NX8349TS, NX8349YK, NX8349XK

LASER DIODE

1 310 nm AlGaInAs MQW-DFB LASER DIODE FOR 10 Gb/s APPLICATION

DESCRIPTION

The NX8349TS, NX8349YK, NX8349XK are 1 310 nm Multiple Quantum Wells (MQW) structured Distributed Feed-Back (DFB) laser diode TOSA (transmitter optical subassembly) with InGaAs monitor PIN-PD in a receptacle type package designed for SFP+/XFP transceiver.

FEATURES

- Internal optical isolator
- Optical output power $P_I = -3$ dBm
- Low threshold current $I_{th} = 8$ mA TYP. @ $T_C = 25^\circ$C
- Wide operating temperature range $T_C = -5$ to $+95^\circ$C
- InGaAs monitor PIN-PD

APPLICATIONS

- 10 G BASE-LW/LR
- 10 G Fibre Channel
Remarks

1. Receptacle is electrically isolated from CAN.
2. Characteristic impedance of flexible printed circuit is $25 \, \Omega$.
3. NX8349TS has no matching resistor installed.
4. ( ) indicates nominal dimension.
Remarks
1. Receptacle is electrically isolated from CAN.
2. Characteristic impedance of flexible printed circuit is 25 Ω.
3. NX8349YK has no matching resistor installed.
4. ( ) indicates nominal dimension.
Remarks
1. Receptacle is electrically isolated from CAN.
2. NX8349XK has no matching resistor installed.
3. ( ) indicates nominal dimension.
## ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Receptacle Type</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX8349TS</td>
<td>LC, Electrically isolated, type 1</td>
<td>Differential input with short length flexible PCB,</td>
</tr>
<tr>
<td>NX8349YK</td>
<td>LC, Electrically isolated, type 2</td>
<td>without matching resistor</td>
</tr>
<tr>
<td>NX8349XK</td>
<td>LC, Electrically isolated, type 2</td>
<td>Differential input without flexible PCB, without matching resistor</td>
</tr>
</tbody>
</table>
### ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>−40 to +95°C</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Case Temperature</td>
<td>$T_C$</td>
<td>−5 to +95°C</td>
<td>°C</td>
</tr>
<tr>
<td>Forward Current of LD</td>
<td>$I_{FLD}$</td>
<td>120 mA</td>
<td></td>
</tr>
<tr>
<td>Reverse Voltage of LD</td>
<td>$V_{RLD}$</td>
<td>2 V</td>
<td></td>
</tr>
<tr>
<td>Forward Current of PD</td>
<td>$I_{FPD}$</td>
<td>10 mA</td>
<td></td>
</tr>
<tr>
<td>Reverse Voltage of PD</td>
<td>$V_{RPD}$</td>
<td>15 V</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature (Flexible Printed Circuit)</td>
<td>$T_{Sld}$</td>
<td>350 (10 sec.)</td>
<td>°C</td>
</tr>
<tr>
<td>Optical Output Power</td>
<td>$P_{f}$</td>
<td>5 mW</td>
<td></td>
</tr>
</tbody>
</table>
### ELECTRO-OPTICAL CHARACTERISTICS (Tc = −5 to +95°C, BOL, unless otherwise specified)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>MIN.</th>
<th>TYP</th>
<th>MAX.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Optical Output Power</td>
<td>P_f</td>
<td>CW, P_f = −3 dBm</td>
<td>−3 dBm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Emission Wavelength</td>
<td>λ_p</td>
<td>CW, P_f = −3 dBm, 20 dB down</td>
<td>1290 nm</td>
<td>1 330 nm</td>
<td>1 nm</td>
<td></td>
</tr>
<tr>
<td>Spectral Width</td>
<td>Δλ</td>
<td>CW, P_f = −3 dBm</td>
<td>35 dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side Mode Suppression Ratio</td>
<td>SMSR</td>
<td>CW, P_f = −3 dBm</td>
<td>2 40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshold Current</td>
<td>I_th</td>
<td>CW, T_C = 25°C</td>
<td>8 mA</td>
<td>15 mA</td>
<td>30 mA</td>
<td>mA</td>
</tr>
<tr>
<td>Differential Efficiency</td>
<td>η_d</td>
<td>CW, P_f = −3 dBm, T_C = 25°C</td>
<td>0.020</td>
<td>0.033</td>
<td>0.040</td>
<td>W/A</td>
</tr>
<tr>
<td>Temperature Dependence of Differential Efficiency</td>
<td>Δη_d</td>
<td>CW, P_f = −3 dBm</td>
<td>−3.5 dB</td>
<td>1.5 dB</td>
<td>0.060</td>
<td>dB</td>
</tr>
<tr>
<td>Operation Voltage</td>
<td>V_op</td>
<td>CW, P_f = −3 dBm</td>
<td>0.5 V</td>
<td>2.2 V</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Monitor Current</td>
<td>I_m</td>
<td>CW, P_f = −3 dBm</td>
<td>70 μA</td>
<td>700 μA</td>
<td>500</td>
<td>μA</td>
</tr>
<tr>
<td>Monitor Dark Current</td>
<td>I_D</td>
<td>V_R = 3.3 V, T_C = 25°C</td>
<td>10 nA</td>
<td></td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Rise Time</td>
<td>t_r</td>
<td>20-80%</td>
<td>50 ps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Time</td>
<td>t_f</td>
<td>20-80%</td>
<td>50 ps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor PD Terminal Capacitance</td>
<td>C_t</td>
<td>V_R = 3.3 V, f = 1 MHz</td>
<td>6 pF</td>
<td>20 pF</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Relative Intensity Noise</td>
<td>RIN</td>
<td></td>
<td>−128 dB/Hz</td>
<td>1.0 dB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
- *1. 9.95/10.3/10.5 Gb/s, PRBS 2\(^{31}\) − 1, NRZ, Duty Cycle = 50%
- *2. Tracking Error: γ

\[
\gamma = 10 \log \left( \frac{P_f}{P_f @ 25°C} \right) \quad [\text{dB}]
\]
## REFERENCE

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document No.</th>
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<tbody>
<tr>
<td>Opto-Electronics Devices Pamphlet*1</td>
<td>PX10160E</td>
</tr>
</tbody>
</table>

Notes: *1. Published by the former NEC Electronics Corporation.
## SAFETY INFORMATION ON THIS PRODUCT

**Danger**

**INVISIBLE LASER RADIATION**

**AVOID DIRECT EXPOSURE TO BEAM**

**OUTPUT POWER** mW MAX

**WAVELENGTH** nm

**CLASS IIIb LASER PRODUCT**

**Avoid Exposure**

Invisible Laser Radiation is emitted from this aperture.

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### Warning: Laser Beam

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.
  - Do not look directly into the laser beam.
  - Avoid exposure to the laser beam, any reflected or collimated beam.

### Caution: GaAs Products

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.
  1. 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.
     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.

### Caution: Optical Fiber

A glass-fiber is attached on the product. Handle with care.

- When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.
## Revision History

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Page</th>
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<tr>
<td>1.00</td>
<td>Jul 26, 2010</td>
<td>–</td>
<td>First edition issued</td>
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