

Single-Mode D-type OEM Module



Innovative Photonic Solutions' proprietary Single-Mode Spectrum Stabilized Laser features high output power with ultra-narrow spectral bandwidth and a circularized and collimated output beam. Designed to replace expensive DFB, DBR, fiber, and external cavity lasers, the Single-Mode Spectrum Stabilized Laser offers superior wavelength stability over time, temperature ($0.007 \text{ nm/}^{\circ}\text{C}$), and vibration, and is manufactured to meet the most demanding wavelength requirements.

The OEM D-type module comes standard with a circularized and collimated output beam, integral laser line filter pack, internal thermistor and TEC, linear tracking photodiode and ESD protection. Lasing wavelength can be accurately specified and repeatedly manufactured to within 0.1 nm upon request. The laser is ideal for high resolution Raman spectroscopy, confocal microscopy, metrology and interferometry applications.

The D-type OEM module was designed with modularity in mind. It comes standard with a 3-5 X beam expander, but can be ordered without the beam expander if preferred. We have the option of adding an optical isolator to the standard package for some wavelengths as well.

- 1 - Integral laser line filters for 633 nm, 638 nm, 785 nm, 808 nm, 830 nm and 1064 nm
- 2 - Optical isolator available for 633 nm, 638 nm, 780 nm, 785 nm
- 3 - Refer to blue and green data sheets for 405 nm and 514 nm specifications. 514 nm coming soon.

RoHS
COMPLIANT

Features

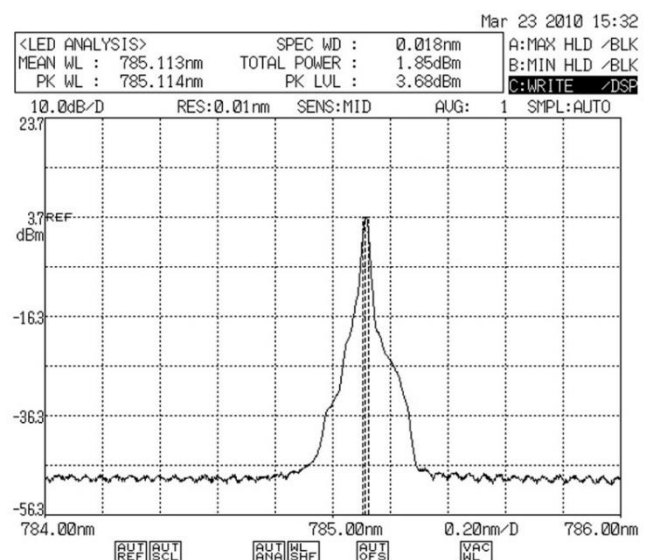
- High Power Single Frequency Output (SLM)
- Ultra-Narrow Spectral Bandwidth
- Circularized & Collimated Output Beam
- Stabilized Output Spectrum ($< 0.007 \text{ nm/}^{\circ}\text{C}$)
- Gaussian TEM_{00} Spatial Mode
- Integral Laser Line Filter¹
- Optical Isolator²
- SMSR 70 dB w/ laser line filter (40 dB without)
- Integral Thermistor & TEC
- Integral ESD Protection
- Integral Linear Tracking Photodiode

Standard Wavelengths

- 405 nm³
- 514 nm³
- 633 nm
- 638 nm
- 660 nm
- 780 nm
- 785 nm
- 808 nm
- 830 nm
- 1053 nm
- 1064 nm

Additional wavelengths available.

Typical Spectral Plot



Typical 785 nm SS Laser Spectrum

General Optical Specifications

Wavelength Tolerance	+/- 0.5 nm
Spectral Linewidth ($\Delta\lambda$) / FWHM	<100MHz, <0.005 cm ⁻¹ Typical
Wavelength Stability Range	15 C - 45 C
SMSR	35 -45 dB
SMSR w/integral laser line filter	70 dB
Power Stability	+/- 0.5% to 1% typical
Power Consumption	2W typical, 5W max
Linear Tracking Photodiode (Optional, Internal TIA output)	1V max
Polarization Extinction (PER)	>17 dB
Polarization Orientation	Perpendicular to the plane of the base plate mounting plane
Spatial Profile	TEM00
Beam Quality (M-Squared)	< 1.5
Beam Ellipticity	1.5:1
Spot Size ⁴	1.5 mm with beam expander ~0.7 mm without beam expander
Beam Divergence ⁴	<1 mrad with beam expander ~ 2mrad without beam expander
Cold Start to <1 wavenumber	10 seconds
Warm Start to <1 wavenumber	1 second
Warm Start to < 0.1 wavenumber	3 seconds

2 - Comes standard with beam expander, add -NBE to part number for no beam expander. Spot size measured at 500 mm.

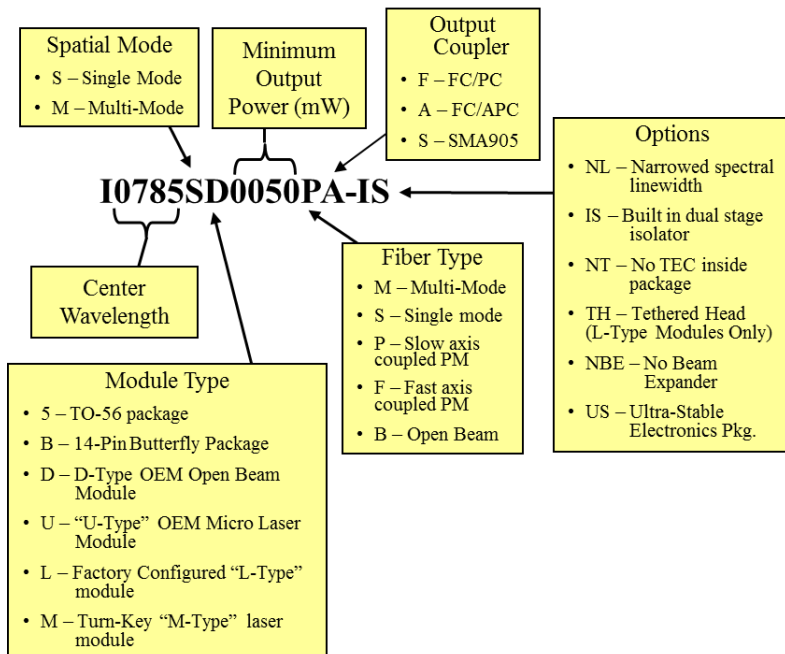
Standard D-type

Wavelength (nm)	Min. Power (mW)	Part number
633	15	I0633SD0015B
633	60	I0633SD0060B
638	35	I0638SD0035B
638	60	I0638SD0060B
660	50	I0660SD0050B
780	100	I0780SD0100B
785	100	I0785SD0100B
808	100	I0808SD0100B
830	100	I0830SD0100B
1053	150	I1053SD0150B
1064	150	I1064SD0150B

D-type with Isolator

Wavelength (nm)	Min. Power (mW)	Part number
633	10	I0633SD0010B-IS
633	35	I0633SD0035B-IS
638	20	I0638SD0020B-IS
638	35	I0638SD0035B-IS
780	90	I0780SD0090B-IS
785	90	I0785SD0090B-IS

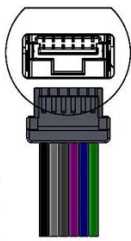
Part Numbering Schema



Operational Notes

- Do not retro-reflect beam! This can cause Catastrophic Optical Damage (COD) and is not covered under warranty (unless optical isolator version is chosen (e.g. I0785SD0090B-IS).
- Laser Enable Safety Feature: The optical output is enabled when pin (5) is changed from TTL “LO” (0 V) to TTL “HI” (5 Volt). A built-in safety circuit keeps the laser turned off after a power failure, even when pin (5) is set to 5 Volt. The laser output turns on only at the rising edge of the signal applied to pin (5).
- To adjust power output, IPS strongly recommends using Pulse Width Modulation (PWM) to adjust average power rather than using pin 4 (LD SET). See Note 4.
- By using PWM, user can adjust average power from 10% to 100% in digital increments by setting pulse width and duty cycle. For example, if a 50% duty cycle is selected, the laser will be on 50% of the time, and off 50% of the time, making the average power equal to 50% of the CW output power. and the sample will experience a lower average power. Rise/fall time is approximately 20 microseconds.
- IPS offers a Laser Control Unit (LCU-D) that will allow the laser to be controlled via USB. The LCU-D comes with PWM software.
- D-type comes with a cable with 6pin Molex connector on both ends (see electrical pinout on p.3). User must supply 5V power and TTL signal to operate.

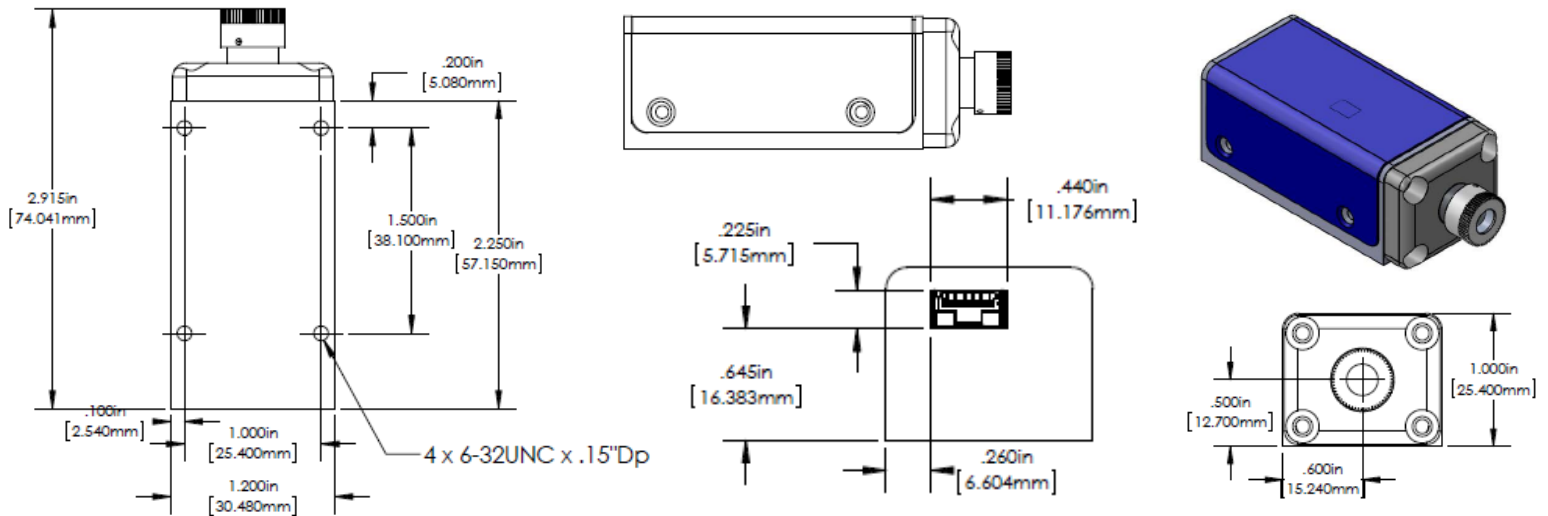
Electrical Pinout



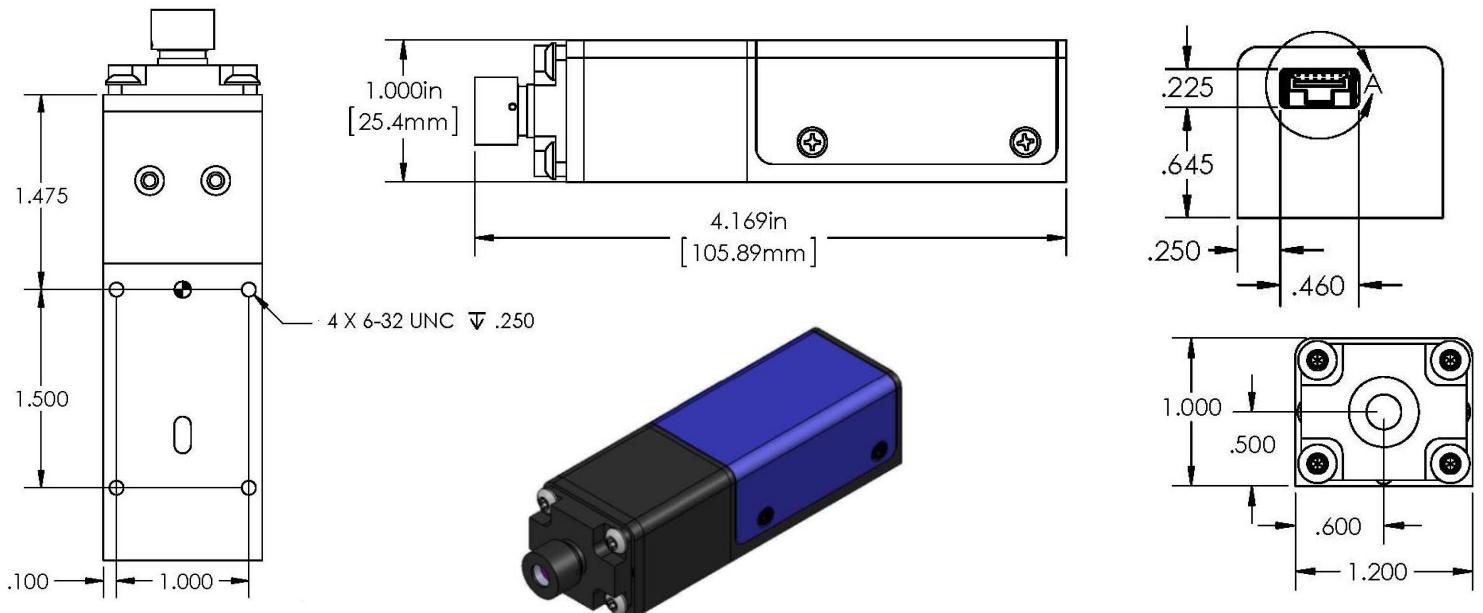
Controller
Module
6-Pin Molex
Connector
Pin-Out
(Molex Part#
5023860670)
16" long cable

Pin #	Symbol	Wire Color	Description	Notes
1	VCC	Green	Supply Voltage	5 V DC, 1 Amp
2	GND Return	Blue	Ground Return	Need to connect to Signal Ground
3	PD -	Purple	Linear Tracking PhotoDiode	Optional - Not Installed by Default
4	LD SET	Grey	Laser Power Control	0.0 V DC - 0.2 V DC
5	LD Enable	White	Laser Enable	5 V TTL, See Note 1 Below
6	Sig GND	Black	Signal Ground	Tie to GND Return (Pin 2)

Mechanical Specifications – Standard D-type with Beam Expander



Mechanical Specifications – D-type with Beam Expander and Optical Isolator



OEM Laser Product

This laser module is designed for use as a component (or replacement) part and is thereby exempt from 21 CFR1040.10 and 1040.11 provisions.

VISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT
405 nm, 633 nm, 638 nm,
660 nm, 100 mW CW
EN/IEC 60825-1:2007

INVISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT
780 nm, 785 nm, 808 nm, 830 nm,
1053nm, 1064 nm, 200 mW CW
EN/IEC 60825-1:2007



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