

SBS Series Acousto-optical Q-switched DPSS Lasers



Over the years we developed or customized several ns and sub-ns DPSS lasers for some particular applications requested by our customers, other than harmonic generation and parametric conversion of our standard platforms, like Onda and Wedge. Though initially developed for limited production runs, we may offer both larger production runs as well as differently customized options.

Our custom products typically include:

- High Power ns and sub-ns MOPA Lasers, UV, Visible and IR
- Optical Parametric Converters
- Amplified Single-Frequency sub-ns lasers
- Amplified Picosecond Laser
- DPSS Femtosecond Laser at 1um

We can provide further Custom Solutions on design and manufacture of high quality laser diode systems and DPSS Lasers for industrial, medical and defence applications

List of DPSS Lasers

- Compact AO Q-switched DPSS Lasers SOL Series
- Short Pulse AO Q-switched DPSS Lasers WEDGE Series WEDGE
- Nano-second AO Q-switched DPSS Lasers ONDA Series
- MOPA Sub-ns Lasers Vento Series
- One DPSS Miniaturized Q-switched Lasers
- Aero High Energy DPSS Lasers
- NPS-Narrowband ps Lasers

1. Compact AO Q-switched DPSS Lasers – SOL Series



SOL is the most compact Q-switched diode pumped solid state laser available in the power range from 6W to 40W @1064nm. Sol versions at 532nn are also available with the same footprint. These air-cooled DPSS lasers are offered in a rugged and lightweight single unit, designed to allow easy and reliable integration in micro-machining and marking applications.

The Sol single unit design is based on a permanently aligned monolithic optical resonator integrated with 24VDC powered driving electronics. Cooling of the unit is provided by low noise fans. Due to the single unit

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.

Features:

- Up to 40W at1064nm
- Up to 30W at 532nm
- Up to 4W at 355nm
- 300 kW peak power
- Compact air cooled single unit
- Up to 200kHz repetition rate
- Electronic pulse energy modulation
- Sealed and rugged
- Monolithic Design
- 24VDC

- Material processing
- Marking
- Scribing
- Medical and aesthetical
- Thin film removal
- Micro-machining
- Nonlinear optics



Automotive



Electronic machining





Industrial

Sol Models		Sol DPSS 1064nm			Sol DPSS 532nm				
Available models\ Max Average Output power	6W	10W	20W	30M	40W	3W	5W	10W	
Q-Switch Repetition Rate		10 to 100 kHz (option				: single shot to 200 kHz)			
CW Operating Mode		YES				NO			
Pulsewidth		6 to 80 ns							
Beam Diameter		< 8 mm (option: customized internal or external BEX)						BEX)	
Cooling	Air-c	ooled v	with ther	rmostat	ic fan (option: wate	er cooling, co	ontact cooling)	
Operating temperature	15 to 40 °C 15 to 35 °C								
DC Voltage IN		24 V							
Mechanical dimensions	23 x 10 x 9 cm ³ [9 x 4 x 4 in ³]								
Weight	< 4,5 kg (< 10 lbs)								



Options available:

- Beam expanding and collimating optics
- Red aiming beam
- Extended frequency range
- Pulse width modulation
- Circular polarization
- Monitoring photodiode
- AC-DC power supply
- Fiber coupling
- Low jitter option

2. Short Pulse AO Q-switched DPSS Lasers – WEDGE Series WEDGE



Wedge family has been fully renewed in terms of performances and available models. Based on a proprietary fast Q-switching technology, these compact sealed and monolithic diode pumped lasers are insensitive to vibrations and harsh environments. They have been designed for OEM applications like micro machining of hard and soft materials, specialty marking, OLED, glass and crystals engraving, LIDAR, LIBS, spectroscopy and medical diagnostics. High output peak power, with relatively low energy and heat generation, allows efficient ablation and non-linear interaction with most materials. The compact and lightweight package represents a great benefit in LIDAR and other aerospace applications, while short pulses give extremely precise time-of-flight measurements.

Features:

- Up to 4mJ pulse energy
- 3MW peak power
- 500ps to 3ns pulse width
- Single shot to 100kHz
- Monolithic design
- Air cooling
- Low heat waste
- 266, 355, 532, 1064, 1570, 3100nm available
- Multi-wavelength configurations

Applications:

- Micromachining of glass and hard materials
- Specialty marking
- Thin film removal
- LIDAR
- LIBS
- Medical, aesthetical and diagnostics
- Non-linear spectroscopy
- Harmonic and parametric generation
- Visible to IR OPO pumping
- TeraHertz generation

Wedge HB and XB laser models are available at different wavelengths and their main featues are reported in the table below. All the configurations are based on our proprietary fast active Q-Switch technology, the key point for all the applications requiring high performances in terms of synchronization between the laser and the entire system.

		VVe					dge models				
	HB 266	HB 355	HB 532	HB 1064	HB 1570	XB 266	XB 355	XB 532	XB 1064	XB 1570	XB 3100
Primary wavelength	266 nm	355 nm	532 nm	1064 nm	1570 nm	266 nm	355 nm	532 nm	1064 nm	1570 nm	3100 nm
Max Pulse Energy	150 uJ	200 uJ	1 mJ	2 mJ	400 uJ	500 uJ	600 uJ	2 mJ	4 mJ	0.8 mJ	> 0.1 mJ
Q-Switch Rep. Rate		Single Shot to 2 kHz				Single Shot to 1 kHz					Single Shot to 2 kHz
Pulsewidth	< 1.5 ns < 2.5 ns				< 2.5 ns	< 1.5 ns < 2.5 ns				< 3 ns	
Max Peak Power	120 kW	150 kW	800 kW	1.8 MW	200 kW	300 kW	400 kW	1.8 MW	3.6 MW	400 kW	> 30 kW
Polarization	Linear 100:1 (option: circular polarization)					Linear 100:1 (option: circular polarization)					
Cooling	Air-cooled (option: water cooling and contact cooling)				Air-cooled (option: water cooling and contact cooling)						
DC IN Voltage	Dual 8 V - 15 V					Dual 12 V – 15 V					

Wedge HF and XF are also actively Q-Switched lasers and this feature together with the sub-ns pulse width makes these lasers unique on the market. The extremely compact and rugged design coming from airborne applications is very appreciated also in industrial and instrumentation fields.

					vveač	je moo	models			
	HF 266	HF 355	HF 532	HF 532 Plus	HF 1064	XF 266	XF 532	XF 532 Plus	XF 1064	XF 1064 Plus
Primary wavelength	266 nm	355 nm	532 nm	532 nm	1064 nm	266 nm	532 nm	532 nm	1064 nm	1064 nm
Max Pulse Energy	15 uJ	40 uJ	100 uJ	120 uJ	180 uJ	5 uJ	30 uJ	40 uJ	70 uJ	80 uJ
Q-Switch Rep. Rate	single shot to 50 kHz	single shot	to 100 kHz	20 to 100 kHz	single shot to 100 kHz	single shot to 50 kHz	single shot to 100 kHz	50 to 200 kHz	single shot to 100 kHz	50 to 200 kHz
Pulsewidth	700 ps to 1.5 ns	500 ps to 1 ns	700 ps to 2.5 ns	500 ps to 2 ns	700 ps to 2.5 ns	400 ps to 700 ps	400 ps to 1.5 ns	400 ps to 1.6 ns	400 ps to 1.5 ns	400 ps to 1.6 ns
Max Peak Power	20 kW	80 kW	140 kW	200 kW	250 kW	10 kW	75 kW	90 kW	175 kW	150 kW
Polarization		Linear 100:1 (option: circular polarization)					Linear 100:1 (option: circular polarization)			
Beam quality (M ²)	< 1.5					< 1.3				
Cooling	Air-cooled (option: water cooling and contact cooling)				Air-cooled (option: water cooling and contact cooling)					
DC IN Voltage			24 V			24 V				

In order to better describe the performances of the Wedge models, please refer to the specific datasheets available for each model. Below you can find the nominal performance curves related to the infrared versions of the Wedge XB 1064nmand of the Wedge HF 1064nm.



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Options available:

- Beam expanding and collimation optics
- External beam separator with independent mechanical shutters
- Red aiming beam
- Circular polarization
- Monitoring photodiode
- AC-DC power supply

3. Nano-second AO Q-switched DPSS Lasers – ONDA Series



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 metal, 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 the Onda models can work from single shot to 50kHz or up to 100kHz with a pulse width between 2 and 10ns 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. A new version of the digitalic Control Box and the new proprietary Software Interface are available for simplified remote control and monitoring.

Features:

- Up to 1mJ pulse energy
- @266nm @355nm @532 @1064nm
- 2 to 10ns pulse width
- Single shot to 100kHz
- MOPA configurations
- Monolithic design
- Air cooling
- Low heat waste

- Specialty marking
- Micromachinig of glass
- Electronic manufacturing
- LIDAR and bathymetry
- Thin film removal
- Hole drilling

	Onda models							
	Onda 266	Onda 355	Onda 532	Onda 532 Plus	Onda 1064			
Primary wavelength	266 nm	355 nm	532 nm	532 nm	1064 nm			
Max Peak Power	40 kW	50 kW	200 kW	300 kW	400 kW			
Max Pulse Energy	80 uJ	150 uJ	400 uJ	800 uJ	800 uJ			
Q-Switch Rep. Rate	Single Shot to 50 kHz	gle Shot to 50 kHz Single shot to 4 kHz Single Shot to 100 kHz						
Pulsewidth	2 to 6 ns	2 to 6 ns < 3 ns 2 to 12 ns						
Polarization			Linear 100:1 (option: circular polarizatio	n)				
Beam quality (M²)		< 1.5						
Cooling	Air-cooled (option: water cooling and contact cooling)							
DC IN Voltage	24 V							
Overall mechanical dimensions	23 x 10 x 9 cm ³ (9 x 4 x 4 in ³)							
Total weight	< 4,5 kg (< 10 lbs)							

Options available

- Beam expanding and collimation optics
- Fiber coupling
- Low jitter option
- Extended operating temperature range
- Pulse energy modulation
- Circular polarization
- Monitoring photodiode
- Red aiming beam
- Remote control box and software interface
- AC-DC power supply
- Higher energy MOPA configurations

4. MOPA Sub-ns Lasers – Vento Series



The new Vento series operates in the hundreds of ps range and with average power up to 50W @532 nm and up to 100W @1064 nm.

The possibility to choose air-cooled or water-cooled layouts (for some versions) and industrial or IP65 packages allows these products to comply with a variety of environmental requirements, from MIL-type temperature ranges and vibrations to clean laboratories as well as industrial production sites.

Ideal for micromachining, fine cutting machines and powerful LIDAR sensors, all the models are enclosed in an extremely compact and ruggedized single units

			Vento	models			
	١	/ento 1064 DPS	SS	Vento 532 DPSS			
Average Power	16 W 25 W 40 W			8 W	15 W	20 W	
Max Pulse Energy	600 uJ	1 mJ	1.5 mJ	300 uJ	550 uJ	750 uJ	
Q-Switch Rep. Rate		50 to 200 kHz		50 to 200 kHz			
Pulsewidth	500 to 1500 ps			500 to 1200 ps			
Polarization		Linear 100:1 (option: circular polarization)	Linear 100:1 (option: circular polarization)			
Beam quality (M²)	<	< 1.5	< 2.5	< 1.	5	< 2.5	
Cooling	Air Liquid			Air	Li	iquid	
Laser design	Industrial (option: IP65 or MIL-grade)			Industrial (option: IP65 or MIL-grade)			
DC IN Voltage		24 - 28 V		24 - 28 V			

Options available:

- Beam expanding and collimating optics
- Low jitter option
- Extended operating temperature range
- Pulse energy modulation up to IP68 package
- 28VDC Input for airborne installation
- Circular polarization
- Remote control box and software interface
- AC-DC power supply

5. One DPSS - Miniaturized Q-switched Lasers



One is an example of how compact our lasers can be! A nanosecond pulsed Q-switched DPSS (also configurable in CW mode) laser source with up to 200uJ pulse energy is integrated in a very small and lightweight contact-cooled package; this unique laser solution is currently used in very compact marking systems and in portable instrumentation. The ns pulse width and 3W average power provide enough peak power to mark metals and plastics with extremely high quality, e.g. for gray-scale images, and to build LIDAR systems for atmospheric monitoring, altimetry and 3D mapping.

Features:

- Down to 3ns
- CW mode or single shot to 30kHz
- Up to 200uJ
- M2 <1.5
- Miniaturized contact cooled design

- Plastic marking
- Material processing
- ID Card
- Portable LIDAR

Remote sensing



	One 3W	One 100uJ					
Primary wavelength	1 um						
Pulse Energy	100 µJ	up to 100 µJ					
Q-Switch Rep. Rate	between 20 and 30 kHz (fixed value factory set)	up to 10 kHz (fixed value factory set)					
Pulsewidth	10 to 20 ns	10 to 20 ns optional:< 5 ns					
Polarization	Linear 100:1						
Beam quality (M ²)	< 1.5						
Cooling	Con	tact					
DC IN Voltage	15	V					
MAX Power consumption	< 30 W						
Overall mechanical dimensions	13 x 7 x 4 cm³ [5 x 3 x 2 in³]						
Total weight	0.5 kg [1.1 lbs]						

Options available:

- Internal photodiode
- Beam expanding and collimating optics
- Red aiming beam
- Heat-sink
- AC-DC power supply
- Custom packaging

6. Aero - High Energy DPSS Lasers



The Aero is a high-energy product line operating in the ns range with repetition rate up to 500Hz with the possibility to work in burst mode too. Pulse energy up to 200mJ at 1064nm and 100mJ at 532nm is achieved in a thermo-mechanically stable package. Customized systems have undergone severe vibration and qualification tests for operation in space. These Q-switched laser systems are ideal for atmospheric LIDAR, air-borne and space-borne instruments, micromachining and ablation processes, telemetry and LIBS. Recently also the UV versions have been developed and multiple wavelength-configurations are available.

Features:

- Up to 200mJ @1064nm
- Up to 100mJ @532nm
- 10ns to 30ns
- 1064, 532, 355, 266nm
- Single shot up to 500Hz
- Burst mode operation
- Multi-wavelength configurations
- Custom beam shaping

- Atmospheric LIDAR
- Air-borne and space-borne instruments
- LIBS
- Microelectronics
- FPD repair
- Non-Linear spectroscopy
- Options available
- Beam expanding and collimating optics
- External beam separator and beam shaper
- Extended operating temperature range
- 28VDC Input for airborne installation
- Circular polarization
- AC-DC power supply

		Aero models							
	Aero 100			Aero 50					
Available wavelengths	266 nm	<mark>355 n</mark> m	532 nm	1064 nm	266 nm	355 nm	532 nm	1064 nm	
Max Pulse Energy	12 mJ	20 mJ	40 mJ	100 mJ	6 mJ	10 mJ	20 mJ	50 mJ	
Q-Switch Rep. Rate		up to (burst mod	50 Hz e available)		up to 100 Hz (burst mode available)				
Pulsewidth				5 to	15 ns				
Polarization	Linear > 100:1								
Optional Beam shaping	Flat-top (square or round)								
Cooling		Air (option: conductive or liquid)							



7. NPS-Narrowband ps Lasers



Our Nps laser platform is a new ultrafast picosecond laser series, especially tailored for spectroscopic applications, by combining compactness and ruggedness of fiber laser technology with spectral purity of the DPSS design.

According to the number and the features of the proprietary amplification stages, it is possible to achieve several power levels at 1064.3nm and its harmonics. The new ultrafast Nps-1064-10 laser operates in the regime of few picoseconds pulse durations (7ps) with average power of 10mW at a repetition rate of 40MHz. The transform-limited operation (spectral width < 0.3nm) and remarkably accurate central wavelength (1064.3 \pm 0.1nm) make this laser a suitable candidate for highly efficient amplification by Nd-doped DPSS amplifiers, opening the way to applications in non linear optics (i.e. OPO pumping) and narrowband Raman spectroscopy.

Features:

- 1064.3+-0.1nm
- 1064, 532, 355nm
- 7ps
- spectral width <0.3nm
- 40MHz
- air-cooled and liquid-cooled version

Applications:

- Non-linear optics
- OPO pumping
- Raman spectroscopy
- Fluorescence spectroscopy
- Multimodal imaging

	Nps models						
	Nps-1064-10	Custom Nps-1064-k2					
Wavelength	1064.3 nm	1064.3 nm					
Pulsewidth	7 ps	7 ps					
Average Power	> 10 mW	> 2 W					
Repetion Rate	40 MHz	40 MHz					
Polarization	Linear 100:1	Linear 100:1					
Spectral Width	< 0.3	< 0.3					
Time-bandwidth Product	< 0.5	< 0.5					
Beam Quality (M ²)	< 1.2	< 1.3					
RF Side-Mode Suppression	> 50 dBc	> 50 dBc					
Cooling	Contact	Air					
DC IN Voltage	5 V	24 V					

Options available:

• Custom amplifications



- Beam expanding and collimating optics
- Circular polarization Water cooling •
- •
- Remote control CBOX and software interface
- AC-DC power supply