Single-Mode Digital D-Type Module with Optical Isolator

Innovative Photonic Solutions' proprietary Single-Mode Spectrum Stabilized Laser Diode 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 nm/°C), 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, and UART I/O interface.

Applications

This laser package is designed for OEM Integration and is ideal for:

- High Resolution Raman Spectroscopy
  - Handheld Raman Spectroscopy
  - Confocal Microscopy
  - Raman Imaging
  - Portable Raman
  - Process Raman
- Metrology & Interferometry
- Remote Sensing

Key Features

- High Power Single Frequency Output (SLM)
- Ultra-Narrow Spectral Bandwidth
- Circularized & Collimated Output Beam
- Gaussian TEM00 Spatial Mode
- Integral Laser Line Filters
- SMSR 70 dB w/ laser line filter (40 dB without)
- Integral Thermistor & TEC
- Integral ESD Protection
- Integral Linear Tracking Photodiode
- Designed with modularity in mind. It comes standard with a 3-5 X adjustable beam expander and optical isolator.
- Digital UART I/O
- Available with a "D-Type Switch Box" to enable plug-and-play

Standard Wavelengths

All specified wavelengths are measured "in-vacuum"

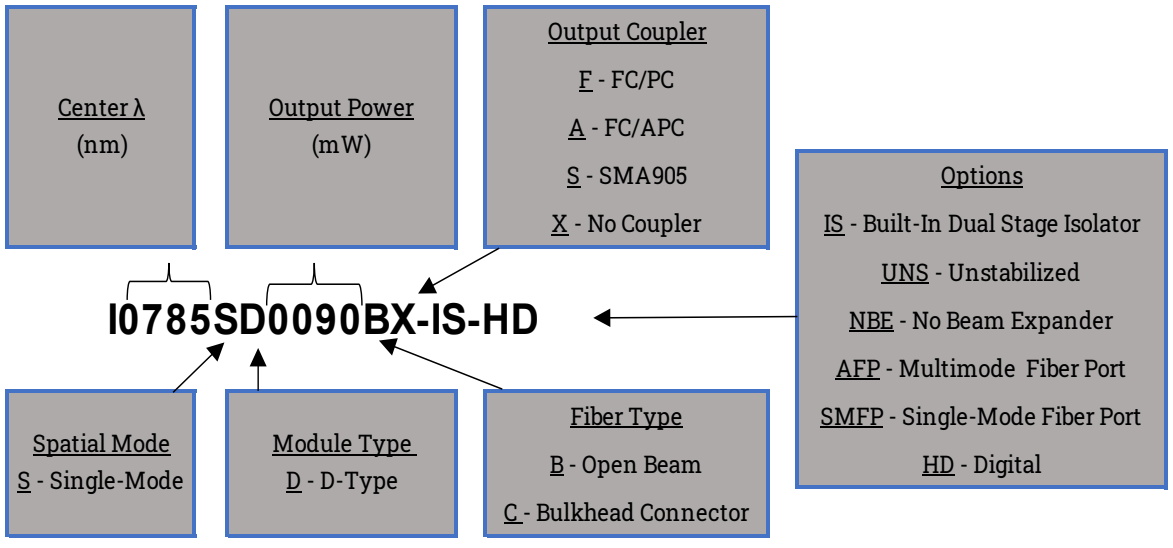
633nm	780nm	785nm
638nm	783nm	808nm
		830nm

Specifications

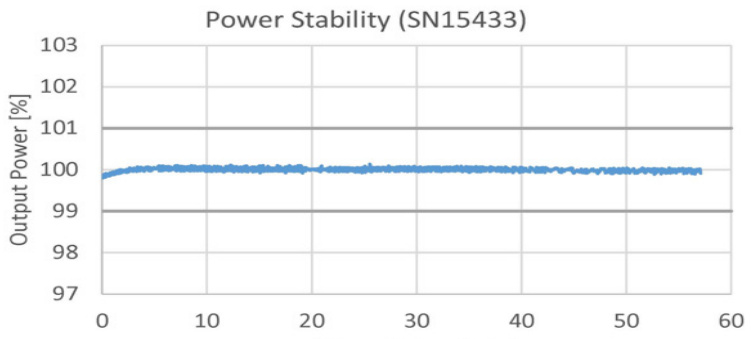
Wavelength Tolerance	+/- 0.5nm
Spectral Linewidth FWHM	<100MHZ
SMSR w/ integral laser line filter	70 dB
Power Stability	+/- 0.5% to 1% typical
Wavelength Stability Range	15 °C to 45 °C
Power Consumption	2W typical, 5W max
Linear Tracking Photodiode (Optional, Internal TIA output)	1V Max
Polarization Extinction (PER)	>17 dB (20 dB Typical)
Polarization Orientation	Perpendicular to the plane of baseplate mounting plane
Spatial Profile	TEM00
Beam Quality (M^2, $1/e^2$)	<1.2
Beam Ellipticity	<1.5:1
Adjustable Beam Expander	up to 4.0 mm (+/- 0.4mm) w/ beam expander
	~0.7mm w/o beam expander
Beam Divergence	<2 mrad w/ beam expander
	~2 mrad w/o beam expander
Cold Start to <1 wavenumber	10 Seconds
Warm Start to <1 wavenumber	1 Second
Warm Start to <0.1 wavenumber	3 seconds

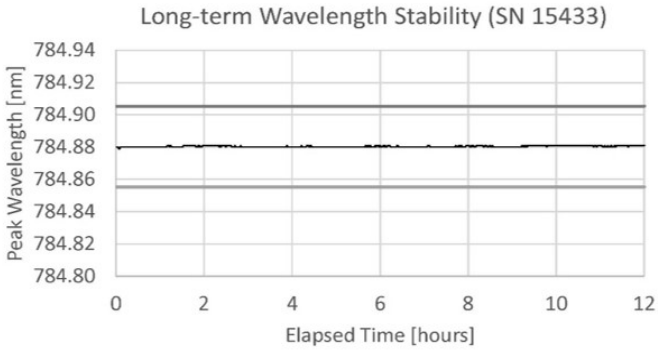
λ (nm)	Output Power (mW)	Base Part Number
633	35	I0633SD0035BX-IS-HD
638	35	I0638SD0035BX-IS-HD
780	90	I0780SD0090BX-IS-HD
783	90	I0783SD0090BX-IS-HD
785	90	I0785SD0090BX-IS-HD
	135	I0785SD0135BX-IS-HD
808	90	I0808SD0090BX-IS-HD
	135	I0808SD0135BX-IS-HD
830	90	I0830SD0090BX-IS-HD
	135	I0830SD0135BX-IS-HD

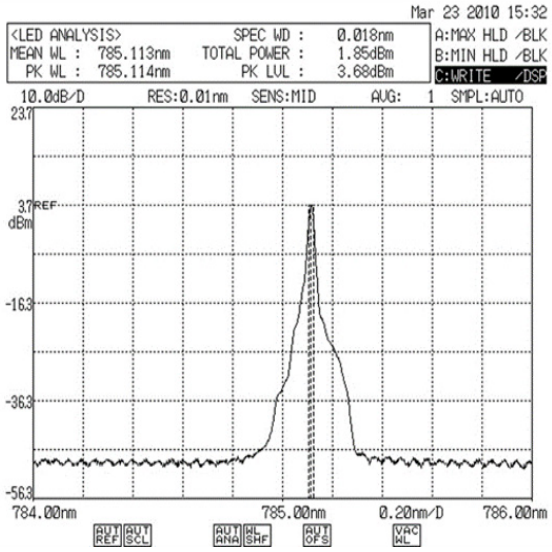
Part Schema



Selected Data







Custom Capability

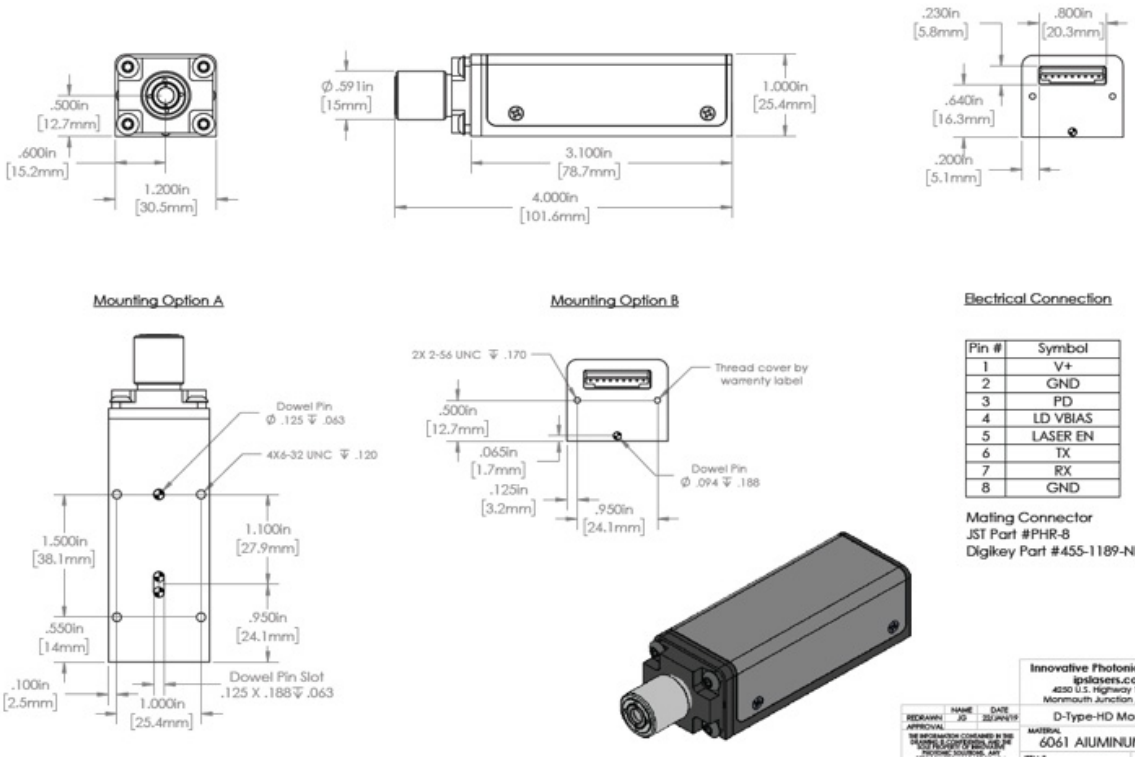
- Custom wavelengths available upon request
- Adjustable beam expander to set beam diameter at specified distances
- Multimode Achro-fiber port available
- Optical isolator available for 633nm, 638nm, 780nm, 785nm in standard D-Type module
- Optical isolator available for 976nm and 1064nm in larger D-Type module - Call for details

NOTES: Pins 1, 2**, 5*, and 8** are required for laser operation
*Laser Enable is required unless module is set to "Always On" Laser Enable Mode (Mode 2)
**GND must be supplied to both GND pins (pin 2 and pin 8)
+ Transmit from host connects to Rx on Laser Module, receive on host connects to Tx on Laser Module

Electrical Specs

Pin	Symbol	Wire Color	Description	Notes
1	VCC	Red	Supply Voltage	5-12V DC, 1 Amp
2**	GND Retrun	Gray	Ground Return	Need to connect to signal ground
3	PD	Gray	Linear Tracking Photodiode	Voltage Proportional to PD Current
4	LD Set	Gray	Laser Power Control	0.0V DC - 5V DC - Disabled by default
5*	LD Enable	Gray	Laser Enable	5V TTL, See Note 1 Below
6+	Tx	Gray	Transmit	Digital I/O (UART 3.3V)
7+	Rx	Gray	Receive	Digital I/O (UART 3.3V)
8**	Sig GND	Gray	Signal Ground	Tie GND Return (Pin 2)

Mechanical Drawings



Operational Notes

1. Switch box, baseplate, and power supply are not included with module. These items are available as accessories.
2. Do not retro-reflect beam! This can cause Catastrophic Optical Damage (COD) and is not covered under warranty (unless optical isolator is included).
3. 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).
4. A VBG-locked Single-mode laser will experience mode hops as the temperature and driver current are changed (see Mode-Hop White Paper). For this reason, IPS profiles and sets both the current and temperature for this module and does not allow user adjustment.
5. To adjust power output, IPS strongly recommends using Pulse Width Modulation (PWM) to adjust average power rather than using pin 4 (LD SET).
6. 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.
7. D-Type comes with a cable with 8-pin JST connector on one end (see electrical pinout on p.3). User must supply 5V power and TTL signal to operate. IPS has an accessory switch box available.
8. Digital D-Type is UART compatible (see digital I/O manual for command set).

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