

**CW LIGHT SOURCE**  
**InGaAsP STRAINED MQW-DFB LASER DIODE MODULE**  
**FOR D-WDM APPLICATIONS**

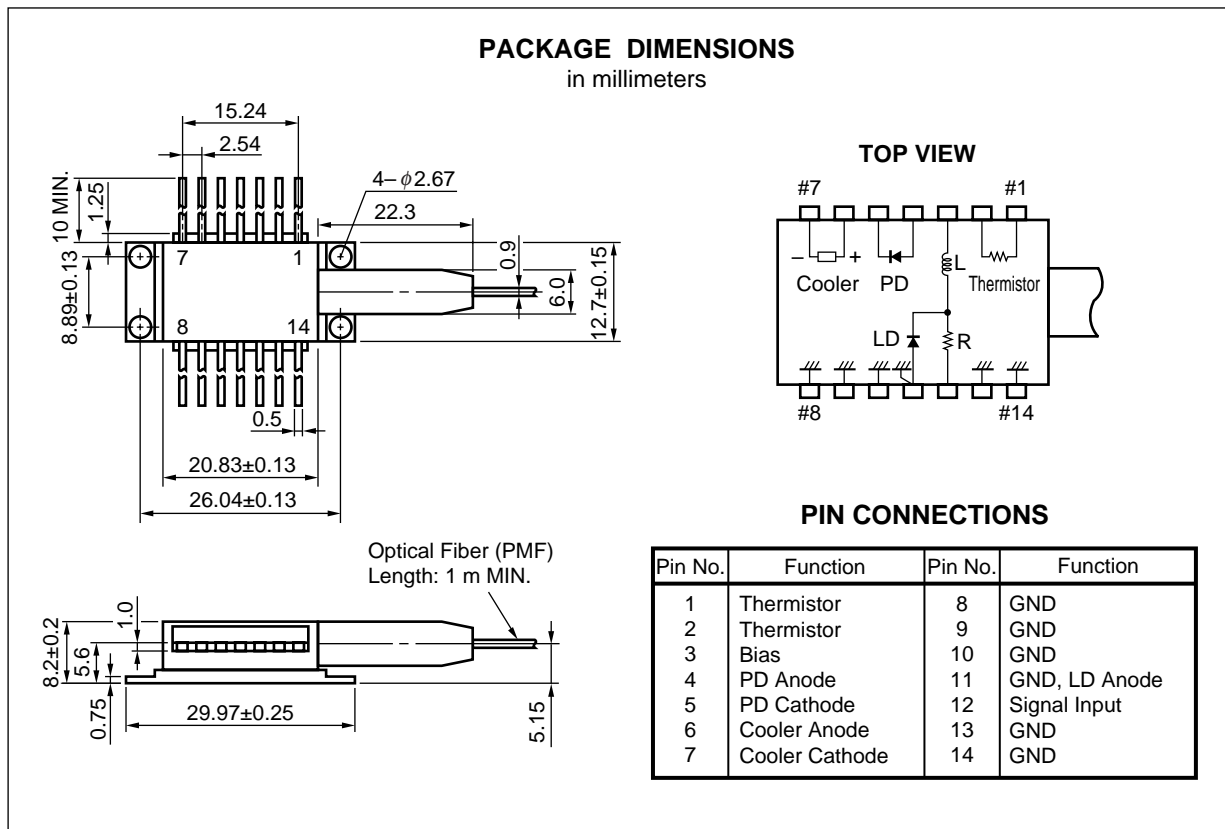
**DESCRIPTION**

The NX8563LB Series is a 1 550 nm laser diode with Polarization Maintain Fiber (PMF).

This device is designed as CW light source and ideal for D-WDM transmission systems in which external modulators are used.

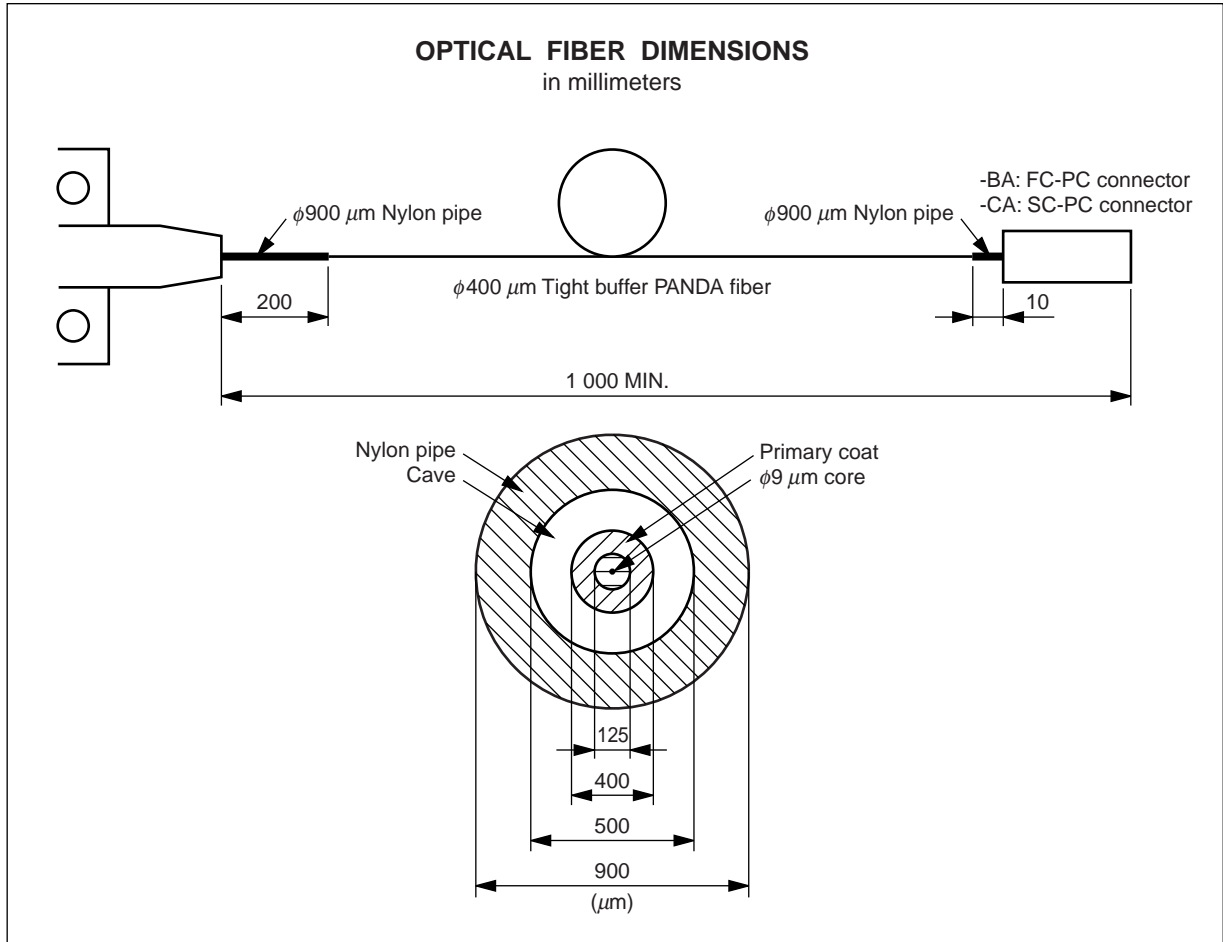
**FEATURES**

- Output power  $P_f = 10 \text{ mW MIN.}$
- Wavelength availability  $\lambda_p = 1\ 540 \text{ to } 1\ 560 \text{ nm, ITU standard based}$
- Internal thermo-electric cooler and isolator
- Hermetically sealed 14-pin butterfly package
- Polarization maintain fiber pigtail



The information in this document is subject to change without notice.

★



**ORDERING INFORMATION**

Part Number			ITU-T Wavelength (nm)	Frequency (THz)
Without Connector	With FC-PC Connector	With SC-PC Connector		
NX8563LB405	NX8563LB405-BA	NX8563LB405-CA	1540.56	194.6
NX8563LB413	NX8563LB413-BA	NX8563LB413-CA	1541.35	194.5
NX8563LB421	NX8563LB421-BA	NX8563LB421-CA	1542.14	194.4
NX8563LB429	NX8563LB429-BA	NX8563LB429-CA	1542.94	194.3
NX8563LB437	NX8563LB437-BA	NX8563LB437-CA	1543.73	194.2
NX8563LB445	NX8563LB445-BA	NX8563LB445-CA	1544.53	194.1
NX8563LB453	NX8563LB453-BA	NX8563LB453-CA	1545.32	194
NX8563LB461	NX8563LB461-BA	NX8563LB461-CA	1546.12	193.9
NX8563LB469	NX8563LB469-BA	NX8563LB469-CA	1546.92	193.8
NX8563LB477	NX8563LB477-BA	NX8563LB477-CA	1547.72	193.7
NX8563LB485	NX8563LB485-BA	NX8563LB485-CA	1548.51	193.6
NX8563LB493	NX8563LB493-BA	NX8563LB493-CA	1549.32	193.5
NX8563LB501	NX8563LB501-BA	NX8563LB501-CA	1550.12	193.4
NX8563LB509	NX8563LB509-BA	NX8563LB509-CA	1550.92	193.3
NX8563LB517	NX8563LB517-BA	NX8563LB517-CA	1551.72	193.2
NX8563LB525	NX8563LB525-BA	NX8563LB525-CA	1552.52	193.1
NX8563LB533	NX8563LB533-BA	NX8563LB533-CA	1553.33	193
NX8563LB541	NX8563LB541-BA	NX8563LB541-CA	1554.13	192.9
NX8563LB549	NX8563LB549-BA	NX8563LB549-CA	1554.94	192.8
NX8563LB557	NX8563LB557-BA	NX8563LB557-CA	1555.75	192.7
NX8563LB565	NX8563LB565-BA	NX8563LB565-CA	1556.55	192.6
NX8563LB573	NX8563LB573-BA	NX8563LB573-CA	1557.36	192.5
NX8563LB581	NX8563LB581-BA	NX8563LB581-CA	1558.17	192.4
NX8563LB589	NX8563LB589-BA	NX8563LB589-CA	1558.98	192.3
NX8563LB597	NX8563LB597-BA	NX8563LB597-CA	1559.79	192.2
NX8563LB606	NX8563LB606-BA	NX8563LB606-CA	1560.61	192.1

**ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub> = 25 °C, unless otherwise specified)**

Parameter	Symbol	Ratings	Unit
Forward Current of LD	I <sub>F</sub>	300	mA
Reverse Voltage of LD	V <sub>R</sub>	2.0	V
Forward Current of PD	I <sub>F</sub>	10	mA
Reverse Voltage of PD	V <sub>R</sub>	20	V
Operating Case Temperature	T <sub>c</sub>	-20 to +65	°C
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C
Lead Soldering Temperature (10 s)	T <sub>slid</sub>	260	°C

**ELECTRO-OPTICAL CHARACTERISTICS (T<sub>LD</sub> = 25 °C, T<sub>c</sub> = -20 to +65 °C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Laser Set Temperature	T <sub>set</sub>		20		35	°C
Forward Voltage	V <sub>F</sub>	P <sub>f</sub> = 10 mW	0.9		1.5	V
Threshold Current	I <sub>th</sub>			20	40	mA
Optical Output Power from Fiber	P <sub>f</sub>	I <sub>F</sub> = 167 mA, T <sub>LD</sub> = T <sub>set</sub>	10			mW
Threshold Output Power from Fiber	P <sub>th</sub>	I <sub>F</sub> = I <sub>th</sub>			100	μW
Quantum Efficiency	η		0.08	0.1		W/A
Peak Emission Wavelength	λ <sub>p</sub>	P <sub>f</sub> = 10 mW, CW, T <sub>LD</sub> = T <sub>set</sub>	Specified to ITU-T <sup>*1</sup>			nm
Spectral Line Width	Δν	P <sub>f</sub> = 10 mW, CW, 3 dB down		1	2	MHz
Side Mode Suppression Ratio	SMSR	P <sub>f</sub> = 10 mW, CW	30	35		dB
FM Response	η <sub>FM</sub>	P <sub>f</sub> = 10 mW	50	70		MHz/mA
Relative Intensity Noise	RIN	P <sub>f</sub> = 10 mW, 20 MHz to 3 GHz			-150	dB/Hz
Flat frequency response	f <sub>m</sub>	P <sub>f</sub> = 10 mW, +/-3 dB	1.8			GHz
Polarization Extinction Ratio <sup>*2</sup>	ext	P <sub>f</sub> = 10 mW, CW	15	20		dB

\*1 Please refer to ORDERING INFORMATION

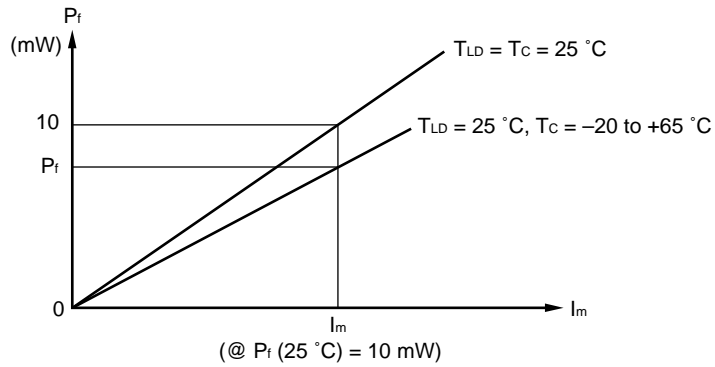
\*2 Polarization state of LD is aligned parallel to the slow axis.

**ELECTRO-OPTICAL CHARACTERISTICS**

(Applicable to Monitor PD: T<sub>LD</sub> = 25 °C, T<sub>C</sub> = -20 to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I <sub>m</sub>	P <sub>f</sub> = 10 mW, V <sub>R</sub> = 5 V	100			μA
Dark Current	I <sub>d</sub>	V <sub>R</sub> = 5 V		2	10	nA
Tracking Error	γ <sup>-1</sup>	I <sub>m</sub> = const.			0.5	dB

$$*1 \gamma = \left| 10 \log \frac{P_f}{10 \text{ mW}} \right|$$



**ELECTRO-OPTICAL CHARACTERISTICS**

(Applicable to Thermistor and TEC: T<sub>LD</sub> = 25 °C, T<sub>C</sub> = -20 to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	T <sub>LD</sub> = 25 °C	9.5	10.0	10.5	kΩ
B Constant	B		3 300	3 400	3 500	K
Cooler Current	I <sub>c</sub>	ΔT = 65 - T <sub>set</sub> , P <sub>f</sub> = 10 mW			1.0	A
Cooler Voltage	V <sub>c</sub>	ΔT = 65 - T <sub>set</sub> , P <sub>f</sub> = 10 mW			2.0	V

**DFB-LD FAMILY FOR TELECOM**

Part Number	Absolute Maximum Ratings		Typical Characteristics			SDH Application	Package
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	P <sub>r</sub> (mW)	λ <sub>p</sub> (nm)		
			TYP.	MIN.	TYP.		
NDL7603P Series	-40 to +85	-40 to +85	15	2	1 310	≤ STM-4 : 622 Mb/s	Coaxial
NDL7620P Series	0 to +70	-40 to +85	45 (MAX.)	2	1 310	≤ STM-16: 2.5 Gb/s	Coaxial
NDL7701P Series	-20 to +85	-40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NDL7705P Series	-40 to +85	-40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NX8562LB	-20 to +65	-40 to +85	20	20	1 550 <sup>*1</sup>	CW Light Source for external modulator	BFY
NX8563LB Series	-20 to +65	-40 to +85	20	10	ITU-T <sup>*2</sup>	CW Light Source for external modulator	BFY
NDL7910P	-20 to +70	-40 to +85	7	0.5	1 550 <sup>*1</sup>	≤ STM-16: 2.5 Gb/s EA modulator integrated DFB-LD	BFY

\*1 Wavelength selectable for ITU-T standards upon request

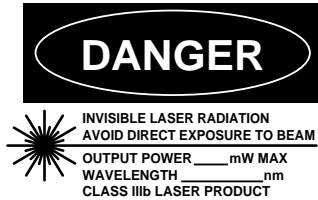
\*2 Wavelength selectable for ITU-T standards

**REFERENCE**

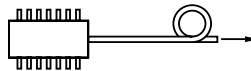
Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
Semiconductor selection guide	X10679E

**CAUTION**

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**



**SEMICONDUCTOR LASER**



**AVOID EXPOSURE-Invisible Laser Radiation is emitted from this aperture**

**NEC Corporation**

NEC Building, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-01, Japan

Type number: \_\_\_\_\_

Manufactured: \_\_\_\_\_

Serial Number: \_\_\_\_\_

This product conforms to FDA regulations as applicable to standards 21 CFR Chapter 1. Subchapter J.

The export of this product from Japan is prohibited without governmental license. To export or re-export this product from a country other than Japan may also be prohibited without a license from that country. Please call an NEC sales representative.

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

**Standard:** Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

**Special:** Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

**Specific:** Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.