

1 550 nm OPTICAL FIBER COMMUNICATIONS

InGaAsP STRAINED MQW DFB DC-PBH LASER DIODE MODULE

DESCRIPTION

The NDL7701P Series is a 1 550 nm phase-shifted DFB (Distributed Feed-Back) laser diode with single mode fiber. The strained Multiple Quantum Well (st-MQW) structure is adopted to achieve stable dynamic single longitudinal mode operation over wide temperature range of -20 to $+85$ °C.

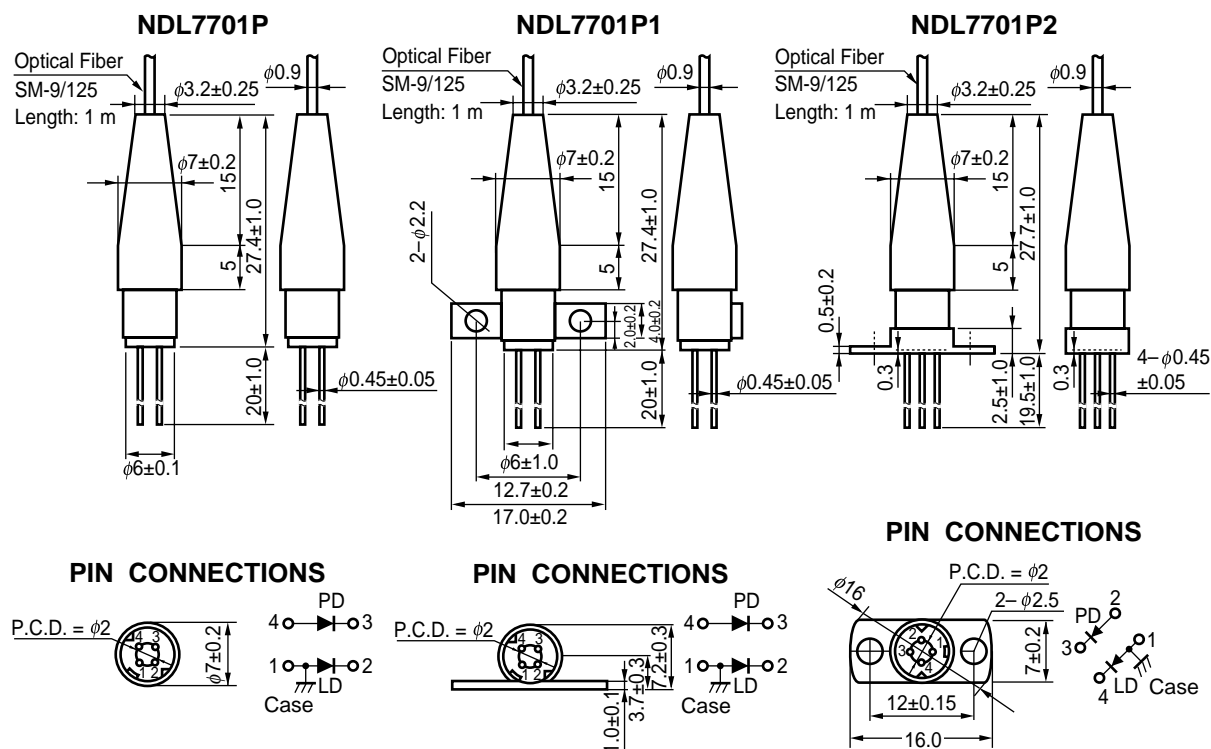
It is designed for all STM-1 and STM-4 applications.

FEATURES

- Peak emission wavelength $\lambda_p = 1\,550$ nm
- ★ • Low threshold current $I_{th} = 15$ mA @ $T_c = 25$ °C
- Wide operating temperature range $T_c = -20$ to $+85$ °C
- InGaAs monitor PIN-PD
- Based on Bellcore TA-NWT-000983

PACKAGE DIMENSIONS

in millimeters



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

ORDERING INFORMATION

| Part Number | Available Connector | Flange Type |
|-------------|----------------------|-------------------|
| NDL7701P | Without Connector | No Flange |
| NDL7701PC | With FC-PC Connector | |
| NDL7701PD | With SC-PC Connector | |
| NDL7701P1 | Without Connector | Flat Mount Flange |
| NDL7701P1C | With FC-PC Connector | |
| NDL7701P1D | With SC-PC Connector | |
| NDL7701P2 | Without Connector | Vertical Flange |
| NDL7701P2C | With FC-PC Connector | |
| NDL7701P2D | With SC-PC Connector | |

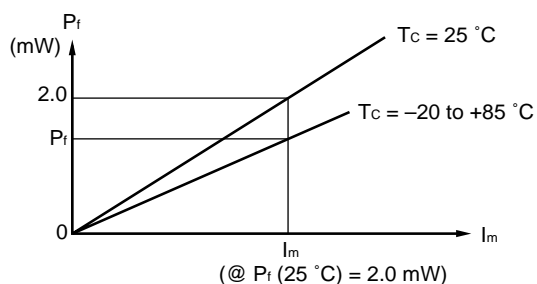
ABSOLUTE MAXIMUM RATINGS (T_c = –20 to +85 °C, unless otherwise specified)

| Parameter | Symbol | Ratings | Unit |
|-----------------------------------|------------------|------------|------|
| Optical Output Power from Fiber | P _f | 5.0 | mW |
| Forward Current of LD | I _F | 150 | 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 +85 | °C |
| Storage Temperature | T _{stg} | –40 to +85 | °C |
| Lead Soldering Temperature (10 s) | T _{sld} | 260 | °C |

ELECTRO-OPTICAL CHARACTERISTICS (T_c = –20 to +85 °C, unless otherwise specified)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--|-----------------|--|-------|-------|-------|------|
| Forward Voltage | V _F | P _f = 2.0 mW, T _c = 25 °C | | | 1.3 | V |
| Threshold Current | I _{th} | T _c = 25 °C | | 15 | 25 | mA |
| Differential Efficiency from Fiber | η _d | P _f = 2.0 mW, T _c = 25 °C | | 0.1 | | W/A |
| Peak Emission Wavelength | λ _p | P _f = 1.0 mW, PN 1/2, I _b = I _{th} , 622 Mb/s-NRZ | 1 530 | 1 550 | 1 570 | nm |
| Side Mode Suppression Ratio | SMSR | | 30 | | | dB |
| Temperature Dependence of Differential Efficiency from Fiber | Δη _d | Δη _d = 10 log $\frac{\eta_d (T_c = 85\text{ °C})}{\eta_d (T_c = 25\text{ °C})}$ | –3.0 | –2.5 | | dB |
| Rise Time | t _r | 10-90%, T _c = 25 °C | | | 0.5 | ns |
| Fall Time | t _f | 90-10%, T _c = 25 °C | | | 0.5 | ns |
| Monitor Current | I _m | V _R = 5 V, P _f = 2.0 mW | 100 | | | 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 |

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



★ 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 _r (mW) | λ _p (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 ^{*1} | CW Light Source for external modulator | BFY |
| NX8563LB Series | −20 to +65 | −40 to +85 | 20 | 10 | ITU-T ^{*2} | CW Light Source for external modulator | BFY |
| NDL7910P | −20 to +70 | −40 to +85 | 7 | 0.5 | 1 550 ^{*1} | ≤ 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

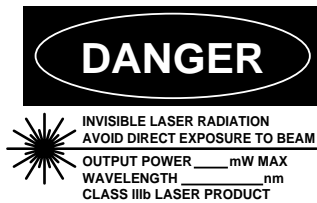
| Document Name | Document No. |
|---|--------------|
| NEC semiconductor device reliability/quality control system | C11159E |
| Quality grades on NEC semiconductor devices | C11531E |
| Semiconductor device mounting technology manual | C10535E |
| Semiconductor selection guide | X10679E |

[MEMO]

[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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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.

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Anti-radioactive design is not implemented in this product.