



Active Components Pump Laser Modules

Key Features

Up to 1000mW Pop

Low Power Consumption

Extended operating temperature range
(-5 °C to +75 °C)

Fiber Bragg Grating (FBG) on PMF
High wavelength and power stability

RoHS compliant

Applications

High output power low noise EDFAs

Dense wavelength division multiplexing
EDFAs

CATV

1999CVB

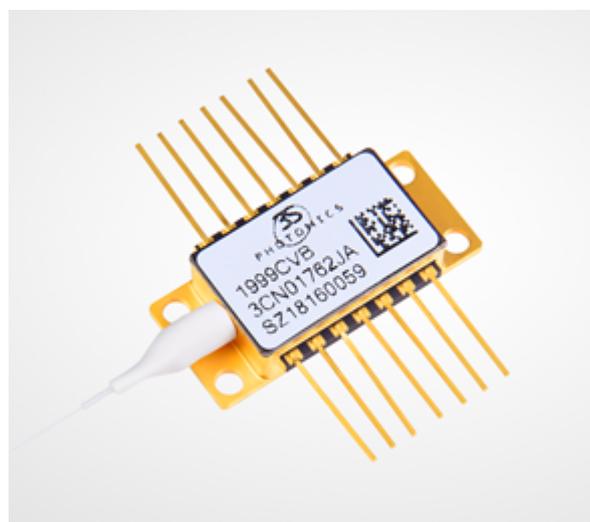
980 nm Cooled Pump Laser Module 1100mW Kink-free with PM Fiber

The 1999CVB is a new generation of 980 nm terrestrial pump modules powered by an in-house chip technology fully qualified, ensuring an outstanding level of performance and reliability.

Low Profile, 14-pin butterfly modules are available with an operating power up to 1000 mW.

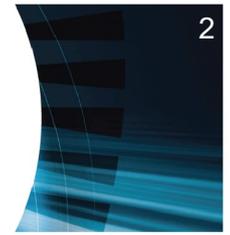
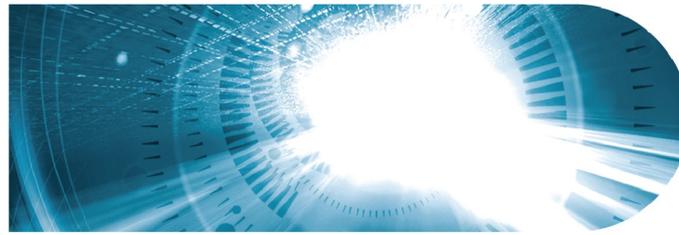
They incorporate a thermoelectric cooler (TEC), a precision NTC thermistor and a back-facet monitoring photodiode.

The 1999CVB family has been designed to ensure high wavelength and power stability performance at low power.



For more Info

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ELECTRO-OPTICAL CHARACTERISTICS

The following parameters are specified BOL for a $T_{\text{submount}} = 25\text{ }^{\circ}\text{C}$, $T_{\text{case}} = -5\text{ }^{\circ}\text{C}$ to $75\text{ }^{\circ}\text{C}$, $V_{\text{BFM}} = -5\text{ V}$ and -50 dB max back-reflection unless otherwise stated.

| Parameters | Conditions | Symbol | Min | Typ | Max | Unit |
|--|--|-------------------------------|-----------------------------|-----|------------------|---------------------------|
| PUMP LASER | | | | | | |
| Threshold current (1) | | I_{th} | - | - | 80 | mA |
| Nominal operating power | | P_{nom} | 850 | - | 1000 | mW |
| Kink free power (2) | | P_{kink} | $1.1 \times P_{\text{nom}}$ | - | - | mW |
| Forward current (3) | $P_{\text{nom}} = 850\text{ mW}$ | I_{nom} | - | - | 1520 | mA |
| | $P_{\text{nom}} = 900\text{ mW}$ | | - | - | 1575 | |
| | $P_{\text{nom}} = 950\text{ mW}$ | | - | - | 1600 | |
| | $P_{\text{nom}} = 1000\text{ mW}$ | | - | - | 1630 | |
| Forward voltage | @ 1000 mW | V_{nom} | - | - | 2 | V |
| Peak wavelength tolerance | @ $T_{\text{case}} = T_{\text{FBG}} = 25\text{ }^{\circ}\text{C}$ Power Range | $\Delta\lambda_p$ | - | - | ± 1 | nm |
| Wavelength tuning vs temperature ($T_{\text{FBG}} = -5$ to $75\text{ }^{\circ}\text{C}$) | Power Range | $\Delta\lambda_p / \Delta T$ | - | - | 0.02 | nm / $^{\circ}\text{C}$ |
| Spectral width @ -3 dB | Power Range | $\Delta\lambda_{\text{FWHM}}$ | - | - | 1.0 | nm |
| Power range | | | 30 | | P_{nom} | mW |
| Power in band (4) | P_{nom} | P_{band} | 90 | - | - | % |
| Optical power stability | Peak to peak, 1 Hz-50 kHz, 60 sec, $30\text{ mW} \leq P < 50\text{ mW}$ $50\text{ mW} \leq P \leq P_{\text{nom}}$ | ΔP | - | - | 0.2 0.1 | dB |
| Power consumption, EOL | $1.1 P_{\text{nom}} = 1000\text{ mW}$ | | - | - | 9.5 | W |
| Polarization Extinction Ratio (5) | $T_{\text{case}} = 25\text{ }^{\circ}\text{C}$ | | 13 | | | dB |
| MONITOR DIODE | | | | | | |
| Responsivity | @ P_{nom} , $V_r = 5\text{ V}$ | I_{BFM} / P | 0.5 | - | 10 | $\mu\text{A} / \text{mW}$ |
| Dark current | $V_r = 5\text{ V}$ | $I_{\text{BFM_dark}}$ | - | - | 100 | nA |
| THERMO-ELECTRICAL COOLER | | | | | | |
| TEC voltage (EOL) | $T_{\text{case}} = 75\text{ }^{\circ}\text{C}$, $1.1 P_{\text{nom}} = 1000\text{ mW}$ | $V_{\text{TEC, EOL}}$ | - | - | 3.52 | V |
| TEC current (EOL) | | $I_{\text{TEC, EOL}}$ | - | - | 1.54 | A |
| TEC Power consumption | | $P_{\text{TEC, EOL}}$ | - | - | 5.42 | W |
| THERMISTOR | | | | | | |
| Resistance | $25\text{ }^{\circ}\text{C}$ | R_{th} | 9.5 | - | 10.5 | k Ω |
| Constant | | β | 3600 | - | 4200 | K |

(1) I_{th} is the intersection point with the x-axis of a linear fit of the P(I) curve between 15 mW and 50 mW

(2) A kink is detected when the local slope dP/dI is below S_{min} or above S_{max} . S_{min} is defined as $0.5 \times S_{\text{avg}}$ and S_{max} is defined as $1.5 \times S_{\text{avg}}$

(3) EOL forward current $I(\text{EOL}) = 1.1 \times I(\text{BOL})$

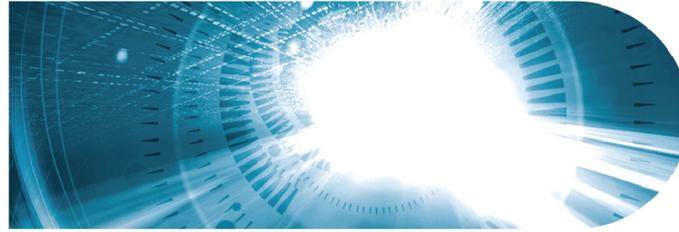
(4) P_{band} is defined as the power within the band $\lambda_p \pm 1.5\text{ nm}$ vs the total output power

(5) The intensity noise is sensitive to varying stress (by mechanical and temperature effects) introduced to the PM fiber. Measurement is performed at $25\text{ }^{\circ}\text{C}$ case temperature

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1100mW Kink-free,
FBG Stabilized,
980 nm Cooled
Pump Laser Module with
PMF pig-tail

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ABSOLUTE MAXIMUM RATINGS

Exposing this device to stresses and conditions above those listed in this section could cause permanent damage and affect reliability. The device is not meant to operate outside the operational limits described in previous section at any length of time.

| Parameter Conditions | Symbol | Min | Max | Unit |
|--|-------------------|------|------|------|
| Storage temperature (2000 h) | T_{stg} | -40 | 85 | °C |
| Operating temperature ($T_{submount} = 25\text{ °C}$)* | T_{op} | -20 | 75 | °C |
| Lead soldering temperature (10 s maximum) | | - | 280 | °C |
| Storage Relative Humidity (Non Condensing) | | 5 | 95 | % |
| Operating Relative humidity | | 5 | 85 | % |
| LD forward drive current (10 s maximum) | I_{f_max} | - | 1800 | mA |
| LD reverse voltage | V_{r_max} | - | 2.0 | V |
| LD reverse current | I_{rev} | | 10 | μA |
| PD reverse voltage | V_{PD_max} | - | 15 | V |
| PD forward current | I_{PD_max} | - | 10 | mA |
| TEC voltage | $V_{TEC_C_max}$ | -4.2 | 4.2 | V |
| TEC current | $I_{TEC_C_max}$ | -2.0 | -2.0 | A |
| ESD** LD damage | V_{ESD-LD} | - | 1000 | V |
| ESD** MPD damage | $V_{ESD-MPD}$ | | 500 | V |
| Mounting torque | | - | 150 | mN.m |
| Fiber bend radius | | 16 | - | mm |
| Axial pull force (1x1 min) | | - | 5 | N |

* No cold start. TEC will be turned on first.

** Human Body model, C = 100 pF, R = 1.5 kΩ

FIBER PIGTAIL CHARACTERISTICS

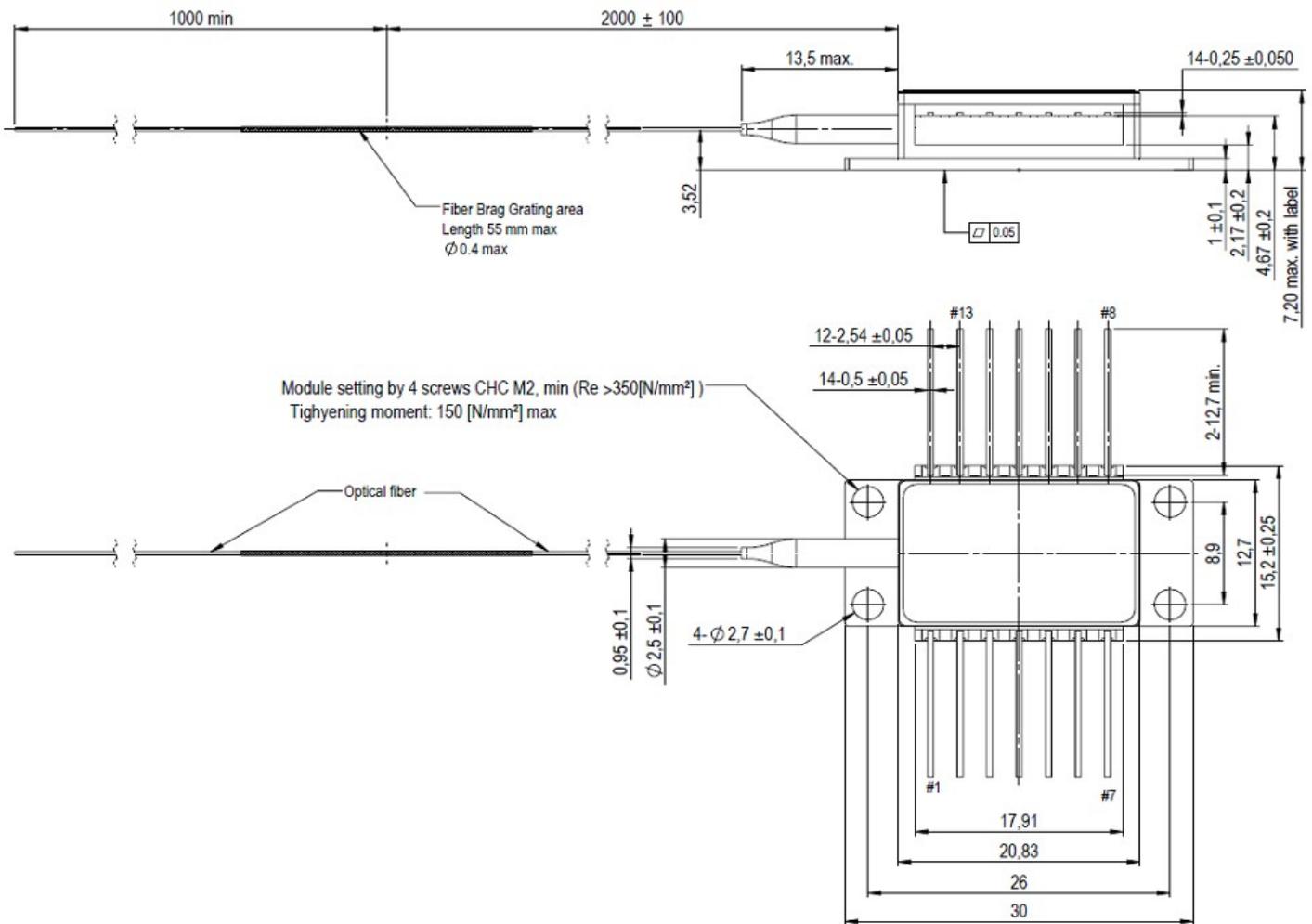
| Parameter | Note | Min | Typ | Max | Unit |
|----------------------------|-----------------------------------|------------------------------|-----|-----|------|
| Fiber type | | SM98-PS-U25D-H or equivalent | | | |
| Coating diameter | (except along grating) | 230 | 250 | 270 | μm |
| FBG recoat diameter | | - | - | 400 | μm |
| FBG position | Module to center of FBG | - | 2 | - | m |
| Loose tube buffer diameter | | 885 | - | 915 | μm |
| Fiber proof test level | | 200 | - | - | kpsi |
| Grating proof test level | | 150 | - | - | kpsi |
| Pigtail termination | Bare fiber | | | | |
| Polarization State | Aligned parallel to the slow axis | | | | |

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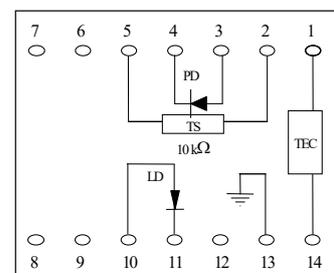
MECHANICAL DETAILS



PIN ASSIGNMENT

Dimensions are in mm

| N° | Description | N° | Description |
|----|--------------------|----|-------------------|
| 1 | TEC (+) | 8 | No connect |
| 2 | Thermistor | 9 | No connect |
| 3 | Monitor PD Anode | 10 | Laser Anode (+) |
| 4 | Monitor PD Cathode | 11 | Laser Cathode (-) |
| 5 | Thermistor | 12 | No connect |
| 6 | No connect | 13 | Ground |
| 7 | No connect | 14 | TEC (-) |



Totally floating pin-out

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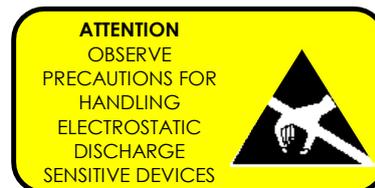
LASER SAFETY INFORMATION

This laser module emits invisible light. Take appropriate precautions to prevent undue exposure to naked eye when module is in operation. This product is classified Class 4 Laser Product according to IEC-60825-1.

HANDLING

This product is sensitive to electrostatic discharge and should not be handled except at a static free workstation. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling the pump laser module. Caution! Handle the module by its package only; never hold it by its pigtail.

Care should be taken to avoid supply transient currents and voltages. Drive voltage above the maximum specified in absolute maximum rating section may cause permanent damage to the device.



APPLICATION NOTE

In order to prevent any mishandling, misuse, neglect or accident, it is highly recommended to read and follow the instructions detailed in the application note reference “3SPT_980nm Cooled 14_10 pin butterfly module & Raman pump_Application Note_RCLIMAAPN00000007” that can be downloaded from 3SP Technologies website:

<http://www.3sptechnologies.com>

ORDERING INFORMATION

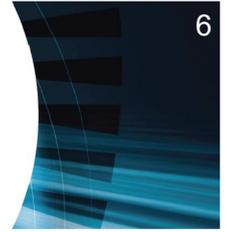
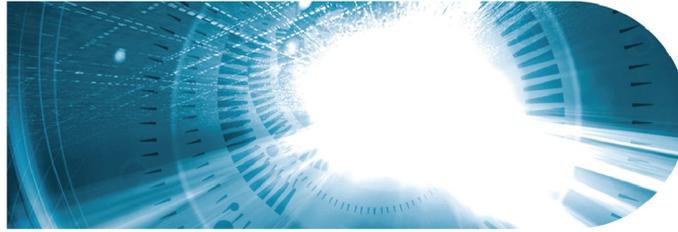
1999CVB PUMP PRODUCT FAMILY

| PMF Pigtail | $\lambda_p = 974.0$ nm, T= 25 °C | $\lambda_p = 976.0$ nm T= 25 °C | $\lambda_p = 979.5$ nm T= 25 °C | $\lambda_p = 981$ nm T= 25 °C |
|---------------|-------------------------------------|------------------------------------|------------------------------------|----------------------------------|
| Nominal Power | Part Number | Part Number | Part Number | Part Number |
| 850mW | 3CN04039HL | 3CN04040HL | 3CN04041HL | 3CN04042HL |
| 900mW | 3CN04039JA | 3CN04040JA | 3CN04041JA | 3CN04042JA |
| 950mW | 3CN04039JL | 3CN04040JL | 3CN04041JL | 3CN04042JL |
| 1000 mW | 3CN04039KA | 3CN04040KA | 3CN04041KA | 3CN04042KA |

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