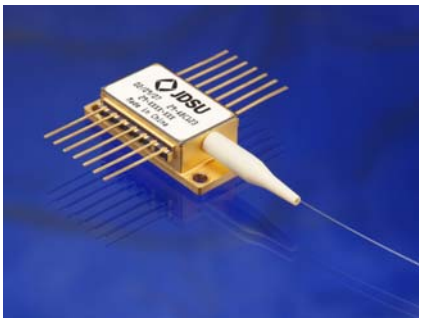
Up to 500 mW Fiber Bragg Grating Stabilized 980 nm Pump Modules

2900 Series



Key Features

- **Very high kink-free powers to 500 mW**
- **Low-profile, epoxy-free, and flux-free 14-pin butterfly planar package with PM fiber**
- **Fiber Bragg grating stabilization**
- **Wavelength selection available**
- **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

The JDSU 2900 Series 980 nm pump module utilizes a planar construction with chip on subcarrier. The high power JDSU 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 supression ratios (SMSR) over a very wide dynamic range.

The 2900 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

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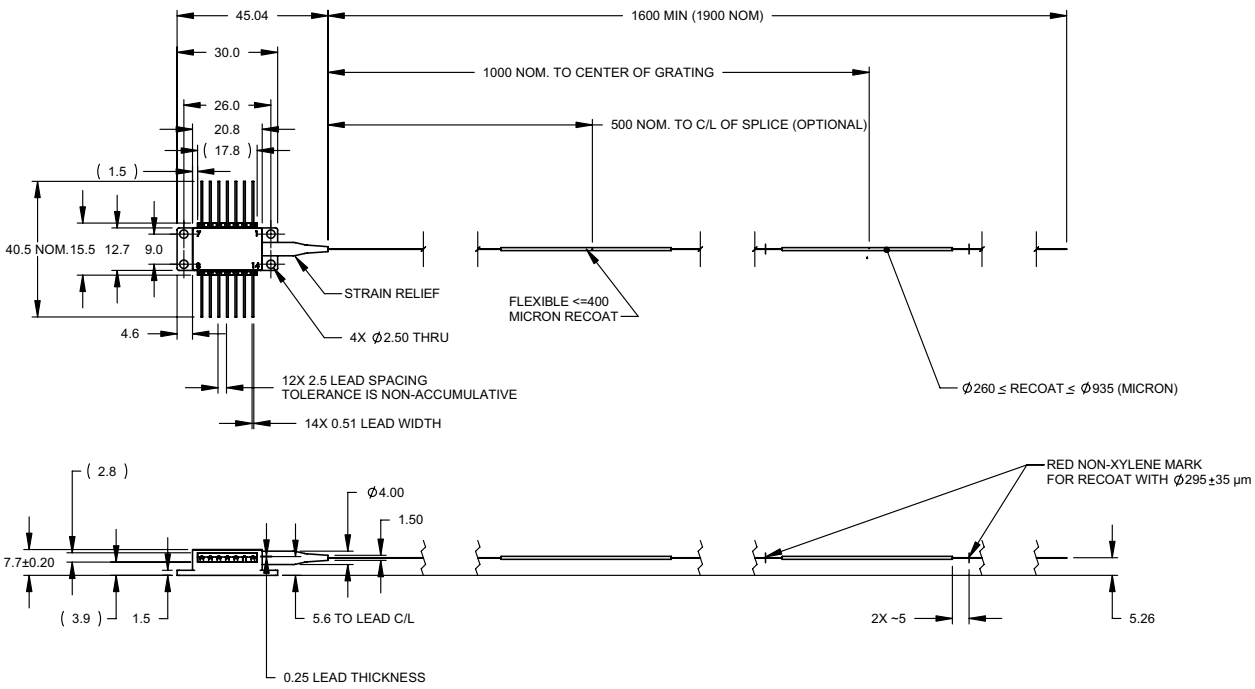
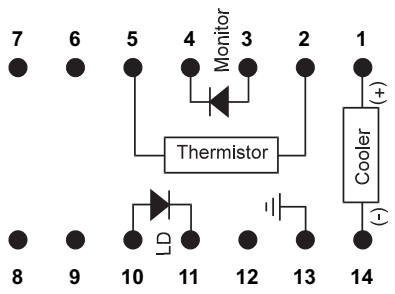
Dimensions Diagram

(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 (-)



Absolute Maximum Ratings

Parameter	Symbol	Test Condition	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}	-	0 °C	50 °C
LD reverse voltage	V_r	-	-	2.5 V
LD forward current	I_{f_max}	48 hours maximum	-	1100 mA
LD reverse current		-	-	10 µA
PD reverse voltage	V_{PD}	-	-	20 V
PD forward current	I_{PF}	-	-	10 mA
Electrostatic discharge (ESD)	V_{ESD}	C = 100 pF, R = 1.5 Ω, human body model	-	1000 V
Cooler current	I_C	-	-	4 A
TEC voltage	V_C	-	-	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	-
Atmospheric pressure				
Storage			-	11 kPa
Operating			-	58 kPa
Relative humidity	R_H	Non condensing	5%	95%
Lead soldering time		260 °C	-	10 seconds

Note: Each device is rated to a maximum kink-free current (I_{max}), provided on the individual datasheet. This is the maximum current under which the device will perform itsintended function. Operation above I_{max}, and up to the absolute maximum rating, may result in poor device performance, and degrade device reliability. Long-termoperation above Imax may lead to early device failure.

Operating Parameters

Product Code	Operating Power Pop (mW)	Operating Current Iop (mA)	Kink-Free Power Pmax (mW)	Kink-Free Current Imax (mA)
29-xxxx-310	280	555	310	615
29-xxxx-320	290	575	320	635
29-xxxx-330	300	595	330	655
29-xxxx-340	310	615	340	680
29-xxxx-350	315	625	350	700
29-xxxx-360	325	645	360	720
29-xxxx-380	340	680	380	760
29-xxxx-400	360	720	400	805
29-xxxx-420	380	760	420	855
29-xxxx-440	400	805	440	910
29-xxxx-460	410	840	460	950
29-xxxx-480	430	875	480	985
29-xxxx-500	450	900	500	1000

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Available Peak Wavelength Selection

Product Code	Peak Wavelength	Peak Wavelength Tolerance
29-7402-xxx	974.0 nm	±1 nm
29-7552-xxx	975.5 nm	±1 nm
29-7602-xxx	976.0 nm	±1 nm
29-7702-xxx	977.0 nm	±1 nm
29-8000-xxx	980.0 nm	-6/+5 nm
29-8052-xxx	980.5 nm	±1 nm

Electro-Optical Performance

(BOL, T_{case} = 0 to 75 °C, P_f range = 12 mW to P_{max}, -50 dB reflection, unless noted otherwise)

Parameter	Symbol	Test Condition	Minimum	Maximum
Threshold current	$I_{th\text{-}BOL}$	-	-	30 mA
Laser diode temperature	T_{LD}	-	20 °C	30 °C
Forward voltage	V_f	$I_f = I_{op}$	-	2.5 V
Operating power	P_{op}	$I_f = I_{op}$	12 mW	450 mW
Kinkfree output power	P_{max}	$I_f = I_{max}$	310 mW	500 mW
Wavelength	λ_m	$T_{ambient}$ = 22±3 °C	973 nm	986 nm
Pump in pump band	P_{pump}	Pump band = λ_m±1.5 nm	90%	-
Spectral width	$\Delta\lambda_{RMS}$	-	-	2.0 nm
Wavelength tuning vs. temperature	$\Delta\lambda/T$	-	-	0.02 nm/°C
Relative optical power stability		Peak-to-peak, T = 10 min, 50 kHz sampling, T_{case} = 25 °C		
		20 mW < P < P_{op}	-	4%
		12 mW < P < 20 mW	-	10%
Monitor diode responsivity	I_{BF}	-	2 µA/mW	20 µA/mW
TEC cooling capacity	ΔT_{EC}	$I_f = I_{max}$, T_{LD} = 25 °C, see table on next page	50 °C	-
Thermistor resistance	R_{th}	T_{set} = 25 °C	9.5 kΩ	10.5 kΩ
Thermistor constant	B	-	3600 K	4200 K

TEC and Total Module Power Consumption (For ΔT = 50 °C, BOL, T_{case} = 75 °C, T_{Id} = 25 °C unless noted otherwise)

Product Code	TEC Current Imax (A)	TEC Voltage Vmax (V)	TEC Power Consumption Pmax (W)	Total Module Power Consumption Pmax (W)
29-xxxx-310	1.35	1.95	2.63	3.80
29-xxxx-320	1.40	2.00	2.80	4.00
29-xxxx-330	1.45	2.20	3.19	4.57
29-xxxx-340	1.45	2.25	3.26	4.70
29-xxxx-350	1.50	2.30	3.45	4.91
29-xxxx-360	1.50	2.30	3.45	4.97
29-xxxx-380	1.60	2.40	3.84	5.40
29-xxxx-400	1.70	2.45	4.17	5.86
29-xxxx-420	1.80	2.60	4.70	6.52
29-xxxx-440	1.85	2.65	4.90	6.82
29-xxxx-460	1.95	2.75	5.36	7.36
29-xxxx-480	2.05	2.85	5.84	7.94
29-xxxx-500	2.10	2.90	6.00	8.20

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±3 µm
Coating outside diameter	250±3 µm
Mode field diameter at 980 nm	6.6±1.1 µm
Cross talk at 100 m	-25 dBm/2 m
Maximum beat length	3.3 mm
Operating temperature	-40 to 85 °C
Fiber tensile proof strength (tested)	200 kpsi

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: 29-7402-310

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Code	Peak Wavelength
7402	973.0 to 975.0 nm
7552	974.5 to 976.5 nm
7602	975.0 to 977.0 nm
7702	976.0 to 978.0 nm
8000	974.0 to 985.0 nm
8052	979.5 to 981.5 nm

Code	Minimum Kink-Free Power
310	310 mW
320	320 mW
330	330 mW
340	340 mW
350	350 mW
360	360 mW
380	380 mW
400	400 mW
420	420 mW
440	440 mW
460	460 mW
480	480 mW
500	500 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.

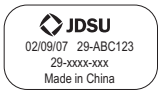
ESD PROTECTION — Electrostatic discharge (ESD) is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling laser diodes.

Labeling

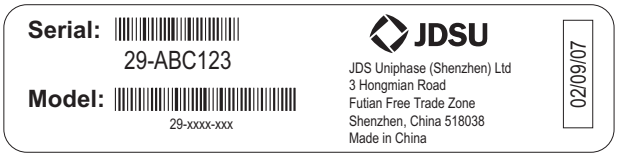
21 CFR 1040.10 Compliance

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