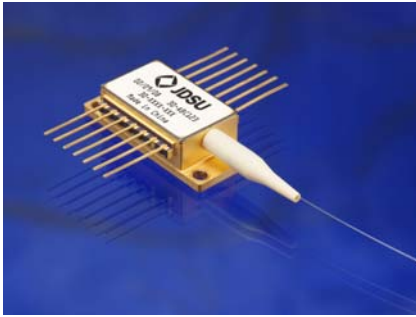


# Up to 660 mW Fiber Bragg Grating Stabilized 980 nm Pump Modules

## 3000 Series



### Key Features

- Very high kink-free powers to 660 mW
- Low-profile, epoxy-free, and flux-free 14-pin butterfly planar package with PM fiber
- Fiber Bragg grating stabilization
- Multiple wavelength availability
- Integrated thermoelectric cooler, thermistor, and monitor diode
- High dynamic range
- Excellent low-power stability

### Applications

- Next-generation dense wavelength division multiplexing (DWDM) erbium doped fiber amplifiers (EDFAs) requiring the highest power with “locked” wavelength emission
- Reduced pump-count EDFA architectures
- Very long distance cable television (CATV) trunks and very high node-count distribution
- Pump splitting (multiple EDFA stages)
- FTTx, Agile metro/ROADM

The JDSU 3000 Series 980 nm pump module uses a planar construction with chip on subcarrier. The high-power laser chip is hermetically sealed in a low-profile, epoxy- and flux-free 14-pin butterfly package and fitted with a thermistor, thermoelectric cooler, and monitor diode. This product uses a polarization maintaining fiber (PMF) pigtail that allows excellent side mode suppression ratios (SMSR) over a very wide dynamic range.

The 3000 Series pump module uses PM fiber Bragg grating stabilization to “lock” the emission wavelength. It provides a noise-free narrowband spectrum, even under changes in temperature, drive current, and optical feedback. Wavelength selection is available for applications that require the highest performance in spectrum control with the highest available powers.

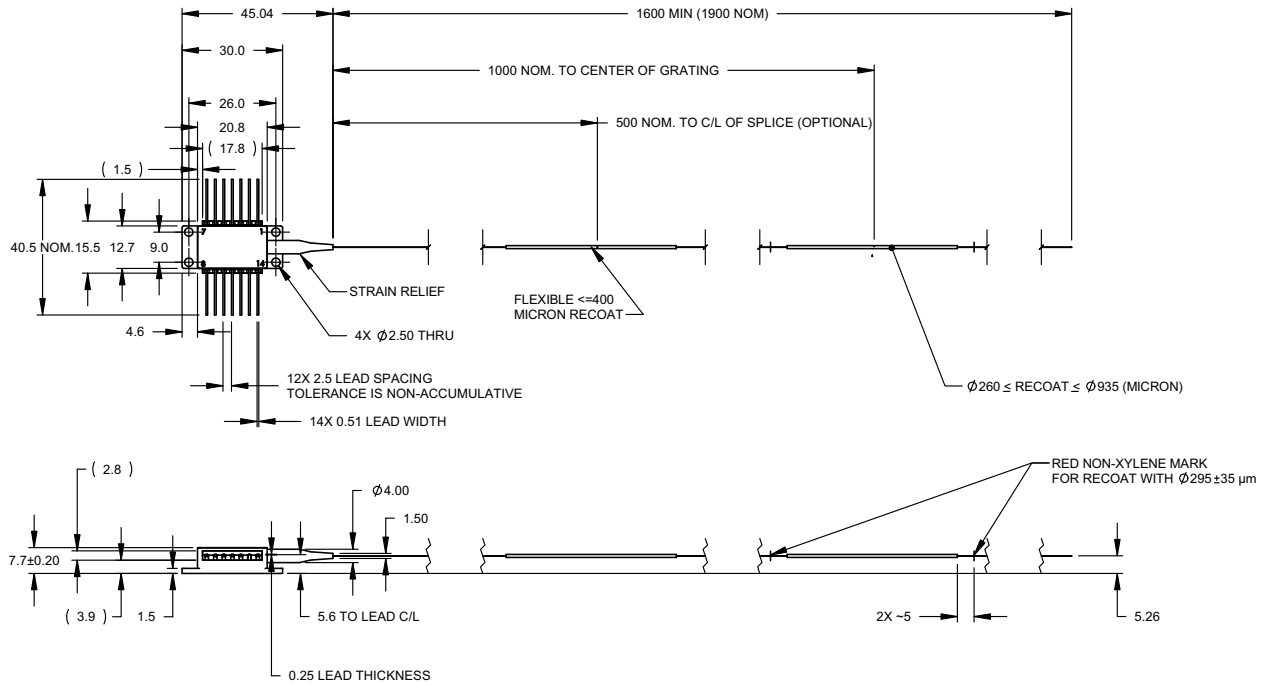
### Compliance

- Telcordia GR-468-CORE

2

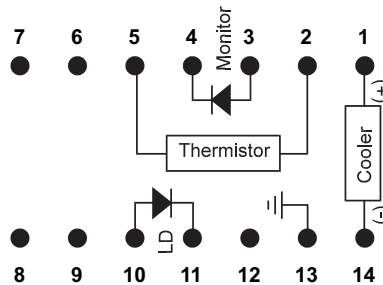
Dimensions Diagram

(Note: Specifications in mm unless otherwise noted; tolerance = .x ± .3, .xx ± .20.)



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

**Absolute Maximum Ratings**

Parameter	Symbol	Test Condition	Minimum	Maximum
Operating case temperature	T <sub>op</sub>	-	-5°C	75°C
Storage temperature	T <sub>stg</sub>	2000 hours	-40°C	85°C
Laser operating temperature	T <sub>LD</sub>	-	0°C	50°C
LD reverse voltage	V <sub>r</sub>	-	-	2.0 V
LD forward current	I <sub>f,max</sub>	Unlimited time	-	1400 mA
LD current transient		1 μs maximum	-	1500 mA
LD reverse current		-	-	10 μA
PD reverse voltage	V <sub>PD</sub>	-	-	20 V
PD forward current	I <sub>PF</sub>	-	-	10 mA
Electrostatic discharge (ESD)	V <sub>ESD</sub>	C = 100 pF, R = 1.5 Ω, human body model	-	1000 V
Cooler current	I <sub>C</sub>	-	-	4 A
Atmospheric pressure				
Storage			-	11 kPa
Operating			-	58 kPa
Relative humidity	R <sub>H</sub>	Non condensing	5%	95%
Lead soldering time		260°C	-	10 seconds

Note: Each device is rated to a maximum kink-free current (I<sub>max</sub>), provided on the individual datasheet. This is the maximum current under which the device will perform its intended function. Operation above I<sub>max</sub>, and up to the absolute maximum rating, may result in poor device performance, and degrade device reliability. Long-term operation above I<sub>max</sub> may lead to early device failure.

**Operating Parameters**

Product Code	Operating Power Pop (mW)	Operating Current I <sub>op</sub> (mA)	Kink-Free Power P <sub>max</sub> (mW)	Kink-Free Current I <sub>max</sub> (mA)
30-xxxx-500	450	1000	500	1100
30-xxxx-520	460	1020	520	1150
30-xxxx-540	480	1060	540	1200
30-xxxx-560	500	1100	560	1250
30-xxxx-580	520	1150	580	1300
30-xxxx-600	540	1200	600	1350
30-xxxx-620	560	1250	620	1400
30-xxxx-640	580	1250	640	1400
30-xxxx-660	600	1250	660	1400

## 4

## Available Peak Wavelength Selection

Product Code	Peak Wavelength	Peak Wavelength Tolerance
30-7402-xxx	974.0 nm	-0.5/+1.0 nm
30-7602-xxx	976.0 nm	±1 nm
30-8000-xxx	980.0 nm	-6/+5 nm

## Electro-Optical Performance

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

Parameter	Symbol	Test Condition	Minimum	Maximum
Threshold current	$I_{\text{th-BOL}}$	-	-	35 mA
Laser diode temperature	$T_{\text{LD}}$	-	$20^{\circ}\text{C}$	$30^{\circ}\text{C}$
Forward voltage	$V_{\text{f}}$	$I_{\text{f}} = I_{\text{op}}$	-	2.6 V
Operating power	$P_{\text{op}}$	$I_{\text{f}} = I_{\text{op}}$	20 mW	$P_{\text{op}}$
Kinkfree output power	$P_{\text{max}}$	$I_{\text{f}} = I_{\text{max}}$	500 mW	660 mW
Wavelength	$\lambda_{\text{m}}$	-	973 nm	985 nm
Pump in pump band	$P_{\text{pump}}$	Pump band = $\lambda_{\text{m}} \pm 1.5$ nm	90%	-
Spectral width	$\Delta\lambda_{\text{RMS}}$	-	-	2.0 nm
Wavelength tuning vs. temperature	$\Delta\lambda/T$	-	-	0.02 nm/ $^{\circ}\text{C}$
Optical power stability	$\Delta P_{\text{f,t}}$	Over $P_{\text{f}}$ range, DC to 50 kHz, 50 kHz sampling, $T_{\text{case}} = 25^{\circ}\text{C}$ $20 \text{ mW} < P_{\text{op}} < 100 \text{ mW}$ $100 \text{ mW} < P_{\text{op}} < 600 \text{ mW}$	- -	4% 2.5%
Monitor diode responsivity	$I_{\text{BF}}$	-	1 $\mu\text{A}/\text{mW}$	10 $\mu\text{A}/\text{mW}$
TEC cooling capacity	$\Delta T_{\text{TEC}}$	$I_{\text{f}} = I_{\text{max}}$ , $T_{\text{LD}} = 25^{\circ}\text{C}$ , see table on next page	$50^{\circ}\text{C}$	-
Thermistor resistance	$R_{\text{th}}$	$T_{\text{set}} = 25^{\circ}\text{C}$	9.5 $\text{k}\Omega$	10.5 $\text{k}\Omega$
Thermistor constant	B	-	3600 K	4200 K

## 5

**TEC and Total Module Power Consumption**(For  $\Delta T = 50^{\circ}\text{C}$ , BOL,  $T_{\text{case}} = 75^{\circ}\text{C}$ ,  $T_{\text{ld}} = 25^{\circ}\text{C}$  unless noted otherwise)

Product Code	TEC Current $I_{\text{max}}$ (A)	TEC Voltage $V_{\text{max}}$ (V)	TEC Power Consumption $P_{\text{max}}$ (W)	Total Module Power Consumption $P_{\text{max}}$ (W)
30-xxxx-500	1.94	2.69	5.22	7.17
30-xxxx-520	1.97	2.73	5.38	7.38
30-xxxx-540	2.01	2.76	5.55	7.66
30-xxxx-560	2.03	2.78	5.64	7.87
30-xxxx-580	2.06	2.80	5.77	8.14
30-xxxx-600	2.09	2.83	5.91	8.45
30-xxxx-620	2.20	2.90	6.38	9.19
30-xxxx-640	2.20	2.90	6.38	9.19
30-xxxx-660	2.20	2.90	6.38	9.19

**Panda PM-980 Polarization Maintaining Fiber Nominal Characteristics and Tolerances**

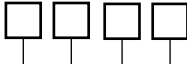
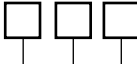
Parameter	Specification
Cutoff wavelength	950 nm
Maximum attenuation at 980 nm	3.0 dB/km
Cladding outside diameter	125 $\pm$ 3 $\mu\text{m}$
Coating outside diameter	250 $\pm$ 3 $\mu\text{m}$
Mode field diameter at 980 nm	6.6 $\pm$ 1.1 $\mu\text{m}$
Cross talk at 100 m	-25 dBm/2 m
Maximum beat length	3.3 mm
Operating temperature	-40 to 85 $^{\circ}\text{C}$
Fiber tensile proof strength (tested)	200 kpsi

## 6

## 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](mailto:customer.service@jdsu.com).

## Sample: 30-7402-520

<b>30-</b>		-																														
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## 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.**

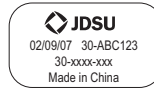
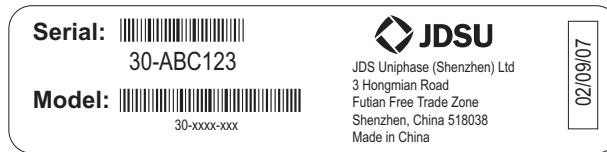
Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with this component cannot exceed maximum peak optical power.

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**
