DATA SHEET

NEC

LASER DIODE

NDL7705P Series

1 500 nm OPTICAL FIBER COMMUNICATIONS
InGaAsP MQW-DFB LASER DIODE COAXIAL MODULE

DESCRIPTION

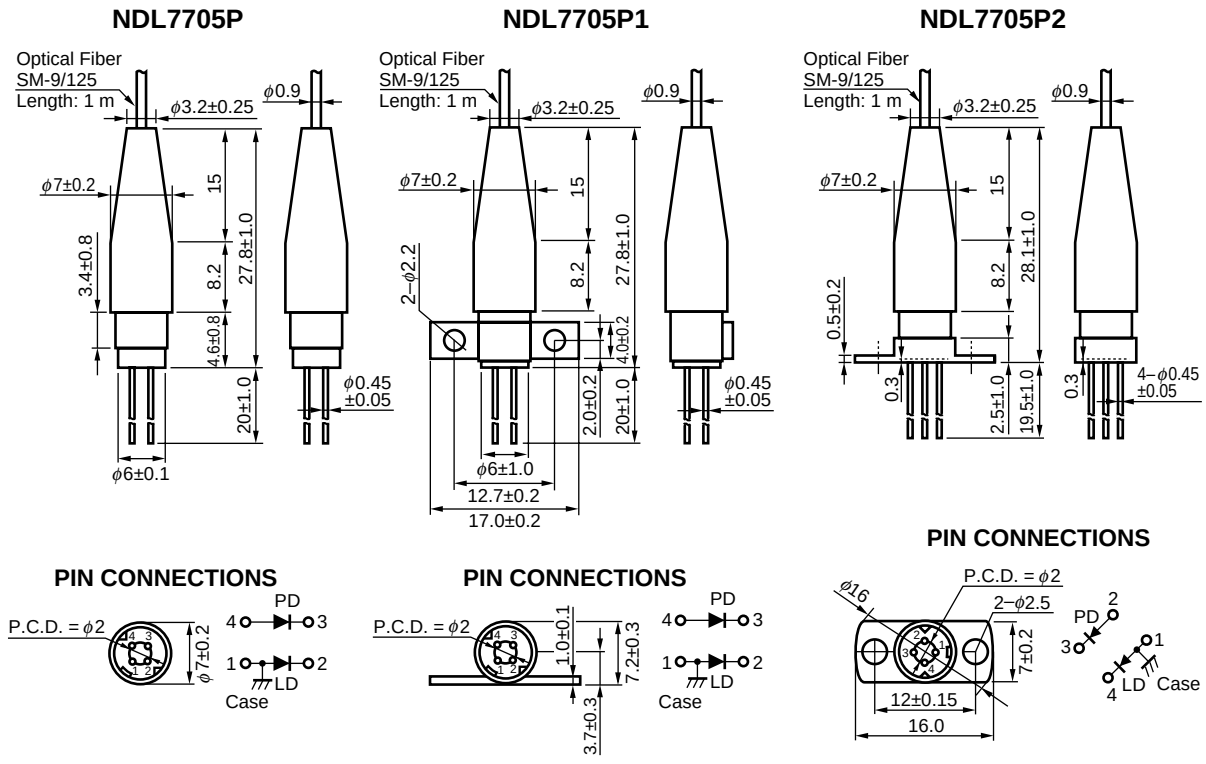
The NDL7705P Series is a 1 550 nm phase-shifted DFB (Distributed Feed-Back) laser diode module with optical isolator. Multiple Quantum Well (MQW) structure is adopted to achieve stable dynamic single longitudinal mode operation over wide temperature range of –40 to +85 °C.

It is designed for all STM-1 and STM-4 applications.

FEATURES

- Peak emission wavelength λ_p = 1 550 nm
- Optical output power P_f = 2.0 mW
- Wide operating temperature range T_C = –40 to +85 °C
- λ/4-phase-shifted DFB
- InGaAs monitor PIN-PD
- Internal optical isolator

PACKAGE DIMENSIONS
in millimeters



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

Document No. P12438EJ3V0DS00 (3rd edition)
Date Published September 1997 NS
Printed in Japan

The mark ★ shows major revised points.

ORDERING INFORMATION

Part Number	Available Connector	Flange Type
NDL7705P	Without Connector	No flange
NDL7705PC	With FC-PC Connector	
NDL7705PD	With SC-PC Connector	
NDL7705P1	Without Connector	Flat Mount Flange
NDL7705P1C	With FC-PC Connector	
NDL7705P1D	With SC-PC Connector	
NDL7705P2	Without Connector	Vertical Mount Flange
NDL7705P2C	With FC-PC Connector	
NDL7705P2D	With SC-PC Connector	

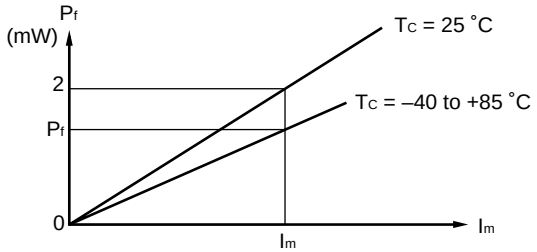
ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Optical Output Power	P_f	5.0	mW
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	2.0	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_{sld}	260	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_C = –40 to +85 °C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage	V_F	I_F = 30 mA	0.9		1.3	V
Threshold Current	I_{th}	T_C = 25 °C		15		mA
		T_C = 85 °C		35	50	
Differential Efficiency form Fiber	η_d	T_C = 25 °C	0.070	0.120		W/A
		T_C = 85 °C	0.035	0.075		
Temperature Dependence of Differential Efficiency from Fiber	$\Delta\eta_d$	$\Delta\eta_d = 10 \log \frac{\eta_d (85\ °C)}{\eta_d (25\ °C)}$	–3	–2		dB
Peak Emission Wavelength	λ_p	P_f = 1 mW	1 530	1 550	1 570	nm
Side Mode Suppression Ratio	SMSR	P_f = 1 mW	30			dB
Rise Time	t_r	$I_b = 0.9 \times I_{th}$			0.5	ns
Fall Time	t_f	$I_b = 0.9 \times I_{th}$			0.5	ns
Monitor Current	I_m	V_R = 5 V, P_f = 2 mW	300		2 500	μA
Monitor Dark Current	I_D	V_R = 5 V, T_C = 25 °C		0.1	5	nA
Tracking Error	γ^{*1}	I_m = const. (P_f = 2 mW, T_C = 25 °C)			1.0	dB
Relative Intensity Noise	RIN	Ref = –14 dB, P_f = 1 mW		–140	–130	dB/Hz

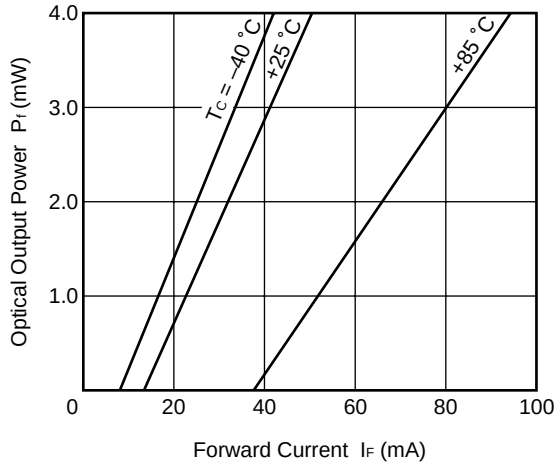
***1** $\gamma = \left| 10 \log \frac{P_f}{2.0\ mW} \right|$



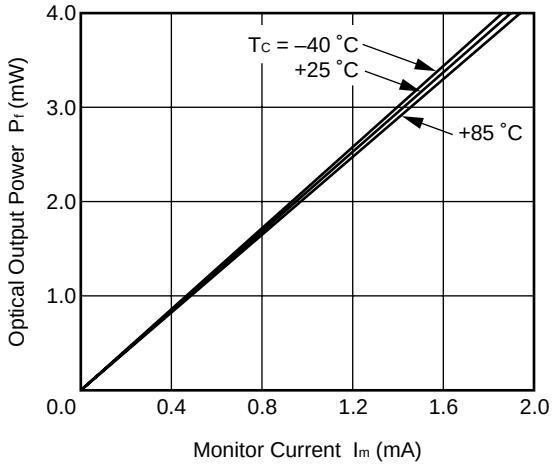
(@ P_f (25 ˚C) = 2 mW)

★ **TYPICAL CHARACTERISTICS (T_C = 25 °C, unless otherwise specified)**

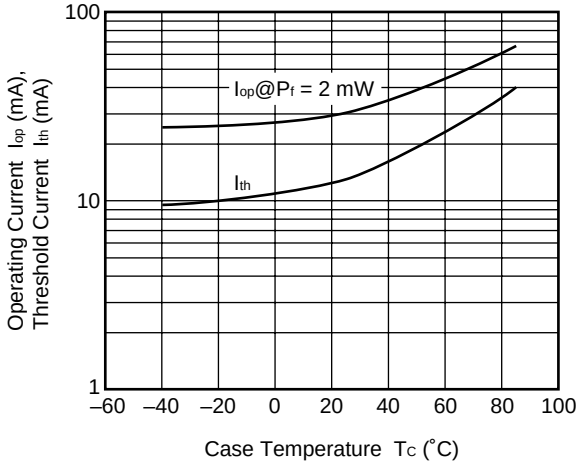
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



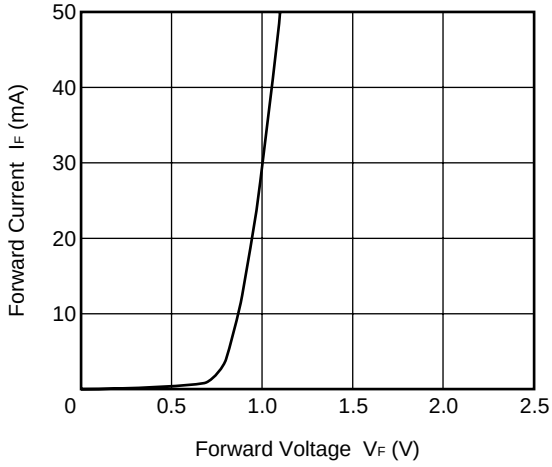
OPTICAL OUTPUT POWER vs. MONITOR CURRENT



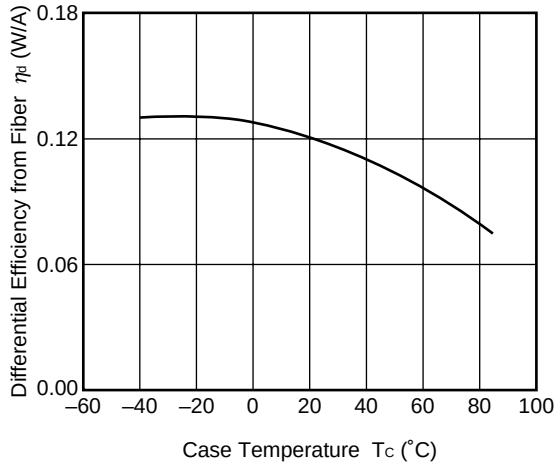
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



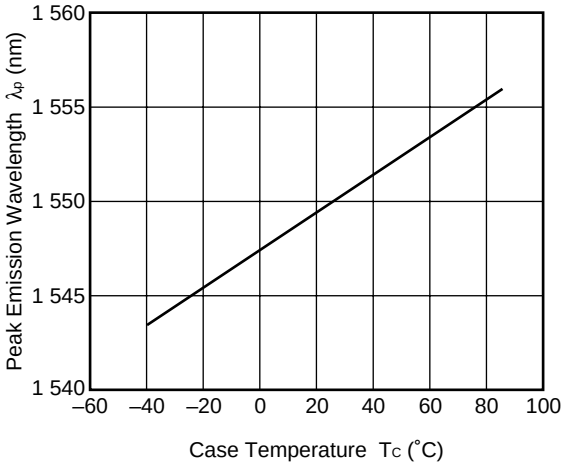
FORWARD CURRENT vs. FORWARD VOLTAGE



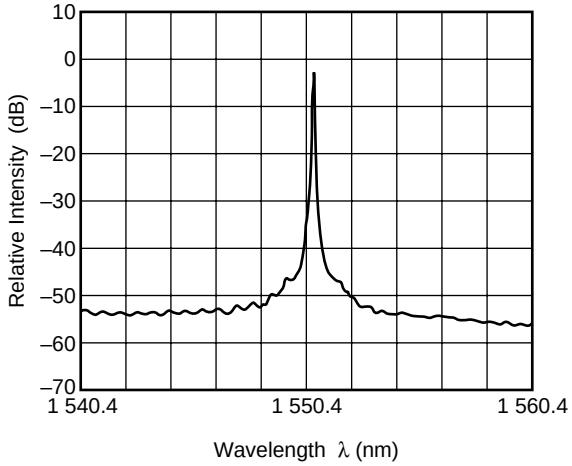
TEMPERATURE DEPENEDENCE OF DIFFERENTIAL EFFICIENCY FROM FIBER



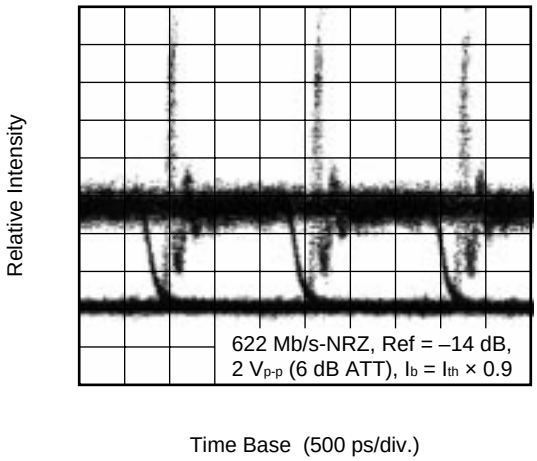
TEMPERATURE DEPENDENCE OF PEAK EMISSION WAVELENGTH



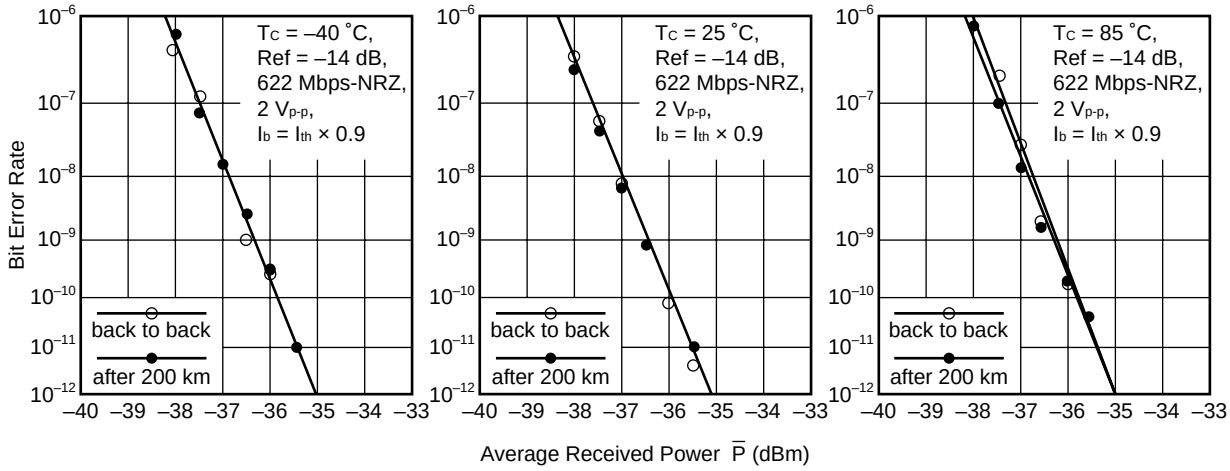
LONGITUDINAL MODE FROM FIBER



EYE DIAGRAM



ERROR RATE CHARACTERISTICS



★ DFB-LD FAMILY FOR TELECOM

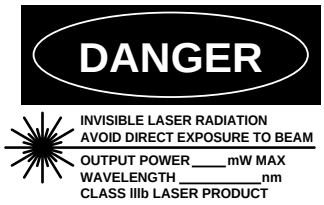
Part Number	Absolute Maximum Ratings		Typical Characteristics			SDH Application	Package
	T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_C (nm)		
			TYP.	MIN.	TYP.		
NDL7603P Series	–40 to +85	–40 to +85	15	2	1 310	≤ STM-4 : 622 Mb/s	Coaxial
NDL7620P Series	0 to +70	–40 to +85	45 (MAX.)	2	1 310	≤ STM-16: 2.5 Gb/s	Coaxial
NDL7701P Series	–20 to +85	–40 to +85	20	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
NDL7740PA	–20 to +65	–40 to +85	40	20 (TYP.)	1 550	≤ STM-16: 2.5 Gb/s CW Light Source for external modulator	BFY
NDL7910P	–20 to +65	–40 to +70	7	3 (TYP.)	1 550	≤ STM-16: 2.5 Gb/s EA modulator integrate DFB-LD	BFY

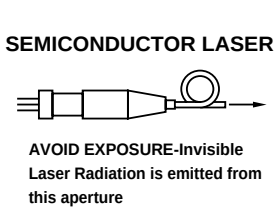
REFERENCE

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
Guide to quality assurance for semiconductor devices	MEI-1202
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.





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.

M4 96.5