

Transmission Laser Modules

Key Features

Up to 30mW output power

Wavelength selection according to ITU-T G.692 from 1529.55 nm to 1569.59 nm

50 GHz channel spacing available

Optimized for use with LiNbO₃ external modulator

Polarization Maintaining Fiber pigtail

RIN -140 dB/Hz

Industry standard hermetic 14-pin butterfly package

InGaAsP Distributed FeedBack (DFB) SLMQW in-house laser

Applications

Ultra Long Haul 10 Gbit/s synchronous digital transmission systems

WDM submarine terminal digital transmission systems

Instrumentation

For more info

Please contact us at:

North America: **514.748.4848**
888.922.1044

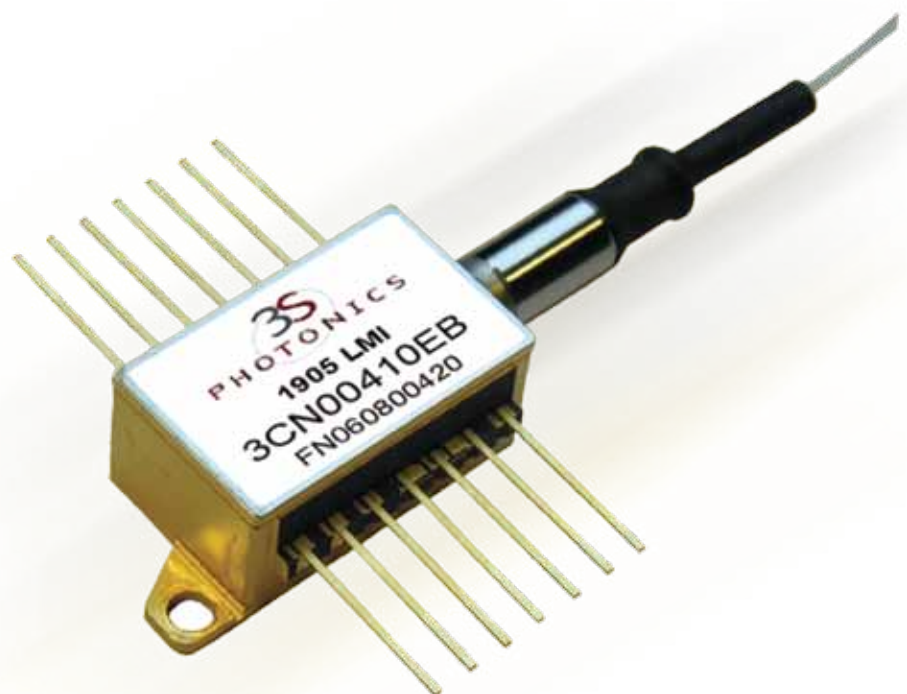
Europe & Asia: **+33 (0) 1 69 80 58 33**
or via e-mail at sales@3spgroup.com

1905 LMI

Up to 30mW WDM C-band version for external modulation CW 1.55 μ m Laser Module with optical Isolator

This laser module contains a 3SP Group SLMQW DFB laser and is designed for use with external modulation optimized for high power Wavelength Division Multiplexed (WDM) systems.

The module incorporates a polarization maintaining fiber pigtail, thermoelectric cooler, precision thermistor, and optical isolator for stable operation under all conditions.



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OPTICAL CHARACTERISTICS

All limits start of life (except I_t , V_t), $T_{submount}=25^\circ\text{C}$, $T_c=25^\circ\text{C}$, $P_f, V=-5\text{V}$, unless otherwise stated.

Parameters	Symb	Conditions	Min	Typical	Max	Units
Operating case temperature	T_c	10mW & 20mW	-5		70	$^\circ\text{C}$
		30mW	-5		65	$^\circ\text{C}$
Output power	P_f	$T_{wave}=20$ to 35°C	10			mW
			20			mW
			30			mW
Threshold current	I_{th}				40	mA
Forward voltage	V_f	P_f , pin 3 & 11			2.5	V
Laser forward current	I_f	10 mW, pin 3 & 11			100	mA
		20 mW, pin 3 & 11			190	mA
		30 mW, pin 3 & 11			260	mA
Emission wavelength	λ	See table 3	1529.55		1569.59	nm
Δ (Emitted-Target) wavelength	$\Delta\lambda$	@ T_{wave} , See table 3 for λ target	-0.1		+0.1	nm
Submount temperature	T_{wave}		20		35	$^\circ\text{C}$
Wavelength drift vs T_{wave}	$\Delta\lambda / \Delta T_{wave}$			90		pm/ $^\circ\text{C}$
Wavelength drift vs T_c	$\Delta\lambda / \Delta T_c$			0.2	0.5	pm/ $^\circ\text{C}$
Spectral width	$\Delta\lambda$	CW, P_f , -3 dB		2	5	MHz
TE/TM extinction ratio	ER		17			dB
Side mode suppression ratio	SMSR	P_f	40			dB
Relative intensity noise	RIN	10MHz to 10GHz @ P_f			-140	dB/Hz
Photodiode current	I_m	$V=-5\text{V}$, @ 10mW	0.1		1	mA
		$V=-5\text{V}$, @ 20mW	0.2		2	mA
		$V=-5\text{V}$, @ 30mW	0.3		3	mA
Photodiode dark current	I_d	$V=-5\text{V}$			0.1	μA
TEC current	I_t	See note 1		0.85	1.3	A
TEC voltage	V_t	See note 1		1.6	2.5	V
Thermistor resistance	R_{th}		9.7		10.3	k Ω
Thermistor β constant	β		3800	3900	4000	K

Note 1 : $T_{case}=70^\circ\text{C}$ (10 and 20 mW), $T_{case}=65^\circ\text{C}$ (30 mW), $T_{submount}=20^\circ\text{C}$, @1.2 x P_f

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only.

Parameters	Min	Max	Unit
Operating case temperature	-10	70	$^\circ\text{C}$
Storage temperature	-40	85	$^\circ\text{C}$
Laser forward current		350	mA
Laser reverse voltage		2	V
Photodiode forward current		1	mA
Photodiode reverse voltage		20	V
TEC voltage		2.8	V
TEC current		1.4	A
Lead soldering time (at 260°C)		10	s
Fiber bend radius	30		mm
Packing mounting screw torque		0.2	N.m

Definitions

T_{wave} : T_{wave} is the submount temperature at which the laser emission wavelength reaches the target wavelength with an accuracy of better than: $\lambda_{target} \pm 0.1\text{nm}$. This temperature is calculated during manufacturing according to: $T_{wave}=25^\circ\text{C} + (1/C) * (\lambda_{target} - \lambda_{25^\circ\text{C}})$, where C is the laser wavelength drift with temperature (in nm/ $^\circ\text{C}$).

Emitted wavelength drift vs T_{case} : absolute value of maximum emitted wavelength deviation per unit of case temperature ($^\circ\text{C}$) when T_{case} varies from min to max operating conditions. Wavelength is stabilized through the thermal regulation of the laser chip based on the thermistor reading.

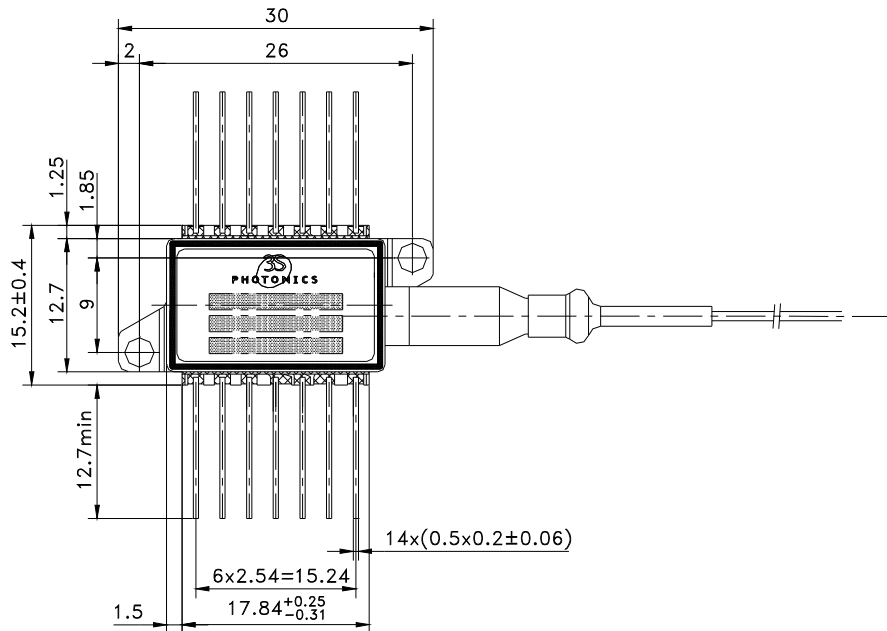
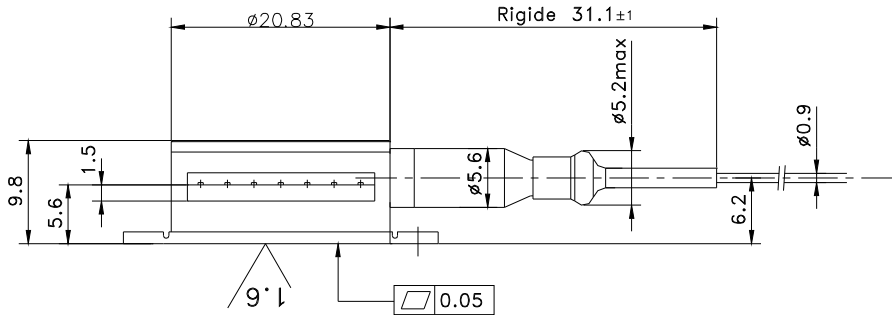
Emitted wavelength drift vs T_{wave} : Maximum emitted wavelength deviation per unit of submount temperature ($^\circ\text{C}$) when $T_{submount}$ varies from min to max conditions. Wavelength is stabilized through the thermal regulation of the laser chip based on the thermistor reading.

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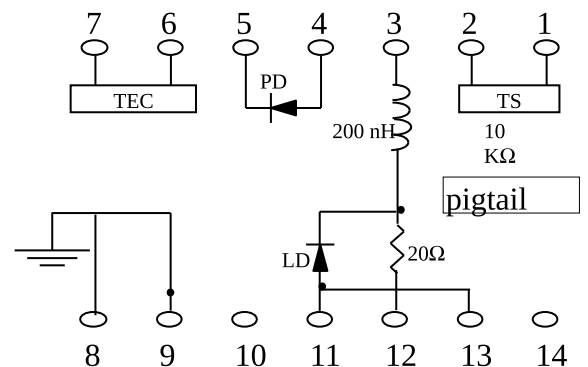
Mechanical Details



Dimensions are in mm
Fiber length 1000 ± 90 mm
(including optical connector)

Pin Out

N°	Description	N°	Description
1	Thermistor	8	Case Ground
2	Thermistor	9	Case Ground
3	Laser DC bias (+)	10	Not Connected
4	Photodetector Anode (-)	11	RF common (+)
5	Photodetector Cathode (+)	12	Laser RF input (-)
6	TEC (+)	13	RF common (+)
7	TEC (-)	14	Not Connected



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Shipment **packing**

Each device is individually packed in an anti-static container and in such a manner as to prevent damage in transit.

The packing shall include the following information:

1. 3S Photonics logo
2. Product family name: 1905 LMI
3. Product code: 3CN number (see Ordering Information section)
4. Serial number
5. Hazard warning label (ESD)
6. Laser Safety Class Label

Laser Safety **Information**

Take appropriate precautions to prevent undue exposure to naked eye.

This product is classified Class 1M Laser Product according to IEC-60825-1: edition2.

All versions are Class IIIB laser products per 21 CFR 1040-10 Laser. Safety requirements under accession number 0120546-00.



Qualification, Reliability and **Standards**

3SPGroup handling policy for all products is to carry out a complete qualification program. This qualification is based on manufacturers qualification in agreement with Telcordia GR-468-Core (generic reliability assurance requirements for optoelectronic devices used in Telecommunications equipment - central office level), MIL STD 883E (Test method and procedures for microelectronics) and following the standards ITU-T G652 and G-691. All products pass strict tests before shipping. Failure criteria are defined during the product qualification process.

Device **marking**

The device shall be legibly and permanently marked with the following information:

1. 3S Photonics logo
2. Product family name: 1905 LMI
3. Product code: 3CN number (see Ordering Information section)
4. Serial number

Deliverable **data**

The following data shall be supplied with each device :

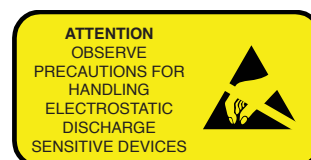
1. L(I)/V(I) curves @ Tc/Tsubmount= 25°C/25°C
2. It, Vt @ Tc/Tsubmount=25°C/70°C, Pf
3. Values of Twave and RTH @ Tsubmount=Twave
4. Values of If, Im, Ith and external differential efficiency @ Tsubmount=Twave and Pf
5. I and SMSR at Tc= Tsubmount= 25°C

Product testing shall be carried out at a level that ensures conformity to the customer specification

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 product. Handle the laser module by its package only. Care should be taken to avoid supply transient and over voltage.

Over voltage above the maximum specified in absolute maximum rating section may cause permanent damage to the device.



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ORDERING INFORMATION

Nominal power	Connector type	Part number [1]
10 mW	FC/PC	3CN 00386 ##
20 mW	FC/PC	3CN 00410 ##
30 mW	FC/PC	3CN 00302 ##

defines the wavelength according to the following Table 3.

Table 3

λ (nm)	THz	Code ##	λ (nm)	THz	Code ##	λ (nm)	THz	Code ##	λ (nm)	THz	Code ##	λ (nm)	THz	Code ##
1529,55	196,00	BP	1537,79	194,95	CL	1546,12	193,90	DH	1554,54	192,85	EE	1563,05	191,80	FB
1529,94	195,95	BQ	1538,19	194,90	CM	1546,52	193,85	DJ	1554,94	192,80	EF	1563,45	191,75	FC
1530,33	195,90	BR	1538,58	194,85	CN	1546,92	193,80	DK	1555,34	192,75	EG	1563,86	191,70	FD
1530,72	195,85	BS	1538,98	194,80	CP	1547,32	193,75	DL	1555,75	192,70	EH	1564,27	191,65	FE
1531,12	195,80	BT	1539,37	194,75	CQ	1547,72	193,70	DM	1556,15	192,65	EJ	1564,68	191,60	FF
1531,51	195,75	BU	1539,77	194,70	CR	1548,11	193,65	DN	1556,55	192,60	EK	1565,08	191,55	FG
1531,90	195,70	BV	1540,16	194,65	CS	1548,51	193,60	DP	1556,96	192,55	EL	1565,49	191,50	FH
1532,29	195,65	BW	1540,56	194,60	CT	1548,91	193,55	DQ	1557,36	192,50	EM	1565,90	191,45	FJ
1532,68	195,60	BX	1540,95	194,55	CU	1549,32	193,50	DR	1557,77	192,45	EN	1566,31	191,40	FK
1533,07	195,55	BY	1541,35	194,50	CV	1549,72	193,45	DS	1558,17	192,40	EP	1566,72	191,35	FL
1533,47	195,50	BZ	1541,75	194,45	CW	1550,12	193,40	DT	1558,58	192,35	EQ	1567,13	191,30	FM
1533,86	195,45	CA	1542,14	194,40	CX	1550,52	193,35	DU	1558,98	192,30	ER	1567,54	191,25	FN
1534,25	195,40	CB	1542,54	194,35	CY	1550,92	193,30	DV	1559,39	192,25	ES	1567,95	191,20	FP
1534,64	195,35	CC	1542,94	194,30	CZ	1551,32	193,25	DW	1559,79	192,20	ET	1568,36	191,15	FR
1535,04	195,30	CD	1543,33	194,25	DA	1551,72	193,20	DX	1560,20	192,15	EU	1568,77	191,10	FS
1535,43	195,25	CE	1543,73	194,20	DB	1552,12	193,15	DY	1560,61	192,10	EV	1569,18	191,05	FT
1535,82	195,20	CF	1544,13	194,15	DC	1552,52	193,10	DZ	1561,01	192,05	EW	1569,59	191,00	FU
1536,22	195,15	CG	1544,53	194,10	DD	1552,93	193,05	EA	1561,42	192,00	EX			
1536,61	195,10	CH	1544,92	194,05	DE	1553,33	193,00	EB	1561,83	191,95	EY			
1537,00	195,05	CJ	1545,32	194,00	DF	1553,73	192,95	EC	1562,23	191,90	EZ			
1537,40	195,00	CK	1545,72	193,95	DG	1554,12	192,90	ED	1562,64	191,85	FA			

All wavelengths referenced to vacuum @ Tsubmount

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Please note: 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.
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ORDERING INFO

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

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