

1 310 nm FOR 156 Mb/s, 622 Mb/s, 1.25 Gb/s, FTTH
InGaAsP MQW-FP LASER DIODE**DESCRIPTION**

The NX5321 Series is a 1 310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diode with InGaAs monitor PIN-PD. These devices are designed for application up to 1.25 Gb/s.

APPLICATIONS

- STM-1 (I-1, S-1.1), STM-4 (I-4, S-4.1), ITU-T recommendations
- FTTH P2P (Fiber To The Home Point to Point) system

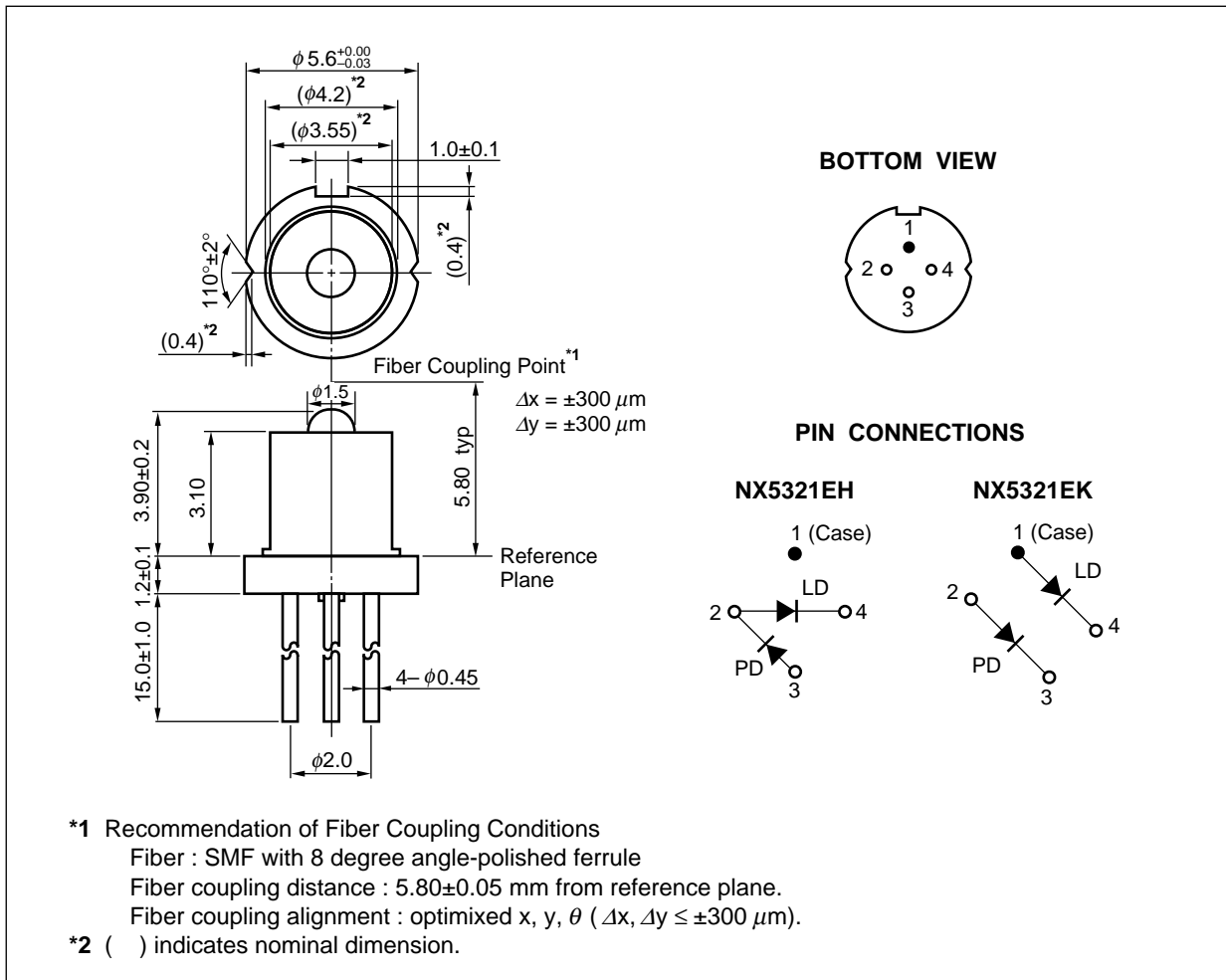
FEATURES

- Optical output power $P_o = 5.0 \text{ mW}$
- Low threshold current $I_{th} = 7 \text{ mA}$
- Differential efficiency $\eta_d = 0.3 \text{ W/A}$
- Wide operating temperature range $T_c = -40 \text{ to } +85^\circ\text{C}$
- InGaAs monitor PIN-PD
- CAN package $\phi 5.6 \text{ mm}$
- Fiber coupling point 5.8 mm

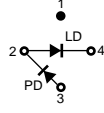
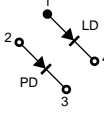


The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

PACKAGE DIMENSIONS (UNIT: mm)



ORDERING INFORMATION

| Part Number | Package | Pin Connections |
|-------------|------------------------------|---|
| NX5321EH-AZ | 4-pin CAN with ball lens cap |  |
| NX5321EK-AZ | |  |

- Remarks**
1. The color of ball lens cap might be observed differently.
 2. The hermetic test will be performed as AQL 1.0%.

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Ratings | Unit |
|-----------------------------------|-----------|--------------|------|
| Optical Output Power | P_o | 10 | 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 | -40 to +85 | °C |
| Storage Temperature | T_{stg} | -40 to +85 | °C |
| Lead Soldering Temperature | T_{sld} | 350 (3 sec.) | °C |
| Relative Humidity (noncondensing) | RH | 85 | % |

ELECTRO-OPTICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---------------------------------|-------------|---|-------|-------|-------|---------------|
| Operating Voltage | V_{op} | $P_o = 5.0 \text{ mW}$ | | 1.1 | 1.5 | V |
| Operating Current | I_{op} | $P_o = 5.0 \text{ mW}$ | 10 | 20 | 35 | mA |
| Threshold Current | I_{th} | | 3 | 7 | 15 | mA |
| Differential Efficiency | η_d | | 0.2 | 0.3 | 0.7 | W/A |
| Center Wavelength | λ_c | $P_o = 5.0 \text{ mW}$, RMS (-20 dB) | 1 290 | 1 310 | 1 330 | nm |
| Spectral Width | σ | $P_o = 5.0 \text{ mW}$, RMS (-20 dB) | | 1.0 | 2.0 | nm |
| Rise Time | t_r | 10-90% | | 0.15 | 0.3 | ns |
| Fall Time | t_f | 90-10% | | 0.15 | 0.3 | ns |
| Lateral Beam Angle | θ_l | $P_o = 5.0 \text{ mW}$ | | 11 | | deg. |
| Vertical Beam Angle | θ_v | $P_o = 5.0 \text{ mW}$ | | 11 | | deg. |
| Monitor Current | I_m | $V_R = 1.5 \text{ V}$, $P_o = 5.0 \text{ mW}$ | 100 | 500 | 900 | μA |
| Monitor Dark Current | I_D | $V_R = 10 \text{ V}$ | | | 100 | nA |
| Monitor PD Terminal Capacitance | C_t | $V_R = 10 \text{ V}$, $f = 1 \text{ MHz}$ | | | 20 | pF |
| Focal Distance | D_f | $P_o = 5.0 \text{ mW}$ | 5.0 | 5.8 | 6.2 | mm |
| Optical Output Power from Fiber | P_f | $P_o = 5.0 \text{ mW}$, 8 degree angled fiber, Optimized x, y, θ . z = 5.80±0.05 mm | 400 | 800 | | μW |

REFERENCE

| Document Name | Document No. |
|-----------------------------------|--------------|
| Opto-Electronics Devices Pamphlet | PX10160E |

- **The information in this document is current as of December, 2008. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**

- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.
- NEC Electronics does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC Electronics products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Electronics or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality, reliability and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC Electronics products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

"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).

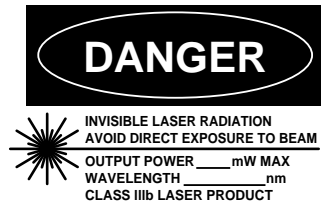
"Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

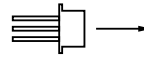
(Note)

- (1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.
- (2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).

SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible
Laser Radiation is emitted from
this aperture

| | |
|-------------------------------------|---|
| <p>Warning Laser Beam</p> | <p>A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight.</p> <ul style="list-style-type: none"> • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam. |
| <p>Caution GaAs Products</p> | <p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. <ol style="list-style-type: none"> 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth. |