

Product Bulletin



The JDS Uniphase MicroChip NanoLaser produces high peak power, high repetition rates, and short pulses from compact, turnkey packages. The MicroChip laser cavities consist of Nd:YAG or Er:Glass gain medium bonded to a YAG-saturable absorber. The cavity mirrors are vapor-deposited directly on each side of the crystal to form a rugged, monolithic oscillator that is end pumped by a CW diode laser.

This technology is not limited to YAG lasers. Using a microchip directly emitting at 1.54 μm , the MicroChip EyeSafe uses an innovative combination of materials and, like the Nd:YAG crystal, is also fabricated with a collective process for high volume/low cost production.

The NanoPulse laser produces 1064 nm output and can be optimized for up to either 50 mW of average power or 8 μJ pulse energy. In either case, the output is a pulse train of high peak power, sub-1 nsec, near-diffraction limited pulses. The NanoGreen laser utilizes a KTP frequency doubler at the same output as the crystal that is used for the NanoPulse to produce 532 nm pulses. An IR blocking filter is added to remove residual 1064 nm light. The NanoGreen can be specified for up to 15 mW of average power or 3 μJ of pulse energy. The mode is excellent and specified to have an M^2 better than 1.2.

The MicroChip NanoLaser CDRH series groups all safety features that comply with CDRH such

MicroChip NanoPulse, NanoGreen, and NanoEyeSafe CDRH Solid-State Lasers

as key On/Off switch, a voltage filtering circuit and a minimum of 5 seconds delay between "switch On" and light emission indicator On." The light emission indicator alerts the user of laser risks and provides additional information of laser status. Opening the interlock circuit instantly shuts down the primary DC power from the laser that is immediately stopped and reset. When the interlock circuit is restored, it is necessary to restart the laser operation either manually or remotely as a new "Power On" procedure.

Key Features

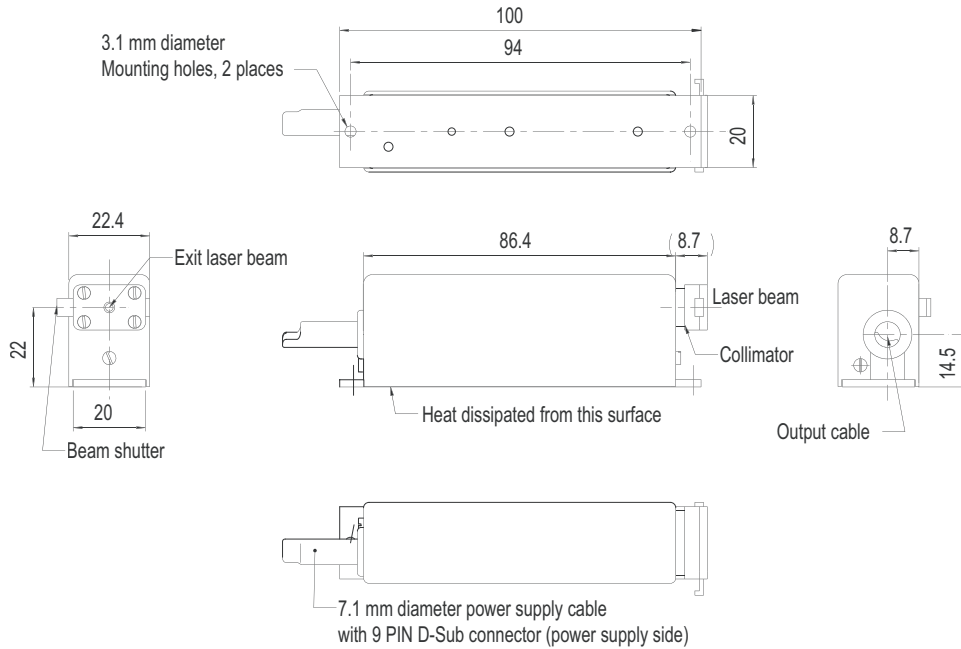
- 1064, 1535, or 532 nm outputs available
- High average and peak output powers
- Compact package design
- Highly reliable
- Collimated beam, manual beam shutter, on/off key switch, light indicator, time delay at switch-on
- Ideal for secured laboratory applications or OEM application tests

Applications

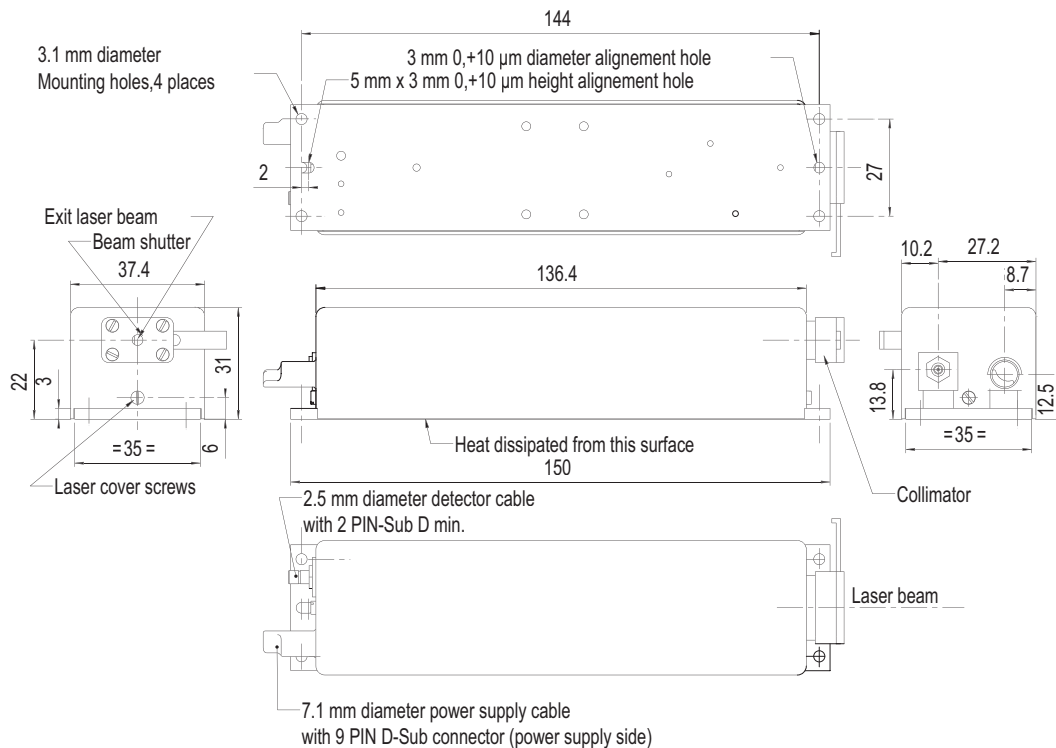
- Micromachining and marking
- Ranging and remote sensing
- Laser induced fluorescence
- Alignment, particle image velocimetry (PIV), instrumentation

**MicroChip NanoPulse,
NanoGreen, and NanoEyeSafe
CDRH Solid-State Lasers | 2**

NanoPulse and NanoGreen without Options (Specifications in mm unless otherwise noted.)

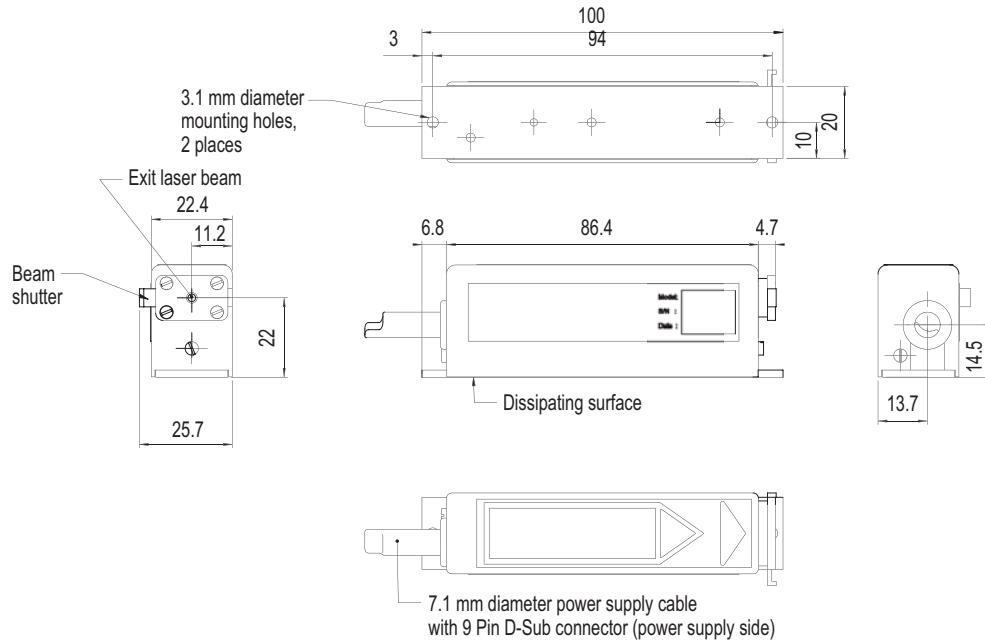


NanoPulse and NanoGreen with Options (Specifications in mm unless otherwise noted.)

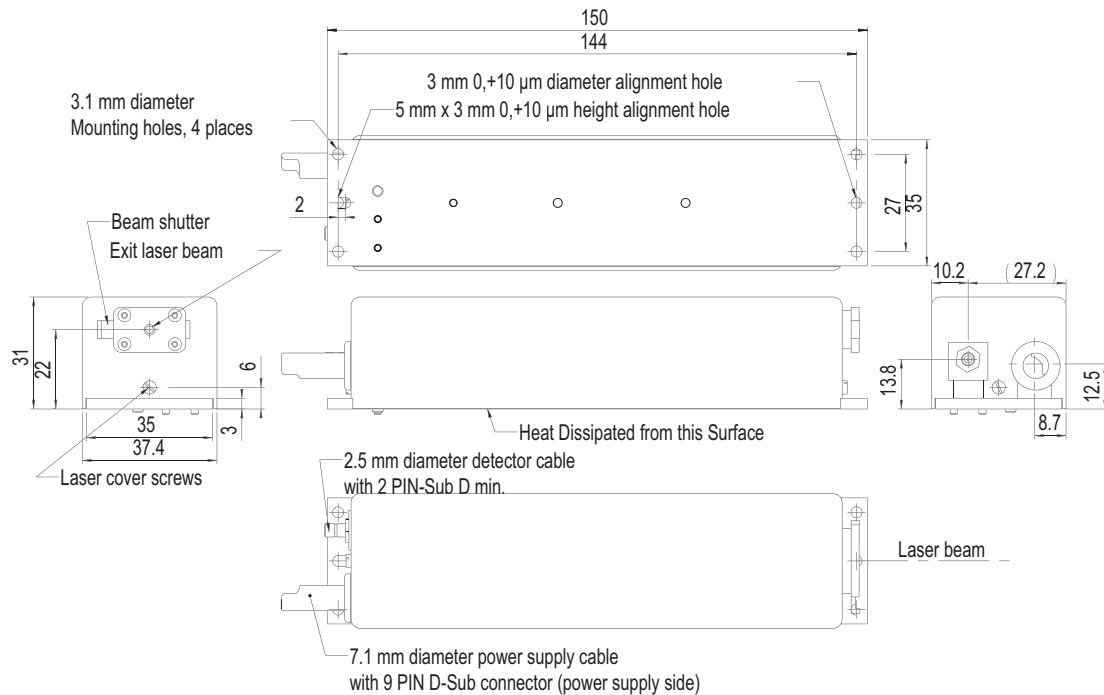


**MicroChip NanoPulse,
NanoGreen, and NanoEyeSafe
CDRH Solid-State Lasers | 3**

NanoEyeSafe without Options (Specifications in mm unless otherwise noted.)



NanoEyeSafe with Options (Specifications in mm unless otherwise noted.)



**MicroChip NanoPulse,
NanoGreen, and NanoEyeSafe
CDRH Solid-State Lasers | 4**

Power Supply

Controller Model	Description
PS-01401-100	115 V AC standard CDRH controller model
PS-01402-100	230 V AC standard CDRH controller model
PS-01401-150	115 V AC computer on/off option CDRH controller model
PS-01402-150	230 V AC computer on/off option CDRH controller model

Notes: The MicroChip NanoLaser laser system is composed of a laser head and a separate laser controller. CDRH certification is valid only for a complete system composed of a laser head and one of the above laser controllers.

Available Microchip NanoLaser Options

Option	Description	To Be Used with Controller Models
Trigger signal output	A photodetector mounted into the laser head delivers the image of the leading edge of the optical pulse on a SMB connector located on the back of the laser head. The rise time is about 3.5 ns with a jitter of about 100 ps. This signal can be used as a trigger for measurements.	PS-01401-110, PS-01402-110
Single pulse	It allows the operation of the laser in single pulse mode from single shot on demand up to 100 Hz repetition rate with a fixed duty cycle. The 0 to 5 V command for the pulse can be provided manually or via a computer. The trigger signal-out option is included in the single pulse option.	PS-01401-120, PS-01402-120
Fixed frequency	It allows the operation of the laser at a customer chosen, fixed, factory set, repetition rate in the range 100 to 1000 Hz. The trigger output signal option and the computer on/off option are included in this option.	PS-01401-130, PS-01402-130
Computer on/off	This option allows the on/off operation of the laser using a computer or a 0 to 5 V signal. It can also be used as an electronic interlock. THIS IS AN OPTION OF THE LASER CONTROLLER ONLY.	PS-01401-150, PS-01402-150

Notes: The MicroChip NanoLaser series can be configured to meet specific customer requirements for specific repetition rates, computer control, and single-shot capability. Custom power supplies and head designs are also available. Please contact factory for details.

Environmental Specifications

Parameter	Specification
Base plate operating temperature	0 to 50 °C
Base plate storage temperature	10 to 50 °C
Polarization	Non specified
Polarization ratio	>100:1
Mode quality M ²	<1.2
Beam profile	Gaussian
Storage temperature	-20 to 60 °C

**MicroChip NanoPulse,
NanoGreen, and NanoEyeSafe
CDRH Solid-State Lasers | 5**

NanoPulse Laser Specifications

Parameter	Models ¹					
	NP-10120-1x0	NP-10320-1x0	NP-10620-1x0	NP-10820-1x0	NP-12010-1x0	NP-15010-1x0
Wavelength	1064 nm	1064 nm	1064 nm	1064 nm	1064 nm	1064 nm
Average output power	N/A	N/A	N/A	N/A	>20 mW	>50 mW
Energy/Pulse	>1 µJ	>3 µJ	>6 µJ	>8 µJ	N/A	N/A
Pulse width	<1 ns	<1 ns	<1 ns	<1 ns	<1 ns	<1 ns
Repetition rate ²	8 to 13 kHz	6 to 10 kHz	5 to 9 kHz	2 to 8 kHz	14 to 20 kHz	10 to 20 kHz
Options						
Trigger signal output	Yes	Yes	Yes	Yes	Yes	Yes
Single pulse	Yes	Yes	Yes	Yes	N/A	N/A
Fixed frequency	Yes	Yes	Yes	Yes	N/A	N/A
Computer on/off	Yes	Yes	Yes	Yes	Yes	Yes
Output beam diameter (typical)	0.2 mm					
Beam divergence (typical)	±1 mrad					
Power stability (over 6 hours)	<±3%					
Ellipticity	<1.1:1					
Warm-up time	10 minutes					
Class	IIIB					

Notes: All specifications are given in permanent laser operation and after a minimum of 10 minutes warm-up with laser permanently emitting; insufficient warm-up and/or intermittent laser emission (as allowed by external mode) may transitively affect the laser performance.

1. OEM certified systems are available.
2. Repetition rate is a nominal value valid for laser without single pulse or fixed frequency options and may vary from laser to laser.

NanoGreen Laser Specifications

Parameter	Models ¹				
	NG-10120-1x0	NG-10320-1x0	NG-10610-1x0	NG-11010-1x0	NG-11510-1x0
Wavelength	532 nm	532 nm	532 nm	532 nm	532 nm
Average output power	N/A	N/A	>6 mW	>10 mW	>15 mW
Energy/Pulse	>1 µJ	>3 µJ	N/A	N/A	N/A
Pulse width	<0.9 ns	<0.9 ns	<0.9 ns	<0.9 ns	<0.9 ns
Repetition rate ²	8 to 13 kHz	5 to 9 kHz	14 to 20 kHz	8 to 13 kHz	5 to 9 kHz
Options					
Trigger signal output	Yes	Yes	Yes	Yes	Yes
Single pulse	Yes	Yes	N/A	N/A	N/A
Fixed frequency	Yes	Yes	N/A	N/A	N/A
Computer on/off	Yes	Yes	Yes	Yes	Yes
Output beam diameter (typical)	0.2 mm				
Beam divergence (typical)	±2 mrad				
Power stability (over 6 hours)	<±3%				
Ellipticity	<1.1:1				
Warm-up time	10 minutes				
Class	IIIB				

Notes: All specifications are given in permanent laser operation and after a minimum of 10 minutes warm-up with laser permanently emitting; insufficient warm-up and/or intermittent laser emission (as allowed by external mode) may transitively affect the laser performance.

1. OEM certified systems are available.
2. Repetition rate is a nominal value valid for laser without single pulse or fixed frequency options and may vary from laser to laser.

NanoEyeSafe Laser Specifications

Parameter	Models ¹	
	NE-10620-1x0	NE-10910-1x0
Wavelength	1535 nm	1535 nm
Average output power	N/A	>9 mW
Energy/Pulse	>6 µJ	N/A
Pulse width	<6 ns	<6 ns
Repetition rate ²	1 to 3 kHz	1 to 3 kHz
Options		
Trigger signal output	Yes	Yes
Single pulse	Yes	N/A
Fixed frequency	Yes	N/A
Computer on/off	Yes	Yes
Output beam diameter (typical)	0.35 mm	0.35 mm
Beam divergence (typical)	±6 mrad	±6 mrad
Power stability (over 6 hours)	<±5%	<±5%
Ellipticity	<1.2:1	<1.2:1
Warm-up time	15 minutes	15 minutes
Class	IIIB	I

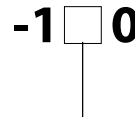
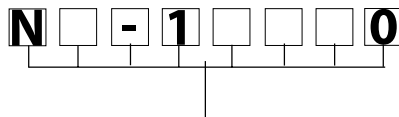
Notes: All specifications are given in permanent laser operation and after a minimum of 15 minutes warm-up with laser permanently emitting; insufficient warm-up and/or intermittent laser emission (as allowed by external mode) may transitively affect the laser performance.

- OEM certified systems are available.
- Repetition rate is a nominal value valid for laser without single pulse or fixed frequency options and may vary from laser to laser.

Ordering Information

For more information on this or other products and their availability, please contact your local JDS Uniphase account manager or JDS Uniphase directly at 1-800-254-3684 in North America and +800-5378-JDSU worldwide or via e-mail at sales@jdsu.com.

Sample: NP-10120-110



Code	Model
NP-10120	NanoPulse, 1064 nm, >1 µJ E/pulse, 8 to 13 kHz repetition rate
NP-10320	NanoPulse, 1064 nm, >3 µJ E/pulse, 6 to 10 kHz repetition rate
NP-10620	NanoPulse, 1064 nm, >6 µJ E/pulse, 5 to 9 kHz repetition rate
NP-10820	NanoPulse, 1064 nm, >8 µJ E/pulse, 2 to 8 kHz repetition rate
NP-12010	NanoPulse, 1064 nm, >20 mW average power, 14 to 20 kHz repetition rate
NP-15010	NanoPulse, 1064 nm, >50 mW average power, 10 to 20 kHz repetition rate
NG-10120	NanoGreen, 532 nm, >1 µJ E/pulse, 8 to 13 kHz repetition rate
NG-10320	NanoGreen, 532 nm, >3 µJ E/pulse, 5 to 9 kHz repetition rate
NG-10610	NanoGreen, 532 nm, >6 mW average power, 14 to 20 kHz repetition rate
NG-11010	NanoGreen, 532 nm, >10 mW average power, 8 to 13 kHz repetition rate
NG-11510	NanoGreen, 532 nm, >15 mW average power, 5 to 9 kHz repetition rate
NE-10620	NanoEyeSafe, 1535 nm, >6 µJ E/pulse, 1 to 3 kHz repetition rate
NE-10910	NanoEyeSafe, 1535 nm, >9 mW average power, 1 to 3 kHz repetition rate

Code	Option
0	No option
1	Trigger signal output
2	Single pulse 0 to 100 Hz (note ¹)
3	Fixed frequency 100 Hz to 1 kHz (note ¹)

Note: Two types of laser controllers complying to 115 or 230 line voltage are available (to be specified upon ordering).

- Not available for models:
NP-12010-1x0, NP-15010-1x0,
NG-10610-1x0, NG11010-1x0,
NG-11510-1x0, NE-10910-1x0.

Compliance with Regulatory Requirements

These laser sources are CDRH versions of JDS Uniphase diode-pumped solid-state lasers and can be used as standalone devices or do not need to be integrated. These lasers are Class 1 or 3B according to IEC 60825-1/1993 laser safety recommendations and Class IIIB to the 21 CFR 1040.10 (CDRH).

Safety Labels



Warranty

JDS Uniphase diode-pumped solid-state lasers are warranted to be free from defects in materials and workmanship for 12 months from the date of shipment or 5000 hours, whichever occurs first.

Patent Information

5,495,494 self-aligned, monolithic, solid microlaser with passive switching by a saturable absorber and production process.

Licensing Information

Some of these products are sold pursuant to a limited sublicense under certain technology owned by ATX Telecom Systems, Inc. The rights that customers of JDS Uniphase receive through purchase of some of these products are restricted and exclude any right to use some products in the telecommunications field.

Some of these products are sold pursuant to a limited sublicense of the US patent 5,394,413 and of the equivalent international patent WO 95/22186. The rights that customers of JDS Uniphase receive through purchase of some of these products are restricted and exclude any right to use some of these products for optical ranging, positioning, aligning and the characterization of optical properties of a measurement path (e.g. index of refraction). By way of further explanation of the characterization of optical properties of a measurement path, the optical properties of the path that are affected by changes in temperature, pressure, or chemical composition (for example, fractional mixture of Nitrogen and Oxygen) of elements or molecules in the path. It is understood that the limitation of this field of use explicitly does not include the broad areas of temperature measurement, pressure measurement, chemical analysis, or spectroscopic analysis.

Some of these NanoLasers use laser components manufactured by NanoLase under a CEA/LETI license. Please contact a JDS Uniphase sales representative for information regarding your specific application.



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