

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>)

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NDL7408P Series

1 310 nm InGaAsP STRAINED MQW DC-PBH LASER DIODE COAXIAL MODULE WITH SINGLE MODE FIBER

DESCRIPTION

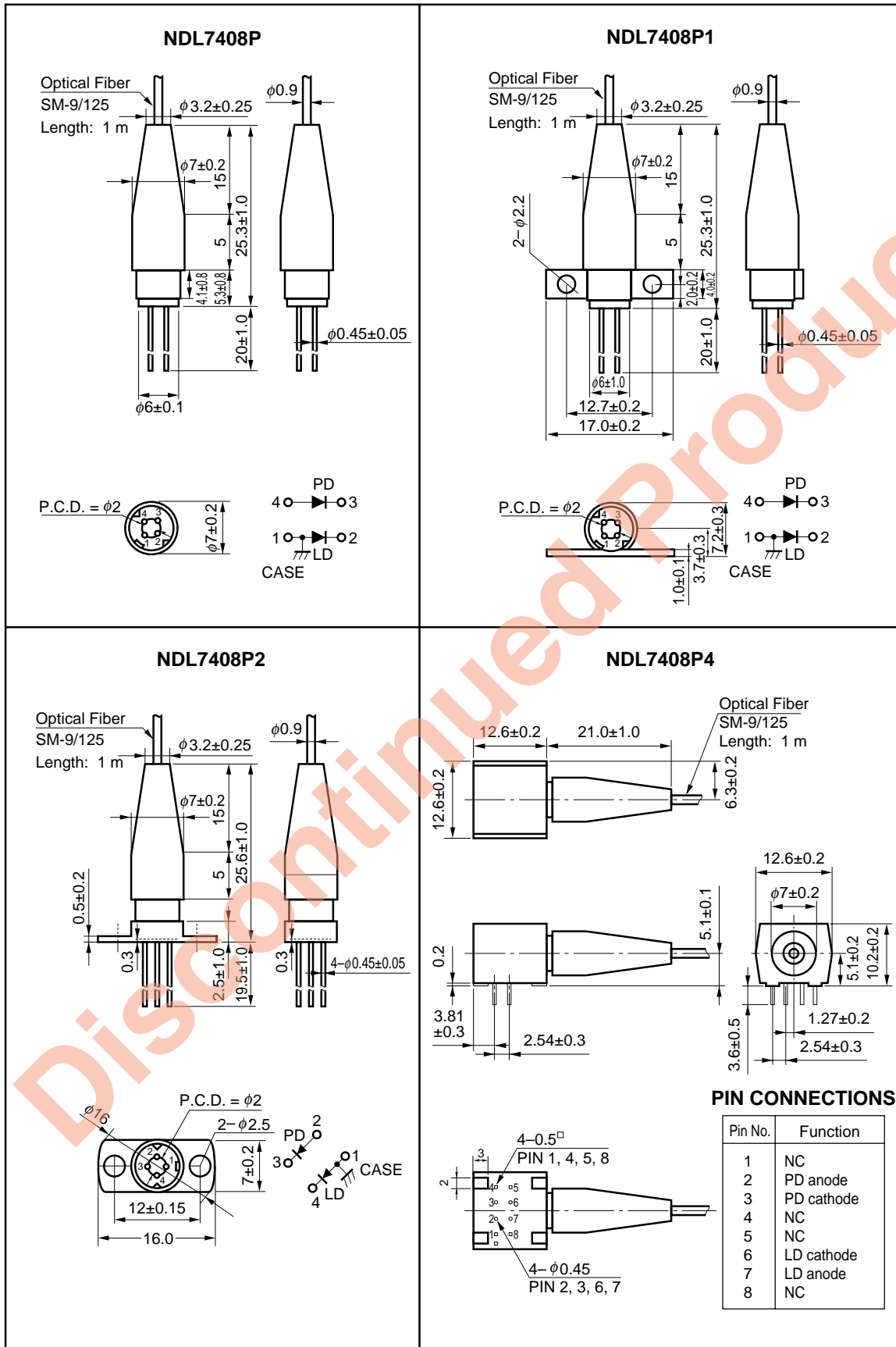
NDL7408P Series is a 1 310 nm laser diode coaxial module with single mode fiber. It has a strained Multiple Quantum Well (st-MQW) structure and a built-in InGaAs monitor photo diode. It is recommended for junction or access network systems. The series is available in two types of output power: 1.0 mW and 0.2 mW.

FEATURES

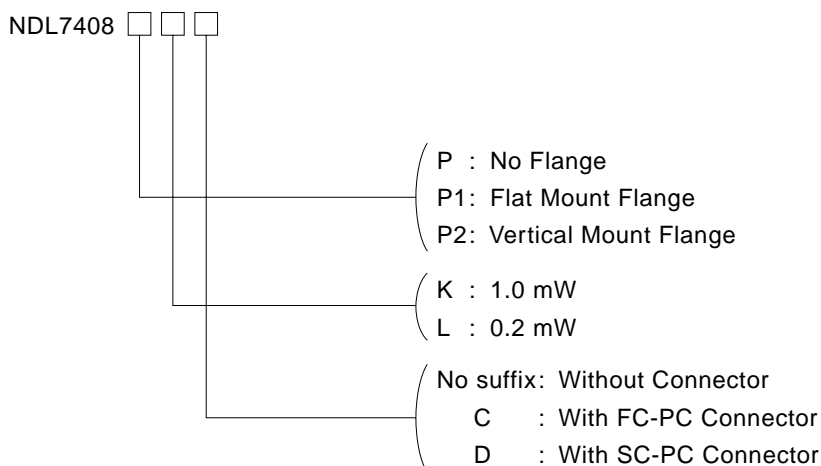
- Center wavelength $\lambda_c = 1\ 310\ \text{nm}$
- Two types of output power : 1.0 mW (NDL7408PK Series)
0.2 mW (NDL7408PL Series)
- Low threshold current $I_{th} = 12\ \text{mA TYP. @}T_c = 25\ ^\circ\text{C}$
- High cut-off frequency $f_c = 2.0\ \text{GHz}$
- InGaAs monitor PIN-PD
- Wide operating temperature range: $-40\ \text{to}\ +85\ ^\circ\text{C}$
- Based on Bellcore TA-NWT-000983

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

★ PACKAGE DIMENSIONS (in millimeters)



ORDERING INFORMATION



| Part Number | Ranks | Description | |
|-------------|-------|-------------------|----------------------|
| NDL7408PK | M | 1.0 mW | Without Connector |
| NDL7408PKC | | No Flange | With FC-PC Connector |
| NDL7408PKD | | | With SC-PC Connector |
| NDL7408P1K | M | 1.0 mW | Without Connector |
| NDL7408P1KC | | Flat Mount Flange | With FC-PC Connector |
| NDL7408P1KD | | | With SC-PC Connector |
| NDL7408P2K | M | 1.0 mW | Without Connector |
| NDL7408P2KC | | Vertical Flange | With FC-PC Connector |
| NDL7408P2KD | | | With SC-PC Connector |
| NDL7408P4K | M | 1.0 mW | Without Connector |
| NDL7408P4KC | | 8-pin DIP | With FC-PC Connector |
| NDL7408P4KD | | | With SC-PC Connector |
| NDL7408PL | N | 0.2 mW | Without Connector |
| NDL7408PLC | | No Flange | With FC-PC Connector |
| NDL7408PLD | | | With SC-PC Connector |
| NDL7408P1L | N | 0.2 mW | Without Connector |
| NDL7408P1LC | | Flat Mount Flange | With FC-PC Connector |
| NDL7408P1LD | | | With SC-PC Connector |
| NDL7408P2L | N | 0.2 mW | Without Connector |
| NDL7408P2LC | | Vertical Flange | With FC-PC Connector |
| NDL7408P2LD | | | With SC-PC Connector |
| NDL7408P4L | N | 0.2 mW | Without Connector |
| NDL7408P4LC | | 8-pin DIP | With FC-PC Connector |
| NDL7408P4LD | | | With SC-PC Connector |

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

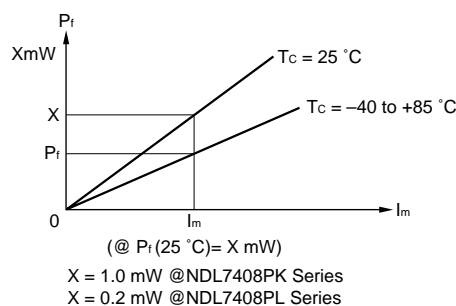
| Parameter | Symbol | Ratings | Unit |
|-----------------------------------|-------------------|----------------------|------|
| Forward Current of LD | I _F | I _{th} + 50 | mA |
| Reverse Voltage of LD | V _R | 2.0 | V |
| Forward Current of PD | I _F | 10 | mA |
| Reverse Voltage of PD | V _R | 20 | 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, unless otherwise specified)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|------------------|---|-------|-------|-------|-------|
| Operating Voltage | V _{op} | *1 | | 1.1 | 1.3 | V |
| Threshold Current | I _{th} | | | 10 | 25 | mA |
| | | T _c = +85 °C | | 25 | 50 | |
| Modulation Current | I _{mod} | P _f = 1.0 mW @NDL7408PK Series | | 15 | 30 | mA |
| | | P _f = 0.2 mW @NDL7408PL Series | | | | |
| Differential Efficiency from Fiber for NDL7408PK Series | η _d | | 0.025 | 0.050 | | W/A |
| | | T _c = +85 °C | 0.018 | 0.035 | | |
| Differential Efficiency from Fiber for NDL7408PL Series | η _d | | 0.010 | 0.015 | | |
| | | T _c = +85 °C | 0.005 | 0.010 | | |
| Center Emission Wavelength | λ _c | *1, RMS (-20 dB) | 1 290 | 1 310 | 1 330 | nm |
| | | T _c = -40 to +85 °C | 1 260 | | 1 360 | |
| Temperature Dependence of Center Emission Wavelength | Δλ/ΔT | T _c = -40 to +85 °C | | 0.4 | 0.5 | nm/°C |
| Spectral Width | σ | *1, RMS (-20 dB) | | 1.3 | 2.5 | nm |
| | | T _c = +85 °C | | 1.5 | 4 | |
| Cut-off Frequency | f _c | -3 dB | | 2.0 | | GHz |
| 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 of PD | I _m | V _{RD} = 5 V, *1 | 100 | 700 | | μA |
| Dark Current of PD | I _D | V _{RD} = 5 V | | 0.1 | 10 | nA |
| Tracking Error | γ ² | I _m = const., T _c = -40 to +85 °C | | 0.5 | 1.0 | dB |

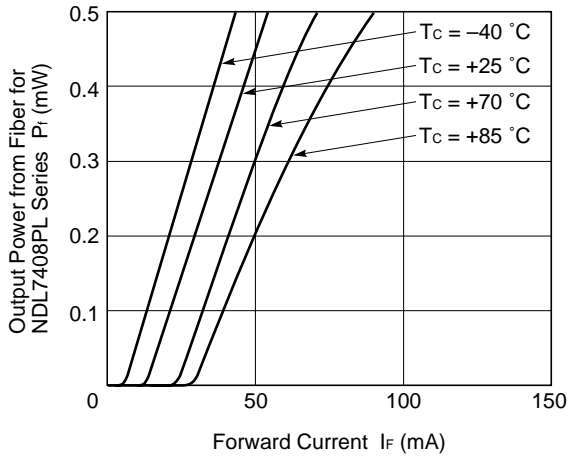
*1 P_f = 1.0 mW @NDL7408PK Series
 P_f = 0.2 mW @NDL7408PL Series

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

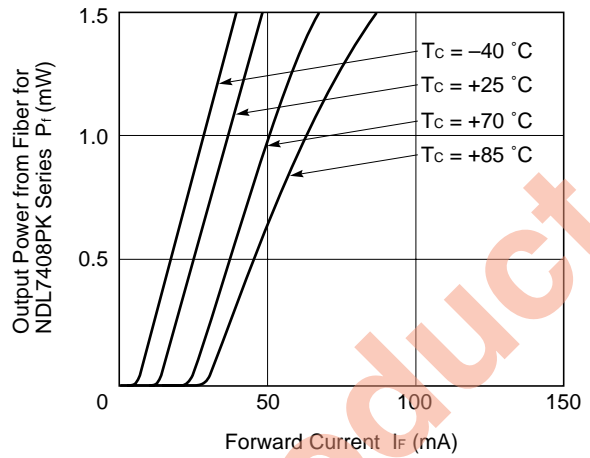


TYPICAL CHARACTERISTICS ($T_c = -40$ to $+85$ °C)

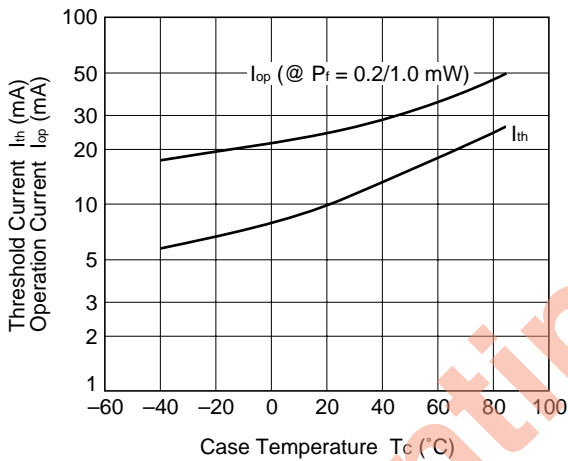
OUTPUT POWER FROM FIBER vs. FORWARD CURRENT FOR NDL7408PL SERIES



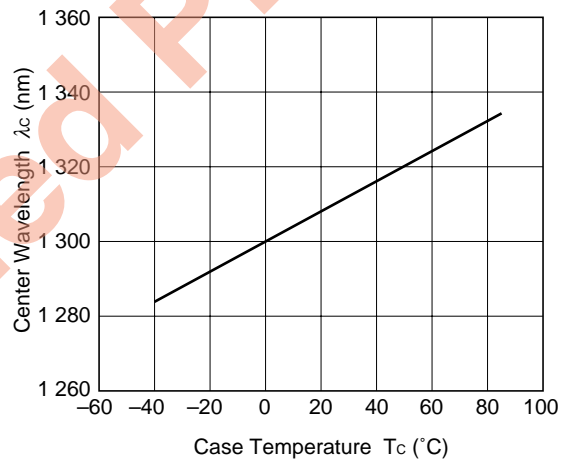
OUTPUT POWER FROM FIBER vs. FORWARD CURRENT FOR NDL7408PK SERIES



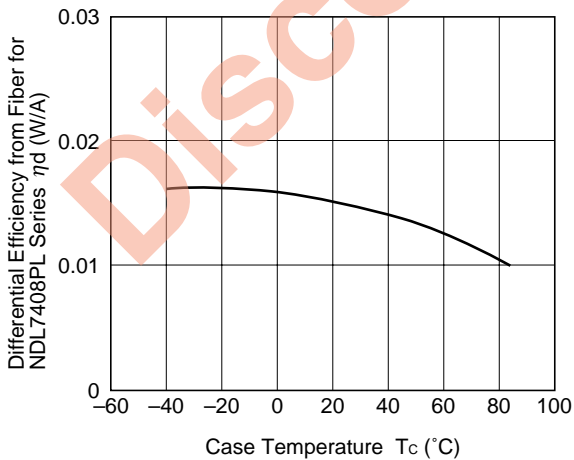
THRESHOLD CURRENT AND OPERATION CURRENT vs. CASE TEMPERATURE



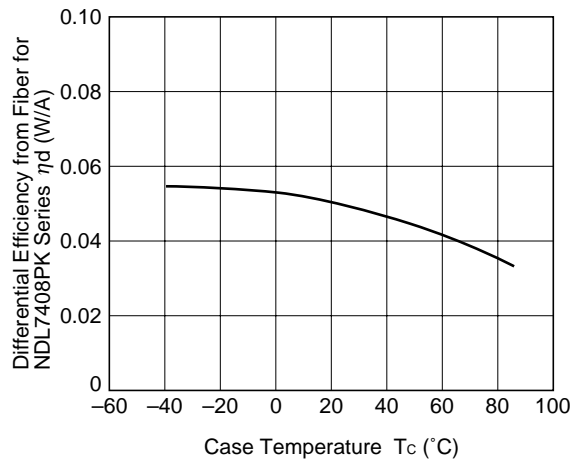
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH FOR NDL7408P SERIES



TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY FROM FIBER FOR NDL7408PL SERIES

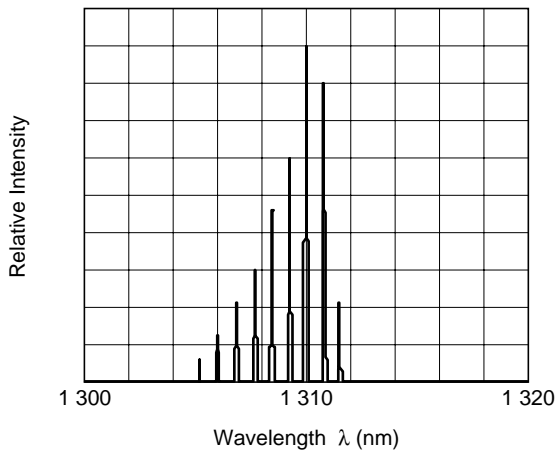


TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY FROM FIBER FOR NDL7408PK SERIES

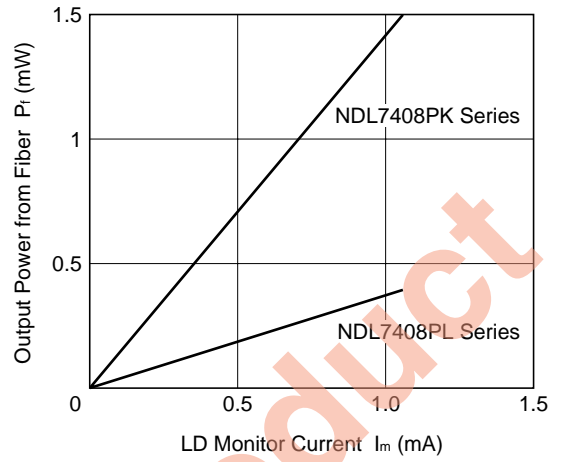


TYPICAL CHARACTERISTICS (T_c = 25 °C)

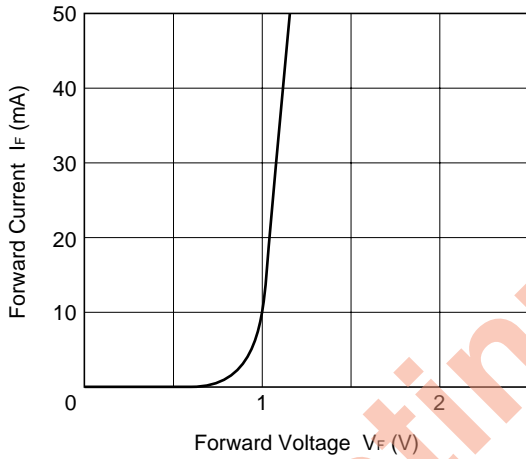
LONGITUDINAL MODE FROM FIBER FOR NDL7408P SERIES



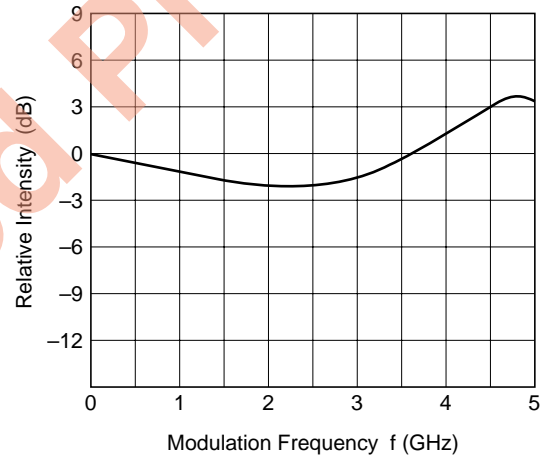
OUTPUT POWER FROM FIBER vs. LD MONITOR CURRENT



FORWARD CURRENT vs. FORWARD VOLTAGE FOR NDL7408P SERIES



FREQUENCY RESPONSE (P_f = 0.2 / 1.0 (mW))



Discontinued Product

1.3 μm FABRY-PEROT DC-PBH LASER DIODE FAMILY

| Package \ Features | Part Number | Remarks |
|-----------------------------------|------------------------------------|---|
| ϕ 5.6 mm Small Can | NDL7001 | With monitor photo diode |
| ϕ 5.6 mm Small Can with Lens | NDL7001L | With monitor photo diode |
| 4-pin Coaxial Module with SMF | NDL7401P Series NDL7408P Series | Without TEC With monitor photo diode |

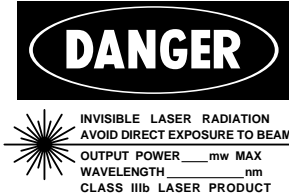
REFERENCE

| Document Name | Document No. |
|---|--------------|
| NEC semiconductor device reliability/quality control system | LEI-1201 |
| Quality grades on NEC semiconductor devices | IEI-1209 |
| Semiconductor device mounting technology manual | C10535E |
| Guide to quality assurance for semiconductor devices | MEI-1202 |
| Semiconductor selection guide | X10679E |

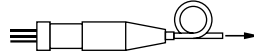
Discontinued Product

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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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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