

1 310 nm OPTICAL CATV RETURN PATH APPLICATIONS InGaAsP MQW LASER DIODE MODULE WITH ISOLATOR

DESCRIPTION

The NDL7405P Series is a 1 310 nm uncooled isolated coaxial FP (Fabry Perot) laser diode, which has a newly developed Multiple Quantum Well (MQW) structure. It is especially designed for optical CATV return path applications.

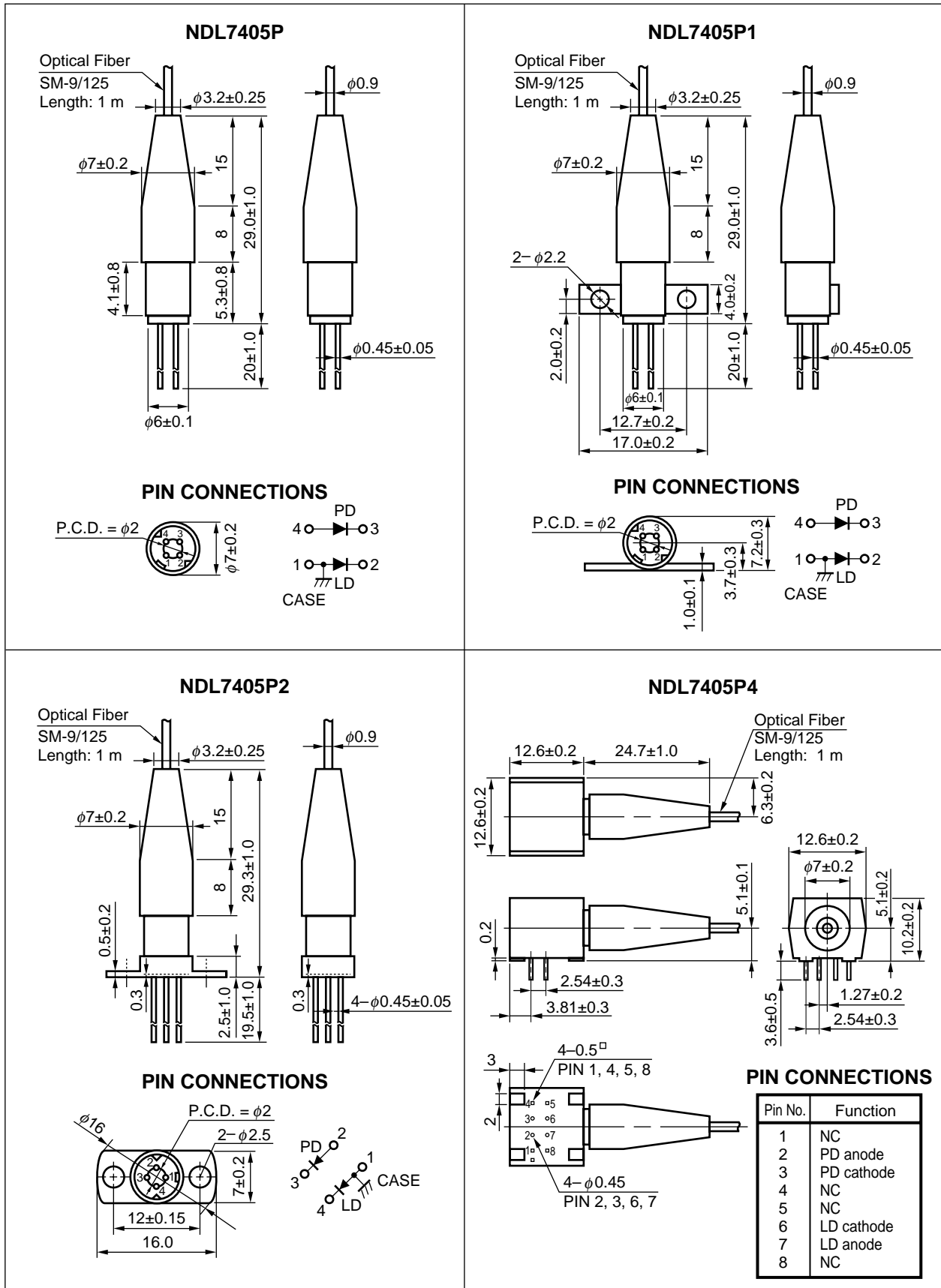
FEATURES

- Low distortion IMD2 = -40 dBc MAX.*¹
- High CNR IMD3 = -50 dBc MAX.*¹
- Output power CNR = 43 dB MIN.*¹
- Long wavelength P_i = 1.0 mW
- Internal InGaAs monitor PD and isolator λ_c = 1 310 nm
- Single mode fiber pigtail with FC-SPC connector, SC-SPC connector or SC-APC connector
- Wide operating temperature range T_c = -40 to +85 °C

*1 2 ch, Fiber loss = 7 dB, OMI = 20 %

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)



ORDERING INFORMATION

Part Number	Available Connector	Flange Type
NDL7405PC	With FC-SPC Connector	No Flange
NDL7405PD	With SC-SPC Connector	
NDL7405PX	With SC-APC Connector	
NDL7405P1C	With FC-SPC Connector	Flat Mount Flange
NDL7405P1D	With SC-SPC Connector	
NDL7405P1X	With SC-APC Connector	
NDL7405P2C	With FC-SPC Connector	Vertical Flange
NDL7405P2D	With SC-SPC Connector	
NDL7405P2X	With SC-APC Connector	
NDL7405P4C	With FC-SPC Connector	Lead Bend
NDL7405P4D	With SC-SPC Connector	
NDL7405P4X	With SC-APC 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	15	V
Operating Case Temperature	T _c	-40 to +85	°C
Storage Temperature	T _{stg}	-40 to +85	°C
Lead Soldering Temperature (10 s)	T _{slid}	260	°C

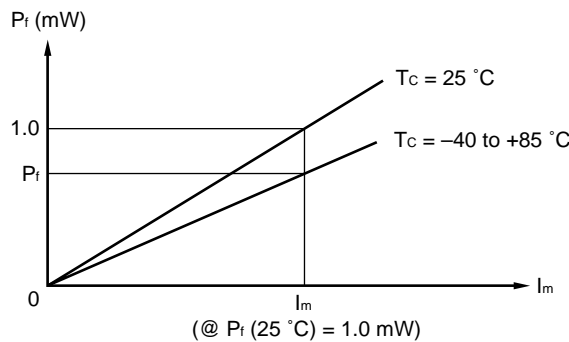
ELECTRO-OPTICAL CHARACTERISTICS

(T_c = 25 °C, Optical Reflection ≤ -40 dB, unless otherwise specified)

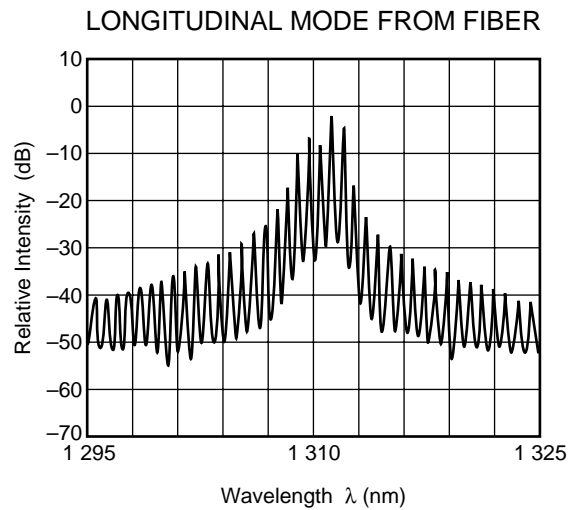
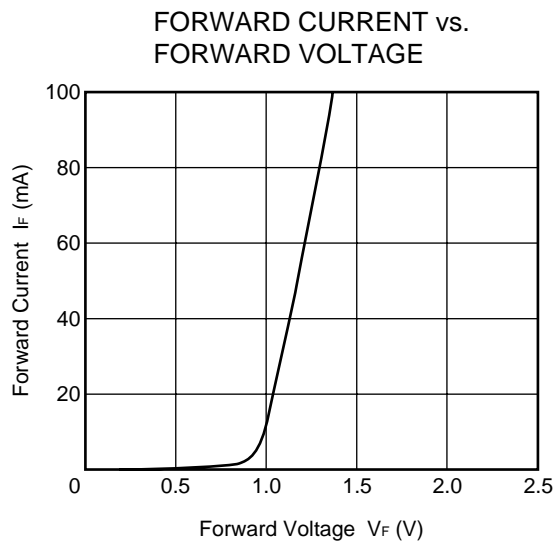
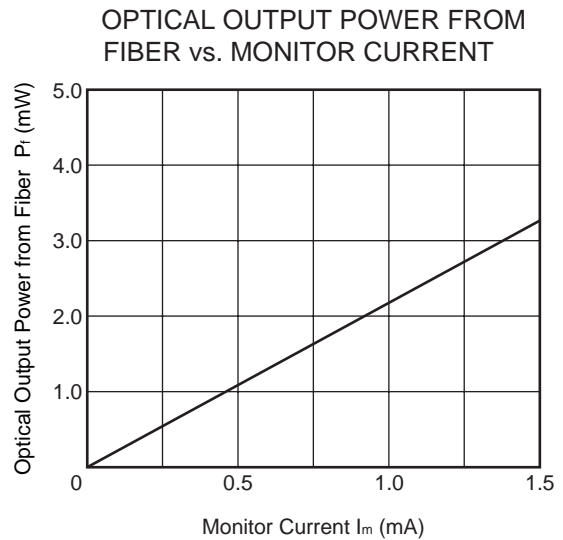
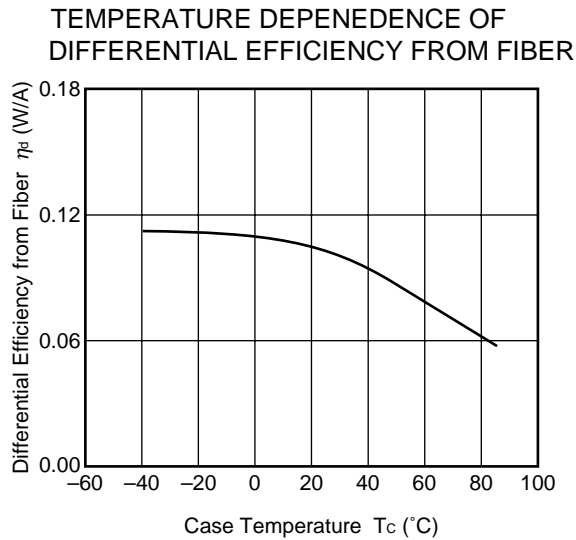
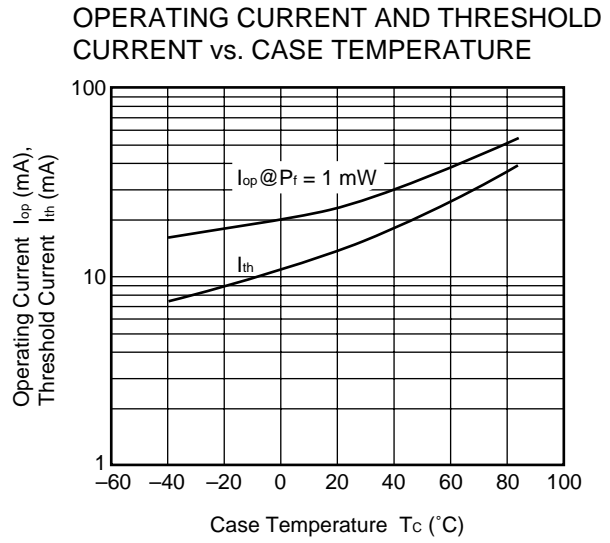
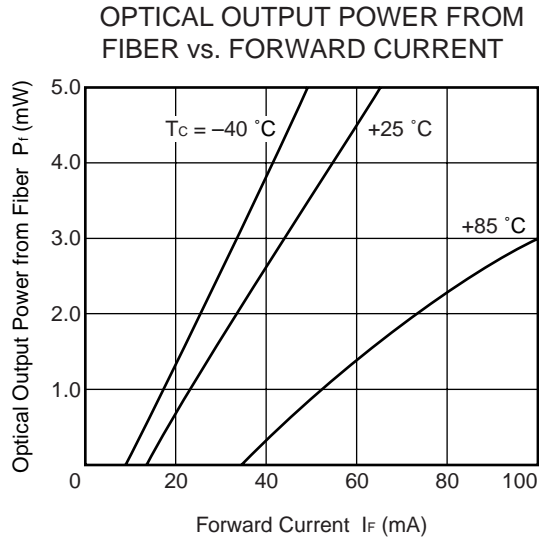
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage	V _F	I _F = 30 mA		1.1	1.5	V
Threshold Current	I _{th}	CW		10	25	mA
		CW, T _c = 85 °C		25	50	
Operating Current	I _{op}	CW		25	40	mA
		CW, T _c = 85 °C		50	80	
Differential Efficiency from Fiber	η _d	P _f = 1.0 mW	0.050	0.100		W/A
		P _f = 1.0 mW, T _c = 85 °C	0.036	0.070		
Center Wavelength	λ _c	P _f = 1.0 mW, RMS (-20 dB), T _c = -40 to +85 °C	1 260	1 310	1 360	nm
Spectral Width	σ	P _f = 1.0 mW, RMS (-20 dB), T _c = -40 to +85 °C			4.0	nm
2nd Order Inter-modulation Distortion	IMD2	*1			-40	dBc
3rd Order Inter-modulation Distortion	IMD3	*1			-50	dBc
Carrier to Noise Ratio	CNR	*1	43			dB
Monitor Current	I _m	V _R = 5 V, P _f = 1.0 mW	100	700	1 000	μA
Dark Current	I _D	V _R = 5 V		0.1	10	nA
Tracking Error	γ ²	I _m = const., P _f = 1.0 mW, T _c = -40 to +85 °C	-1.0		1.0	dB

*1 Conditions: P_f = 1.0 mW, T_c = -40 to +85 °C, 2 channel unmodulated carriers 13 MHz and 19 MHz,
Optical Reflection = -40 dB, Fiber Loss = 7 dB,
OMI = 20 %/ch @ T_c = -40 to +85 °C

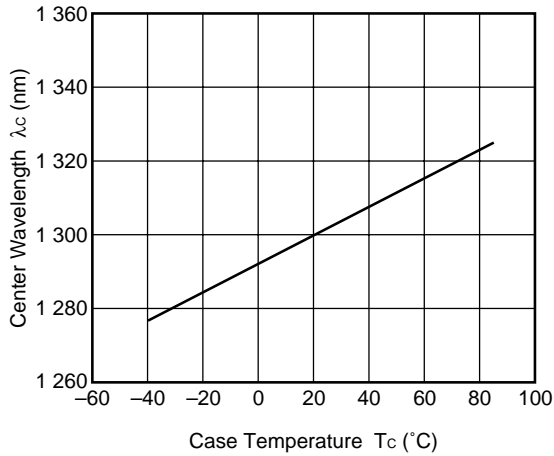
*2 $\gamma = \left| 10 \log \frac{P_f}{1.0 \text{ mW}} \right|$



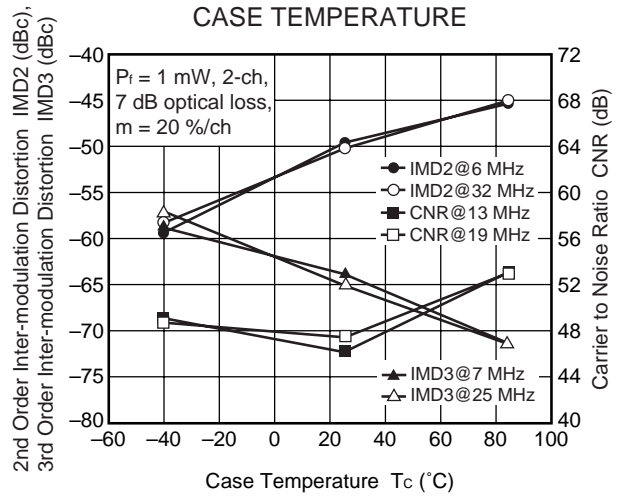
★ TYPICAL CHARACTERISTICS ($T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified)



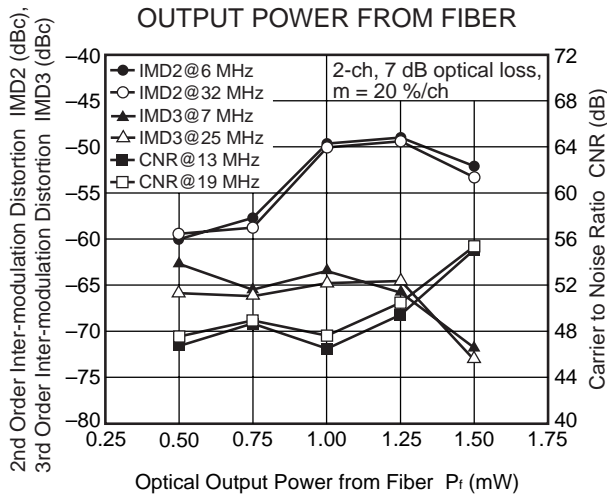
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



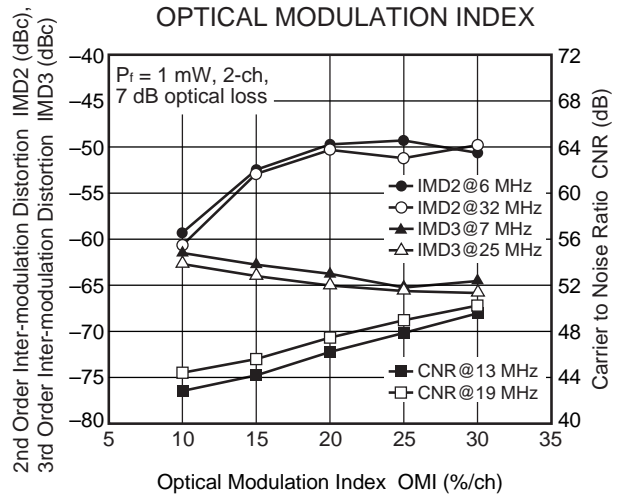
IMD2, IMD3, CNR vs. CASE TEMPERATURE



IMD2, IMD3, CNR vs. OPTICAL OUTPUT POWER FROM FIBER



IMD2, IMD3, CNR vs. OPTICAL MODULATION INDEX



Remark The graphs indicate nominal characteristics.

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 Products & Packages(CD-ROM)	X13769X

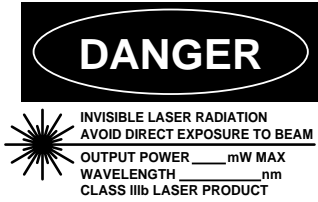
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CAUTION

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.

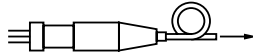


DANGER

INVISIBLE LASER RADIATION
AVOID DIRECT EXPOSURE TO BEAM

OUTPUT POWER _____mW MAX
WAVELENGTH _____nm
CLASS IIIb LASER PRODUCT

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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