



Active Components Pump Laser Modules

Datasheet

Key Features

Up to 540mW Pop

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

Ultra Low Power Consumption
($T_{chip}@40^{\circ}C$)

Fiber Bragg Grating (FBG) on SMF

High wavelength and power stability

Telcordia GR 468 CORE qualified

RoHS compliant

1999SHB

980nm Low Power Consumption Pump Module Up to 600mW kink-free

The 1999SHB 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 540 mW. They incorporate a thermoelectric cooler (TEC), a precision NTC thermistor and a back-facet monitoring photodiode.

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

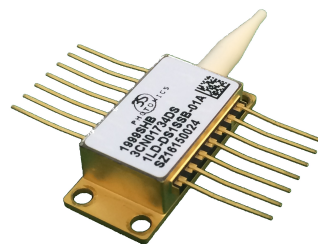
The 1999SHB pump module meets the Telcordia™ GR-468-Core requirements for hermetic 980 nm pump modules.

Applications

High output power low noise Erbium-Doped Fiber Amplifiers

Dense wavelength division multiplexing

CATV



For more Info

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ELECTRO-OPTICAL CHARACTERISTICS

The following parameters are specified BOL for a $T_{\text{submount}} = 40\text{ }^{\circ}\text{C}$, $T_{\text{case}} = -5\text{ }^{\circ}\text{C}$ 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}	350	-	540	mW
Kink free power (2)		P_{kink}	$1.1 \times P_{\text{nom}}$	-	-	mW
Forward current (3)	$P_{\text{nom}} = 400\text{ mW}$	I_{nom}		-	780	mA
	$P_{\text{nom}} = 440\text{ mW}$			-	830	
	$P_{\text{nom}} = 460\text{ mW}$			-	880	
	$P_{\text{nom}} = 480\text{ mW}$			-	910	
	$P_{\text{nom}} = 500\text{ mW}$			-	940	
	$P_{\text{nom}} = 540\text{ mW}$			-	1010	
Forward voltage	@ 600 mW	V_{nom}	-	-	1.9	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 ($T_{\text{grating}} = -5$ to $75\text{ }^{\circ}\text{C}$)	Power range	$\Delta\lambda_p / \Delta T$	-	0.01	0.02	nm / $^{\circ}\text{C}$
Spectral width @ -3 dB	Power range	$\Delta\lambda_{\text{FWHM}}$	-	0.6	1.0	nm
Power in band (4)	P_{nom}	P_{band}	90	-	-	%
Power Range			15		P_{nom}	mW
Optical power stability	Peak to peak, 1 Hz-50 kHz, 60 sec $15\text{mW} \leq P < 20\text{mW}$ $20\text{mW} \leq P \leq P_{\text{nom}}$	ΔP	-		0.2 0.1	dB
Power consumption,	$P_{\text{nom}} = 540\text{ mW}$		-	-	4.1	W
MONITOR DIODE						
Responsivity		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)	$T_{\text{case}} = 75\text{ }^{\circ}\text{C}$, $1.1 \times P_{\text{nom}} = 540\text{mW}$	$V_{\text{TEC, EOL}}$	-	-	2.1	V
TEC current (EOL)		$I_{\text{TEC, EOL}}$	-	-	0.95	A
TEC Power consumption		$P_{\text{TEC, EOL}}$	-	-	2.0	W
THERMISTOR						
Resistance	$40\text{ }^{\circ}\text{C}$	R_{th}	9.5	10	10.5	$\text{k}\Omega$
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 $1.5 \times S_{\text{avg}}$

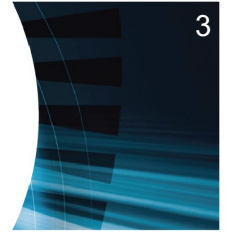
(3) EOL forward current $I(\text{EOL}) = 1.1 \times I(\text{BOL})$

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

1999SHB

600mW Kink-free,
FBG Stabilized,
980 nm 40°C Cooled
Pump Laser Module

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3

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 ($T_{submount} = 40\text{ °C}$)*	T_{op}	-20	75	°C
Storage relative humidity (Non condensing)		5	95	%
Operating relative humidity		5	85	%
Lead soldering temperature (10 s maximum)		-	280	°C
LD forward drive current (10 s maximum)	I_{f_max}	-	1150	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	$V_{TEC_C_max}$	-	4.2	V
TEC current	$I_{TEC_C_max}$	-	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

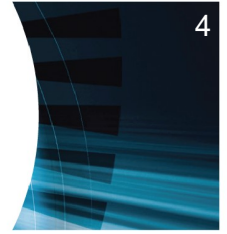
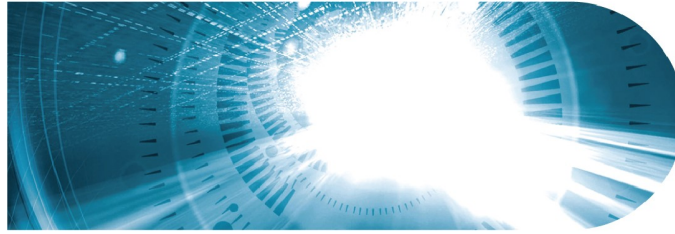
Parameter	Note	Min	Typ	Max	Unit
Fiber type		HI1060™ or equivalent			
Coating diameter	(except along grating)	230	250	270	μm
FBG recoat diameter		-	-	400	μm
FBG position	Module to center of FBG	-	2	-	m
Fiber proof test level		200	-	-	kpsi
Grating proof test level		150	-	-	kpsi
Pigtail termination	Bare fiber				

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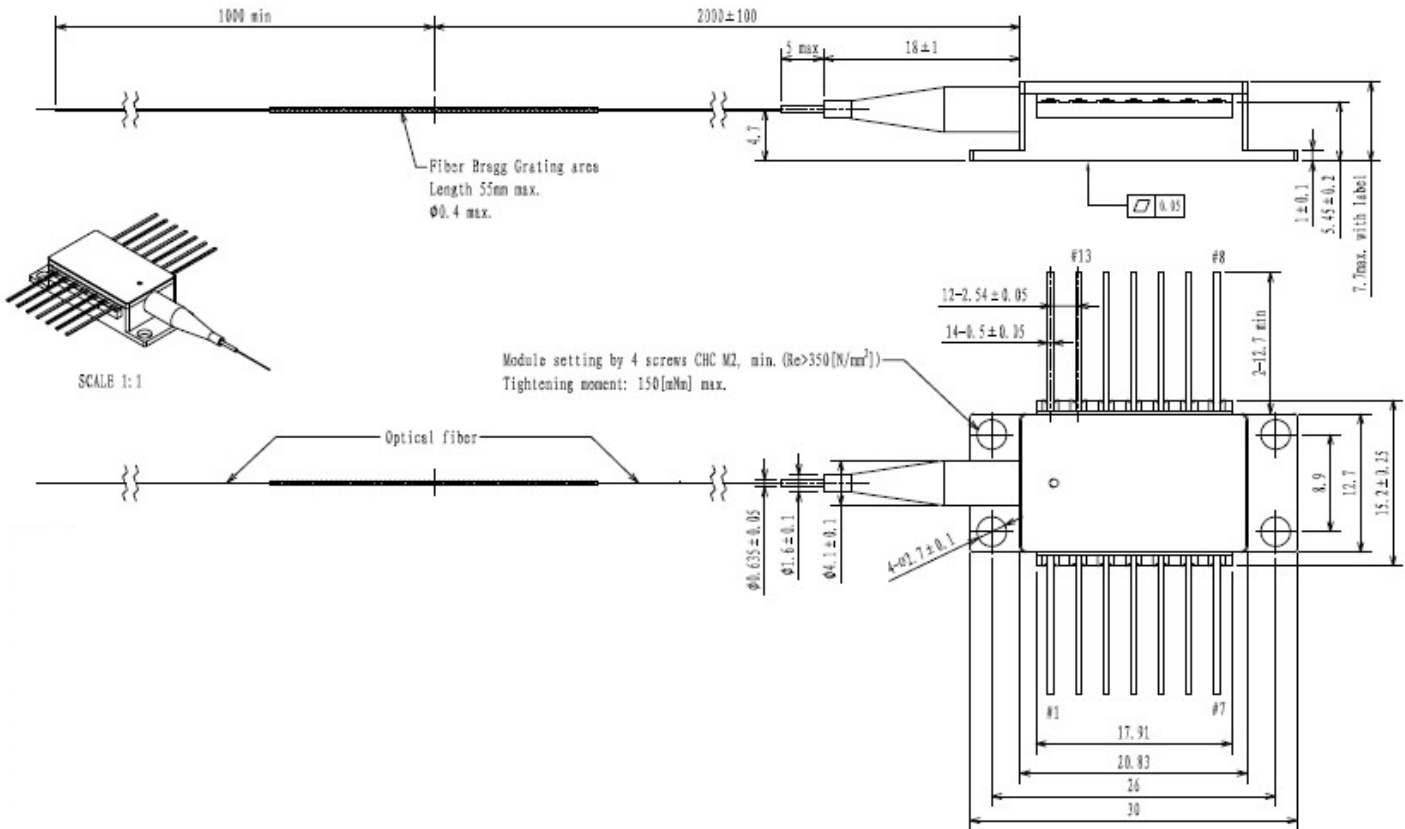
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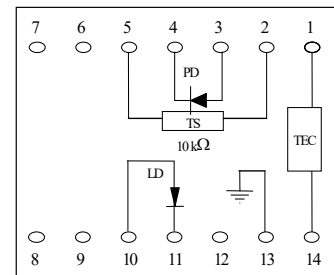
MECHANICAL DETAILS



Dimensions are in mm

PIN ASSIGNMENT

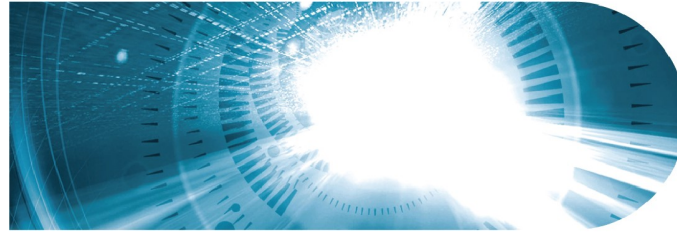
N°	Description	N°	Description
1	TEC (+)	8	No connect
2	Thermistor	9	No connect
3	Monitor PD Anode	10	Laser Anode (+)
4	Monitor PD Cathode	11	Laser Cathode (-)
5	Thermistor	12	No connect
6	No connect	13	Ground
7	No connect	14	TEC (-)



Totally floating pin-out

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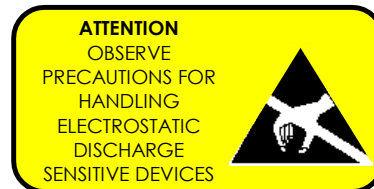
LASER SAFETY INFORMATION

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:

http://www.3sptechnologies.com/data/File/3SP_AN_AC_Cooled-BTF-Pumps_R1407_RCLIMAAPN00000007_01.pdf

ORDERING INFORMATION

1999SHB PUMP PRODUCT FAMILY

SMF Pigtail	$\lambda_p = 974.0 \text{ nm}$, T= 40 °C	$\lambda_p = 976.0 \text{ nm}$ T= 40 °C
Nominal Power	Part Number	Part Number
400 mW	3CN01734DA	3CN01735DA
440 mW	3CN01734DJ	3CN01735DJ
460 mW	3CN01734DN	3CN01735DN
480 mW	3CN01734DS	3CN01735DS
500 mW	3CN01734EA	3CN01735EA
540 mW	3CN01734EJ	3CN01735EJ

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