B&W TEK INC.

Your Photonics Partner

Laser Solution

BWN Series

Diode and DPSS Lasers

Features

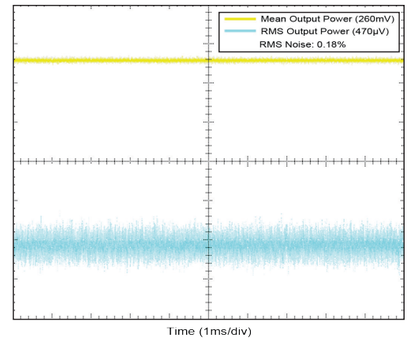
- Green (532 nm), Yellow (594 nm), Red (635 nm, 660 nm, and 685 nm), and NIR (780 nm and 830 nm)
- TEM_{00} Beam Quality
- > 10,000 Hours Expected Lifetime
- Low Noise and Excellent Power Stability
- Integratable into Larger OEM Systems

About the BWN Series

The BWN laser series is a line of solid-state electrically pumped diode lasers and diode pumped solid-state lasers. Compact and self-contained, the BWN emits a pure TEM_{00} beam with diffraction limited performance and a typical M^2 of 1.05. Available in green (532 nm), yellow (594 nm), red (635 nm, 660 nm, and 685 nm), and NIR (780 nm and 830 nm). With variable power options, these modules are ideal for demanding applications, such as metrology, photoluminescence, printing, illumination, scanning, inspection, particle counting, and a variety of biomedical applications. These OEM laser modules maintain outstanding optical performance over a broad temperature range, guaranteeing minimal power fluctuations and virtually eliminating high frequency noise. It has the world's smallest OEM controller with power consumption < 5 Watts. It has been qualified for use in some of the most demanding high-end instruments, with deployments in the tens of thousands of units.

Applications

- Optical Trapping
- Material Processing
- Metrology
- Wafer Inspection
- Printing
- Medicine
- Particle Counting
- Photoluminescence
- Illumination
- Pointing
- Bio Instrument
- Spectroscopy
- Signal Transmission

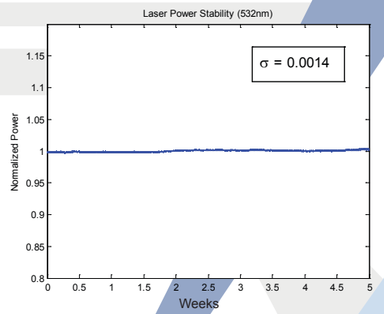


Low Noise

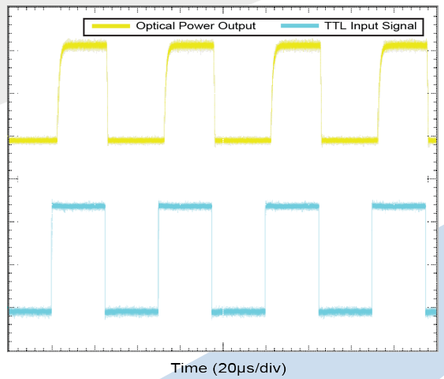
The BWN can be operated in a wide temperature range (10°C - 35°C), with a stable and quiet laser output power at most wavelengths. The BWN has a proven history of RMS noise stability < 1.0%. The combination of excellent beam characteristics (such as mode quality, low divergence, and brightness), makes the BWN laser series suitable for beam focusing, as well as for long distance beam positioning.

Excellent Power Stability

The BWN includes an external laser driver, thermoelectric cooling, and optical fiber coupling with an expected lifetime > 10,000 hours. The BWN has been proven reliable up to a 5% peak-to-peak long term power stability rating.

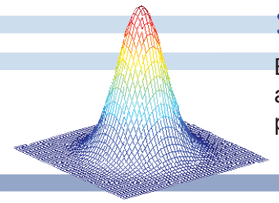


External Modulation Available



Using the TTL modulation option, the laser can be digitally pulsed in on/off mode up to 20 kHz with a modulation depth > 100:1. With a rise/fall time of < 4 µs, the TTL signal can be used in conjunction with the trigger signal of your detection system to control your measurement cycle and integration time. TTL modulation is ideal for Raman spectroscopy, fluorescence spectroscopy, and other applications where the source and the detector need to be precisely triggered.

With analog modulation (AM), the laser output power is controlled by applying an arbitrary 0 - 5 V input signal from a function generator. Using the AM option, the laser can be modulated up to 1 kHz with a modulation depth > 100:1.



Spatial Mode Profile

By internally coupling the laser output into a single-mode fiber optic that acts as a mode filter, the BWN laser series delivers a single-mode (TEM_{00}) spatial beam profile with circularity < 1.2:1 and a typical M^2 of 1.05 for lasers above 600 nm.

Quality Control

- ISO-9001 and ISO-13485 certified
- FDA/CDRH registration and compliance
- CE Mark and UL Mark
- Application of Six Sigma methodologies
- Mock FDA Quality Systems Inspection Technique (QSIT)
- Extensive Quality Control Check Points including Installation Qualifications (IQs), Operational Qualifications (OQs), Performance Qualifications (PQs), and Product Qualifications, as well as software verifications and validations

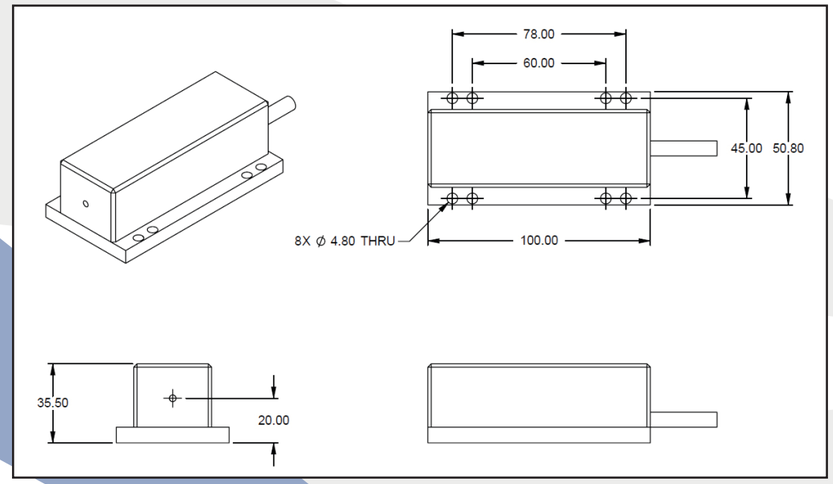
General Specifications: BWN Series

Model Number	BWN-532-5-OEM	BWN-532-10-OEM	BWN-532-20-OEM	BWN-532-50-OEM	BWN-532-100-OEM	BWN-532-300-OEM	BWN-594-5-OEM	BWN-594-10-OEM	BWN-594-20-OEM	BWN-594-50-OEM	BWN-635-5-OEM	BWN-635-10-OEM	BWN-635-20-OEM	BWN-660-5-OEM	BWN-660-10-OEM	BWN-660-20-OEM	BWN-660-40-OEM	BWN-660-60-OEM	BWN-685-5-OEM	BWN-685-10-OEM	BWN-780-5-OEM	BWN-780-10-OEM	BWN-780-20-OEM	BWN-780-40-OEM	BWN-780-60-OEM	BWN-830-5-OEM	BWN-830-10-OEM
Wavelength (nm)	532 +/- 1	532 +/- 1	532 +/- 1	532 +/- 1	532 +/- 1	532 +/- 1	594 +/- 1	594 +/- 1	594 +/- 1	594 +/- 1	635 +/- 10	635 +/- 10	635 +/- 10	660 +/- 5	660 +/- 5	660 +/- 5	660 +/- 5	660 +/- 5	685 +/- 10	685 +/- 10	780 +/- 5	780 +/- 5	780 +/- 5	780 +/- 5	780 +/- 5	830 +/- 10	830 +/- 10
Output Power (mW)	5	10	20	50	100	300	5	10	20	50	5	10	20	5	10	20	40	60	5	10	5	10	20	40	60	5	10
Spatial Mode	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}
FWHM Linewidth (nm)						-				-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
M^2	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Beam Diameter at $1/e^2$ (mm) (typical)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.5	< 1.5	< 1.5	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Beam Divergence (mrad) (typical)	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Beam Asymmetry	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1
Mode of Operation	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated
Long-Term Power Stability (pk-pk)	<+/-3%	< +/- 3%	< +/- 3%	< +/- 3%	< +/- 3%	< +/- 5%	< +/- 10%	< +/- 10%	< +/- 10%	< +/- 10%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%	< 5%
RMS Noise																											
20 Hz to 10 MHz	< 0.5%	< 0.5%	< 0.5%	< 0.5%	< 0.5%	-	-	-	-		< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%
10 MHz to 500 MHz	< 0.5%	< 0.5%	< 0.5%	< 0.5%	< 0.5%	-	-	-	-		< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%	< 1.0%
Digital Modulation/External Trigger*																											
Maximum Bandwidth (kHz)	> 20	> 20	> 20	> 20	> 20	on/off only	on/off only	on/off only	on/off only	on/off only	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20	> 20
Rise Time (10% to 90%) (µsec)	< 20	< 20	< 20	< 20	< 20	-	-	-	-	-	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Fall time (10% to 90%) (µsec)	< 20	< 20	< 20	< 20	< 20	-	-	-	-	-	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Modulation Depth (extinction ratio)	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
Analog Modulation*																											
Maximum Bandwidth (kHz)	> 1	> 1	> 1	> 1	> 1	set power only	-	-	-	-	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1	> 1
Rise Time (10% to 90%) (µsec)	< 50	< 50	< 50	< 50	< 50	-	-	-	-	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fall time (10% to 90%) (µsec)	< 50	< 50	< 50	< 50	< 50	-	-	-	-	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Modulation Depth (extinction ratio)	> 100:1	> 100:1	> 100:1	> 100:1	>100:1	-	-	-	-	-	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
Polarization Ratio	> 100:1	> 100:1	> 100:1	> 100:1	>100:1	>100:1	> 100:1	> 100:1	> 100:1	> 100:1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Warm-Up Time (minutes)	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Beam Position (mm)	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	30.8 +/- 1	30.8 +/- 1	30.8 +/- 1	30.8 +/- 1	30.8 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1
Beam Angle (mrad)	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5
Pointing Stability (µrad/°C)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ambient Temperature (°C)	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	15 - 35	10 - 35	10 - 35	10 - 35	15 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35

*Optional
Note: OEM Laser compents are not CDRH compliant

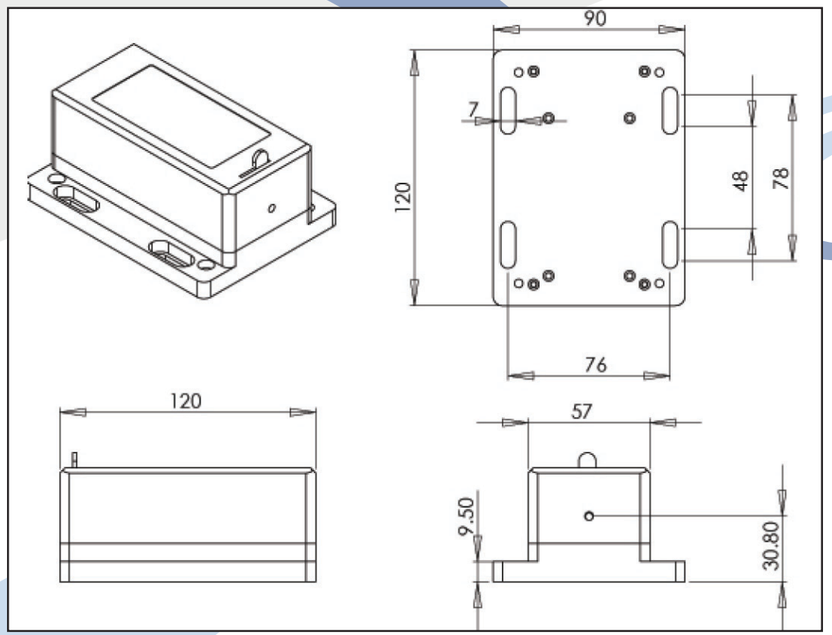
Dimensions

Laser Head (All Models Excluding 594 nm & BWN-532-300-OEM)



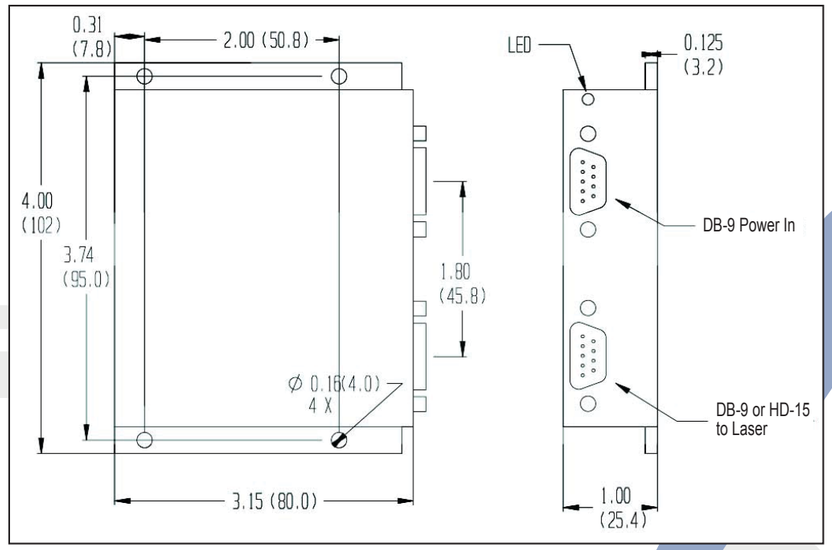
Units are mm

Laser Head (594 nm & BWN-532-300-OEM)



Units are mm

Control Box



Units are inches (mm)

Power In Pin Out Configuration

Pin 1	Ground	Black Wire
Pin 2	Ground	
Pin 3	TTL Modulation	White Wire
Pin 4	+5V	Red Wire
Pin 5	+5V	
Pin 6	Ground	
Pin 7	Interlock	
Pin 8	Analog Modulation Input	Brown Wire
Pin 9	N.C.	

Note: pin 3 and pin 8 functions are optional

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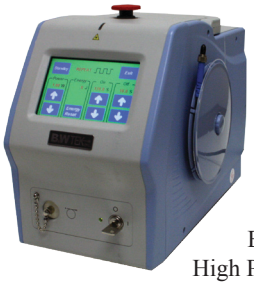
Additional Laser Products



BWF5
High Power Laser

- **High Power Lasers**
  Up to 200 W with wavelengths from 63 5nm - 2000 nm
- **Solid-State Lasers**
  TEM_{00} beam quality from 4 mW - 2500 mW
- **Fiber Coupled Lasers**
  Multi-mode or single-mode fiber coupled lasers up to 20 W with wavelengths from 635 nm - 2000 nm
- **Multi-channel Lasers**
  Custom configurations 960 nm -1650 nm

CleanLaze®
Turnkey End User Package

Additional Spectroscopy Products

i-Raman™
Portable Raman System

- **UV-Vis-NIR Spectrometer Modules**
  Compact, USB interface, plug-and-play
- ***i*-Spec Spectrophotometers**
  Models from 190 nm - 2500 nm
- **Raman Spectrometer Systems**
  Portable systems: 785 nm, 532 nm, and custom
- **Raman Microscopy and Micro Sampling**
  Confocal Raman microscopes & video micro sampling accessories
- **Sampling Accessories**
  Cuvette holders, optical fibers, fiber probes, etc.

i-trometer™
Back-thinned CCD
Array Spectrometer

To find out more:

Contact our Application Team for your unique solution.

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