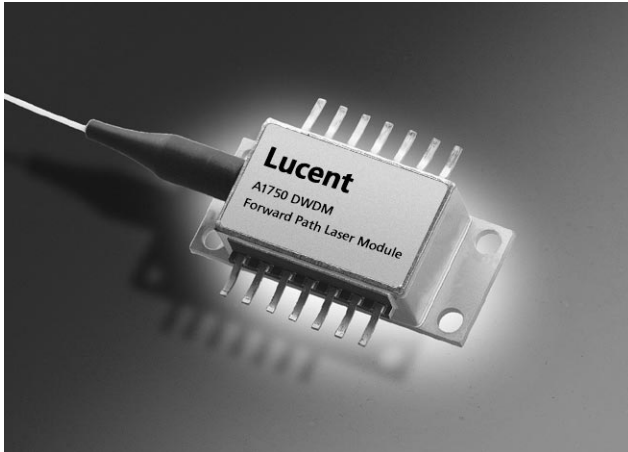




A1750A DWDM Analog Laser Module



Features

- Low adiabatic chirp
- Excellent linearity
- Standard ITU wavelengths
- Advanced analog chip design
- Tested for forward-path or return-path applications
- Reduces equipment requirements in the hub
- Exceeds *Telcordia Technologies** 468 specification.

Applications

- Networks with limited fiber
- Architectures using separate optical wavelengths to carry targeted services

* *Telcordia Technologies* is a trademark of Bell Communications Research, Inc.

Description

The A1750A laser module is a dense wavelength-division multiplexing laser with a DFB chip designed specifically for analog RF applications. The device features low adiabatic chirp to maximize signal quality in short and long lengths of fiber.

The laser's excellent inherent linearity minimizes degradation of the broadcast signals caused by the QAM channels.

The A1750A is available at a variety of standard ITU wavelengths. Lucent offers these lasers as either forward-path or return-path modules.

Wavelength-division multiplexing (WDM) has gained widespread acceptance in the telecommunications market and is being designed into emerging cable television network architectures. Dense WDM, a method for delivering targeted QAM signals to different locations, allows multiple signal sets to be combined onto a single strand of fiber for transmission from a headend to a hub. At the hub, individual QAM signals can be selected and combined with broadcast analog channels. The A1750A DWDM laser module can help reduce cable network architecture fiber requirements and lessen equipment requirements in the hub.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter*	Symbol	Min	Max	Unit
Operating Case Temperature Range	T _C	-25	65	°C
Storage Temperature Range	T _{stg}	-40	70	°C
Monitor Photodiode Reverse Voltage	V _{MPPD}	—	10	V
Laser Forward Current	I _F	—	150	mA
Reverse Voltage (Laser)	V _R	—	2	V
TEC Current	I _{TEC}	-1.5	1.5	A
RF Input Power	P _{RFIN}	—	62	dBm V

* The device can withstand continuous exposure to the specified limits without damage.

Characteristics

Table 1. Key Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Frequency Range ¹	F	—	5	—	870	MHz
Frequency Response ¹	S ₂₁	I _F = 60 mA, 40 MHz—890 MHz, T _{OP} = 25 °C,	—	±0.5	—	dB
RF Return Loss ¹	S ₂₁	I _F = 60 mA, 40 MHz—890 MHz,	—	>16	—	dB
Optical Output Power	P _O	I _F = I _{OP}	6, 8, or 10	—	—	mW
Laser Relative Intensity Noise	RIN	I _F = I _{TH} + 70 mA, T = 25 °C	—	< -155	—	dB/Hz
Composite Second Order ^{2, 3}	CSO	I _F = I _{OP} , OMI = 10%	—	< -50	—	dBc
Composite Triple Beat ^{2, 4}	CTB	I _F = I _{OP} , OMI = 10%	—	< -60	—	dBc
Available Wavelengths ⁵	λ	I _P = I _{OP} , T = T _{OP}	1528	—	1563	nm
Wavelength Drift ⁶	Δλ _{OP}	I _F = 60 mA, T = T _{OP} , T _C varied from min—>max	—	—	0.04	nm
Adiabatic Chirp	FM	I _F = 60 mA, T _{OP} = 25 °C, measured at 500 MHz	40	—	100	MHz/mA
Operating Case Temperature Range	T _C	I _F = I _{OP}	-20	—	65	°C

1. Tested in a 50 Ω system with 27 Ω series matching resistor.

2. Eight-channel loading, 10% OMI, 40 km fiber.

3. Measured at 42 MHz.

4. Measured at 553.25 MHz, 577.25 MHz, and 595.25 MHz.

5. Consult a Lucent account manager for other wavelengths.

6. Change in wavelength as case temperature is changed.

Characteristics (continued)

Table 2. Additional Characteristics

Parameter	Symbol	Conditions	Min	Max	Unit
Bias Current ¹ (Operating Current)	I _B	BOL	—	120	mA
Threshold Current	I _{TH}	25 °C, BOL	—	30	mA
Slope Efficiency ²	η	I _P = I _{TH} + 20 and I _{TH} + 60	0.10	—	mW/mA
Monitor Photocurrent	I _{MON}	I _{OP} = 0 mA, V _{RM} = 5 V, T _{OP} = 25 °C	10	200	μA/mW
Operating Chip Temperature ³	T _{OP}	I _F = I _{OP}	15	35	°C
TEC Current	I _{TEC}	−20 °C < T _C < 65 °C, T _{OP} = 15 °C—35 °C, I _F = 60 mA	−1.5	1.5	A
TEC Voltage	V _{TEC}	T _{OP} = 15 °C—35 °C over T _C	−2	2	V
Thermistor Resistance	R _{TH}	T _{OP} = 25 °C	9.5	10.5	kΩ
Optical Return Loss	ORL	T _C	40	—	dB
Side Mode Suppression Ratio	SMSR	I _F = I _{OP}	30	—	dB

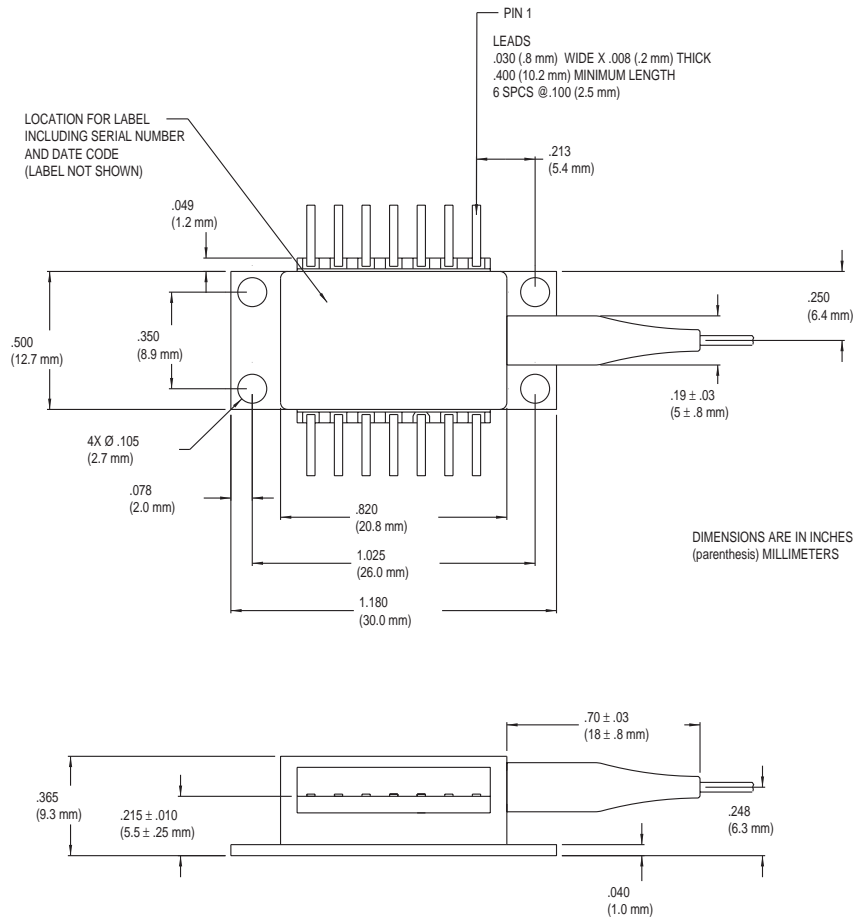
1. Bias point at which all specifications apply.

2. For 10 mW output power. Minimum slope efficiency is lower for lower power lasers.

3. Chip temperature at which wavelength specification is met. Operating chip temperature is reported for each laser.

Outline Diagram

Dimensions are in inches and (millimeters).



Pin Information

Table 3. Pin Descriptions

Pin No.	Description
1	Thermistor
2	Thermistor
3	dc Laser Bias (-)
4	MPD Anode, Case Ground
5	MPD Cathode
6	Thermoelectric Cooler (+)
7	Thermoelectric Cooler (-)
8	Case Ground
9	Case Ground
10	NC
11	Laser Common (+)
12	Laser Modulation (-)
13	Laser Common (+)
14	NC

Laser Safety Information

Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All versions are Class IIIb laser products per CDRH, 21 CFR 1040 Laser Safety requirements. All versions are Class 3B laser products per IEC* 60825-1:1993. The device has been certified with the FDA under an accession number to be determined.

This product complies with 21 CFR 1040.10 and 1040.11.

Single-mode fiber pigtail with SC/APC connectors (standard)

Wavelength = 1.5 μm

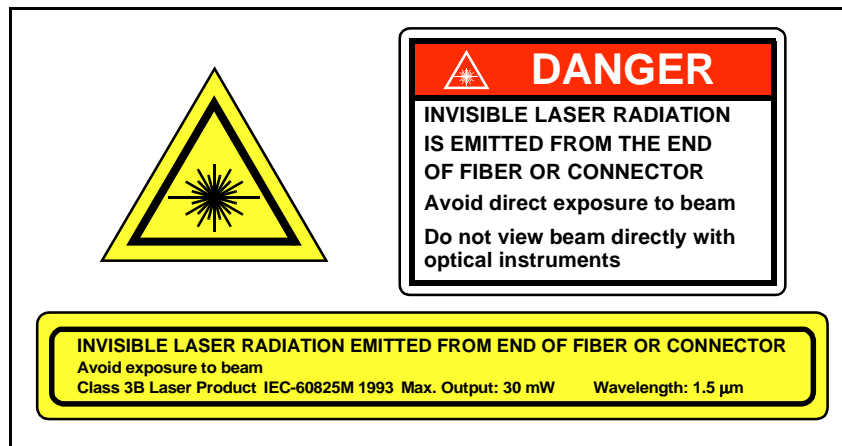
Maximum power = 30 mW

Because of size constraints, laser safety labeling (including an FDA Class IIIb label) is not affixed to the module but attached to the outside of the shipping carton.

Product is not shipped with power supply.

Caution: Use of controls, adjustments, and procedures other than those specified herein may result in hazardous laser radiation exposure.

* IEC is a registered trademark of The International Electrotechnical Commission.



Ordering Information

Table 4. Ordering Information*

Device Code	Description	Connector	Comcode
A1750A	DWDM Forward-Path Laser Module	SC/APC standard; FC/APC available	TBD

* For additional ordering information, please contact a Lucent account manager at Microelectronics Group, Opto West, 1-800-362-3891 (for sales staff, please press option 2).

For additional information, contact your Microelectronics Group Account Manager or the following:

INTERNET: <http://www.lucent.com/micro>, or for Optoelectronics information, <http://www.lucent.com/micro/opto>
 E-MAIL: docmaster@micro.lucent.com
 N. AMERICA: Microelectronics Group, Lucent Technologies Inc., 555 Union Boulevard, Room 30L-15P-BA, Allentown, PA 18109-3286
1-800-372-2447, FAX 610-712-4106 (In CANADA: **1-800-553-2448**, FAX 610-712-4106)
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 CHINA: Microelectronics Group, Lucent Technologies (China) Co., Ltd., A-F2, 23/F, Zao Fong Universe Building, 1800 Zhong Shan Xi Road, Shanghai 200233 P. R. China **Tel. (86) 21 6440 0468, ext. 325**, FAX (86) 21 6440 0652
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 Technical Inquiries: OPTOELECTRONICS MARKETING: **(44) 1344 865 900** (Ascot UK)

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