



## Active Components Pump Laser Modules

Datasheet

### Key Features

Up to 680mW 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

## 1999CHX

### 980 nm Cooled 10 pin mini-butterfly Pump Laser Module 750 mW Kink-free

The 1999CHX 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.

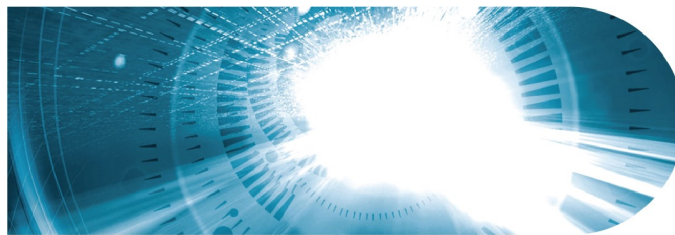
Low Profile, 10-pin butterfly modules are available with an operating power up to 680 mW.

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

The 1999CHX 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.

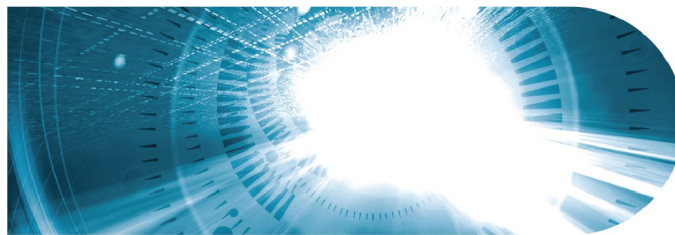
Parameters	Conditions	Symbol	Min	Typ	Max	Unit
PUMP LASER						
Threshold current (1)		I <sub>th</sub>	-		80	mA
Nominal operating power		P <sub>nom</sub>	360	-	680	mW
Kink free power (2)		P <sub>kink</sub>	1.1 x P <sub>nom</sub>	-	-	mW
Forward current (3)	P <sub>nom</sub> = 360 mW	I <sub>nom</sub>	-	-	790	mA
	P <sub>nom</sub> = 400 mW		-	-	820	
	P <sub>nom</sub> = 440 mW		-	-	850	
	P <sub>nom</sub> = 460 mW		-	-	880	
	P <sub>nom</sub> = 480 mW		-	-	900	
	P <sub>nom</sub> = 500 mW		-	-	935	
	P <sub>nom</sub> = 540 mW		-	-	975	
	P <sub>nom</sub> = 600 mW		-	-	1050	
	P <sub>nom</sub> = 620 mW		-	-	1090	
	P <sub>nom</sub> = 660 mW		-	-	1120	
	P <sub>nom</sub> = 680 mW		-	-	1150	
Forward voltage	@ 680 mW	V <sub>nom</sub>	-		1.9	V
Center Wavelength		λ <sub>974</sub>	973	974	975	nm
		λ <sub>976</sub>	975	976	977	
Peak wavelength tolerance	@ T <sub>case</sub> = T <sub>FBG</sub> = 25 °C Power Range	Δλ <sub>p</sub>	-	-	±1	nm
Wavelength tuning vs temperature (T <sub>FBG</sub> = -5 to 75 °C)	Power Range	Δλ <sub>p</sub> / ΔT	-	-	0.02	nm / °C
Spectral width @ -3 dB	Power Range	Δλ <sub>FWHM</sub>	-	-	1.0	nm
Power range			15		P <sub>nom</sub>	mW
Power in band (4)	P <sub>nom</sub>	P <sub>band</sub>	90	-	-	%
Optical power stability	Peak to peak, 1 Hz-50 kHz, 60 sec, 15mW≤P<20mW 20mW≤P≤P <sub>nom</sub>	ΔP	-		0.2 0.1	dB
Power consumption, EOL	P <sub>nom</sub> = 680 mW		-	-	7.4	W
MONITOR DIODE						
Responsivity		I <sub>BFM</sub> / P	0.5	-	10	μA / mW
Dark current	V <sub>r</sub> = 5 V	I <sub>BFM_dark</sub>	-	-	100	nA
THERMO-ELECTRICAL COOLER						
TEC voltage (EOL)	T <sub>case</sub> = 75 °C,  1.1 P <sub>nom</sub> = 680 mW	V <sub>TEC, EOL</sub>	-	-	2.2	V
TEC current (EOL)		I <sub>TEC, EOL</sub>	-	-	2.3	A
TEC Power consumption		P <sub>TEC, EOL</sub>	-	-	5	W
THERMISTOR						
Resistance	25 °C	R <sub>th</sub>	9.5	-	10.5	kΩ
Constant		β	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



## 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)	$I_{f\_max}$	-	1300	mA
LD reverse voltage	$V_{r\_max}$	-	2.0	V
PD reverse voltage	$V_{PD\_max}$	-	15	V
PD forward current	$I_{PD\_max}$	-	10	mA
TEC voltage	$V_{TEC\_C\_max}$	-	3.6	V
TEC current	$I_{TEC\_C\_max}$	-	4	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

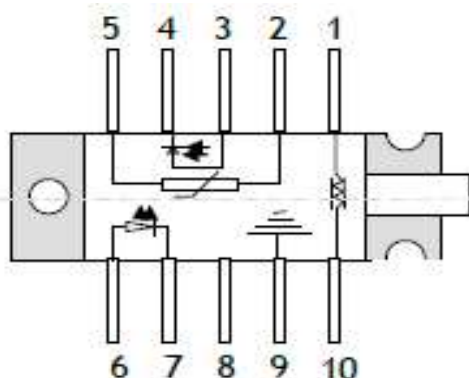
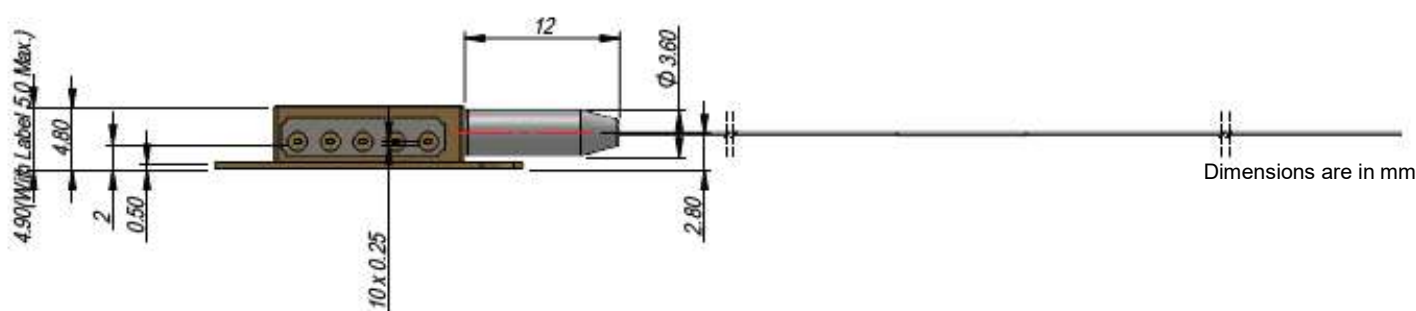
\* No cold start. TEC will be turned on first.

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

## FIBER PIGTAIL CHARACTERISTICS

Parameter	Note	Min	Typ	Max	Unit
Fiber type		HI1060™ 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
Fiber proof test level		200	-	-	kpsi
Grating proof test level		150	-	-	kpsi
Pigtail termination	Bare fiber				

**750mW Kink-free,  
FBG Stabilized,  
980 nm Cooled  
10 pin Pump Laser Module**

[illegible]

Pin	Description	Pin	Description
1	TEC (+)	8	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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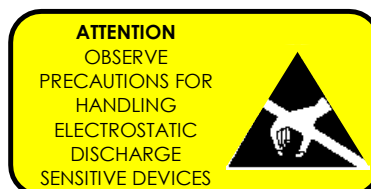
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## LASER SAFETY INFORMATION

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.



## ORDERING INFORMATION

### 1999CHX 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
360mW	3CN01758CN	3CN01759CN
400mW	3CN01758DA	3CN01759DA
440mW	3CN01758DJ	3CN01759DJ
460mW	3CN01758DN	3CN01759DN
480mW	3CN01758DS	3CN01759DS
500mW	3CN01758EA	3CN01759EA
540mW	3CN01758EJ	3CN01759EJ
600mW	3CN01758FA	3CN01759FA
620mW	3CN01758FE	3CN01759FE
660 mW	3CN01758FN	3CN01759FN
680 mW	3CN01758FS	3CN01759FS

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