

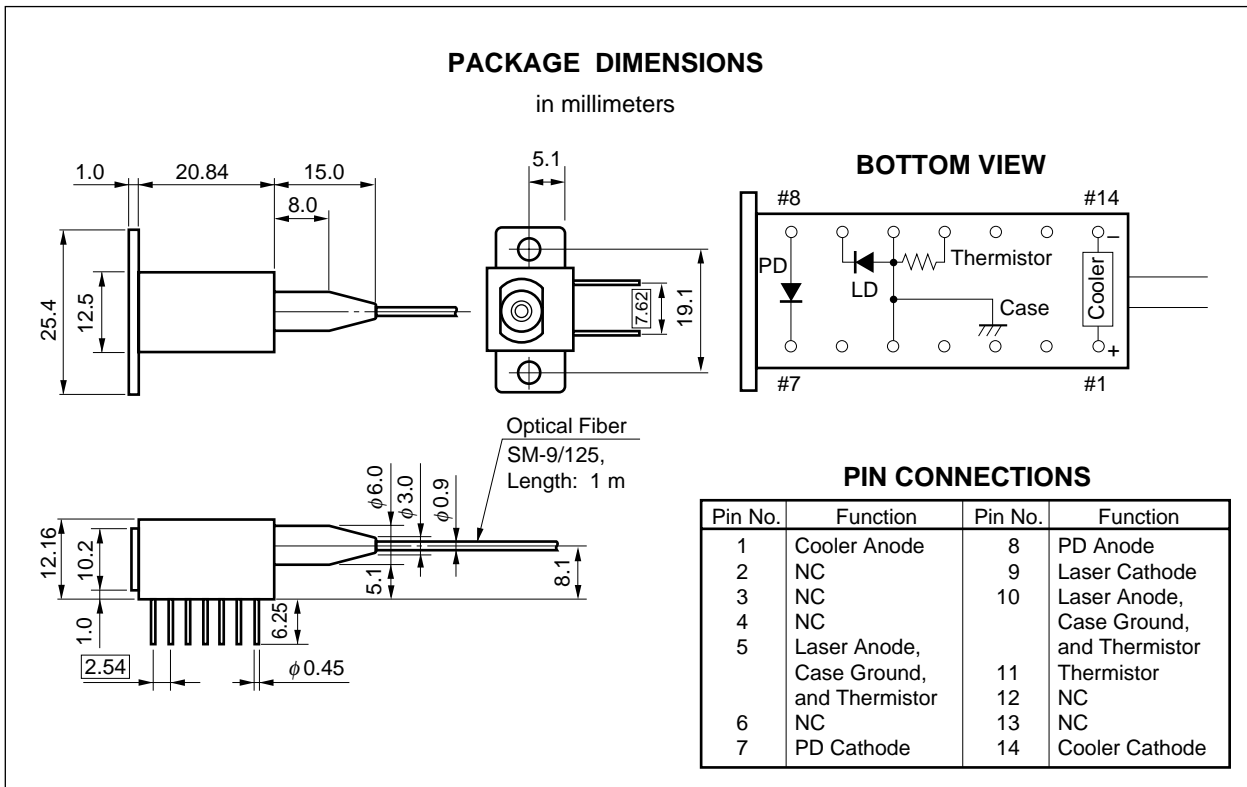
1 310 nm OPTICAL FIBER COMMUNICATIONS
InGaAsP STRAINED MQW DC-PBH LASER DIODE MODULE

DESCRIPTION

The NDL7400P is a 1 310 nm laser diode DIP module with single mode fiber and internal thermo-electric cooler. It incorporates lens for optical coupling between laser chip and optical fiber and YAG laser welding technique is utilized. Therefore, this lens coupling system can achieve stable optical output power as well as high coupling efficiency in wide operating temperature range.

FEATURES

- High output power $P_f = 2.0 \text{ mW}$
- High speed $t_r = 0.5 \text{ ns}, t_f = 0.7 \text{ ns}$
- Low threshold current $I_{th} = 10 \text{ mA}$
- Long wavelength $\lambda_c = 1310 \text{ nm}$
- Internal thermo-electric cooler
- Hermetically sealed 14-pin Dual-In-Line Package
- Single mode fiber pigtail
- High reliability



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

ORDERING INFORMATION

Part Number	Available Connector
NDL7400P	Without Connector
NDL7400PC	With FC-PC Connector
NDL7400PD	With SC-PC Connector

ABSOLUTE MAXIMUM RATINGS (T_c = 25 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Forward Current of LD	I _F	I _{th} + 50	mA
Reverse Voltage of LD	V _R	2.0	V
★ Forward Current of PD	I _F	10	mA
Reverse Voltage of PD	V _R	20	V
Operating Case Temperature	T _c	-20 to +65	°C
Storage Temperature	T _{stg}	-40 to +70	°C
Lead Soldering Temperature (10 s)	T _{slid}	260	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_{LD} = 25 °C, T_c = -20 to +65 °C)

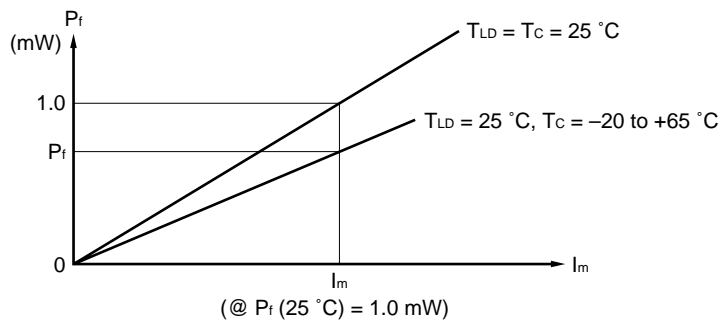
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage	V _F	I _F = 30 mA			1.3	V
Threshold Current	I _{th}			10	20	mA
Optical Output Power from Fiber	P _f	I _F = I _{th} + 30 mA	1.0	2.0		mW
Spontaneous Emission Power from Fiber	P _s	I _F = I _{th}			40	μW
Differential Efficiency from Fiber	η _d		0.033	0.067		W/A
RMS Center Wavelength	λ _c	P _f = 1.0 mW, RMS (-20 dB)	1 290	1 310	1 330	nm
Spectral Width	σ	P _f = 1.0 mW, RMS (-20 dB)		1.0	2.5	nm
Rise Time	t _r	10 to 90 %		0.5	1.0	ns
Fall Time	t _f	90 to 10 %		0.7	1.0	ns

ELECTRO-OPTICAL CHARACTERISTICS

(Applicable to Monitor PD: T_{LD} = 25 °C, T_C = -20 to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I _m	V _R = 5 V, P _f = 1.0 mW	50		350	μA
Dark Current	I _d	V _R = 5 V			1.0	μA
Rise Time	t _r	V _R = 5 V, R _L = 100 Ω		3.0	5.0	ns
Fall Time	t _f	V _R = 5 V, R _L = 100 Ω		5.0	8.0	ns
Tracking Error	γ ^{*1}	I _m = const.			0.5	dB

$$*1 \gamma = \left| 10 \log \frac{P_f}{1.0 \text{ mW}} \right|$$



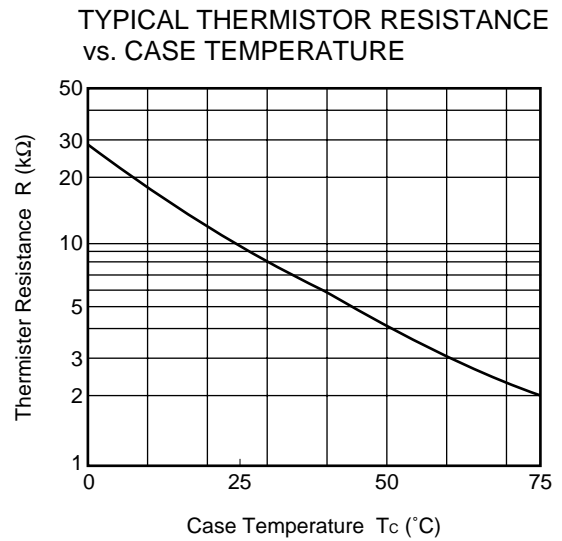
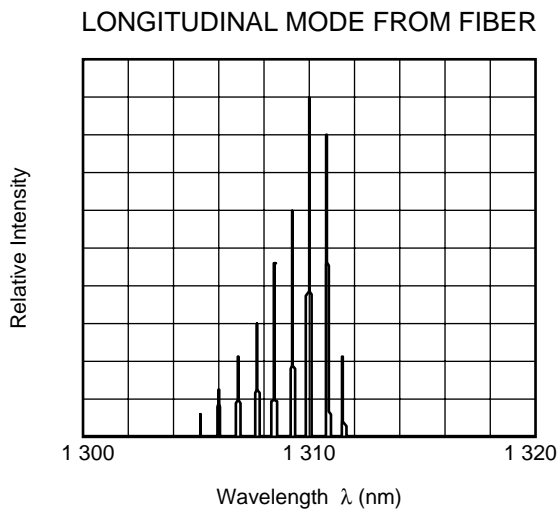
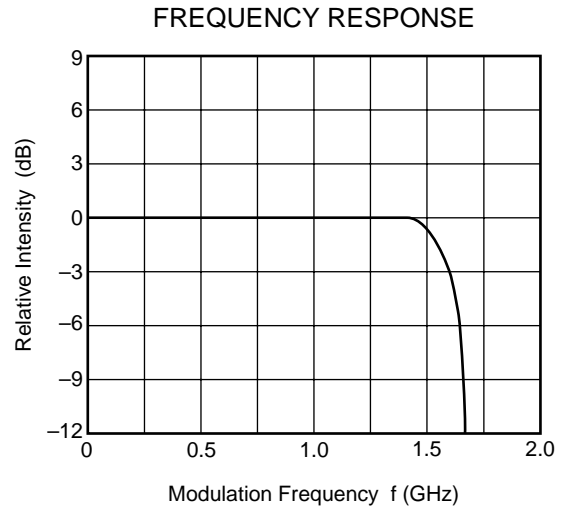
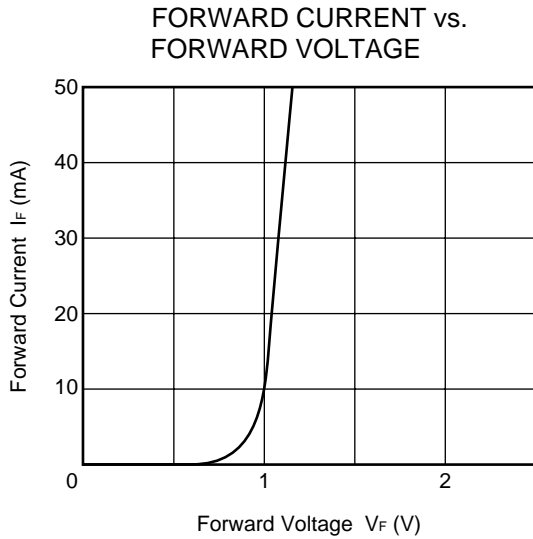
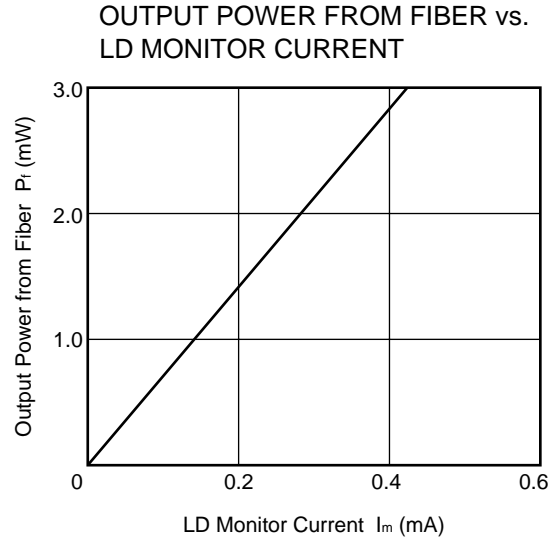
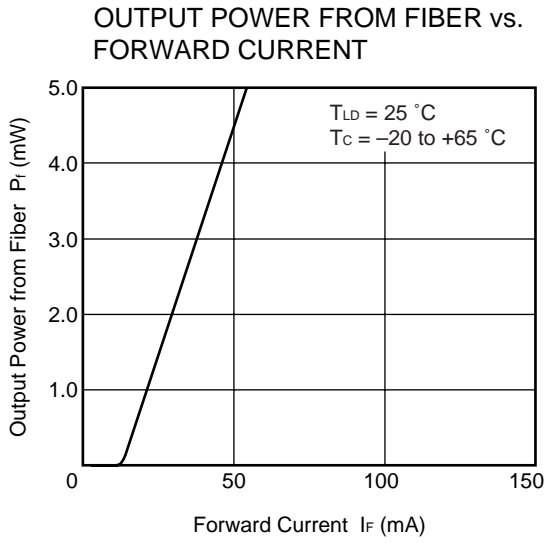
ELECTRO-OPTICAL CHARACTERISTICS

(Applicable to Thermistor and TE Cooler: T_{LD} = 25 °C, T_C = -20 to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	T _{LD} = 25 °C	9.5	10	10.5	kΩ
B Constant	B		3 300	3 400	3 500	K
Cooler Current	I _c	ΔT = 40 K		0.6	1.0	A
Cooler Voltage	V _c	ΔT = 40 K		1.1	1.5	V
Cooler Capacity	ΔT ^{*1}	I _c = 1.0 A, P _f = 1.0 mW	40			K

$$*1 \Delta T = |T_c - T_{LD}|$$

TYPICAL CHARACTERISTICS ($T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified)



1.3 μm FABRY-PEROT DC-PBH LASER DIODE FAMILY

Part Number	Package	Remarks
NDL7001	ϕ 5.6 mm Small Can	With monitor photo diode
NDL7001L	ϕ 5.6 mm Small Can with Lens	With monitor photo diode
NDL7401P Series NDL7408P Series	4-pin Coaxial Module with SMF	Without TEC With monitor photo diode
NDL7400P	14-pin DIP Module with SMF	With TEC, thermistor, monitor photo diode

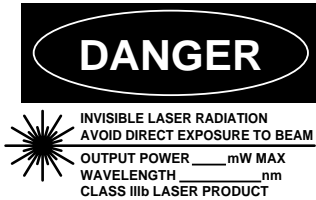
★ **REFERENCE**

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

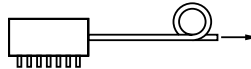
[MEMO]

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.