

NX5313 Series

1 310 nm FOR FTTH PON APPLICATION InGaAsP MQW-FP LASER DIODE

DESCRIPTION

The NX5313 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.

APPLICATION

- FTTH PON (B-PON, G-PON, GE-PON 10 km) system

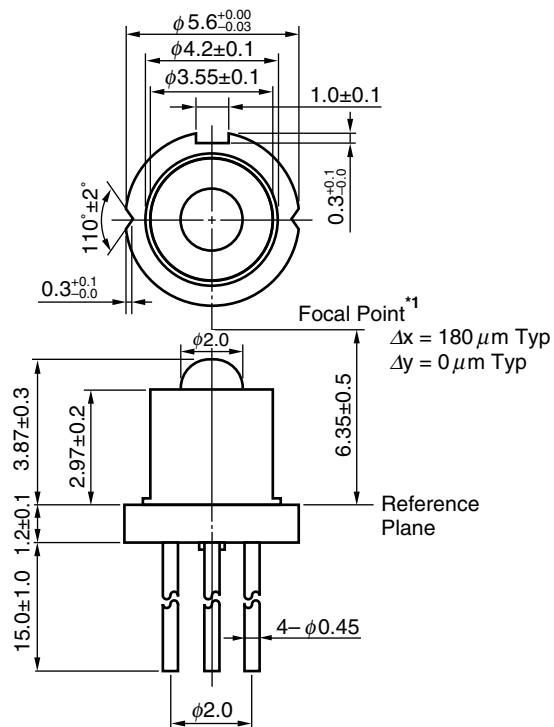
FEATURES

- Optical output power $P_o = 13.0 \text{ mW}$
- Low threshold current $I_{th} = 6 \text{ mA}$
- Differential Efficiency $\eta_d = 0.5 \text{ W/A}$
- Wide operating temperature range $T_c = -40 \text{ to } +85^\circ\text{C}$
- InGaAs monitor PIN-PD
- CAN package $\phi 5.6 \text{ mm}$
- Focal point 6.35 mm
- LD beam angle optimized for 8 degree angled SMF

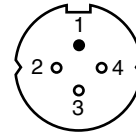


The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PACKAGE DIMENSIONS (UNIT: mm)

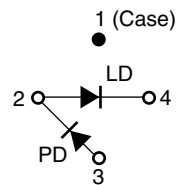


BOTTOM VIEW

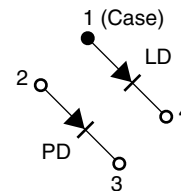


PIN CONNECTIONS

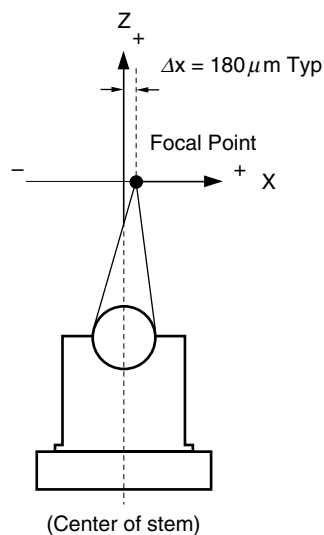
NX5313EH



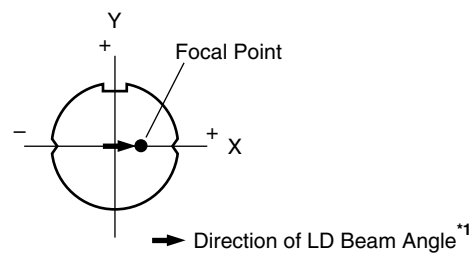
NX5313EK



*1 Focal Point: A point to get maximum optical output power from fiber.



TOP VIEW



*1 LD Beam angle is optimized for coupling with 8 degree angled SMF.

ORDERING INFORMATION

| Part Number | Package | Pin Connections |
|-------------|------------------------------|-----------------|
| NX5313EH | 4-pin CAN with ball lens cap | |
| NX5313EK | | |

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

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Ratings | Unit |
|-----------------------------------|-----------|--------------|------|
| Optical Output Power | P_o | 20 | 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 |
| Assembly Temperature | T_{asb} | 150 (15 Hr) | °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} | $P_o = 13.0 \text{ mW}$ | | 1.1 | 1.5 | V |
| Threshold Current | I_{th} | | | 6 | 15 | mA |
| Differential Efficiency | η_d | | 0.40 | 0.50 | | W/A |
| Center Wavelength | λ_C | $P_o = 13.0 \text{ mW, RMS } (-20 \text{ dB})$ $T_C = -40 \text{ to } +85^{\circ}\text{C}$ | 1 276 | 1 310 | 1 352 | nm |
| Spectral Width | σ | $P_o = 13.0 \text{ mW, RMS } (-20 \text{ dB})$ $T_C = -40 \text{ to } +85^{\circ}\text{C}$ | | 1.5 | 2.8 | nm |
| Rise Time | t_r | 10-90% | | 0.15 | 0.3 | ns |
| Fall Time | t_f | 90-10% | | 0.15 | 0.3 | ns |
| Monitor Current | I_m | $V_R = 1.5 \text{ V, } P_o = 13.0 \text{ mW}$ | 50 | 100 | | μA |
| Monitor Dark Current | I_D | $V_R = 10 \text{ V}$ | | | 100 | nA |
| Monitor PD Terminal Capacitance | C_t | $V_R = 10 \text{ V, } f = 1 \text{ MHz}$ | | 5 | 20 | pF |
| Fiber Coupling Power | P_f | $P_o = 13.0 \text{ mW, Optimized Coupling with } 8 \text{ degree angled SMF}$ | | 2.6 | | mW |
| Focal Distance | D_f | | 5.85 | 6.35 | 6.85 | mm |

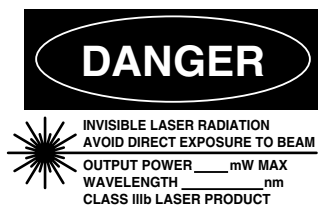
REFERENCE

| Document Name | Document No. |
|---|--------------|
| OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE | PL10161E |
| Opto-Electronics Devices Pamphlet | PX10160E |

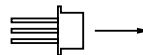
- **The information in this document is current as of August, 2004. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC 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 prior written consent of NEC. NEC assumes no responsibility for any errors that may appear in this document.
- NEC 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 semiconductor 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 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 customer's equipment shall be done under the full responsibility of customer. NEC assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC endeavours to enhance the quality, reliability and safety of NEC semiconductor 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 semiconductor products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment, and anti-failure features.
- NEC semiconductor products are classified into the following three quality grades:
 "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor 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 semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
 (Note)
 (1) "NEC" as used in this statement means NEC Corporation, NEC Compound Semiconductor Devices, Ltd. and also includes its majority-owned subsidiaries.
 (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible
Laser Radiation is emitted from
this aperture

| | |
|--|---|
| <div data-bbox="177 539 296 584" data-label="Section-Header">Warning</div> <div data-bbox="312 546 432 571" data-label="Text">Laser Beam</div> | <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. |
| <div data-bbox="177 705 296 750" data-label="Section-Header">Caution</div> <div data-bbox="312 712 443 736" data-label="Text">GaAs Products</div> | <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. |

► For further information, please contact

NEC Compound Semiconductor Devices, Ltd. <http://www.ncsd.necel.com/>

E-mail: salesinfo@ml.ncsd.necel.com (sales and general)

techinfo@ml.ncsd.necel.com (technical)

Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579

NEC Compound Semiconductor Devices Hong Kong Limited

E-mail: ncsd-hk@elhk.nec.com.hk (sales, technical and general)

Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309

Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859

Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH <http://www.ee.nec.de/>

TEL: +49-211-6503-0 FAX: +49-211-6503-1327

California Eastern Laboratories, Inc. <http://www.cel.com/>

TEL: +1-408-988-3500 FAX: +1-408-988-0279