



## Active Components Pump Laser Modules

Datasheet

### Key Features

Up to 950mW Pop

Small form factor, hermetically sealed  
10-pin mini-butterfly package

Pin-out compatibility with 14-pin BTF  
package

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

Fiber Bragg Grating (FBG) on SMF

High wavelength and power stability

RoHS compliant

### Applications

High output power low noise EDFAs

Dense wavelength division multiplexing  
EDFAs

CATV

## 1999CVX

### 980 nm Cooled Pump Laser Module 1050 mW Kink-free

The 1999CVX 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.

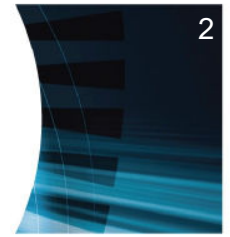
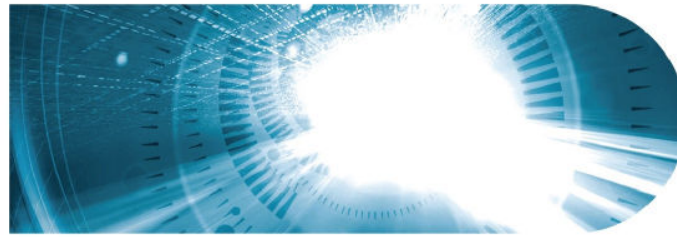
Low Profile, 10-pin butterfly modules are available with an operating power up to 950 mW.

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

The 1999CVX family has been designed to ensure high wavelength and power stability performance at low power with a 16.5dB dynamic range.

## 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  $-50\text{ dB}$  max back-reflection unless otherwise stated.

Parameters	Conditions	Symbol	Min	Typ	Max	Unit
<b>PUMP LASER</b>						
Threshold current (1)		$I_{\text{th}}$	-	-	100	mA
Nominal operating power		$P_{\text{nom}}$	700	-	950	mW
Kink free power (2)		$P_{\text{kink}}$	$1.1 \times P_{\text{nom}}$	-	-	mW
Forward current (3)	$P_{\text{nom}} = 700\text{ mW}$ $P_{\text{nom}} = 750\text{ mW}$ $P_{\text{nom}} = 800\text{ mW}$ $P_{\text{nom}} = 850\text{ mW}$ $P_{\text{nom}} = 900\text{ mW}$ $P_{\text{nom}} = 950\text{ mW}$	$I_{\text{nom}}$	-	-	1270 1360 1450 1520 1575 1575	mA
Forward voltage	@ 950 mW	$V_{\text{nom}}$	-	-	2	V
Peak wavelength tolerance	@ $T_{\text{case}} = T_{\text{FBG}} = 25\text{ }^{\circ}\text{C}$ Power Range	$\Delta\lambda_p$	-	-	$\pm 1$	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			$P_{\text{nom}}$
Power in band (4)	$P_{\text{nom}}$	$P_{\text{band}}$	90	-	-	%
Optical power stability	Peak to peak, 1 Hz-50 kHz, 60 sec, $30\text{ mW} \leq P < 50\text{ mW}$ $50\text{ mW} \leq P \leq P_{\text{nom}}$	$\Delta P$	-	-	0.2 0.1	dB
Power consumption, EOL	$1.1 P_{\text{nom}} = 950\text{ mW}$		-	-	9.4	W
<b>MONITOR DIODE</b>						
Responsivity		$I_{\text{BFM}} / P$	0.5	-	5	$\mu\text{A} / \text{mW}$
Dark current	$V_r = 5\text{ V}$	$I_{\text{BFM\_dark}}$	-	-	100	nA
<b>THERMO-ELECTRICAL COOLER</b>						
TEC voltage (EOL)	$T_{\text{case}} = 75\text{ }^{\circ}\text{C}$ , $1.1 P_{\text{nom}} = 950\text{ mW}$	$V_{\text{TEC, EOL}}$	-	-	2.5	V
TEC current (EOL)		$I_{\text{TEC, EOL}}$	-	-	2.5	A
TEC Power consumption		$P_{\text{TEC, EOL}}$	-	-	6.25	W
<b>THERMISTOR</b>						
Resistance	$25\text{ }^{\circ}\text{C}$	$R_{\text{th}}$	9.5	-	10.5	k $\Omega$
Constant		$\beta$	3600	-	4200	K

(1)  $I_{\text{th}}$  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  $S_{\text{min}}$  or above  $S_{\text{max}}$ .  $S_{\text{min}}$  is defined as  $0.5 \times S_{\text{avg}}$  and  $S_{\text{max}}$  is defined as  $1.5 \times S_{\text{avg}}$

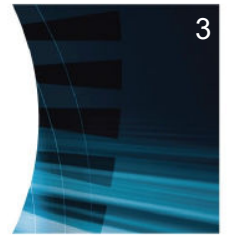
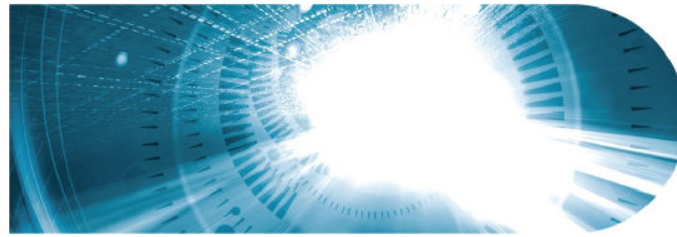
(3) EOL forward current  $I(\text{EOL}) = 1.1 \times I(\text{BOL})$

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

# 1999CVX

1050mW Kink-free,  
FBG Stabilized,  
980 nm Cooled  
10-pin Pump Laser Module

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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	$V_{TEC\_C\_max}$	-3.6	3.6	V
TEC current	$I_{TEC\_C\_max}$	-4.0	4.0	A
ESD** LD damage	$V_{ESD-LD}$	-	1000	V
ESD** PD damage	$V_{ESD-MPD}$	-	500	V
Mounting torque		-	150	mN.m
Fiber bend radius		16	-	mm

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

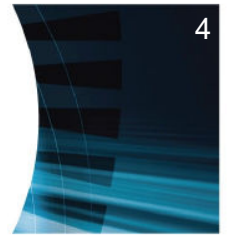
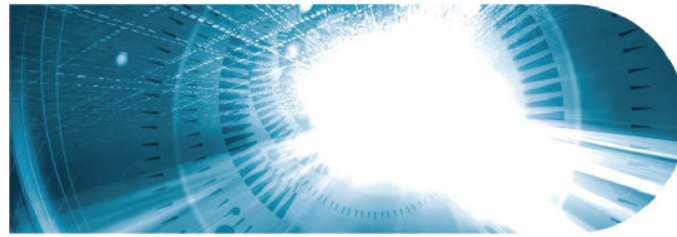
\*\* Human Body Model, C = 100 pF, R = 1.5 kΩ

## FIBER PIGTAIL CHARACTERISTICS

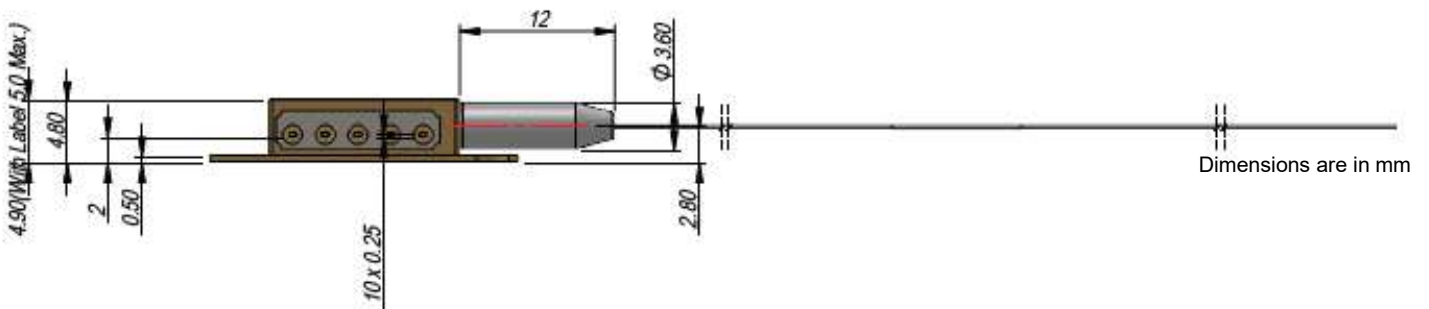
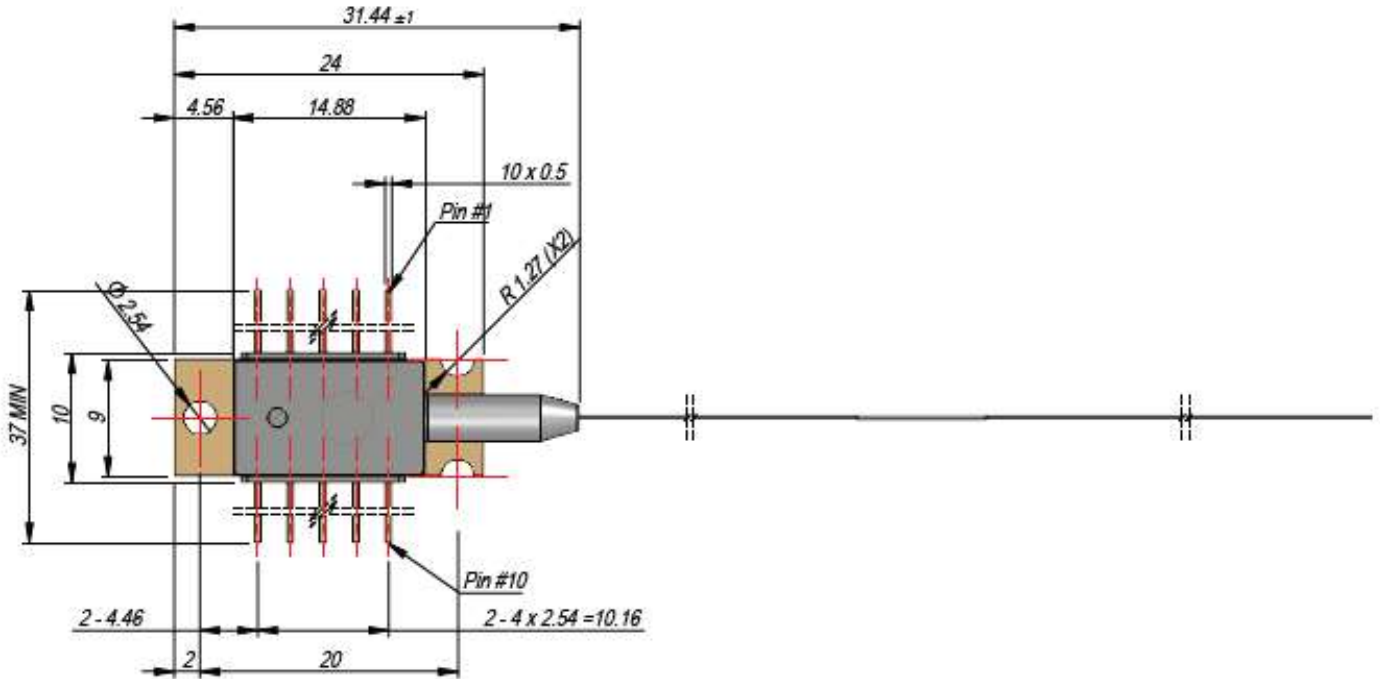
Parameter	Note	Min	Typ	Max	Unit
Fiber type		HI1060™ or equivalent			
Cladding outside diameter		124	125	126	μm
Coating outside diameter	(except along grating)	235	245	255	μm
Core to cladding offset				0.5	μm
Mode Field diameter		5.6	5.9	6.2	μm
FBG recoat diameter		-	-	400	μm
FBG position	Module to center of FBG	-	2	-	m
Fiber proof test level		200	-	-	kpsi
Grating proof test level		150	-	-	kpsi
Pigtail termination	Bare fiber				

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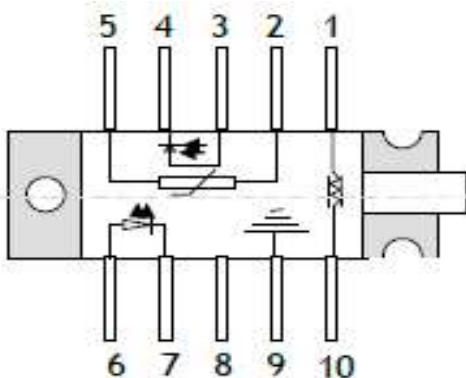
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## MECHANICAL DETAILS



Dimensions are in mm

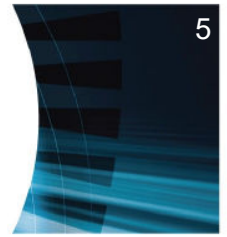
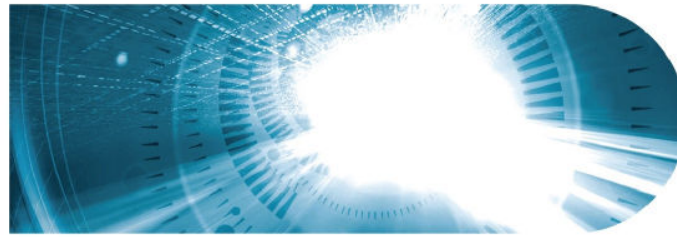


Pin	Description	Pin	Description
1	TEC (+)	6	Laser anode (+)
2	Thermistor	7	Laser cathode (-)
3	Monitor anode (-)	8	NC
4	Monitor cathode (+)	9	Package ground
5	Thermistor	10	TEC (-)

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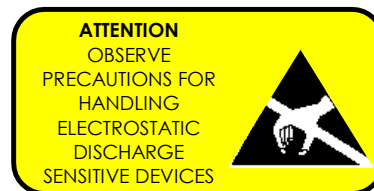
## LASER SAFETY INFORMATION

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 document

"3SPT\_980nm Cooled 14\_10 pin butterfly module & Raman pump\_Application Note\_RCLIMAAPN00000007.pdf" available on 3SP Technologies web site

## ORDERING INFORMATION

### 1999CVX PUMP PRODUCT FAMILY

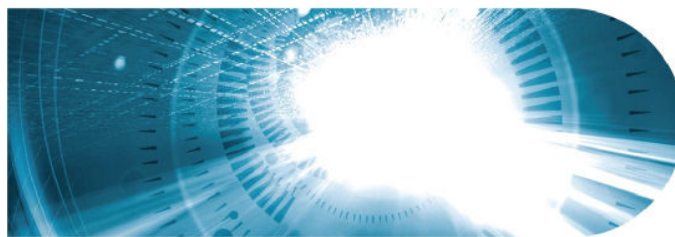
SMF Pigtail	$\lambda_p = 974.0 \text{ nm}$ , T= 25 °C	$\lambda_p = 976.0 \text{ nm}$ , T= 25 °C
Nominal Power	Part Number	Part Number
700mW	3CN01786GA	3CN01787GA
750mW	3CN01786GL	3CN01787GL
800mW	3CN01786HA	3CN01787HA
850 mW	3CN01786HL	3CN01787HL
900mW	3CN01786JA	3CN01787JA
950 mW	3CN01786JL	3CN01787JL



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