

## Active Components Pump Laser Modules

### Key Features

Up to 300 mW operating power

Operating temperature up to 75 °C

Fiber Bragg Grating (FBG) on PMF

Telcordia GR-468-CORE qualified

RoHS compliant

### Applications

Compact size, low noise Erbium-Doped Fiber Amplifiers requiring low power consumption

Multi pumping architectures

Sensors

## 1999PLU

### 330 mW Kink-Free, FBG Stabilized, 980 nm Uncooled Pump Laser Module

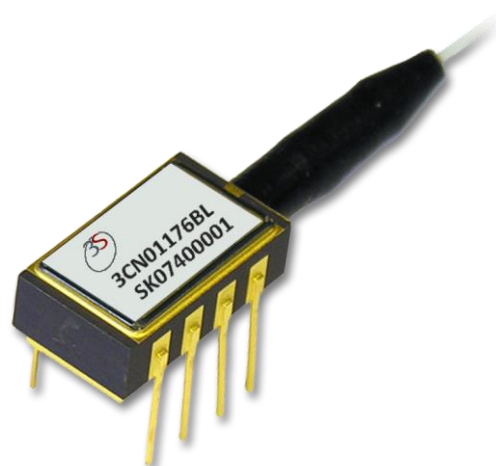
The 1999PLU is a new generation of 980 nm uncooled pump modules powered by in-house chip technology fully qualified for submarine applications, ensuring an outstanding level of performance, power consumption and reliability.

Low Profile, 8-pin mini-DIL modules are available with an operating power up to 300 mW.

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

The wavelength is “locked” utilizing a fiber bragg grating (FBG) located in a single mode Polarization Maintaining Fiber (PMF) pigtail.

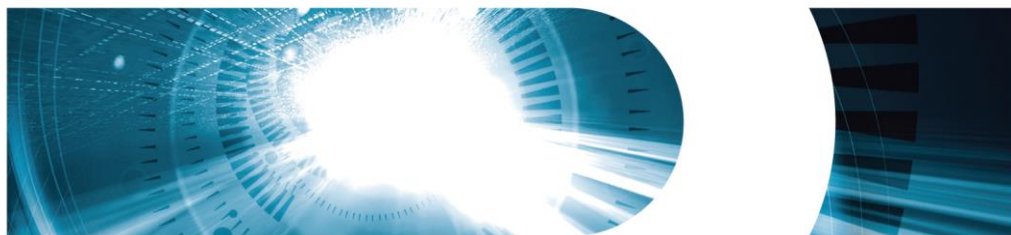
The module meets the Telcordia™ GR-468-Core requirements for hermetic 980 nm pump modules.



## For more Info

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## ELECTRO-OPTICAL CHARACTERISTICS

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

Parameters	Conditions	Symbol	Min	Typ	Max	Unit
<b>PUMP LASER</b>						
Threshold current <sup>(1)</sup>		$I_{\text{th}}$	-	-	85	mA
Nominal operating power		$P_{\text{nom}}$	100	-	300	mW
Kink free power <sup>(2)</sup>		$P_{\text{kink}}$	$1.1 \times P_{\text{nom}}$	-	-	mW
Forward current <sup>(3)</sup>	$P_{\text{nom}} = 100\text{ mW}$	$I_{\text{nom}}$	-	225	280	mA
	$P_{\text{nom}} = 150\text{ mW}$		-	305	380	
	$P_{\text{nom}} = 200\text{ mW}$		-	385	480	
	$P_{\text{nom}} = 250\text{ mW}$		-	465	580	
	$P_{\text{nom}} = 260\text{ mW}$		-	480	600	
	$P_{\text{nom}} = 270\text{ mW}$		-	495	600	
	$P_{\text{nom}} = 300\text{ mW}$		-	550	600	
Forward voltage	@up to 260 mW @from 260 mW to 300 mW	$V_{\text{nom}}$	-	1.75 1.75	2.0 2.1	V
Peak wavelength tolerance	@ $T_{\text{case}} = T_{\text{FBG}} = 25\text{ °C}$ $0.1 \times P_{\text{nom}}$ to $P_{\text{nom}}$	$\Delta\lambda_p$	-	-	$\pm 0.5$	nm
Wavelength tuning vs temperature ( $T_{\text{grating}} = -5$ to $75\text{ °C}$ )	$0.1 \times P_{\text{nom}}$ to $P_{\text{nom}}$	$\Delta\lambda_p / \Delta T$	-	0.01	0.02	nm / °C
Spectral width @ -3 dB	$0.1 \times P_{\text{nom}}$ to $P_{\text{nom}}$	$\Delta\lambda_{\text{FWHM}}$	-	-	1.0	nm
Spectral width @ -13 dB	$0.1 \times P_{\text{nom}}$ to $P_{\text{nom}}$	$\Delta\lambda_{\text{FWHM}}$	-	-	1.0	nm
Power in band <sup>(4)</sup>	$P_{\text{nom}}$	$P_{\text{band}}$	90	-	-	%
Optical power stability	Peak to peak, 10 Hz-50 kHz, 60 sec, $P_{\text{nom}}$	$\Delta P$	-	2.0	3.5	%
Power consumption, EOL	$P_{\text{nom}} = 100\text{ mW}$		-	0.35	0.50	W
	$P_{\text{nom}} = 150\text{ mW}$		-	0.50	0.75	
	$P_{\text{nom}} = 200\text{ mW}$		-	0.70	1.00	
	$P_{\text{nom}} = 250\text{ mW}$		-	0.90	1.25	
	$P_{\text{nom}} = 260\text{ mW}$		-	0.92	1.30	
	$P_{\text{nom}} = 270\text{ mW}$		-	0.94	1.35	
	$P_{\text{nom}} = 300\text{ mW}$		-	0.96	1.35	
<b>MONITOR DIODE</b>						
Responsivity		$I_{\text{BFM}} / P$	0.5	-	10	$\mu\text{A} / \text{mW}$
Dark current	$V_r = 5\text{ V}$	$I_{\text{BFM\_dark}}$	-	50	100	nA
<b>THERMISTOR</b>						
Resistance	$25\text{ °C}$	$R_{\text{th}}$	9.5	10	10.5	k $\Omega$
Constant		B	3600	-	4200	K

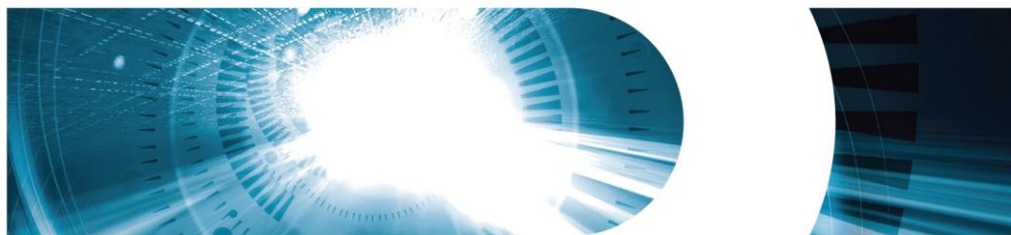
(1)  $I_{\text{th}}$  is the intersection point with the x-axis of a linear fit of the P(I) curve between 15 mW and 50 mW

(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

**330 mW Kink-Free,  
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Pump Laser Module**



## 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 (2000h)	$T_{stg}$	-40	85	°C
Operating temperature ( $T_{submount} = 25\text{ °C}$ )	$T_{op}$	-5	75	°C
Lead soldering temperature (10s maximum)		-	280	°C
LD forward drive current	$I_{f\_max}$	-	800	mA
LD reverse voltage	$V_{r\_max}$	-	2	V
PD reverse voltage	$V_{PD\_max}$	-	15	V
PD forward current	$I_{PD\_max}$	-	10	mA
ESD* damage	$V_{ESD}$	-	500	V
Mounting torque		-	150	mN.m
Fiber bend radius		20	-	mm
Axial pull force (1x1min)		-	5	N

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

## FIBER PIGTAIL CHARACTERISTICS

Parameter	Note	Min	Typ	Max	Unit
Fiber type		SM98-PS-U25A-H or equivalent			
Coating diameter	(except along grating)	230	250	270	μm
FBG recoat diameter		-	-	400	μm
FBG position	Module to center of FBG	-	3	-	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				

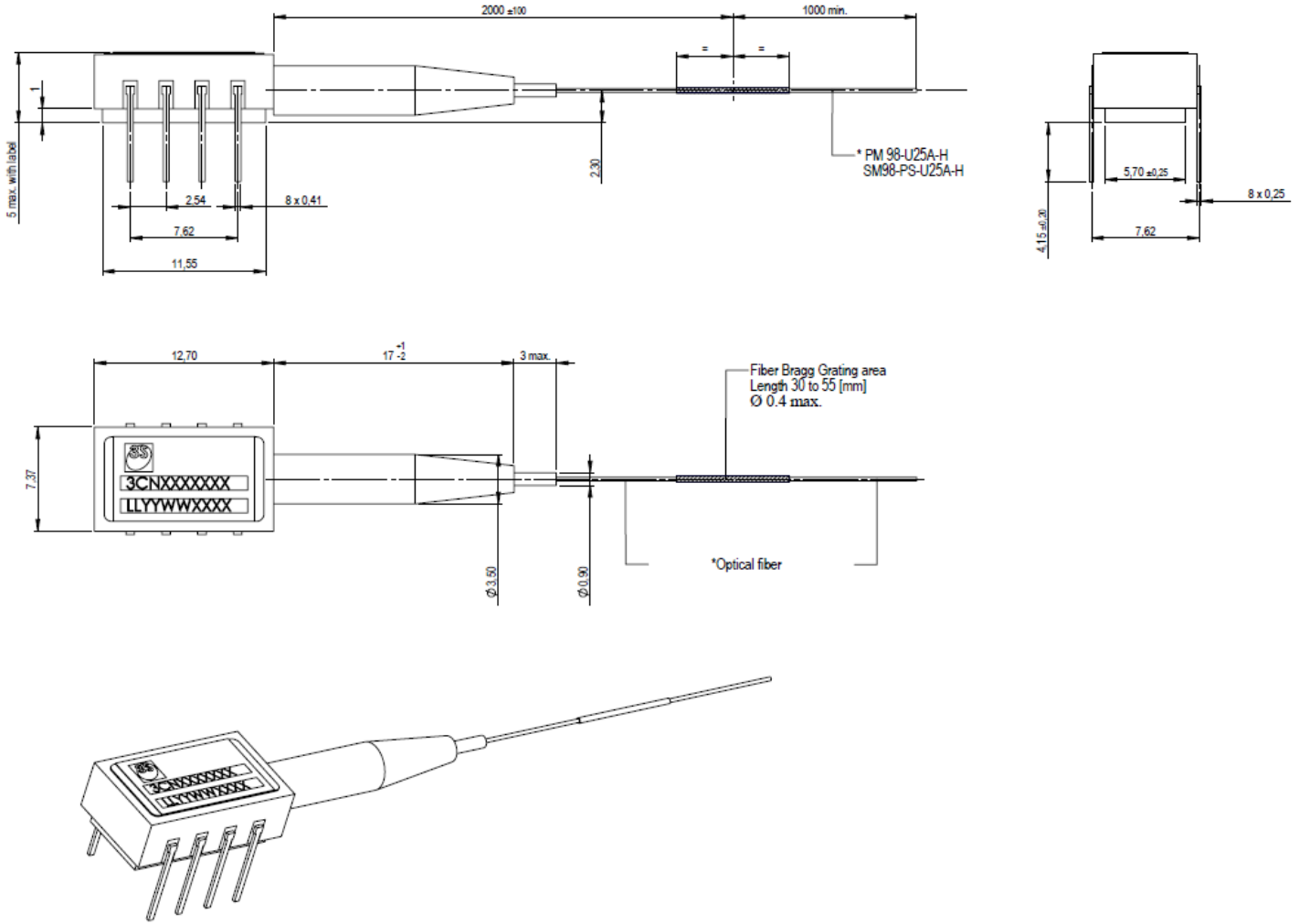
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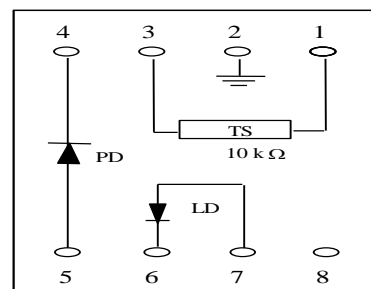
## MECHANICAL DETAILS



Dimensions are in mm

## PIN ASSIGNMENT

N°	Description
1	Thermistor
2	Case ground
3	Thermistor
4	Monitor PD Cathode
5	Monitor PD Anode
6	Laser Cathode
7	Laser Anode
8	No connect



Totally floating pin-out

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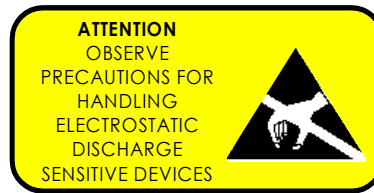


## LASER SAFETY INFORMATION

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.



## ORDERING INFORMATION

### 1999PLU PUMP PRODUCT FAMILY

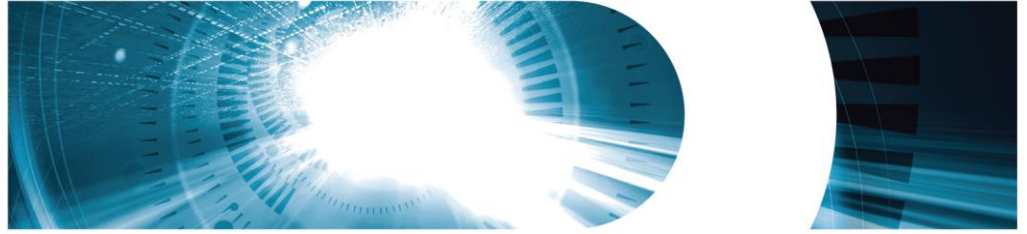
PMF Pigtail	$\lambda_p= 974.0 \text{ nm, T}= 25 \text{ }^\circ\text{C}$	$\lambda_p= 976.0 \text{ nm, T}= 25 \text{ }^\circ\text{C}$
Nominal Power	Part Number	Part Number
100 mW	3CN01176AA	3CN01177AA
150 mW	3CN01176AL	3CN01177AL
200 mW	3CN01176BA	3CN01177BA
250 mW	3CN01176BL	3CN01177BL
260 mW	3CN01176BN	3CN01177BN
270 mW	3CN01176BQ	3CN01177BQ
300 mW	3CN01176CA	3CN01177CA

3SPGroup can also develop custom products to meet a wide range of technical requirements. Please contact your Sales Manager for details.

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## IMPORTANT NOTICE

Information in this document is typical and must be specifically confirmed in writing by your supplier before it becomes applicable to any order or contract.

Information is subject to change without notice.

## NOTES