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Digital 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, and vibration, and is manufactured to meet the most demanding wavelength requirements.

The Digital 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. The laser offers UART I/O interface and is reverse compatible with all of IPS's older D-Type model products. 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.

Features

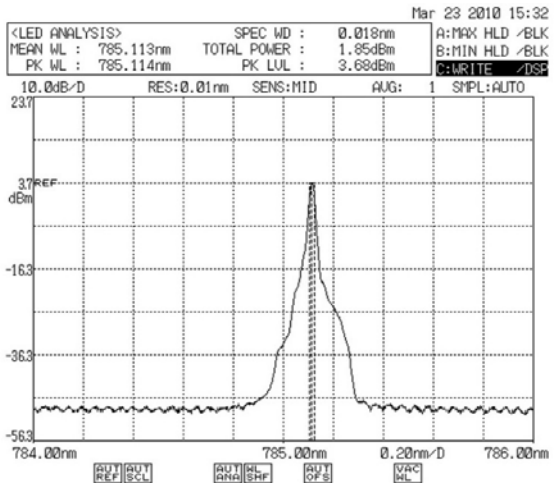
- High Power Single Frequency Output (SLM)
- Ultra-Narrow Spectral Bandwidth
- Circularized & Collimated Output Beam
- Gaussian TEM_{00} Spatial Mode
- Integral Laser Line Filter[1]
- Optical Isolator[2]
- SMSR 70 dB w/ laser line filter (40 dB without)
- Integral Thermistor & TEC
- Integral ESD Protection
- Integral Linear Tracking Photodiode
- Digital UART I/O

Standard Wavelengths

• 633 nm	• 780 nm	• 830 nm
• 638 nm	• 785 nm	• 1053 nm
• 660 nm	• 808 nm	• 1064 nm

Additional wavelengths available.

Typical Spectral Plot



Typical 785 nm SS Laser Spectrum

RoHS COMPLIANT

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

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General Optical Specifications

Wavelength Tolerance	+/- 0.5 nm
Spectral Linewidth (Δλ) / FWHM	<100MHz
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
TEC temperature control	+/- 0.01 degree C or better
Polarization Extinction (PER)	>20 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
Beam Diameter[3]	4.0 mm (+/- 0.4mm) with beam expander as measured 1/e² @ 2.4m
	~0.7 mm without beam expander
Beam Divergence	<1 mrad with beam expander
	~ 2 mrad without beam expander[4]
Cold Start to <1 wavenumber	10 seconds
Warm Start to <1 wavenumber	1 second
Warm Start to < 0.1 wavenumber	3 seconds

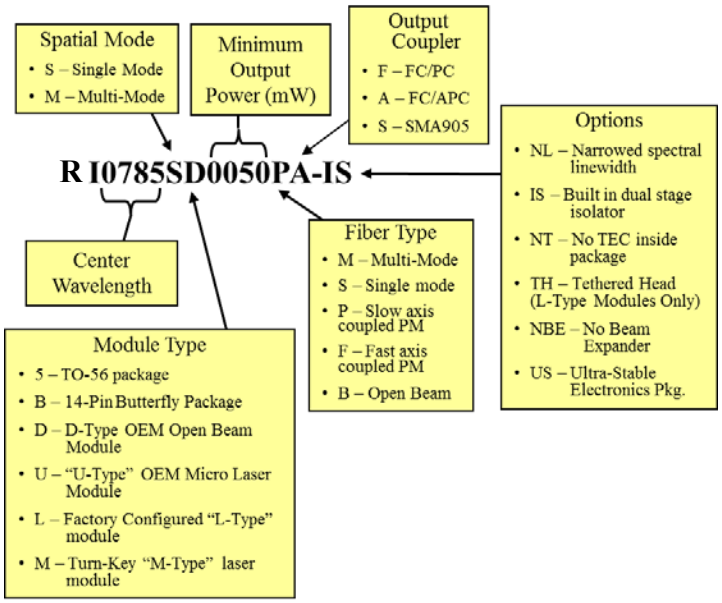
D-Type Standard Product Variants

Wavelength (nm)	Min. Power (mW)	Part number
633	30	RI0633SD0030B-IS-HD
638	35	RI0638SD0035B-IS-HD
660	50	RI0660SD0050B-HD
785	100	RI0785SD0100B-IS-HD
785	150	RI0785SD0150B-IS-HD
808	100	RI0808SD0100B-HD
830	100	RI0830SD0100B-HD
1064	150	RI1064SD0150B-HD

3 - Comes standard with beam expander, add -NBE to part number for no beam expander.

4 – For 785 nm, Beam Divergence is ~ 3-4 mrad without beam expander

Part Numbering Schema



Operational Notes

1. Do not retro-reflect beam! This can cause Catastrophic Optical Damage (COD) and is not covered under warranty (unless optical isolator version is included in product).
2. 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).
3. To adjust power output, IPS strongly recommends using Pulse Width Modulation (PWM) to adjust average power rather than using pin 4 (LD SET).
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.
5. D-type comes with a cable with 8pin JST connector on one end (see electrical pinout on p.3). User must supply 5V power and TTL signal to operate.
6. Digital D-type is UART compatible (see digital I/O manual for command set).

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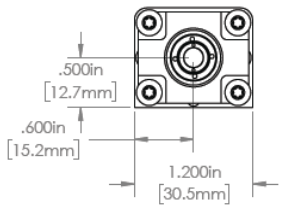
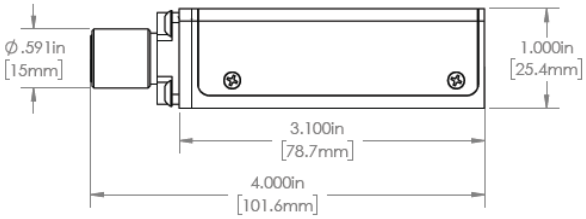
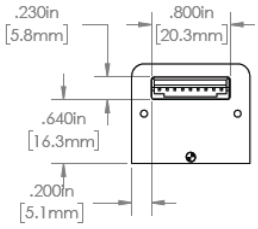
Electrical Pinout

Pin #	Symbol	Wire Color	Description	Notes
1	VCC	Red	Supply Voltage	5 V DC, 1 Amp
2	GND Return	Gray	Ground Return	Need to connect to Signal Ground
3	PD	Gray	Linear Tracking PhotoDiode	Optional - Not Installed by Default
4	LD SET	Gray	Laser Power Control	0.0 V DC - 0.2 V DC - Disabled by default
5	LD Enable	Gray	Laser Enable	5 V TTL, See Note 1 Below
6	Tx	Gray	Transmit	Digital I/O
7	Rx	Gray	Receive	Digital I/O
8	Sig GND	Gray	Signal Ground	Tie to GND Return (Pin 2)

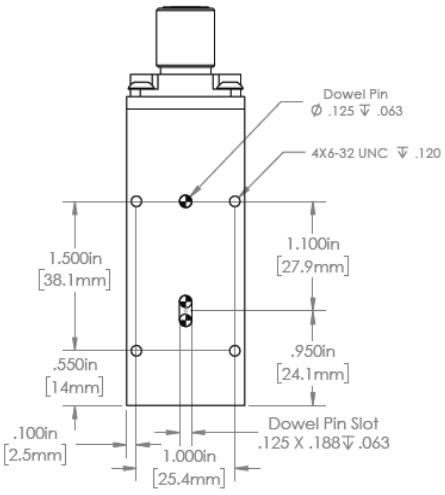
Mechanical Specifications – Digital D-type with Beam Expander



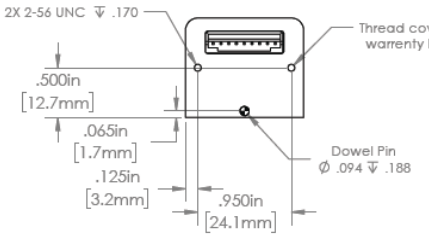




Mounting Option A

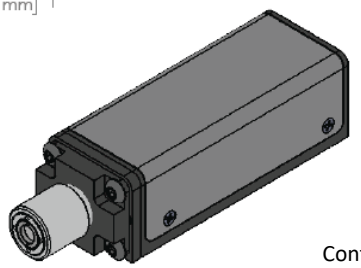


Mounting Option B



Electrical Connection

Pin #	Symbol
1	V+
2	GND
3	PD
4	LD VBIAS
5	LASER EN
6	TX
7	RX
8	GND



Controller Module
8-Pin JST Connector
(JST Part# S8B-PH-SM4-TB(LF)(SN))
12” long I/O cable Provided

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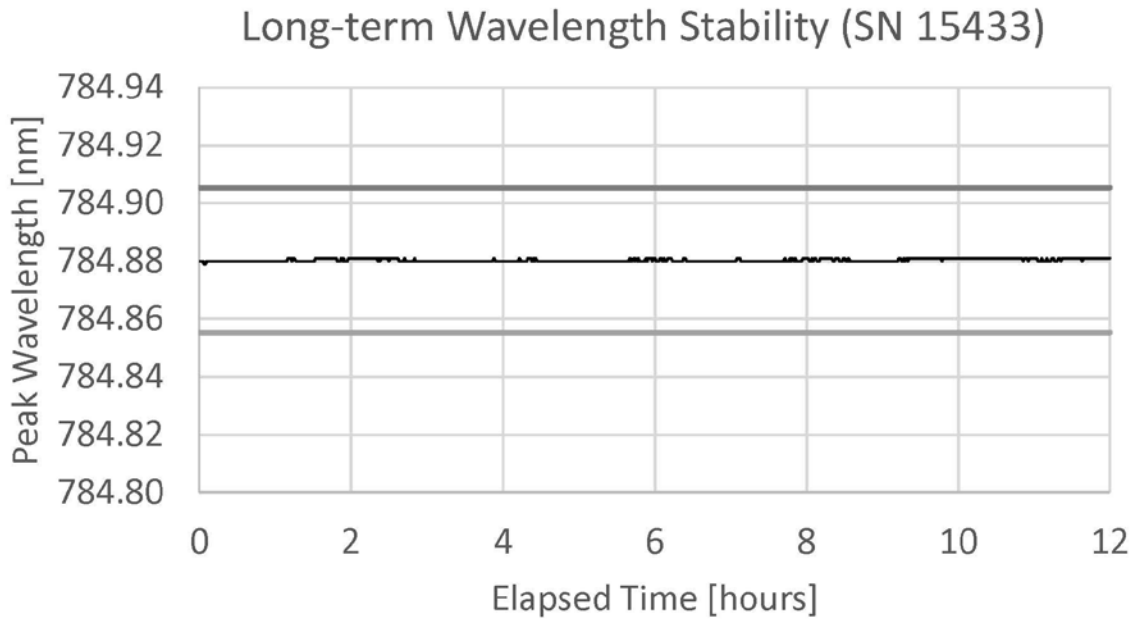
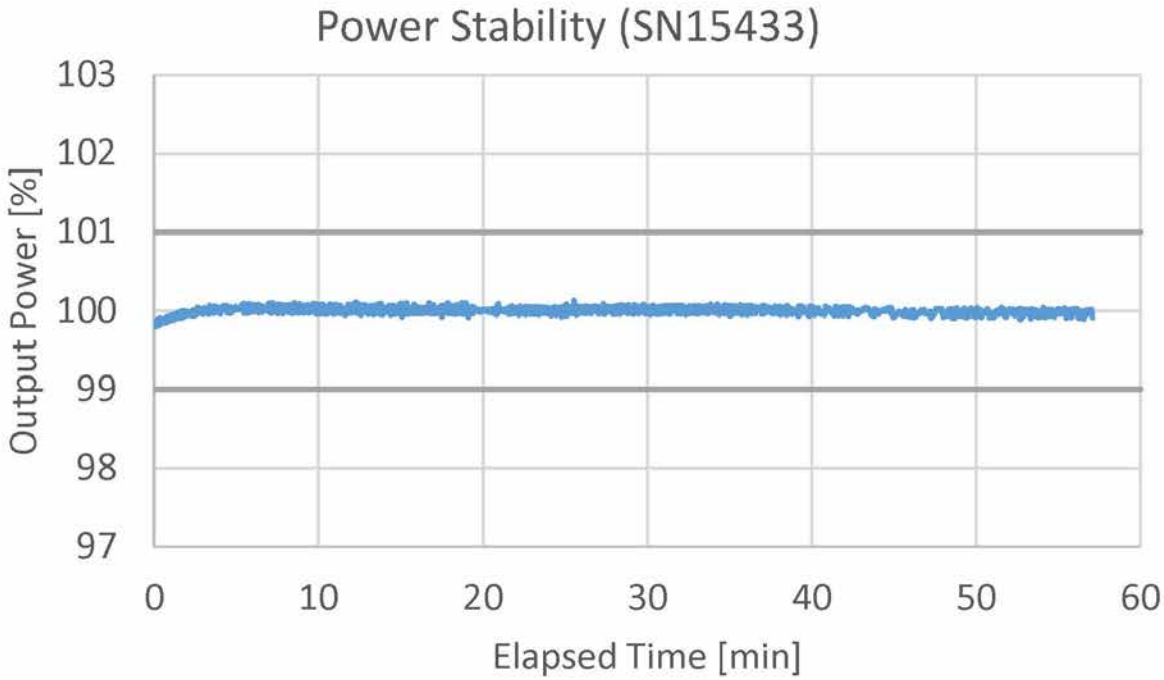
Wavelength & Power Stability Data
(Constant Case Temperature)





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