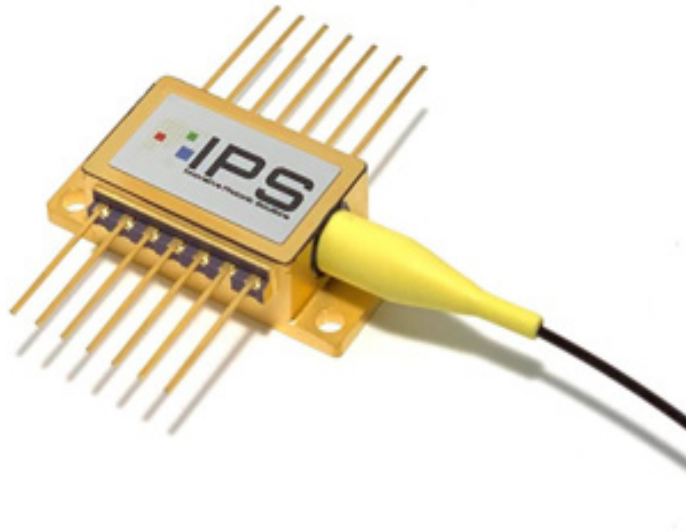


# Single Mode Fiber Coupled Butterfly



Innovative Photonic Solutions' proprietary single-mode wavelength-stabilized laser features high output power with ultra-narrow spectral bandwidth and a diffraction limited 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 single-mode packaged product line comes standard with a circularized output beam, internal photodiode, thermistor and ESD protection. Lasing wavelength can be accurately specified and repeatedly manufactured to within +/-0.1 nm upon request.

## Applications

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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

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- High-Power Single-Spatial-Mode, Single-Frequency Output
- Ultra-Narrow Spectral Linewidth (< 100 kHz)
- Stabilized Output Spectrum (< 0.007 nm/°C)
- Excellent Beam Quality ( $M^2 < 1.1$ )
- Integral ESD Protection & Thermistor
- Integral Laser Line Filter
- SMSR 70 dB w/ laser line filter (40 dB without)

## Standard Wavelengths

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

# Specifications



|                            |                                      |
|----------------------------|--------------------------------------|
| Wavelength Tolerance       | +/- 0.5 nm                           |
| Spectral Linewidth (DI)    | ~ 100 kHz Typical                    |
| Wavelength Stability Range | 15 C - 45 °C                         |
| SMSR                       | 35 - 45 dB                           |
| Fiber Options              | Single-Mode                          |
|                            | Polarization Maintaining, Panda Type |
| PER                        | >17dB, 20dB Typical                  |
| Polarization Orientation   | Standard is PM slow.                 |
| Output Power Stability     | 1% Typical                           |

| $\lambda$ (nm) | Output Power (mW) | Base Part Number  | Max Current, Voltage |
|----------------|-------------------|-------------------|----------------------|
| 633            | 25                | I0633SB0020P      | 170 mA, 3.3V         |
| 638            | 30                | I0638SB0030P      | 170 mA, 3.3V         |
| 660            | 30                | I0660SB0030P      | 170 mA, 3.3V         |
| 685            | 20                | I0685SB0020P      | 170 mA, 3.3V         |
| 780            | 50                | I0780SB0050P      | 220 mA, 2.3V         |
| 783            | 50                | I0783SB0050P      | 220 mA, 2.3V         |
| 785            | 50                | I0785SB0050P      | 250 mA, 2.3V         |
|                | 75                | I0785SB0075P      | 400 mA, 2.5V         |
| 808            | 100               | I0808SB0100P      | 400 mA, 2.5V         |
| 830            | 100               | I0830SB0100P      | 250 mA, 2.3V         |
| 852            | 100               | I0852SB0100P      | 250 mA, 2.3V         |
| 976            | 220               | I0976SB0220P      | 650 mA, 2.2V         |
|                | 450               | I0976SB0450P      | 1000 mA, 2.2V        |
| 1030           | 50                | I1030SB0050P-IS   | 500 mA, 2.2V         |
|                | 100               | I1030SB0100P      | 500 mA, 2.2V         |
|                | 280               | I1030SB0280P      | 1000 mA, 2.2V        |
| 1053           | 50                | I1053SB0050P-IS   | 350 mA, 2.2V         |
|                | 120               | I1053SB0120P      | 400 mA, 2.2V         |
|                | 300               | I1053SB0300P      | 1000 mA, 2.2V        |
| 1064.X         | 50                | I1064.XSB0050P-IS | 350 mA, 2.2V         |
|                | 120               | I1064.XSB0120P    | 400 mA, 2.2V         |
|                | 300               | I1064.XSB0300P    | 1000 mA, 2.2V        |

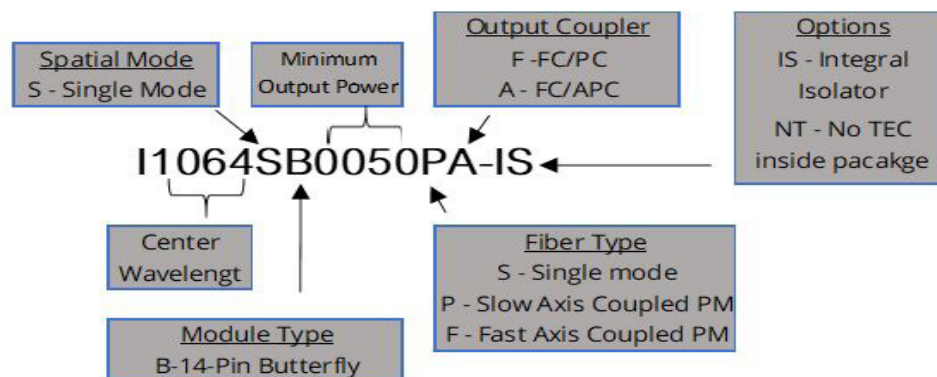
\*Add A after P in part number for FC/APC Connector.

\*Substitute the "P" in the part number for PM fast axis polatization orientation

\* substitute "X" for 0, 1, 3, 4, wavelength measured in vacuum)

\* Butterfly packages with internal isolators & power >250 mW utilize an extended tube design

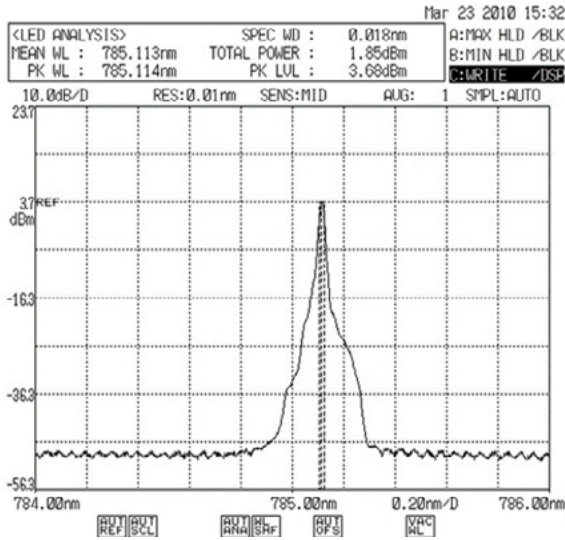
# Part Schema



# Selected Data

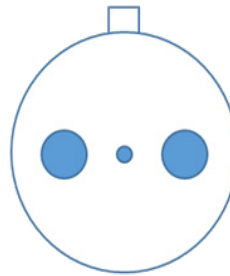


|                     |                   |
|---------------------|-------------------|
| TEC Current Limit   | 3.2 A             |
| TEC Voltage Limit   | 5.8 V             |
| Photodiode Current  | 30uA              |
| Integral Thermistor | Betatherm 10K3CG3 |



Typical 785nm SS Laser Spectrum

Fiber Alignment Key



“F” – PM Fast Axis Coupled

Fiber Alignment Key



“P” – PM Slow Axis Coupled

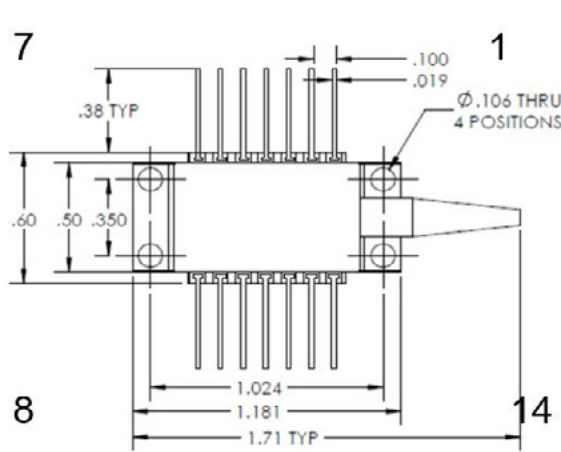
## Custom Capability

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

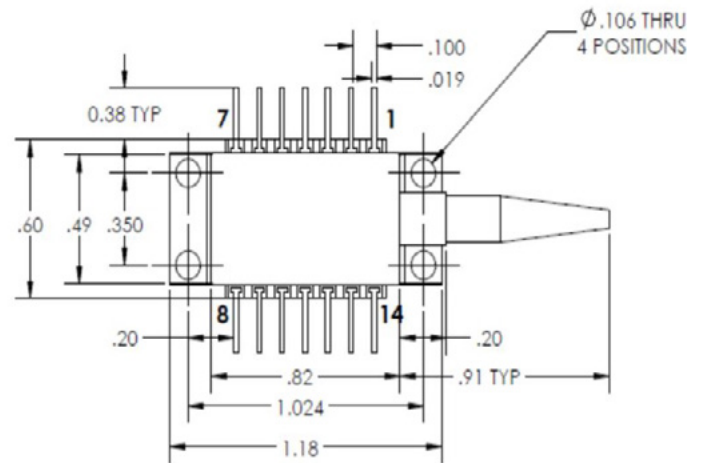
## Electrical Specs

|                |                           |
|----------------|---------------------------|
| <b>Pin 1</b>   | TEC+                      |
| <b>Pin 2</b>   | Thermistor (10kOhm @25°C) |
| <b>Pin 3</b>   | PD Anode                  |
| <b>Pin 4</b>   | PD Cathode                |
| <b>Pin 5</b>   | Thermistor                |
| <b>Pin 6-8</b> | NC                        |
| <b>Pin 9</b>   | Laser Cathode (-)         |
| <b>Pin 10</b>  | Laser Anode (+)           |
| <b>Pin 11</b>  | Laser Cathode (-)         |
| <b>Pin 12</b>  | NC                        |
| <b>Pin 13</b>  | Case Ground               |
| <b>Pin 14</b>  | TEC -                     |

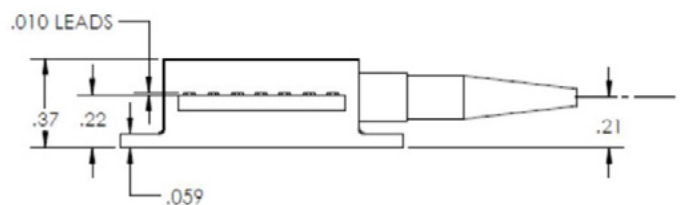
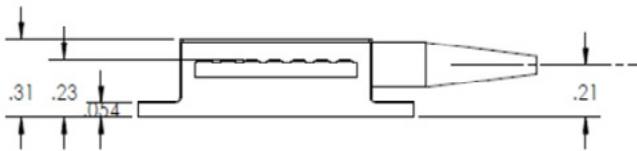
# Mechanical Drawings



*Standard Package*



*Extended Tube Package*



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.

## Operational Notes

1. 14-pin BF should be mounted on a heat sink with a thermal compound (thermal grease).
2. Take care not to over-tighten screws when mounting. This can bend the BF package causing damage and hindering performance and is not covered under warranty.
3. Laser and TEC driver circuitry should be configured in a manner to prevent power /current / voltage surges and spikes.
4. IPS recommends not grounding anode and cathode as this can cause ground loops.
5. Laser and TEC driver circuitry should be configured in a manner to prevent power /current / voltage surges and spikes.
6. Do not retro-reflect beam! This can cause Catastrophic Optical Damage (COD) and is not covered under warranty.
7. Laser will operate in single frequency mode at set-points between 10 and 45 degrees, however, optimal operating set point must be determined for each laser diode to avoid mode-hopping (see note 4).
8. To determine optimal operating point, plot output power vs temperature to determine where mode-hop locations are. Set operating temperature halfway between mode-hops. This will ensure the most stable operation (IPS can offer the option of determining this optimal operating point for each diode).

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