

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

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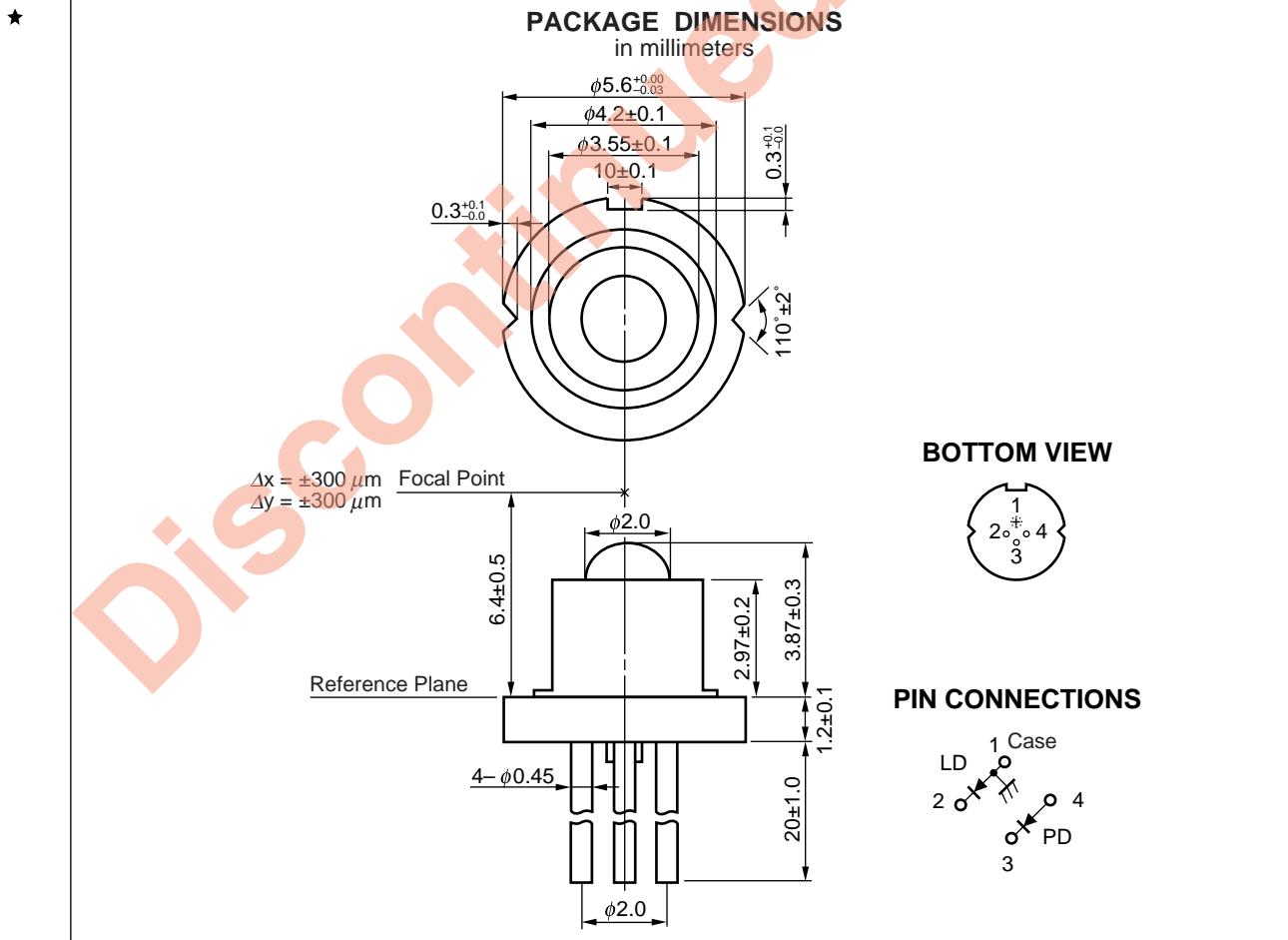
1 310 nm FIBER OPTIC COMMUNICATIONS
InGaAsP STRAINED MQW DC-PBH LASER DIODE WITH LENS

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 $P_o = 5.0$ mW
- High efficiency $\eta_d = 0.38$ W/A
- Low threshold current $I_{th} = 10$ mA
- High speed $t_r, t_f = 0.5$ ns MAX.
- Wide operating temperature range $T_c = -40$ to $+85$ °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_c = 25 °C, unless otherwise specified)

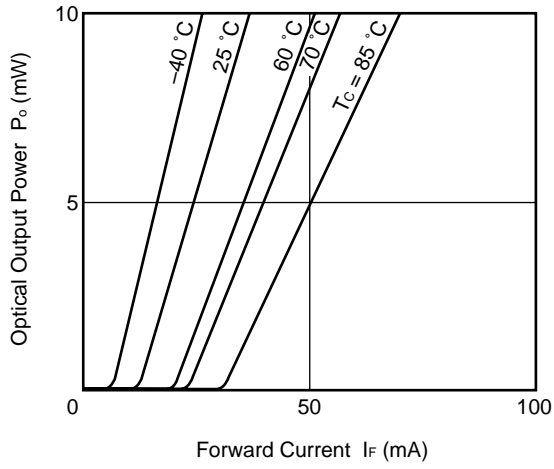
| Parameter | Symbol | Ratings | Unit |
|-----------------------------------|-------------------|-------------|------|
| Optical Output Power | P _o | 10 | mW |
| Reverse Voltage of LD | V _R | 2.0 | V |
| Forward Current of PD | I _F | 10 | mA |
| Reverse Voltage of PD | V _R | 20 | V |
| Operating Case Temperature | T _c | -40 to +85 | °C |
| Storage Temperature | T _{stg} | -55 to +125 | °C |
| Lead Soldering Temperature (10 s) | T _{slid} | 260 | °C |

ELECTRO-OPTICAL CHARACTERISTICS (T_c = 25 °C, unless otherwise specified)

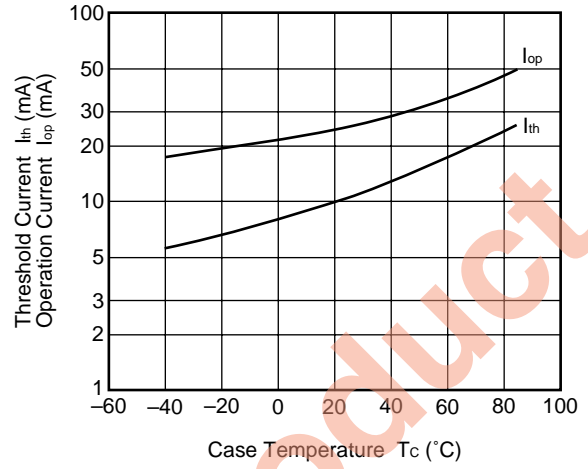
| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|------------------|--|-------|-------|-------|-------|
| Operating Voltage | V _{op} | P _o = 5.0 mW | | 1.1 | 1.3 | V |
| Threshold Current | I _{th} | | | 10 | 20 | mA |
| | | T _c = 85 °C | | 25 | 50 | |
| Modulation Current | I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

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

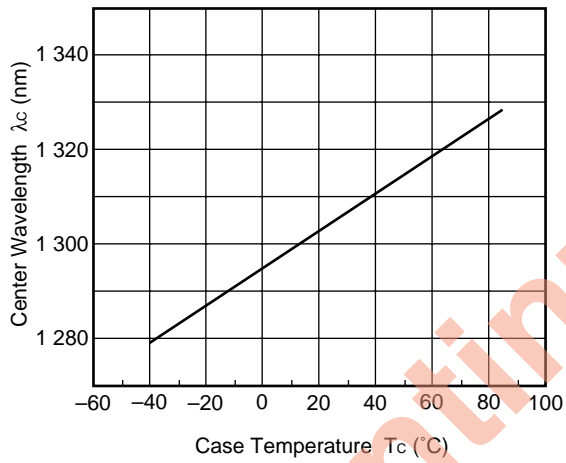
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



THRESHOLD CURRENT AND OPERATION CURRENT vs. CASE TEMPERATURE



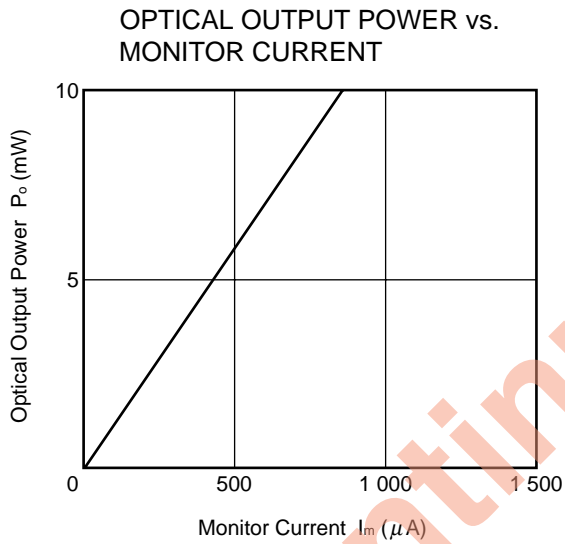
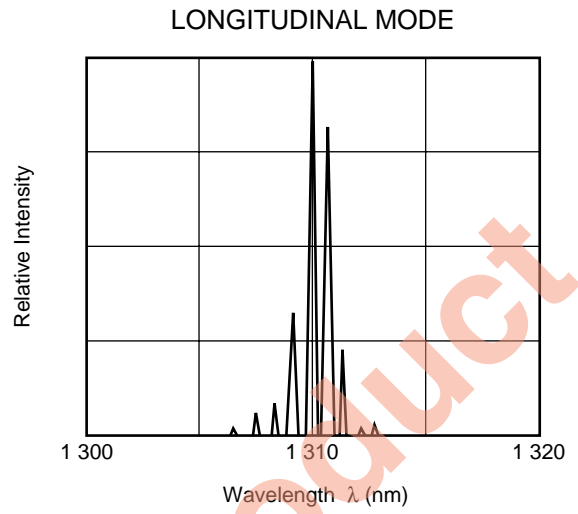
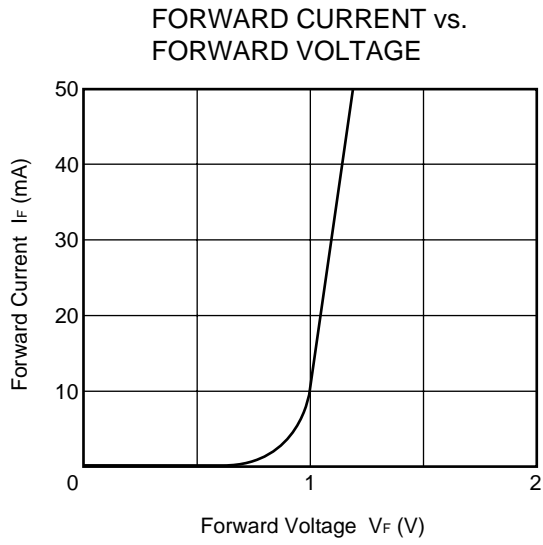
CENTER WAVELENGTH vs. CASE TEMPERATURE



Remark The graphs indicate nominal characteristics.

Discontinued Product

TYPICAL CHARACTERISTICS (T_c = 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 _c = 25 °C) | | | | | Package |
|------------------|--------------------------|------------------------|--------------------------|--|-------------------------|--|------------------------|--|---------|
| | I _F (mA) | T _c (°C) | T _{stg} (°C) | I _{th} (mA) | I _{op} (mA) | P _o /P _f (mW) | λ _c (nm) | t _r /t _f (ns) | |
| | | | | TYP. | TYP. | MIN. | TYP. | MAX. | |
| NDL7001 | — | -40 to +85 | -55 to +125 | 10 | I _{th} + 12 | 5.0 | 1 310 | 0.5/0.5 | CAN |
| NDL7001L | — | -40 to +85 | -55 to +125 | 10 | I _{th} + 15 | 5.0 | 1 310 | 0.5/0.5 | CAN |
| NDL7401P Series | I _{th} + 50 | -40 to +85 | -40 to +85 | 10 | I _{th} + 15 | 2.0 | 1 310 | 0.5/0.5 | Coaxial |
| NDL7408PL Series | I _{th} + 50 | -40 to +85 | -40 to +85 | 10 | I _{th} + 15 | 0.2 | 1 310 | 0.5/0.5 | Coaxial |
| NDL7408PK Series | I _{th} + 50 | -40 to +85 | -40 to +85 | 10 | I _{th} + 20 | 1.0 | 1 310 | 0.5/0.5 | Coaxial |

Discontinued Product

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 |

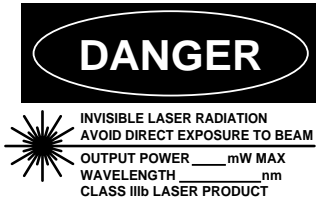
Discontinued Product

[MEMO]

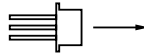
Discontinued Product

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.

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.