

Single-Mode Digital U-Type Module



Innovative Photonic Solutions' proprietary Wavelength Stabilized Laser Diode features high output power with narrow spectral bandwidth. The laser's stabilized peak wavelength remains "locked" regardless of case temperature (15 to 45 °C). Devices can be spectrally tailored to suit application needs and offer side mode suppression ratios (SMSRs) better than 40 dB, thereby providing extremely high signal-to-noise ratio and making these sources ideal for Raman spectroscopy and pump laser applications. The laser is integrated with high performance laser drive and temperature control electronics in a compact package. In addition to integration into systems, IPS' OEM U-Type module is designed to "drop in" to our UL/CE and IEC certified turnkey modules to offer wavelength flexibility at a lower cost.

Applications

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

- High Resolution Raman Spectroscopy
 - Confocal Microscopy
 - Raman Imaging
 - Portable Raman
 - Process Raman
- Direct-Diode Frequency Doubling
- Fiber Laser Seeding
- Metrology & Interferometry
- Remote Sensing

Key Features

- High-Power Single-Spatial-Mode, Single-Frequency Output
- Narrow Spectral Linewidth (< 100 MHz FWHM)
- High Power Single-Mode Fiber Coupled Output
- Excellent Beam Quality ($M^2 < 1.1$)
- Integral ESD Protection & Thermistor
- Temperature Stabilized Spectrum (< 0.007 nm/°C)
- Low Power consumption (< 5.5 W)
- > 45 dB SMSR Typical
- 3" x 2.5" x 0.69" Package Weighing < 4 oz
- Available with a "U-Type switch box" to enable plug-and-play
- External fiber patch cord sold separately

Standard Wavelengths

633nm	780nm	830nm	1053nm
638nm	783nm	852nm	1064nm
660nm	785nm	976nm	
685nm	808nm	1030nm	

All specified wavelengths are measured "in-vacuum"

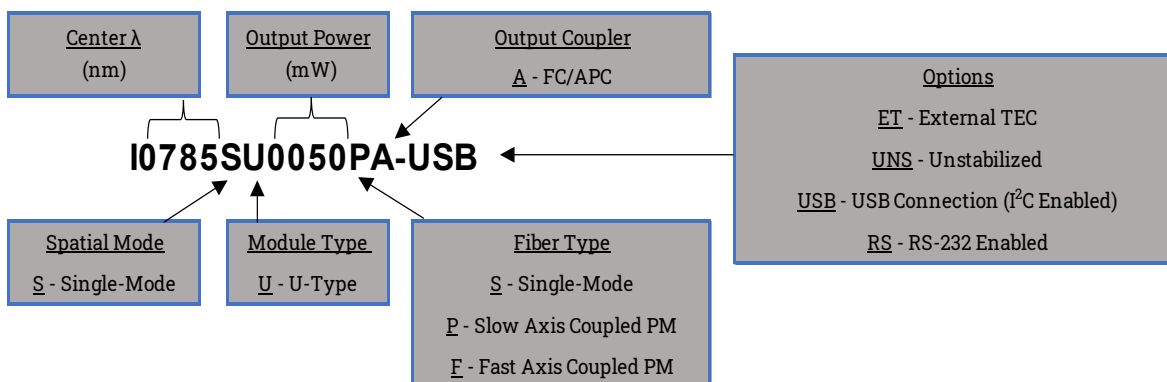
Specifications



Wavelength Tolerance	+/- 0.5nm
Spectral Linewidth	<100MHZ
Wavelength Stability Range	15 - 45 °C
SMSR	45 - 55 dB typical
Polarization Extinction (PER)	>17 dB (20 dB Typical)
Polarization Orientation	Standard is PM Slow Axis
Output Power Stability	1% typical
Modulation Rate	CW to 1KHz (for 10% power to CW) up to 10 KHz for 50% power.
Warm-Up Time	10 seconds from cold start
	1.5 seconds from warm start

λ (nm)	Output Power (mW)	Base Part Number
633	25	I0633SU0025PA-USB
638	30	I0638SU0030PA-USB
660	30	I0660SU0030PA-USB
685	20	I0685SU0020PA-USB
780	50	I0780SU0050PA-USB
783	50	I0783SU0050PA-USB
785	50	I0785SU0050PA-USB
	75	I0785SU0075PA-USB
808	100	I0808SU0100PA-USB
830	100	I0830SU0100PA-USB
852	100	I0852SU0100PA-USB
976	220	I0976SU0220PA-USB
	450	I0976SU0450PA-USB
1030	100	I1030SU0100PA-USB
	280	I1030SU0280PA-USB
1053	120	I1053SU0120PA-USB
	300	I1053SU0300PA-USB
1064.X	120	I1064.XSU0120PA-USB
	300	I1064.XSU0300PA-USB

Part Schema

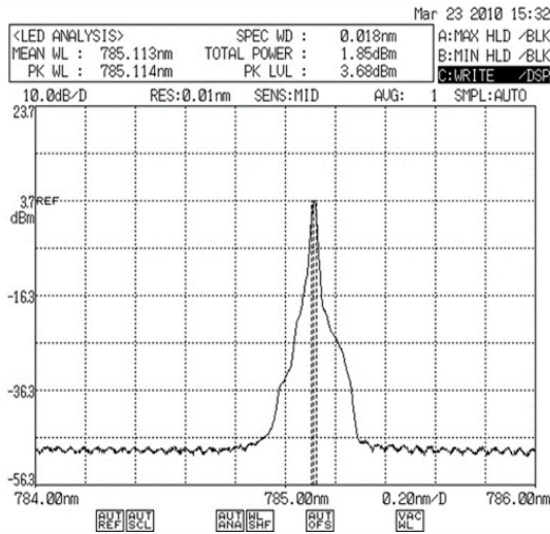


Selected Data



Supply Voltage	4.9V min to 5.1V max
Power Consumption	3.5W typical, 5.5W maximum
Photodiode Current	30 μ A
Laser Set Point Control (LD SET)	900mA to 1000mA when pin 2 grounded

Optical Fiber Options	Single-Mode Fiber
	Polarization Maintaining, Panda Type
Connector	FC/APC
Electrical Connector	10-pin, Molex #53014-1010 (mating connector: 51004-1000)
Module Dimensions	3.0 x 2.5 x 0.69 inches
Module Weight	100 grams (3.5 ounces)
Case Material	Anodized Aluminum
Operating Temperature	10 to 45 $^{\circ}$ C
Cooling air flow (internal)	100 LRM with attached heat sink
Environment	0-80% Humidity, non-condensing
Storage Temperature	-10 to 55 $^{\circ}$ C



Electrical Specs

Pin	Pin Label	Function
1*	V+	Power Supply: 5V-12V. For lasers operating <600mW, a 5V minimum is required. For lasers operating >600mW, a minimum of 9V is required, 12V recommended
2^	VBIAS ENABLE (Set Enable)	For analog control: Enable external laser power control through pin 8 (LD VBIAS): High (>3.6V up to V+ supply voltage) = Enable Low (GND) = Disable The same functionality is emulated via software as a replacement for this analog control.
3	SCL/TX	I ² C: SCL standard (RS-232: TX; board by request)
4	SDA/RX	I ² C: SDA standard (RS-232: RX; board by request)
5**	GND	Ground
6*	V+	See Pin 1
7	Enable	Laser Enable: TTL High (>3.6V up to V+ supply voltage) = Enable TTL Low (GND) = Disable Pin may also be used for PW modulation at a rate of 1kHz.
8^	LD VBIAS (LD Set)	Laser power setpoint - Enables analog external control of laser drive current. Drive VBIAS Enable (pin 2) high to enable this option. Drive voltage between 0V and 1V. The voltage bias will be a 1:1 ratio to the laser drive current. See Operational Note #3.
9^	PD+	For analog readout. Connect voltmeter to PD+ (pin 9) and GND for photo diode V output (0V-3.3V). The same functionality is emulated via software as a replacement for this analog control.
10**	GND	Ground

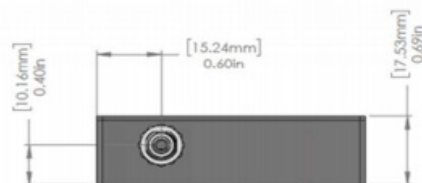
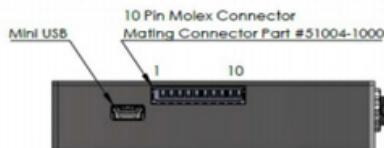
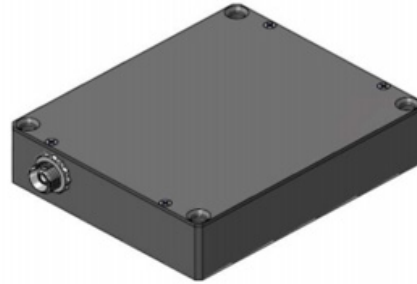
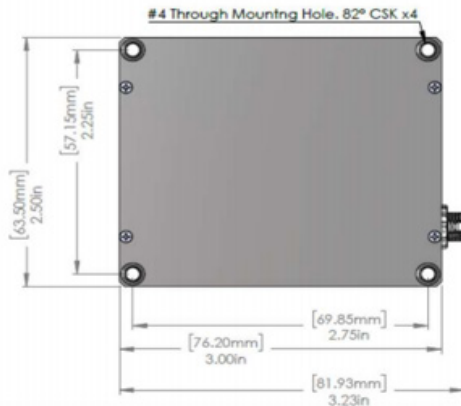
Custom Capability

- Custom wavelengths available upon request
- FC/PC or FC/APC output coupler
- Single-mode or Polarization-maintaining fiber available with orientation in either fast or slow axis
- Integral optical isolator available
- External TEC (e.g. No TEC inside of package optional)

Pins 1, 2, 6, 7 and 10 are required for laser operation

Notes: *Power must be supplied to both V+ pins (pin 1 and pin 6), **GND must be supplied to both GND pins (pin 5 and pin 10). ^ Pins 2, 8, and 9 are optional for analog control/readout

Mechanical Drawings



- Connector Options:**
1. FC/PC (M8 Thread)
 2. SMA 905 (1/4"-36 Thread)

Operational Notes

1. Switch box, heat sink, 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
3. 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.
4. To adjust power output, IPS recommends Pulse Width Modulation (PWM) to adjust AVERAGE power rather than using pin 8 (LD SET) for single-mode diode lasers. See Note 4.
5. 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. The sample will experience a lower average power. Rise/fall time is approximately 20 microseconds.
7. User must supply DC power and TTL or serial communication to operate.
8. Module must be attached to a suitable heat sink for proper operation.
9. Please see IPS Digital U-Type [user guide](#) and [quick start guide](#) for additional information.

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