Photonics Industries
International, Inc.

# DX Short Pulse Series Nanosecond Lasers

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Photonics Industries' DX Series short pulse nanosecond lasers provide industrial systems with the most ideal compact form factor, short pulse width[1] (down to ~11 ns), high power, high repetition rate (up to 1 MHz) Q-switched DPSS laser for high production throughput and precision quality. Specially patented intracavity harmonic generation, with no damaging indexing on the harmonic crystals, allows for higher performance and higher reliability, fulfilling demanding production criteria.


## Applications

- Cutting, drilling, welding, scribing, marking, intra-marking, patterning, dielectric grooving, de-paneling, annealing, repair
- Reel to reel on-the-fly Converting Process Micromachining
- PCB/FPCB cutting, drilling, de-paneling
- Silicon Wafer Scribing and Singulation, Low-k dielectric grooving
- Solar Cell Scribing and PERC processing
- Via Hole Drilling, Laser Trepanning, Laser Percussion Drilling
- Laser Lift-Off (LLO), Laser Debonding Systems, Semiconductor Microprocessing
- LIDAR Systems
  - Autonomous Systems, 3-D Scanning Systems, Airborne Laser Swath Mapping Systems, Laser Altimetry Systems

## Features

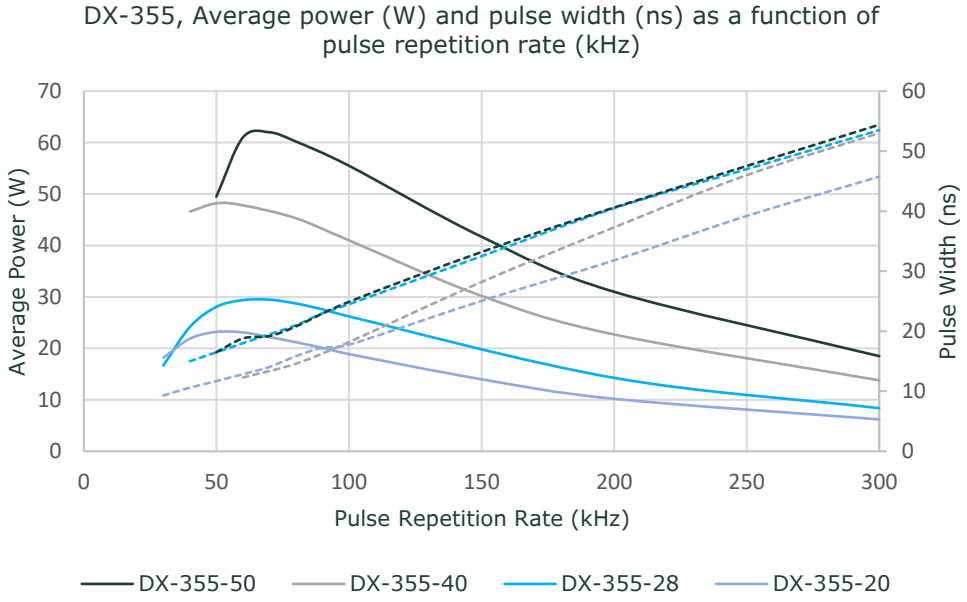
- Short pulse[1] at high powers:
  - Up to 50 W UV, ~12 ns,
  - Up to 100 W Green, ~25 ns
- High pulse energy:
  - Up to 1 mJ UV & Green
- Most versatile repetition rate range:
  - Single shot up to 1 MHz Green,
  - Single shot up to >0.5 MHz UV
- Reliable, low COO, non-consumable design
  - Patented intracavity harmonic UV & Green generation, no damaging indexing of the harmonic crystals
- Industrialized, small form factor, ideal for compact integration
- Excellent TEM00 beam quality:
  - Typical M2 ≤ 1.1
- Superior pulse stability:
  - Typical < 2 %
- Total Pulse Control for ultimate integrability into systems:
  - Duty Control to change output power while allowing for longer pulse widths than the standard operating values
  - PEC (Power or Pulse Energy Control)

1. For longer pulse width models, please see the DX Long Pulse Series Nanosecond Lasers brochure

Specifications – **DX Series Short Pulse Nanosecond Lasers**, UV Models

| | DX-355-20 | DX-355-28 | DX-355-40 | DX-355-50 |
|---|---|---|---|---|
| **Beam and output specifications** | | | | |
| Wavelength | 355 nm | | | |
| Average power | 20 W at 50 kHz<br>18 W at 100 kHz<br>10 W at 200 kHz | 28 W at 50 kHz<br>23 W at 100 kHz<br>12 W at 200 kHz | 40 W at 50 kHz<br>40 W at 100 kHz<br>25 W at 200 kHz | 50 W at 50 kHz<br>50 W at 100 kHz<br>30 W at 200 kHz |
| Pulse energy | ~0.4 mJ | ~0.6 mJ | ~1 mJ | ~1 mJ |
| Pulse width | 12±3 ns at 50 kHz<br>20±4 ns at 100 kHz | | | |
| Pulse repetition rate[1] | Single shot to 300 kHz (option up to >500 kHz) | | | |
| Pulse-to-pulse stability[2] | < 2% rms | | | |
| Long term power stability[3] | < ±2% rms | | | |
| Beam spatial mode | $TEM_{00}$ $M^2$ < 1.1 | | | $TEM_{00}$ $M^2$ < 1.2 |
| Beam pointing stability | < 25 µrad | | | |
| Beam divergence | < 1.5 mrad | | | |
| Beam roundness | ~90% | | | |
| Beam diameter[4], at exit | ~0.6 mm | | ~2.5 mm | |
| Polarization ratio | Horizontal; >100:1 | | | |
| **Operational specifications and system characteristics** | | | | |
| Interface | RS232, Ethernet, Software GUI, External TTL Triggering | | | |
| Warm-up time | < 15 minutes from standby, < 30 minutes from cold start | | | |
| Electrical requirement | 100-240 V AC; or 32 V DC, 15 A | | | |
| Line frequency | 50-60 Hz | | | |
| Ambient temperature | Ambient 15°C to 35°C (59°F to 95°F) Operating Range,<br>Relative Humidity 90% Max., non-condensing | | | |
| Storage conditions | -10°C to 40°C; Sea Level to 12,000 m;<br>0% to 90% Relative Humidity, non-condensing | | | |
| Power consumption | < 240 W | < 320 W | < 420 W | < 600 W |
| Dimensions (LxWxH) | 18 x 7.5 x 3.75 in | | | |
| Weight | 29 lbs (13.2 kg) | | | |
| Cooling system | Water-cooled | | | |

1. Lower pulse repetition rates (down to < 30 kHz) performance achieved by pulse energy capping
2. Measured at ambient temperature ± 2°C
3. Measured over 8 hours ± 1°C
4. Larger beam diameters at the exit (up to ~2.5 mm) are available with the expansion option

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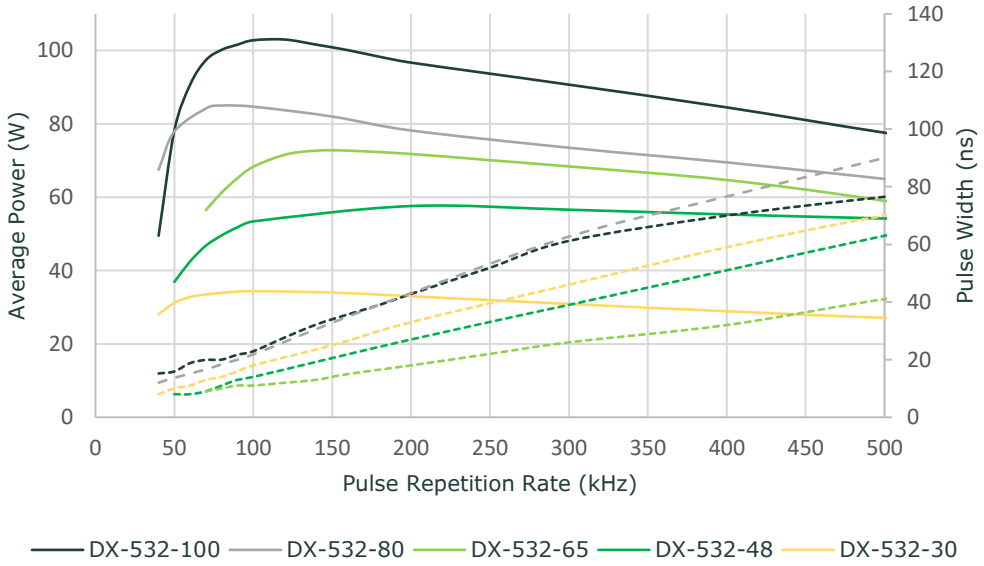
Specifications – **DX Series Short Pulse Nanosecond Lasers**, GRN Models

| | DX-532-30 | DX-532-48 | DX-532-65 | DX-532-80 | DX-532-100 |
|---|---|---|---|---|---|
| **Beam and output specifications** | | | | | |
| Wavelength | 532 nm | | | | |
| Average power | 30 W, 100-200 kHz<br>27 W at 300 kHz<br>25 W at 400 kHz<br>22 W at 500 kHz | 48 W, 100-500 kHz | 65 W, 100-200 kHz<br>63 W at 300 kHz<br>60 W at 400 kHz<br>57 W at 500 kHz | 80 W, 100-200 kHz<br>65 W at 300 kHz<br>60 W at 400 kHz<br>55 W at 500 kHz | 100 W, 100-200 kHz<br>85 W at 300 kHz<br>80 W at 400 kHz<br>75 W at 500 kHz |
| Pulse energy | ~0.5 mJ | ~0.6 mJ | ~0.7 mJ | ~0.8 mJ | ~1 mJ |
| Pulse width | 11±2 ns at 100 kHz<br>< 25 ns at 250 kHz | | | 15±3 ns at 50 kHz<br>25±3 ns at 100 kHz | |
| Pulse repetition rate[1] | Single shot to 500 kHz (option up to 1 MHz) | | | | |
| Pulse-to-pulse stability[2] | < 2% rms | | | | |
| Long term power stability[3] | < ±2% rms | | | | |
| Beam spatial mode | $TEM_{00}$ $M^2$ < 1.1 | | $TEM_{00}$ $M^2$ < 1.2 | | |
| Beam pointing stability | < 25 µrad | | | | |
| Beam divergence | < 2 mrad | | | | |
| Beam roundness | ~90% | | | | |
| Beam diameter, at exit | ~0.7 mm | | ~1 mm | | |
| Polarization ratio | Vertical; >500:1 | | | | |
| **Operational specifications and system characteristics** | | | | | |
| Interface | RS232, Ethernet, Software GUI, External TTL Triggering | | | | |
| Warm-up time | < 15 minutes from standby, < 30 minutes from cold start | | | | |
| Electrical requirement | 100-240 V AC; or 32 V DC, 15 A | | | | |
| Line frequency | 50-60 Hz | | | | |
| Ambient temperature | Ambient 15°C to 35°C (59°F to 95°F) Operating Range,<br>Relative Humidity 90% Max., non-condensing | | | | |
| Storage conditions | -10°C to 40°C; Sea Level to 12,000 m;<br>0% to 90% Relative Humidity, non-condensing | | | | |
| Power consumption | < 240 W | | < 320 W | < 420 W | |
| Dimensions (LxWxH) | 16 x 7.5 x 3.75 in | | | 20 x 8.5 x 3.75 in | |
| Weight | 29 lbs (13.2 kg) | | | 43 lbs (19.5 kg) | |
| Cooling system | Water-cooled | | | | |

1. Lower pulse repetition rates (down to < 30 kHz) performance achieved by pulse energy capping
2. Measured at ambient temperature ± 2°C
3. Measured over 8 hours ± 1°C

DX-532, Average power (W) and pulse width (ns) as a function of pulse repetition rate (kHz)

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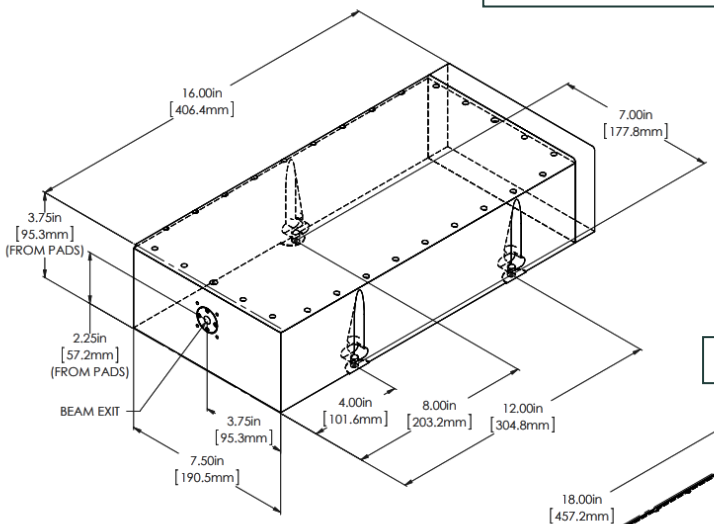
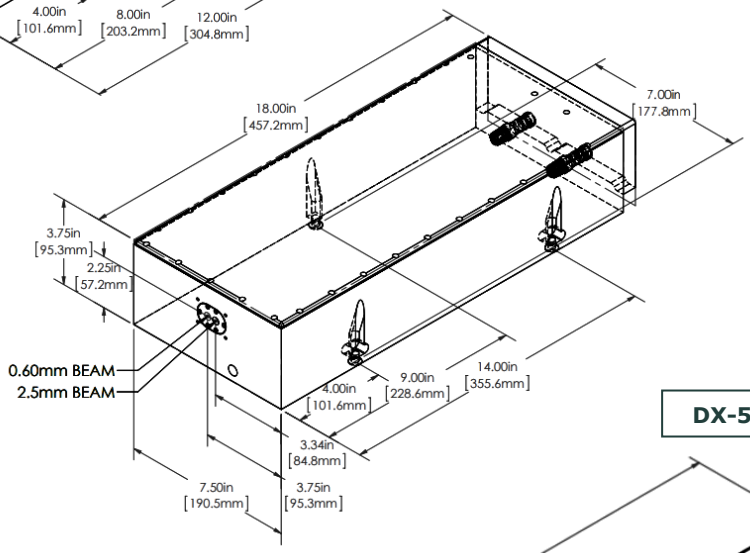
## Dimensional Drawings

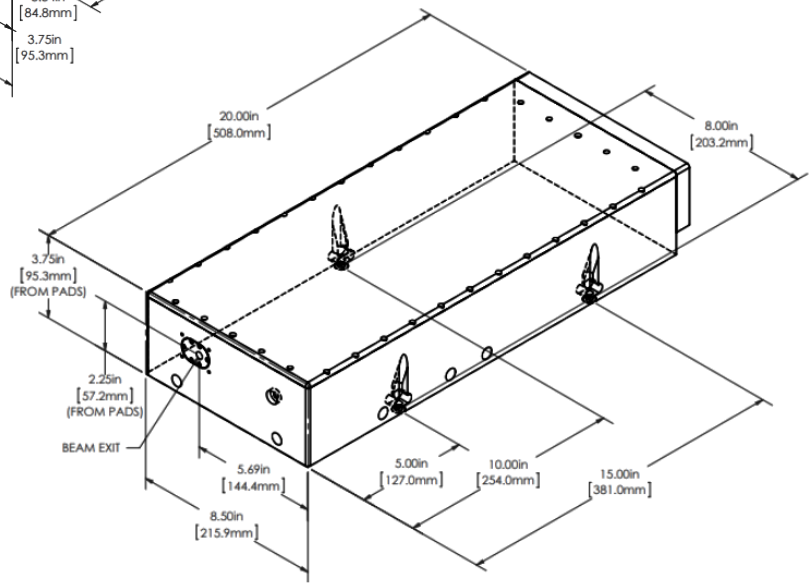
### DX-532-30, DX-532-48, DX-532-65




### DX-355-20, DX-355-28, DX-355-40, DX-355-50




### DX-532-80, DX-532-100




Product specifications, characteristics, and dimensional drawings are subject to change without notice.

Photonics Industries conforms to provisions of US 21 CFR 1040.10 & 1040.11 and is made under one or more US patents listed below: 9,531,147, 8,817,831, 7,869,471, 7,346,092, 7,082,149, 7,079,557, 6,999,483, 6,980,574, 6,961,355, 6,842,293, 6,762,405, 6,690,692, 6,587,487, 6,584,134,6,366,596, 6,356,578, 6,327,281, 6,246,707, 6,229,829, 6,108,356, 6,061,370, 6,028,620, 5,936,983, 5,898,717 and Pending Patents



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Photonics Industries International is the pioneer of intracavity harmonic lasers and is at the forefront of developing, manufacturing and marketing a wide range of nanosecond, sub-nanosecond, picosecond and femtosecond lasers for industrial, scientific, defense, and medical industries. Check out our products and see how we can help you apply our lasers to your needs.



LASER RADIATION