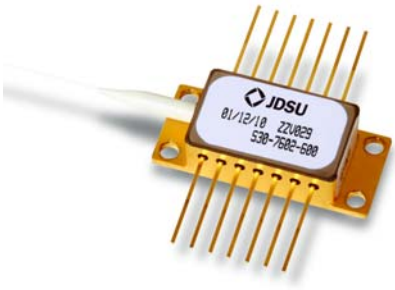
Up to 660 mW Fiber Bragg Grating Stabilized 980 nm Pump Modules

S30 Series



Key Features

- **Operating power range from 400 – 660 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

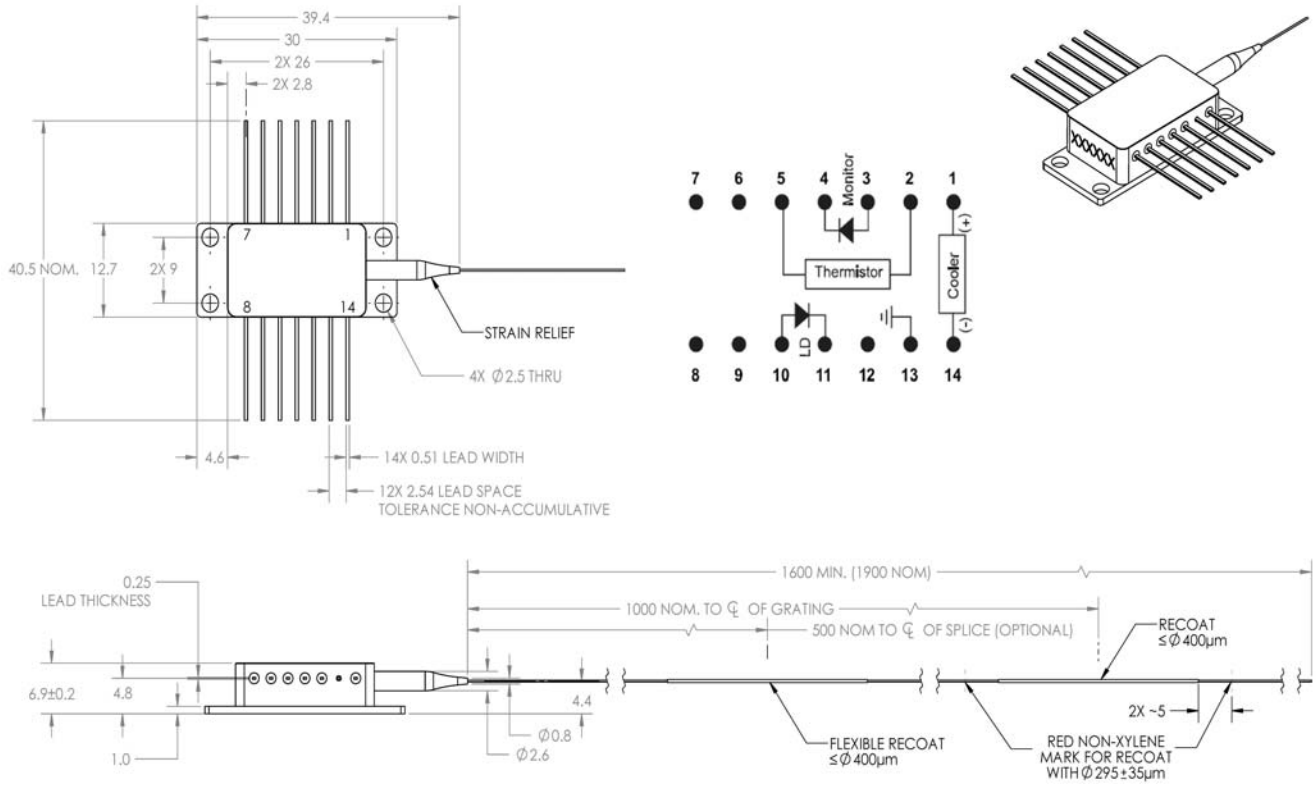
The JDSU S30 Series pump laser module uses a revolutionary design and lean manufacturing processes to significantly advance the performance and scalability of 980 nm pumps. The module meets the stringent requirements of the telecommunications industry, including Telcordia GR-468-CORE for hermetic 980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

2

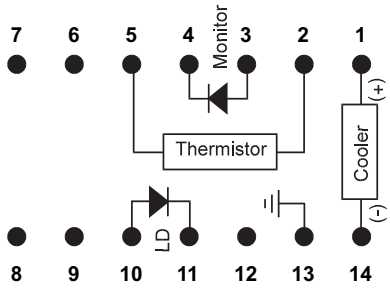
Dimensions Diagram

(Note: Specifications in mm unless otherwise noted; tolerance = x. ± 0.3, x.x ± 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 (-)



3

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	If_max		-	1400 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

Note: xx denotes wavelength per below.

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°C, P_f range = 20 mW to P_{max}, -50 dB reflection, unless otherwise noted.)

Parameter	Symbol	Test Condition	Minimum	Maximum
Threshold current	$I_{th\text{-}BOL}$		-	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 = λm±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/°C
Optical power stability	ΔP_{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 µA/mW	5 µA/mW
Thermistor resistance	R_{th}	T_{set} = 25°C	9.5 kΩ	10.5 kΩ
		T_{set} = 45°C	4.1 kΩ	4.6 kΩ
Thermistor constant	B		3600 K	4200 K

1. The tracking error is defined as the normalized change of output power relative to the operating power over case temperature range (0°C to 75°C), at constant back-face monitor current corresponding to the operating power at 45°C.
2. 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 ΔT = 50°C, T_{case} = 75°C, T_{LD} = 25°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

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
7402	973.5 to 975.0 nm
7602	975.0 to 977.0 nm

Code	Maximum Operating Power
400	400 mW
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

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.

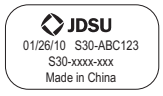
ESD PROTECTION—Electrostatic discharge (ESD) is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling laser diodes.

Labeling

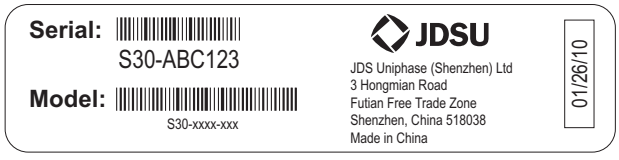
21 CFR 1040.10 Compliance

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.

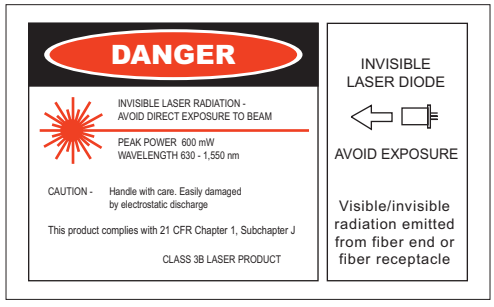
14-Pin Module Label



Shipping Box Label



Output Power and Laser Emission Indicator Label



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