



PART NUMBER 0638L-21A
 ITEM NAME 638 NM SLM LASER

PRODUCT DATASHEET



DESCRIPTION

638 nm single longitudinal mode (SLM) diode laser, a versatile powerhouse designed for applications in confocal microscopy, flow cytometry, Raman spectroscopy, and biomedical research. Precision-engineered to emit red light with a narrow spectrum, this laser offers exceptional stability and accuracy.

638 nm SLM laser could be used in micro Raman or shifted excitation Raman differential spectroscopy (SERDS). Together with 633 nm SLM laser it is a perfect match for SERDS. Raman signals can be a lot easier separated from the background noise compared to conventional Raman spectroscopy. Both lasers are VBG stabilized which provides a superior center wavelength tolerance of ± 0.1 nm.

Note:

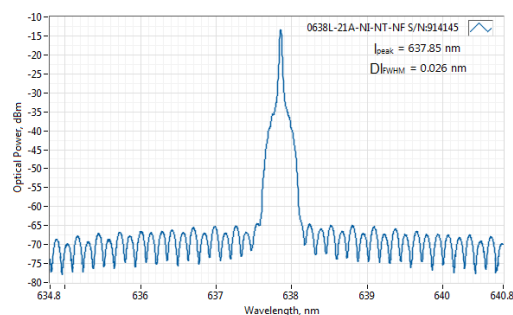
In optical systems with strong back-reflections (e.g. more than 10%), the laser must be protected by using an optical isolator with at least 20 dB isolation. Typical applications include interferometry, confocal microscopy (especially working with reflective samples), etc. Failure to comply with these requirements will render the warranty void for cases of COD (Catastrophic Optical Damage) of laser diode facets.

SPECIFICATIONS

Specifications updated: 24 January 2024

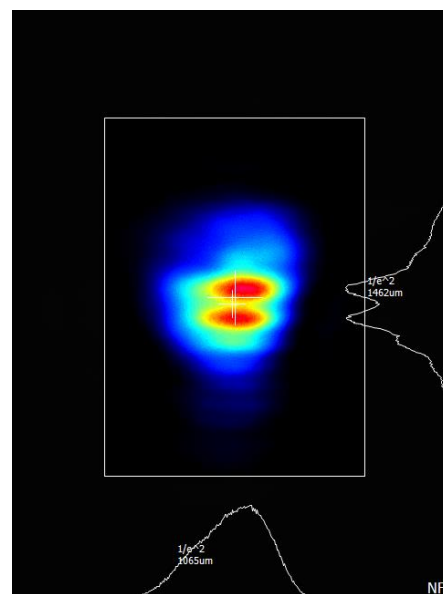
Parameter	Minimum Value	Typical Value	Maximum Value
Central wavelength, nm	637.7	637.8	638.1
Longitudinal modes	-	Single	-
Spectral line width FWHM, MHz	-	2 ¹	5
Output power, mW	-	100 ²	-
Side-mode suppression ratio (SMSR), dB	-	50	-
Power stability, % (RMS, 8 hrs)	0.01	0.03 ³	0.1
Power stability, % (peak-to-peak, 8 hrs)	0.05	0.15 ⁴	0.5
Intensity noise, % (RMS, 20 Hz to 20 MHz)	0.05	0.25 ⁵	0.6
Transversal modes	-	TEM00	-
Beam width (1/e ²), mm	-	1 ⁶	1.3
Beam height (1/e ²), mm	-	1.2	1.6
Horizontal beam divergence, mrad	-	1.2	1.5
Vertical beam divergence, mrad	-	0.6	1
M ² horizontal axis	-	1.2	1.4
M ² vertical axis	-	1.3	1.6
M ² effective	-	1.3	1.6
Polarization direction	-	Horizontal ⁷	-
Polarization contrast	1000	2000	-
Control interface type	-	UART ⁸	-
Operation mode	-	APC (CW)	-
Modulation bandwidth, MHz	-	N/A ⁹	-
Input voltage, VDC	4.8	5	5.3
External power supply requirement	-	+5 V DC, 1.5 A	-

TYPICAL SPECTRUM



Typical spectrum of 0638 nm diode laser. Measured with 20 pm resolution.

TYPICAL NEAR FIELD



Typical near field (0.45 m from output aperture) beam profile. Non-circularized beam of a 0638 nm direct diode laser.

Dimensions (WxDxH), mm	-	50 x 30 x 18 ¹⁰	-
Beam height from the base, mm	9.9	10.4	10.9
Heat-sinking requirement, °C/W	-	1	-
Optimum heatsink temperature, °C	18	25	32
Warm up time, mins (cold start)	0.2	1	2
Temperature stabilization	-	Internal TEC	-
Overheat protection	-	Yes	-
Storage temperature, °C (non-condensing)	-10	-	50
Net weight, kg	0.1	0.12	0.14
Max. power consumption, W	0.4	2	10
Warranty, months (op. hrs)	-	14 (10000) ¹¹	-
RoHS	-	Yes	-
CE compliance	-	- General Product Safety Directive (GPSD) 2001/95/EC - (EMC) Directive 2004/108/EC	-
Laser safety class	-	3B	-
OEM lasers are not compliant with	-	IEC60825-1:2014 (compliant using additional accessories)	-
Country of origin	-	Lithuania	-
Spectral line width FWHM, pm	-	0.003 ¹²	0.007

¹ Measured using HighFinesse LineWidth Analyzer LWA-10k having 10 kHz resolution. Linewidth Analyzer testing is not provided for each laser being manufactured, the standard test is OSA measurement with 20-30 pm resolution instead.

² The output power of SLM lasers shall not be tuned and SLM performance is not guaranteed at power ratings other than factory preset. However, the power setting capability is not disabled. External attenuators are recommended instead.

³ The long term power test is carried out at constant laser body temperature (+/-0.1 °C) using an optical power meter with an input bandwidth of 10 Hz. The actual measurement rate has a period of about 20 seconds to 1 minute.

⁴ The long term power test is carried out at constant laser body temperature (+/-0.1 °C) using an optical power meter with an input bandwidth of 10 Hz. The actual measurement rate has a period of about 20 seconds to 1 minute.

⁵ Noise level is measured with a fast photodiode connected to an oscilloscope. The overall system bandwidth is from 2 kHz to 20 MHz.

⁶ Beam width and height are measured at 0.4 m from output aperture.

⁷ For lasers without integrated optical isolators.

⁸ Break-out-boxes AM-C8 and AM-C3 can be used for conversion of UART communication to either USB or RS232.

⁹ SLM lasers shall not be modulated - use external modulators instead.

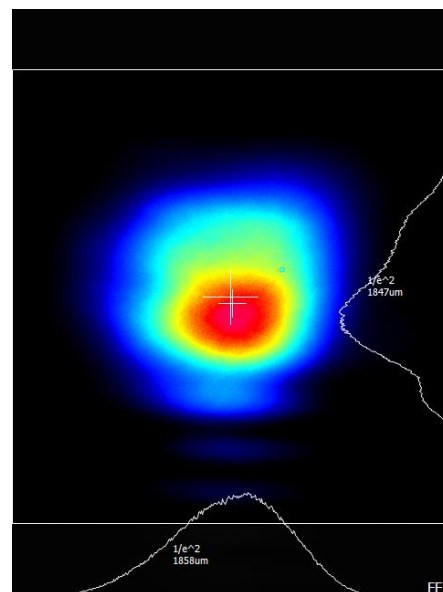
¹⁰ Excluding control interface pins and an output window/fiber assembly.

¹¹ Whichever occurs first. The laser has an integrated operational hours counter.

¹² Converted from bandwidth value.

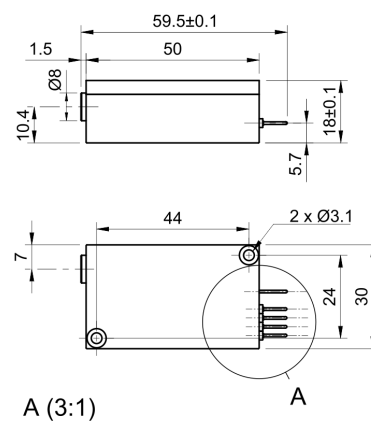
Note: Product specifications are subject to change without prior notice to improve reliability, function or design or otherwise.

TYPICAL FAR FIELD



Typical far field (1 m from output aperture) beam profile. Non-circularized beam of a 0638 nm direct diode laser.

DRAWING



A (3:1)

MatchBox
Free-Space

