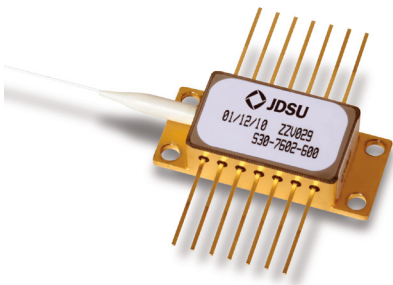


Up to 720 mW Fiber Bragg Grating Stabilized 980 nm Pump Modules

S30 Series

**Key Features**

- Operating power range from 400 – 720 mW
- 25°C internal temperature, compatible with legacy temperature control
- Low-profile, 14-PIN butterfly package
- Fiber Bragg grating stabilization
- Wavelength selection available
- Integrated thermoelectric cooler, thermistor, and monitor diode
- High dynamic range
- Excellent low power stability

Applications

- Dense wavelength division multiplexing (DWDM) EDFAs for small package designs
- High bit-rate, high channel-count EDFAs
- CATV distribution

Compliance

- Telcordia GR-468-CORE

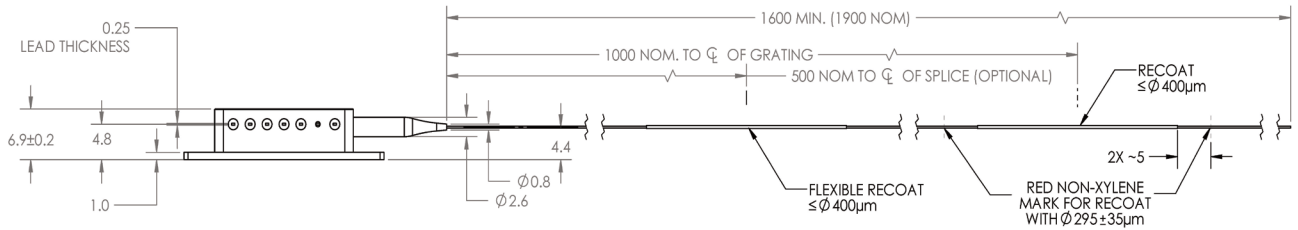
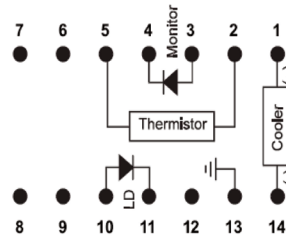
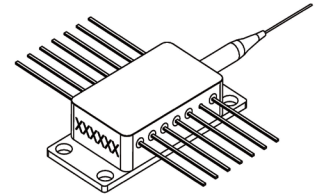
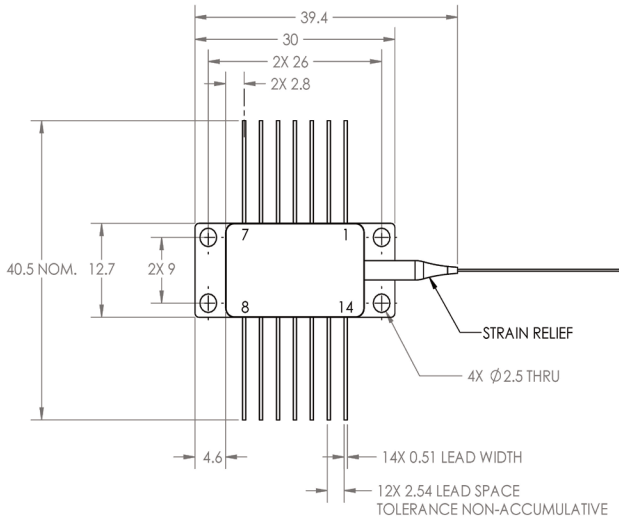
The JDSU S30 Series pump laser module leverages a revolutionary design and lean manufacturing processes to significantly advance the performance and scalability of 980 nm pumps. The module meets the stringent requirements of the telecommunications industry, including Telcordia GR-468-CORE for hermetic 980 nm pump modules.

The S30 Series pump module, which uses fiber Bragg grating stabilization to lock the emission wavelength, provides a noise-free, narrowband spectrum, even under changes in temperature, drive current, and optical feedback. Wavelength selection is available for applications requiring the highest performance in spectrum control with the highest power available.

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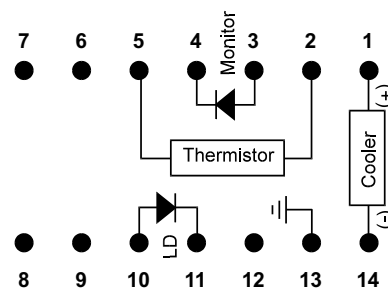
Dimensions Diagram

(Note: Specifications in mm unless otherwise noted; tolerance = $x \pm 0.3$, $x.x \pm 0.25$)



Pinout

| Pin | Description |
|-----|--------------------|
| 1 | Cooler (+) |
| 2 | Thermistor |
| 3 | Monitor PD anode |
| 4 | Monitor PD cathode |
| 5 | Thermistor |
| 6 | N/C |
| 7 | N/C |
| 8 | N/C |
| 9 | N/C |
| 10 | Laser anode |
| 11 | Laser cathode |
| 12 | N/C |
| 13 | Case ground |
| 14 | Cooler (-) |



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Table 1: Absolute Maximum Ratings

| Parameter | Symbol | Test Conditions | Minimum | Maximum |
|----------------------------------|---------------------|--|---------|------------|
| Operating case temperature | T _{op} | - | -5°C | 75°C |
| Storage temperature | T _{stg} | 2000 hours | -40°C | 85°C |
| Laser operating temperature | T _{LD} | - | -5°C | 50°C |
| LD reverse voltage | V _r | - | - | 2 V |
| LD forward current | I _{f_max} | - | - | 1450 mA |
| LD reverse current | | - | - | 10 μA |
| PD reverse voltage | V _{PD} | - | - | 20 V |
| PD forward current | I _{PF} | - | - | 10 mA |
| LD electrostatic discharge (ESD) | V _{ESD LD} | C = 100 pF, R = 1.5 kΩ, human body model | - | 1000 V |
| PD electrostatic discharge (ESD) | V _{ESD PD} | C = 100 pF, R = 1.5 kΩ, human body model | - | 700 V |
| TEC current | I _{TEC} | - | -1.0 A | 4.0 A |
| TEC voltage | V _{TEC} | - | - | 4.5 V |
| Axial pull force | | 3 x 10 seconds | - | 5 N |
| Side pull force | | 3 x 10 seconds | - | 2.5 N |
| Fiber bend radius | | - | 16 mm | - |
| Relative humidity | RH | Non-condensing | 5% | 95% |
| Lead soldering time | | 300°C | - | 10 seconds |

Note: Absolute maximum ratings are the maximum stresses that may be applied to the module for short periods of time without causing damage. Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for extended periods of time or exposure to more than one absolute maximum rating simultaneously may adversely affect device reliability. Specifications may not necessarily be met under these conditions.

Table 2: Operating Parameters(BOL, T_{case} = -5 to 75°C, -50 dB reflection, unless otherwise noted.)

| Product Code | Maximum Operating Power P _{op} (mW) | Maximum Operating Current I _{op} (mA) | Minimum Kink-free Power P _{max} (mW) | Kink-free Current I _{max} (mA) Maximum |
|--------------|--|--|---|---|
| S30-xx02-400 | 400 | 805 | 440 | 890 |
| S30-xx02-420 | 420 | 860 | 460 | 940 |
| S30-xx02-440 | 440 | 890 | 480 | 985 |
| S30-xx02-460 | 460 | 920 | 505 | 1050 |
| S30-xx02-480 | 480 | 960 | 530 | 1100 |
| S30-xx02-500 | 500 | 1000 | 550 | 1150 |
| S30-xx02-520 | 520 | 1050 | 570 | 1200 |
| S30-xx02-540 | 540 | 1100 | 595 | 1250 |
| S30-xx02-560 | 560 | 1150 | 615 | 1300 |
| S30-xx02-580 | 580 | 1200 | 640 | 1350 |
| S30-xx02-600 | 600 | 1250 | 660 | 1400 |
| S30-xx02-620 | 620 | 1150 | 680 | 1300 |
| S30-xx02-640 | 640 | 1200 | 710 | 1350 |
| S30-xx02-660 | 660 | 1250 | 730 | 1400 |
| S30-xx02-680 | 680 | 1250 | 750 | 1400 |
| S30-xx02-700 | 700 | 1300 | 770 | 1450 |
| S30-xx02-720 | 720 | 1300 | 790 | 1450 |

Note: xx denotes wavelength per below.

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Table 3: Available Peak Wavelength Selection

| Product Code | Minimum Center Wavelength | Maximum Center Wavelength |
|--------------|---------------------------|---------------------------|
| S30-7402-yyy | 973.5 nm | 975.0 nm |
| S30-7602-yyy | 975.0 nm | 977.0 nm |

Note: yyy denotes operating power per above.

Table 4: Electro-optical Performance

(BOL, $T_{case} = -5$ to $75^{\circ}C$, P_f range = 20 mW to P_{max} , -50 dB reflection, unless otherwise noted.)

| Parameter | Symbol | Test Condition | Minimum | Maximum |
|-----------------------------------|-----------------------|---|----------------|----------------------|
| Threshold current | I_{th-BOL} | | - | 35 mA |
| Forward voltage | V_f | $I_f = I_{op}$ | - | 2.6 V |
| Fiber output power range | P_f | | 20 mW | P_{op} |
| Pump power in band | P_{pump} | $P_{pump} Band = \lambda_m \pm 1.5$ nm, at P_{op} | 90% | - |
| Spectral width | $\Delta\lambda_{RMS}$ | 50 mW < $P < P_{op}$ | - | 2.0 nm |
| Wavelength tuning vs. temperature | $\Delta\lambda/T$ | $I = I_{op}$ | - | 0.01 nm/ $^{\circ}C$ |
| Optical power stability | $\Delta P_{f,t}$ | Over P_f range, DC to 50 kHz, 20 mW to P_{op} | - | 2.0% |
| Tracking ratio | TR | $0.1P_{op} < P_f < P_{op}$ | 0.75 | 1.25 |
| Tracking error | TE | At P_{op} | -25% | 25% |
| Monitor diode responsivity | I_{BF} | At P_{op} | 1 $\mu A/mW$ | 5 $\mu A/mW$ |
| Thermistor resistance | R_{th} | $T_{set} = 25^{\circ}C$ | 9.5 k Ω | 10.5 k Ω |
| | | $T_{set} = 45^{\circ}C$ | 4.1 k Ω | 4.6 k Ω |
| Thermistor constant | B | | 3600 K | 4200 K |

- The tracking error is defined as the normalized change of output power relative to the operating power over case temperature range ($0^{\circ}C$ to $75^{\circ}C$), at constant back-face monitor current corresponding to the operating power at $45^{\circ}C$.
- The tracking ratio is a measure of the front-to-back tracking when the output power is varied. On a plot of optical power versus back-face photocurrent, a straight line is drawn between the minimum power (20 mW) and the operating power (P_{op}) points. The tracking ratio is defined as the ratio between measured optical power (shown as data points on the plot) to the value derived from the straight line.

Table 5: TEC and Total Module Power Consumption

(BOL for $\Delta T = 50^{\circ}C$, $T_{case} = 75^{\circ}C$, $T_{LD} = 25^{\circ}C$)

| Product Code | TEC Current I_{max} (A) | TEC Voltage V_{max} (V) | TEC Power Consumption P_{TEC} (W) | Total Module Power Consumption P_{max} (W) |
|--------------|------------------------------|------------------------------|--|---|
| S30-xx02-400 | 1.86 | 2.43 | 4.50 | 6.21 |
| S30-xx02-420 | 1.91 | 2.48 | 4.88 | 6.77 |
| S30-xx02-440 | 1.96 | 2.53 | 5.05 | 7.05 |
| S30-xx02-460 | 1.98 | 2.54 | 5.38 | 7.21 |
| S30-xx02-480 | 2.03 | 2.60 | 5.55 | 7.48 |
| S30-xx02-500 | 2.09 | 2.65 | 5.64 | 7.69 |
| S30-xx02-520 | 2.12 | 2.67 | 5.77 | 7.96 |
| S30-xx02-540 | 2.18 | 2.74 | 5.91 | 8.26 |
| S30-xx02-560 | 2.21 | 2.76 | 6.06 | 8.56 |
| S30-xx02-580 | 2.28 | 2.84 | 6.19 | 8.84 |
| S30-xx02-600 | 2.31 | 2.85 | 6.38 | 9.19 |
| S30-xx02-620 | 2.21 | 2.76 | 6.06 | 8.56 |
| S30-xx02-640 | 2.28 | 2.84 | 6.19 | 8.84 |
| S30-xx02-660 | 2.31 | 2.85 | 6.38 | 9.19 |
| S30-xx02-680 | 2.35 | 2.90 | 6.82 | 10.32 |
| S30-xx02-700 | 2.41 | 2.95 | 7.11 | 10.73 |
| S30-xx02-720 | 2.50 | 3.10 | 7.75 | 11.38 |

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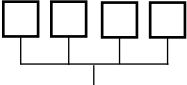
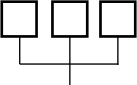
Table 6: HI 1060 Fiber Nominal Characteristics and Tolerances

| Parameters | Specification |
|-------------------------------|---------------|
| Cutoff wavelength | 920 nm |
| Maximum attenuation at 980 nm | 2.1 dB/km |
| Cladding outside diameter | 125 ±1 μm |
| Coating outside diameter | 245 ±10 μm |
| Core-cladding concentricity | ≤ 0.5 μm |
| Mode field diameter | 5.9 ±0.3 μm |

Ordering Information

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at customer.service@jdsu.com.

Sample: S30-7402-580

| S30-  | | -  | |
|--|-------------------|--|-------------------------|
| Code | Peak Wavelength | Code | Maximum Operating Power |
| 7402 | 973.5 to 975.0 nm | 400 | 400 mW |
| 7602 | 975.0 to 977.0 nm | 420 | 420 mW |
| | | 440 | 440 mW |
| | | 460 | 460 mW |
| | | 480 | 480 mW |
| | | 500 | 500 mW |
| | | 520 | 520 mW |
| | | 540 | 540 mW |
| | | 560 | 560 mW |
| | | 580 | 580 mW |
| | | 600 | 600 mW |
| | | 620 | 620 mW |
| | | 640 | 640 mW |
| | | 660 | 660 mW |
| | | 680 | 680 mW |
| | | 700 | 700 mW |
| | | 720 | 720 mW |

User Safety
Safety and Operating Considerations

The laser light emitted from this laser diode is invisible and may be harmful to the human eye. Avoid looking directly into the fiber when the device is in operation.

CAUTION: THE USE OF OPTICAL INSTRUMENTS WITH THIS PRODUCT INCREASES EYE HAZARD.

Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with this component cannot exceed maximum peak optical power.

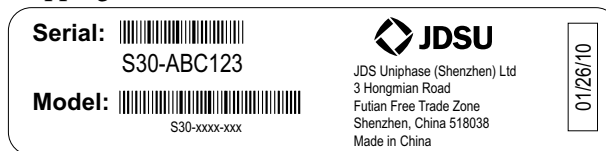
CW laser diodes may be damaged by excessive drive current or switching transients. When using power supplies, the laser diode should be connected with the main power on and the output voltage at zero. The current should be increased slowly while monitoring the laser diode output power and the drive current. Careful attention to heatsinking and proper mounting of this device is required to ensure specified performance over its operating life. To maximize thermal transfer to the heatsink, the heatsink mounting surface must be flat to within .001” and the mounting screws must be torqued down to 1.5 in.-lb.

ESD PROTECTION—Electrostatic discharge (ESD) is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling laser diodes.

Labeling
21 CFR 1040.10 Compliance

Because of the small size of these devices, the output power and laser emission indicator label shown below is attached to the individual shipping container. All labels are illustrated here to comply with 21 CFR 1040.10 as applicable under the Radiations Control for Health and Safety Act of 1968.

14-Pin Module Label

Shipping Box Label

Output Power and Laser Emission Indicator Label
