, 90  $\mu\text{m}$  Top Hat by 10  $\mu\text{m}$  Gaussian axis at 60mm working distance.

Example 2: DTH option (Flexible BioShape Laser) at focal of external 100mm Imaging lens

EX: BSL-488-60-DTH-20-100-0.5

External imaging lens option, 488nm wavelength, 60mW diode power, 2000  $\mu\text{m}$  Top Hat by 50 $\mu\text{m}$  Gaussian axis.