

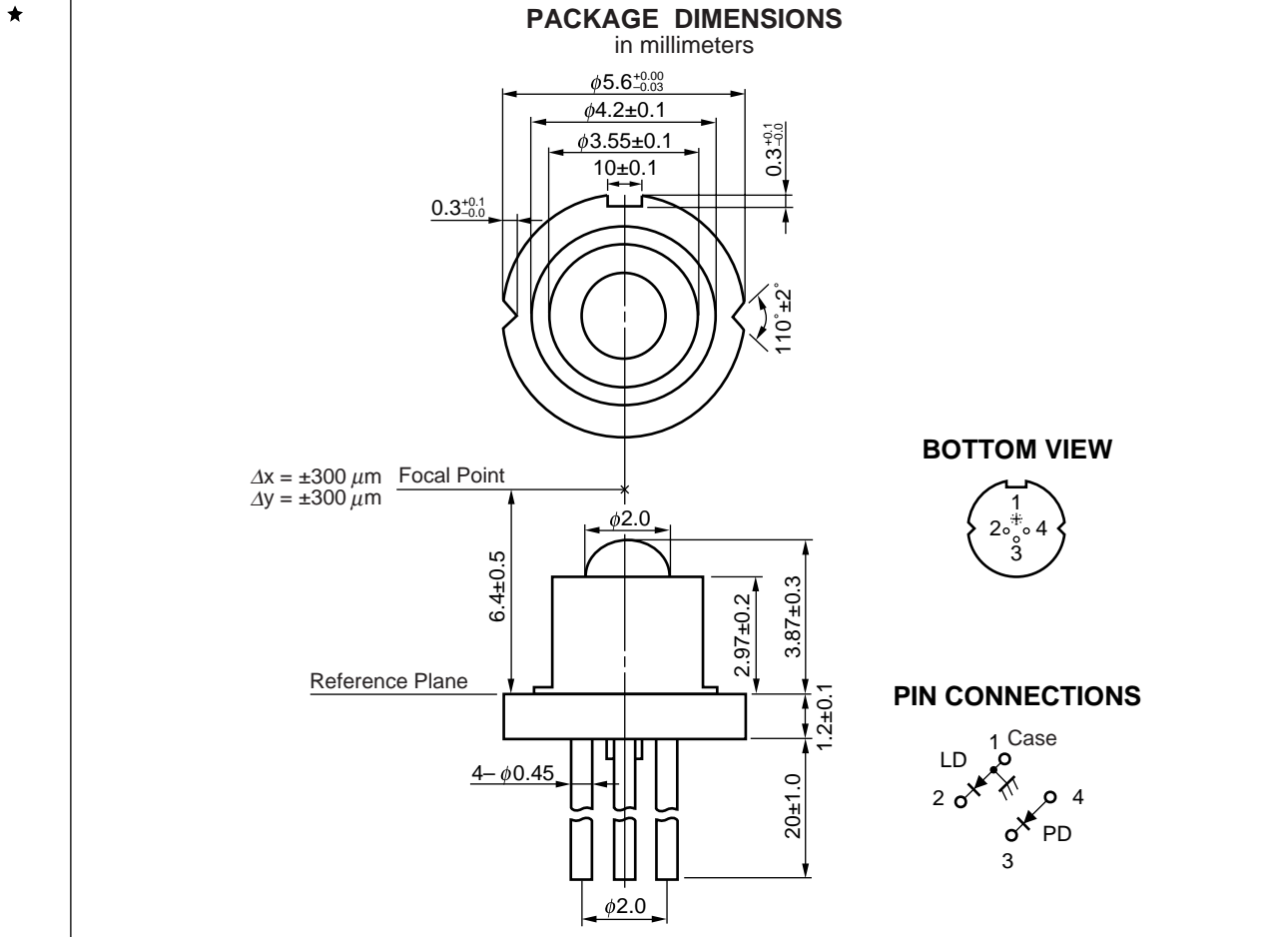
1 310 nm FIBER OPTIC COMMUNICATIONS  
InGaAsP STRAINED MQW DC-PBH LASER DIODE WITH LENS

DESCRIPTION

NDL7001L is a 1 310 nm laser diode for fiber optic communications. It has a strained Multiple Quantum Well (st-MQW) structure and a built-in InGaAs monitor photo diode. It is designed for all STM-1 and short haul of STM-4 applications.

FEATURES

- Optical output power  $P_o = 5.0 \text{ mW}$
- High efficiency  $\eta_d = 0.38 \text{ W/A}$
- Low threshold current  $I_{th} = 10 \text{ mA}$
- High speed  $t_r, t_f = 0.5 \text{ ns MAX.}$
- Wide operating temperature range  $T_c = -40 \text{ to } +85 \text{ }^\circ\text{C}$
- InGaAs monitor PIN-PD
- Small package with lens



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

★ ORDERING INFORMATION

Part Number	Rank
NDL7001L	M

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

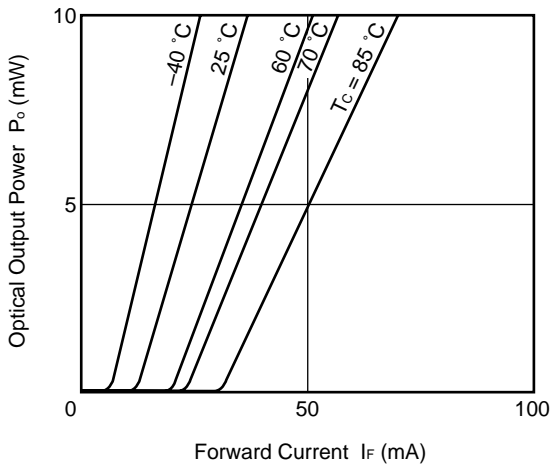
Parameter	Symbol	Ratings	Unit
Optical Output Power	P <sub>o</sub>	10	mW
Reverse Voltage of LD	V <sub>R</sub>	2.0	V
Forward Current of PD	I <sub>F</sub>	10	mA
Reverse Voltage of PD	V <sub>R</sub>	20	V
Operating Case Temperature	T <sub>C</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-55 to +125	°C
Lead Soldering Temperature (10 s)	T <sub>slid</sub>	260	°C

**ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C, unless otherwise specified)**

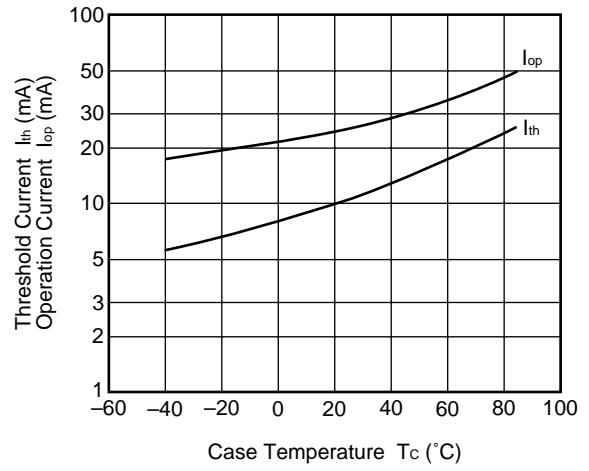
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V <sub>op</sub>	P <sub>o</sub> = 5.0 mW		1.1	1.3	V
Threshold Current	I <sub>th</sub>			10	20	mA
		T <sub>c</sub> = 85 °C		25	50	
Modulation Current	I <sub>mod</sub>	P <sub>o</sub> = 5.0 mW		13	20	mA
Differential Efficiency	η <sub>d</sub>		0.25	0.38		W/A
Temperature Dependence of Differential Efficiency	Δη <sub>d</sub>	$\Delta\eta_d = 10 \log \frac{\eta_d(T_c = 85\text{ }^\circ\text{C})}{\eta_d(T_c = 25\text{ }^\circ\text{C})}$	-3.0	-1.5		dB
Center Wavelength	λ <sub>c</sub>	P <sub>o</sub> = 5.0 mW, RMS (-20 dB)	1 280	1 310	1 340	nm
Temperature Dependence of Center Wavelength	Δλ/ΔT	T <sub>c</sub> = -40 to +85 °C		0.4	0.5	nm/°C
Spectral Width	σ	P <sub>o</sub> = 5.0 mW, RMS (-20 dB)		1.0	4.0	nm
Rise Time	t <sub>r</sub>	10 to 90 %		0.2	0.5	ns
Fall Time	t <sub>f</sub>	90 to 10 %		0.3	0.5	ns
Monitor Current	I <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>o</sub> = 5.0 mW	200	650		μA
Monitor Dark Current	I <sub>d</sub>	V <sub>R</sub> = 5 V		0.1	10	nA

TYPICAL CHARACTERISTICS (Tc = -40 to +85 °C)

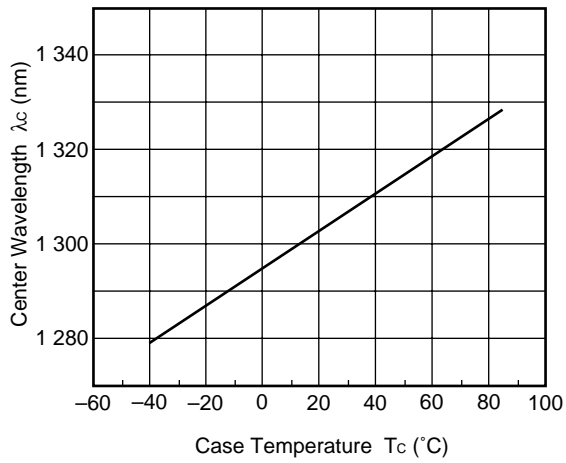
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



THRESHOLD CURRENT AND OPERATION CURRENT vs. CASE TEMPERATURE

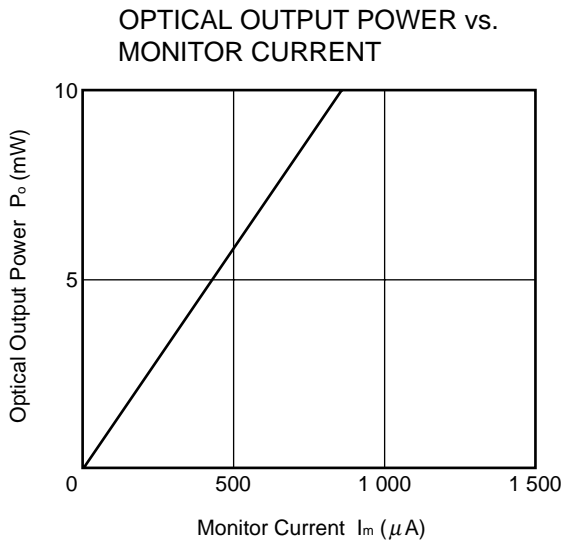
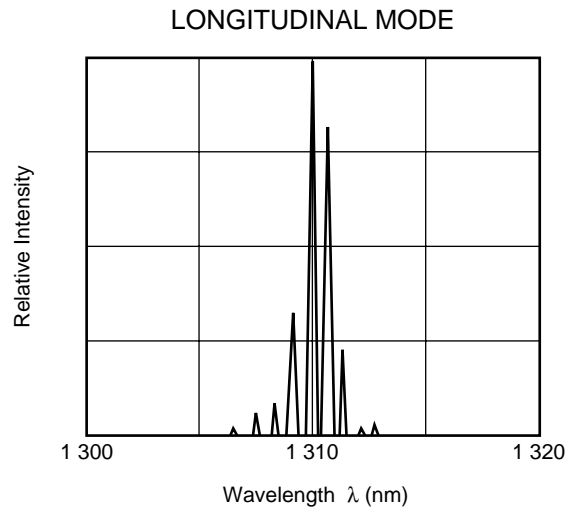
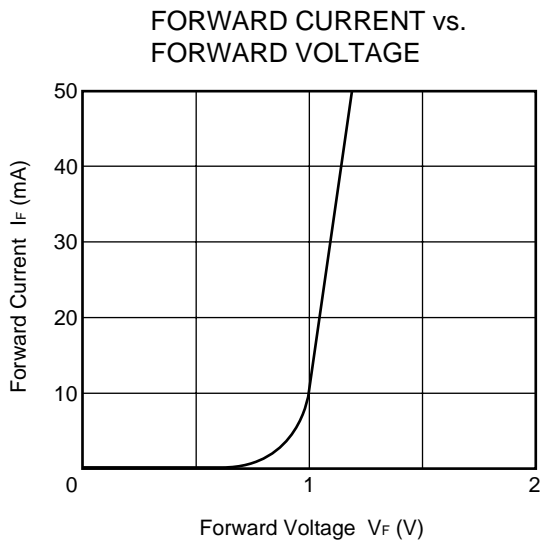


CENTER WAVELENGTH vs. CASE TEMPERATURE



**Remark** The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C)



**Remark** The graphs indicate nominal characteristics.

★ 1.3 μm FABRY-PEROT DC-PBH LASER DIODE FAMILY

Part Number	Absolute Maximum Ratings			Typical Characteristics (T <sub>c</sub> = 25 °C)					Package
	I <sub>F</sub> (mA)	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	I <sub>op</sub> (mA)	P <sub>o</sub> /P <sub>f</sub> (mW)	λ <sub>c</sub> (nm)	t <sub>r</sub> /t <sub>f</sub> (ns)	
				TYP.	TYP.	MIN.	TYP.	MAX.	
NDL7001	—	-40 to +85	-55 to +125	10	I <sub>th</sub> + 12	5.0	1 310	0.5/0.5	CAN
NDL7001L	—	-40 to +85	-55 to +125	10	I <sub>th</sub> + 15	5.0	1 310	0.5/0.5	CAN
NDL7401P Series	I <sub>th</sub> + 50	-40 to +85	-40 to +85	10	I <sub>th</sub> + 15	2.0	1 310	0.5/0.5	Coaxial
NDL7408PL Series	I <sub>th</sub> + 50	-40 to +85	-40 to +85	10	I <sub>th</sub> + 15	0.2	1 310	0.5/0.5	Coaxial
NDL7408PK Series	I <sub>th</sub> + 50	-40 to +85	-40 to +85	10	I <sub>th</sub> + 20	1.0	1 310	0.5/0.5	Coaxial

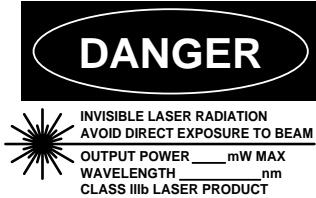
**REFERENCE**

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

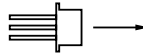
[MEMO]

**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.

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**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)

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Anti-radioactive design is not implemented in this product.